PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2023/1446

Date: 19 March 2025

Queensland Government

NORTHROP



CIVIL ENGINEERING REPORT: SITE BASED STORMWATER MANAGEMENT PLAN

Lot 101 Flagstone Estate

4499 – 4651 Mount Lindesay Highway North Maclean

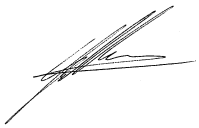
PREPARED FOR
CH Hydrangea Pty Ltd

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Rev: C
Date: 19.02.25

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Glossary

Term	Definition
ADP	Area Development Plan
AEP	Annual Exceedance Probability
ARI	Average Recurrence Interval
ESR	Engineering Services Report
EY	Exceedances per year
IECA	International Erosion Control Association
kL	Kilolitres
MCU	Material Change of Use
ML	Megalitres
MUSIC	Model for Urban Stormwater Improvement Conceptualisation
QUDM	Queensland Urban Drainage Manual
ROL	Reconfiguring of a Lot
SBSMP	Site Based Stormwater Management Plan
SPP	State Planning Policy
SQID	Stormwater Quality Improvement Device
WQO	Water Quality Object
WSUD	Water Sensitive Urban Design

Executive Summary

This Site Based Stormwater Management Plan (SBSMP) has been prepared on behalf of CH Hydrangea Pty Ltd (Applicant) in support of a development application over land at 4499-4651 Mount Lindesay Highway, North Maclean QLD 4280 and described as Lot 39 on SP258739 (site). This PDA Development Application seeks approval for the following aspects of development:

- Development Permit for a Material Change of Use for Warehouse (Distribution Centre).
- In support of Reconfiguration of Lot – 1 into 8, plus access easements.

The material change of use aspect of the proposed development seeks approval for a warehouse (distribution centre) to enable the construction of one of the first buildings within the Flagstone Logistics Estate. The proposed warehouse will be located on Proposed Lot 101 and is intended to service as a distribution centre for the tenant, for the receival, warehousing, storing and distribution of products.

It is noted that the infrastructure referred to as existing in this report, is the estate infrastructure that is currently under construction. It is anticipated that this construction will be underway concurrently with the proposed Lot 101 development is commenced.

This SBSMP addresses the stormwater management strategy for the proposed development and demonstrates that the proposed development can be constructed and operated in accordance with all stormwater objectives required for the development. The primary outcomes of this SBSMP are as follows:

Lawful Point of Discharge

As outlined in the Arcadis SBSMP EAG001-30109334-AAR Revision 12 and Approved as part of the EDQ approval DEV2018/961/12. The subject site has two lawful points of discharge:

- Minor flows from the development are to discharge to the conveyance channel located along the eastern site boundary (Lot 901).
- Major flows from the development are to discharge to the Enterprise Drive road reserve to the north of the subject site

most of the site flows will be captured for stormwater quantity and quality treatment prior to discharge from the site. A small portion of the development will bypass the private stormwater treatment and discharge towards the lot 901 drainage channel to the east; however, the combined site runoff achieves all stormwater quantity and quality objectives.

Stormwater Quantity

The stormwater quantity objective was to demonstrate non-worsening in peak discharges from the subject site flows outlined in the Arcadis SBSMP EAG001-30109334-AAR Revision 12 and Approved as part of the EDQ approval DEV2018/961/12.

To achieve non-worsening, the proposed development requires a total detention volume of approximately 2190m^3 which has been achieved via an underground detention tank, located on the northern boundary beneath the heavy-duty pavement.

Stormwater Quality

Stormwater quality infrastructure has been included in the design to achieve the water quality objectives for Southeast Queensland specified in the State Planning Policy 2017, namely, the removal of gross pollutants, suspended solids, nitrogen and phosphorus. The proposed treatment train was modelled using MUSIC modelling software and includes the following SQID's:

- 21x Ocean Protect OceanGuard 200 micron filter baskets to all stormwater inlet pits
- 42x Ocean Protect Stormfilter 690 Psorb Cartridges

Erosion and Sediment Control

Construction phase ESCP measures are to be implemented during construction in accordance with the relevant requirements.

1. Introduction

This Site Based Stormwater Management Plan (SBSMP) has been prepared on behalf of CH Hydrangea Pty Ltd (Applicant) in support of a development application over land at 4499-4651 Mount Lindesay Highway, North Maclean QLD 4280 and described as Lot 39 on SP258739 (site). This PDA Development Application seeks approval for the following aspects of development:

- Development Permit for a Material Change of Use for Warehouse (Distribution Centre).
- In support of Reconfiguration of Lot – 1 into 8, plus access easements.

The material change of use aspect of the proposed development seeks approval for a warehouse (distribution centre) to enable the construction of one of the first buildings within the Flagstone Logistics Estate. The proposed warehouse will be located on Proposed Lot 101 and is intended to service as a distribution centre for the tenant, for the receival, warehousing, storing and distribution of products

Table 1-1 - Property Details

Category	Description
Site Address	4499 – 4651 Mount Lindesay Highway North Maclean
Lot Title	Proposed Lot 101 Flagstone Estate
Total Site Area	29,385m^2
Proposed Land Use	Warehouse

This primary objectives of this SBSMP are to define the following:

- Lawful point of discharge
- Stormwater Conveyance and Flood Management
- Stormwater Quantity management strategy
- Stormwater Quality management strategy
- Erosion and Sediment Control strategy.

1.1. Related Reports and Documents

This report is to be read in conjunction with the following reference documents:

- Arcadis SBSMP EAG001-30109334-AAR Revision 12
- PDA Development Approval DEV2018/961/12
- Civil Design Drawings by Northrop. Appendix A

2. Site Context and Existing Characteristics

The subject site was created as part of the greater Flagstone Priority Development Area (PDA) and as described in the RoL Approval DEV2018/961/12. The subject site is located within Stage 1 of the development and aims to provide a new industrial warehouse with circulation roadway and associated carparking. The stormwater management strategy for the development has been designed to satisfy the quantity and quality requirements as outlined in the Arcadis SBSMP EAG001-30109334-AAR Revision 12.

The subject site falls within the INTNL-2CE1 catchment and is not catered for by the estate's stormwater quantity or quality management devices. The subject site is required to provide on lot stormwater quality and quantity treatment.

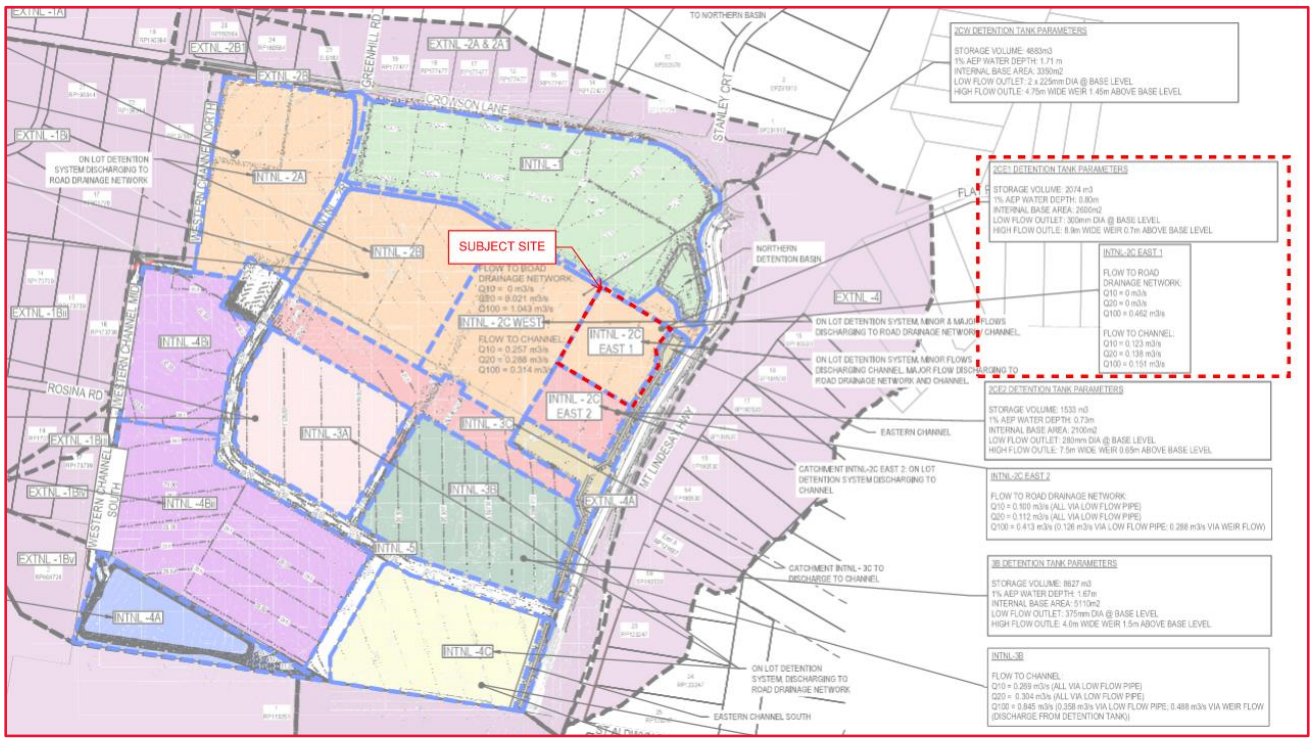


Figure 2-1 - Site Management Strategy (Extract from Arcadis SBSMP EAG001-30109334-AAR)

2.1. Existing Site Characteristics

The subject site was created as part of the greater Flagstone Priority Development Area (PDA) and as described as Lot 39 in RoL Approval DEV2018/961/12. The site is currently cleared and undeveloped, comprising primarily of exposed soils. The site generally falls east towards the existing drainage channel (Lot 901) at approximately 0.5% grade. The subject site is located within stage 1 of the development and is located within the Industrial and Warehouse Precinct of the endorsed greater flagstone context plan.

The site is currently bound by:

- Enterprise Drive to the north
- Existing drainage channel to the east (Lot 901)
- Industrial development to the south
- Industrial development to the west

A site locality is located above in Figure 2-1.

2.2. Existing Lawful Point of Discharge

The following existing stormwater infrastructure has been identified in the vicinity of the site. The information has been sourced from the Arcadis Detailed Design documentation and the SBSMP EAG001-30109334-AAR Revision 12.

- Minor flows from the development are to discharge to the conveyance channel located along the eastern site boundary (Lot 901).
- Major flows from the development are to discharge to the Enterprise Drive road reserve to the north of the subject site

3. Proposed Development

The proposed development involves the construction of a warehouse (distribution centre) on Proposed Lot 101 in support of the Reconfiguration of Lot – 1 into 8 Lots, plus access easements. The proposed architectural layout of the development prepared by Watson Young is shown below in Figure 3-1. Architectural drawings are included in Appendix C.

The material change of use of the proposed development seeks approval for a warehouse (distribution centre) to enable to the construction of one of the first buildings within the Flagstone Logistics Estate.

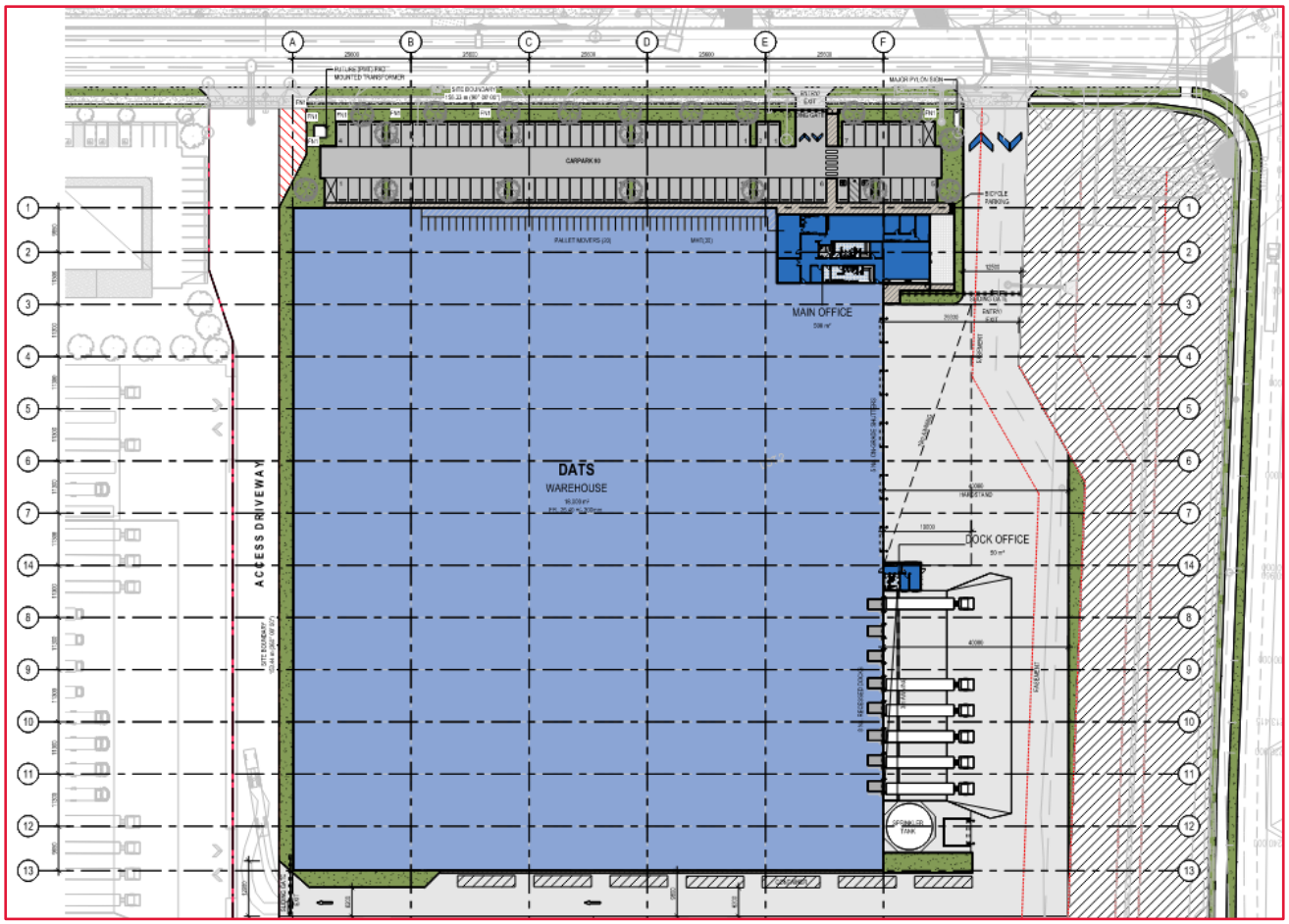


Figure 3-1 - Proposed Development (Watson Young)

3.1. Proposed Stormwater Management Strategy

The proposed development will introduce a new internal pit and pipe system and connect into the existing lawful point of discharge defined in Section 2.1.

Runoff generated from the site will be captured and conveyed through the proposed stormwater quantity and quality control devices. A small portion of the site will bypass the tank and discharge towards the existing conveyance channel (Lot 901), similar to the existing conditions. The site will discharge minor flows to the conveyance channel located at the eastern boundary of the site (Lot 901) and major flows to the road reserve to the north. A small portion of the development will bypass the private stormwater treatment and discharge towards the drainage channel to the east (Lot 901); however, the combined site runoff achieves all stormwater quantity and quality objectives.

4. Stormwater Management Objectives

4.1. Development Control Plan Objectives

Stormwater management for the proposed development has been designed in accordance with the following documents:

- EDQ Guideline – PDA Guideline No. 13 Engineering Standards, Stormwater Quantity and Quality
- State Planning Policy (SPP), 2017
- Environmental Protection (Water) Policy, 2009)
- Queensland Urban Drainage Manual (QUDM) Fourth Edition, 2016
- Water By Design MUSIC Modelling Guidelines, Version 3.0, 2018
- Water by Design - Construction and Establishment Guidelines: Swales, Bioretention Systems and Wetlands V1.1, 2010
- Plumbing and Drainage Code AS3500.3
- Australian Rainfall and Runoff Guideline (ARR)
- International Erosion Control Association – Best Practise Erosion and Sediment Control, 2008

The stormwater management objectives for the development are summarised below:

- Development should not result in water being diverted onto land that is not normally subject to overland flow
- Define a lawful point of discharge that will not cause an actionable nuisance in accordance with QUDM
- Ensure that the development does not create adverse flood impacts to upstream or adjacent properties
- No increase in post development flows for all rainfall events up to and including 100-year event
- Stormwater quality to achieve the minimum design requirements of the State Planning Policy (2017) and achieve water quality objectives in accordance with Environmental Protection (Water) Policy (2009), as follows in Table 4-1 below.

Table 4-1 - Water Quality Objectives

Pollutant	Percent Reduction
Gross Pollutants (>5mm), GP	90%
Total Suspended Solids, TSS	80%
Total Phosphorous, TP	60%
Total Nitrogen, TN	45%

5. Flooding

The estate Site Based Stormwater Management Plan (Quantity) by Arcadis (EAG001-30109334-AAR Revision 12) discusses the flood risk associated with the proposed estate for design storms up to and including the 1% AEP. The report demonstrates that the proposed Lot 101 development has immunity for all design storms.

Further to their SBSMP, Arcadis have prepared a technical memorandum (EAG001-30109334-AAR-02) which discusses the flood risk associated with the proposed estates for design storms exceeding the 1% AEP 2100, up to and including the 0.2% 2100 AEP. This memorandum was prepared in response to Logan City Council Planning Scheme 2015 Section 8.2.5 – Flood Overlay Code. The memorandum combined with the proposed design drawings demonstrate that the proposed Lot 101 development has immunity up to and including the 0.5% AEP design event.

6. Stormwater Quantity Management

6.1. Hydrological Modelling (DRAINS)

The stormwater quantity analysis of the developed site conditions has been undertaken to the requirements and procedure outlined by:

- Queensland Urban Drainage Manual (QUDM)
- Australian Rainfall and Runoff 2016 (ARR2016)

The DRAINS model was setup using BOM rainfall parameters downloaded from the Australian Rainfall and Runoff Data Hub, and hydrological model parameters listed in Table 6-1.

Table 6-1 - IL-CL Hydrological Model Parameters

Model Parameters	Post Development
Impervious Area Initial Loss (mm)	1
Impervious Area Continuing Loss (mm)	0
Pervious Area Initial Loss (mm)	26
Pervious Area Continuing Loss (mm)	1.9
IFD Data	2019 rainfall depths from ARR Data Hub using site coordinates

Permissible site discharge parameters adopted directly from Arcadis SBSMP EAG001-30109334-AAR Revision 12

6.2. Existing Catchment

The existing site consists of vacant land and currently falls east, discharging stormwater runoff to the existing drainage channel (Lot 901) at approximately 0.5%. The development involves the construction of an industrial warehouse facility including hardstand vehicle manoeuvring and parking areas and associated infrastructure works. The development catchment area to be considered for stormwater design purposes is 2.94ha

The time of concentration for the existing catchment has been determined using a combination of overland flow time and channel flow time as described in QUDM. The time of concentration was found to be 22 minutes.

The existing site catchment is summarised below:

- Area – 2.94 Ha
- Total time of concentration (tc) – 22 minutes
- Percent impervious (fi) – 0%

Peak flow rates from the existing site have been determined by modelling various storm durations for each AEP storm Ensemble. The peak flow rate for each median AEP storm event is given in Table 5.2 below.

As part of PDA Development Approval DEV2018/961/12 the permissible discharge from the subject site in its developed state has been determined by Arcadis and outlined within Site Based Stormwater Management Plan EAG001-30109334-AAR Revision 12. The permissible site discharge takes precedence over the calculated peak flow rates for the existing catchment for each applicable median AEP storm. The applicable peak flow rates to be considered for stormwater quantity modelling is given in Table 6-2 below

Table 6-2 – Existing Site Peak Flow Rates

AEP Storm Event	Permissible Site Discharge (L/s) (Arcadis SBSMP)	Existing Site Peak flow Rate (L/s)
1EY	N/A	**165**
0.5EY	N/A	**266**
0.2EY	N/A	**421**
10%	**123**	N/A
5%	**138**	N/A
2%	N/A	**841**
1%	**613 (462 to road reserve, 151 to conveyance channel)**	N/A

6.3. Developed site

The Lot 101 development involves the construction of an industrial warehouse facility including hardstand vehicle manoeuvring and parking areas, associated infrastructure works. The development catchment areas are as follows:

Lot	Site Area (Ha)
101	2.94

The lawful point of discharge for the development shall be a combination of the conveyance channel to the east of the subject site (Lot 901) and the existing stormwater infrastructure within Enterprise Drive to the north of the development. Runoff from the roof and hardstand areas shall be captured on site and directed to the lawful point of discharge via the construction of new on-site drainage infrastructure, subject to detailed design.

The total impervious area of the development site was found to be approximately 95% (fi=0.95). This calculated fraction impervious will be used in lieu of a standard QUDM fraction impervious value for this development. This is inline with the catchment characteristics for the surrounding developments and the assumed fraction impervious of the Arcadis report.

The time of concentration is determined by using a standard inlet time as described in QUDM. The time of concentration was determined to be 5 minutes.

6.3.1. DRAINS results for developed site

The developed site catchment is summarised below:

- Area – 2.94 Ha
- Total time of concentration (tc) – 5 minutes
- Percent impervious (fi) – 95%

Peak flow rates from the existing site have been determined by modelling various storm durations for each AEP storm ensemble. The peak flow rate for each median AEP storm event is given in Table 6-3.

Table 6-3 – Developed Site Peak Flow Rates

AEP Storm Event	Peak flow rate (L/s)
1EY	704
0.5EY	901
0.2EY	1150
10%	1360
5%	1590
2%	1890
1%	2120

6.3.2. Water Quantity Comparison

Table 6-4 compares the peak flow rates for the median design storm for the developed case against the permissible site discharge and the existing site discharge for the development.

Table 6-4 Existing v Developed Peak Flow Rates

AEP Storm Event	Permissible Site Discharge (L/s)	Existing peak flow rate (L/s)	Developed peak flow rate (L/s)	Change in peak flow rate (L/s)
1EY	N/A	165	704	+539
0.5EY	N/A	266	901	+635
0.2EY	N/A	421	1150	+729
10%	123	N/A	1360	+1237
5%	138	N/A	1590	+1452
2%	N/A	841	1890	+1049
1%	613 (462 to road reserve, 151 to conveyance channel)	N/A	2120	+1507

As shown in Table 6-4 the peak flow rate of stormwater runoff has increased due to the increase in impervious area and the reduction in time of concentration for the developed case. Stormwater detention is required to offset this increase in peak flow rate.

6.3.3. Stormwater Detention

Stormwater detention has been sized for the proposed Lot 101 development. Stormwater runoff from the proposed roof and hardstand areas shall be conveyed to the tank prior to discharge. Refer to Table 6-5 and Appendix A for further details of the modelled site catchments and detention tank location.

Table 6-5 - Detention System Details - Lot 101 Detention Tank

Description	Specification
Assumed catchment to detention (Flows up to and including the 1% AEP are to be directed to the tank)	Roof and Hardstand – 2.84 (ha)
Assumed catchment bypassing detention and entering the conveyance channel	Bypass 1 – 0.1 (ha)
Tank Details	**Specification**
Required Tank Volume (excluding treatment volume and freeboard)	2,190 m^3
Tank Base Area	982 m^2
Maximum Water Depth	2230 mm
Orifice 1 (Lowflow)	Ø220mm @ base of tank discharging to conveyance channel
Weir 1	5m wide @ 2120mm from base of tank discharging to road infrastructure

Figure 6-1 illustrates the DRAINS model layout developed for the detention system.

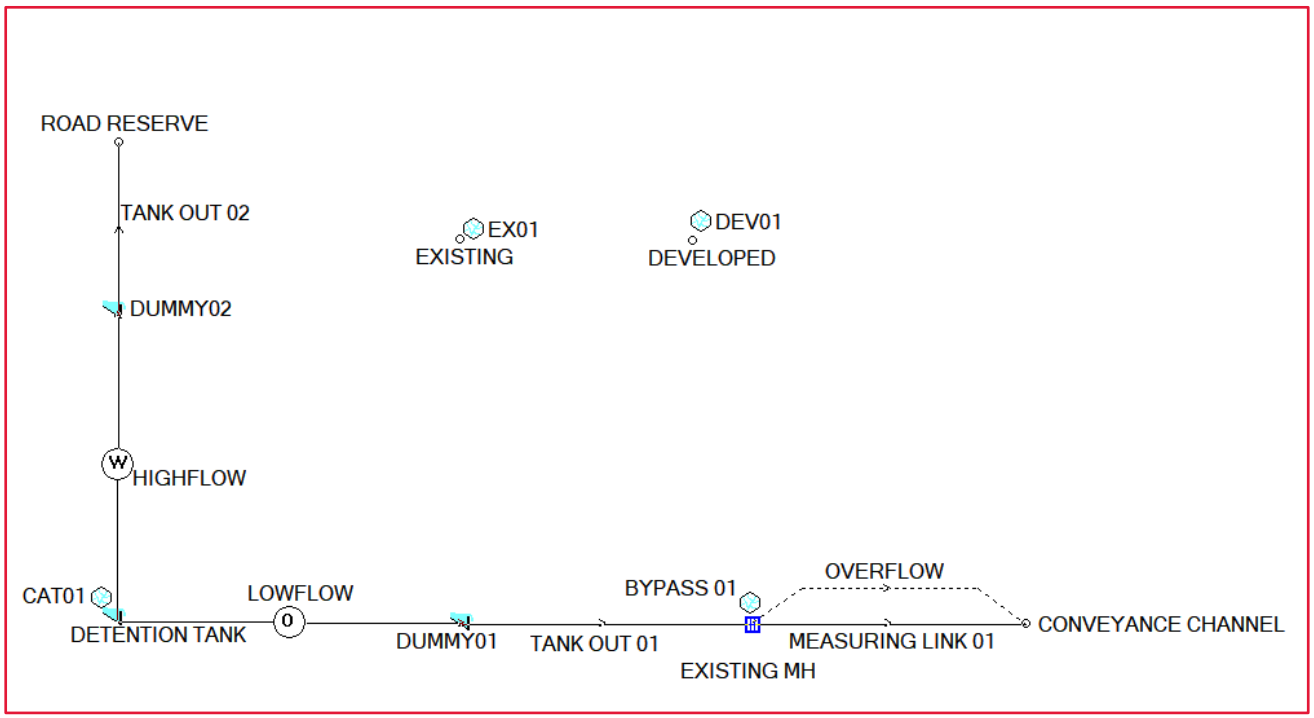


Figure 6-1 – DRAINS Model Layout

Flow rates determined for the detention model are outlined in table 6-6.

Table 6-6 – Existing v Mitigated Peak Flow Rates

AEP Storm Event	Permissible Site Discharge (L/s)	Existing peak flow rate (L/s)	Developed peak flow rate (L/s)	Mitigated peak flow rate at conveyance channel (L/s)	Mitigated peak flow rate at road reserve (L/s)	Mitigated peak flow rate (L/s)
1EY	N/A	165	704	80	0	80 (-85)
0.5EY	N/A	266	901	93	0	93 (-173)
0.2EY	N/A	421	1150	109	0	109 (-312)
10%	123	N/A	1360	123	0	123 (-0)
5%	138	N/A	1590	135	0	135 (-3)
2%	N/A	841	1890	141	329	470 (-371)
1%	613 (462 to road reserve, 151 to conveyance channel)	N/A	2120	401	149	550 (-63)

As shown above, the proposed detention tank effectively achieves the permissible site discharge for the 10%, 5% and 1% AEP events in accordance with the Arcadis Site Based Stormwater Management Plan EAG001-30109334-AAR Revision 12 and effectively mitigates against the existing sites peak flow rate. Therefore, the proposed stormwater detention system is considered adequate for the development.

7. Stormwater Quality Management - Construction Phase

7.1. Erosion and Sediment Control

Prior to construction commencing, it is the principal contractor's responsibility to ensure adequate erosion and sediment control measures are installed around the subject site to minimise disturbance and ensure the quality of runoff discharging from the site is of an acceptable standard.

An erosion and sediment control plan (ESCP) is to be produced by a Certified professional in Erosion and Sediment Control (CPESC) and submitted to the relevant authorities for approval prior to construction. The ESCP is to be prepared in accordance with the Best Practice Erosion and Sediment Control Manual (ICEA 2009) based on Type 1 techniques. Typical erosion and sediment control techniques to be used include but are not limited to:

- Sediment barriers to be installed on all entrances to stormwater inlet pits
- Construction entry and exit shakedown areas
- Sediment fences are to be installed on the downstream boundaries of the subject site
- Construction of temporary bunds at the top of all earthworks batters to ensure runoff is directed away from exposed batters
- Construction of temporary diversion drains to divert water to sediment basins and around any stockpiles
- Sediment fences to be installed on the downstream side of any stockpiles
- Stabilisation of all batters upon reaching the finished earthworks levels
- Dust control measures which includes covering stockpiles, maintain site fences and watering exposed areas
- Sediment basin in accordance with IECA Best Practice Erosion and Sediment Control.

8. Stormwater Quality Management - Operational Phase

8.1. Proposed Stormwater Quality Improvement Devices (SQID's)

At the time proposed lot 101 is developed, the site will need to address stormwater quality and quantity with a site-specific stormwater management plan. The proposed development is required to adequately and appropriately treat stormwater flows in accordance with the State Planning Policy.

During the operational phase of the development, is it proposed to construct the following stormwater quality improvement devices (SQID's) to achieve the stormwater quality objectives summarised in Section 4:

- 21x Ocean Protect OceanGuard 200 micron filter baskets to all stormwater inlet pits
- 42x Ocean Protect Stormfilter 690 Psorb Cartridges

Engineering drawings in Appendix A provide more details on the tank arrangement and locality.

8.1.1. Ocean Protect OceanGuard (200 micron)

The OceanGuard 200 inserts will be used as a pre-treatment for stormwater runoff to capture litter and coarse sediment surface flows on the site. OceanGuard inserts are to be installed on all surface inlet pits within the development.

The 200 Oceanguards consist of a steel frame and a cage. Within the cage a screening bag is attached to capture litter, debris, sediment and other pollutants from stormwater flows. The mesh size of the screening bag proposed for each OceanGuard within the site is 200 micro-meters. The mesh size is small enough to capture heavy metals and hydrocarbons associated with solids in the stormwater flows.

8.1.2. Ocean Protect StormFilter 690 PSorb

The Stormfilter 690 Psorb cartridges will be installed in the OSD tank (refer to section 6).

The Ocean Protect StormFilter system is a passive stormwater filter that cleans stormwater through a patented passive filtration system, effectively removing pollutants to meet the most stringent regulatory requirements. The StormFilter stormwater treatment system uses rechargeable, self-cleaning, media-filled cartridges to absorb and retain the most challenging pollutants from stormwater runoff including total suspended solids, hydrocarbons, nutrients, soluble heavy metals, and other common pollutants.

8.2. Stormwater Quality Modelling (MUSIC) Methodology

Stormwater quality modelling for the site was prepared using 'Model for Urban Stormwater Improvement Conceptualisation' (MUSIC) Version 6.3. The model has been built to assess the adequacy of the proposed SQID's and to ensure that the quality of stormwater meets the WQO's for the development. A diagrammatic layout of the MUSIC Model is presented in Figure 8-1 below.

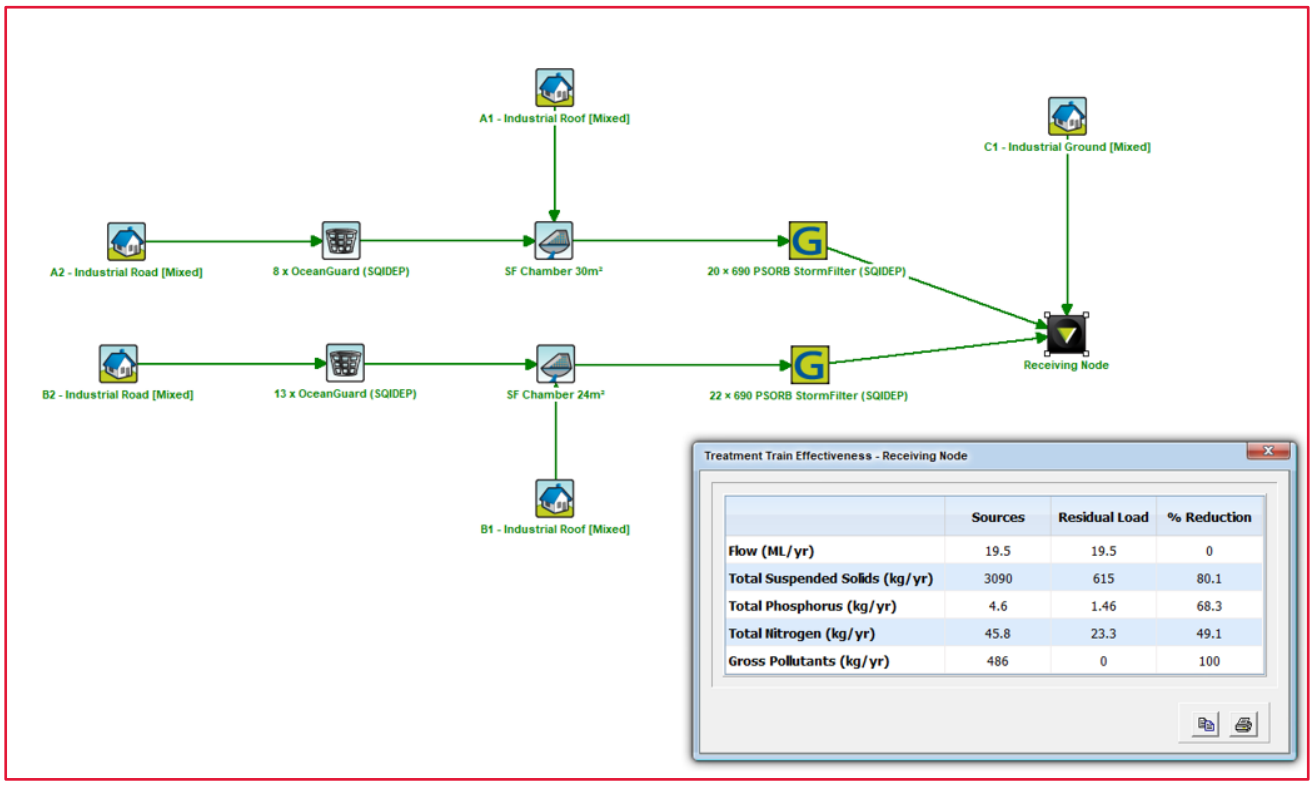


Figure 8-1 - MUSIC Link and Node Diagram

For the analysis of the MUSIC modelling, Meteorological data (average potential evapotranspiration (PET) and Rainfall Station) was based on the recommendations listed in WBD MUSIC Modelling Guidelines for SEQ, Table 3.1. The rainfall data was obtained from the Bureau of Meteorology for Station No. 40659 at Greenbank. The analysis was undertaken using a 6min time step from the period of 01/01/1980 to 31/12/1989

The following rainfall and runoff parameters shown in Table 8-1 have been utilised.

Table 8-1 - Rainfall Runoff Parameters

Parameter	Value*
Land Use Category	Commercial and Industrial
Rainfall Threshold (mm/day)	1
Soil Storage Capacity (mm)	18
Initial Storage (% of Capacity)	10
Field Capacity (mm)	80
Infiltration Capacity Coefficient – a	243
Infiltration Capacity Exponent – b	0.6
Initial Depth (mm)	50
Daily Recharge Rate (%)	0
Daily Base flow Rate (%)	31
Daily Deep Seepage Rate (%)	0

The catchments used for MUSIC modelling were broken down into land use category to accurately model the pollutant runoff characteristics for all land-use categories. The Source node catchments are summarised below in Table 8-2.

Table 8-2 - Catchment Source Node Summary

Catchment ID	MUSIC Source Nodes	Catchment Area (Ha)	Impervious %
A (Treated Catchment)	A1 - Roof	0.918	100%
	A2 - Road	0.358	95%
B (Treated Catchment)	B1 - Roof	1.061	100%
	B2 - Road	0.531	95%
C (Bypass Catchment)	E1 - Ground	0.082	0%

The pollutant concentration parameters used in the model were based on information provided in Water By Design – MUSIC Modelling Guidelines for Southeast Queensland V3.0 (2018). The parameters are listed in Table 8-3.

Table 8-3 - Water Quality Parameters for MUSIC Source Nodes

Land- Use Category		Log TSS (mg/L)		Log TP (mg/L)		Log TN (mg/L)	
		Storm Flow	Base flow	Storm Flow	Base Flow	Storm Flow	Base Flow
Roof Areas (Industrial)	Mean	1.30	N/A	-0.89	N/A	0.25	N/A
	Std Dev	0.44	N/A	0.36	N/A	0.32	N/A
Roads (Industrial)	Mean	2.43	0.78	-0.30	-1.11	0.25	0.14
	Std Dev	0.44	0.45	0.36	0.48	0.32	0.20
Ground Level (Industrial)	Mean	1.92	0.78	-0.59	-1.11	0.25	0.14
	Std Dev	0.44	0.45	0.36	0.48	0.32	0.20

**Parameter values taken from WBD – MUSIC Modelling Guidelines for SEQ, V3.0 (2018), Table 3.9.*

Table 8-4 - MUSIC Model Results

Pollutant	Annual Loads (kg/yr)		% Reduction		Compliance
	Source	Residual	Actual	Target	
TSS	3090	615	80.1	80	OK
TP	4.6	1.46	68.3	60	OK
TN	45.8	23.3	49.1	45	OK
GP	486	0	100	90	OK

9. Maintenance

All the stormwater quantity and quality infrastructure detailed in this document are contained within the subject site and will remain an asset of the development's property owner, tenant or similar internal authority.

Maintenance of all SQIDs will be the responsibility of body corporate or the development owner. The maintenance should be carried out in accordance with the manufacturer's recommendations and as a minimum shall include the following:

- Ocean Protect 'StormFilter'

Maintenance to be carried out by manufacturer's maintenance staff including but not limited to de-silting of cartridges. Refer to Appendix E for further information regarding the maintenance of the proposed StormFilter.

- Ocean Protect 'OceanGuard'

Maintenance to be carried out by manufacturer's maintenance staff including but not limited to inspection of basket and removal and lawful disposal of trapped litter/sediment. Refer to Appendix E for further information regarding the maintenance of the proposed OceanGuards.

10. Onsite Stormwater Network Product Specifications

This report specifies proprietary stormwater products for use on Proposed Lot 101 (e.g. Ocean Protect). Should there be a need to change to an alternative product (e.g. Atlan) this will be at the discretion of the RPEQ Engineer who is responsible for the 'Issued for Construction' drawings. If an alternative proprietary product is selected during the course of detailed design, the product must be SQIDEP APPROVED (Stormwater Australia). in providing their certification, the RPEQ engineer is required to ensure that the proposed stormwater management quantity and quality objectives are achieved in accordance with the relevant industry standards.

11. Conclusion

This Site Based Stormwater Management Plan (SBSMP) has been prepared on behalf of CH Hydrangea Pty Ltd (Applicant) in support of a development application over land at 4499-4651 Mount Lindesay Highway, North Maclean QLD 4280 and described as Lot 39 on SP258739 (site). This PDA Development Application seeks approval for the following aspects of development:

- Development Permit for a Material Change of Use for Warehouse (Distribution Centre).
- In support of Reconfiguration of Lot – 1 into 8, plus access easements.

The material change of use aspect of the proposed development seeks approval for a warehouse (distribution centre) to enable the construction of one of the first buildings within the Flagstone Logistics Estate. The proposed warehouse will be located on Proposed Lot 101 and is intended to service as a distribution centre for the tenant, for the receival, warehousing, storing and distribution of products.

Lawful Point of Discharge

As outlined in the Arcadis SBSMP EAG001-30109334-AAR Revision 12 and Approved as part of the EDQ approval DEV2018/961/12. The subject site has two lawful points of discharge:

- Minor flows from the development are to discharge to the conveyance channel located along the eastern site boundary (Lot 901).
- Major flows from the development are to discharge to the Enterprise Drive road reserve to the north of the subject site

most of the site flows will be captured for stormwater quantity and quality treatment prior to discharge from the site. A small portion of the development will bypass the private stormwater treatment and discharge towards the lot 901 drainage channel to the east; however, the combined site runoff achieves all stormwater quantity and quality objectives.

Stormwater Quantity

The stormwater quantity objective was to demonstrate non-worsening in peak discharges from the subject site flows outlined in the Arcadis SBSMP EAG001-30109334-AAR Revision 12 and Approved as part of the EDQ approval DEV2018/961/12.

To achieve non-worsening, the proposed development requires a total detention volume of approximately 2190m^3 which has been achieved via an underground detention tank, located on the northern boundary beneath the heavy-duty pavement.

Stormwater Quality

Stormwater quality infrastructure has been included in the design to achieve the water quality objectives for Southeast Queensland specified in the State Planning Policy 2017, namely, the removal of gross pollutants, suspended solids, nitrogen and phosphorus. The proposed treatment train was modelled using MUSIC modelling software and includes the following SQID's:

- 21x Ocean Protect OceanGuard 200 micron filter baskets to all stormwater inlet pits
- 42x Ocean Protect Stormfilter 690 Psorb Cartridges

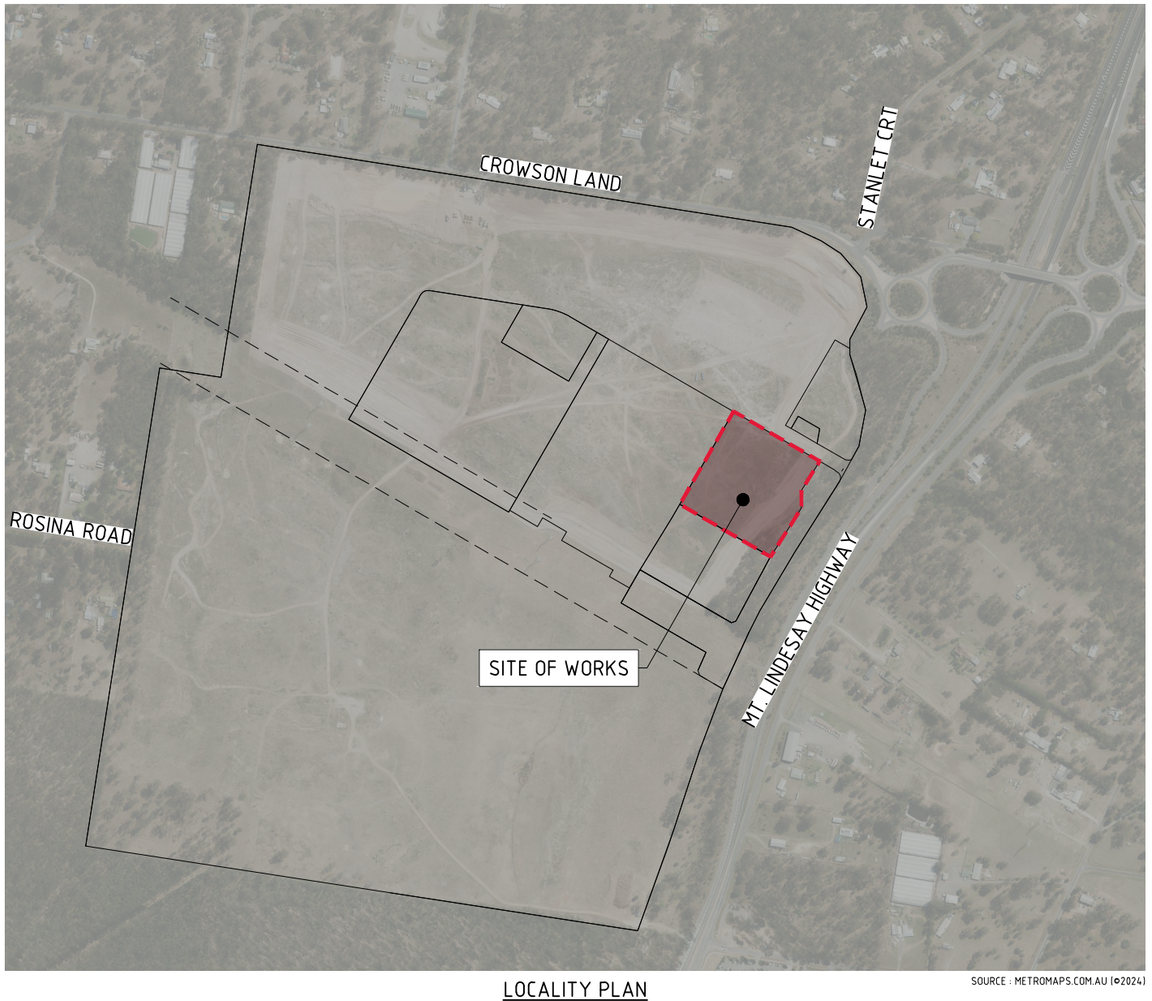
Erosion and Sediment Control

Construction phase ESCP measures are to be implemented during construction in accordance with the relevant requirements.

Appendix A – Civil Engineering Plans

PROPOSED INDUSTRIAL DEVELOPMENT

LOT 101, 4499-4651 MT. LINDESAY HIGHWAY, NORTH MACLEAN QLD 4280
DEVELOPMENT APPLICATION



LOCALITY PLAN
NTS

SOURCE : METROMAPS.COM.AU (©2024)

DRAWING SCHEDULE

DWG NUMBER	DWG TITLE
DA-001	COVER SHEET, LOCALITY PLAN AND DRAWING SCHEDULE
DA-101	BULK EARTHWORKS LAYOUT PLAN
DA-111	BULK EARTHWORKS SECTIONS - SHEET 1 OF 2
DA-112	BULK EARTHWORKS SECTIONS - SHEET 2 OF 2
DA-211	ROADWORKS & STORMWATER DRAINAGE LAYOUT PLAN
DA-220	TYPICAL SECTIONS
DA-311	STORMWATER DRAINAGE CATCHMENT LAYOUT PLAN

BEFORE YOU DIG www.byda.com.au

DRAWN: B.ADAMS DESIGNED: R.MITCHELL JOB MANAGER: A.DE ANDRADE VERIFIER: S.KILLORAN

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ARCHITECT: watson young

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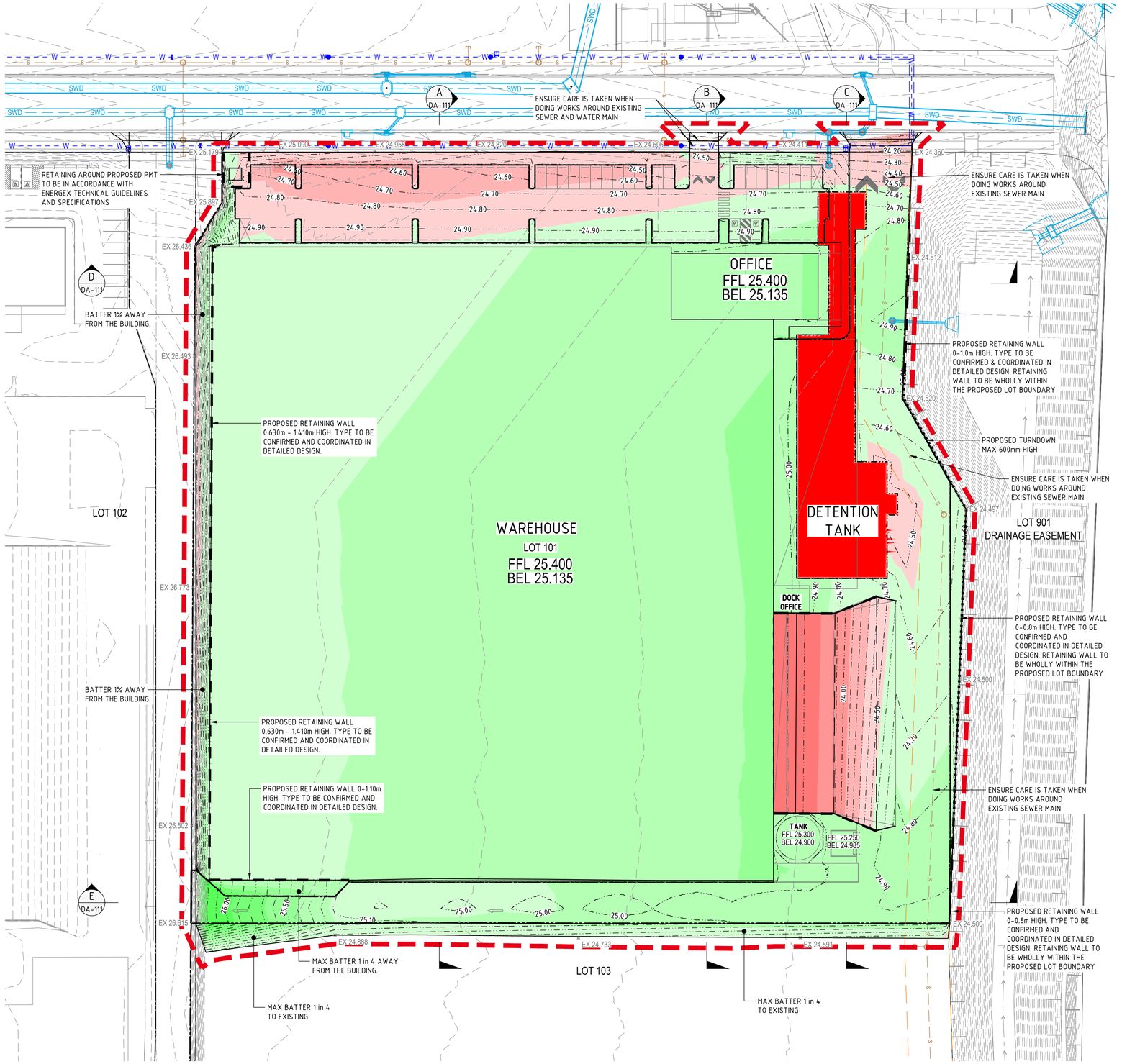
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PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
LOT 101
4499-4651 MT. LINDESAY HIGHWAY
NORTH MACLEAN QLD 4280

DRAWING TITLE
COVER SHEET, LOCALITY PLAN AND DRAWING SCHEDULE

JOB NUMBER: 253338
DRAWING NUMBER: DA-001
REVISION: C
DRAWING SHEET SIZE = A1



VOLUME NOTES

1. VOLUMES ARE CALCULATED BETWEEN STRIPPED SURFACE AND BOXING (BULK) LEVELS.
2. VOLUMES DO NOT CONSIDER BULKING / COMPACTION FACTORS, UNSUITABLE GROUND REMOVAL OR CONTAMINATED GROUND REMOVAL.
3. IT HAS BEEN ASSUMED THAT THE SITE WILL REQUIRE 0mm TOPSOIL STRIP TO REMOVE ORGANIC MATERIAL. SHOULD THIS DEPTH VARY, PLEASE NOTIFY SUPERINTENDENT, GEOTECH & NORTHROP IMMEDIATELY.
4. REFER TO CIVIL PAVEMENT & STRUCTURAL FOUNDATION / SLAB DRAWINGS FOR PAVEMENT DEPTHS, TO BE CONFIRMED & VALIDATED AGAINST BULK / BOXING LEVELS BY CONTRACTOR & SURVEYOR PRIOR TO COMMENCEMENT OF EARTHWORKS.
5. ALL EARTHWORKS VOLUMES ARE PRELIMINARY ONLY, AND ARE TO BE USED AS A GUIDE ONLY. CONTRACTOR IS TO ALLOW ADEQUATE CONTINGENCY.

UNKNOWN GEOTECH PARAMETERS

THE CONTRACTORS IS TO ALLOW ADEQUATE PROVISIONAL AMOUNTS FOR CONTINGENCIES FOR THE FOLLOWING UNKNOWN EARTHWORKS/GEOTECH PARAMETERS:

- SWELLING/COMPACTION FACTORS - UNKNOWN
- SUBGRADE CBR - UNKNOWN
- SUBGRADE SUITABLE FOR FILLING/PAVEMENT - UNKNOWN
- IF CUT IS CONSIDERED SUITABLE FOR FILLING - UNKNOWN
- TOPSOIL DEPTH - UNKNOWN
- ONSITE SOILS ARE DISPERSIVE/HIGHLY REACTIVE - UNKNOWN

LEVELS AND SETOUT NOTES

1. EARTHWORKS LEVELS SHOWN ARE BULK SURFACE LEVELS (UNDERSIDE OF PAVEMENT AND TOPSOIL LAYERS)
2. EARTHWORKS LEVELS ALLOW DRIVEWAY / CAR PARK SLAB THICKNESS AND BUILDING SLAB THICKNESS AS PER STRUCTURAL ENGINEERING DRAWINGS. REFER TO FINAL 'FOR CONSTRUCTION' STRUCTURAL DESIGN DRAWINGS FOR FINAL PAD THICKNESS AND CROSS-CHECK/VERIFY THE ASSOCIATED FINAL CIVIL BULK PAD LEVELS PRIOR TO CONSTRUCTION SETOUT.
3. FLOOD IMMUNITY - 200 YR ARI RIVER FLOOD LEVEL = 25.4m AHD ('FLOOD TECHNICAL NOTE' PREPARED BY ARCADIS DATED 1/03/24). ENSURE THE MINIMUM FINISHED FLOOR LEVELS FOR HABITABLE BUILDINGS CAN BE CONSTRUCTED AT ABOVE THIS RL.
4. ALL RETAINING WALL HEIGHT LABELS ARE CALCULATED TO FINISHED SURFACE LEVELS INCLUDING TOPSOIL (AND TO NEAREST 200mm HEIGHT). FINAL RETAINING WALL DESIGNS AND DETAILED STEPPING IS SUBJECT TO STRUCTURAL DESIGN BY OTHERS.
5. REFER TO ARCHITECTURAL DRAWINGS FOR BUILDING SETOUT INFORMATION.
6. CONTRACTOR TO CONFIRM SITE SURVEY STATION LOCATION AND BUILDING/PAD SETOUT LOCATIONS IN RELATION TO BOUNDARIES PRIOR TO CONSTRUCTION AND ADVISE SUPERINTENDENT IF ANY DISCREPANCIES/ANOMALIES FOUND.

PRELIMINARY BOXING DEPTHS

TRUCK MANEUVERING HARDSTAND, CONTAINER SET DOWN = 170mm THICK CONCRETE + 100mm CBR 15 SUBBASE = 270 TOTAL BOX

LIGHT DUTY PAVEMENT = 130mm THICK CONCRETE + 100mm CBR 15 SUBBASE = 230 TOTAL BOX

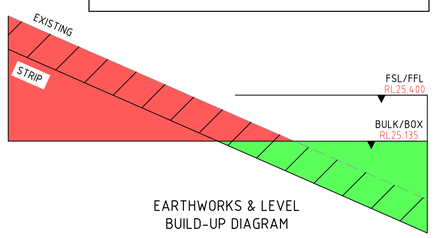
WAREHOUSE, OFFICE, PUMP ROOM = 165mm THICK CONCRETE + 100mm CBR 15 SUBBASE = 265 TOTAL BOX

TANK SLAB = 300mm THICK CONCRETE + 100mm CBR 15 SUBBASE = 400 TOTAL BOX

NOTE: FOR INTERNAL PAVEMENT DESIGN REFER TO STRUCTURAL DRAWINGS FOR DETAILS AND SPECIFICATIONS

NOTE

CRASH BARRIER TO BE INSTALLED WHERE RETAINING HEIGHT EXCEEDS 600mm HIGH



EARTHWORKS & LEVEL BUILD-UP DIAGRAM

LEGEND

- XX.XX — PROPOSED BULK EARTHWORKS CONTOURS (0.10m INTERVAL)
- XX.XX — EXISTING SURFACE CONTOURS (0.10m INTERVAL)
- EX XX.XX — SPOT LEVEL (EXISTING)
- FFL XX.XX / BEL XX.XX — FINISHED FLOOR LEVEL / BULK EARTHWORKS LEVEL
- BUILDING PAD
- PROPOSED RETAINING WALL (TYPE TO BE CONFIRMED)
- SITE OF WORKS
- SWD — EXISTING STORMWATER
- S — EXISTING SEWER MAIN
- W — EXISTING WATER MAIN
- EXISTING 10m WIDE SEWER EASEMENT

DEPTH OF CUT

- - 999m TO - 2.0m
- - 2.0m TO - 1.5m
- - 1.5m TO - 1.25m
- - 1.25m TO - 1.0m
- - 1.0m TO - 0.75m
- - 0.75m TO - 0.5m
- - 0.5m TO - 0.25m
- - 0.25m TO - 0.0m

DEPTH OF FILL

- 0.0m TO 0.25m
- 0.25m TO 0.5m
- 0.5m TO 0.75m
- 0.75m TO 1.0m
- 1.0m TO 1.25m
- 1.25m TO 1.5m
- 1.5m TO 2.0m
- 2.0m TO 999m



FIRE ANT TREATMENT ZONE

MOVEMENT OF MATERIAL SHALL BE IN ACCORDANCE WITH THE DEPARTMENT OF AGRICULTURE AND FISHERIES ACTS AND REGULATIONS. FOR MORE INFORMATION CALL BIOSECURITIES QUEENSLAND ON 13 25 23 OR VISIT WWW.DAF.QLD.GOV.AU FOR MORE INFORMATION.

WARNING

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PRELIMINARY BULK EARTHWORKS VOLUMES

CUT	FILL	BALANCE
4,746 m^3	8,253 m^3	3,507 m^3 (FILL)

DESIGNED: R.MITCHELL
DRAWN: B.ADAMS
JOB MANAGER: A.DE ANDRADE
VERIFIER: S.KILLORAN

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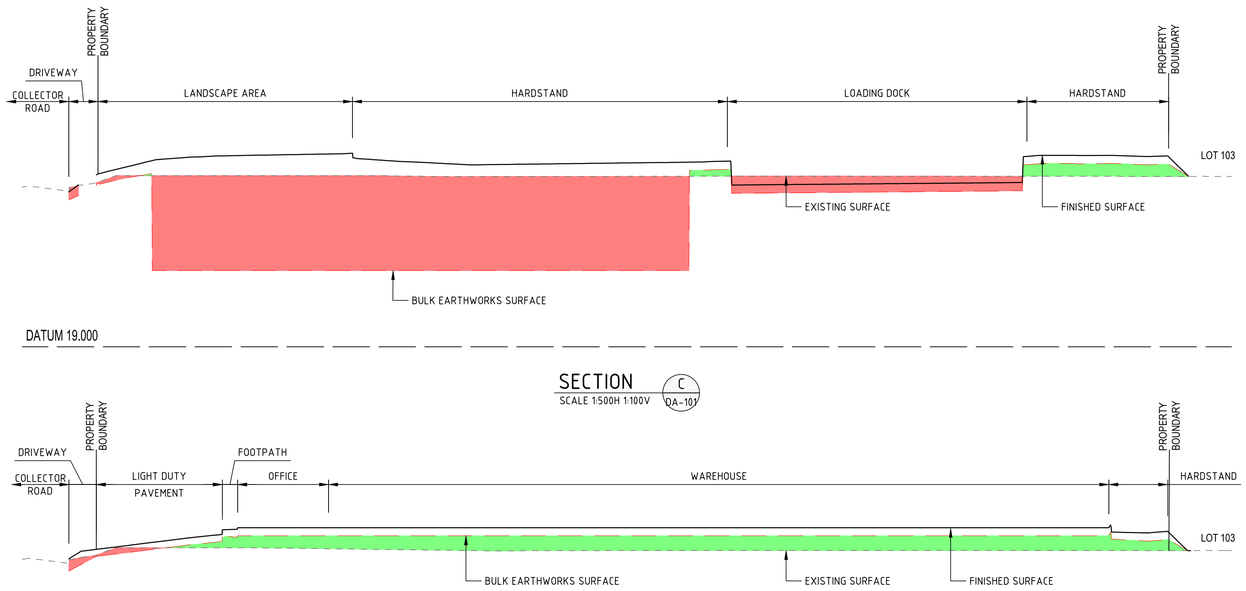
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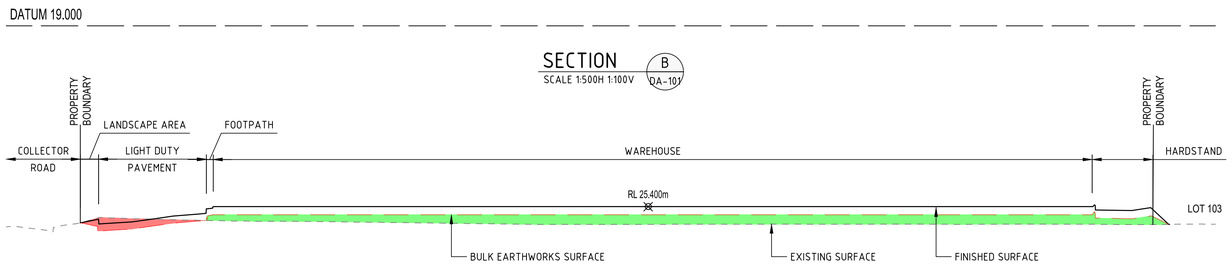
PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
LOT 101
4499-4651 MT. LINDESAY HIGHWAY
NORTH MACLEAN QLD 4280

DRAWING TITLE: BULK EARTHWORKS LAYOUT PLAN

JOB NUMBER: 253338
DRAWING NUMBER: DA-101
REVISION: B
DRAWING SHEET SIZE = A1



SECTION C
SCALE 1:500H 1:100V
DA-101



SECTION B
SCALE 1:500H 1:100V
DA-101

SECTION A
SCALE 1:500H 1:100V
DA-101

LEGEND - SECTIONS

- FINISHED SURFACE
- EXISTING SURFACE
- BULK EARTHWORKS SURFACE
- EARTHWORKS AREA OF CUT
- EARTHWORKS AREA OF FILL
- PROPOSED RETAINING WALL (TYPE TBC) - BY OTHERS

LAYOUT & NOTES REFERENCE

FOR EARTHWORKS LAYOUT PLAN & REFERENCE NOTES
REFER DWG No DA-101

DRAWN: B.ADAMS
DESIGNED: R.MITCHELL
JOB MANAGER: A.DE ANDRADE
VERIFIER: S.KILLORAN

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DRAWING TITLE
BULK EARTHWORKS SECTIONS SHEET 1 OF 2

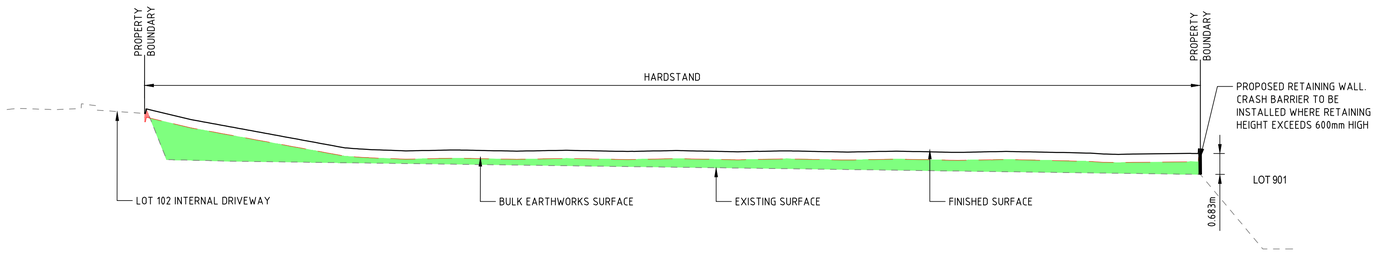
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DRAWING SHEET SIZE = A1

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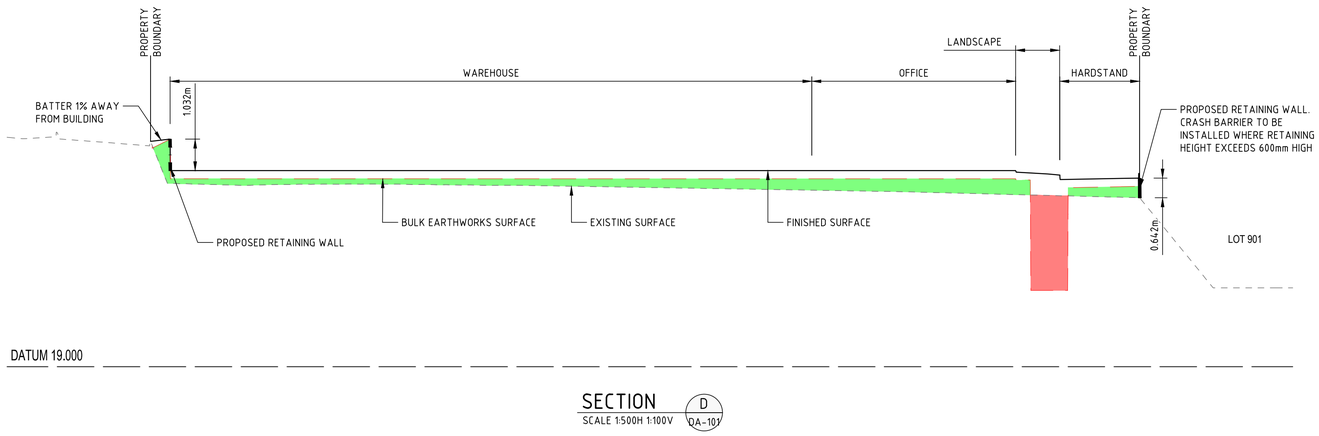
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- EXISTING SURFACE
- BULK EARTHWORKS SURFACE
- EARTHWORKS AREA OF CUT
- EARTHWORKS AREA OF FILL
- PROPOSED RETAINING WALL (TYPE TBC) - BY OTHERS

LAYOUT & NOTES REFERENCE

FOR EARTHWORKS LAYOUT PLAN & REFERENCE NOTES
REFER DWG No DA-101



SECTION E
SCALE 1:500H 1:100V DA-101



SECTION D
SCALE 1:500H 1:100V DA-101

DRAWN: B.ADAMS DESIGNED: R.MITCHELL JOB MANAGER: A.DE ANDRADE VERIFIER: S.KILLORAN

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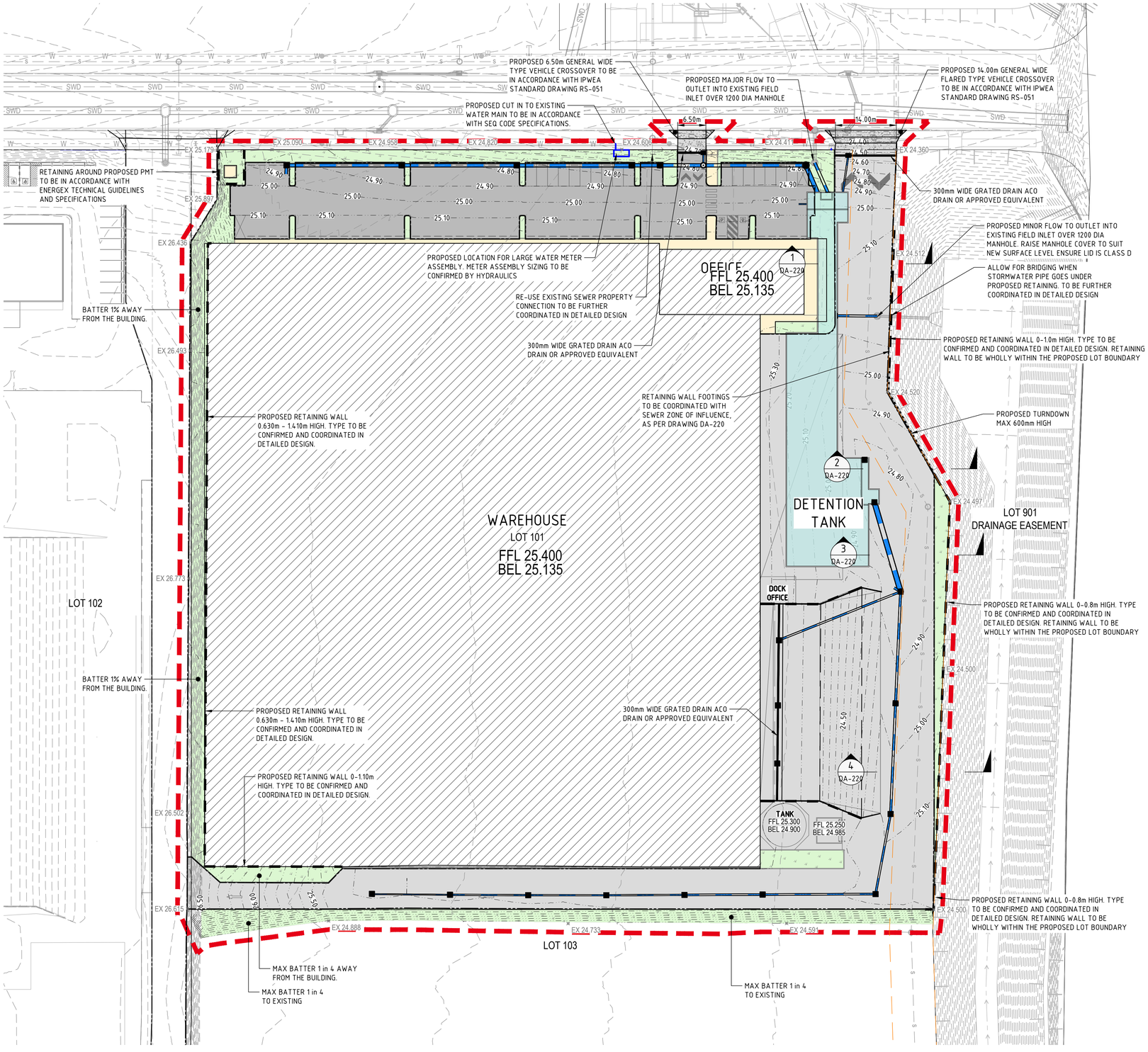
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4499-4651 MT. LINDESAY HIGHWAY
NORTH MACLEAN QLD 4280

DRAWING TITLE
BULK EARTHWORKS SECTIONS SHEET 2 OF 2

JOB NUMBER: **253338**
DRAWING NUMBER: **DA-112**
REVISION: **B**
DRAWING SHEET SIZE = A1



NOTE

CRASH BARRIER TO BE INSTALLED WHERE RETAINING HEIGHT EXCEEDS 600mm HIGH

NOTES

ALL GRATED INLET PITS TO BE FITTED WITH OCEAN PROTECT OCEAN GUARDS (TRASH BASKETS) OR APPROVED EQUIVALENT

LEGEND

- XX.XX — PROPOSED BULK EARTHWORKS CONTOURS (0.10m INTERVAL)
- XX.XX — EXISTING SURFACE CONTOURS (0.10m INTERVAL)
- PROPOSED INTEGRAL KERB
- EX XX.XX — SPOT LEVEL (EXISTING)
- FFL XX.XX — FINISHED FLOOR LEVEL
- BEL XX.XX — BULK EARTHWORKS LEVEL
- PROPOSED STORMWATER DRAINAGE
- XXXØ — PROPOSED STORMWATER SIZE
- PROPOSED STORMWATER FIELD INLET / GRATED DRAIN
- PROPOSED STORMWATER MANHOLE
- S — PROPOSED SEWERAGE RETICULATION
- W — PROPOSED WATER RETICULATION
- SWD — EXISTING STORMWATER DRAINAGE
- S — EXISTING SEWERAGE RETICULATION
- W — EXISTING WATER RETICULATION
- EXISTING 10m WIDE SEWER EASEMENT
- PROPOSED RETAINING WALL (TYPE TO BE CONFIRMED)
- SITE OF WORKS
- PROPOSED CONCRETE LIGHT DUTY PAVEMENT
- PROPOSED HEAVY DUTY PAVEMENT
- PROPOSED CONCRETE FOOTPATH REFER TO LCC STD. DRG. 08-00399
- PROPOSED LANDSCAPE AREA
- PROPOSED VEHICLE CROSSVER

WARNING

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DRAWN: B.ADAMS
DESIGNED: R.MITCHELL
JOB MANAGER: A.DE ANDRADE
VERIFIER: S.KILLORAN

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PROJECT: **PROPOSED INDUSTRIAL DEVELOPMENT LOT 101 4499-4651 MT. LINDESAY HIGHWAY NORTH MACLEAN QLD 4280**

DRAWING TITLE: **ROADWORKS & STORMWATER DRAINAGE LAYOUT PLAN**

JOB NUMBER: 253338
DRAWING NUMBER: DA-211
REVISION: B
DRAWING SHEET SIZE = A1

LEGEND - SECTIONS

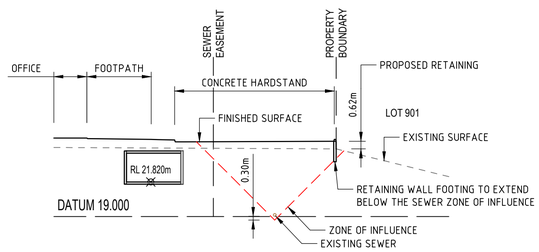
FINISHED SURFACE

EXISTING SURFACE

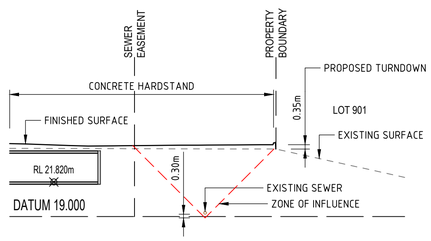
PROPOSED RETAINING WALL (TYPE TBC) - BY OTHERS

LAYOUT & NOTES REFERENCE

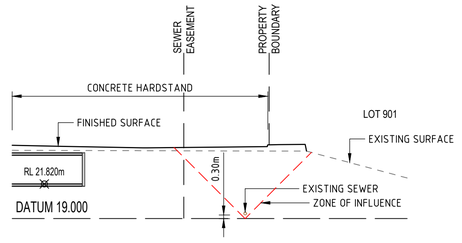
FOR ROADWORKS AND DRAINAGE LAYOUT PLAN & REFERENCE NOTES REFER DWG No DA-211



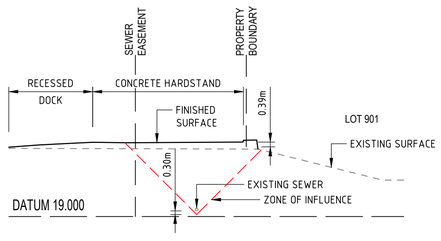
SECTION 1
SCALE 1:250 DA-211



SECTION 2
SCALE 1:250 DA-211



SECTION 3
SCALE 1:250 DA-211



SECTION 4
SCALE 1:250 DA-211

DRAWN: B.ADAMS
DESIGNED: R.MITCHELL
JOB MANAGER: A.DE ANDRADE
VERIFIER: S.KILLORAN

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	PRELIMINARY ISSUE	CL	SK	ADA	04.02.25
B	PRELIMINARY ISSUE	BA	SK	ADA	05.02.25

CLIENT: Charter Hall

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ARCHITECT: watson young

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SCALE 1:250@ A1 0 2 4 6 8 10 12m

NORTHROP
Brisbane
Level 25, 12 Creek Street, Brisbane QLD 4000
GPO BOX 423 Brisbane QLD 4001
(07) 3365 0400 brisbane@northrop.com.au
ABN 81 094 433 100

PROJECT: **PROPOSED INDUSTRIAL DEVELOPMENT LOT 101 4499-4651 MT. LINDESAY HIGHWAY NORTH MACLEAN QLD 4280**

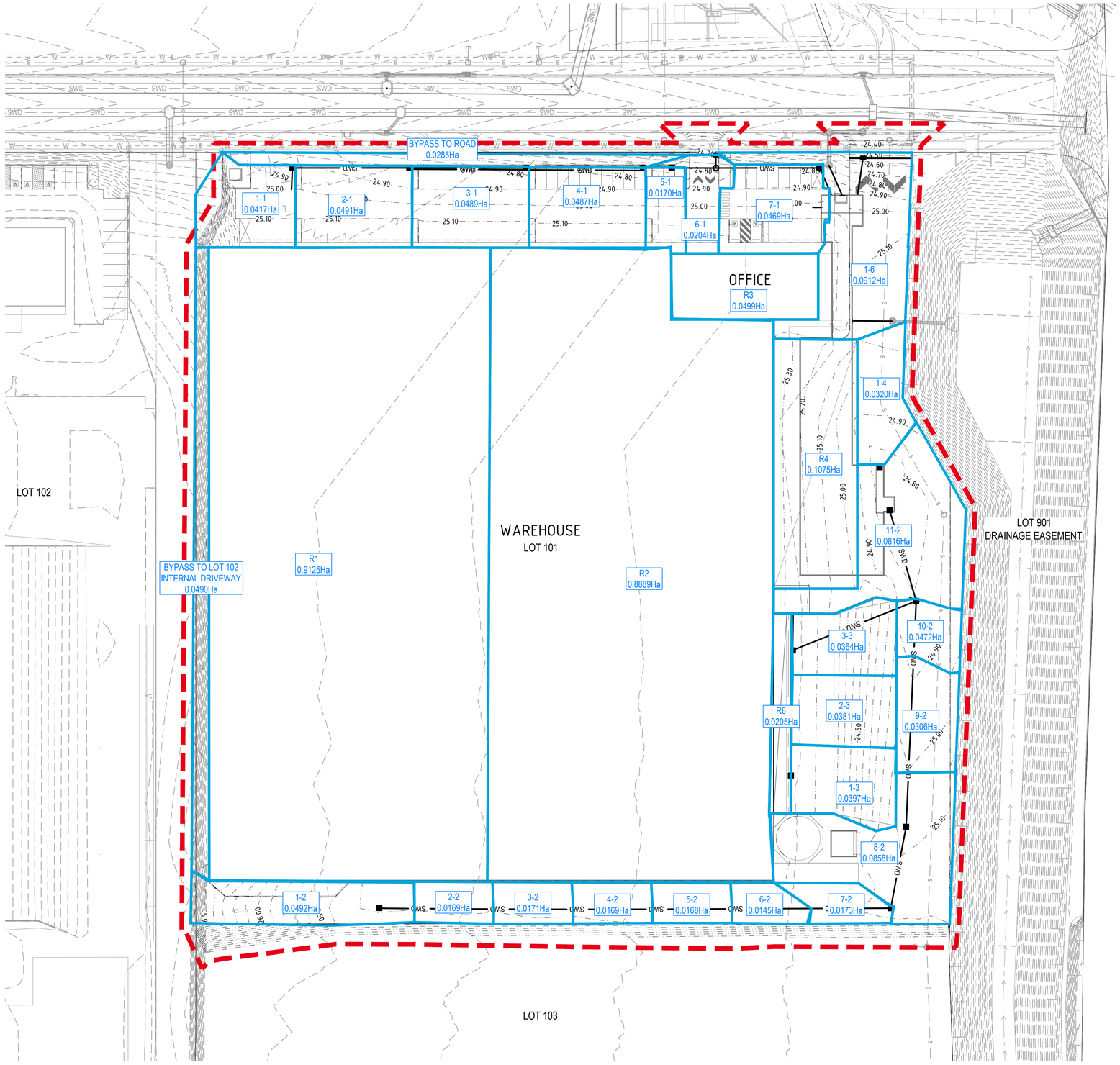
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JOB NUMBER: **253338**

DRAWING NUMBER: **DA-220**

REVISION: **B**

DRAWING SHEET SIZE = A1



LEGEND

XX.XX	PROPOSED SURFACE CONTOURS
XX.XX	EXISTING SURFACE CONTOURS
SWD	PROPOSED STORMWATER DRAINAGE
SWD	EXISTING STORMWATER DRAINAGE
	PROPOSED CATCHMENT BOUNDARY
X/XX X.XXXXha	PROPOSED CATCHMENT IDENTIFIER AND AREA (ha)
X/XX X.XXXXha	EXISTING CATCHMENT IDENTIFIER AND AREA (ha)

DRAWN: B.ADAMS
DESIGNED: R.MITCHELL
JOB MANAGER: A.DE ANDRADE
VERIFIER: S.KILLORAN

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
A	ISSUED FOR INFORMATION	BA	SK	ADA	28.01.25
B	PRELIMINARY ISSUE	CL	SK	ADA	04.02.25
C	PRELIMINARY ISSUE	BA	SK	ADA	05.02.25

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ARCHITECT
watson young

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SCALE 1:500@ A1
0 5 10 15 20 25m

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(07) 3365 0400 brisbane@northrop.com.au
ABN 81 094 433 100

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
LOT 101
4499-4651 MT. LINDESAY HIGHWAY
NORTH MACLEAN QLD 4280

DRAWING TITLE
STORMWATER DRAINAGE CATCHMENT LAYOUT PLAN

JOB NUMBER **253338**
DRAWING NUMBER **DA-311**
REVISION **C**
DRAWING SHEET SIZE = A1

Appendix B – Arcadis IFC Documentation (Existing Estate Infrastructure)

FOR CONTINUATION REFER DRG-CV-0204

FOR CONTINUATION REFER DRG-CV-0202

CH 300.000
CH 280.000
CH 260.000
CH 240.000
CH 220.000
CH 200.000
CH 180.000
CH 160.000
CH 140.000
CH 120.000
CH 100.000

PROPOSED 2.5m WIDE CONCRETE FOOTPATH, REFER IPWEAQ STD. DWG. RS-065 FOR DETAILS

REFER TYPICAL ALLOTMENT GRATED PIT ON MANHOLE CONNECTION DETAIL ON DRG-0215.

PROPOSED 1.8m WIDE CONCRETE FOOTPATH, REFER IPWEAQ STD. DWG. RS-065 FOR DETAILS.

REFER TYPICAL ALLOTMENT GRATED PIT ON MANHOLE CONNECTION DETAIL ON DRG-0215.

PROPOSED 1.8m WIDE CONCRETE FOOTPATH, REFER IPWEAQ STD. DWG. RS-065 FOR DETAILS.

PROPOSED 6.0m WIDE HEAVY DUTY DRIVEWAY CROSS-OVERS IN ACCORDANCE WITH IPWEAQ RS-051. CONTRACTOR TO DOWEL INTO EXISTING INTERNAL SPS DRIVEWAY WITH R24 GALVANIZED, 400 LONG BARS @ 300 CRS AND EPOXY BONDED

REFER TYPICAL ALLOTMENT GRATED PIT ON MANHOLE CONNECTION DETAIL ON DRG-0215.

TYPICAL BOLLARDS TO DRAINAGE LOT ALONG ROAD RESERVE - REFER LANDSCAPE ARCHITECT FOR DETAILS.

PROVIDE LOCKABLE GATE AT BOUNDARY IN ACCORDANCE WITH IPWEAQ GS-043

LOCALLY GRADE CHANNEL BASE AT MIN. 0.5% TO LOW FLOW INLET

REFER TYPICAL ALLOTMENT GRATED PIT ON MANHOLE CONNECTION DETAIL ON DRG-0215.

EXISTING 900mm CONCRETE INVERT CHANNEL

PROPOSED BIO-RETENTION BASIN FOR DETAILS REFER CV-DRG-0491

PROPOSED 3.0m WIDE HEAVY DUTY CONCRETE CROSSOVER 175mm DEPTH

REFER DETAIL 'C' ON DRG 0209 FOR OUTLET DETAILS AND SETOUT.

FUTURE ROAD EXTENSION TO MT LINDESAY HWY SERVICE ROAD COMPLETED UNDER SEPARATE APPLICATION.

REFER DETAIL 'B' ON DRG 0209 FOR OUTLET DETAILS AND SETOUT.

HYDROMULCHING TO STABILIZE WORKS. CHANNEL SUBJECT TO FINAL LANDSCAPE ARCHITECT SPECIFICATION

REFER DETAIL 'A' ON DRG 0209 FOR OUTLET DETAILS AND SETOUT.

EXTEND EXISTING 900mm CONCRETE INVERT CHANNEL TO MATCH NEW INLET HEADWALL

ENTERPRISE DRIVE

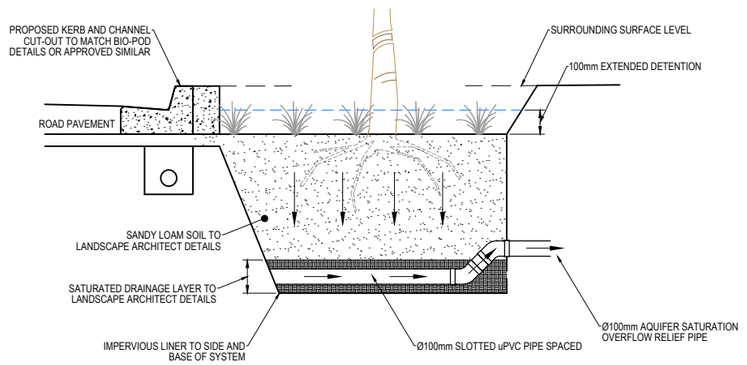
MT LINDESAY HWY

LOT 1
LOT 2
LOT 900
LOT 905

SAG 81.631
CH 80.000
R.R.P. 85.176
CH 61.196
CH 60.000
CH 40.000
CH 25.231
CH 20.000
CH 10.000
CH 0.000
CH 589.486
CH 580.000

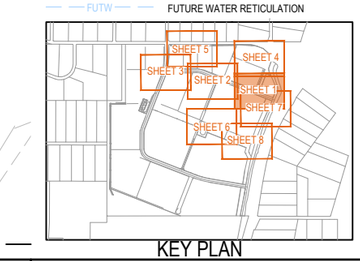
LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- EXISTING RETAINING WALL
- PROPOSED ROCK GABION RETAINING WALL
- PROPOSED BARRIER KERB & CHANNEL TYPE "B1" NOM. 450mm WIDE
- PROPOSED FLUSH EDGE RESTRAINT TYPE "ER2" NOM. 230mm WIDE
- PROPOSED CHANNEL INVERT KERB NOM. 900mm WIDE
- PROPOSED EDGE OF BITUMEN
- ROAD PAVEMENT
- CONCRETE FOOTPATH
- HEAVY DUTY CONCRETE CROSSOVER (225mmDEPTH)
- HYDROMULCHING TREATMENT
- TEMPORARY TURNAROUND INFILL PAVEMENT
- HEAVY DUTY CONCRETE CROSSOVER / TRACK (175mm DEPTH)
- COMPACTED GRAVEL PAVEMENT TYPE 2.3 (MIN 150mm THICK UNLESS OTHERWISE SPECIFIED)
- PROPOSED STORMWATER DRAINAGE STRUCTURE NAME
- PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED STORMWATER DRAINAGE STRUCTURE
- PROPOSED BIOPOD
- PROPOSED LANDSCAPE POD
- PROPOSED SEWER RETICULATION
- PROPOSED WATER RETICULATION
- POWERLINK EASEMENT
- EXISTING STORMWATER DRAINAGE STRUCTURE NAME
- EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING STORMWATER DRAINAGE STRUCTURE
- EXISTING SEWER RETICULATION
- EXISTING WATER RETICULATION
- EXISTING OVERHEAD ELECTRICAL RETICULATION
- FUTURE STORMWATER DRAINAGE STRUCTURE NAME
- FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE STORMWATER DRAINAGE STRUCTURE
- FUTURE SEWER RETICULATION
- FUTURE WATER RETICULATION



NOTE: TYPICAL DETAIL ONLY REFER TO LANDSCAPE ARCHITECT FOR DETAILS AND SPECIFICATIONS.

LANDSCAPE POD TYPICAL DETAIL
NTS



KEY PLAN

FOR CONTINUATION REFER DRG-CV-0207

Issue	Description	DR	CH	VE	Date
E	UPDATED LAYOUT	A.O.	S.S.	B.K.	01.08.24
D	UPDATED LAYOUT TEMPORARY ACCESS ROAD REMOVED	A.O.	S.S.	B.K.	15.07.24
C	AMENDMENTS TO SWD DESIGN	A.O.	S.S.	G.E.	03.07.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales

0 5 10 20 30 40 50m

1 : 500

100mm on Original

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 1

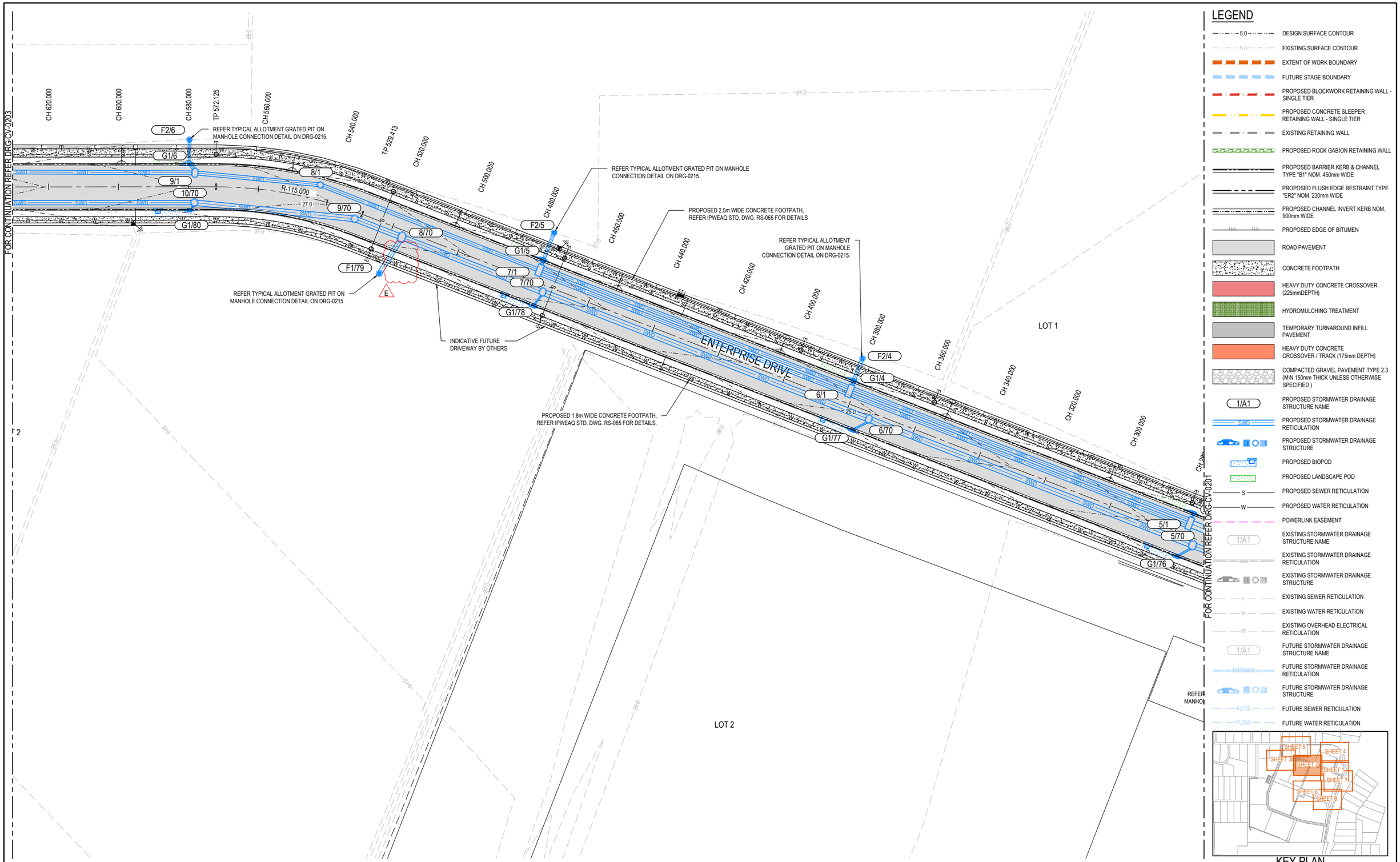
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Tel No: +61 7 3337 0000
www.arcadis.com/au

Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0201

Issue: E

Date Plotted: 2 Aug 2024 - 09:37AM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0201-CivilWorksPlan.dwg



Issue	Description	DR	CH	VE	Date
E	UPDATED LAYOUT, CROSSOVER REMOVED	A.O.	S.S.	B.K.	15.07.24
D	AMENDMENTS TO SWD DESIGN	A.O.	S.S.	G.E.	03.07.24
C	PCN17 AMENDMENTS TO SWD LINES 60, 65 & 79	G.P.	T.F.	G.E.	25.06.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales

0 5 10 20 30 40 50m

1 : 500

Surveyor

WOLTER consulting group

Planning Urban Design Landscape Environment Surveying

Client

Charter Hall

Status

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project

FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title

ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 2

ARCADIS

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Level 35, 111 Eagle Street
BRISBANE QLD 4000
ABN 76 104 485 289

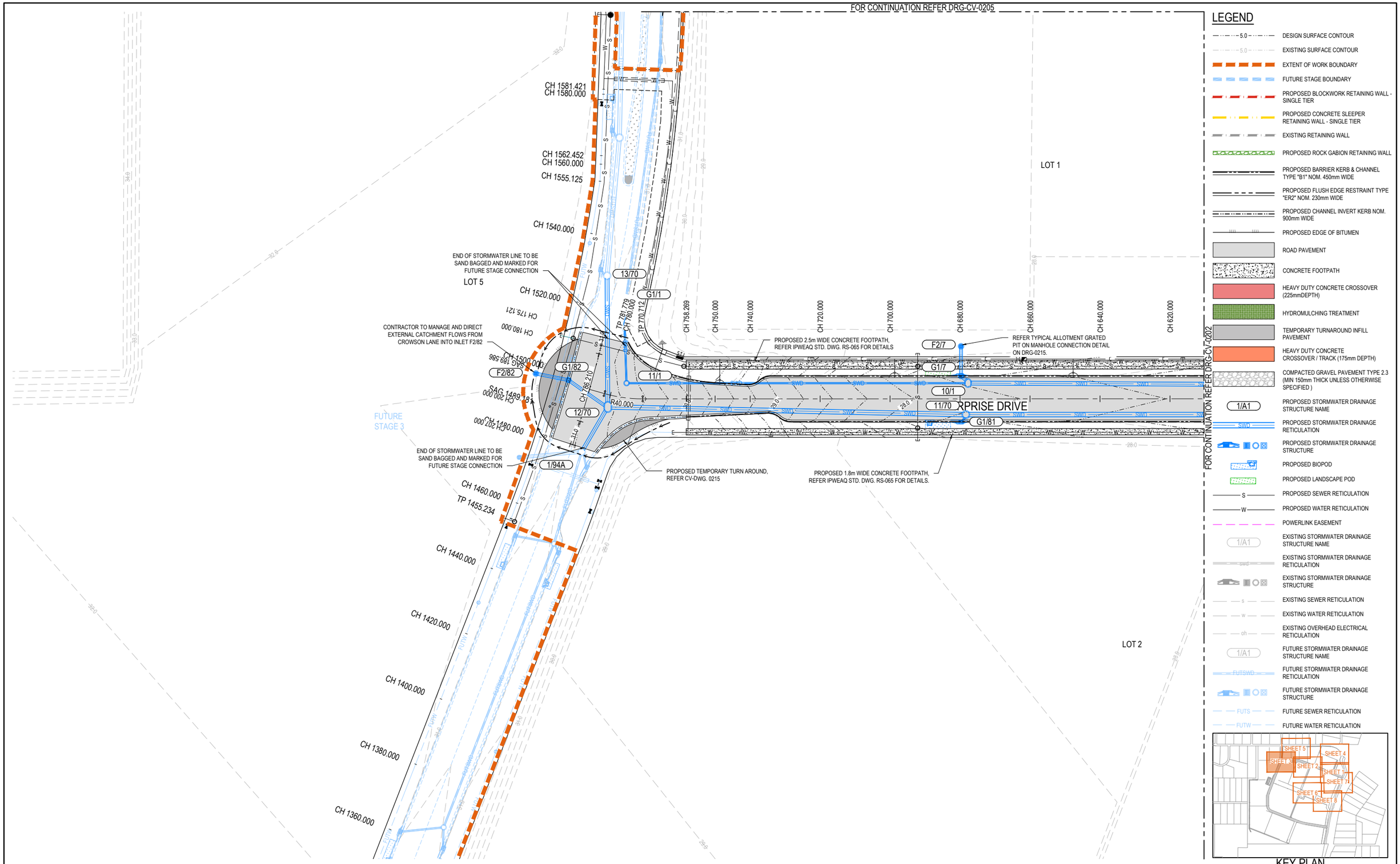
Tel No: +61 7 3337 0000
www.arcadis.com/au

Project Number 30109334

Drawing No. 30109334-AAP-P301OP-CV-DRG-0202

Issue E

Date Plotted: 1 Aug 2024 - 01:19PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0201-CivilWorksPlan.dwg



Issue	Description	DR	CH	VE	Date
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales

0 5 10 20 30 40 50m

1 : 500

100mm on Original

Surveyor

WOLTER consulting group

Planning Urban Design Landscape Environment Surveying

Client

Charter Hall

Status

FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project

FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title

ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 3

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ABN 76 104 485 289

Tel No: +61 7 3337 0000
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Project Number	30109334

Drawing No.	Issue
30109334-AAP-P301OP-CV-DRG-0203	B

Date Plotted: 1 Aug 2024 - 01:19PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0201-CivilWorksPlan.dwg

FOR CONTINUATION REFER DRG-CV-0205 INSET 'A'

CROWSON LANE

2 0215 | 3 0215 | 4 0215 | 5 0215

7/8 | 6/8 | 5/8 | 4/8 | 3/8 | 2/9 | 1/9 | F1/16 | F1/9

TEMPORARY BUND MAX BATTERS. TOP RL 29.00

OPEN DRAIN TO BE TURFED UNDER BEW WORKS.

CHANNEL GRADE: 0.5% VELOCITY AT CAPACITY: 1.70 (m/s)

CHANNEL GRADE: 0.5% VELOCITY AT CAPACITY: 0.50 (m/s)

EXISTING 4.0m WIDE TURFED DIVERSION DRAIN TO FOLLOW EXISTING SURFACE PROFILE AT TOE OF BATTER. MAINTAIN 0.5% MIN FREE-DRAINING.

SWALE TO BE STONE PITCHED AS VELOCITY EXCEEDS 1.5m/s

CHANNEL GRADE: 3% VELOCITY AT CAPACITY: 1.70 (m/s)

6.00m EASEMENT OVER STORMWATER LINE.

0.5m M HIGH TEMPORARY BUND WITH 1 IN 2 BATTERS

EXISTING TYPICAL 3.0m WIDE TURFED DIVERSION DRAIN TO FOLLOW EXISTING SURFACE PROFILE AT TOP OF BATTER. MAINTAIN 0.5% MIN FREE-DRAINING.

SWALE TO BE STONE PITCHED AS VELOCITY EXCEEDS 1.5m/s

CHANNEL GRADE: 6% VELOCITY AT 50yr STORM EVENT : 2.42 (m/s)

REFER TYPICAL ALLOTMENT GRATED PIT ON MANHOLE CONNECTION DETAIL ON DRG-0215.

SWD LINE 9B (Q3 MONTH BYPASS)

CONTRACTOR TO INSTALL NO-RETURN VALVE TO SUIT PROPOSED 0.45m RCP

FOR CONTINUATION REFER DRG-CV-0201

LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- EXISTING RETAINING WALL
- PROPOSED ROCK GABION RETAINING WALL
- PROPOSED BARRIER KERB & CHANNEL TYPE "B1" NOM. 450mm WIDE
- PROPOSED FLUSH EDGE RESTRAINT TYPE "ER2" NOM. 230mm WIDE
- PROPOSED CHANNEL INVERT KERB NOM. 900mm WIDE
- PROPOSED EDGE OF BITUMEN
- ROAD PAVEMENT
- CONCRETE FOOTPATH
- HEAVY DUTY CONCRETE CROSSOVER (225mmDEPTH)
- HYDROMULCHING TREATMENT
- TEMPORARY TURNAROUND INFILL PAVEMENT
- HEAVY DUTY CONCRETE CROSSOVER / TRACK (175mm DEPTH)
- COMPACTED GRAVEL PAVEMENT TYPE 2.3 (MIN 150mm THICK UNLESS OTHERWISE SPECIFIED)
- 1/A1 — PROPOSED STORMWATER DRAINAGE STRUCTURE NAME
- SWD — PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED STORMWATER DRAINAGE STRUCTURE
- PROPOSED BIOPOD
- PROPOSED LANDSCAPE POD
- S — PROPOSED SEWER RETICULATION
- W — PROPOSED WATER RETICULATION
- POWERLINK EASEMENT
- 1/A1 — EXISTING STORMWATER DRAINAGE STRUCTURE NAME
- SWD — EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING STORMWATER DRAINAGE STRUCTURE
- S — EXISTING SEWER RETICULATION
- W — EXISTING WATER RETICULATION
- OH — EXISTING OVERHEAD ELECTRICAL RETICULATION
- 1/A1 — FUTURE STORMWATER DRAINAGE STRUCTURE NAME
- FUTSWD — FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE STORMWATER DRAINAGE STRUCTURE
- FUTS — FUTURE SEWER RETICULATION
- FUTW — FUTURE WATER RETICULATION

KEY PLAN

SHEET 1, SHEET 2, SHEET 3, SHEET 4, SHEET 5, SHEET 6, SHEET 7, SHEET 8

Issue	Description	DR	CH	VE	Date
D	UPDATED LAYOUT	A.O.	S.S.	B.K.	01.08.24
C	UPDATED LAYOUT TEMPORARY ACCESS ROAD REMOVED	A.O.	S.S.	B.K.	15.07.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales

0 5 10 20 30 40 50m

1 : 500

100mm on Original

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures

Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 4

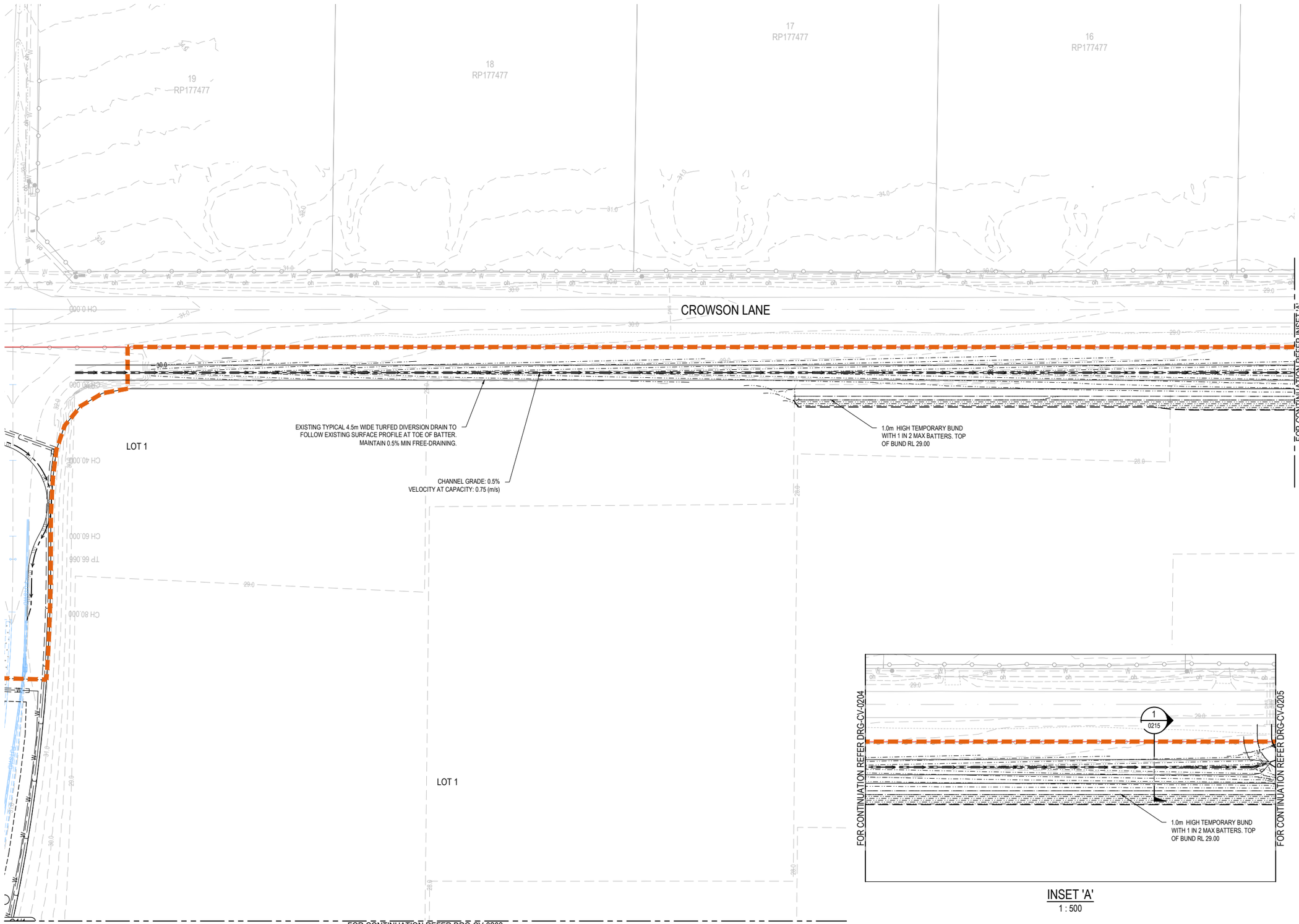
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Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0204

Issue: D

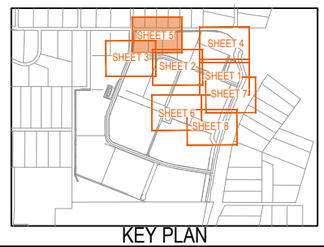
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INSET 'A'
1 : 500

LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- EXISTING RETAINING WALL
- PROPOSED ROCK GABION RETAINING WALL
- PROPOSED BARRIER KERB & CHANNEL TYPE "B1" NOM. 450mm WIDE
- PROPOSED FLUSH EDGE RESTRAINT TYPE "ER2" NOM. 230mm WIDE
- PROPOSED CHANNEL INVERT KERB NOM. 900mm WIDE
- PROPOSED EDGE OF BITUMEN
- ROAD PAVEMENT
- CONCRETE FOOTPATH
- HEAVY DUTY CONCRETE CROSSOVER (225mmDEPTH)
- HYDROMULCHING TREATMENT
- TEMPORARY TURNAROUND INFILL PAVEMENT
- HEAVY DUTY CONCRETE CROSSOVER / TRACK (175mm DEPTH)
- COMPACTED GRAVEL PAVEMENT TYPE 2.3 (MIN 150mm THICK UNLESS OTHERWISE SPECIFIED)
- PROPOSED STORMWATER DRAINAGE STRUCTURE NAME (1/A1)
- PROPOSED STORMWATER DRAINAGE RETICULATION (SWD)
- PROPOSED STORMWATER DRAINAGE STRUCTURE
- PROPOSED BIOPOD
- PROPOSED LANDSCAPE POD
- PROPOSED SEWER RETICULATION (S)
- PROPOSED WATER RETICULATION (W)
- POWERLINK EASEMENT
- EXISTING STORMWATER DRAINAGE STRUCTURE NAME (1/A1)
- EXISTING STORMWATER DRAINAGE RETICULATION (SWD)
- EXISTING STORMWATER DRAINAGE STRUCTURE
- EXISTING SEWER RETICULATION (S)
- EXISTING WATER RETICULATION (W)
- EXISTING OVERHEAD ELECTRICAL RETICULATION (OH)
- FUTURE STORMWATER DRAINAGE STRUCTURE NAME (1/A1)
- FUTURE STORMWATER DRAINAGE RETICULATION (FUTSWD)
- FUTURE STORMWATER DRAINAGE STRUCTURE
- FUTURE SEWER RETICULATION (FUTS)
- FUTURE WATER RETICULATION (FUTW)



KEY PLAN

Issue	Description	DR	CH	VE	Date
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales

0 5 10 20 30 40 50m

1 : 500

Surveyor

WOLTER consulting group

Planning Urban Design Landscape Environment Surveying

Client

Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 5

ARCADIS
Arcadis Australia Pacific Pty Limited
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ABN 76 104 485 289
Tel No: +61 7 3337 0000
www.arcadis.com/au

Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0205

Issue: B

Date Plotted: 1 Aug 2024 - 01:19PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0201-CivilWorksPlan.dwg

FOR CONTINUATION REFER DRG-CV-0202

TOWER SURROUNDS
100mm THICK

CONTRACTOR TO ENSURE THAT
TOWER AREA AND SURROUNDS ARE
FREE DRAINING WITH NO PONDING

REFER TYPICAL ALLOTMENT GRATED PIT ON
MANHOLE CONNECTION DETAIL ON DRG-0215.

F1/61

F2/60

REFER TYPICAL ALLOTMENT GRATED PIT ON
MANHOLE CONNECTION DETAIL ON DRG-0215.
ENSURE MIN 0.55m PONDING DEPTH

JOIN TO EXISTING STUB

3/60

2/65

3/65

CONTRACTOR TO PROOF ROLL
POWERLINK TOWER MAINTENANCE
ACCESS TRACK SUBGRADE IN PRESENCE
OF SUPERVISING ENGINEER PRIOR TO
INSTALLATION OF COMPACTED GRAVEL

DRAINAGE FLOOR AREA
100mm THICK

F1/60

1/65

2/60

1/60

JOIN TO EXISTING STUB

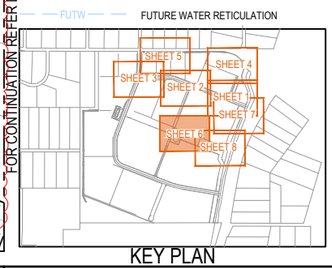
FUTURE
STAGE 2

F

LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- EXISTING RETAINING WALL
- PROPOSED ROCK GABION RETAINING WALL
- PROPOSED BARRIER KERB & CHANNEL TYPE "B1" NOM. 450mm WIDE
- PROPOSED FLUSH EDGE RESTRAINT TYPE "ER2" NOM. 230mm WIDE
- PROPOSED CHANNEL INVERT KERB NOM. 900mm WIDE
- PROPOSED EDGE OF BITUMEN
- ROAD PAVEMENT
- CONCRETE FOOTPATH
- HEAVY DUTY CONCRETE CROSSOVER (225mmDEPTH)
- HYDROMULCHING TREATMENT
- TEMPORARY TURNAROUND INFILL PAVEMENT
- HEAVY DUTY CONCRETE CROSSOVER / TRACK (175mm DEPTH)
- COMPACTED GRAVEL PAVEMENT TYPE 2.3 (MIN 150mm THICK UNLESS OTHERWISE SPECIFIED)
- PROPOSED STORMWATER DRAINAGE STRUCTURE NAME
- PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED STORMWATER DRAINAGE STRUCTURE
- PROPOSED BIOPOD
- PROPOSED LANDSCAPE POD
- PROPOSED SEWER RETICULATION
- PROPOSED WATER RETICULATION
- POWERLINK EASEMENT
- EXISTING STORMWATER DRAINAGE STRUCTURE NAME
- EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING STORMWATER DRAINAGE STRUCTURE
- EXISTING SEWER RETICULATION
- EXISTING WATER RETICULATION
- EXISTING OVERHEAD ELECTRICAL RETICULATION
- FUTURE STORMWATER DRAINAGE STRUCTURE NAME
- FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE STORMWATER DRAINAGE STRUCTURE
- FUTURE SEWER RETICULATION
- FUTURE WATER RETICULATION

FOR CONTINUATION REFER DRG-CV-0208



KEY PLAN

Issue	Description	DR	CH	VE	Date
F	UPDATED LAYOUT	A.O.	S.S.	B.K.	01.08.24
E	UPDATED LAYOUT	A.O.	S.S.	B.K.	15.07.24
D	AMENDMENTS TO SWD DESIGN	A.O.	S.S.	G.E.	03.07.24
C	PCN17 AMENDMENTS TO SWD LINES 60, 65 & 79	G.P.	T.F.	G.E.	25.06.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales

0 5 10 20 30 40 50m

1 : 500

Surveyor

WOLTER consulting group
Planning Urban Design Landscape Environment Surveying

Client

Charter Hall

Status

FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project

FLAGSTONE LOGISTICS
ESTATE - STAGE 1

Title

ROADWORKS AND DRAINAGE
LAYOUT PLAN
SHEET 6

ARCADIS
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Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0206

Issue: F

Date Plotted: 2 Aug 2024 - 09:57AM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0201-CivilWorksPlan.dwg

FOR CONTINUATION REFER DRG-CV-0201

PROPOSED 1.8m WIDE CONCRETE FOOTHPATH, REFER IPWEAQ STD. DWG. RS-065 FOR DETAILS.

PROPOSED 6.0m WIDE HEAVY DUTY DRIVEWAY CROSS-OVERS IN ACCORDANCE WITH IPWEAQ RS-051. CONTRACTOR TO DOWEL INTO EXISTING INTERNAL SPS DRIVEWAY WITH R24 GALVANIZED, 400 LONG BARS @ 300 CRS AND EPOXY BONDED

REFER TYPICAL ALLOTMENT GRATED PIT ON MANHOLE CONNECTION DETAIL ON DRG-0215.

TYPICAL BOLLARDS TO DRAINAGE LOT ALONG ROAD RESERVE - REFER LANDSCAPE ARCHITECT FOR DETAILS.

PROVIDE LOCKABLE GATE AT BOUNDARY IN ACCORDANCE WITH IPWEAQ GS-043

LOCALLY GRADE CHANNEL BASE AT MIN. 0.5% TO LOW FLOW INLET

REFER TYPICAL ALLOTMENT GRATED PIT ON MANHOLE CONNECTION DETAIL ON DRG-0215.

EXISTING 900mm CONCRETE INVERT CHANNEL

PROPOSED 3.0m WIDE HEAVY DUTY CONCRETE CROSSOVER 175mm DEPTH

REFER DETAIL 'C' ON DRG 0209 FOR OUTLET DETAILS AND SETOUT.

FUTURE ROAD EXTENSION TO MT LINDESAY HWY SERVICE ROAD COMPLETED UNDER SEPARATE APPLICATION.

REFER DETAIL 'B' ON DRG 0209 FOR OUTLET DETAILS AND SETOUT.

HYDROMULCHING TO STABILIZE WORKS. CHANNEL SUBJECT TO FINAL LANDSCAPE ARCHITECT SPECIFICATION

REFER DETAIL 'A' ON DRG 0209 FOR OUTLET DETAILS AND SETOUT.

EXTEND EXISTING 900mm CONCRETE INVERT CHANNEL TO MATCH NEW INLET HEADWALL

HYDROMULCHING TO STABILIZE WORKS. CHANNEL SUBJECT TO FINAL LANDSCAPE ARCHITECT SPECIFICATION

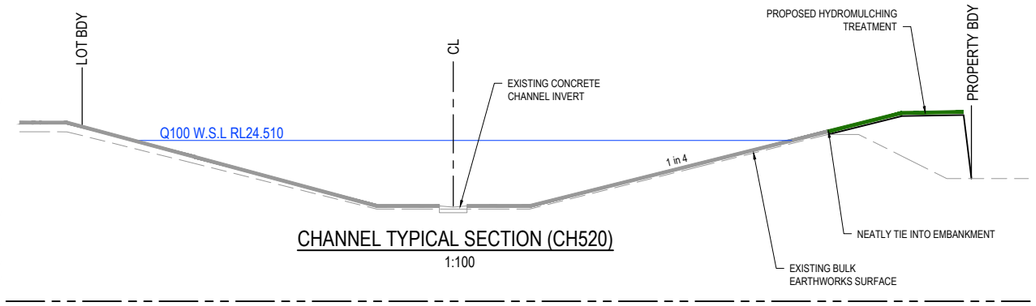
LOT 2

MT LINDESAY HWY

FOR CONTINUATION REFER DRG-CV-0208

CHANNEL TYPICAL SECTION (CH520)

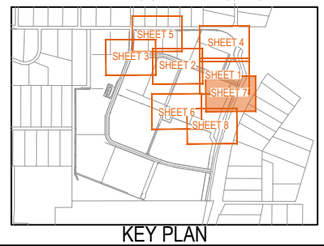
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LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- EXISTING RETAINING WALL
- PROPOSED ROCK GABION RETAINING WALL
- PROPOSED BARRIER KERB & CHANNEL TYPE "B1" NOM. 450mm WIDE
- PROPOSED FLUSH EDGE RESTRAINT TYPE "ER2" NOM. 230mm WIDE
- PROPOSED CHANNEL INVERT KERB NOM. 900mm WIDE
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- ROAD PAVEMENT
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- HYDROMULCHING TREATMENT
- TEMPORARY TURNAROUND INFILL PAVEMENT
- HEAVY DUTY CONCRETE CROSSOVER / TRACK (175mm DEPTH)
- COMPACTED GRAVEL PAVEMENT TYPE 2.3 (MIN 150mm THICK UNLESS OTHERWISE SPECIFIED)
- 1/A1 PROPOSED STORMWATER DRAINAGE STRUCTURE NAME
- SWD PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED STORMWATER DRAINAGE STRUCTURE
- PROPOSED BIOPOD
- PROPOSED LANDSCAPE POD
- S PROPOSED SEWER RETICULATION
- W PROPOSED WATER RETICULATION
- POWERLINK EASEMENT
- 1/A1 EXISTING STORMWATER DRAINAGE STRUCTURE NAME
- SWD EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING STORMWATER DRAINAGE STRUCTURE
- S EXISTING SEWER RETICULATION
- W EXISTING WATER RETICULATION
- oh EXISTING OVERHEAD ELECTRICAL RETICULATION
- 1/A1 FUTURE STORMWATER DRAINAGE STRUCTURE NAME
- FUTSWD FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE STORMWATER DRAINAGE STRUCTURE
- FUTS FUTURE SEWER RETICULATION
- FUTW FUTURE WATER RETICULATION

KEY PLAN



Issue	Description	DR	CH	VE	Date
D	UPDATED LAYOUT, SWD LINE 15 UPDATED	A.O.	S.S.	B.K.	15.07.24
C	AMENDMENTS TO SWD DESIGN	A.O.	S.S.	G.E.	03.07.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales

0 5 10 20 30 40 50m

1 : 500

0 1 2 4 6 8 10m

1 : 100

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures

Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 7

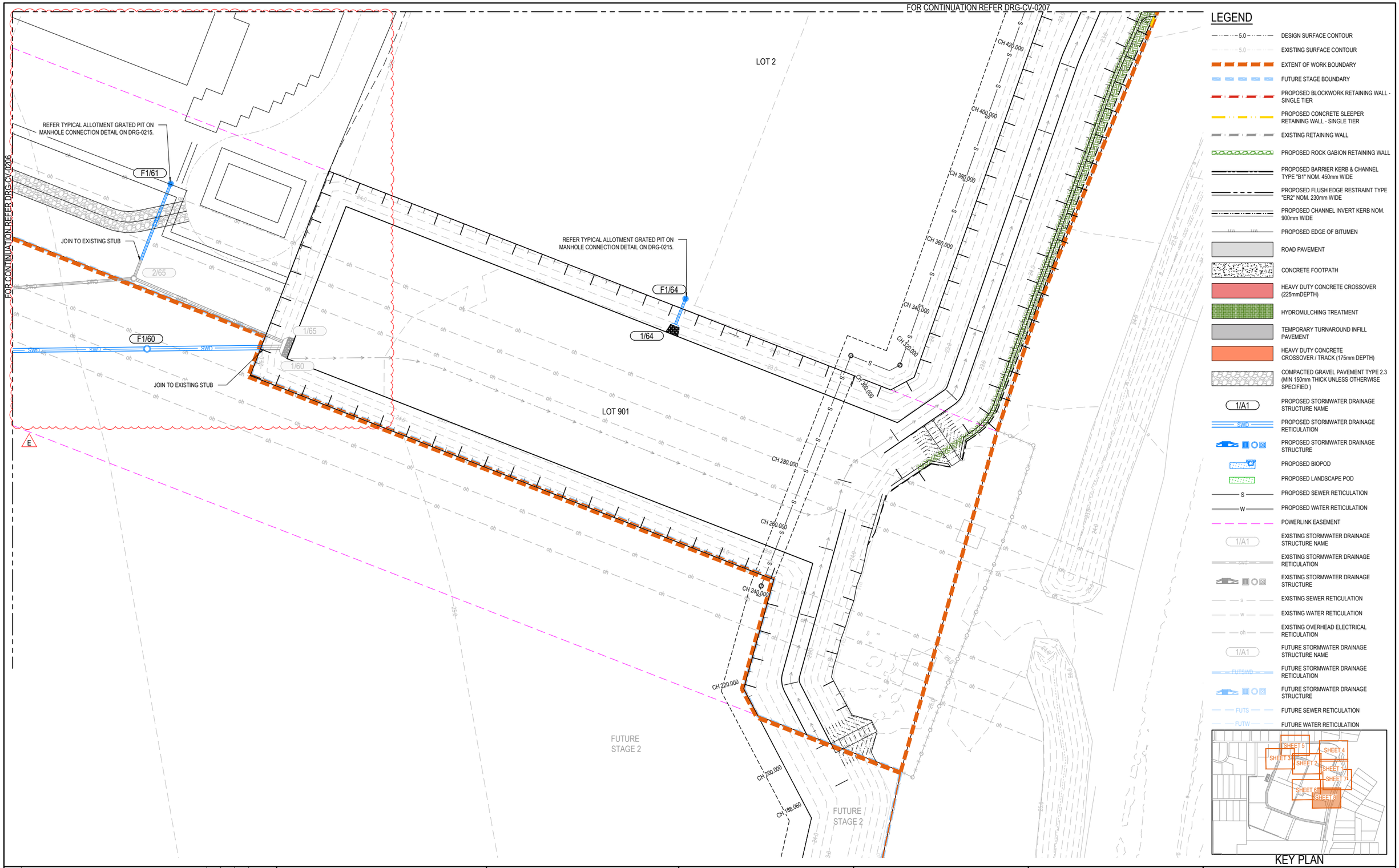
ARCADIS
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Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0207

Issue: D

Date Plotted: 1 Aug 2024 - 01:19PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0201-CivilWorksPlan.dwg



Issue	Description	DR	CH	VE	Date
E	UPDATED LAYOUT	A.O.	S.S.	B.K.	15.07.24
D	AMENDMENTS TO SWD DESIGN	A.O.	S.S.	G.E.	03.07.24
C	PCN17 AMENDMENTS TO SWD LINES 60, 65 & 79	G.P.	T.F.	G.E.	25.06.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales

0 5 10 20 30 40 50m

1 : 500

0 5 10 15 20 25m

1 : 250

Surveyor

WOLTER consulting group

Planning Urban Design Landscape Environment Surveying

Client

Charter Hall

Status

FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project

FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title

ROADWORKS AND DRAINAGE LAYOUT PLAN SHEET 8

ARCADIS

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www.arcadis.com/au

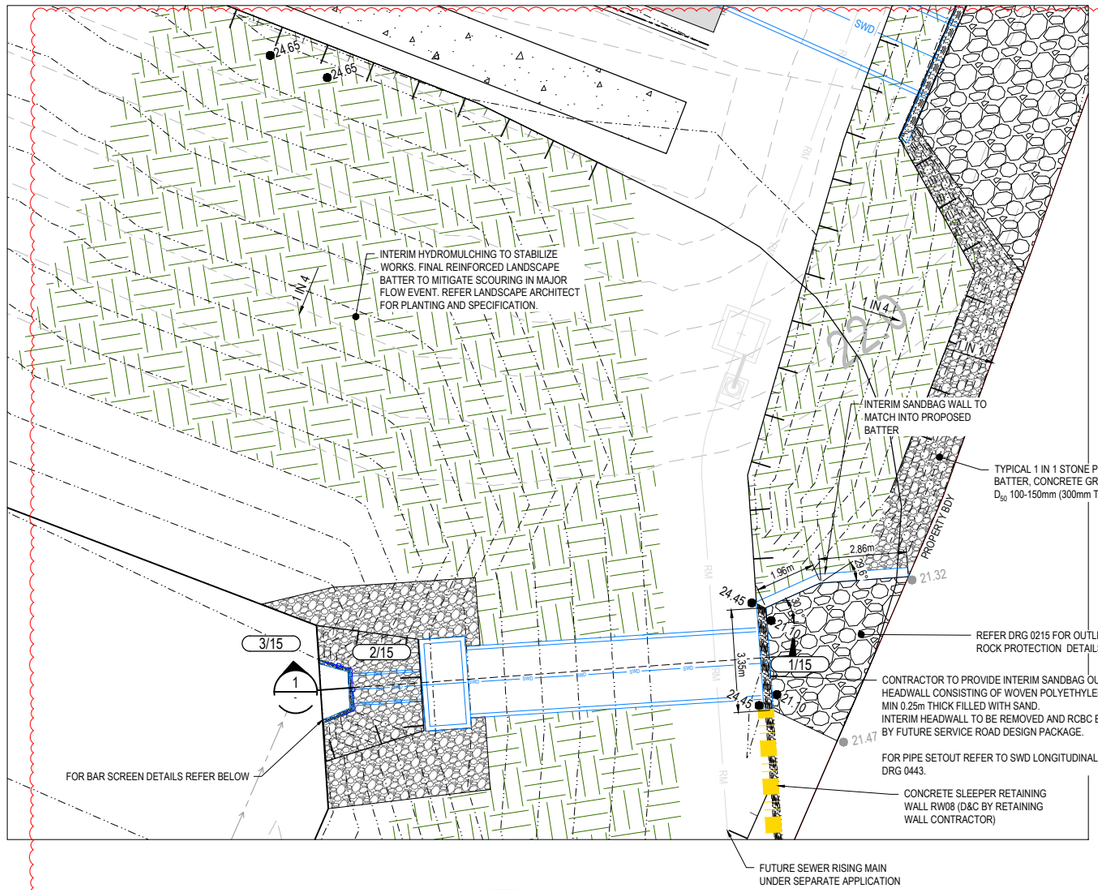
Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0208

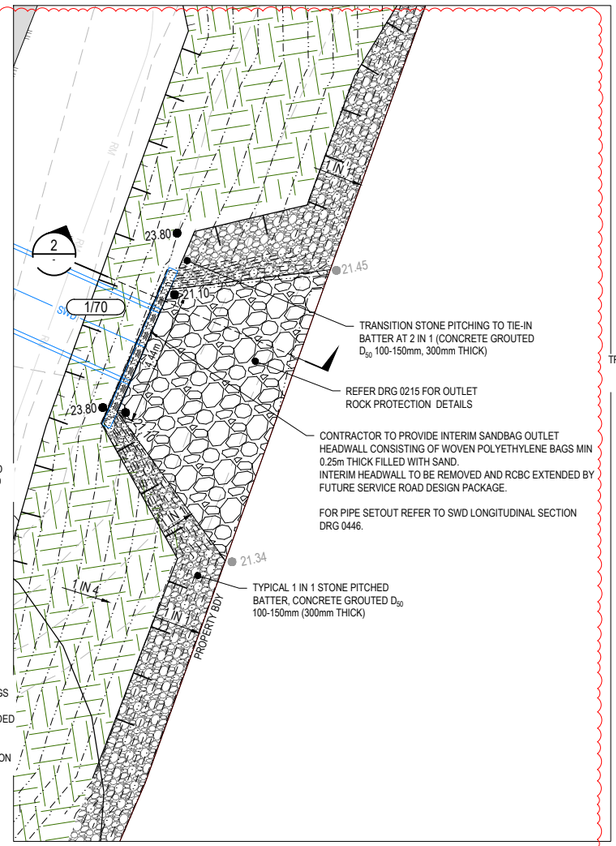
Issue: E

100mm on Original

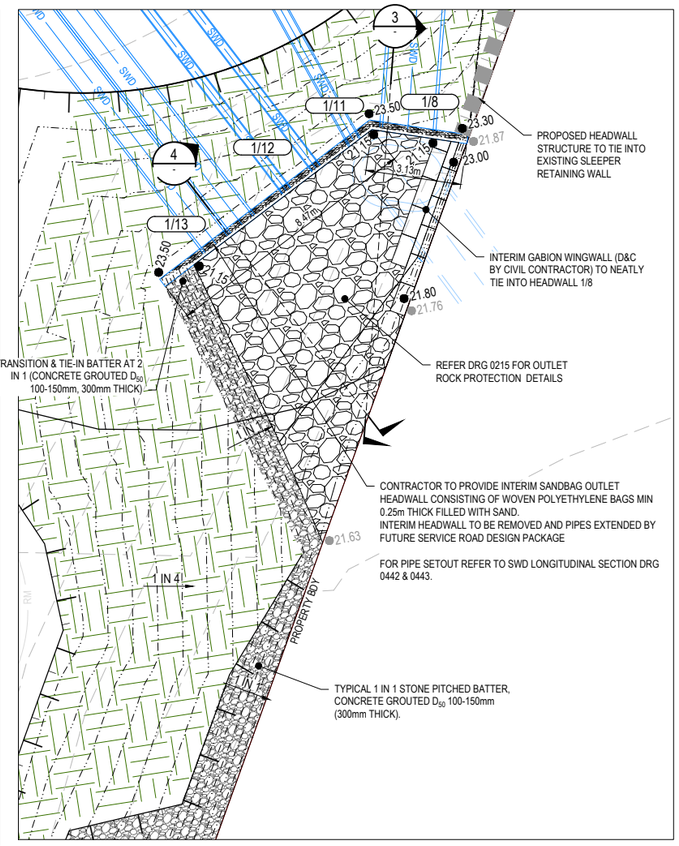
Date Plotted: 1 Aug 2024 - 01:19PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0201-CivilWorksPlan.dwg



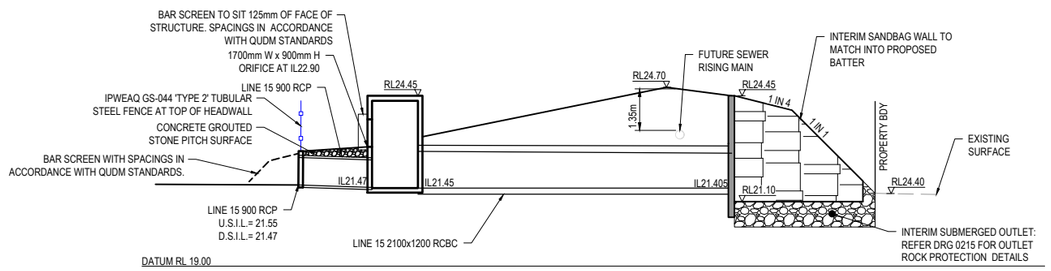
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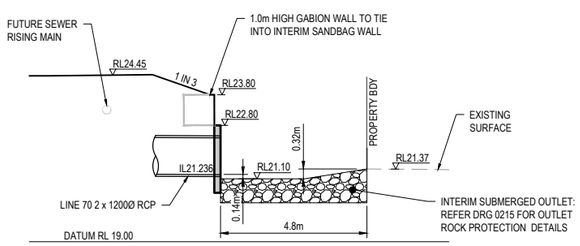
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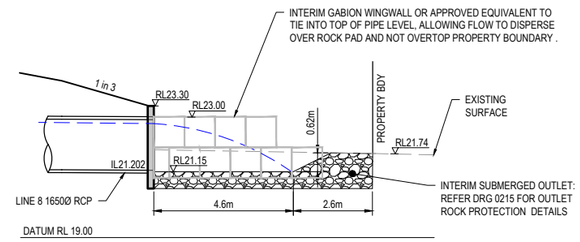
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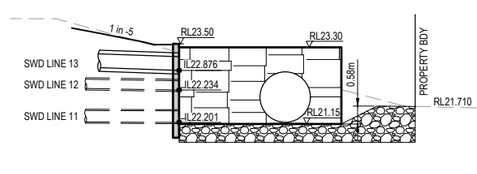
SECTION 1 1 : 100



SECTION 2 1 : 100



SECTION 3 1 : 100



SECTION 4 1 : 100

Issue	Description	DR	CH	VE	Date
D	UPDATED DETAILS AND SECTION	A.O.	S.S.	B.K.	15.07.24
C	AMENDMENTS TO SWD DESIGN	A.O.	S.S.	G.E.	03.07.24
B	SEEDED TREATMENT AMENDED TO HYDROMULCH	J.B.	T.F.	G.E.	19.03.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales

0 5 10 20 30 40 50m

1 : 500

0 1 2 4 6 8 10m

1 : 100

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: STORMWATER OUTLET DETAILS LAYOUT PLAN

ARCADIS
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Level 35, 111 Eagle Street
BRISBANE QLD 4000
ABN 76 104 485 289
Tel No: +61 7 3337 0000
www.arcadis.com/au

Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0209

Issue: D

Date Plotted: 1 Aug 2024 - 01:19PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0201-CivilWorksPlan.dwg

SERVICE PROVIDER AND CONTRACTOR LIVE SEWER WORKS - TYPICAL SCHEDULE

NO.	WORKS DESCRIPTION	SEWER DIA	MH NO.	MH/MS TYPE	COVER TYPE	LOT No.	F.S.L.	I.L.	DEPTH TO INVERT
1(A)	INFRASTRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH RELEVANT OPERATIONAL WORKS APPROVAL BY APPROVED CONTRACTOR OR LOGAN WATER AT THE DEVELOPERS EXPENSE. CONSTRUCTOR TO INSTALL TEMPORARY PLUG IN EXISTING STUB PRIOR TO WORKS	225	1/1	STUB	B	905	24.575	18.500	6.075
1(B)	CONTRACTOR TO CONNECT NEW SEWER MAIN FROM EXISTING STUB								
1(C)	CONTRACTOR TO REMOVE TEMPORARY PLUG AFTER SUCCESSFUL "ON MAINTENANCE" INSPECTION AND TESTING.								

NAME OF ESTATE:	4499-4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN	
SUBDIVIDER:	CH HYDRANGEA PTY LTD	
SP DELEGATE APPROVAL DATE:	-	
DRAWING/PLAN No.:	-	
No. OF ALLOTMENTS:	6 LOTS	
AREA IN Ha:	-	
LENGTH OF SEWERS:	150mm	
	225mm	

SEWER NOTES

1. ALL WORK & MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT SOUTH EAST QUEENSLAND SEWERAGE CODE SPECIFICATIONS & STANDARDS.
2. UNLESS SPECIFIED OTHERWISE ALL MATERIALS & WORK SHALL COMPLY WITH THE RELEVANT AUSTRALIAN STANDARDS.
3. THE CONSTRUCTION OF THE SEWERAGE WORK SHOWN ON THIS DRAWING SHALL BE INSPECTED BY AN ENGINEER WHO HAS RPEQ REGISTRATION. SEWERAGE WORKS NOT COMPLYING WITH THIS REQUIREMENT WILL NOT BE PERMITTED TO CONNECT INTO THE SEQ SERVICE PROVIDER SEWERAGE SYSTEM.
4. ALL WORK ASSOCIATED WITH LIVE SEWERS OR MAINTENANCE HOLES SHALL BE CARRIED OUT BY THE SEQ SERVICE PROVIDER AT THE DEVELOPER'S COST.
5. ALL PIPES & MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE "ACCEPTED PRODUCTS & MATERIALS" LIST.
6. WHERE PIPES ARE LAID IN FILL, THE FILLING SHALL BE CARRIED OUT IN LAYERS NOT EXCEEDING 300mm (LOOSE) IN DEPTH & SHALL BE COMPACTED UNTIL THE COMPACTION IS NOT LESS THAN 95% OF THE MATERIALS MAXIMUM COMPACTION WHEN TESTED IN ACCORDANCE WITH A.S. 1289 (MODIFIED COMPACTION). TESTING SHALL BE CARRIED OUT AFTER EACH ALTERNATE LAYER. IN ALL SUCH CASES APPROVAL OF CONSTRUCTED SEWERS WILL NOT BE ISSUED BY THE SEQ SERVICE PROVIDER UNLESS CERTIFICATES ARE PRODUCED CERTIFYING THAT THE REQUIRED COMPACTION HAS BEEN ACHIEVED.
7. WHERE SEWERS HAVE A GRADE OF 1 IN 20 OR STEEPER,BULKHEADS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SEQ SEWER CODE.
8. THE CONTRACTOR SHALL VERIFY THE LOCATION & DEPTH OF EXISTING SERVICES WITH RELEVANT AUTHORITIES BEFORE COMMENCING WORKS.
9. SEWERS SHALL BE DISUSED /ABANDONED IN ACCORDANCE WITH PROCEDURES SET OUT IN THE SEQ SEWER CODE.
10. BENCH MARK & LEVELS TO AHD.
11. EXISTING ALLOTMENTS REQUIRING A PROPERTY CONNECTION FROM EXISTING SEWERS SHALL BE PROVIDED BY THE SEQ SERVICE PROVIDER AT THE DEVELOPERS COST.
12. ALL MANHOLES 1500mm DIAMETER AND LARGER AND/ OR MANHOLES GREATER THAN 4.0m IN DEPTH TO BE LINED AS PER SOUTH EAST QUEENSLAND SEWERAGE CODE. REFER SEQ-SPS-1407 FOR DETAILS.
13. ALL MAINTENANCE HOLES ARE TO BE CONSTRUCTED USING CONCRETE CONTAINING CALCAREOUS AGGREGATE. IF CALCAREOUS AGGREGATE CONCRETE IS NOT AVAILABLE FOR MAINTENANCE HOLES POURED AFTER 1 AUGUST 2016, AN APPROVED INTERNAL PE LINER CAST IN PLACE IS TO BE CONSTRUCTED. MAINTENANCE HOLES POURED PRIOR TO THIS DATE WITHOUT USING CALCAREOUS AGGREGATE CONCRETE WILL ONLY BE ACCEPTED WITH SUFFICIENT (AS DETERMINED BY THE SUPERINTENDENT) PROOF THAT ALL REASONABLE EFFORTS WERE MADE TO SOURCE CALCAREOUS AGGREGATE CONCRETE.

VEGETATION PROTECTION

A. TREES LOCATED ALONG THE FOOTPATH SHALL BE, TRANSPLANTED PRIOR TO CONSTRUCTION, OR REPLACED IF DESTROYED.
B. WHEN WORKING WITHIN 4m OF TREES, RUBBER OR HARDWOOD GIRDLES SHALL BE CONSTRUCTED WITH 1.8m BATTENS CLOSELY SPACED & ARRANGED VERTICALLY FROM GROUND LEVEL. GIRDLES SHALL BE STRAPPED TO TREES PRIOR TO CONSTRUCTION & REMAIN UNTIL COMPLETION.
C. TREE ROOTS SHALL BE TUNNELLED UNDER, RATHER THAN SEVERED. IF ROOTS ARE SEVERED THE DAMAGED AREA SHALL BE TREATED WITH A SUITABLE FUNGICIDE. CONTACT RELEVANT COUNCIL ARBORIST FOR FURTHER ADVICE.
D. ANY TREE LOPPING REQUIRED SHOULD BE UNDERTAKEN BY AN APPROVED ARBORIST.

SOIL

A. TOPSOIL & SUBSOIL SHALL BE STOCKPILED SEPARATELY.
B. CARE SHALL BE TAKEN TO PREVENT SEDIMENT FROM ENTERING THE STORMWATER SYSTEM. THIS MAY INVOLVE PLACING APPROPRIATE SEDIMENT CONTROLS AROUND STOCKPILES.

CREEK CROSSINGS

A. SILTATION CONTROL MEASURES SHALL BE PLACED DOWNSTREAM OF ANY EXCAVATION WORK.
B. APPROPRIATE SEDIMENT CONTROLS SHALL BE USED TO PREVENT SEDIMENT FROM ENTERING THE CREEK.
C. NO SOIL SHALL BE STOCKPILED WITHIN 5m OF THE CREEK.

REHABILITATION

A. PREDISTURBANCE SOIL PROFILES & COMPACTION LEVELS SHALL BE REINSTATED.
B. PREDISTURBANCE VEGETATION PATTERNS SHALL BE RESTORED.

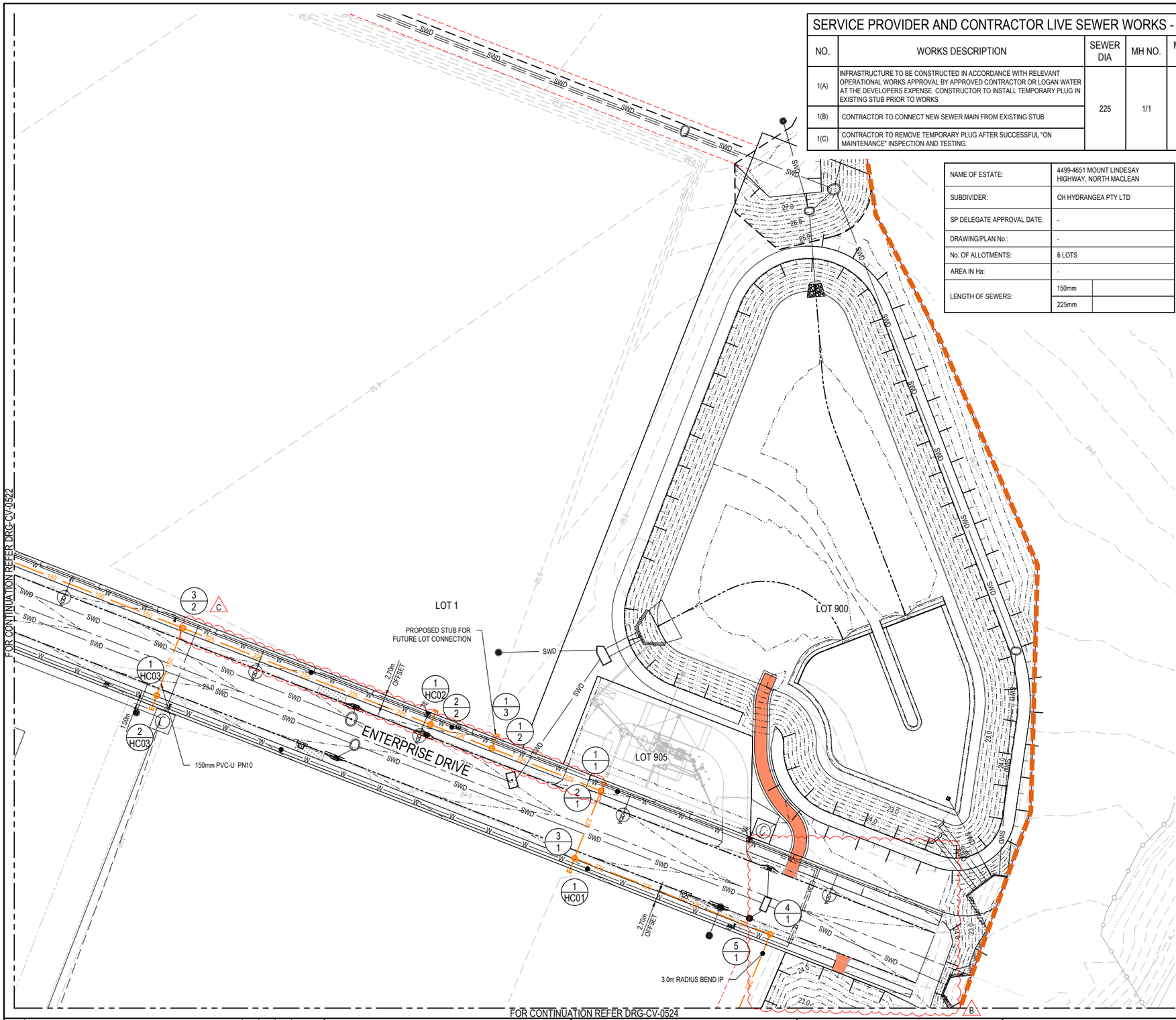
SAFETY

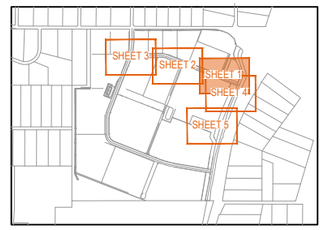
A. THE DESIGN & CONSTRUCTION OF THE WORKS SHALL COMPLY WITH ALL QUEENSLAND LEGISLATION.

LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- PROPOSED ROCK GABION RETAINING WALL
- NOMINAL KERB LINE
- PROPOSED EDGE OF BITUMEN
- SEWER EASEMENT LINE
- PROPOSED SEWER STRUCTURE NAME
- PROPOSED DN150 SEWER RETICULATION AND MANHOLE STRUCTURE
- PROPOSED DN225 SEWER RETICULATION AND MANHOLE STRUCTURE
- PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED WATER RETICULATION
- EXISTING SEWER STRUCTURE NAME
- EXISTING SEWER RETICULATION
- EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING WATER RETICULATION
- EXISTING UNDERGROUND ELECTRICAL RETICULATION
- EXISTING OVERHEAD ELECTRICAL RETICULATION
- EXISTING EARTHWORKS INTERFACE (EXTERNAL WORKS)
- FUTURE SEWER RETICULATION
- FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE WATER RETICULATION

ALL ENVIRONMENT PROTECTION MEASURES SHALL BE IMPLEMENTED PRIOR TO ANY CONSTRUCTION WORK, INCLUDING CLEARING, COMMENCING.





KEY PLAN

Issue	Description	DR	CH	VE	Date
C	SEWER LINE 1/1 TO 3/2 UPDATED TO SIZE 225	A.O.	S.S.	B.K.	01.08.24
B	TEMPORARY ACCESS ROAD REMOVED	J.B.	S.S.	B.K.	15.07.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales: 0 5 10 20 30 40 50m — 1 : 500

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures

Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: SEWER RETICULATION LAYOUT PLAN SHEET 1

ARCADIS
Arcadis Australia Pacific Pty Limited
Level 35, 111 Eagle Street
BRISBANE QLD 4000
ABN 76 104 485 289
Tel No: +61 7 3337 0000
www.arcadis.com/au

Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0521 | Issue: C

100mm on Original

Date Plotted: 1 Aug 2024 - 04:42PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0521-Sewer.dwg

FOR CONTINUATION REFER DRG-CV-0523

FOR CONTINUATION REFER DRG-CV-0521

3.0m RADIUS BEND IP

3.0m RADIUS BEND IP

150mm PVC-U PN10

150mm PVC-U PN10

2.70m OFFSET

1.00m

ENTERPRISE DRIVE

LOT 1

LOT 2

LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- PROPOSED ROCK GABION RETAINING WALL
- NOMINAL KERB LINE
- PROPOSED EDGE OF BITUMEN
- SEWER EASEMENT LINE
- PROPOSED SEWER STRUCTURE NAME
- PROPOSED DN150 SEWER RETICULATION AND MANHOLE STRUCTURE
- PROPOSED DN225 SEWER RETICULATION AND MANHOLE STRUCTURE
- PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED WATER RETICULATION
- EXISTING SEWER STRUCTURE NAME
- EXISTING SEWER RETICULATION
- EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING WATER RETICULATION
- EXISTING UNDERGROUND ELECTRICAL RETICULATION
- EXISTING OVERHEAD ELECTRICAL RETICULATION
- EXISTING EARTHWORKS INTERFACE (EXTERNAL WORKS)
- FUTURE SEWER RETICULATION
- FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE WATER RETICULATION



KEY PLAN

Issue	Description	DR	CH	VE	Date
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales

0 5 10 20 30 40 50m

1 : 500

100mm on Original

Surveyor

WOLTER consulting group

Planning Urban Design Landscape Environment Surveying

Client

Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: SEWER RETICULATION LAYOUT PLAN SHEET 2

ARCADIS

Arcadis Australia Pacific Pty Limited
Level 35, 111 Eagle Street
BRISBANE QLD 4000
ABN 76 104 485 289

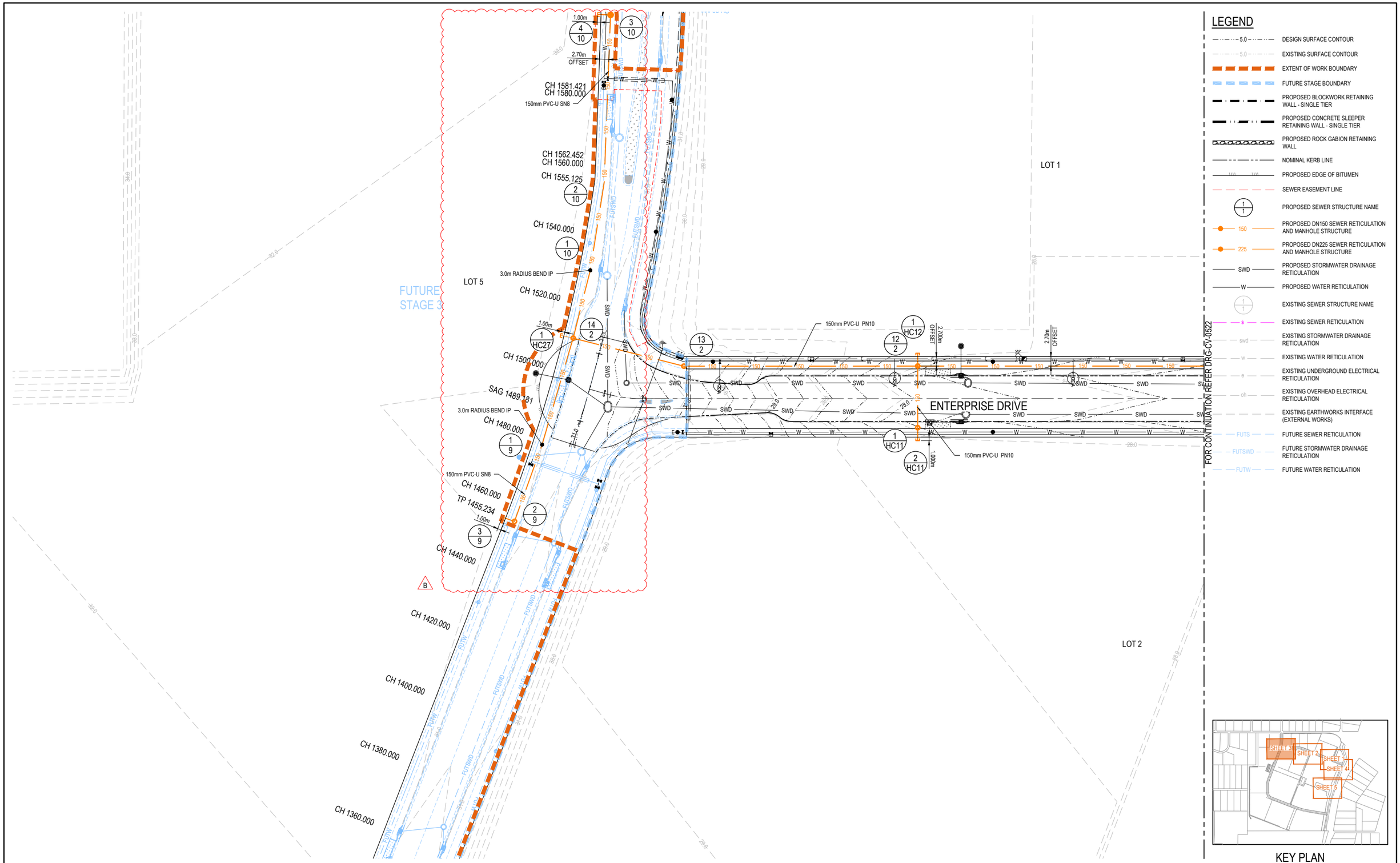
Tel No: +61 7 3337 0000
www.arcadis.com/au

Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0522

Issue: A

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Issue	Description	DR	CH	VE	Date
B	SEWER LINE 9 AND 10 ADDED	A.O.	S.S.	B.K.	18.07.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales

0 5 10 20 30 40 50m

1 : 500

Surveyor

WOLTER consulting group

Planning Urban Design Landscape Environment Surveying

Client

Charter Hall

Status

FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project

FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title

SEWER RETICULATION LAYOUT PLAN SHEET 3

ARCADIS

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BRISBANE QLD 4000
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Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0523

Issue: B

Date Plotted: 1 Aug 2024 - 04:42PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0521-Sewer.dwg

FOR CONTINUATION REFER DRG-CV-0521

LOT 905

150mm PVC-U PN10

225mm PVC-U PN10

3.0m RADIUS BEND IP

3.0m RADIUS BEND IP

10.00m EMT

5.00m OFFSET

2.70m OFFSET

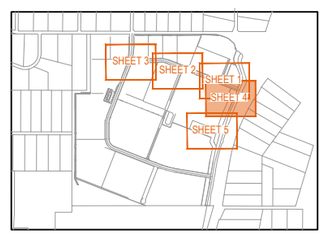
LOT 2

MT LINDESAY HWY

FOR CONTINUATION REFER DRG-CV-525

LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- PROPOSED ROCK GABION RETAINING WALL
- NOMINAL KERB LINE
- PROPOSED EDGE OF BITUMEN
- SEWER EASEMENT LINE
- PROPOSED SEWER STRUCTURE NAME
- PROPOSED DN150 SEWER RETICULATION AND MANHOLE STRUCTURE
- PROPOSED DN225 SEWER RETICULATION AND MANHOLE STRUCTURE
- PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED WATER RETICULATION
- EXISTING SEWER STRUCTURE NAME
- EXISTING SEWER RETICULATION
- EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING WATER RETICULATION
- EXISTING UNDERGROUND ELECTRICAL RETICULATION
- EXISTING OVERHEAD ELECTRICAL RETICULATION
- EXISTING EARTHWORKS INTERFACE (EXTERNAL WORKS)
- FUTURE SEWER RETICULATION
- FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE WATER RETICULATION



KEY PLAN

Issue	Description	DR	CH	VE	Date
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales

0 5 10 20 30 40 50m

1 : 500

100mm on Original

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: SEWER RETICULATION LAYOUT PLAN SHEET 4

ARCADIS
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Tel No: +61 7 3337 0000
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Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0524

Issue: A

Date Plotted: 1 Aug 2024 - 04:42PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0521-Sewer.dwg

FOR CONTINUATION REFER DRG-CV-0524

LOT 2

LOT 901

FUTURE STAGE 2

MT LINDESAY HWY

225mm PVC-U PN10

10.00m EMT

5.00m OFFSET

3.0m RADIUS BEND IP

3.00m OFFSET

6.00m EMT

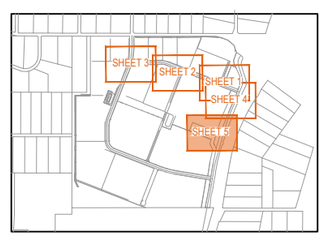
PROPOSED STUB FOR FUTURE STAGE CONNECTION

SWD

11/1 9/1 10/1 12/1 13/1

LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
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- PROPOSED DN225 SEWER RETICULATION AND MANHOLE STRUCTURE
- PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED WATER RETICULATION
- EXISTING SEWER STRUCTURE NAME
- EXISTING SEWER RETICULATION
- EXISTING STORMWATER DRAINAGE RETICULATION
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- EXISTING OVERHEAD ELECTRICAL RETICULATION
- EXISTING EARTHWORKS INTERFACE (EXTERNAL WORKS)
- FUTURE SEWER RETICULATION
- FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE WATER RETICULATION



KEY PLAN

Issue	Description	DR	CH	VE	Date
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales

0 5 10 20 30 40 50m

1 : 500

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: SEWER RETICULATION LAYOUT PLAN SHEET 5

ARCADIS
Arcadis Australia Pacific Pty Limited
Level 35, 111 Eagle Street
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Tel No: +61 7 3337 0000
www.arcadis.com/au

Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0525

Issue: A

Date Plotted: 1 Aug 2024 - 04:42PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0521-Sewer.dwg

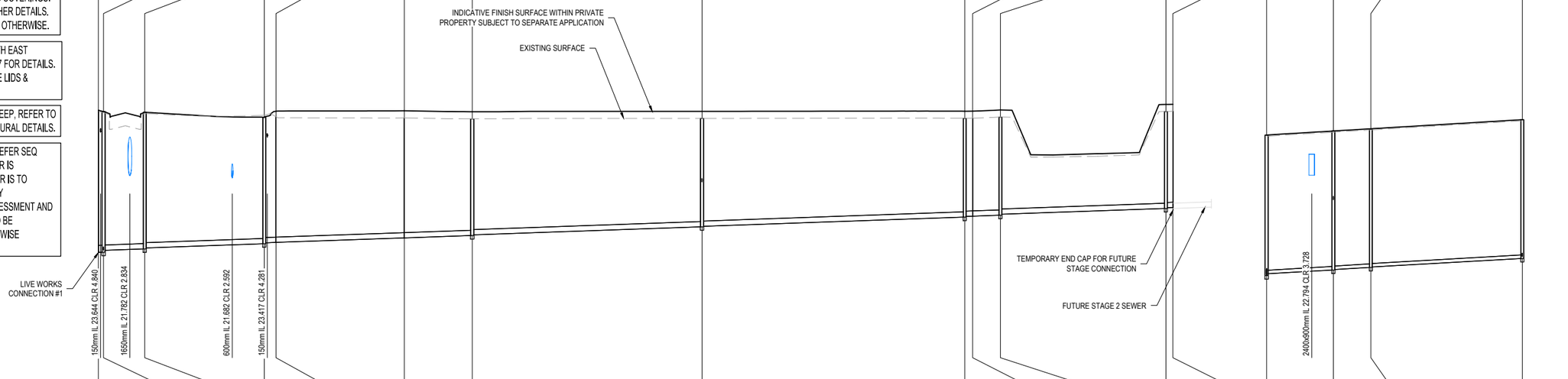
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STRUCTURE TYPE	REFER SPS DESIGN	X	PE LINED	P2	PE LINED	P2	PE LINED	HTP 3.0m RADIUS	HTP 3.0m RADIUS	X	PE LINED	P2	PE LINED	HTP 3.0m RADIUS	P2	PE LINED	END	X	PE LINED	P2	PE LINED	P2	PE LINED	P2	PE LINED
STRUCTURE LID TYPE		B		B		B				B		B			B		B	B		D		B		B
STRUCTURE DROP TYPE			V		V		V				V		V			V	V		V		V		V	
JUNCTION LINE			LINE 2								LINE HC13						LINE 4		LINE 2		LINE 3			LINE HC03
DEPTH TO HC																								
HC INVERT LEVEL																								
HC TYPE																								
HC LOT No																								
CH. FROM D/S STRUC/ BEND																								

ALL PRECAST MANHOLES TO HAVE CONVERSION SLAB COVERINGS. REFER MANHOLE TYPE P2 SEQ-SEW-1300-1 FOR FURTHER DETAILS. ALL TYPE P2 MANHOLES TO BE 1050Ø, UNLESS NOTED OTHERWISE.

ALL PROPOSED MANHOLES TO BE LINED AS PER SOUTH EAST QUEENSLAND SEWERAGE CODE. REFER SEQ-SPS-1407 FOR DETAILS. MANHOLES ARE ALSO REQUIRED TO HAVE COMPOSITE LIDS & FRAMES.

FOR CUSTOM (X TYPE) MANHOLE STRUCTURE >6.0m DEEP, REFER TO DRG 0585-0586 FOR RPEQ CERTIFIED TYPICAL STRUCTURAL DETAILS.

FOR SEWER EMBEDMENT SUPPORT TYPE 3 DETAILS REFER SEQ WATER DWG SEQ-SEW-1201-1. WHERE GROUND WATER IS DISCOVERED DURING EXCAVATIONS THE CONTRACTOR IS TO IMMEDIATELY CEASE ASSOCIATED WORKS AND NOTIFY SUPERINTENDENT WHO IS TO PROVIDE FURTHER ASSESSMENT AND INSTRUCTION ON THE EMBEDMENT SUPPORT TYPE TO BE CONSTRUCTED WITHIN THESE AREAS. UNLESS OTHERWISE DIRECTED ON SITE.



LEGEND:

OP - OPEN SPACE
FP - FOOTPATH/VERGE
PP - PRIVATE PROPERTY
RD - ROAD

| | | | | | | | | | | | | | | | | | | |

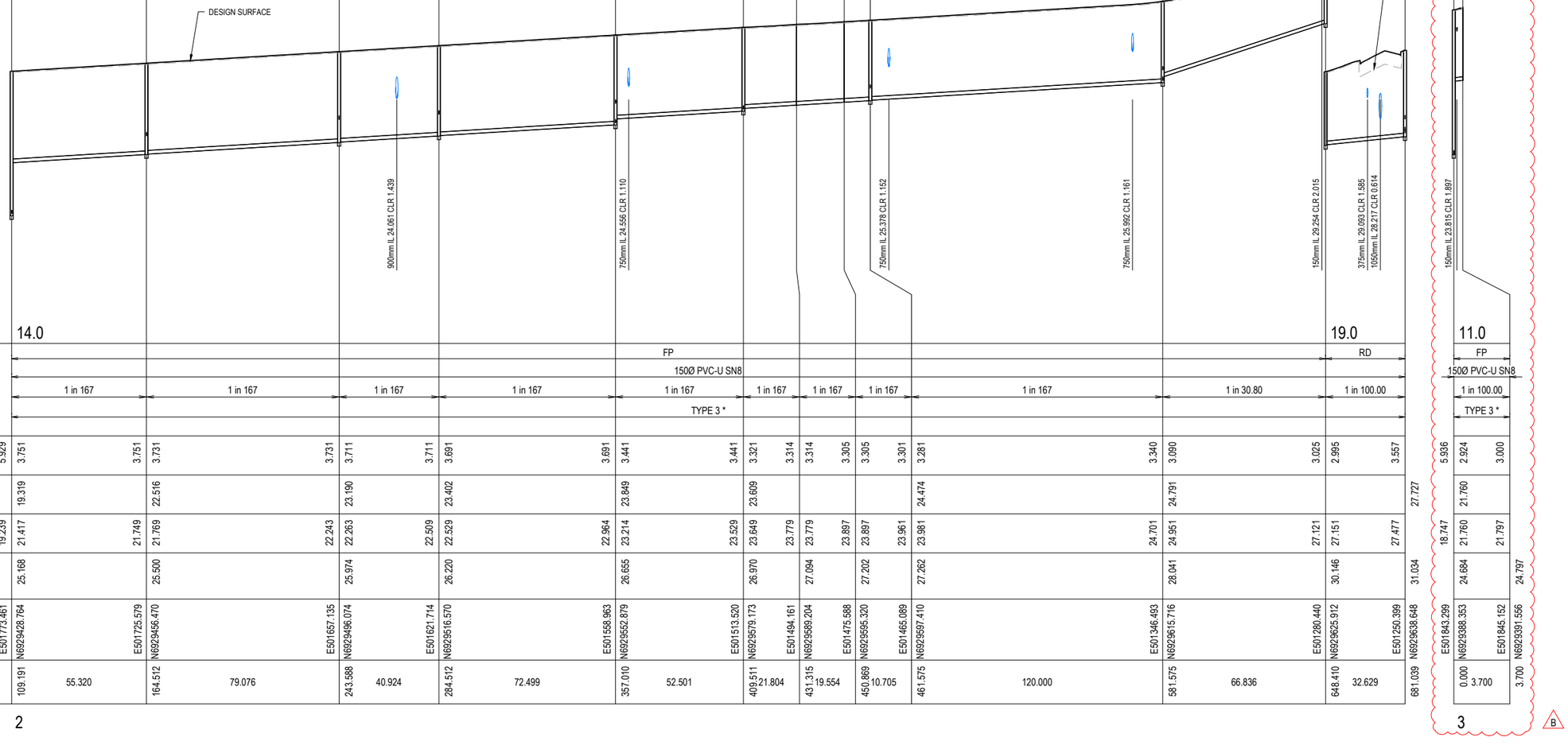
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STRUCTURE TYPE	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	HTP 3.0m RADIUS	HTP 3.0m RADIUS	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	P2 PE LINED	END
STRUCTURE LID TYPE	B	B	B	B	B	B			B	B	B	B	D	
STRUCTURE DROP TYPE	X	V	V	V	V	V			V	V	V	V	X	
JUNCTION LINE	LINE HC03	LINE HC04	LINE HC05	LINE HC06	LINE HC07	LINE HC09			LINE HC10	LINE HC11		LINE 9	LINE 3	
DEPTH TO HC														
HC INVERT LEVEL														
HC TYPE														
HC LOT No														
CH. FROM D/S STRUC/ BEND														

ALL PRECAST MANHOLES TO HAVE CONVERSION SLAB COVERINGS. REFER MANHOLE TYPE P2 SEQ-SEW-1300-1 FOR FURTHER DETAILS. ALL TYPE P2 MANHOLES TO BE 1050Ø, UNLESS NOTED OTHERWISE.

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LEGEND:

OP - OPEN SPACE
FP - FOOTPATH/VERGE
PP - PRIVATE PROPERTY
RD - ROAD

| | | | | | | | | | | | | | |

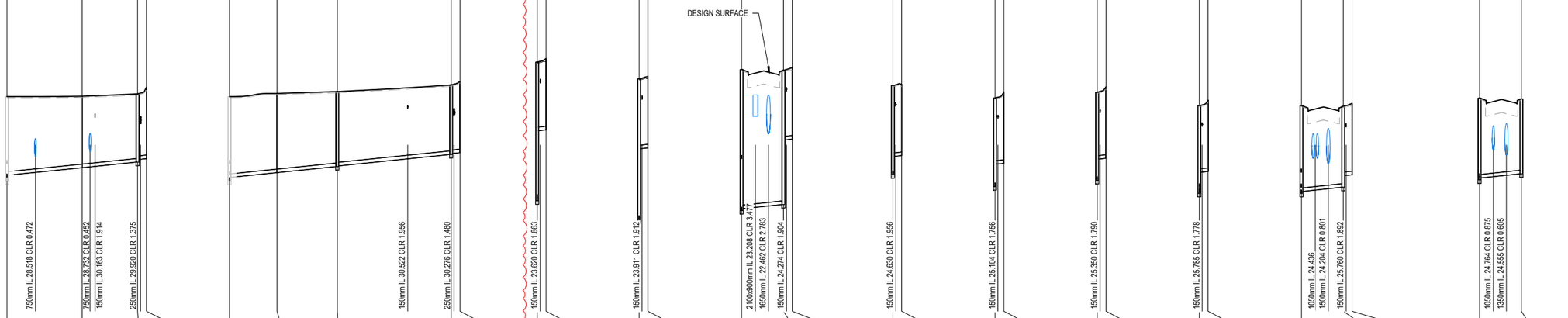
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			4°	90°				15°	7°	90°																				
STRUCTURE TYPE	P2	PE LINED	HTP	3.0m RADIUS	P2	PE LINED	END	P2	PE LINED	HTP	3.0m RADIUS	P2	PE LINED	P2	PE LINED	END	P2	PE LINED	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	P2	PE LINED	END	P2	PE LINED	P2	PE LINED
STRUCTURE LID TYPE	B				B			B				B		B			B		B			B			B			B		B			B		B		
STRUCTURE DROP TYPE		X			X	V		V	X			V	X		V	X		V		V			V			V			V			V			V		V	
JUNCTION LINE		LINE 9						LINE 9					LINE HC01		LINE HC02			LINE HC03		LINE HC04		LINE HC05		LINE HC06		LINE HC07		LINE HC07			LINE HC09						
DEPTH TO HC																																							
HC INVERT LEVEL																																							
HC TYPE																																							
HC LOT No																																							
CH. FROM D/S STRUC/ BEND																																							

ALL PRECAST MANHOLES TO HAVE CONVERSION SLAB COVERINGS. REFER MANHOLE TYPE P2 SEQ-SEW-1300-1 FOR FURTHER DETAILS. ALL TYPE P2 MANHOLES TO BE 1050Ø, UNLESS NOTED OTHERWISE.

ALL PROPOSED MANHOLES TO BE LINED AS PER SOUTH EAST QUEENSLAND SEWERAGE CODE. REFER SEQ-SPS-1407 FOR DETAILS. MANHOLES ARE ALSO REQUIRED TO HAVE COMPOSITE LIDS & FRAMES.

FOR CUSTOM (X TYPE) MANHOLE STRUCTURE >6.0m DEEP, REFER TO DRG 0585-0586 FOR RPEQ CERTIFIED TYPICAL STRUCTURAL DETAILS.

FOR SEWER EMBEDMENT SUPPORT TYPE 3 DETAILS REFER SEQ WATER DWG SEQ-SEW-1201-1. WHERE GROUND WATER IS DISCOVERED DURING EXCAVATIONS THE CONTRACTOR IS TO IMMEDIATELY CEASE ASSOCIATED WORKS AND NOTIFY SUPERINTENDENT WHO IS TO PROVIDE FURTHER ASSESSMENT AND INSTRUCTION ON THE EMBEDMENT SUPPORT TYPE TO BE CONSTRUCTED WITHIN THESE AREAS. UNLESS OTHERWISE DIRECTED ON SITE.



LEGEND:

OP - OPEN SPACE
FP - FOOTPATH/VERGE
PP - PRIVATE PROPERTY
RD - ROAD

DATUM R.L.		19.0						19.0					11.0		12.0		12.0			13.0		14.0		14.0		15.0		15.0			15.0							
LAND USE		RD/FP						RD/FP					FP		FP		RD			FP		FP		FP		FP		RD			RD							
DIAMETER		150Ø PVC-U SN8						150Ø PVC-U SN8					150Ø PVC-U SN8		150Ø PVC-U SN8		150Ø PVC-U SN8			150Ø PVC-U SN8		150Ø PVC-U SN8		150Ø PVC-U SN8		150Ø PVC-U SN8		150Ø PVC-U SN8			150Ø PVC-U SN8							
GRADE		1 in 100.00		1 in 100.00		1 in 100.00		1 in 100.00	1 in 100.00		1 in 100.00		1 in 100		1 in 100.00		1 in 100.00	1 in 100.00		1 in 100		1 in 100		1 in 100.00		1 in 100.00		1 in 100.00	1 in 100		1 in 100.00							
EMBEDMENT TYPE		TYPE 3 *						TYPE 3 *					TYPE 3 *		TYPE 3 *		TYPE 3 *			TYPE 3 *		TYPE 3 *		TYPE 3 *		TYPE 3 *		TYPE 3 *			TYPE 3 *							
DEPTH TO INVERT	3.557	3.307		3.007	3.007	2.873	2.763	3.557	3.399	3.333	3.333	3.156	3.126	2.926	2.886	3.000	5.836	2.887	3.000	5.923	2.939	3.000	5.929	5.849	5.645	2.928	3.000	3.751	2.984	3.000	3.731	2.784	3.000	3.711	2.818	3.000	3.691	2.806	3.000	3.691	3.611	3.407	2.917	3.000	3.441	3.361	3.157
JUNCTION INVERT LEVEL		27.727							27.727									21.599			21.841			19.319					22.516			23.190			23.402			23.849			23.849					23.609		
SEWER INVERT LEVEL	27.477	27.727		28.044	28.044	28.277	28.387	28.424	27.635	27.835	27.835	28.089	28.119	28.598	28.638	28.675	18.649	21.599	21.636	18.857	21.841	21.878	19.239	19.319	19.495	22.212	22.249	21.749	22.516	22.553	22.243	23.190	23.227	22.509	23.402	23.439	22.964	23.849	23.886	22.964	23.044	23.220	23.710	23.747	23.529	23.609	23.785
DESIGN SURFACE LEVEL		31.034		31.051		31.150		31.424	31.034		31.168		31.245		31.524		31.675	24.485		24.636	24.780		24.878	25.168		25.140		25.249	25.500		25.553	25.974		26.227	25.350		26.439	26.655		26.886	26.655		26.627		26.747	26.970		26.942
SETOUT	E501250.399	N6929638.648	E501236.991	N6929609.933	E501225.827	N6929589.454	E501222.573	N6929591.215	E501250.399	N6929638.648	E501258.205	N6929657.061	E501265.961	N6929681.233	E501275.067	N6929728.295	E501271.435	N6929728.998	E501859.085	N6929358.885	E501857.232	N6929355.682	E501829.444	N6929396.370	E501831.298	N6929399.572	E501773.461	N6929428.764	E501764.647	N6929413.530	E501762.794	N6929410.327	E501725.579	N6929456.470	E501727.433	N6929459.672	E501657.135	N6929496.074	E501658.989	N6929499.276	E501621.714	N6929516.570	E501623.568	N6929519.770	E501558.963	N6929552.879	E501560.817	N6929556.081	E501558.963	N6929552.879	E501550.144	N6929537.648	E501548.291	N6929534.448	E501513.520	N6929579.173	E501504.706	N6929563.940
RUNNING CHAINAGE	0.000	31.691		31.691	23.324	55.016	3.700	58.716	0.000	19.999	19.999	25.386	45.385	47.935	93.320	3.700	97.020	0.000	3.700	3.700	0.000	3.700	3.700	0.000	17.600	17.600	3.700	21.301	0.000	3.700	3.700	0.000	3.700	3.700	0.000	3.698	3.698	0.000	3.700	3.700	0.000	17.600	17.600	3.698	21.298	0.000	17.599	17.599
		9						10					HC01		HC02		HC03			HC04		HC05		HC06		HC07		HC08			HC09							

Issue	Description	DR	CH	VE	Date
C	SEWER LINE 9 AND 10 ADDED	A.O.	S.S.	B.K.	18.07.24
B	SEWER LINE 3 REMOVED	J.B.	S.S.	B.K.	15.07.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales
0 10 20 40 60 80 100m
HORZ
1:1000
0 1 2 4 6 8 10m
VERT
1:100

Surveyor
WOLTER consulting group
Planning Urban Design Landscape Environment Surveying

Client
Charter Hall

Status
FOR CONSTRUCTION

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Original Issue Signatures

Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project
FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title
SEWER LONGITUDINAL SECTION SHEET 3

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Project Number 30109334

Drawing No. 30109334-AAP-P301OP-CV-DRG-0583

Issue C

100mm on Original

Date Plotted: 1 Aug 2024 - 04:42PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0581-SewerLX.dwg

STRUC/ BEND/ END NAME	1/HC09		2/HC09	11/2		1/HC10	12/2		1/HC11	2/HC11	12/2	1/HC12	8/1	1/HC13
STRUCTURE TYPE	P2	PE LINED	END	P2	PE LINED	END	P2	PE LINED	P2	PE LINED	P2	PE LINED	X	PE LINED	END
STRUCTURE LID TYPE	B			B			B		B		B		B		
STRUCTURE DROP TYPE		V			W			V		V		W		V	
JUNCTION LINE					LINE HC10			LINE HC11				LINE HC11		LINE HC13	
DEPTH TO HC															
HC INVERT LEVEL															
HC TYPE															
HC LOT No															
CH. FROM D/S STRUC/ BEND															
DATUM R.L.		15.0			15.0			16.0				16.0		12.0	
LAND USE		FP			FP			RD				FP		FP	
DIAMETER		150Ø PVC-U SN8			150Ø PVC-U SN8			150Ø PVC-U SN8				150Ø PVC-U SN8		150Ø PVC-U SN8	
GRADE		1 in 100.00			1 in 100			1 in 100.00		1 in 30.52		1 in 100.00		1 in 100.00	
EMBEDMENT TYPE		TYPE 3 *			TYPE 3 *			TYPE 3 *				TYPE 3 *		TYPE 3 *	
DEPTH TO INVERT	3.157	2.983	3.000	3.301	2.788	3.000	3.340	3.251	3.047	2.847	3.000	3.340	2.820	3.000	4.632	2.715	3.000
JUNCTION INVERT LEVEL					24.474			24.791				24.791				21.510	
SEWER INVERT LEVEL	23.785	23.959	23.996	23.961	24.474	24.511	24.701	24.791	24.967	25.167	25.288	24.701	25.221	25.258	19.592	21.510	21.540
DESIGN SURFACE LEVEL		26.942	26.996		27.262	27.511		28.041	28.013		28.288		28.041	28.258		24.225	24.540
SETOUT	E501504.706	N6929563.940	E501502.853	E501465.089	N6929597.410	E501465.654	N6929601.067	E501346.493	N6929615.716	E501343.808	N6929598.322	E501343.244	N6929594.666	E501346.493	N6929615.716	E501347.059	N6929619.373	E501819.018	N6929170.640	E501816.483	N6929172.243
RUNNING CHAINAGE		17.599	3.700	21.300	0.000	3.700	3.700	0.000	17.600	17.600	3.699	21.299	0.000	3.700	3.700	0.000	3.000	3.000
		HC09			HC10			HC11				HC12		HC13	

150mm I.L. 26.075 CLR 1.958
150mm I.L. 26.392 CLR 1.760
375mm I.L. 26.342 CLR 1.321
1200mm I.L. 25.864 CLR 0.709
150mm I.L. 27.147 CLR 1.805
150mm I.L. 27.172 CLR 1.793

EXISTING SURFACE
DESIGN SURFACE

ALL PRECAST MANHOLES TO HAVE CONVERSION SLAB COVERINGS. REFER MANHOLE TYPE P2 SEQ-SEW-1300-1 FOR FURTHER DETAILS. ALL TYPE P2 MANHOLES TO BE 1050Ø, UNLESS NOTED OTHERWISE.

ALL PROPOSED MANHOLES TO BE LINED AS PER SOUTH EAST QUEENSLAND SEWERAGE CODE. REFER SEQ-SPS-1407 FOR DETAILS. MANHOLES ARE ALSO REQUIRED TO HAVE COMPOSITE LIDS & FRAMES.

FOR CUSTOM (X TYPE) MANHOLE STRUCTURE >6.0m DEEP, REFER TO DRG 0585-0586 FOR RPEQ CERTIFIED TYPICAL STRUCTURAL DETAILS.

FOR SEWER EMBEDMENT SUPPORT TYPE 3 DETAILS REFER SEQ WATER DWG SEQ-SEW-1201-1. WHERE GROUND WATER IS DISCOVERED DURING EXCAVATIONS THE CONTRACTOR IS TO IMMEDIATELY CEASE ASSOCIATED WORKS AND NOTIFY SUPERINTENDENT WHO IS TO PROVIDE FURTHER ASSESSMENT AND INSTRUCTION ON THE EMBEDMENT SUPPORT TYPE TO BE CONSTRUCTED WITHIN THESE AREAS. UNLESS OTHERWISE DIRECTED ON SITE.

LEGEND:

OP - OPEN SPACE
FP - FOOTPATH/VERGE
PP - PRIVATE PROPERTY
RD - ROAD

Issue	Description	DR	CH	VE	Date
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales
HORZ 0 10 20 40 60 80 100m
1:1000
VERT 0 1 2 4 6 8 10m
1:100

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

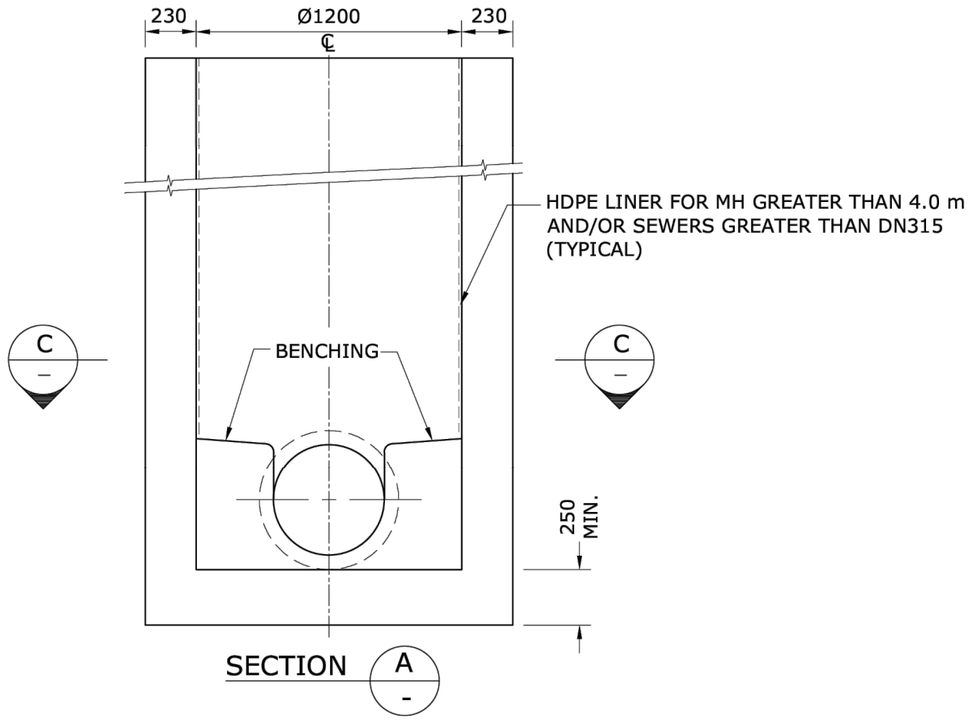
Title: SEWER LONGITUDINAL SECTION SHEET 4

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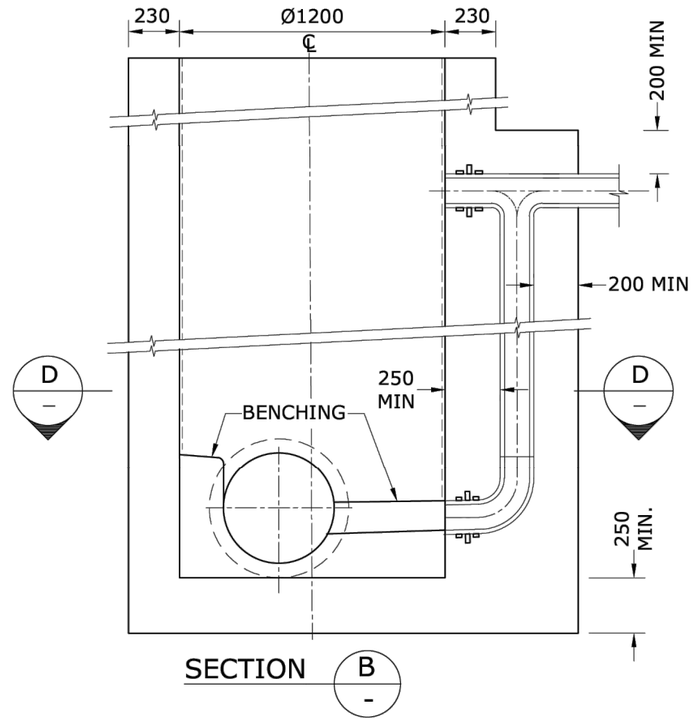
Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0584 Issue: A

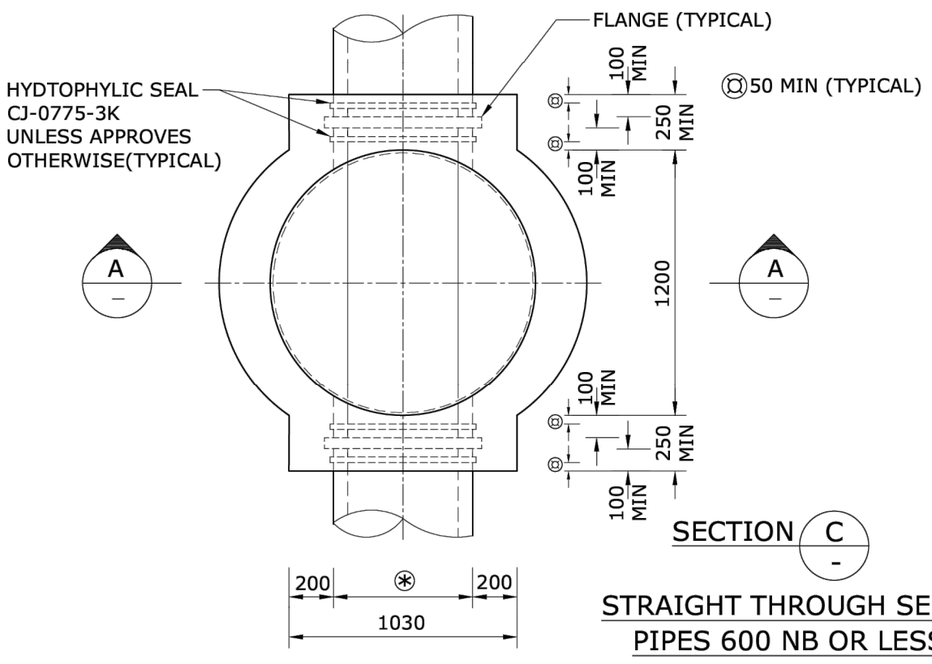
Date Plotted: 1 Aug 2024 - 04:42PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0581-SewerLX.dwg



SECTION A

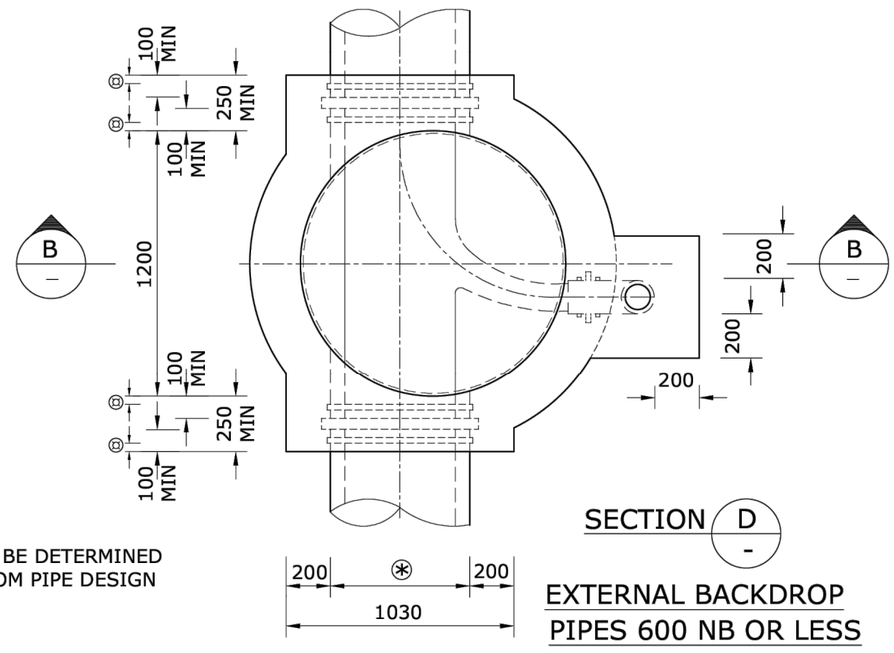


SECTION B



SECTION C

STRAIGHT THROUGH SEWER
PIPES 600 NB OR LESS



TO BE DETERMINED
FROM PIPE DESIGN

SECTION D

EXTERNAL BACKDROP
PIPES 600 NB OR LESS

Issue	Description	DR	CH	VE	Date
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales: NOT TO SCALE

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: CUSTOM X TYPE MANHOLE STRUCTURE DETAILS SHEET 1

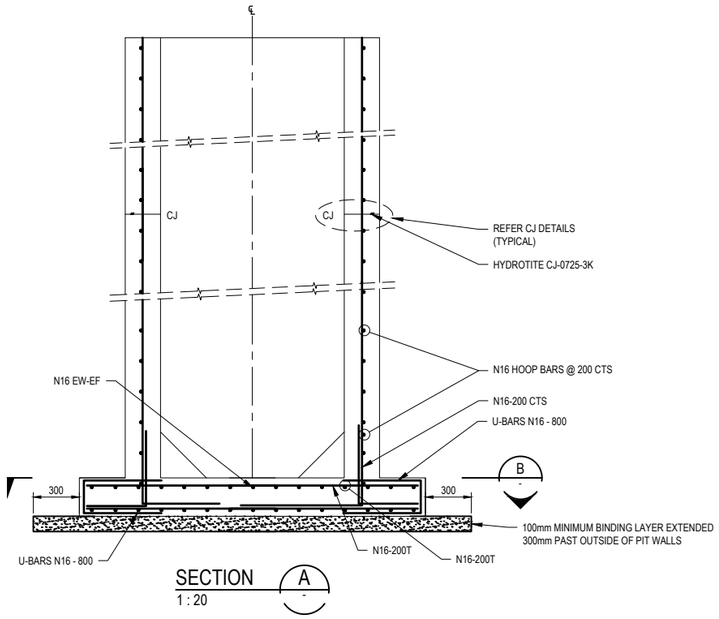
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Project Number: 30109334

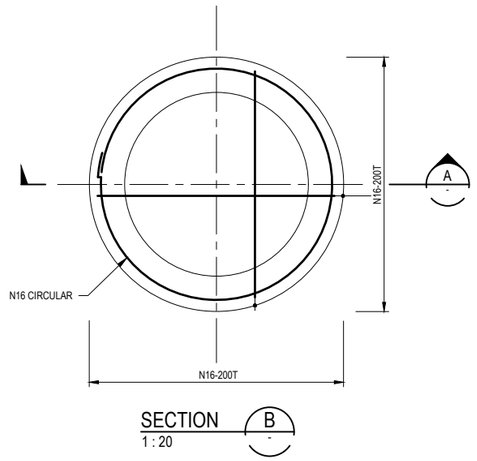
Drawing No.: 30109334-AAP-P301OP-CV-DRG-0585

Issue: A

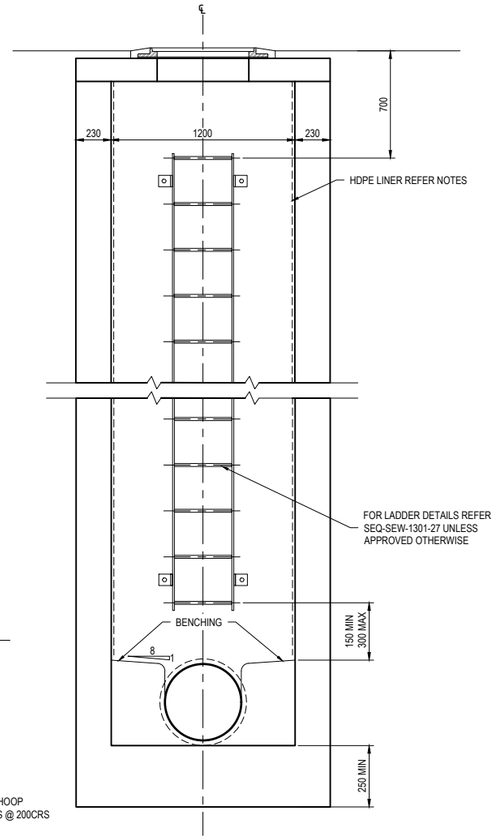
Date Plotted: 1 Aug 2024 - 04:43PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0581-SewerLX.dwg



SECTION A
1 : 20

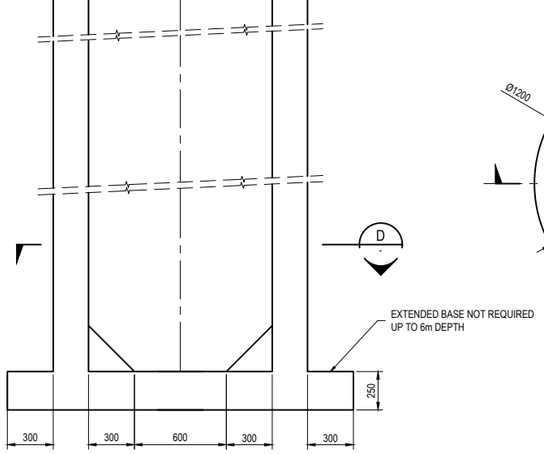


SECTION B
1 : 20

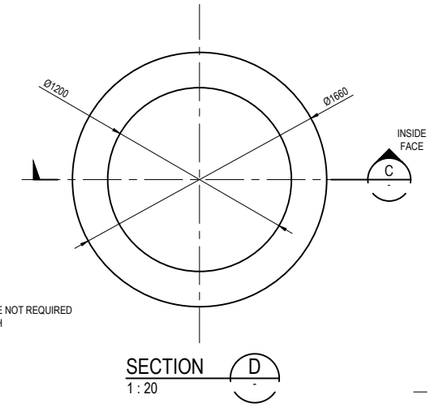


SECTIONAL ELEVATION
SEWERS 600NB OR LESS

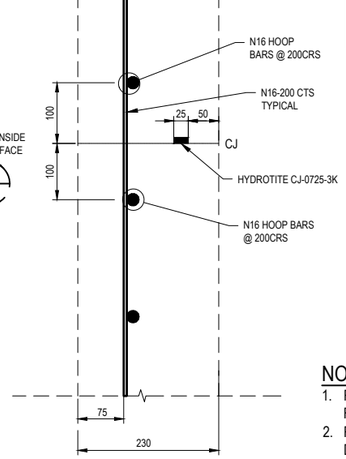
TYPICAL SECTION X-TYPE MAINTENANCE HOLE



SECTION C
1 : 20



SECTION D
1 : 20



TYPICAL CJ DETAIL
1 : 5

X-TYPE MAINTENANCE HOLE

NOTES:

1. REFER SEQ-SEW-1101-4, SEQ-SEW-1101-5 AND SEQ-SEW-1101-6 FOR NOTES.
2. REFER SEQ-SEW-1301-26 FOR TOP SLAB REINFORCEMENT DETAILS.
3. HDPE INTERNAL LINER REQUIRED.
4. LADDERS TO STANDARD DRAWING SEQ-SEW-1301-27 SHALL BE PLACED OVER THE DOWNSTREAM OUTLET.

SEWER MAINTENANCE HOLE STRUCTURE AND REINFORCEMENT DETAIL FOR DN150, DN225 AND DN300 SEWER LINE

CONCRETE NOTES

1. ALL MATERIALS AND WORKMANSHIP MUST BE IN ACCORDANCE WITH AS 3600.
2. CONCRETE QUALITY:
   ADMIXTURES MUST NOT BE USED WITHOUT THE WRITTEN APPROVAL OF THE DESIGN ENGINEER.
   MAXIMUM SIZE OF COARSE AGGREGATE MUST BE 20 mm.

ELEMENT	CHARACTERISTIC CONCRETE STRENGTH (f'c)AT 28 DAYS	SPECIAL REQUIREMENTS
VARIOUS MH's	32	CALCAREOUS_AGGREGATE
BLINDING CONCRETE	N20	NIL

   ELEMENT CHARACTERISTIC CONCRETE STRENGTH (f'c) AT 28 DAYS MUST BE VERIFIED BY PROJECT ASSESSMENT TESTING, WITH SITE CURED SAMPLES TAKEN TO VERIFY STRENGTH AT EARLY LOADING IF REQUIRED PRIOR TO 28 DAYS.
3. COMPACTION OF CONCRETE MUST BE BY MEANS OF HIGH FREQUENCY VIBRATORS.
4. CONCRETE SIZES SHOWN ARE MINIMUM AND NO REDUCTIONS BY DUCTS, PIPES, ETC. MUST BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER. SIZES DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
5. PIPES OR CONDUITS MUST NOT BE PLACED WITHIN THE CONCRETE COVER TO REINFORCEMENT WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.
6. NO HOLES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS MUST BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR APPROVAL OF THE DESIGN ENGINEER.
7. CONSTRUCTION JOINTS, WHERE NOT SHOWN, MUST BE LOCATED TO THE APPROVAL OF THE DESIGN ENGINEER.
8 CURING OF ALL CONCRETE SURFACES MUST COMMENCE IMMEDIATELY AFTER SURFACES ARE FINISHED AS SPECIFIED AND MUST CONTINUE FOR A MINIMUM OF 7 DAYS. CLEAN FULLY WRAPPING ON PLASTIC SHEETING IS PREFERRED AND RECOMMENDED.

REINFORCEMENT NOTES

1. REINFORCEMENT SYMBOLS:
   "N" DENOTES GRADE 500N HOT ROLLED DEFORMED BAR TO AS/NZS 4671.
   "RL" DENOTES GRADE 500L RECTANGULAR MESH TO AS/NZS 4671.
   "SL" DENOTES GRADE 500L SQUARE MESH TO AS/NZS 4671.
   BAR NOTATION
   THE NUMBER PRECEDING A BAR SYMBOL DENOTES THE NUMBER OF BARS IN THE GROUP AND THE NUMBER FOLLOWING THE BAR SYMBOL DENOTES THE BAR DIAMETER i.e. 4-N16. ALTERNATIVELY, THE NUMBER FOLLOWING THE BAR DIAMETER DENOTES THE MAXIMUM CENTRE TO CENTRE SPACING i.e. N16-200.
2. SPLICES IN REINFORCEMENT MUST BE MADE ONLY IN THE POSITIONS SHOWN. THE WRITTEN APPROVAL OF THE DESIGN ENGINEER MUST BE OBTAINED FOR ANY OTHER SPLICES. WHERE THE LAP LENGTH IS NOT SHOWN, IT WILL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCEMENT TO AS3600 REQUIREMENTS OR IN ACCORDANCE WITH THE FOLLOWING LAP SCHEDULE :

BAR SIZE	LAP LENGTH
N16	800

3. WELDING OF REINFORCEMENT WILL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS.
5. CLEAR CONCRETE COVER TO REINFORCEMENT INCLUDING TIES MUST BE TO AS 3600 REQUIREMENTS OR AS STATED BELOW OR OTHERWISE NOTED ON STRUCTURAL DRAWINGS. COVER TO REINFORCEMENT MUST BE OBTAINED BY THE USE OF APPROVED METAL, CONCRETE OR PLASTIC BAR CHAIRS FOR REINFORCEMENT. CHAIRS TO BE SPACED AT 1500 MAXIMUM CENTRES FOR BARS, 1000 MAXIMUM CENTRES FOR FABRIC.

ELEMENT	COVER TO REINFORCEMENT (mm)	
	INSIDE FACE	OUTSIDE FACE
INSITU BASE	70	75
INSITU WALLS	70	75

6. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND IS NOT NECESSARILY SHOWN IN TRUE PROJECTION.
7. INSTALL CIRCULAR TRIMMER BAR AND HORIZONTAL AND VERTICAL MAKE-UP EQUIVALENT STEEL. ALL PIPE PENETRATIONS AS PER TYPICAL PIPE PENETRATION TRIMMER BAR REINFORCEMENT DETAIL.
8. EXTRA DIAGONAL TRIMMER BARS TO BE INSTALLED TO EACH SIDE FACE OF PIPE OPENING. BAR EXTENSION TO BE MIN. 300 PAST PIPE IN EACH DIRECTION

GENERAL NOTES

1. APPLY HEAVY GREASE TO FRAME SEAT PRIOR TO INSTALLING COVER.
2. DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE NOTED.
3. SEWER MANHOLE TO BE CAST IN-SITU
4. MANHOLE TO BE PE LINED WITH COMPOSITE LID AS PER SEQ CODE REQUIREMENTS.

STRUCTURAL DESIGN CERTIFICATE

WE HEREBY CERTIFY THAT ARCADIS PTY LTD IS RESPONSIBLE FOR THE STRUCTURAL DESIGN AND THAT THE DESIGN HAS BEEN CARRIED OUT IN ACCORDANCE WITH ALL RELEVANT PROVISIONS OF THE AUSTRALIAN STANDARDS. WHEN ERECTED IN ACCORDANCE WITH THIS DESIGN, THE STRUCTURE WILL BE ADEQUATE TO SUSTAIN THE WORST COMBINATION OF LOADS TO WHICH IT WILL BE SUBJECTED IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS. THE BASIC DESIGN CODE USED IN THIS DESIGN WAS AS1170 FOR LOADS AND GENERALLY ACCEPTED ENGINEERING PRINCIPLES.

NAME: RICHARD MULLIGAN RPEQ: 7850

SIGNATURE: ..... DATE: 16.07.24

Issue	Description	DR	CH	VE	Date
B	DETAILS UPDATED	A.O.	S.S.	B.K.	15.07.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales
0 50 100 200 300 400 500mm
1 : 5
0 0.5 1 1.5 2m
1 : 20

100mm on Original

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures

Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: CUSTOM X TYPE MANHOLE STRUCTURE DETAILS SHEET 2

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Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0586 Issue: B

Date Plotted: 1 Aug 2024 - 04:43PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0581-SewerLX.dwg

SEQ CODE WATER NOTES

GENERAL NOTES

1. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH CURRENT SOUTH EAST QUEENSLAND WATER SUPPLY CODE SPECIFICATIONS AND STANDARDS.
2. UNLESS SPECIFIED OTHERWISE ALL MATERIALS AND WORK SHALL COMPLY WITH THE RELEVANT AUSTRALIAN STANDARDS.
3. ADOPT LIP OF KERB OR SHOULDER OF ROAD AS PERMANENT LEVEL.
4. COVER ON MAINS FROM PERMANENT LEVEL TO BE AS SHOWN IN SEQ-WAT-1200-2.
5. CONDUITS TO BE INSTALLED IN ACCORDANCE WITH THE STANDARD DRAWINGS.
6. ALL MATERIALS USED IN THE WORKS SHALL COMPLY WITH THE QUU's ACCEPTED PRODUCTS AND MATERIALS LIST OR BE APPROPRIATELY SHOWN, LISTED AND DEFINED IN THE ENGINEERING SUBMISSION SO THAT THE ALTERNATIVE PRODUCT OR MATERIAL CAN BE ASSESSED AND IF APPROPRIATE, APPROVED BY QUU.
7. TEST/CHLORINATION POINTS TO BE INSTALLED IN ACCORDANCE WITH STANDARD DRAWING NO.SEQ-WAT-1410-1.
8. THE CONSTRUCTION OF THE WATER RETICULATION WORK SHOWN ON THIS DRAWING MUST BE SUPERVISED BY AN ENGINEER WHO HAS RPEQ REGISTRATION. WORKS NOT COMPLYING WITH THIS REQUIREMENT WILL NOT BE PERMITTED TO CONNECT TO THE RETICULATION SYSTEM.

ALL ENVIRONMENT PROTECTION MEASURES SHALL BE IMPLEMENTED PRIOR TO ANY CONSTRUCTION WORK, INCLUDING CLEARING, COMMENCING.

VEGETATION PROTECTION

A. TREES LOCATED ALONG THE FOOTPATH SHALL BE, TRANSPLANTED PRIOR TO CONSTRUCTION, OR REPLACED IF DESTROYED.
B. WHEN WORKING WITHIN 4m OF TREES, RUBBER OR HARDWOOD GIRDLES SHALL BE CONSTRUCTED WITH 1.8m BATTENS CLOSELY SPACED AND ARRANGED VERTICALLY FROM GROUND LEVEL. GIRDLES SHALL BE STRAPPED TO TREES PRIOR TO CONSTRUCTION AND REMAIN UNTIL COMPLETION.
C. TREE ROOTS SHALL BE TUNNELLED UNDER, RATHER THAN SEVERED. IF ROOTS ARE SEVERED THE DAMAGED AREA SHALL BE TREATED WITH A SUITABLE FUNGICIDE. CONTACT RELEVANT COUNCIL ARBORIST FOR FURTHER ADVICE.
D. ANY TREE LOPPING REQUIRED SHOULD BE UNDERTAKEN BY AN APPROVED ARBORIST.

SOIL

A. TOPSOIL AND SUBSOIL SHALL BE STOCKPILED SEPARATELY.
B. CARE SHALL BE TAKEN TO PREVENT SEDIMENT FROM ENTERING THE STORMWATER SYSTEM. THIS MAY INVOLVE PLACING APPROPRIATE SEDIMENT CONTROLS AROUND STOCKPILES.
C. ACID SULPHATE SOILS EXIST IN THE WORKS AREA. THE OUTPUTS FROM THE RISK ASSESSMENT BASED ON THE QUEENSLAND ACID SULPHATE SOIL TECHNICAL MANUAL REQUIRES THAT ACID SULPHATE SOILS BE MANAGED AS FOLLOWS: (DELETE IF NO ACID SULPHATE SOILS)

REHABILITATION

A. PREDISTURBANCE SOIL PROFILES AND COMPACTION LEVELS SHALL BE REINSTATED.
B. PREDISTURBANCE VEGETATION PATTERNS SHALL BE RESTORED.

SAFETY

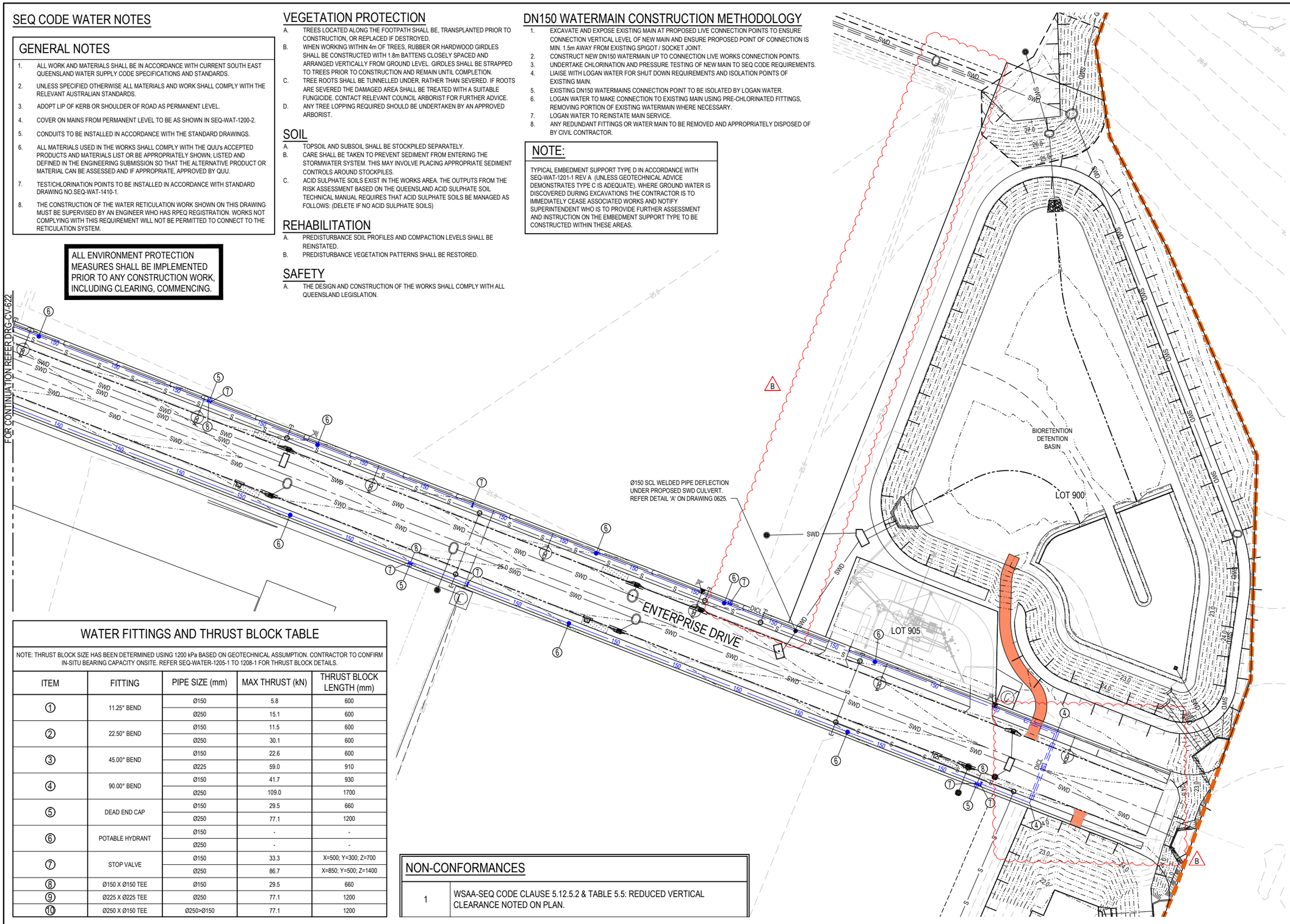
A. THE DESIGN AND CONSTRUCTION OF THE WORKS SHALL COMPLY WITH ALL QUEENSLAND LEGISLATION.

DN150 WATERMAIN CONSTRUCTION METHODOLOGY

1. EXCAVATE AND EXPOSE EXISTING MAIN AT PROPOSED LIVE CONNECTION POINTS TO ENSURE CONNECTION VERTICAL LEVEL OF NEW MAIN AND ENSURE PROPOSED POINT OF CONNECTION IS MIN. 1.5m AWAY FROM EXISTING SPIGOT / SOCKET JOINT.
2. CONSTRUCT NEW DN150 WATERMAIN UP TO CONNECTION LIVE WORKS CONNECTION POINTS.
3. UNDERTAKE CHLORINATION AND PRESSURE TESTING OF NEW MAIN TO SEQ CODE REQUIREMENTS.
4. LIAISE WITH LOGAN WATER FOR SHUT DOWN REQUIREMENTS AND ISOLATION POINTS OF EXISTING MAIN.
5. EXISTING DN150 WATERMAINS CONNECTION POINT TO BE ISOLATED BY LOGAN WATER.
6. LOGAN WATER TO MAKE CONNECTION TO EXISTING MAIN USING PRE-CHLORINATED FITTINGS, REMOVING PORTION OF EXISTING WATERMAIN WHERE NECESSARY.
7. LOGAN WATER TO REINSTATE MAIN SERVICE.
8. ANY REDUNDANT FITTINGS OR WATER MAIN TO BE REMOVED AND APPROPRIATELY DISPOSED OF BY CIVIL CONTRACTOR.

NOTE:

TYPICAL EMBEDMENT SUPPORT TYPE D IN ACCORDANCE WITH SEQ-WAT-1201-1 REV A (UNLESS GEOTECHNICAL ADVICE DEMONSTRATES TYPE C IS ADEQUATE). WHERE GROUND WATER IS DISCOVERED DURING EXCAVATIONS THE CONTRACTOR IS TO IMMEDIATELY CEASE ASSOCIATED WORKS AND NOTIFY SUPERINTENDENT WHO IS TO PROVIDE FURTHER ASSESSMENT AND INSTRUCTION ON THE EMBEDMENT SUPPORT TYPE TO BE CONSTRUCTED WITHIN THESE AREAS.



LEGEND

- 5.0 — DESIGN SURFACE CONTOUR
- 5.0 — EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- PROPOSED ROCK GABION RETAINING WALL
- NOMINAL KERB LINE
- PROPOSED EDGE OF BITUMEN
- 150 — PROPSOED Ø150 DICL PN35 ROAD CROSSING WATER RETICULATION
- 150 — PROPOSED Ø150 PVC-M PN20 SERIES 2 WATER RETICULATION
- 250 — PROPOSED Ø250 PVC-M PN20 SERIES 2 TRUNK WATER MAIN
- SWD — PROPOSED STORMWATER DRAINAGE RETICULATION
- S — PROPOSED SEWER RETICULATION
- s — EXISTING SEWER RETICULATION
- swd — EXISTING STORMWATER DRAINAGE RETICULATION
- w — EXISTING WATER RETICULATION
- e — EXISTING UNDERGROUND ELECTRICAL RETICULATION
- oh — EXISTING OVERHEAD ELECTRICAL RETICULATION
- FUTS — FUTURE SEWER RETICULATION
- FUTSWD — FUTURE STORMWATER DRAINAGE RETICULATION
- FUTW — FUTURE WATER RETICULATION

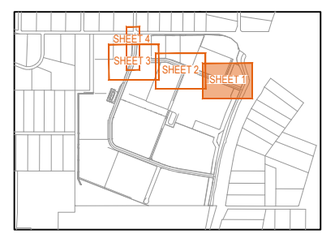
WATER FITTINGS AND THRUST BLOCK TABLE

NOTE: THRUST BLOCK SIZE HAS BEEN DETERMINED USING 1200 kPa BASED ON GEOTECHNICAL ASSUMPTION. CONTRACTOR TO CONFIRM IN-SITU BEARING CAPACITY ONSITE. REFER SEQ-WATER-1205-1 TO 1208-1 FOR THRUST BLOCK DETAILS.

ITEM	FITTING	PIPE SIZE (mm)	MAX THRUST (kN)	THRUST BLOCK LENGTH (mm)
①	11.25° BEND	Ø150	5.8	600
		Ø250	15.1	600
②	22.50° BEND	Ø150	11.5	600
		Ø250	30.1	600
③	45.00° BEND	Ø150	22.6	600
		Ø225	59.0	910
④	90.00° BEND	Ø150	41.7	930
		Ø250	109.0	1700
⑤	DEAD END CAP	Ø150	29.5	660
		Ø250	77.1	1200
⑥	POTABLE HYDRANT	Ø150	-	-
		Ø250	-	-
⑦	STOP VALVE	Ø150	33.3	X=500; Y=300; Z=700
		Ø250	86.7	X=850; Y=500; Z=1400
⑧	Ø150 X Ø150 TEE	Ø150	29.5	660
⑨	Ø225 X Ø225 TEE	Ø250	77.1	1200
⑩	Ø250 X Ø150 TEE	Ø250>Ø150	77.1	1200

NON-CONFORMANCES

1	WSAA-SEQ CODE CLAUSE 5.12.5.2 & TABLE 5.5: REDUCED VERTICAL CLEARANCE NOTED ON PLAN.



KEY PLAN

Issue	Description	DR	CH	VE	Date
B	TEMPORARY ACCESS ROAD REMOVED	J.B.	S.S.	B.K.	15.07.24
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales: 0 5 10 20 30 40 50m — 1 : 500

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures			
Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

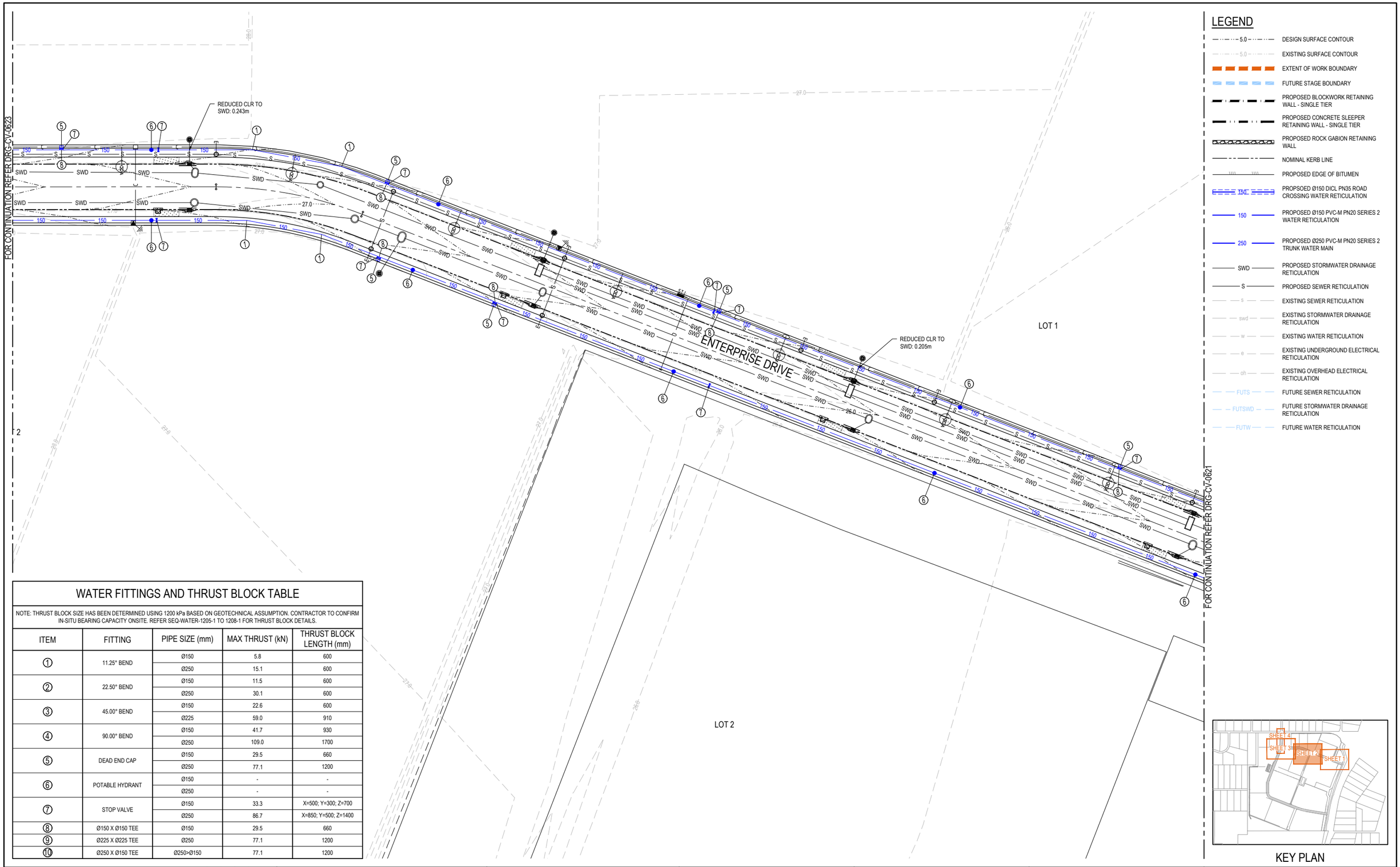
Title: WATER RETICULATION LAYOUT PLAN SHEET 1

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Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0621 | Issue: B

Date Plotted: 2 Aug 2024 - 10:39AM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0621-Water.dwg



LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
- PROPOSED ROCK GABION RETAINING WALL
- NOMINAL KERB LINE
- PROPOSED EDGE OF BITUMEN
- PROPSOED Ø150 DICL PN35 ROAD CROSSING WATER RETICULATION
- PROPOSED Ø150 PVC-M PN20 SERIES 2 WATER RETICULATION
- PROPOSED Ø250 PVC-M PN20 SERIES 2 TRUNK WATER MAIN
- PROPOSED STORMWATER DRAINAGE RETICULATION
- PROPOSED SEWER RETICULATION
- EXISTING SEWER RETICULATION
- EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING WATER RETICULATION
- EXISTING UNDERGROUND ELECTRICAL RETICULATION
- EXISTING OVERHEAD ELECTRICAL RETICULATION
- FUTURE SEWER RETICULATION
- FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE WATER RETICULATION

WATER FITTINGS AND THRUST BLOCK TABLE

NOTE: THRUST BLOCK SIZE HAS BEEN DETERMINED USING 1200 kPa BASED ON GEOTECHNICAL ASSUMPTION. CONTRACTOR TO CONFIRM IN-SITU BEARING CAPACITY ONSITE. REFER SEQ-WATER-1205-1 TO 1208-1 FOR THRUST BLOCK DETAILS.

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KEY PLAN

Issue	Description	DR	CH	VE	Date
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales

0 5 10 20 30 40 50m

1 : 500

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures

Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: WATER RETICULATION LAYOUT PLAN SHEET 2

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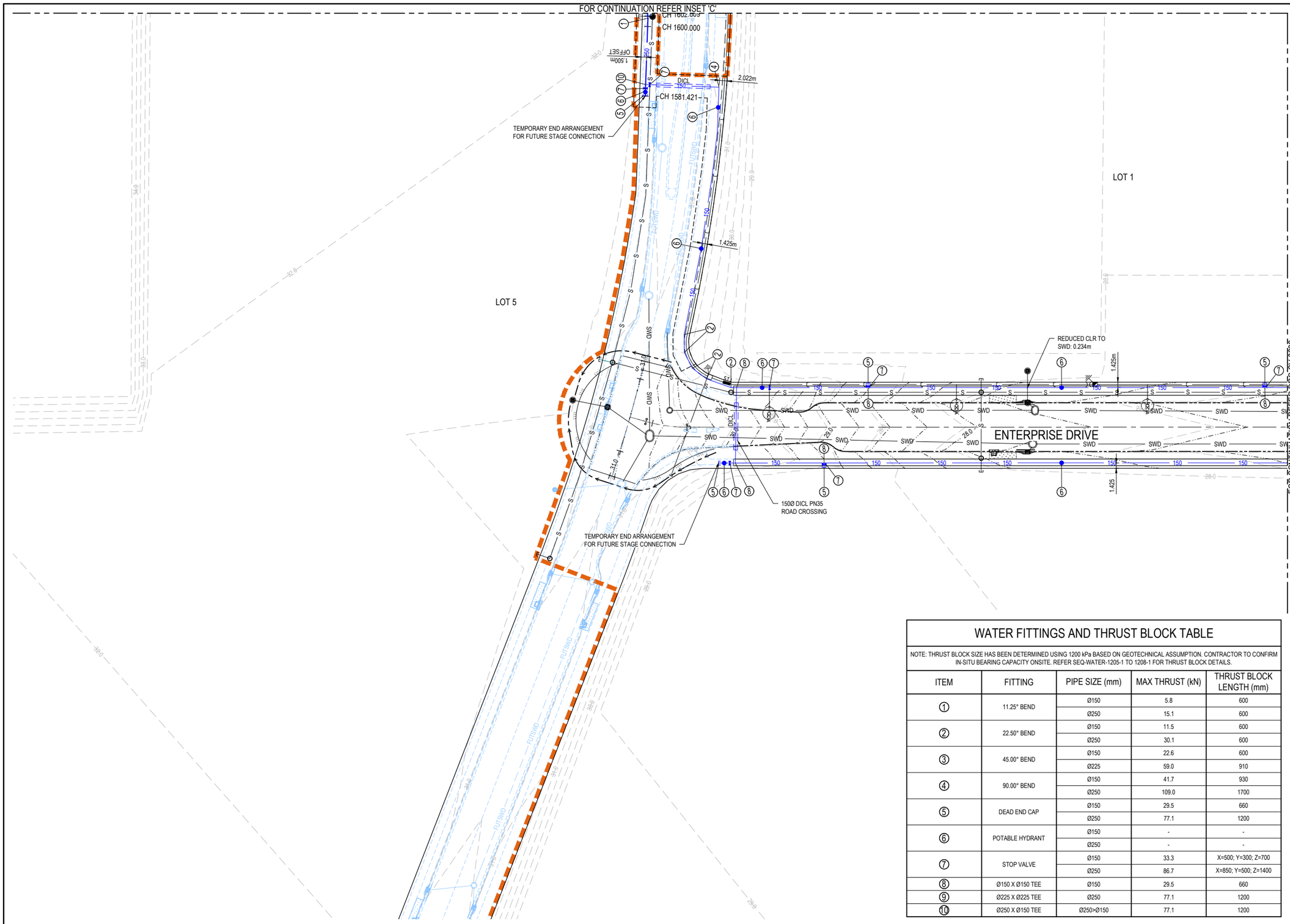
Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0622

Issue: A

100mm on Original

Date Plotted: 1 Aug 2024 - 01:05PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0621-Water.dwg



WATER FITTINGS AND THRUST BLOCK TABLE

NOTE: THRUST BLOCK SIZE HAS BEEN DETERMINED USING 1200 kPa BASED ON GEOTECHNICAL ASSUMPTION. CONTRACTOR TO CONFIRM IN-SITU BEARING CAPACITY ONSITE. REFER SEQ-WATER-1205-1 TO 1208-1 FOR THRUST BLOCK DETAILS.

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		Ø250	30.1	600
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		Ø250	109.0	1700
⑤	DEAD END CAP	Ø150	29.5	660
		Ø250	77.1	1200
⑥	POTABLE HYDRANT	Ø150	-	-
		Ø250	-	-
⑦	STOP VALVE	Ø150	33.3	X=500; Y=300; Z=700
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KEY PLAN

Issue	Description	DR	CH	VE	Date
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales

0 5 10 20 30 40 50m

1 : 500

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures

Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: WATER RETICULATION LAYOUT PLAN SHEET 3

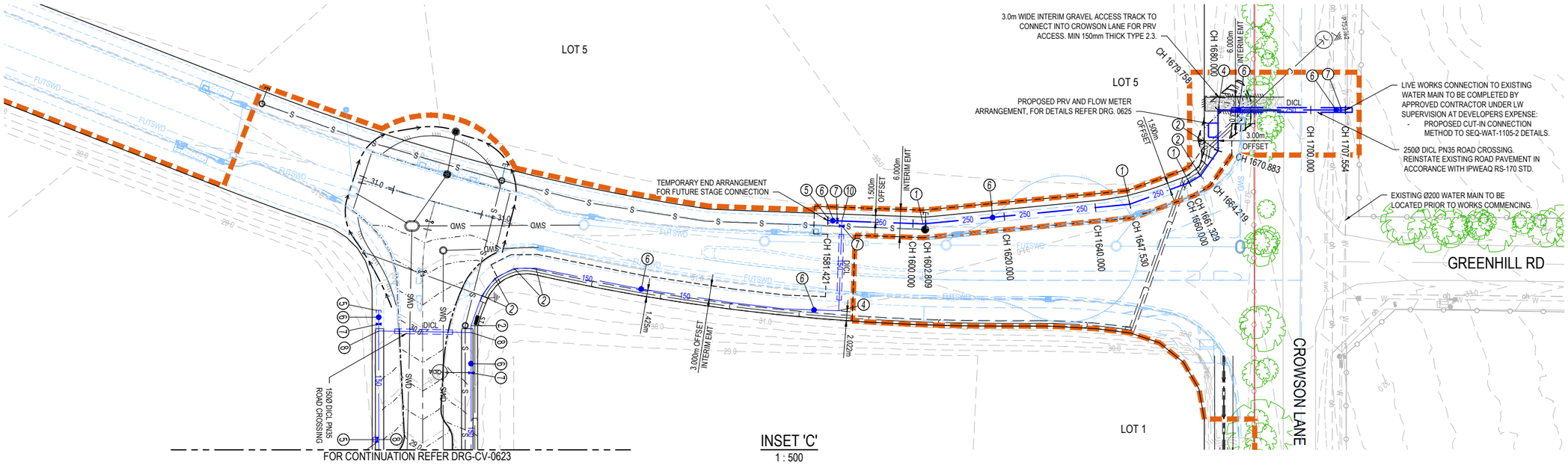
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Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0623

Issue: A

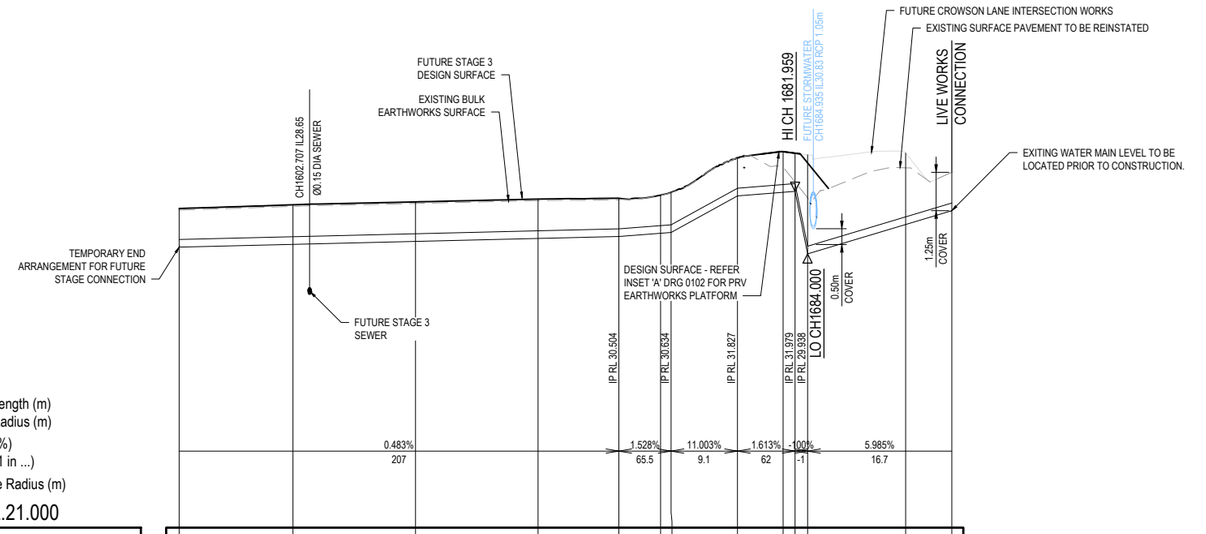
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INSET 'C'
1 : 500

LEGEND

- DESIGN SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXTENT OF WORK BOUNDARY
- FUTURE STAGE BOUNDARY
- PROPOSED BLOCKWORK RETAINING WALL - SINGLE TIER
- PROPOSED CONCRETE SLEEPER RETAINING WALL - SINGLE TIER
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- PROPOSED EDGE OF BITUMEN
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- EXISTING SEWER RETICULATION
- EXISTING STORMWATER DRAINAGE RETICULATION
- EXISTING WATER RETICULATION
- EXISTING UNDERGROUND ELECTRICAL RETICULATION
- EXISTING OVERHEAD ELECTRICAL RETICULATION
- FUTURE SEWER RETICULATION
- FUTURE STORMWATER DRAINAGE RETICULATION
- FUTURE WATER RETICULATION

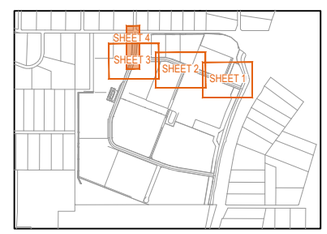


TRUNK Ø250 LONGITUDINAL SECTION
SCALE: HORIZONTAL - 1:500
VERTICAL - 1:100

WATER FITTINGS AND THRUST BLOCK TABLE

NOTE: THRUST BLOCK SIZE HAS BEEN DETERMINED USING 1200 kPa BASED ON GEOTECHNICAL ASSUMPTION. CONTRACTOR TO CONFIRM IN-SITU BEARING CAPACITY ONSITE. REFER SEQ-WATER-1205-1 TO 1208-1 FOR THRUST BLOCK DETAILS.

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		Ø250	30.1	600
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KEY PLAN

Issue	Description	DR	CH	VE	Date
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

Scales
0 5 10 20 30 40 50m
1 : 500
0 1 2 4 6 8 10m
1 : 100

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures

Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: WATER RETICULATION LAYOUT PLAN SHEET 4

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Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0624 | Issue: A

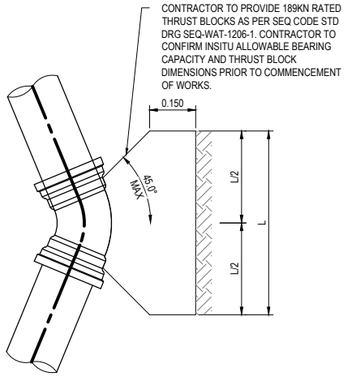
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THRUST BLOCK DIMENSION - 1200kPa

*INDICATES BLOCK LENGTH OF 600

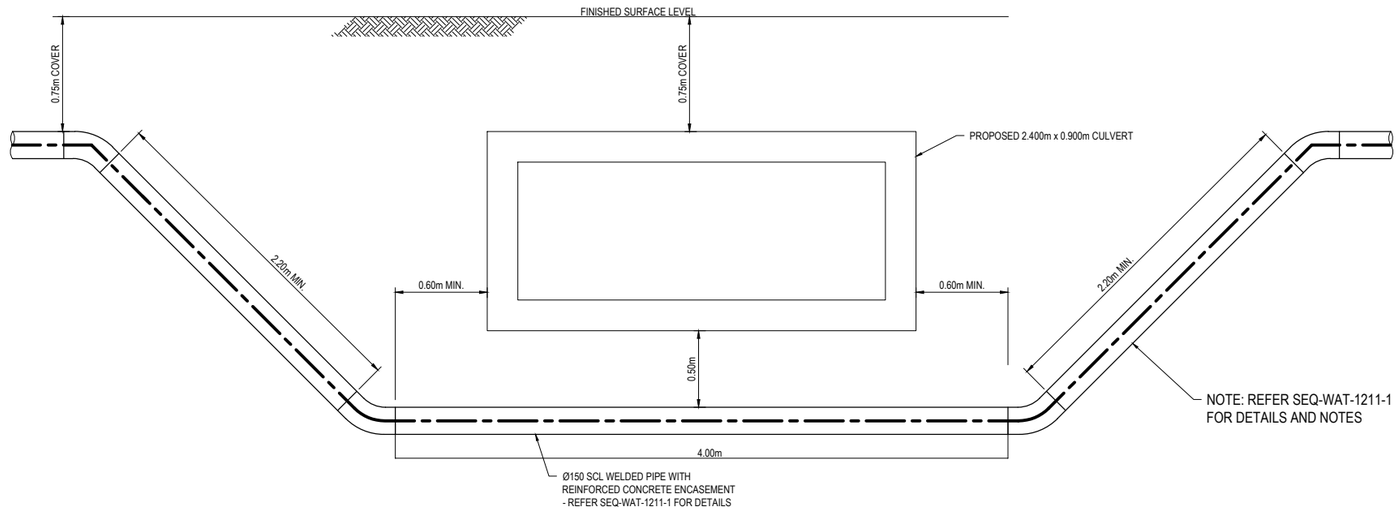
*SPECIAL DESIGN



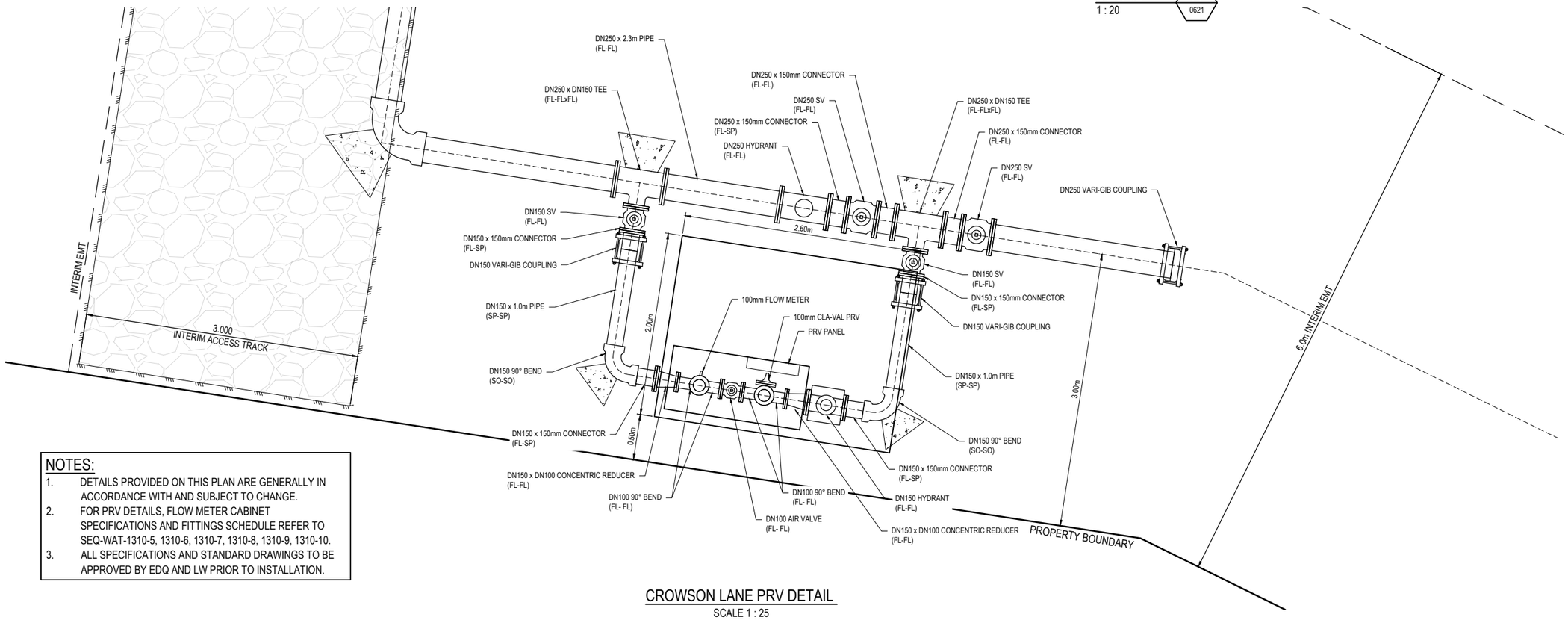
TYPICAL THRUST BLOCK DETAIL FOR NON-RESTRAINED PIPEWORK

11.25°, 22.5°, 45° AND 90° BEND

NTS



DETAIL A
1 : 20
0621



NOTES:

1. DETAILS PROVIDED ON THIS PLAN ARE GENERALLY IN ACCORDANCE WITH AND SUBJECT TO CHANGE.
2. FOR PRV DETAILS, FLOW METER CABINET SPECIFICATIONS AND FITTINGS SCHEDULE REFER TO SEQ-WAT-1310-5, 1310-6, 1310-7, 1310-8, 1310-9, 1310-10.
3. ALL SPECIFICATIONS AND STANDARD DRAWINGS TO BE APPROVED BY EDQ AND LW PRIOR TO INSTALLATION.

CROWSON LANE PRV DETAIL

SCALE 1 : 25

Issue	Description	DR	CH	VE	Date
A	ISSUED FOR CONSTRUCTION	J.B.	T.F.	G.E.	16.02.24

100mm on Original

Scales: 0 0.5 1 1.5 2m — 1 : 20

Surveyor: WOLTER consulting group — Planning, Urban Design, Landscape, Environment, Surveying

Client: Charter Hall

Status: FOR CONSTRUCTION

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Original Issue Signatures

Drawn	P.LAGANAO	Original Size	A1
Designed	G.PUMNUT	Height Datum	AHD
Project Manager	T.FANNING	Grid	LOCAL
Verified	B.KITSON	R.P.E.Q. No: 07884 Date: 01.08.24	

Project: FLAGSTONE LOGISTICS ESTATE - STAGE 1

Title: WATER RETICULATION DETAILS

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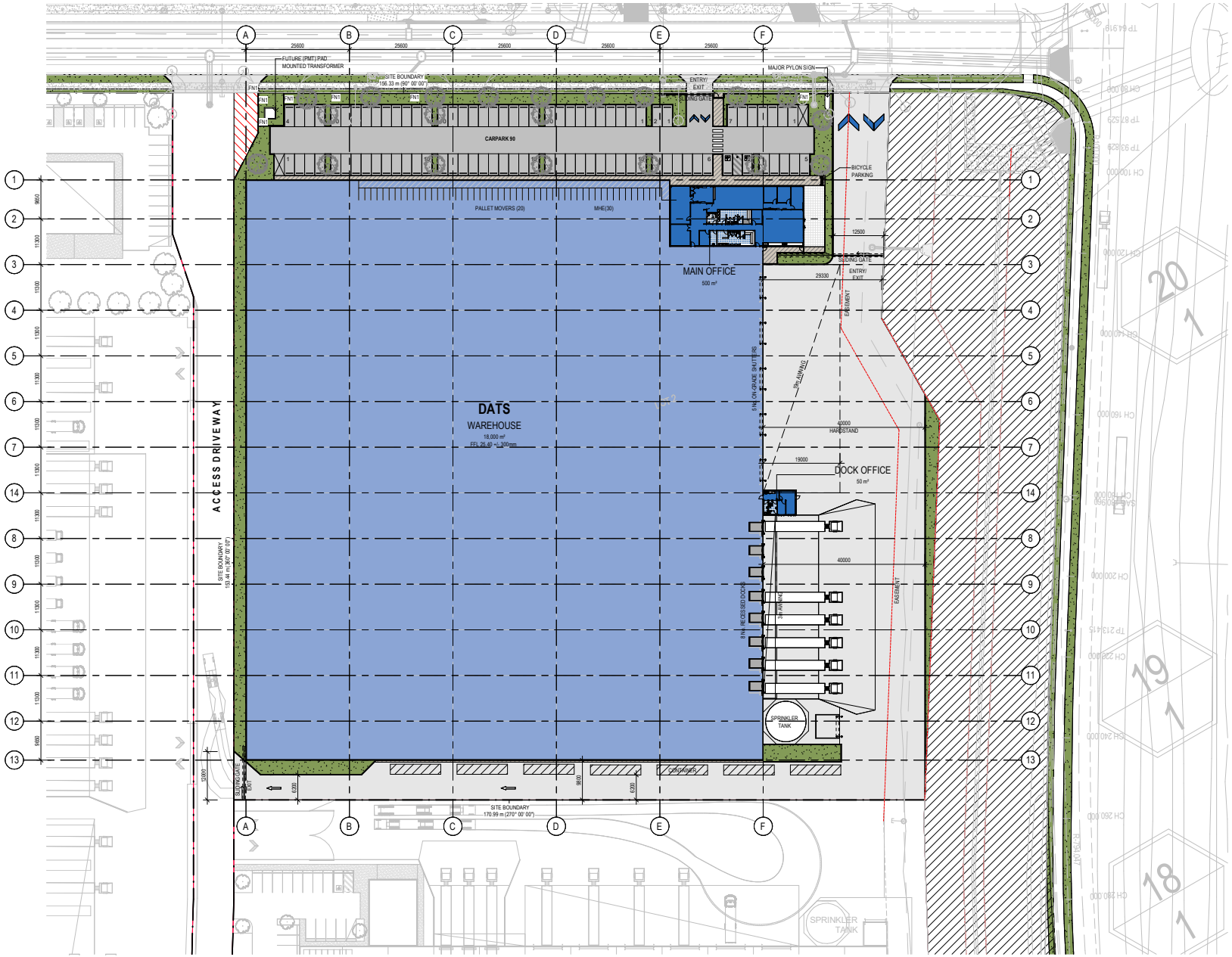
Project Number: 30109334

Drawing No.: 30109334-AAP-P301OP-CV-DRG-0625

Issue: A

Date Plotted: 1 Aug 2024 - 01:06PM File Name: C:\Users\ao67297\DC\ACCDocs\Arcadis\AAU-30109334-4499-4651 Mount Lindesay Highway\Project Files\01_WIP\01_Stage-01_Internal Works\DRG\30109334-AAP-P301OP-CV-DRG-0621-Water.dwg

Appendix C – Architectural Plan



SITE PLAN
SCALE: 1 : 500

DEVELOPMENT ANALYSIS

BUILDING	GLA
WAREHOUSE	18,000 m²
OFFICE	500 m²
DOCK OFFICE	50 m²
TOTAL AREA	18,550 m²

EXTERNAL AREAS (APPROX)	
CANOPIES	1,229 m²
HARDSTAND	5,305 m²
LIGHT DUTY	2,211 m²
PAVING	305 m²
LANDSCAPE	1,515 m²
LANDSCAPING RATIO	5.2%

PARKING	
BAYS PROVIDED	90

SITE COVERAGE	
TOTAL SITE AREA	29,385m²
TOTAL BUILDING FOOTPRINT	18,550 m²
INCL. PUMP HOUSE	
SITE COVERAGE	63%

LEGEND

- WAREHOUSE
- OFFICE
- INDICATES EXTENT OF HEAVY DUTY HARDSTAND TO CIVIL ENGINEERS DETAILS
- INDICATES EXTENT OF LIGHT DUTY PAVEMENT TO CIVIL ENGINEERS DETAILS
- INDICATES EXTENT OF UPGRADED HEAVY DUTY PAVEMENT TO CIVIL ENGINEERS DETAILS
- CONCRETE PAVING WITH EXPOSED AGGREGATE FINISH OR SIMILAR
- SEALED FIRE TRUCK ACCESS TRACK TO BRIGADE APPROVAL
- AREA OF GRASS / LANDSCAPING, REFER TO LANDSCAPE ARCHITECTS DRAWINGS FOR LANDSCAPE LAYOUT AND DETAILS
- EASEMENT LINE
- FN1 — FENCE TYPE 2 - 2100mm HIGH BLACK PVC COATED CHAINMESH FENCING WITH 3X ROWS OF BARBED WIRE ABOVE
- FN2 — FENCE TYPE 1 - 2100mm HIGH PALISADE/ DIPLOMAT TYPE FENCING. BLACK POWDERCOATED
- SG — SLIDING GATE

No.	DATE:	REVISION:	BY:	CHK:
P1	14.01.2025	PRELIMINARY ISSUE	ST	ML
P2	16.01.2025	PRELIMINARY ISSUE	ST	ML

All areas indicated are indicative for design and planning purposes only and should not be used for any contractual reasons without verification by a licensed surveyor or further design development being completed.

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PROJECT:
DATS
LOT 101, FLAFSTONE LOGISTICS ESTATE

TITLE:
OVERALL SITE PLAN

TRUE NORTH

CLIENT: Charter Hall

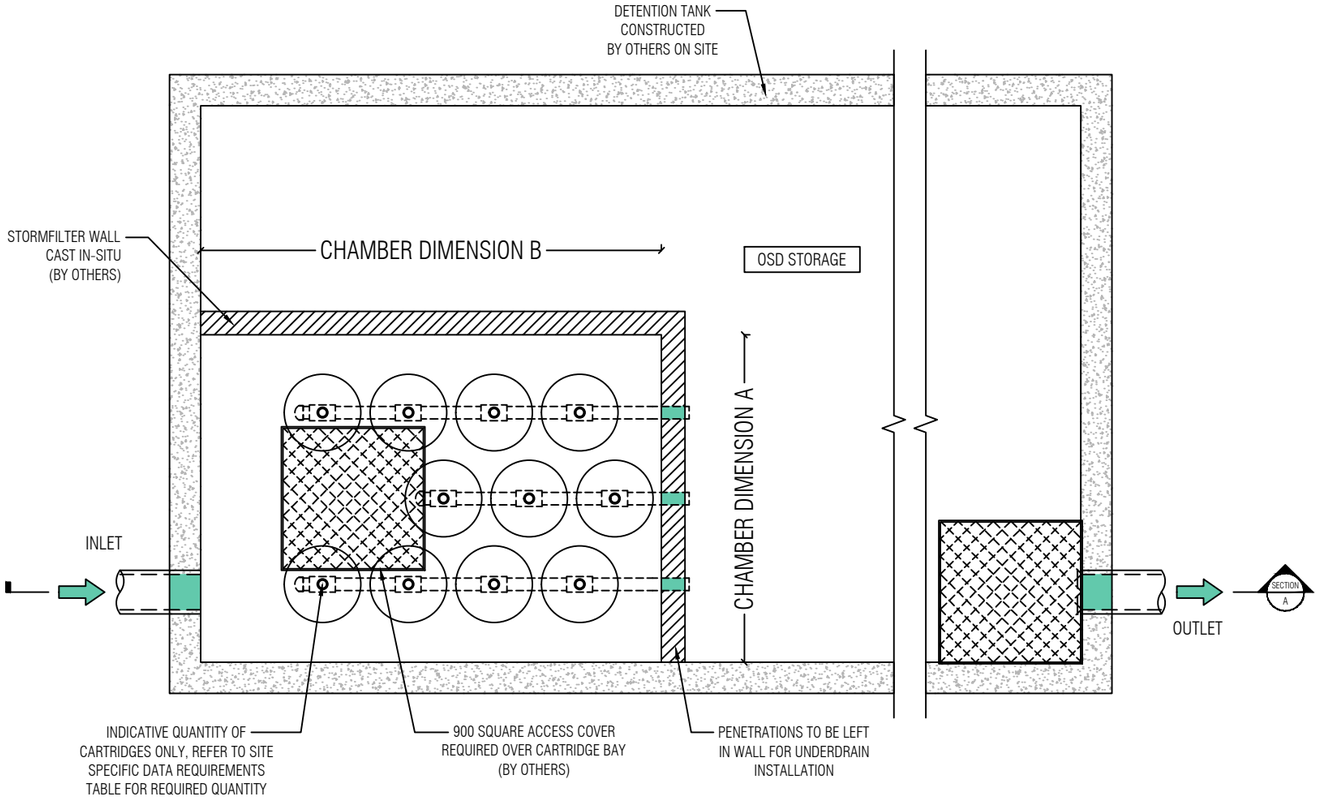
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SCALE: 2000 @ A3

JOB NO. 25004
DRAWING NO. SK01
REVISION. P2

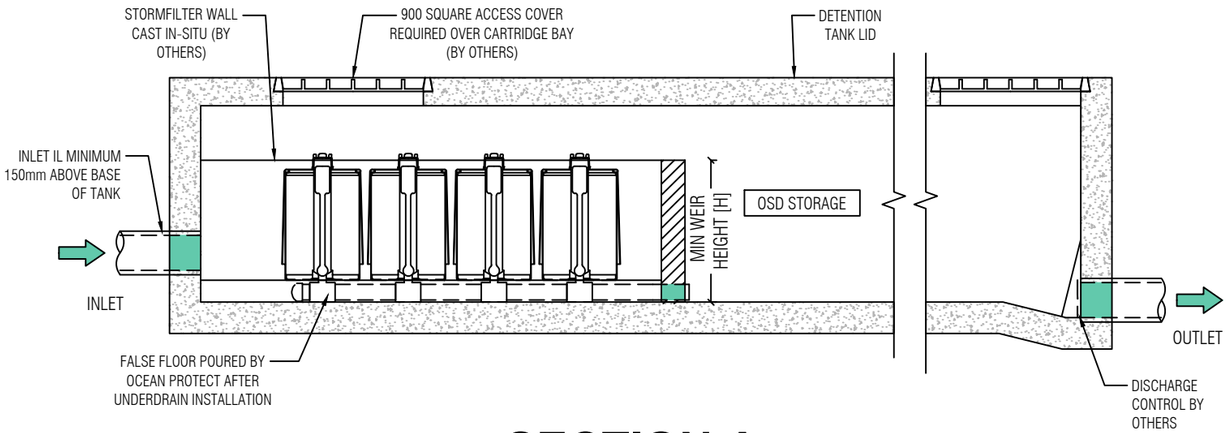
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Appendix D – Ocean Protect Information

NOT FOR CONSTRUCTION



PLAN LAYOUT



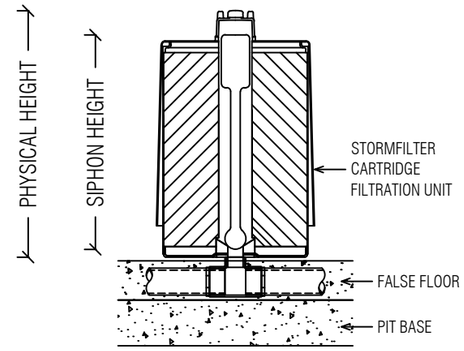
SECTION A

STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CERTIFYING ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF-CLEANING. RADIAL MEDIA DEPTH SHALL BE 178mm.

CARTRIDGE NAME / SIPHON HEIGHT (mm)	690	460	310
CARTRIDGE PHYSICAL HEIGHT (mm)	840	600	600
MINIMUM WEIR HEIGHT* [**H**] (mm)	910	690	540
CARTRIDGE FLOW RATE FOR ZPG MEDIA (L/s)	1.6	1.1	0.7
CARTRIDGE FLOW RATE FOR PSORB MEDIA (L/s)	0.9	0.46	0.39

** MINIMUM WEIR HEIGHT MAY BE REDUCED IN CERTAIN CIRCUMSTANCES. CONTACT OCEAN PROTECT FOR MORE INFORMATION.*



STORMFILTER CARTRIDGE DETAIL

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	[ ]
NUMBER OF CARTRIDGES REQ'D	[ ]
SIPHON HEIGHT (310 / 460 / 690)	[ ]
MEDIA TYPE (ZPG / PSORB)	[ ]
WATER QUALITY FLOW RATE (L/S)	[ ]
DIMENSION A	[ ]
DIMENSION B	[ ]

TOTAL CARTRIDGE BAY AREA (A x B) TO MATCH AREA REQUIRED BY MUSIC MODELLING OR COUNCIL SPECIFIC REQUIREMENTS

GENERAL NOTES

1. INLET AND OUTLET PIPES TO BE IN ACCORDANCE WITH APPROVED PLANS.
2. A HIGH FLOW BYPASS ARRANGEMENT OR DISSIPATION STRUCTURE MAY BE REQUIRED TO MINIMISE RE-SUSPENSION OF SOLIDS OR ANY SIGNIFICANT INERTIAL FORCES ON THE CARTRIDGES.
3. ALL WATER QUALITY TREATMENT DEVICES REQUIRE PERIODIC MAINTENANCE. REFER TO OPERATION AND MAINTENANCE MANUAL FOR GUIDELINES AND ACCESS REQUIREMENTS.
4. SITE SPECIFIC PRODUCTION DRAWING WILL BE PROVIDED ON PLACEMENT OF ORDER.
5. THE INVERT LEVEL OF THE INLET PIPE MUST BE GREATER THAN THE RL OF THE FALSE FLOOR WITHIN THE CARTRIDGE CHAMBER.
6. CONCRETE STRUCTURE AND ACCESS COVERS DESIGNED AND PROVIDED BY OTHERS. ACCESS COVERS TO BE A MINIMUM 900 X 900 ABOVE CARTRIDGES. OH&S REGARDING ACCESS COVERS AND TANK ACCESS TO BE ASSESSED BY OTHERS ON SITE.
7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES.
8. DRAWINGS NOT TO SCALE.

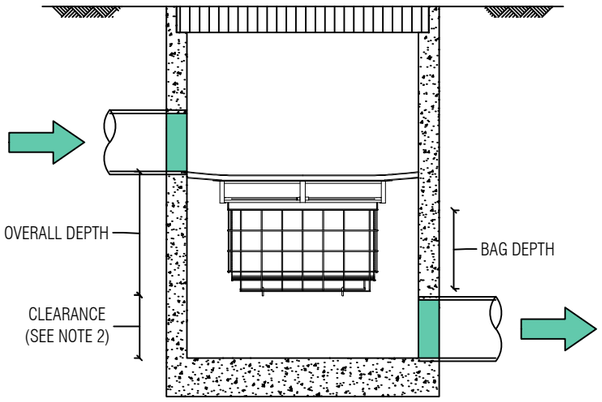
INSTALLATION NOTES

1. UNDERDRAIN AND FALSE FLOOR INSTALLED BY OCEAN PROTECT.

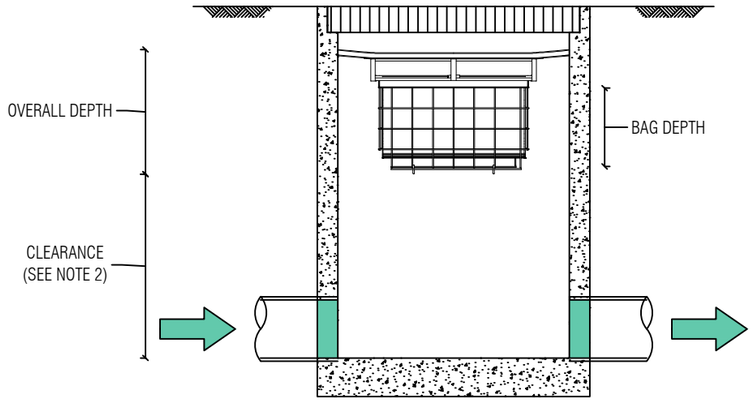
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OCEAN PROTECT
STORMFILTER SYSTEM
DETENTION TANK ARRANGEMENT
SPECIFICATION DRAWING

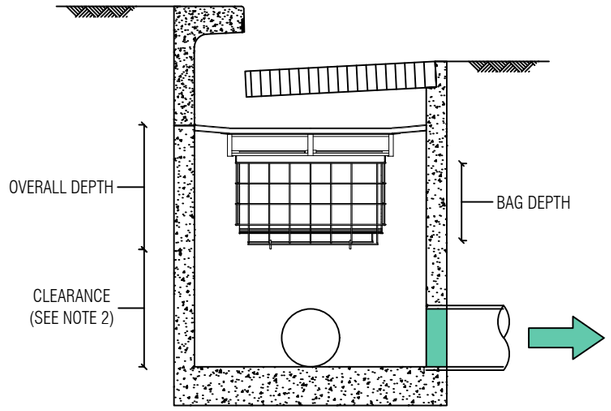
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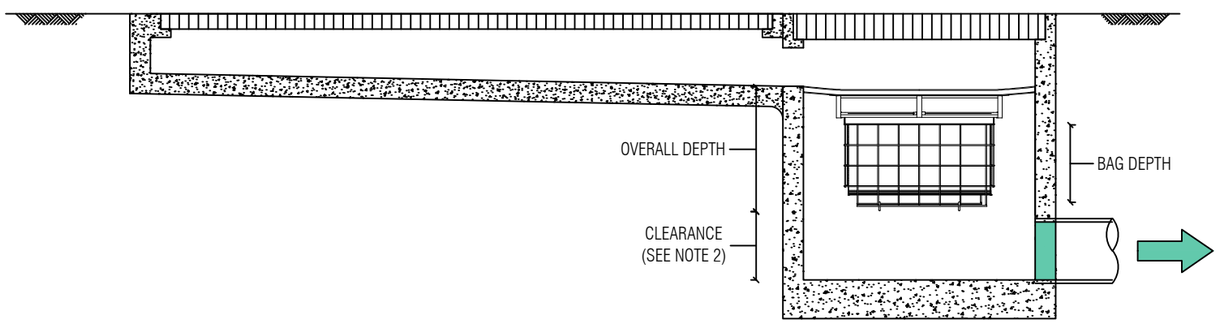
PIPE FLOW CONFIGURATION



SURFACE FLOW CONFIGURATION



SURFACE FLOW CONFIGURATION

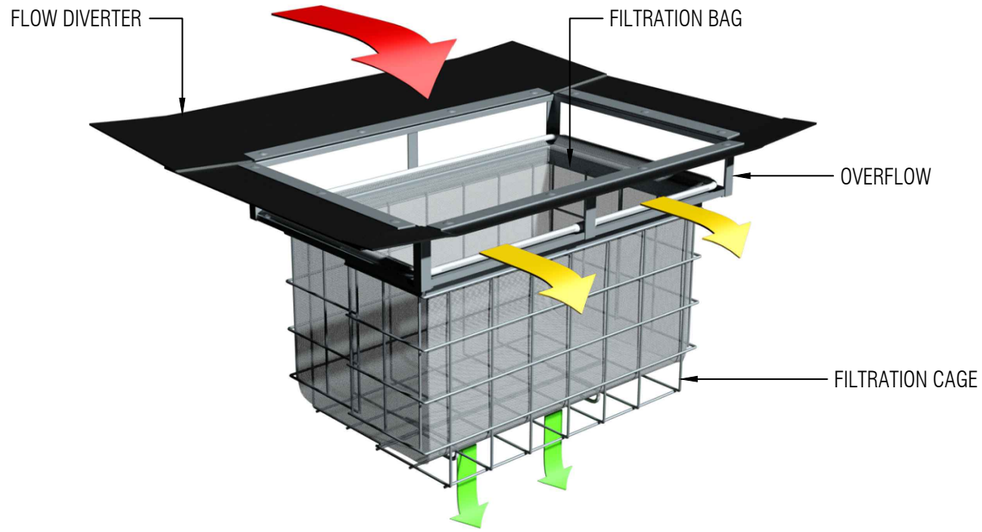


GRATED STRIP DRAIN CONFIGURATION

PLAN ID	MAXIMUM PIT PLAN DIMENSIONS
S	450mm x 450mm
M	600mm x 600mm
L	900mm x 900mm
XL	1200mm x 1200mm

DEPTH ID	BAG DEPTH	OVERALL DEPTH
1	170	270
2	300	450
3	600	700

		DEPTH ID		
		1	2	3
PLAN ID	S	■		
	M	■	■	
	L	■	■	■
	XL	■	■	■



GENERAL NOTES

1. THE MINIMUM CLEARANCE DEPENDS ON THE CONFIGURATION (SEE NOTE 2) AND THE LOCAL COUNCIL REQUIREMENTS.
2. CLEARANCE FOR ANY PIT WITHOUT AN INLET PIPE (ONLY USED FOR SURFACE FLOW) CAN BE AS LOW AS 50mm. FOR OTHER PITS, THE RECOMMENDED CLEARANCE SHOULD BE GREATER OR EQUAL TO THE PIPE OBVERT SO AS NOT TO INHIBIT HYDRAULIC CAPACITY.
3. OCEAN PROTECT PROVIDES TWO FILTRATION BAG TYPES:- 200 MICRON BAGS FOR HIGHER WATER QUALITY FILTERING AND A COARSE BAG FOR TARGETING GROSS POLLUTANTS.
4. DRAWINGS NOT TO SCALE.

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OCEAN PROTECT
OCEANGUARD
TYPCIAL ARRANGEMENTS
SPECIFICATION DRAWING

LAST MODIFIED: 15-10-19

Appendix E – Arcadis SBSMP

ARCADIS Design & Consultancy for natural and built assets

COMPLIANCE APPROVAL
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2018/961/13

Condition no: 21

Date: 24/07/2024

Queensland Government

4499 – 4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN

Site Based Stormwater Management Plan (Quantity)

19 JUNE 2024

Incorporating Hyder

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CHARTER HALL PRIME INDUSTRIAL FUND 4499-4651 MOUNT LINDESAY HIGHWAY, NORTH MACLEAN

Site Based Stormwater Management Plan (Quantity)

Author	Thea Fanning	
Checker	Brook Kitson	
Approver	Darlan Castro RPEQ 19918	
Report No	EAG001-30109334-AAR	
Date	19/06/2024	
Revision Text	12	

COMPLIANCE APPROVAL
referred to in the PDA
DEVELOPMENT APPROVAL
Approval no: DEV2018/961/13
Condition no: 21
Date: 24/07/2024

Queensland Government

This report has been prepared for Charter Hall Prime Industrial Fund in accordance with the terms and conditions of appointment for 4499-4651 Mount Lindesay Highway – North Maclean – Civil Engineering dated 18/10/2021. Arcadis Australia Pacific Pty Limited (ABN 76 104 485 289) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.

REVISIONS

Revision	Date	Description	Prepared by	Approved by
01	30/09/2022	DRAFT Issue	TF	DC
02	14/10/2022	Issue for Approval	TF	DC
03	06/02/2023	Response to RFI	TF	DC
04	22/02/2023	Amended Southern Basin Outlet	EP	DC
05	23/06/2023	Response to Peer Review Comments	TF/DC	DC
06	04/07/2023	Table 5-9 Updated	TF	DC
07	06/07/2023	Weir Width Updated and Inundation Curve Added	TF	DC
08	03/08/2023	Overall Site Layout Updated	TF	DC
09	15/08/2023	ROL Update	TF	DC
10	16/02/2024	ROL Update	TF	DC
11	27/02/2024	Fixed Appendix D Missing Flood Maps	TF	DC
12	19/06/2024	Updated Eastern Channel Drainage Strategy	TF	DC

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1.2 Revision 05 ..... **3**
1.3 Revision 08 ..... **3**
1.4 Revision 09 ..... **3**
1.5 Revision 10 ..... **3**
1.6 Revision 11 ..... **4**
1.7 Revision 12 ..... **4**

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Site Layout Plan

APPENDIX B

Engineering Drawings and Site Topography

APPENDIX C

Existing Decision Notice Approval

APPENDIX D

TUFLOW Mapping

APPENDIX E

Stormwater Drainage Safety Audit

1 EXECUTIVE SUMMARY

Arcadis has been engaged by Charter Hall Prime Industrial Fund to prepare a Site Based Stormwater Management Plan (Quantity) (SBSMPQ) for the proposed industrial development, situated at 4499-4651 Mount Lindesay Highway, North Maclean. The site is located in the Greater Flagstone Priority Development Area located within the Logan City Council local government area. On 21 September 2021, the Minister for Economic Development Queensland (EDQ) granted approval for a PDA development application over the site for a Development Permit for Reconfiguring a Lot – 1 into 4 lots, plus roads and open space. On 27 September EDQ granted approval for an amendment to the previous Reconfiguring a Lot application (DEV2018/961/8). The new approval was for reconfiguring a lot - one (1) lot into eleven (11) lots and new roads and open space.

This report demonstrates the proposed development will be constructed and operated in accordance with the requirements of Council, the South-East Queensland State Planning Policy (SPP), the Queensland Development Code, the Queensland Urban Drainage Manual (QUDM) Economic Development Queensland (EDQ) PDA guidelines and the Environmental Protection (Water) Policy (2009). This report also demonstrates the proposed amendment will not result in substantially different development to the existing approval.

The primary objective of this SBSMPQ is to ensure that:

1. Suitable measures are incorporated into the development to ensure that there are no adverse impacts to downstream receiving waterways, property or infrastructure resulting from any increase to stormwater runoff peak flow rates.

This report therefore includes hydraulic and hydrological modelling which demonstrate, that due to change in stormwater catchment parameters, there is an increase in peak flow rate during the post development scenario. Subsequently, three regional detention structures have been proposed and designed in conjunction with numerous on-site detention systems for Lots 2 - 5 such that flow rates discharged from the development site are no greater than the corresponding catchment existing peak flow rates at the proposed points of interest, from 50% to 1% Average Exceedance Probability (AEP) storm events.

The impact of the proposed development against the existing condition at the areas immediately downstream and upstream of the site have been assessed using TUFLOW. The assessment considers the changes and if they would cause corresponding changes to the existing flood behaviour and thereby would cause any actionable nuisance.

In assessing the area constraints and the flood characteristics surrounding the site, Arcadis assigned a 2m grid size to the TUFLOW model, with resulting increased accuracy of the results in flood sensitive areas compared to larger grid sizes. Results from the model were assessed for peak water surface level afflux between the existing and developed scenarios.

This report presents the methodology and results of a flood modelling assessment which has included the analysis of the impacts of the proposed development in comparison to the existing scenario. In particular, this assessment has focused on the impact immediately upstream and downstream of the site where complex flood behaviour, with flows currently draining through private properties, is present.

Results indicate that the proposed development will generally improve flood conditions downstream of the site by applying the reduction of site stormwater discharge via the proposed detention systems and augmenting the proposed earthworks to allow adequate flood storage and conveyance through the site.

Note: The proposed operational stormwater quality treatment train is detailed in the Site Based Stormwater Quality Management Plan (SBSQMP) (EAG003-30109334-AAR-01).

1.1 Revision 03

Revision 03 of this report was prepared in response to the Information Request received from EDQ via email on 22 November 2022, related to the Compliance Assessment for Condition 21 of the Decision Notice received for the PDA Development Permit for reconfiguring a lot – 1 lot into 4 lots, plus roads and open space. Specifically includes changes to the Western Swale configuration to reduce clearing impacts within the 25m buffer.

1.2 Revision 05

Revision 05 of this report has been prepared in response to the comments received from Water Tech following their peer review of this report, as well as the Further Clarification Request received from EDQ on 31 March 2023 related to the Compliance Assessment for Condition 21 of the Decision Notice received for the PDA Development Permit for reconfiguring a lot – 1 lot into 4 lots, plus roads and open space.

1.3 Revision 08

The Overall Site Layout in Appendix A has been updated for Revision 08 of this report. The Overall Site Layout has been updated to reflect the adjustment to the northern site boundary which has been realigned to reflect the minimum 11m clear zone required by Council for safety purposes pertaining to the proposed upgrade of Crowson Lane. This has adjusted the size of Lots 1 and 4.

The above change results in a minor reallocation of land from the allotment catchments to the Crowson Lane catchments. No changes have been made to the modelling undertaken as part of this report as the change is considered negligible in relation to the catchment as a whole and the modelling undertaken is more conservative.

Revision 08 of this report was submitted to EDQ as part of the Compliance Assessment for Condition 21 of the Decision Notice received for the PDA Development Permit for reconfiguring a lot – 1 lot into 4 lots, plus roads and open space.

1.4 Revision 09

Revision 09 of this report has been prepared to support the amended ROL application, increasing the number of proposed allotments from four (4) to eleven (11) and new roads, consisting of five super lots and six auxiliary lots, comprising drainage, open space and a sewer pumpstation. The proposed amendments to the existing ROL development approval do not result in substantially different development from either a stormwater management or a flooding perspective. No changes were made to the DRAINS or TUFLOW models as a result of this amendment.

1.5 Revision 10

Revision 10 of this report has been prepared in response to detailed design of the allotments, adjusting the stormwater catchments referred to as INTNL-2R, INTNL-2B, INTNL-2C and INTNL-3C with respect to size and direction of flow. INTNL-2B and INTNL-2R was reduced in size. INTNL-3C changed configuration. INTNL-2C increased in size and was divided into three sub-catchments with minor flows directed to the channel. The major and minor flows were divided for these three catchments to direct the minor flows through a longer travel path (passes through two weir structures within the channel), in order to create a non-worsening effect on the downstream properties, east of Mount Lindesay Highway during the 0.5EY storm event. DRAINS and TUFLOW modelling and reporting have been updated accordingly.

1.6 Revision 11

Revision 11 of this report has been prepared to include the missing Flood Maps from Appendix D.

1.7 Revision 12

Revision 12 of this report reflects the changes to the Eastern Channel drainage strategy. The weirs (Weir 01 and 02) and bund previously proposed for the Eastern Channel have been removed to allow the channel to drain in a timely manner. This results in a minor increase in flows downstream of the development site during the 0.5EY storm event; however, it has been demonstrated that such afflux is minor and corresponds to an inundation reduction where viewed in the context of historical earthworks which were undertaken south of the development site.

Minor changes have been made to the internal sub-catchments and allotment detention as details of the final land use and topography have emerged.

2 INTRODUCTION

Arcadis has been engaged by Charter Hall Prime Industrial Fund to prepare a Site Based Stormwater Management Plan (Quantity) (SBSMPQ) for the proposed industrial development, situated at 4499 - 4651 Mount Lindesay Highway, North Maclean. The site is situated within the Greater Flagstone Priority Development Area (PDA) located within the Logan City Council (LCC) local government area.

On 21 September 2021, the Minister for Economic Development Queensland (EDQ) granted approval for a PDA development application over the site for a Development Permit for Reconfiguring a Lot – 1 into 4 lots, plus roads and open space. On 27 September EDQ granted approval for an amendment to the previous Reconfiguring a Lot application (DEV2018/961/8). The new approval was for reconfiguring a lot - one (1) lot into eleven (11) lots and new roads and open space. The proposed amended ROL layout is shown in Figure 2-1, below.

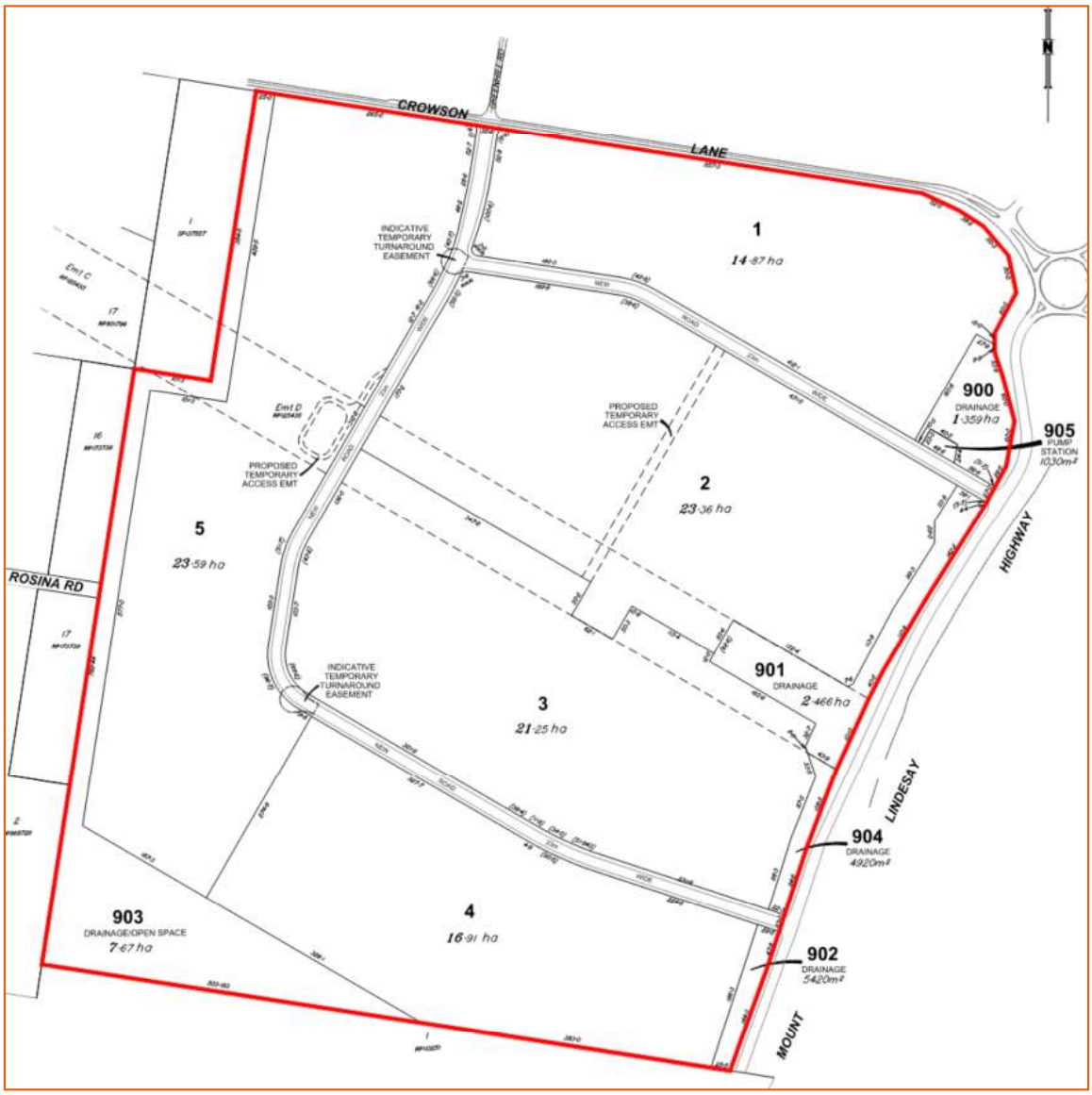


Figure 2-1 – Approved Amended ROL Layout (Source: Wolters, August 2023)

The following report demonstrates the proposed development will be constructed and operated in accordance with the Queensland State Planning Policy (SPP 2017), the Queensland Development Code, the Queensland Urban Drainage Manual (QUDM), Economic Development Queensland (EDQ) PDA guidelines and the Environmental Protection (Water) Policy (2009) with respect to the attenuation of stormwater runoff. This report also demonstrates the proposed amendment will not result in substantially different development to the existing approval.

3 SITE CHARACTERISTICS

3.1 Site Description

The subject site is located within Logan, South-East Queensland, Australia on the following lot:

- Lot 39 on SP258739 (4499-4651 Mount Lindesay Highway, North Maclean)

The site in generally bounded by the following co-ordinates (GDA94 / MGA zone 56)

- South-West: 500708, 6928700
- North-East: 501974, 6929628

The proposed area for the development is approximately 117.9ha.

3.2 Existing Land Usage

The site is predominantly vegetated with cleared areas relating to the existing residential dwelling and associated land use and High Voltage Electrical Power transmission lines and towers.

The site currently has direct property frontage to Mount Lindesay Highway to the east, predominantly trees and vegetation to the south and rural residential developments to the north and west. A MEDQ Approved context plan published 10 September 2021 includes the subject site. The site is approved for specific land use "*Industry and Business Zone*" with overlay for indicative future bio-diversity corridor. An existing high voltage easement running through the site from the south into the existing rural residential dwelling to the north. A further high voltage (275kV) easement runs through the site within the cleared area.

A site locality plan is provided in Figure 3-1 below:

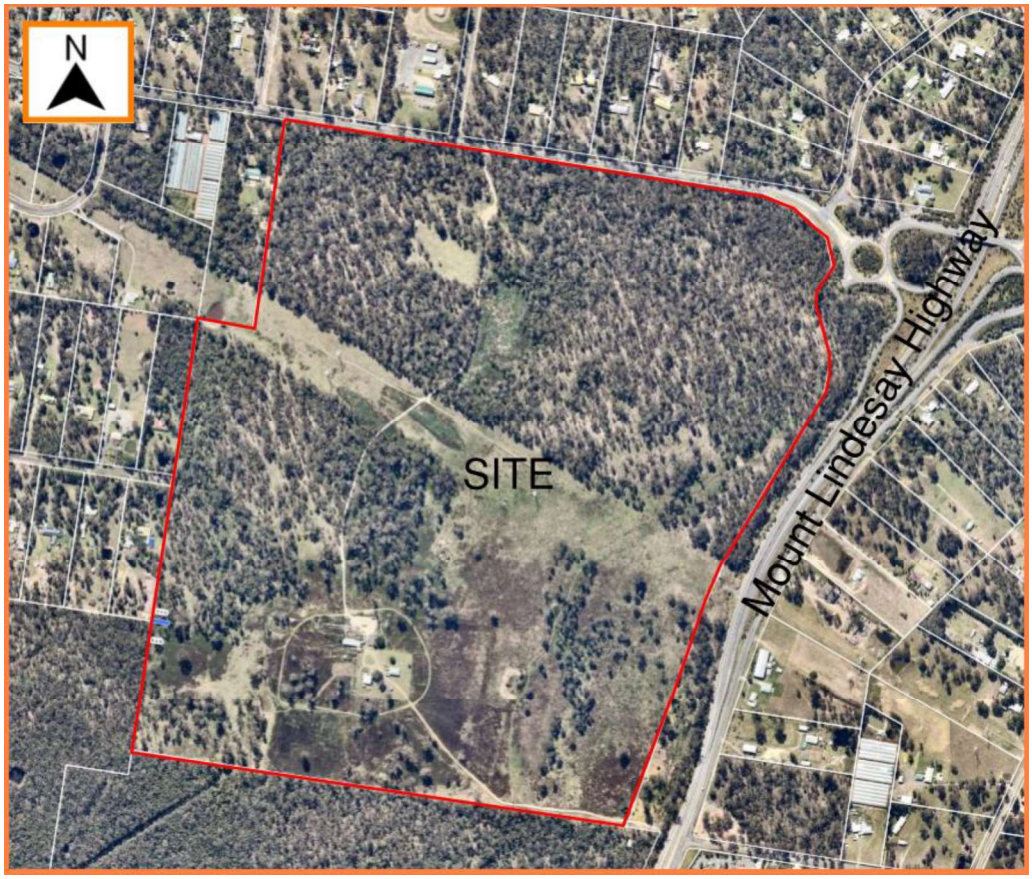


Figure 3-1- Development Locality Plan (Source: NearMap, June 2022)

3.3 Existing Topography and Site Drainage

In its current state, a ridge traverses the development site from the north-western corner to the southern site boundary, with further undulations dividing the site into three sub-catchments, as shown in Figure 3-2. The northern catchment slopes east at an average of 2% from RL44.0 to a culvert with a minimum invert level of RL20.90 which allows flows to pass beneath Mount Lindesay Highway to the opposite side. From here, water is ultimately discharged east of Mount Lindesay Highway towards the Logan River located approximately 1.1km east of the site.

The western portion of the site slopes south from RL44.0 to RL26.5 at an average grade of 1.6%. An overland flow path commences in this portion of the site, exiting the site across the southern boundary before re-entering the site in the east through the third catchment area. The overland flow path flows north-east to the abovementioned culverts. The third catchment area site also slopes to this culvert at an average grade of 1.2%.

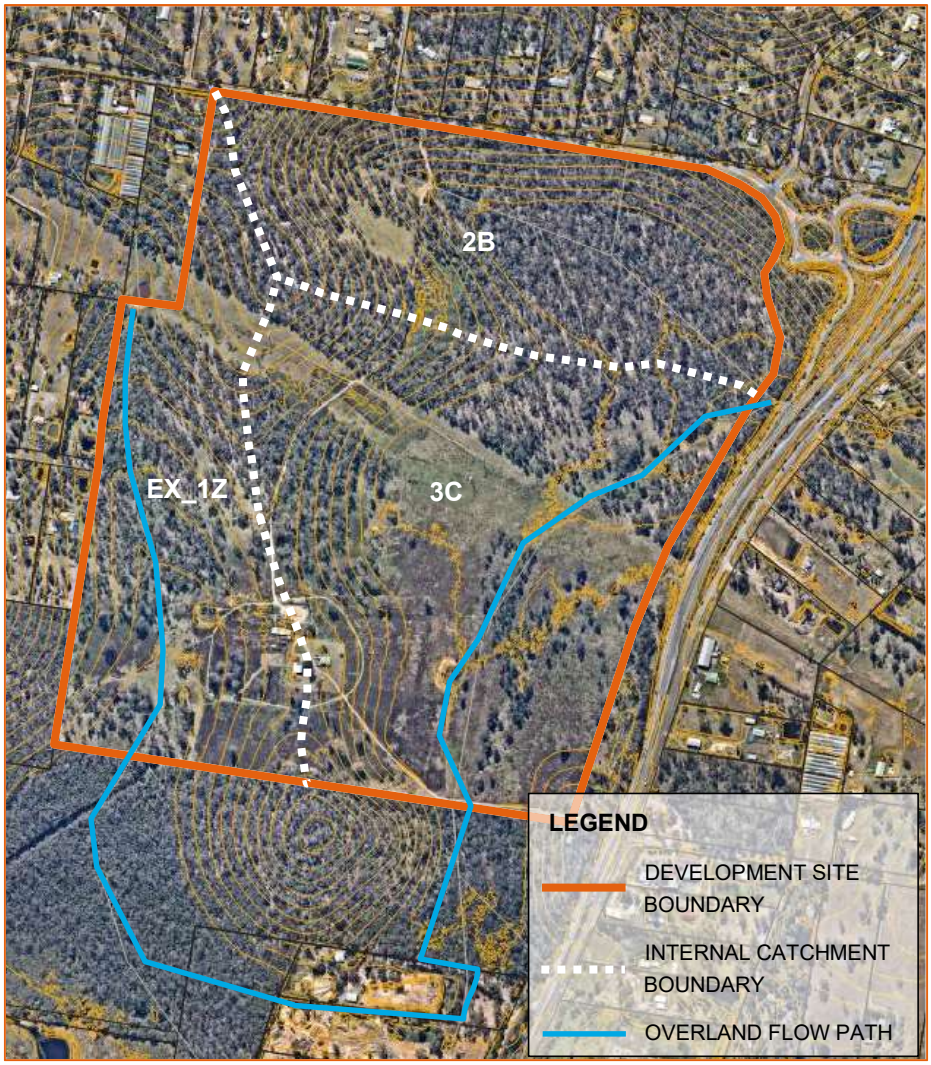


Figure 3-2- Internal Catchment Plan (Source: NearMap, June 2022)

Stormwater runoff from upstream external catchments enter the site from the north, south and west. The extent of the external catchments is shown in Figure 3-3.

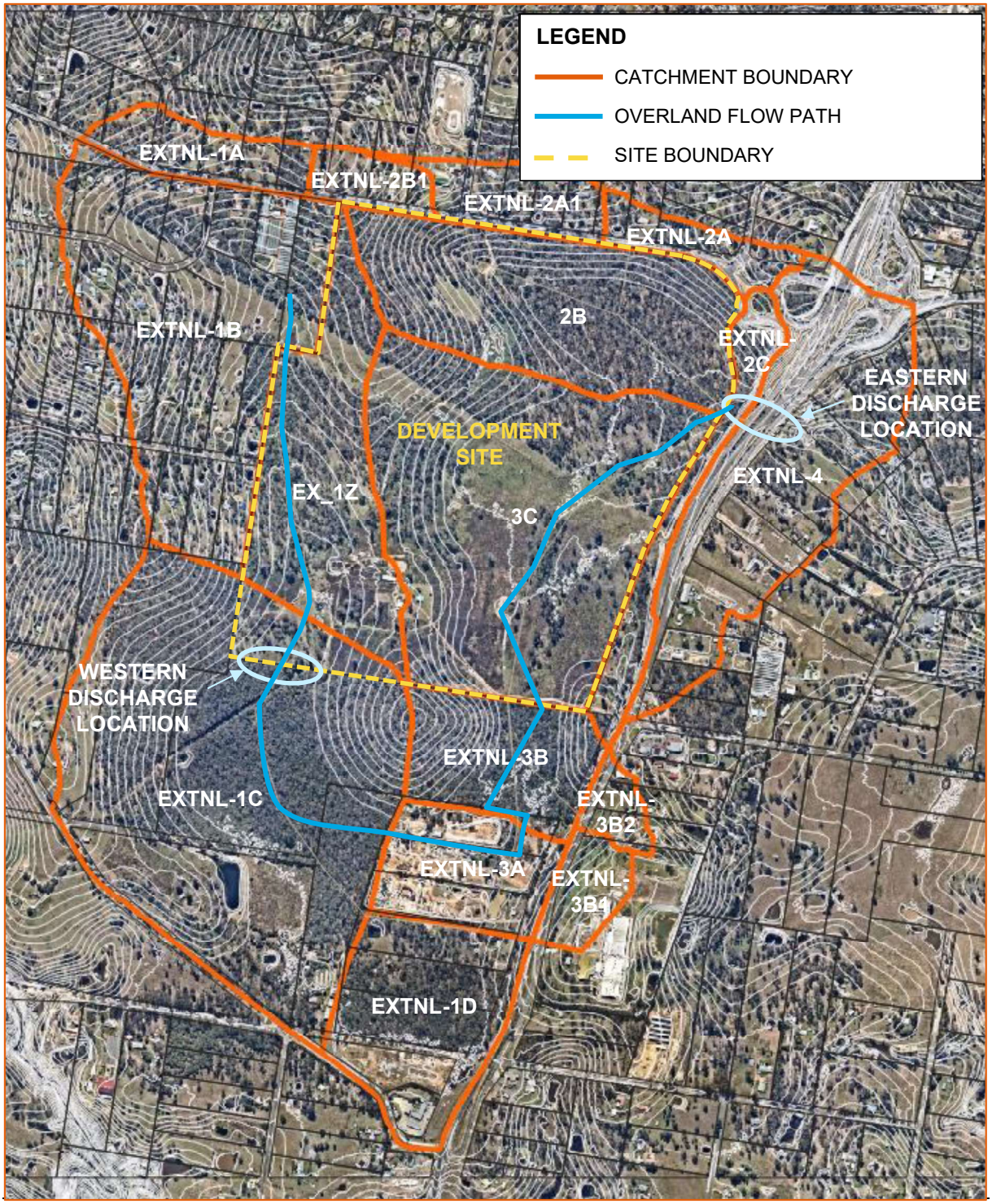


Figure 3-3: Existing Catchment Plan

3.4 Existing Approval

It is understood that the existing EDQ approval (DEV 2018/961/8) over the site is for a reconfiguring a lot – 1 lot into eleven (11) lots, plus roads and open space. As part of this approval key services to support the development were identified with associated works including:

- Construction of a service road along the western side of the Mount Lindesay Highway accessed via the existing Crowson Lane / Mount Lindesay Highway off ramp roundabout;

- Construction of a trunk rising sewer main running through the existing electrical main of the proposed development, ending at Greenbank Road.
- Connection to existing potable water mains along Crowson Lane and the Mount Lindesay Highway
- Proposed stormwater infrastructure;
- Construction of internal roads; and
- Proposed connection to existing underground electrical and telecommunication services along Crowson Lane and the Mount Lindesay Highway.

Further details on the works associated with the adjacent property approval can be found within the relevant Decision Notice attached within Appendix C. The approved EDQ Structure Plan is shown below in Figure 3-4 below.

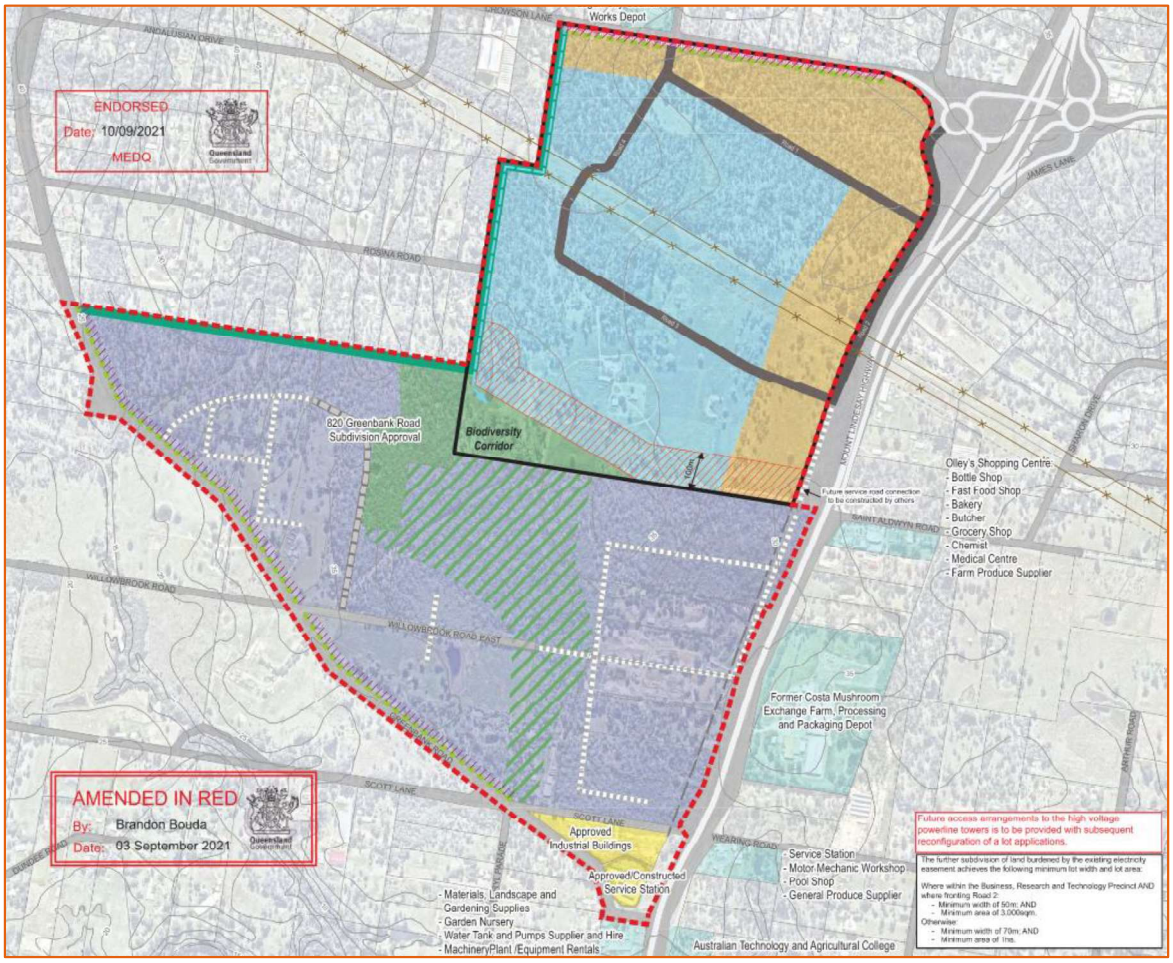


Figure 3-4- North Maclean Enterprise Context Plan (Source: Reel Planning, September 2021)

3.5 Geotechnical Investigation

A geotechnical investigation was completed separately by Protest Engineering in October 2021. Borehole testing revealed the ground profile generally comprises of silty sand (Emerson Class 6) up to 0.6m depth, overlaying silty/sandy clay up to 4m depth followed by low to high strength sandstone. Groundwater was not encountered during the investigation; however, Protest Engineering noted that groundwater levels can be seasonal and fluctuate during and after heavy rainfall events. Refer to Protest Engineering Report PTP/07651-0001-Rev3 for further details.

3.6 Flooding

A review of LCC's Flood Hazard Tigger Overlay Map (OM-05) revealed that the site is identified as a Flooding and inundation area with a large portion of the site being prone to flooding. Figure 3-5 below shows LCC's Flood Hazard Overlay for the site. Detailed flood modelling has been undertaken to ensure modifications to the overland flow path does not have adverse impacts on properties upstream or downstream of the development site. The overland flow path has also been modified to include adequate storage of flows from the eastern developed catchment to ensure flows discharged from the development site do not exceed pre-development flows.

It is noted that the Logan City Council riverine flood modelling and flood overlay mapping is reflective of the previous natural ground levels and not the current approved finish surface levels (bulk earthworks) across the subject land. Arcadis have prepared a supplementary memo titled *Flagstone Estate: LCC TLPI No 1/2023 Response – Flood Overlay Code* dated 1 March 2024, which includes updated flood risk mapping in accordance with the Logan City Council Planning Scheme Policy. Reference should be made to this document for details of the revised flood mapping applicable to the development.

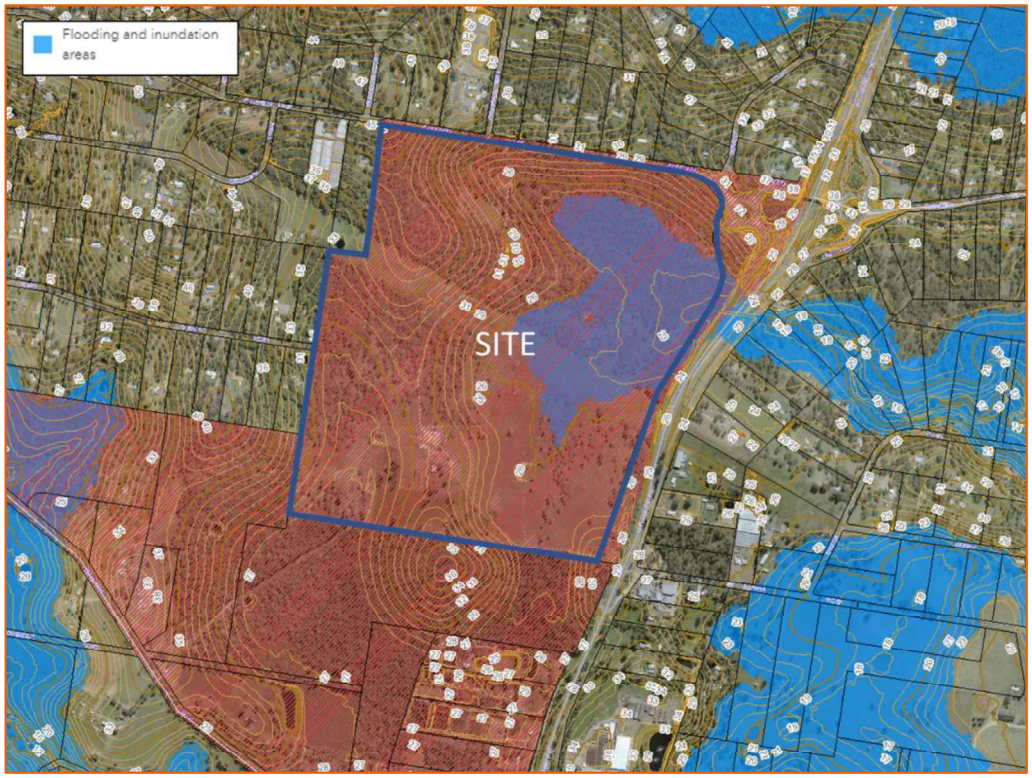


Figure 3-5- Flood Hazard Overlay (Source: Logan City Council, June 2022)

3.7 Existing and Planned Stormwater Infrastructure

Limited stormwater drainage infrastructure is present within the vicinity of the development site. A set of culverts is situated near the eastern property boundary discharging stormwater under the Mount Lindsay Highway and ultimately towards the Logan River located approximately 1.1km east of the site. The culverts comprise two 1.75m high, 2.1m wide reinforced concrete box culverts at RL21.09m AHD, between which sit two 1.75m high, 2.1m wide reinforced concrete box culverts at RL20.90m AHD

Smaller culverts are present within Crowson Lane, directing stormwater runoff from the northern upstream catchments beneath the road and discharging into the subject site. The pipes vary in size from approximately 375mm dia to 4 x 675mm dia.

Crowson Lane and the adjacent streets are to be upgraded by Logan City Council in the near future. The proposed stormwater drainage upgrades are shown in Figure 3-6 below and in Appendix B.

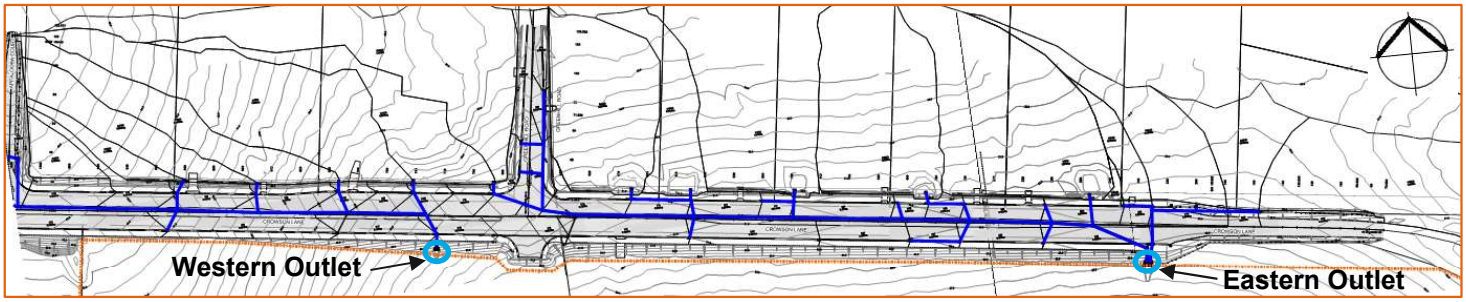


Figure 3-6- Proposed Crowson Lane Stormwater Drainage Upgrade (Source: Logan City Council, August 2022)

Following the proposed stormwater drainage upgrades, the Crowson Lane piped network will discharge flows into the development site at two locations, circled in the figure above. The western discharge pipe is 1050mm dia. The eastern outlet consists of two pipes – a 1350mm dia pipe and a 900mm dia pipe.

The proposed internal drainage network has been designed to convey the developed flows associated with Crowson Lane upgrade through the site to the legal point of discharge.

4 DISCHARGE LOCATIONS

4.1 Pre-Developed Discharge Characteristics

As previously outlined in this report, the site in its pre-developed state consists of multiple catchments, discharging via concentrated flows into either local flood plain area to the south (Catchment EX_1Z) (referred to as “Southern Discharge Location” in Figure 3-3) and/or ultimately to the highway infrastructure to the east (Catchments 2B and 3C) (referred to as “Eastern Discharge Location” in Figure 3-3).

4.2 Proposed Discharge Characteristics and Objectives

The proposed development will retain the existing discharge locations, as marked on Figure 3-3 and Figure 5-1. To comply with the requirements of Council, the Queensland State Planning Policy (SPP 2017), the Queensland Development Code, the Queensland Urban Drainage Manual (QUDM) and the Environmental Protection (Water) Policy (2009), the following primary objectives are to be achieved:

- Suitable measures are incorporated into the development to ensure that there are no adverse impacts to downstream receiving waterways, property or infrastructure resulting from any increase to stormwater runoff peak flow rates; and
- waterway flow management measures are implemented to ensure no adverse stability impacts to downstream receiving unlined waterways;

For all standard Average Exceedance Probability (AEP) design events attenuation is proposed for the 4499 - 4651 Mount Lindesay Highway, North Maclean development. The site assessment will demonstrate compliance with LCC Policy by discharging pre-detained 50%, 20%, 10%, 2% and 1% AEP flows to the points of interest.

5 HYDROLOGICAL ASSESSMENT

The hydrological assessment presented in this report has been undertaken in accordance with the methodology documented in the Australian Rainfall & Runoff 2019. This methodology replaces the Average Variability Method (AVM) temporal patterns of ARR1987 with a fundamentally changed ensemble approach (i.e. 10 temporal distributions per storm duration). This methodology also uses the updated design rainfall inputs sourced from the AR&R (2019) data hub.

5.1 Temporal Patterns

Rainfall Intensities Frequency Duration data were obtained from The Bureau of Meteorology (http://www.bom.gov.au/water/designRainfalls/revised-ifd/?year=2016). The Latitude and Longitude of used for the site is summarised in Table 5-1 below.

Table 5-1 Site Latitude & Longitude

Parameter	Value
Latitude	-27.761
Longitude	153.013

5.2 Preburst Data

Preburst depths and ratios were obtained from the Australian Rainfall and Runoff Data Hub for the coordinates shown in the table above. The preburst depths are listed in Table 5-2.

Table 5-2 Preburst Depths (mm)

Duration (hour)	% AEP					
	50	20	10	5	2	1
1	0.4	2.9	4.6	6.2	7.6	8.7
1.5	0.1	1.3	2.1	2.8	11.4	17.7
2	0.1	2.5	4.1	5.6	12.5	17.7
3	0.3	2.2	3.4	4.6	16.7	25.8
6	0	2.6	4.4	6	16.1	23.6
12	2.5	8.9	13.2	17.3	24	29.1
18	0.6	8.2	13.3	18.1	23.4	27.4
24	0	5.2	8.6	11.9	16.2	19.4
36	0	2.3	3.9	5.4	12.1	17.1
48	0	0.9	1.5	2.1	6.9	10.4
72	0	0	0	0	2	3.4

5.3 Catchment Analysis

As previously discussed, the development site drains to two points of interest (Western Discharge Location and Eastern Discharge Location). The development site has been assessed under the following two scenarios:

- **Pre-development Scenario –** Site and external catchment in their current state. The pre development scenario also includes the proposed upgrades to Crowson Lane and Eastern Trunk service road. As all the catchments modelled in this scenario have a rural/rural residential land use, the RAFTS method has been adopted as the most appropriate method to model the catchments.
- **Mitigated Scenario –** The proposed industrial development (divided into the catchments shown in Figure 5-1) with the calculated detention infrastructure in place and no changes to the external catchment areas. The RAFTS method has continued to be used to model the external catchments in the mitigated scenario. The ILSAX method has been used to model the industrialised internal catchments.

The scenarios listed above have been modelled in TUFLOW to assess the impact on the properties upstream and downstream of the site boundaries beyond identified points of interest. The catchments were first modelled in DRAINS with the hydrographs exported and imported into TUFLOW. This methodology ensures that peak flow concentrations from the catchments are assessed and mitigated appropriately.

Table 5-3 and Table 5-4, below, list the loss parameters adopted in DRAINS for the RAFTS and ILSAX models. The pervious initial and continuing losses were sourced from the AR&R Data Hub.

Table 5-3 RAFTS Initial and Continuing Losses

Parameter	Initial Loss (mm)	Continuing Loss (mm/h)
Impervious Area	1	0
Pervious Area	26	1.9

Table 5-4 ILSAX Depression Storage

Parameter	Depression Storage (mm)
Impervious Area	1
Pervious Area	5

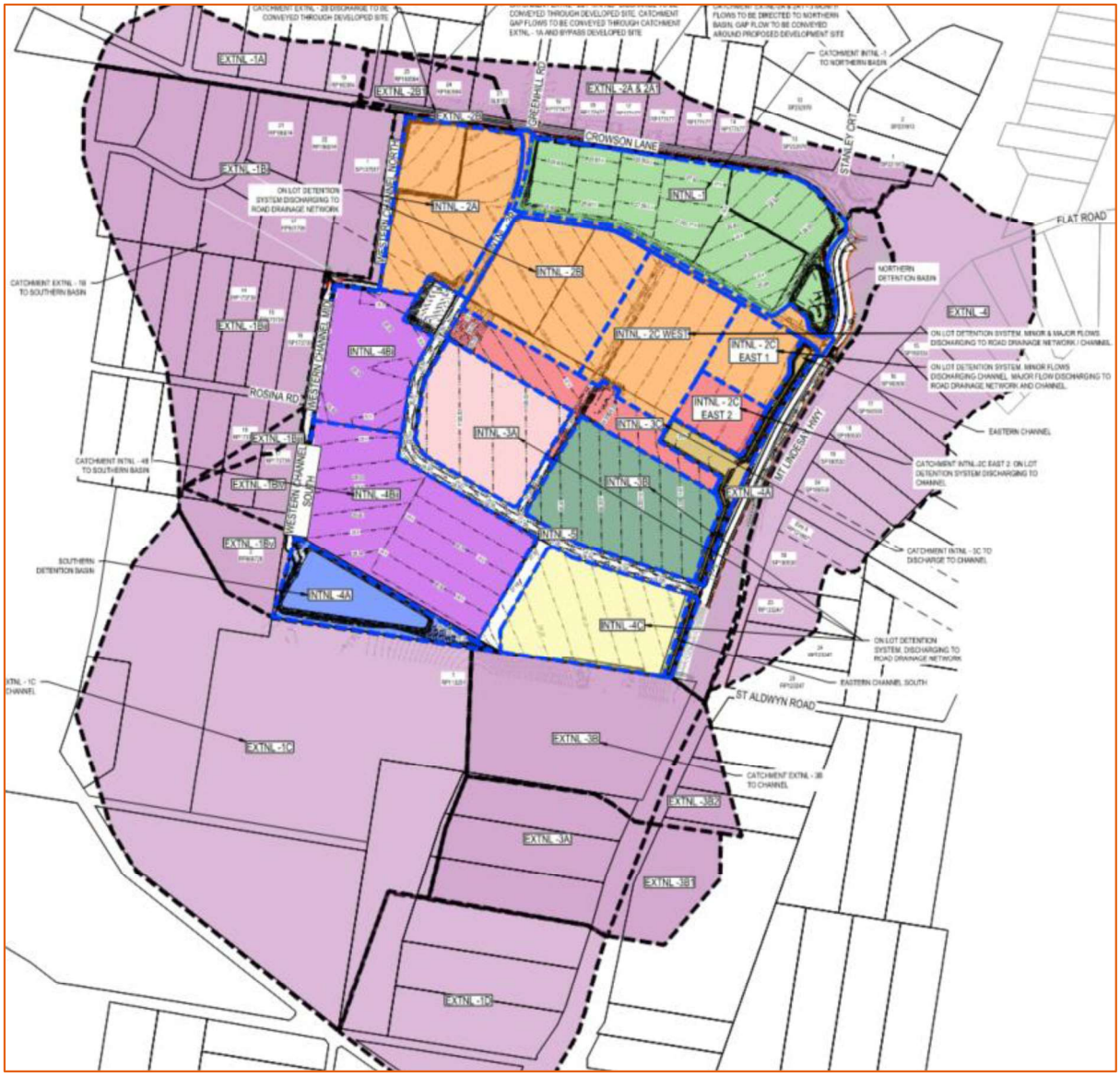


Figure 5-1: Developed Catchment Plan (refer to Appendix B)

Tables 5-5 and 5-6, below, summarise the catchment parameters used to assess the pre and post development flows.

Table 5-5 – Pre-development Catchment Parameters

Catchment	Area (ha)	Impervious (%)	Slope (%)	Mannings 'n'
EXTNL-1A	7.224	1	2.65	0.050
EXTNL-1Bi	23.636	10	2.49	0.050
EXTNL-1Bii	16.974	5	4.19	0.050
EXTNL-1Biii	0.9034	5	4.22	0.050
EXTNL-1Biv	3.3656	5	4.44	0.050
EXTNL-1C	74.256	0.5	1.26	0.100
EXTNL-1D	19.78	10	0.26	0.055
EX_1Z	25.142	0.5	0.98	0.055
EXTNL-2A	5.218	2	2.01	0.045
EXTNL-2A1	7.434	2	2.01	0.055
EXTNL-2B	32.26	0	2.05	0.060
EXTNL-2B1	4.077	2	3.71	0.045
EXTNL-2C	8.764	10	3.55	0.050
EXTNL-3A	12.15	0	1.64	0.055
EXTNL-3B	14.09	0	2.91	0.100
EXTNL-3B1	4.83	25	2.17	0.035
EXTNL-3B2	2.81	5	1.56	0.040
3C	55.53	1	1.62	0.050
EXTNL-4	34.632	25	3.76	0.040

Table 5-6 – Post-development Catchment Parameters

Catchment	Area (ha)	Impervious (%)	Slope (%)	Mannings 'n'
EXTNL-1A	7.224	1	2.65	0.050
EXTNL-1Bi	23.636	10	2.48	0.050
EXTNL-1Bii	16.974	5	4.19	0.050
EXTNL-1Biii	0.9034	5	4.22	0.050
EXTNL-1Biv	3.3656	5	4.44	0.050
EXTNL-1Bv	4.2025	5	4.02	0.050
EXTNL-1C	64.974	0.5	1.26	0.100
EXTNL-1D	19.780	10	0.26	0.055
EXTNL-2A	5.218	2	2.01	0.045
EXTNL-2A1	7.434	2	2.01	0.055
EXTNL-2B1	3.6801	2	3.71	0.045
EXTNL-2B (Crowson Lane)	0.3972	90	3.14	0.015
EXTNL-3A	12.15	0	1.64	0.055
EXTNL-3B	14.09	0.001	2.91	0.100
EXTNL-3B1	4.83	25	2.17	0.035
EXTNL-3B2	2.81	5	1.56	0.040
EXTNL-4A	8.764	10	3.55	0.050
EXTNL-4	34.632	25	3.76	0.040
Western Channel North	1.244	7.4	2.16	0.05
Western Channel Mid	0.960	36	0.66	0.037
Western Channel South	0.517	36	0.5	0.037

Catchment	Area (ha)	Impervious (%)	Impervious Time of Concentration (minutes)	Pervious Time of Concentration (minutes)
INTNL-1	17.052	85	15	15
INTNL-2A	8.918	90	10	10
INTNL-2B	8.8808	90	10	10

Catchment	Area (ha)	Impervious (%)	Slope (%)	Mannings 'n'
INTNL-2CW	7.5559	90	10	10
INTNL-2CE1	2.9479	90	10	10
INTNL-2CE2	2.1702	90	10	10
INTNL-2R	2.3818	75	20	20
INTNL-3A	7.740	90	10	10
INTNL-3B	9.165	90	10	10
INTNL-3C	5.1039	90	17	17
INTNL-4A	5.529	0	1	0.035
INTNL-4Bi	6.5529	75	15	24
INTNL-4Bii	13.9671	75	15	24
INTNL-4C	7.916	90	10	10
INTNL-5	5.958	75	20	20
Channel South	0.5458	0	0.5	0.035
Channel North	2.9041	0	0.5	0.035

5.4 Model Verification

Catchment EXTNL-1B was selected for a comparative exercise to validate the adoption of the RAFTS hydrological models for the rural/rural residential catchments. Catchment EXTNL-1B has been adopted as it does not contain large depression/storage areas which would distort the results. In addition to the RAFTS method, Catchment EXTNL-1B has been modelled using the Rational Method, ILSAX, Initial and Continuing Loss hydrological models.

A time of concentration of 31.7 minutes was applied to pervious and impervious portions of the catchment, alike, as the impervious areas traverse large tracks of pervious area before reaching the edge of the catchment boundary.

A 15mm grass depression storage was adopted for the ILSAX model. This is larger than the value listed in Table 5-4 as Catchment EXTNL-1B has a rural residential land use and is predominantly pervious with an uneven surface.

Refer to Table 5-7, below for the results.

Table 5-7 Catchment EXTNL-1B 1% AEP Hydrological Model Verification

Hydrological Model	1% AEP Flow (m^3/s)
RAFTS	9.95
ILSAX	11.8
Initial and Continuing Loss	13.7
Rational Method	11.2

As can be seen in Table 5-7, the RAFTS model produced the lowest 1% AEP flow and as such is considered the most conservative hydrological model with respect to detention volume calculations and is therefore appropriate for modelling the rural/rural residential catchments.

5.5 Drainage Strategy

As discussed in Section 4 of this report, the development site drains to two discharge locations (refer to Figure 3-3 and Figure 5-1). The proposed development will result in the redefinition of the catchment boundaries and characteristics draining to each discharge location, and as such, detention structures are required to attenuate flows to pre-development flow rates.

A regional detention basin is proposed to be constructed in the south-west corner of the development site to attenuate flows from Catchment INTNL-4B for all storm events, up to and including the 1% AEP storm event. Flows from external catchments EXTNL-1A, EXTNL-2B and EXTNL-1B are also conveyed through this detention basin. This detention basin was previously documented in Arcadis report *'4499-4651 Mount Lindesay Highway, North Maclean SBSMP (Southern Catchment Discharge Area)*' (11-0001-30101970-AAR-04); however, owing to changes to the contributing catchment, and proposed preservation measures to the southern wetland areas this basin has been remodelled. The proposed southern catchment management strategy and mitigation measures still comply with the general outcomes of the previous report (11-0001-30101970-AAR-04).

A second regional detention basin is proposed to be constructed in the north-eastern corner of the site to attenuate flows from Catchment INTNL-1. As such, the minor flows from the road network will by-pass the Northern Detention Basin.

A third regional detention system is proposed in the form of the conveyance channel situated along the eastern site boundary. The channel conveys flows from Catchments INTNL-2C WEST (minor flows only), INTNL-2C EAST 1 (minor flows only), INTNL-2C EAST 2, INTNL-3A, INTNL-3B, INTNL-3C, INTNL-4C, INTNL-5 and external catchments EXTNL-1C (including flows discharged from the southern detention basin), EXTNL-1D, EXTNL-3A, EXTNL-3B, EXTNL-3B1 and EXTNL-3B2. The proposed outlet configuration controls the flows discharging immediately upstream of the existing culverts situated beneath the Mount Lindesay Highway (eastern discharge location).

Catchments INTNL-2A – INTNL3B and INTNL-4C are to provide on-site allotment detention. For the purpose of sizing the three regional detention systems, an estimate of the detention volumes for the INTNL-2A – INTNL3B and INTNL-4C on-site detention systems has been calculated using the DRAINS software and is documented as part of this report; however, this is to be confirmed through a site specific SBSMP created for each individual lot. An allowance has been made for a portion of Lots 2, 3 and 4 to bypass the on-site allotment detention, discharging undetained to the drainage infrastructure in the road corridor. As such Catchments INTNL-2R and INTNL-5 extend slightly beyond the road corridor, and catchments INTNL-2B, INTNL-3A, INTNL-3B and INTNL-4C do not encompass the full allotment extents.

Catchment 2C has split into three catchments: INTNL_2C WEST, INTNL_2C EAST 1 and INTNL_2C EAST 2. Catchments INTNL_2C WEST and INTNL_2C EAST 1 discharge major and minor flow to separate points of discharge where minor flows discharge to the eastern conveyance channel on Lot 901 and major flows discharge to the proposed internal road drainage network. Catchment INTNL_2C EAST 2 discharges both major and minor flows to the eastern conveyance channel.

Note that internal catchment INTNL-3C does not require lot scale detention and is included in the regional mitigation system.

The proposed detention systems work in union to ensure the flows discharged from the development site do not cause adverse impacts upstream or downstream of the development site, for all storm events, up to and including the 1% AEP storm event.

Owing to the extensive external catchments conveyed through the regional detention systems, the complexity of the outlet structures, obstructions and drowned orifices, DRAINS was not considered the most appropriate software to model the regional detention systems. As such, the regional detention systems have been modelled in TUFLOW with input from DRAINS for the discharge flows from the allotment detention systems proposed for Catchments INTNL-2A – INTNL3B and INTNL-4C.

5.6 Detention Sizing

5.6.1 Allotment Detention

5.6.1.1 Methodology

The allotment detention systems proposed for Catchments INTNL-2A – INTNL3B and INTNL-4C were sized using DRAINS. The DRAINS models utilise a combination of the RAFTS and ILSAX methods to more accurately represent the different land use types. ILSAX was used to model the developed catchments with RAFTS used to model the relatively undeveloped existing and external catchments. The rainfall hydrographs generated for each catchment were exported from DRAINS and imported into the TUFLOW model.

The critical storm events were determined via an investigation of storm durations ranging from 10mins to 1080mins. The models were then used to route post-developed runoff from the eastern catchment through the proposed detention structure to determine the most efficient onsite detention system to comply with aforementioned objective.

Each catchment was modelled using a split catchment approach, with the first sub-catchment representing impervious areas and the second pervious. This allows for an accurate representation of Manning's roughness coefficients and applicable loss parameters.

5.6.1.2 Allotment Detention System Design Sizing

As stated in section 5.3, Catchments INTNL-2A – INTNL-3B and INTNL-4C are to provide individual on-site detention. Site specific SBSMPs will be required for each individual lot to determine the detention volumes and configurations required; however, for the purposes of sizing the northern and southern detention basins and the detentions storage in the conveyance channel, the detention volumes has been estimated and modelled in DRAINS. The discharge from each allotment detention system was extracted from DRAINS and imported into TUFLOW.

Table 5-8 provides a summary of the design parameters adopted for each individual allotment detention system. The allotment detention system design parameters were determined by modelling the pre and post development areas specific to Catchments INTNL-2A – INTNL-3B and INTNL-4C in DRAINS and ensuring the detention systems are adequately sized such that the post development flows do not exceed the pre-development flows.

Table 5-8 Allotment Detention System Design Parameters

Catchments	Internal Base Area	Maximum Water Depth	Detention Storage Volume	Control Outlets
INTNL-2A	2,400 m^2	1.99m (RL31.99m AHD)	4,151 m^3	• 375mm dia outlet @ RL30m AHD (base level); • 3m wide weir @ RL31.5m AHD
INTNL-2B	3,250 m^2	1.80m (RL27.80m AHD)	5,854m^3	• 300mm dia outlet @ RL26m AHD (base level); • 4.25m wide weir @RL27.4m AHD
INTNL-2CE1	2,600 m^2	0.8m (RL26.80m AHD)	2,074m^3	• 300mm dia outlet @ RL26m AHD (base level); • 8.9m wide weir @RL26.7m AHD
INTNL-2CE2	2,100 m^2	0.73m (RL26.73mAHD)	1,533 m^3	• 280mm dia outlet @ RL26m AHD (base level); • 7.5m wide weir @RL26.65m AHD
INTNL-2CW	3,350 m^2	1.71m (RL27.71mAHD)	4,883 m^3	• 2 x 225mm dia outlet @ RL26mAHD (base level) • 4.75m wide weir @RL27.45m AHD
INTNL-3A	4,800 m^2	0.86m (RL28.86m AHD)	4,132m^3	• 2x525mm dia outlet @ RL28m AHD (base level); • 4m wide weir @RL28.65m AHD
INTNL-3B	5,110 m^2	1.67m (RL25.67m AHD)	8,627m^3	• 375mm dia outlet @ RL24m AHD (base level); • 4m wide weir @RL25.5m AHD
INTNL-4C	1,800 m^2	1.86m (RL26.36m AHD)	3,495m^3	• 2x375mm dia outlet @ RL24.5m AHD (base level); • 4m wide weir @RL26m AHD

The peak water level estimated for each system is provided in Figure 5-2 below.

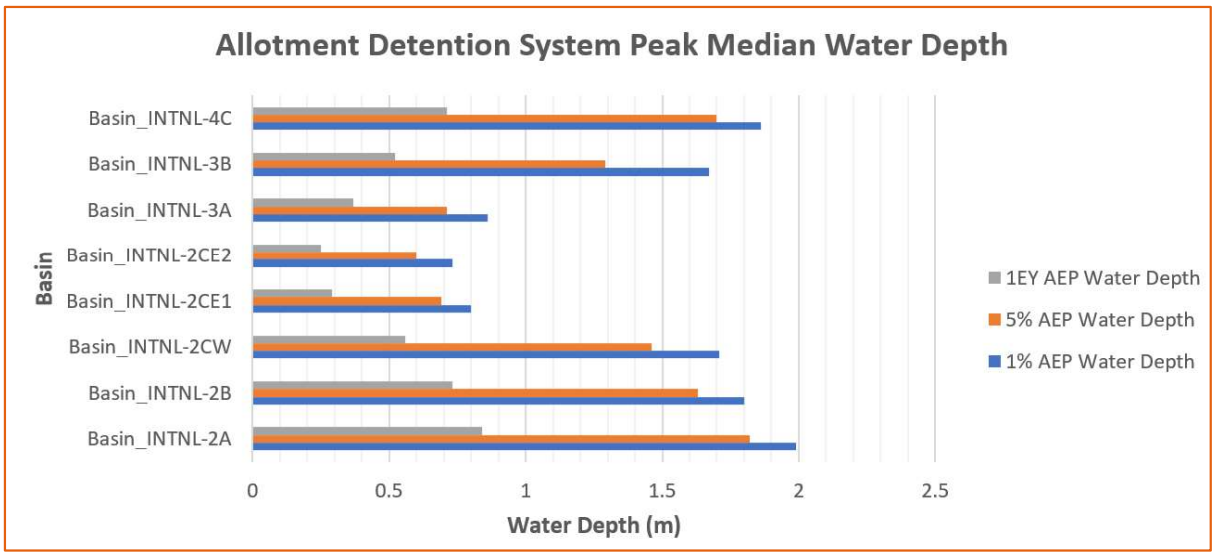


Figure 5-2: Allotment Detention System Peak Median Water Level

We note that should the individual lots adopt a different basin configuration other than what is specified in Table 5-8, the proposed basins shall be designed to ensure no increase in discharge rates up to the 540min duration for all the design events to ensure no impacts downstream.

5.6.2 Southern Detention Basin

Table 5-9 presents the parameters for the proposed southern on-site detention basin, as modelled in TUFLOW, which attenuates flows from Catchment INTNL-4B for all storm events, up to and including the 1% AEP storm event, prior to release to the southern discharge location. External catchments EXTNL-1A and EXTNL-1B are also conveyed through this basin.

This basin was previously documented in Arcadis report *'4499-4651 Mount Lindesay Highway, North Maclean SBSMP (Southern Catchment Discharge Area)'* (11-0001-30101970-AAR-04); however, owing to changes to the contributing catchment, this basin has been remodelled as part of this report, resulting in a larger and higher weir. This adjustment to the outlet configuration ensures that the flows discharged from the basin continue to be restricted to pre-development flows. The proposed southern catchment management strategy and mitigation measures still comply with the general outcomes of the previous report (11-0001-30101970-AAR-04).

Reference should be made to Engineering Drawings in Appendix B for a conceptual illustration of how the detention basin will operate.

Table 5-9 Southern Detention System Design Parameters

Contributing Catchments	Internal Base Area	Maximum Water Depth	Detention Storage Volume	Control Outlets
EXTNL-1A, EXTNL-1B & INTNL-4B	26,672 m^2	1.58 m (RL28.19m AHD)	32,706m^3	• 3 x 900mm dia pipe low flow outlets @ RL26.61m AHD (base level) with 800mm dia orifice fit to one of the 900mm dia low flow pipes • 64m wide weir @ RL28.0m AHD

5.6.3 Northern Detention Basin

The northern on-site detention basin is situated in the north-east corner of the proposed development and attenuates flows from INTNL-1 and the major flows from the northern portion of the internal road network, prior to discharge to the northernmost portion of the eastern conveyance channel. Bio-retention filter media is proposed to be included in the base of this basin to achieve the water quality objectives for Lot 1. The detention volume modelled was above the extended detention required for water quality (0.3 m).

Reference should be made to Figure 5-1 for the catchment plan and the Engineering Drawings in Appendix B for a conceptual illustration of how the detention basin will operate. Table 5-10 provides a summary of the design parameters adopted for the northern detention basin in TUFLOW.

Table 5-10 Northern Detention System Design Parameters (Depths and Areas include extended detention for water quality)

Contributing Catchments	Internal Base Area	Maximum Water Depth (including extended detention depth)	Detention Storage Volume	Control Outlets
INTNL-1	5,200 m^2	1.94m (RL24.48m AHD)	7,402m^3	• 2 x 300mm dia low flow pipe outlets @ RL22.54m AHD; • 2 x 900x450 RCBC @ RL23.40m AHD

5.6.4 Conveyance Channel

A conveyance channel (East) is proposed to be constructed along the eastern site boundary to convey flows from the following catchments to the eastern discharge location, being the four 1.75m high, 2.1m wide reinforced concrete box culverts which convey flows beneath Mount Lindesay Highway to the receiving waterway:

- INTNL-2C WEST (minor flow only)
- INTNL-2C EAST 1 (Minor Flow only)
- INTNL-2C EAST 2
- INTNL-3A
- INTNL-3B
- INTNL-3C
- INTNL-4C
- INTNL-5
- EXTNL-1D
- EXTNL-3A
- EXTNL-1C (including flows discharged from the Southern Detention Basin)
- EXTNL-3B
- EXTNL-3B1
- EXTNL-3B2

An outlet pit structure will be constructed upstream of the receiving stormwater drainage culverts, to control the flows released to the eastern discharge location, thus converting the conveyance channel into a combined conveyance and detention structure. This configuration was represented in the TUFLOW model to ensure flows are safely conveyed through the site and no adverse impacts occur upstream or downstream of the site.

Reference should be made to Figure 5-1 for the catchment plan and to the Engineering Drawings in Appendix B for catchment plans, channel dimensions, outlet details and a conceptual illustration of how the detention structure will operate.

6 HYDRAULIC ASSESSMENT

6.1 Methodology

The hydraulic assessment has been undertaken to evaluate how the proposed on-site detention basin and proposed development pad will manage flows being conveyed through the overland flow path.

The hydraulic assessment of the proposed overland flow path required a detailed understanding of the hydraulic and hydrological characteristics under a series of storm events.

To assess the complex flood behaviour around the site a TUFLOW two-dimensional flood model has been identified as the preferred method to accurately determine any impacts caused by the proposed development.

The hydraulic and hydrological impact assessment undertaken via a two-dimensional model presents more accurate results through utilising a grid to represent the catchment topography and complex existing flow distribution. The results are particularly relevant around the inflow and outflow locations of the site, determining peak flow rates, the extent of flood inundation as well as flow distribution.

6.2 Objectives

The primary objective of this assessment is to ensure the proposed stormwater management will not significantly change the flood behaviour against the existing condition at the areas immediately downstream and upstream of the site. The assessment considers the changes and if they would cause any actionable nuisance.

6.3 Model Set Up and Adopted Data

A TUFLOW 2D flood model has been created to assess any changes in flood behaviour caused by the proposed development as well as the conveyance of external flows through the site and flood impacts upstream and downstream of the site. The following sections provide discussion on the adopted inputs into the TUFLOW model.

6.3.1 Hydrology

Due to intrinsic complexity of 2D modelling and particularly modelling time, a DRAINS rainfall runoff model was used to determine the hydrograph for each Annual Exceedance Probability (AEP) event: 50%, 20%, 10%, 5%, 2% and 1% AEP. The results for this model were then used to give an indication of which duration would be critical at the assessment point (i.e. northern site boundary) however, the routing of flows through the catchment and determination of median temporal pattern has been undertaken in TUFLOW.

6.3.1.1 Determination of Critical Durations and Median Temporal Pattern

TUFLOW was run initially for the storm durations ranging from 60 minutes to 540 minutes using all 10 temporal patterns based on the results of the DRAINS modelling. Although the critical durations throughout the model were found to vary, at the downstream portion of the model, the critical durations would vary from 90min to 540min in the existing and developed case. As such, the model was then run for all these durations to determine potential impacts.

Once the critical durations were selected, the simulation output was processed as follows:

- For each storm duration, the median flood grid was extracted from the 10 temporal pattern flood grids using the TUFLOW utility asc_to_asc.exe, -statMedian switch.
- The median flood grids for each of the simulated durations were combined to form the maximum median flood grid for each AEP (max max).

6.3.1.2 Modelling Results

Modelling results have been assessed to compare the peak flow rates downstream of Mount Lindesay Highway and at the outlet of the Southern Detention Basin in the Existing Model Scenario and Developed Model Scenario, shown in Table 6-1.

Table 6-1 Peak Flow Rates Downstream

Scenario	Peak Flow Rate for Annual Exceedance Probability (m^3/s)					
	50%	20%	10%	5%	2%	1%
Downstream of Mount Lindesay Highway						
Existing	2.90	6.24	8.26	10.50	13.07	16.15 (16.16)
Developed	3.01	4.87	6.79	9.36	12.72	15.85 (14.99)
Difference	+0.11	-1.37	-1.47	-1.14	-0.35	-0.3
Outlet of Southern Detention Basin						
Existing	2.87	3.54	3.74	4.54	8.13	8.84 (9.41)
Developed	1.58	2.71	2.85	3.55	3.83	4.49 (6.68)
Difference	-1.29	-0.83	-0.89	-0.99	-4.3	-4.35

*Flow presented in this table are peak median values “Rank 6”
1% AEP Mean flows provided in ( )

Table 6-2 Critical Temporal Pattern

AEP	Scenario	Duration	Selected Temporal Pattern(s)
50%	Existing	540 min	TP06
	Developed	270 min	TP01
20%	Existing	540 min	TP05
	Developed	540 min	TP05
10%	Existing	180 min	TP08
	Developed	120 min	TP08
5%	Existing	180 min	TP08
	Developed	120 min	TP03
2%	Existing	270 min	TP09
	Developed	120 min	TP02
1%	Existing	90 min	TP03
	Developed	120 min	TP02

6.3.2 Boundary Conditions

The downstream boundary condition has been set approximately 1150m downstream of the Mount Lindesay Highway drainage crossing (west to east). This set up has allowed the system to be generally free discharging with the main hydraulic control being the culvert crossing beneath Mount Lindesay Highway. It is noted however that an existing access road adjacent to the site boundary acts like a ‘weir’ in the existing and developed case allowing additional ponding within the site.

Due to recent updates to the Logan River flood model, Arcadis has conducted a sensitivity assessment based on water level information extracted from this model and applied at the boundary. Further discussion is provided in section 6.5.5 below.

6.3.3 Grid Size

A 2m grid has been adopted in the model to accurately represent the hydraulic features of the existing and proposed overland flow path.

To accurately depict the proposed western channel, the QUADTREE option in TUFLOW has been employed. This function has reduced the grid to 0.5m around the channel, ensuring the accurate representation of channel dimensions. To maintain consistency in the final comparison, the same approach was applied to the modelling of the existing condition.

6.3.4 Manning's Values

The Manning's values adopted as part of this assessment are provided in Table 6-3.

Table 6-3 Manning's Values

Land use	Manning's n
Medium Scrub	0.055 – 0.06
Dense Vegetation	0.1
Scattered Scrub	0.05
Open Ground (sparce grass)	0.027
Road	0.018
Swales	0.06 / 0.02
Eastern Channel*	0.15

*Does not include Powerlink easement area

6.3.5 Existing Downstream Drainage Infrastructure

Mount Lindesay Highway drainage crossing (west to east)– 4 x 1.8 m high x 2.1m wide box culverts.

6.3.6 Planned Upstream Drainage Infrastructure

As discussed in section 3.5, Logan City Council will soon be upgrading the stormwater drainage infrastructure in Crowson Lane. As such the following planned and/or existing drainage infrastructure has been modelled in TUFLOW:

Mount Lindesay Highway drainage crossing (east to west)– 900mm dia RCP.

Crowson Lane West (north to south) – 1050mm dia RCP.

Crowson Lane East (north to south) – 1350mm dia RCP

Crowson Lane East (north to south) – 900mm dia RCP

6.3.7 Existing Model Scenario

The existing terrain has been represented based on LiDAR information for the area. Aerial photos as well as site visits have been used to determine the existing condition roughness.

6.3.8 Developed Model Scenario

The TUFLOW model has been modified to include the proposed industrial development including the proposed overland flow path.

6.4 Assumptions and Limitations

6.4.1 Key Limitations

6.4.1.1 LiDAR Ground Survey

The model topography has been based on LiDAR survey information (2018) provided in digital format with a 1m grid resolution. It is recommended this report be reviewed and amended as required in conjunction with the detailed design once detailed survey of the site and its boundaries is obtained.

6.4.1.2 Climate Change

Climate change has not been considered in this assessment.

6.4.1.3 Sensitivity

No sensitivity assessment for roughness has been considered in this assessment.

6.4.2 Key Assumptions

6.4.2.1 Proposed Development

This report has made assumptions on finished surface levels and roughness values of particular land use areas to show that a potential solution is available for the proposed development. In the event that the development proposal changes in any form or further applications are lodged with Council or EDQ, this report **must** be updated to reflect the changes made to the hydraulic conveyance capacity of the development site.

6.5 Model Results

The primary assessment of flood impacts has been undertaken using a comparison of the peak water surface levels resulting from the proposed development stormwater management and earthworks against the existing scenario terrain, under a variety of flood events. Appendix D of this report shows existing and developed scenario peak water depth ranges along with peak water surface level changes for a range of flood events (50%, 20%, 10%, 5%, 2% and 1% AEP). Additionally, the results section includes peak velocity maps for the existing and proposed scenarios.

6.5.1 Flood Depths

The project site hydraulic properties have been designed with the aim of minimising changes in flood behaviour both upstream and downstream of the site. Maximum depths in the existing case 1% AEP storm event are seen to reach approximately 1.1m adjacent to Mount Lindesay Highway.

Immediately downstream of the site flood depth in the 1% AEP reaches approximately 2.4m in both existing and developed cases. The proposed earthworks changes, creates and overland flow channel crossing the site from south to north. Depth within this channel is approximately 2.9m in the 1% AEP within the bounds of the site.

Figure 6-1 and Figure 6-2, below, provide the 1% AEP peak flood depths for both existing and developed cases respectively.



Figure 6-1 - Existing Peak Water Depth - 1% AEP

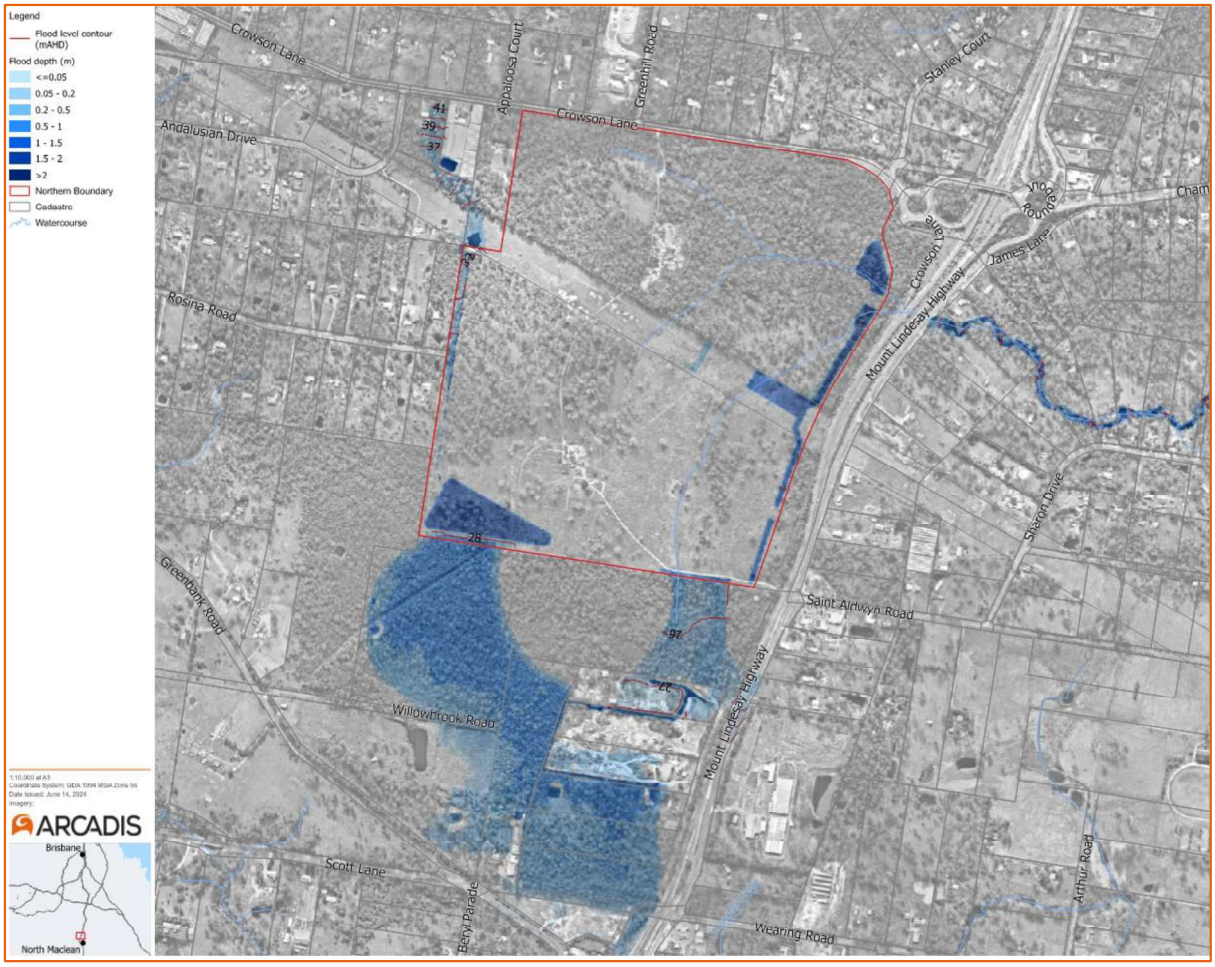


Figure 6-2 - Developed Peak Water Depth - 1% AEP

Table 6-4 1% AEP Channel Water Level

MD01		MD04	
Chainage	1% AEP Water Level	Chainage	1% AEP Water Level
0	25.10	0	25.64
100	24.84	40	25.50
200	24.63	80	25.43
300	24.57	120	25.37
400	24.51	180	25.33
500	24.47	-	-
600	24.46	-	-

Note: Refer to Appendix B DWG SKT011-06 for Chainage references concerning Channels MD01 and MD04. Refer to Arcadis supplementary memo titled Flagstone Estate: LCC TLPI No 1/2023 Response – Flood Overlay Code dated 1 March 2024 for details concerning 1% AEP at 2100 and larger events.

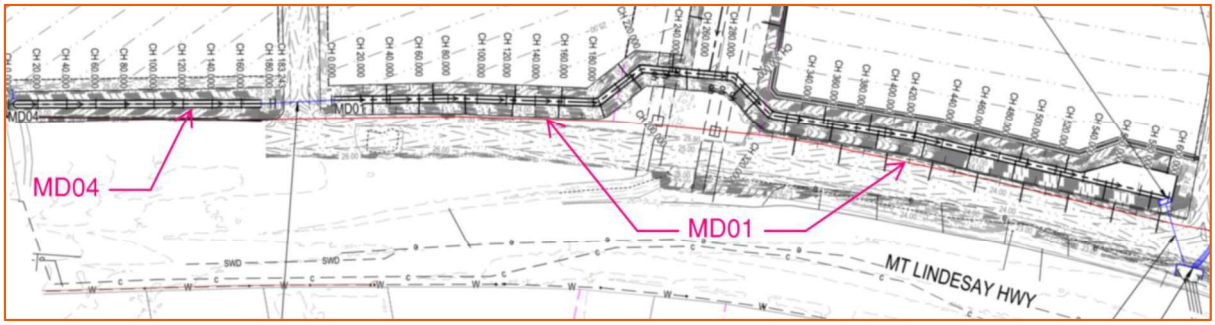


Figure 6-3 – Channels MD01 and MD04 Reference Chainages.

6.5.2 Peak Water Surface Level Change

Modelling results show that generally, the existing flood behaviour outside of the site is maintained as per the existing condition. Changes in the water surface levels are generally negative with a reduction in levels in the proposed case scenario. Increase in water surface levels are contained to the site boundary, where earthworks are proposed. A minor positive afflux is shown downstream of the site in the 50% AEP event however this is considered negligible (11mm) and localised. An additional sensitivity assessment is provided in Section 6.5.6 of this report showing that when compared to Historical events, no negative afflux is noticed.

Modelling results for all storm events up to the 1% AEP have been included in Appendix D.



Figure 6-4 - Developed Peak Water Surface Level Change - 50% AEP

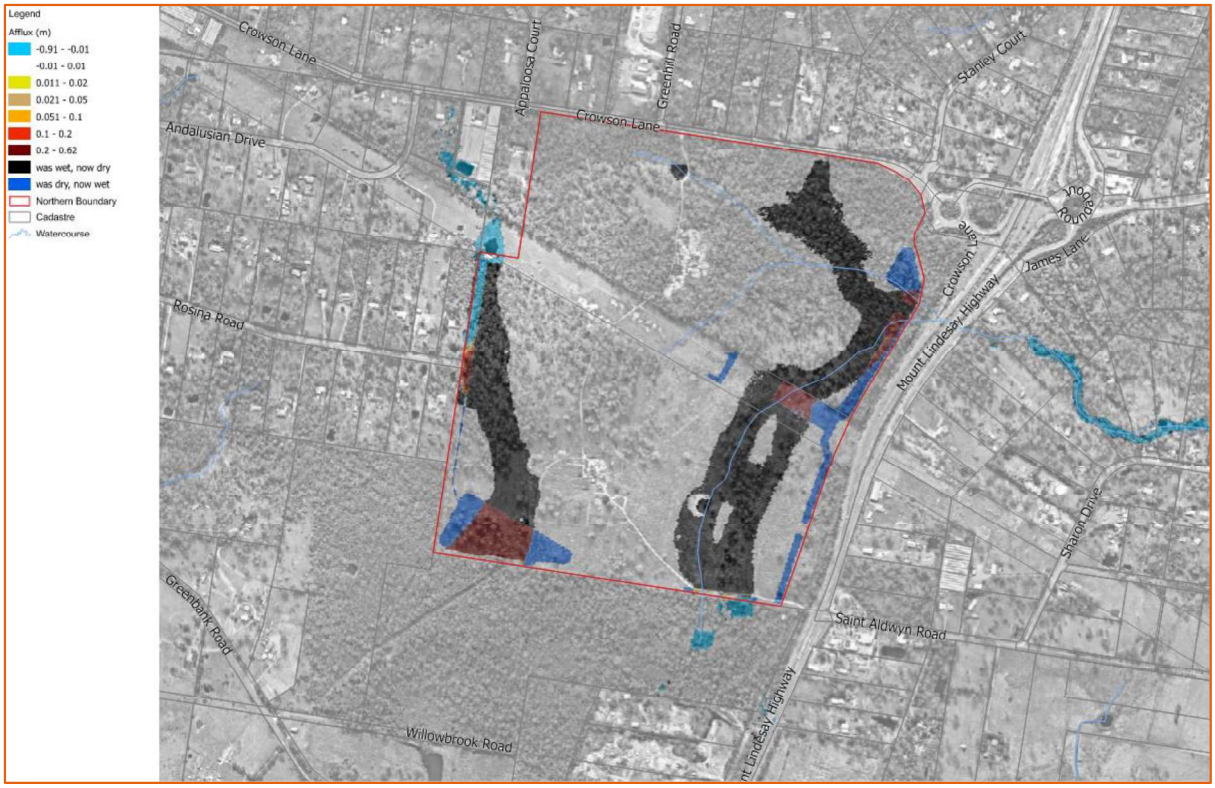


Figure 6-5 - Developed Peak Water Surface Level Change - 1% AEP

6.5.3 Peak Velocities

Modelling results are presented in Appendix D to show the peak velocities reached within the assessment area. Figure 6-6 and 6-7, show an extract of the 1% AEP flood event peak velocity, with the results indicating that velocities are generally below 1m/s and unchanged upstream and downstream of the site. Within the proposed overland flow channel created by the earthworks, velocities are higher than existing case reaching 1.5m/s.



Figure 6-6 - Existing Peak Water Velocity - 1% AEP



Figure 6-7 - Developed Peak Water Velocity - 1% AEP

No significant change in flow velocity is observed outside of the site. Modelling results are presented in Appendix D showing change in velocity for all events up to the 1% AEP.



Figure 6-8 – Change in Flow Velocity - 1% AEP

6.5.4 Blockage Sensitivity

A sensitivity assessment for pipe blockage has been conducted, modelling two scenarios: a 20% pipe blockage and a 50% pipe blockage. The results presented in Appendix D indicate that in the 20% blockage scenario, the flow is generally contained within the channel. In the 50% blockage scenario, minor spillage is observed at the downstream end of the eastern and western channels. However, it is worth noting that water levels are still below the finished floor level and the proposed sewer pump station.

Figure 6-9 demonstrates that the peak water level in the Southern Detention Basin increases slightly under the blocked scenario and the inundation time increases from approximately 6.5 hours to 9.5 hours during the 1% AEP event.

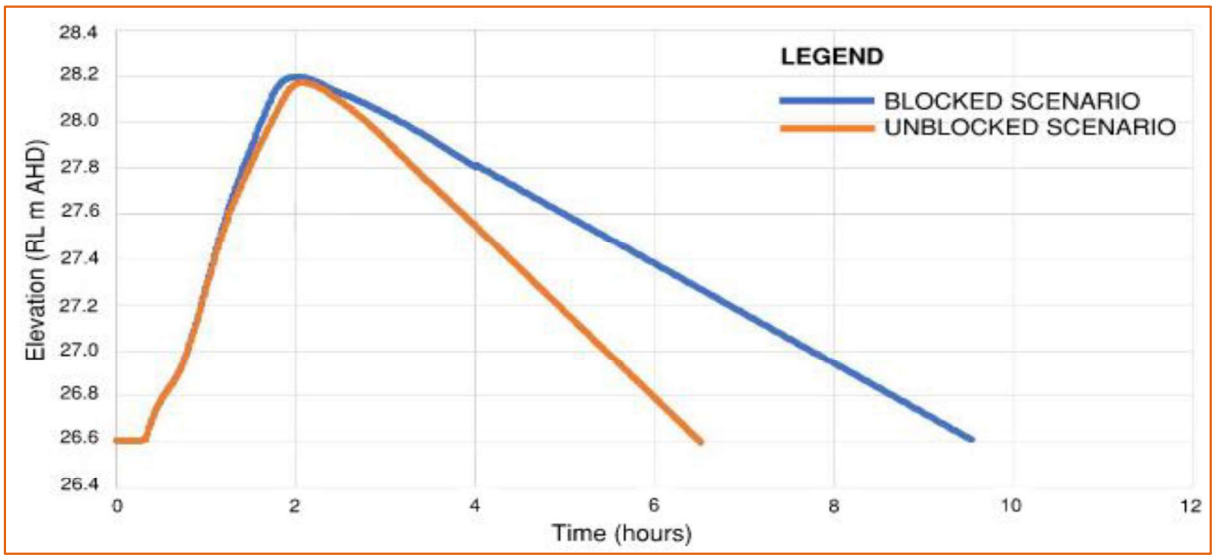


Figure 6-9 – Southern Basin Inundation Curves - 1% AEP

6.5.5 Regional Flood Sensitivity

A regional sensitivity has been undertaken based on the recently updated Logan River Flood Model. To undertake this assessment Arcadis has purchased the TUFLOW model and accompanying report. Based on this information Arcadis has determined that the peak water level for the site area occurs in the 72hr event.

Water levels for this event was then extracted and applied to the site-specific flood model as a boundary condition. Whilst the results indicated a higher water level downstream of the site, flood levels were generally below the peak water level for the site (540min). It is also noted that results indicated that the peak for the river occurs approximately 20hrs past the site peak which validates the assessment with a lower boundary.



Figure 6-10 - 1% AEP 72hr Regional Flood Depth and Extents

6.5.6 Historical Flood Sensitivity

A historical sensitivity has been undertaken based on the catchment configuration south of the site. Arcadis investigated the impact of existing earthworks to the south of the site as it currently causes some unintentional flow attenuation. This external catchment feature is not accounted for in Council's regional flood model. Two figures are provided to show catchment features.

Figure 6-.11 below shows the existing earthworks as represented in the site-specific assessment presented in this report. Figure 6-.12, from 1983, shows the catchment without the earthworks.

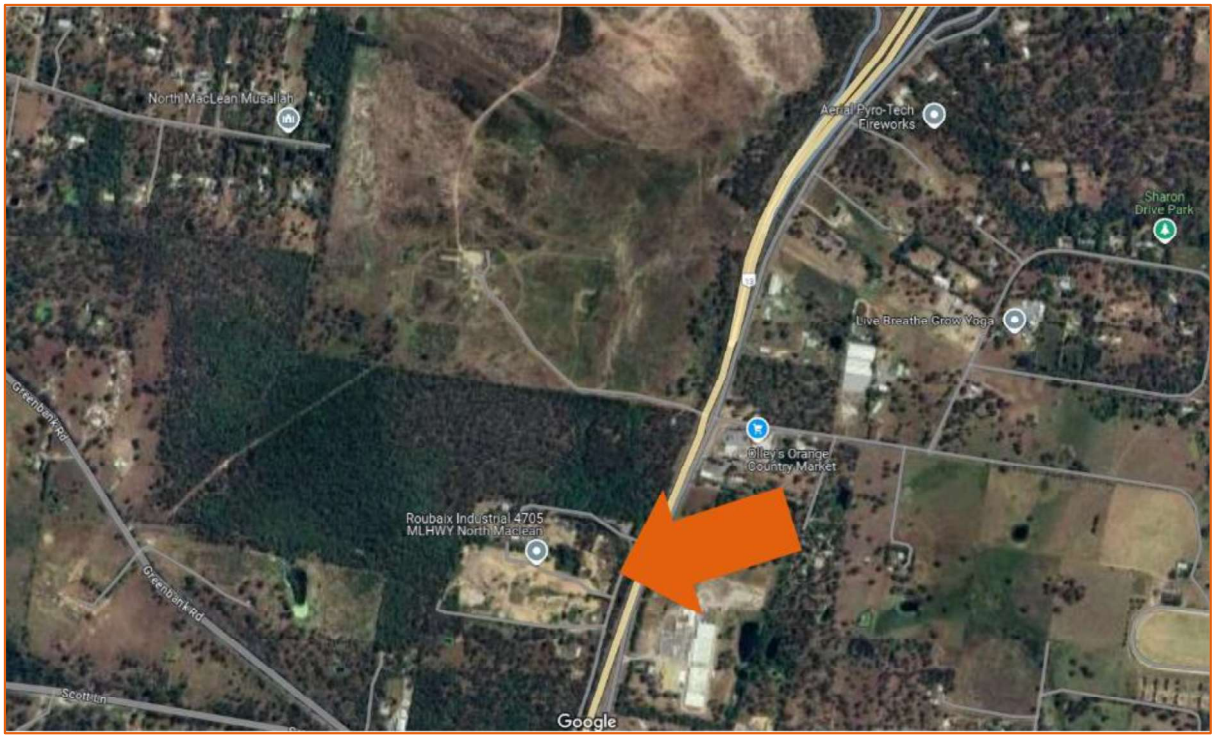


Figure 6-11 – Current Earthworks Extents South of the Site



Figure 6-12 – Catchment condition in 1983

Results indicate that compared to the historical results, the proposed development will significantly reduce flood levels. Afflux figures below show a reduction in water level of up to 200mm in the 1% AEP and 140mm in the 50% AEP for historical comparison.



Figure 6-13 - Developed Peak Water Surface Level Change - 50% AEP



Figure 6-14 - Developed Peak Water Surface Level Change - 1% AEP

Arcadis also investigated the area where, when compared to the current existing condition, a minor afflux is shown. The cross-section below shows the levels for all three scenarios, and while an 11mm increase in water level is shown when compared to existing conditions, a 44mm reduction is shown when compared to the historical event.

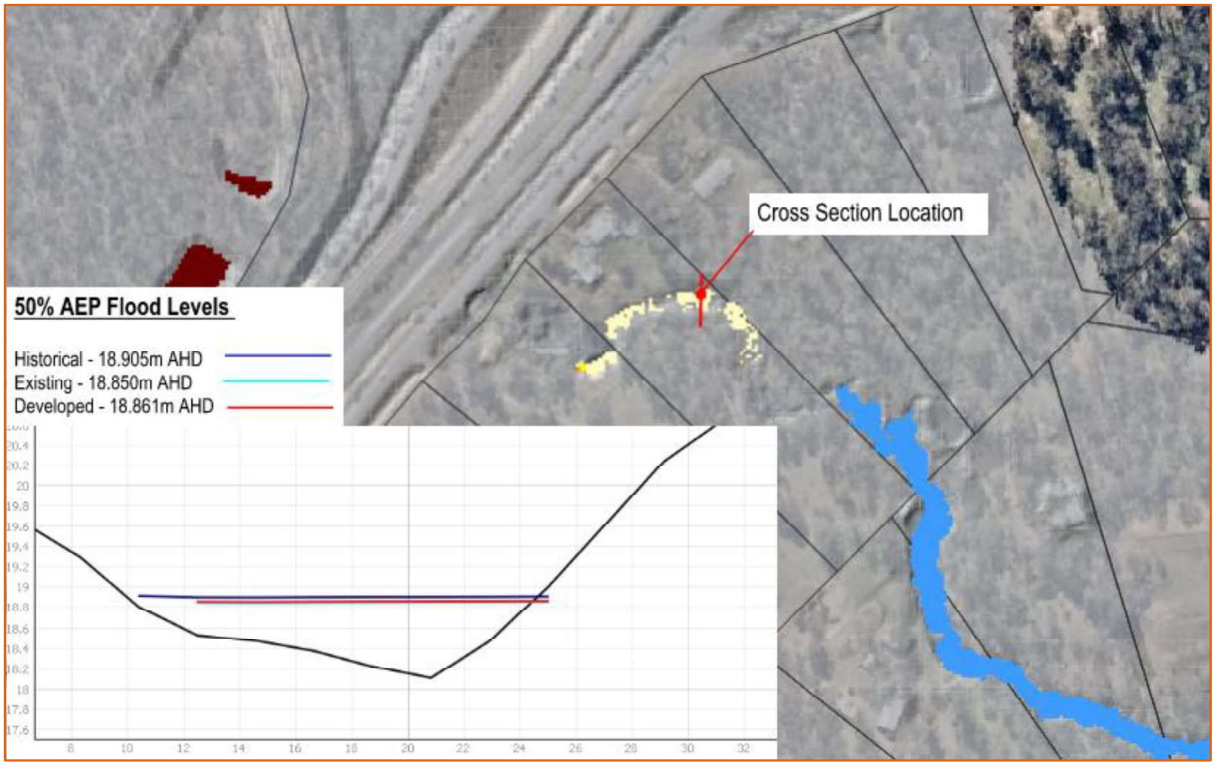


Figure 6-15 – 50 % AEP Flood Level Comparison

The subject minor 50% AEP afflux corresponds to no adverse or discernible velocity change for the associated 11mm WSL increase. Further, the maximum 50% AEP velocity is recorded along this reach as 1.4 m/s and is anticipated to cause no waterway instability issue. Figure 6-16 shows the velocity vector along the longitudinal section of this particular reach of the downstream waterway.

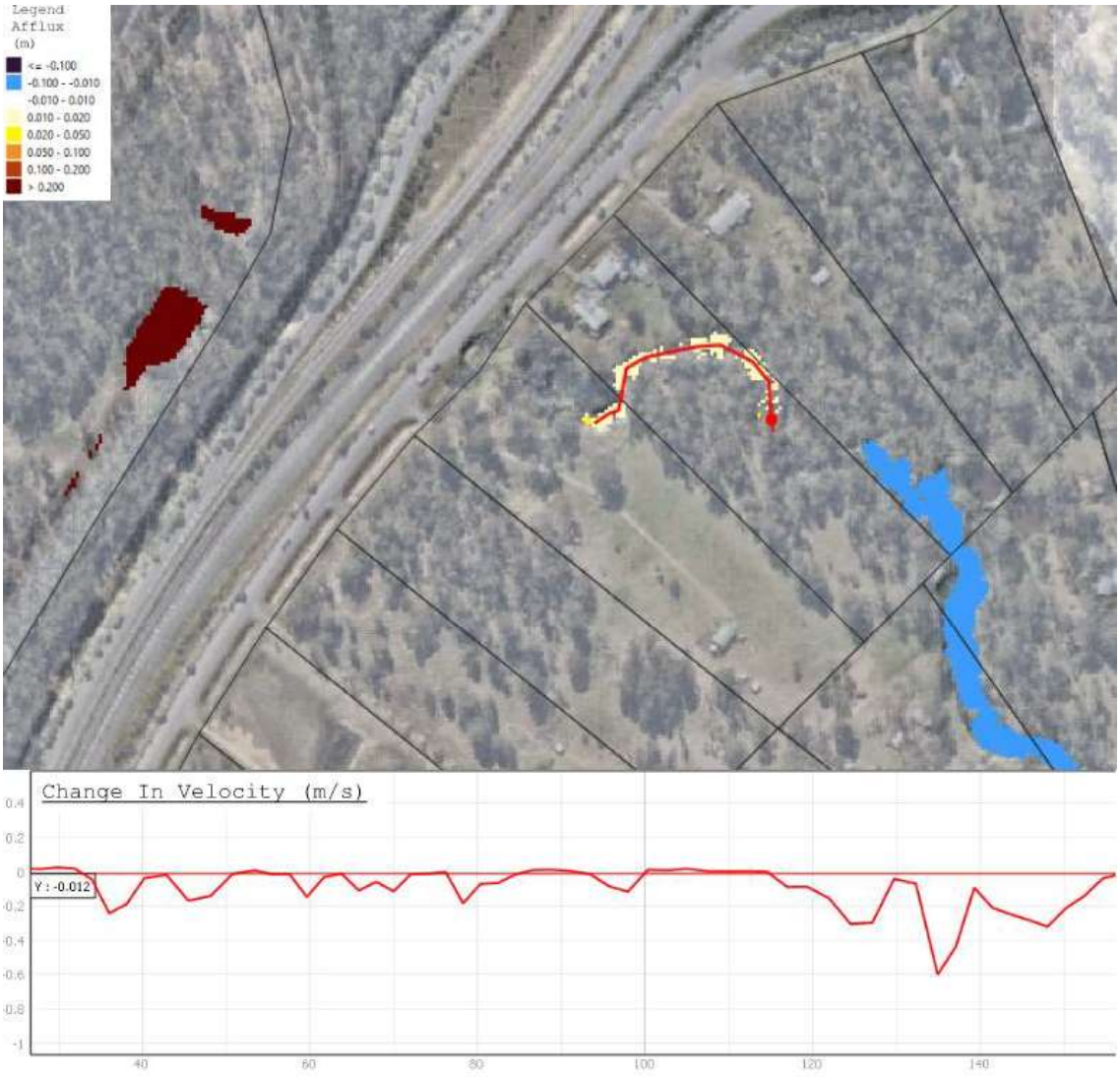


Figure 6-16 – 50 % AEP Velocity Change for afflux reach section.

6.6 Objective Discussion

The above hydraulic investigation has demonstrated that suitable measures can be included in the design of the proposed development, to ensure that there is no increase in peak 1% AEP discharge being directed off-site to existing downstream infrastructure and no actionable nuisance caused to neighbouring properties as a result of the development.

6.7 Drainage System Safety

Urban drainage systems can present a risk to community during storms and times of flood. The consequences of interaction with the proposed drainage system and treatment areas can lead to physical harm and trauma. Notwithstanding the safety risks associated with the proposed stormwater structures can be managed though design and management techniques. In this instance it is considered necessary to develop risk assessment profile and implement where required appropriate design and management techniques. Refer to supplied Bulk Earthworks Engineering Plans for associated risk analysis and proposed management actions.

7 CONCLUSION

This SBSMPQ has been prepared to provide a design proposal and guide to the stormwater quantity management techniques and strategies for the site.

The primary objective of this SBSMPQ has been to ensure that:

1. **Suitable measures are incorporated in the development to ensure that there are no adverse impacts to downstream receiving waterways, property or infrastructure resulting from any increase to peak discharging stormwater flow rates.**

This report has presented the methodology and results of a flood modelling assessment which has included the analysis of the impacts of the proposed development in comparison to the existing scenario. In particular this assessment has concentrated to the impact immediately upstream and downstream of the site where complex flood behaviour exists.

To undertake the assessment of the hydraulic conveyance changes as a result of the proposed development, Arcadis has created a TUFLOW model using results documented in the 4499 - 4651 Mount Lindesay Highway, North Maclean Site Based Stormwater Management Plan Report, EAG001-30139050-AAR-01. The assumptions and limitations associated with the modelling exercises undertaken are highlighted in this report and the subsequent results are summarised as follows.

Results indicate that the proposed development will generally improve flood conditions downstream of the site by applying the reduction of site stormwater discharge via the proposed detention systems.

Note: The proposed operational stormwater quality treatment train is detailed in the Site Based Stormwater Quality Management Plan (SBSQMP) (EAG003-30109334-AAR-05).

Appendix F – Arcadis Flood Impact Technical Memorandum

MEMO

ARCADIS Design & Consultancy for natural and built assets

Date	1/03/2024
To	Erin Dyer (Charter Hall)
From	Gary Ellis (Arcadis) and Darlan Castro (Arcadis)
Copy to	
Subject	Flagstone Estate: LCC TLPI No. 1/2023 Response – Flood Overlay Code

1 INTRODUCTION

This Technical Memo has been prepared for Charter Hall to provide for the Flagstone Logistics Estate an assessment of larger design storm events for and exceeding 1% AEP in 2100 and requirements to satisfy Logan City Council Planning Scheme 2015 Section 8.2.5 – Flood Overlay Code (October 2023). Moreover, analyse these larger events and determined minimum Flood Planning Levels for the site development areas for corresponding accepted land use compatibility. It is noted that purported flood planning levels relate to uniform development (i.e. minimum 0.5% AEP in 2100 immunity) for specific flood zonal areas as defined in Section 7.4. Uniform development is defined by all relevant individual lot pads elevated to or above the corresponding flood planning level for this specific storm event.

2 SITE DESCRIPTION & INDUSTRIAL LAND USE

The subject development is situated at 4499 - 4651 Mount Lindesay Highway, North Maclean. The site is situated within the Greater Flagstone Priority Development Area (PDA) located within the Logan City Council (LCC) local government area. The site is approved for specific land use "*Industry and Business Zone*" with overlay for indicative future bio-diversity corridor.

3 RELATED EXISTING APPROVALS

The proposed development is approved with a Development Permit for the reconfiguring a lot - one (1) lot into eleven (11) lots and new roads, consisting of five super lots and six auxiliary lots, comprising drainage, open space and a sewer pumpstation. Additionally, compliance assessment endorsements are noted as follows:

- Bulk Earthworks and Drainage (Condition 11A)
- Western Boundary Wall (Condition 13A)
- Updated SBSMP (Condition 21)

Refer to EDQ correspondence (Reference: DEV2018/961/4_D23/116559) dated 2 August 2023 for endorsement and approved plans and report. Figure 1 shows the approved overall bulk earthworks (and finish surface levels) and associated drainage and pipe infrastructure. Refer to Appendix A for copy of this endorsed drawing No 0100 Issue 07.

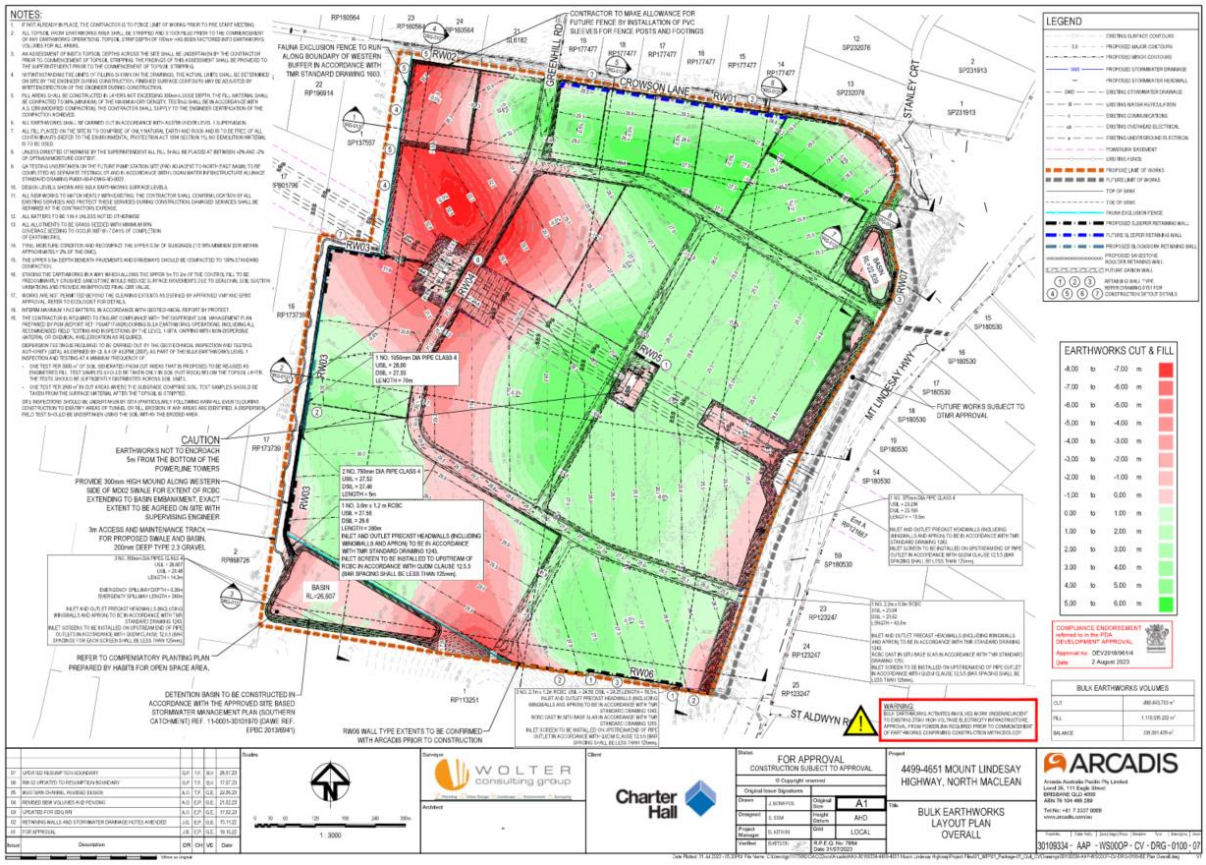


Figure 1 – Endorsed Bulk Earthworks Overall Plan

4 OM-05 FLOOD HAZARD OVERLAY

The Logan City Council Planning Scheme 2015 Part 8 is the specific reference document for this assessment concerning land use flood compatibility and associated assessment benchmarks for accepted development. Particularly, the subject site and surrounding PDA associated land parcels are to be considered subject to the recently introduced TLPI: No. 1/2023 (effective Date 30 Oct 2023) and associated OV-05 Flood Hazard Overlay.

Figure 2 below shows the present OV-05 Flood Hazard Overlay mapping for the Estate and surrounding land parcels. The subject site and surrounds include all flood risk type areas and High Flow Area, specially:

- High Flood Risk
- Moderate Flood Risk
- Low Flood Risk
- Very Low Flood Risk

It is noted that the High Flow Area is a minor encroachment to the development area and is limited to the drainage channel only and not considered any further for this assessment. The associated overlays trigger assessable code requirements as per Section 8.2.5 Flood Hazard Overlay Code. A full response to this code performance and acceptable outcomes are included to Appendix B based upon the

outcomes of updated Logan River flood model (see Section 6). Notably, the current Logan City riverine flood modelling and flood overlay mapping is reflective of previous natural ground levels and not current approved finish surface levels (bulk earthworks) and progressed works. Further, owing to existing approvals (refer Section 3, including hydraulic flood assessment) and works already undertaken, this benchmark assessment is:

- Based upon BEW finish surface levels (development and adjoining); and
- limited to those flood events equal to and larger than the DFE (1% AEP) and relevant to compatible land use concerning industrial development. Specifically, the 1%, 0.5% AEP and 0.2% AEP at 2100 events.

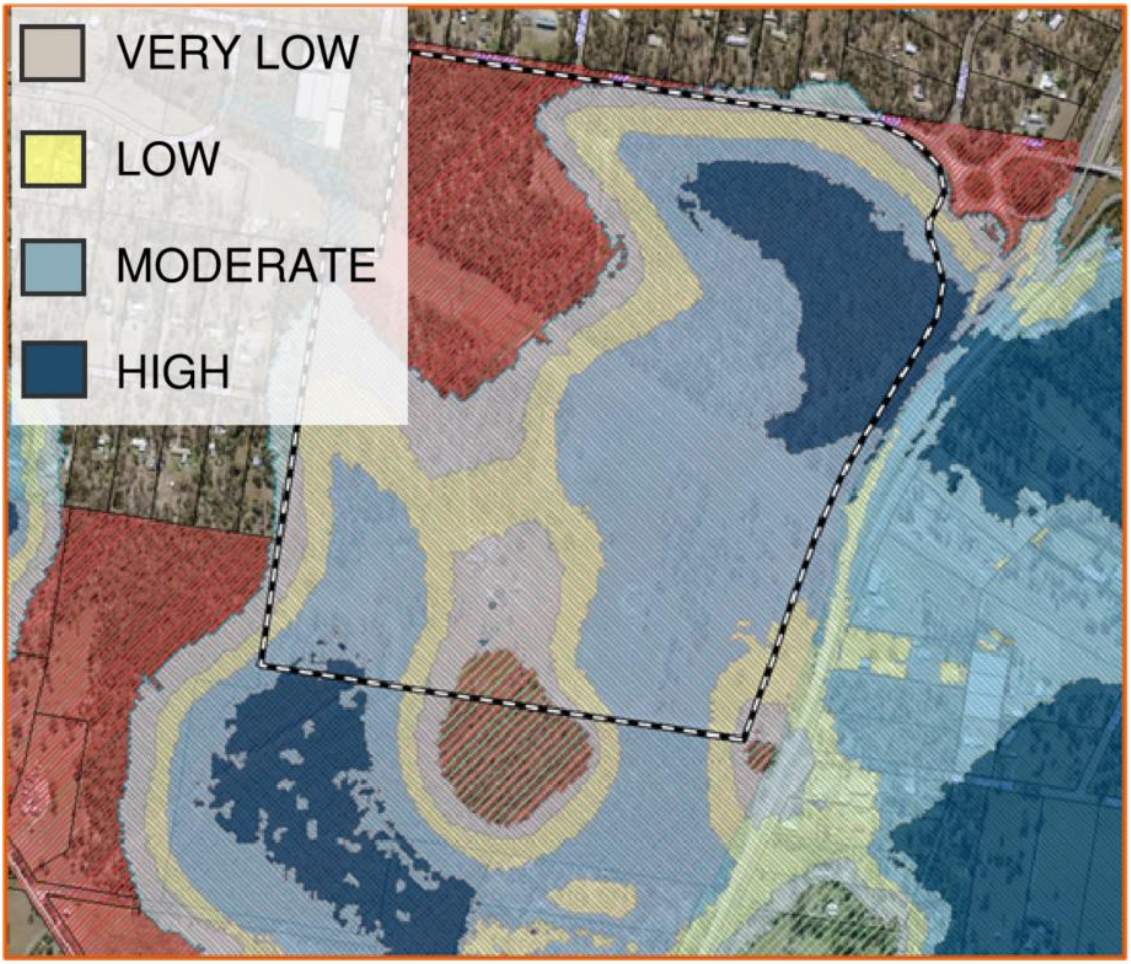


Figure 2 – LCC Flood Hazard Overlay Mapping

Importantly Flood Hazard mapping produced within this report uses LCC's flood risk hazard matrix for plotting hazards in context of relevant AEP events up to and including PMF. Refer Logan Planning Scheme 2015 SC6.2.10 Flood Figure 1.8.2 – Hydraulic risk matrix (included as a legend in Appendix C mapping).

The stock water surface level (WSL) results provided by Council (within the updated model package) have been compiled below to allow for comparison of inundation extents. Refer to Figure 3.

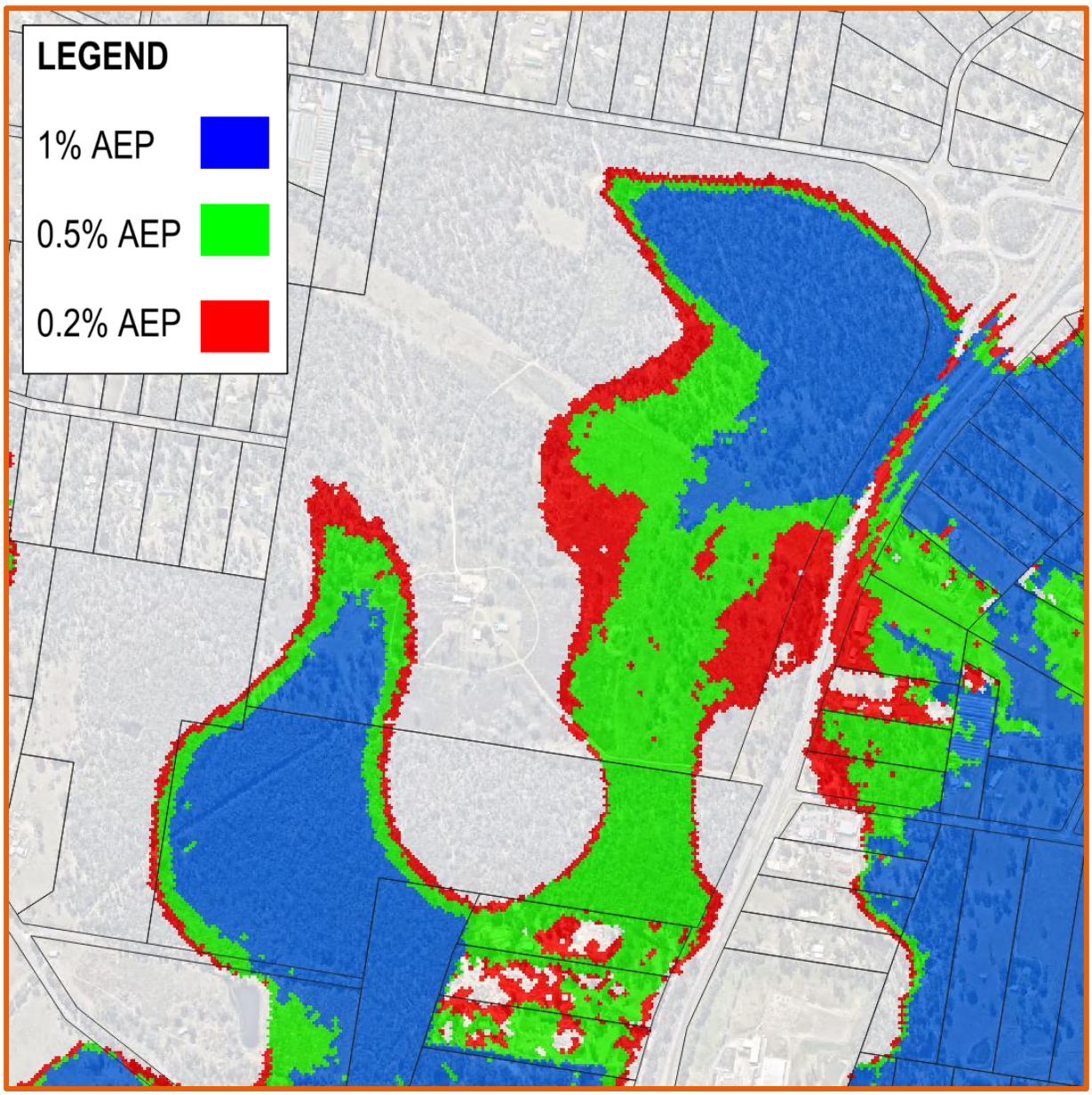


Figure 3 – LCC Stock Results Compiled for Inundation Extents (1% AEP – 0.2% AEP)

5 ADOPTED FLOOD MODEL

The adopted flood model for this assessment is the Logan and Albert rivers hydraulic model 2023, which was released by Council under a Data / Image Use agreement signed on the 1st of December 2023. This updated model incorporates changes to the previously provided Climate Change assessment, specifically in relation to the Representative Concentration Pathways (RCPs) for greenhouse gas and aerosol concentrations in the year 2100. The model now adopts the RCPs 4.5 as the Climate Change scenario. It should be noted however that hydrology was not made available for a climate change 0.05% AEP event and was therefore without climate change for the purposes of this assessment.

The critical duration for the site has been determined to be a 72-hour storm event for 1% AEP to 0.05% AEP (with climate change except 0.05% AEP, not available), and 36-hour storm event for the PMF (PMPDF). To determine the median Temporal Patterns (TP) for the site, all 10 distributions were run

using the 20m grid. These temporal patterns represent different flood scenarios and help in understanding the range of possible outcomes.

Once the critical duration and TP were determined, they were used as inputs for the assessments described in this memo. It is important to note that the assessment has been undertaken using a 10m grid, which is the level of resolution adopted in the regional assessment to capture the flood risk for the site.

It should be further noted that the critical TP for the 1% AEP climate change was found to differ in water surface levels / hazard classifications to Council's stock results for the wetland location southwest of the site. While "TP2" is supposedly used in Council's results according to the model report, it was determined that the critical TP is in fact TP6 for the subject site and immediate adjacent areas. This should be understood when reviewing updated flood hazard mapping provided within Appendix C of this report.

6 MODEL UPDATES

6.1 Base Case

The Logan River Flood model has been updated for the digital terrain as depicted within the approved endorsement plans (Refer to Section 3). This includes earthworks and major drainage mitigation systems.

Accordingly, refer to Figure 4, for pre and post update TUFLOW terrain images for the inclusion of endorsed earthworks finished surface levels (FSL). Areas internal to the site and west within the road were read into TUFLOW to inform the model topography.



Figure 4 – TUFLOW Digital Terrain Pre (existing model) and Post (approved FSLs) respectively.

6.2 Developed Case

The flood model DEM was updated to include "glass walls" to conservatively simulate floodplain blockages that may be created by future development within specific zonal areas. These "glass walls" are allocated to allotment pads as shown in Section 7.4 Figure 10, specifically zones A1-A3 and B1-B2, but zones C and D are excluded. This update allows for the establishment of flood planning levels and helps with compliance demonstration with OV-05 Flood Hazard Overlay Code, especially in cases where the land use may involve food storage or hazardous material storage/manufacturing (at a 0.5% and 0.2% AEP at 2100 respectively). Additionally, it provides relevant Design Flood Event (DFE) flood levels (at a 1% AEP at 2100) to ensure that development areas are above the DFE + 500mm freeboard requirement. For more information, please refer to Section 8.

6.3 Sensitivity Testing

Additionally, for purposes of sensitivity testing both the Base and Developed Case model has also been updated to reflect the approved development situated at 4563 - 4691 Mount Lindesay Highway, North Maclean (referred to in flood mapping as “NM2”) and associated endorsed earthworks and surface levels as shown in Figure 5 below. Importantly, this inclusion permits comprehensive and interconnected understanding of the associated floodplain behaviour and influences for both development areas.

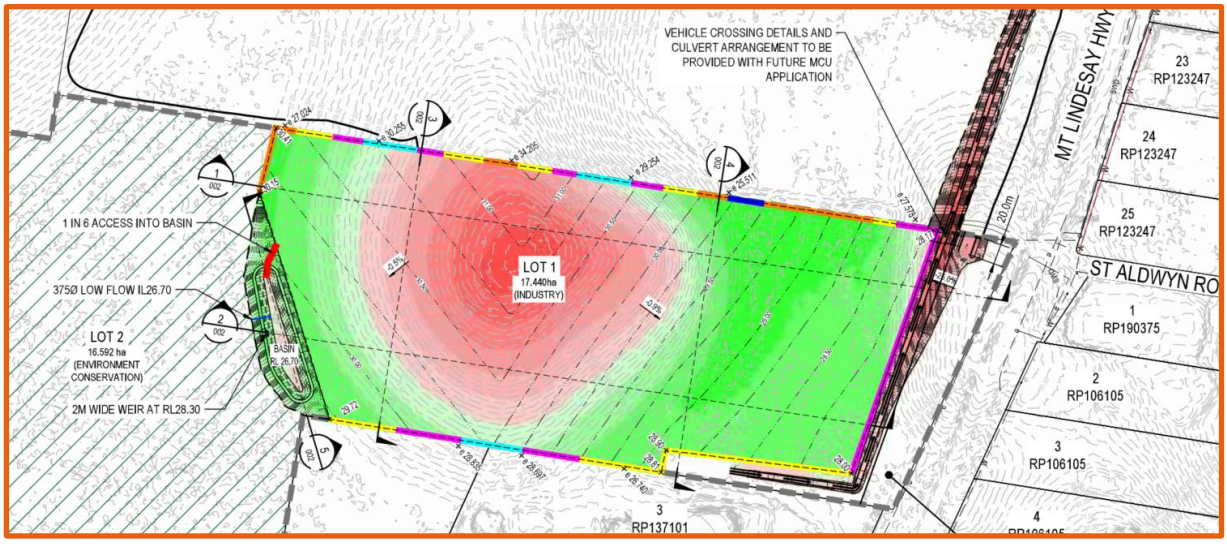


Figure 5 – Adjoining Development Bulk Earthworks.

7 RESULTS – BASE AND DEVELOPED CASES

7.1 Flood Inundation Mapping (1% AEP at 2100)

Concerning the approved BEW (FSL) works, the “Base Case” results demonstrate that the high hazard area is modified with the approved earthworks and is limited to the proposed drainage channel and detention basin infrastructure areas, i.e. development lot envelopes are situated above the DFE flood level. Refer to image below demonstrating the revised 1% AEP at 2100 inundation area. Accordingly, contrary to LCC Planning Scheme Flood Hazard Area mapping the development areas of the Flagstone Logistics Estate is now not subject to an inundation associated with this storm event. Refer to Appendix C for associated flood maps. Importantly, lot freeboard should be set based upon the higher of corresponding flood levels shown in Section 9 Table 1 for 1% AER at 2100 or 1% AEP local event flood levels (refer to the approved Arcadis SBSMP report).



Figure 6 – Base Case 1.0% AEP (100 year) at 2100 flood inundation.

7.2 Flood Inundation Mapping (Larger Events)

The larger events examination included those events associated with the Moderate Hazard Areas and compatible land use, specifically the 0.2% AEP and 0.5% AEP at 2100 in accordance with the TLPI provisions (31 October 2023) of the Logan City Council planning scheme.

7.2.1 Larger Event – 0.2% AEP at 2100

Concerning the approved BEW Finish Surface Levels works “Base Case”, the results demonstrate that the associated inundation area is subsequently modified from that shown in Section 4 – Figure 3. Refer to image (Figure 7) below demonstrating the revised 0.2% AEP at 2100 inundation area. Accordingly, the demonstrated flood inundation is considered to now be the revised flood inundation extent within current the Moderate Flood Hazard Area for the development area of the Flagstone Logistics Estate for approved BEW levels. Refer to Appendix C for associated flood maps.

It is noted that there is a variance in flood level comparing the base and developed cases for the 0.2% AEP at 2100 event which is attributed to the relative levels of floodplain blockage. Some downstream portions of the site experience greater flood planning levels in the Base Case due to increased flood conveyance (i.e.. less water being diverted to the east). Flood planning levels established within this document consider the maximum of the two to ensure the potential worst case flood level is captured.



Figure 7 – Base Case 0.2% AEP (500 year) at 2100 flood inundation.

7.2.2 Larger Event – 0.5% AEP at 2100

Concerning the approved BEW (constructed) works, the results demonstrate that the associated inundation area is reduced to that shown for 0.2% AEP event (Figure 7). Refer to image (Figure 8) below demonstrating the 0.5% AER at 2100 inundation area within the current Moderate Flood Risk zone. It is noted that for part of the estate, this larger event is limited to the southern portion of the drainage channel and future road network. Refer to Appendix C for associated flood maps.

It is noted that the Development Case results in a greater flood planning level than the Base Case for each impacted zone within the development.



Figure 8 – Base Case 0.5% AEP (200 year) at 2100 flood inundation.

The below Figure 9 overlays each of the assessed inundation extents at 2100 for Base Case approved BEW FSL, comparatively to Figure 3.

Formalised mapping for depth (including WSL contours) as well as collated flood hazard per LCC hazard matrix is provided within Appendix C.

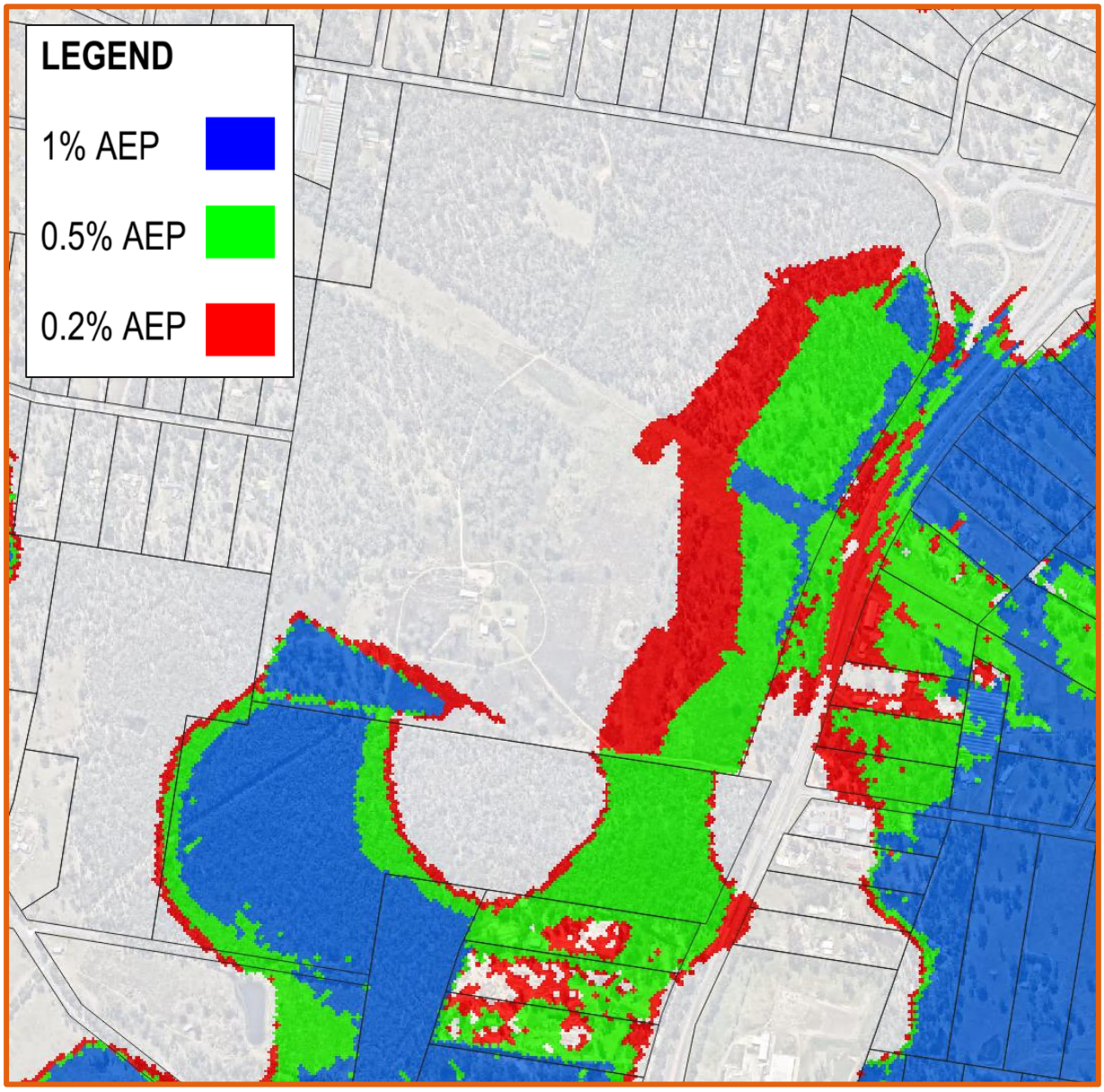


Figure 9 – Inundation extents for 1% AEP – 0.2% AEP under approved BEW FSL's.

7.3 Assessment of Events Larger than DFE (1% AEP)

In accordance with OM-05 – PO.25 (LCC Planning Scheme Policy 6.2.10), there is the requirement for an assessment of the impact of the development on flood response for events larger than the DFE (0.5%, 0.2%, 0.05% and PMF). This assessment should demonstrate no rapid or unexpected increase in safety risks or flood damage during a flood event larger than the DFE. This could include a significant or sudden change in distribution of the defined flood event flow, flood level or velocity which may result in:

i. the failure of a levee;
ii. blockage of infrastructure;
iii. concentration or diversion of flows;
iv. excessive scour;
v. realignment of the waterway;
vi. sedimentation;
vii. bank instability and collapse;
viii. a reduction in flood warning times;
ix. extension of the duration of inundation;
x. hindrance to emergency evacuation routes;
xi. disruption to critical infrastructure, services, or access routes.

Notably, this assessment assumes approved BEW surface levels plus any required future immunity works (represented via a “glass wall” scenario in the flood modelling undertaken) within the current LCC Moderate Flood Hazard area. The grid output for the flood hazard (per ARR classifications) has been compared to the benchmark scenario (i.e. approved BEW surface levels only) for the purposes of this assessment. Key locations have been focused upon to determine any impacts which the endorsed earthworks strategy has upon surrounding areas. It is determined that there is no demonstrable adverse impact concerning rapid or unexpected increase in safety risks or flood damage.

It is noted that with the revised larger event inundation extents that associated flood risk may alter and require further assessment to understand change to LCC flood risk categories for the ultimate completed site and adjoining properties developments.

Refer to Appendix C for comparative flood hazard maps per LCC hazard matrix. Also, refer to Appendix B, for detailed code response concerning the Items i) to xi). Flood velocities were found to be generally < 0.5m/s within the development pad areas, and therefore hazard is largely driven by the depth of flood waters. Slight variance in finished surface levels is therefore not anticipated to drastically alter hazard conditions internal or external to the site in view of the assessments conducted within this report.

It should be noted that the results presented for 0.05% AEP (2000y) are not considerate of 2100 climate conditions as the current LCC regional flood model (at the timing of this report) does not have hydrology for this particular event.

7.4 Flood Planning Level Zones

It is noted that the water surface levels for the large storm events has a gradient traversing through the site and flood Water Surface Levels (WSL) will vary for spatial variations. In order to provide appropriate Flood Planning levels (based upon worst case WSL scenario), it is determined to assign zones for each respective inundation area in conjunction with proposed development area lot configuration. It is proposed that these zones correspond to the revised large event inundation areas within the current Moderate Flood Hazard Area for the development based upon approved (constructed) bulk earthworks (refer Figure 10).

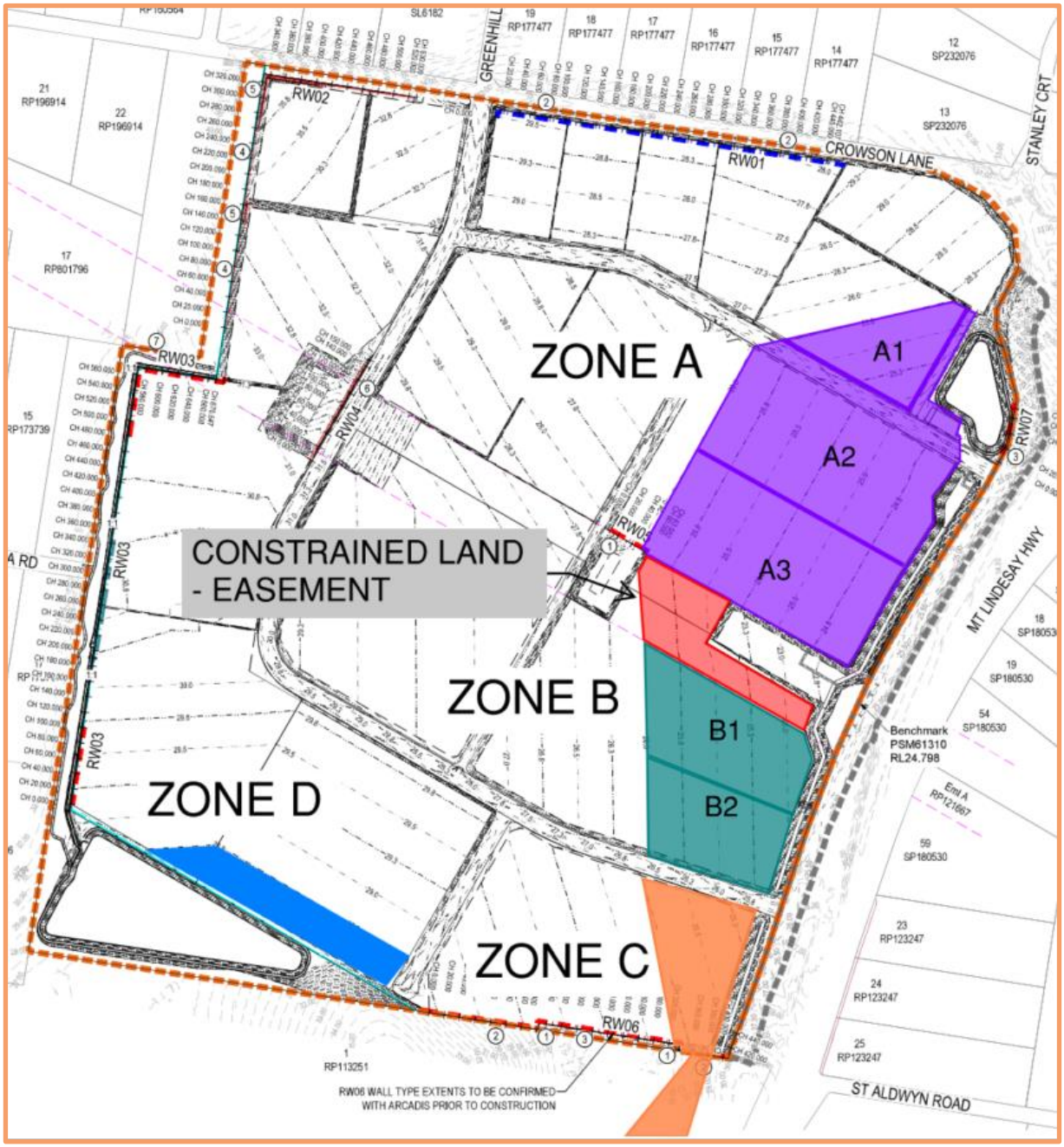


Figure 10 – Estate Flood Planning Level Zones (Revised Moderate Flood Hazard Areas)

7.4.1 Developed Zones

To establish flood planning levels, it is assumed that for each zone (excepting Zones C and D), it will be necessary to undertake future (building/civil) works to increase final FSL to above that required for flood immunity concerning both the 0.2% and 0.5% AEP event at 2100. It is assumed for the purposes of this exercise that each zone is modified accordingly, and this analysis was determined by creating a “glass wall” around pads internal to the subject site to simulate such outcome. Refer to Figure 11 for revised inundation extents under this scenario.

Flood hazard mapping produced in Appendix C also includes results for this scenario for the assessed AEP events.

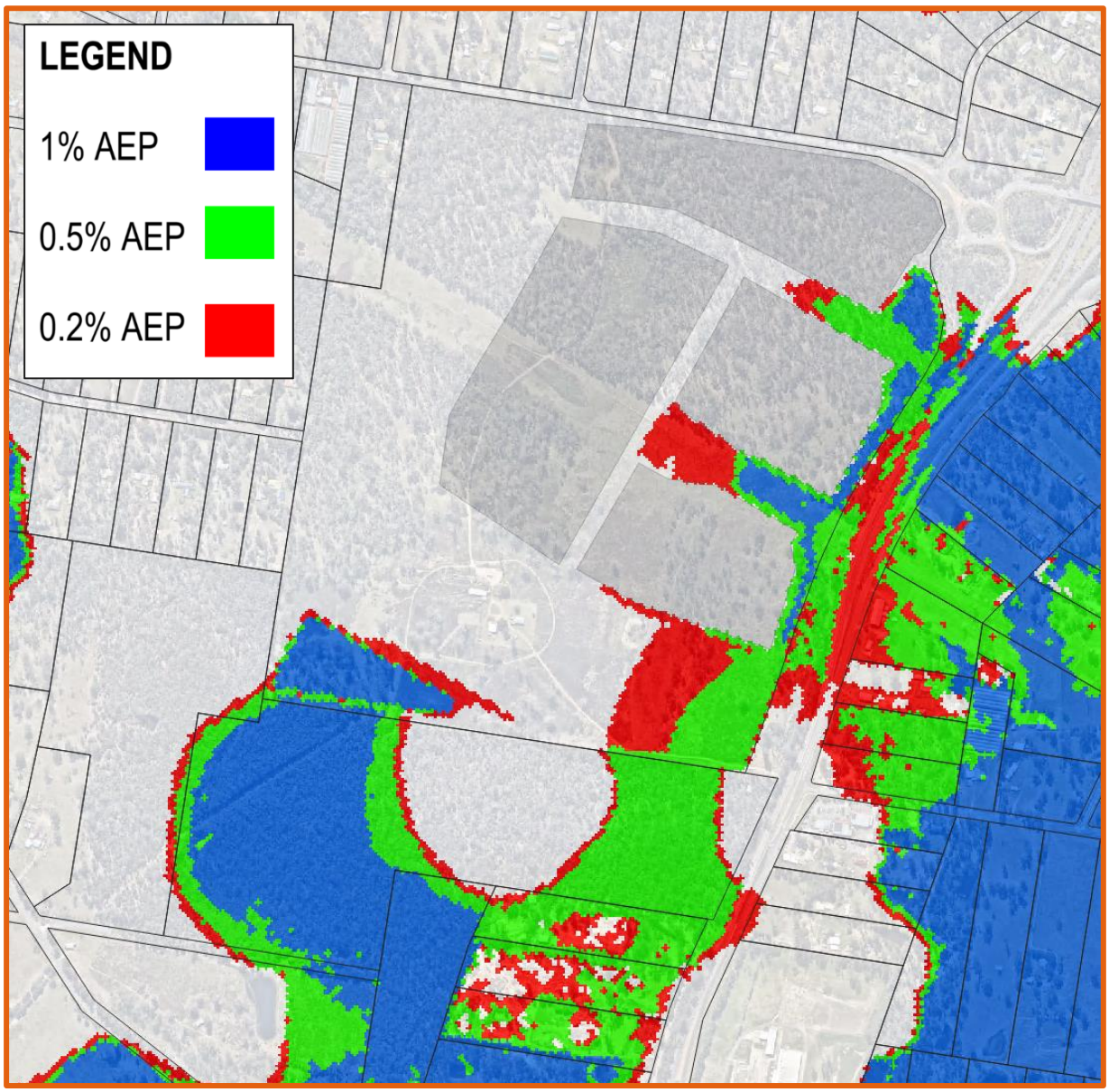


Figure 11 – Inundation extents for 1% AEP – 0.2% AEP under approved BEW, including "glass walls" for flood planning level determination.

8 SENSTIVITY TESTING

8.1 Adjoining Development

The inclusion of the approved BEW for the adjoining development as described in Section 6.3 alters the revised flood inundation footprint per the figure below.

Flood hazard mapping produced in Appendix C includes results for this scenario for the assessed AEP events. This was assessed as both with and without "glass walls" to determine potential variance in flood planning levels.

The below Figures 12 and 13 overlay each of the assessed inundation extents under context of both approved earthworks, as well as development / glass wall scenario.

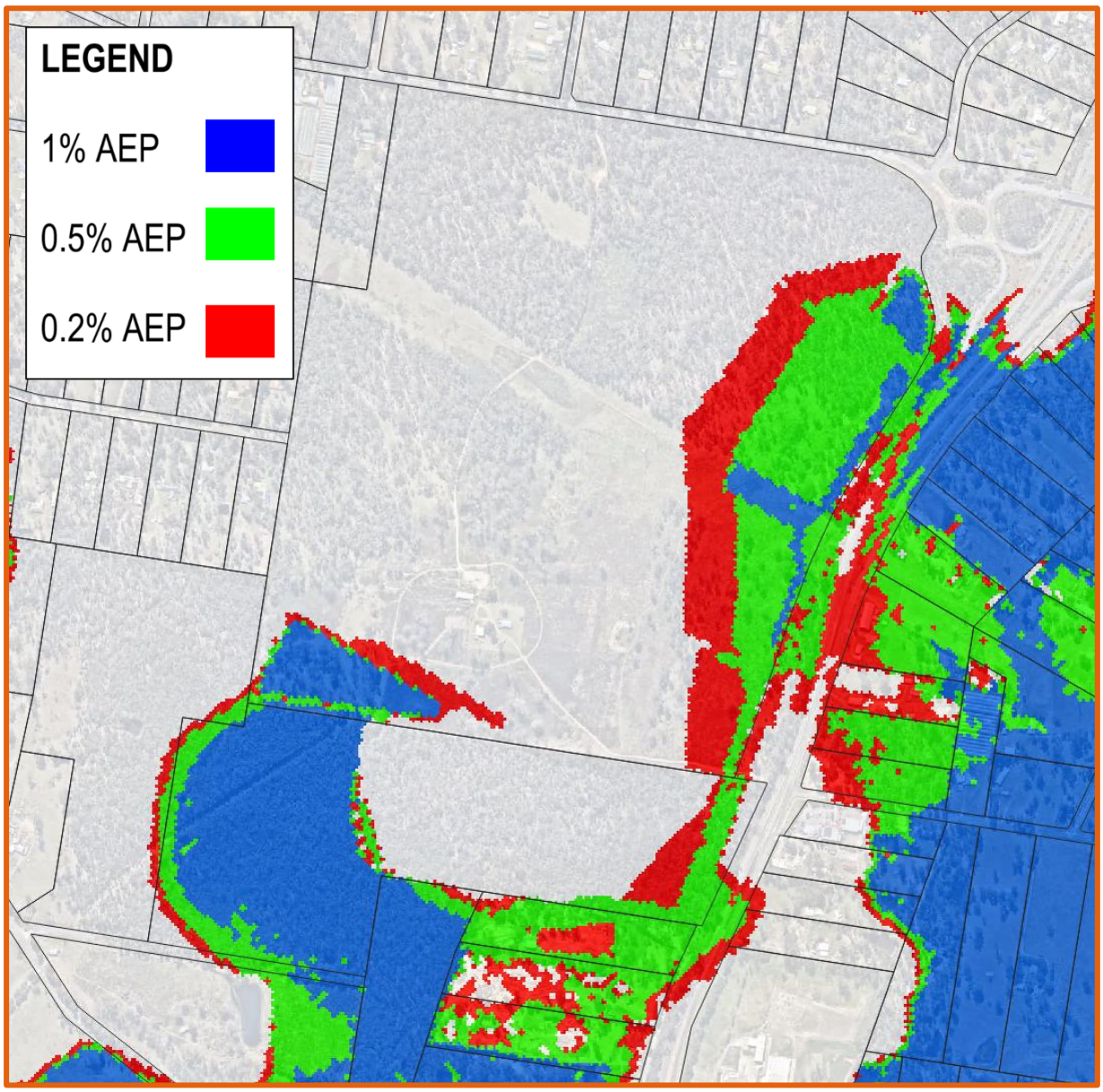


Figure 12 – Inundation extents for 1% AEP – 0.2% AEP under approved BEW for both sites.

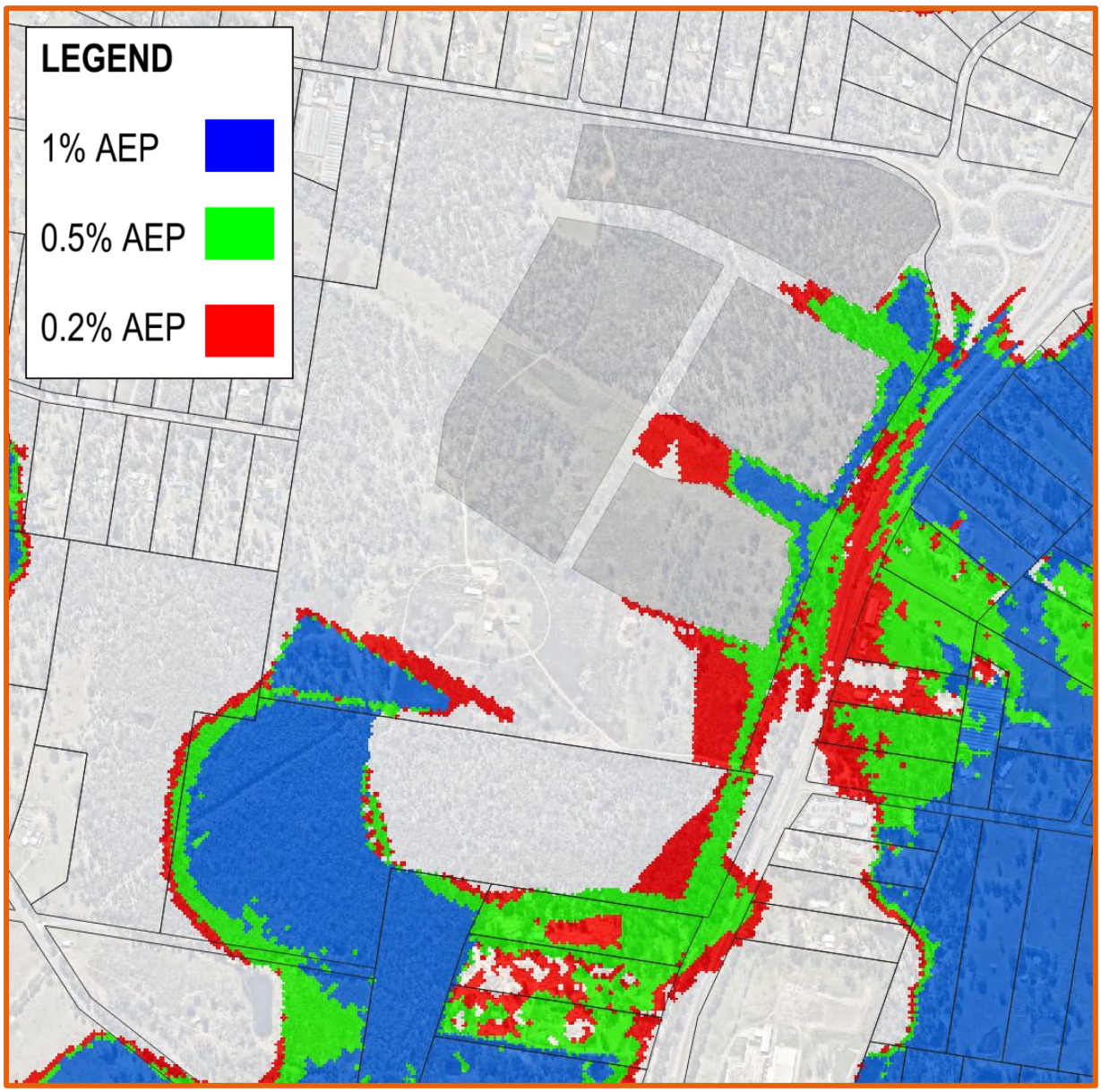


Figure 133 – Inundation extents for 1% AEP – 0.2% AEP under approved BEW for both sites and "glass walls" for flood planning level determination.

9 FLOOD RISK CATEGORY

Logan Planning Scheme 2015 SC6.2.10 Flood Figure 1.8.2 – Hydraulic risk matrix is shown in below table and is used to define areas of flood risk and corresponding flood hazard mapping. In conjunction with this investigation concerning specific large storm events and the change to surface levels, the assessment also applies this hydraulic risk matrix to determine revised flood risk areas for all scenarios. Refer to Appendix C for mapping.

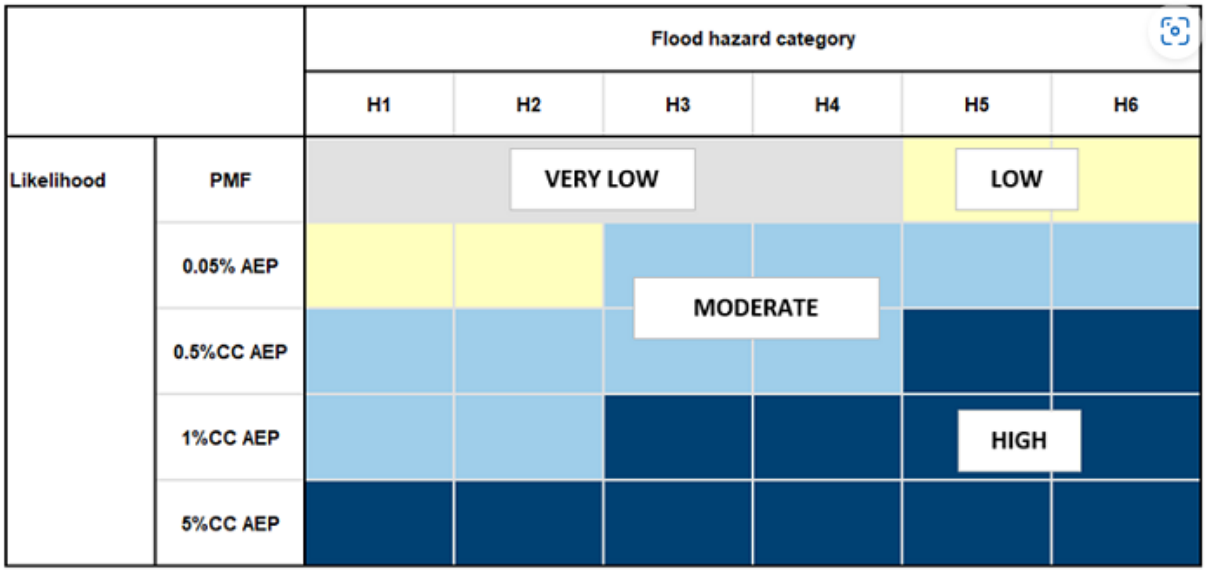


Figure 144 – Flood Hazard Category.

9.1 Base Case

The Base case revised flood risk mapping is as shown in Figure 15.

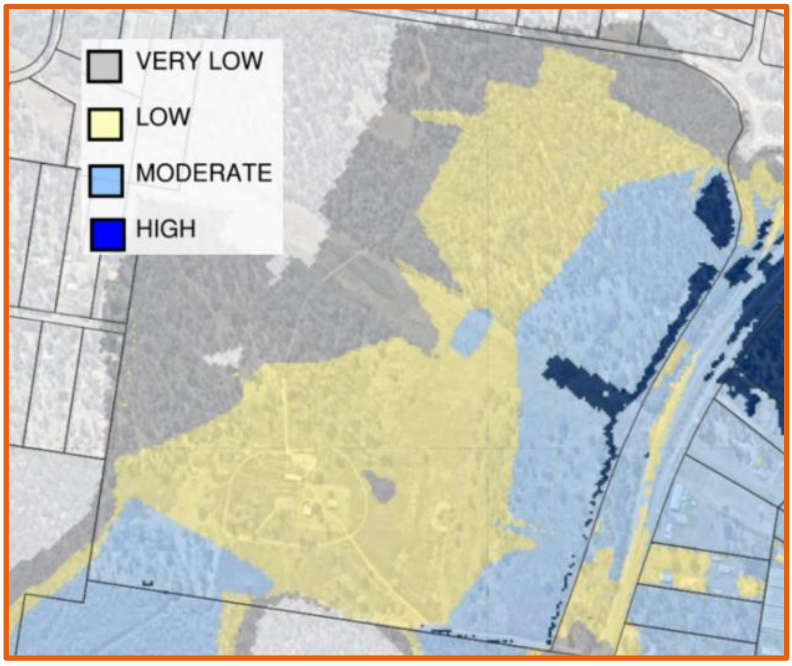


Figure 155 – Flood Risk Mapping – Base Case.

9.2 Sensitivity Case

The sensitivity case revised flood risk mapping is as shown in Figure 16.

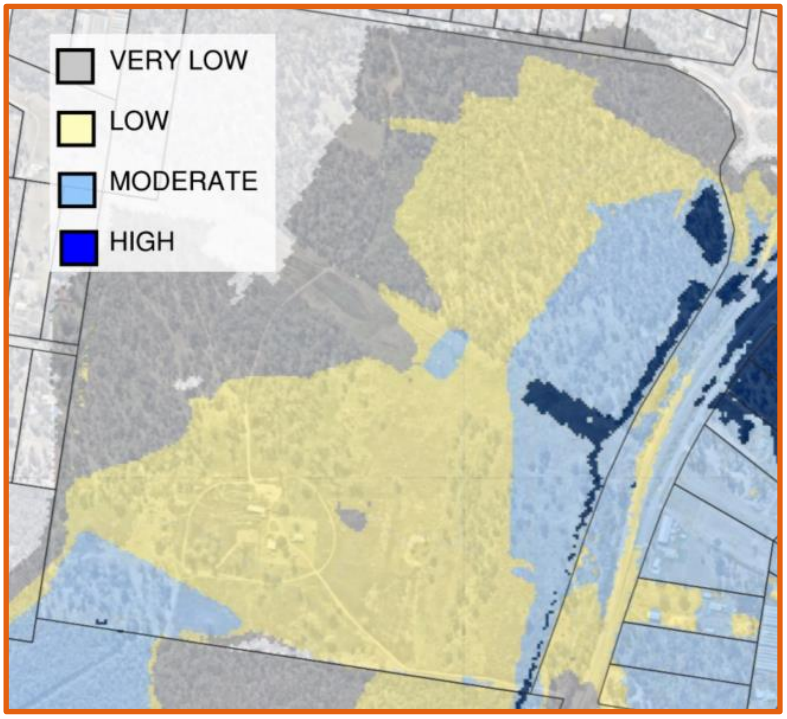


Figure 166 – Flood Risk Mapping – Sensitivity Case for approved FSL's.

10 FLOOD AND LAND USE COMPATIBILITY

10.1 TLPI No. 1/2023 OM-05 Response

Subsequent to Section 7.4.1, the following table presents the corresponding required minimum Flood Planning Levels for respective zones and sub-zones to satisfy relevant performance outcomes of the OM-05 Flood Hazard Overlay Code. Included to Appendix B is a full response to the overlay code performance and acceptable outcomes.

Table 1 – Estate Flood Planning Levels for Respective Zones

	Flood Planning Levels (Minimum) (RL m)		
Zone	1% AEP @ 2100*	0.5% AEP @ 2100*	0.2% AEP @ 2100*
A1	24.2	25.3	25.8^
A2	24.2	25.4	25.9^
A3	24.2	25.5	26.2
B1	NA	25.5	26.2
B2	NA	26.0	26.9
C	NA	**27.2**	27.7
D	27.0	28.1	28.6

^Level driven by base case. Unmarked levels are driven by the developed / glass wall case, or are equal in either scenario. Refer Section 7.2.1.

*It should be noted that these planning levels are based on:

- 1% AEP at 2100 – Base Case Approved BEW levels.
- 0.5% AEP at 2100 – Developed Case extracted from the zonal assessment (i.e. “glass wall”) conducted for the purposes of Section 7.4.1 and Zones A1 – A3 and B1 – B2.
- 0.2% AEP at 2100 – Worst scenario between Base Case and Developed Case (i.e. “Glass Wall”) for all Zones. In essence, these scenario levels assume that all pads with Zones A and B are elevated to above 0.5% AEP at 2100 and design incorporates storage system to elevate hazardous materials above the 0.2% AEP at 2100.

10.2 TLPI No. 1/2023 OM-05 Response – Sensitivity Case

Where the adjoining development occurs, then flood planning levels are revised as per Table 2. Importantly, all assumptions and notes remain relevant to this table. Notably, as per Figure 16 Zone C moderate risk area is reduced in area and predominantly limited to within the adjoining conveyance channel area. This can be seen in the 700mm reduction to the 0.5% AEP at 2100 flood planning level – reduced from RL 27.2m to 26.5m when comparing Developed Case and corresponding Sensitivity Case. Consequently, where the adjoining development earthworks are undertaken then Table 2 may be used for obtaining the prescribed flood planning level corresponding to the respective zone area.

Table 2 – Estate Flood Planning Levels for Respective Zones

	Flood Planning Levels (Minimum) (RL m)		
Zone	1% AEP @ 2100*	0.5% AEP @ 2100*	0.2% AEP @ 2100*
A1	24.2	25.3	25.7^
A2	24.2	25.4	25.8
A3	24.2	25.5	26.0
B1	NA	25.5	26.1
B2	NA	26.0	26.6
C	NA	**26.5**	27.0
D	27.0	28.1	28.6

^Level driven by base case. Unmarked levels are driven by the development / glass wall case, or are equal in either scenario. Refer Section 7.2.1.

*Refer Section 9 Table 1 notes.

11 SUMMARY

To achieve the required flood and land use compatibility in accordance with OM-05 Flood Hazard Overlay Code each respective development located within the current mapped flood hazard areas must produce development envelopes that are elevated as per Section 9 – Table 1. Notably, subject site flood hazard mapping is revised to that shown below, with all development pad areas excluded from the high hazard areas for the Base Case Scenario.

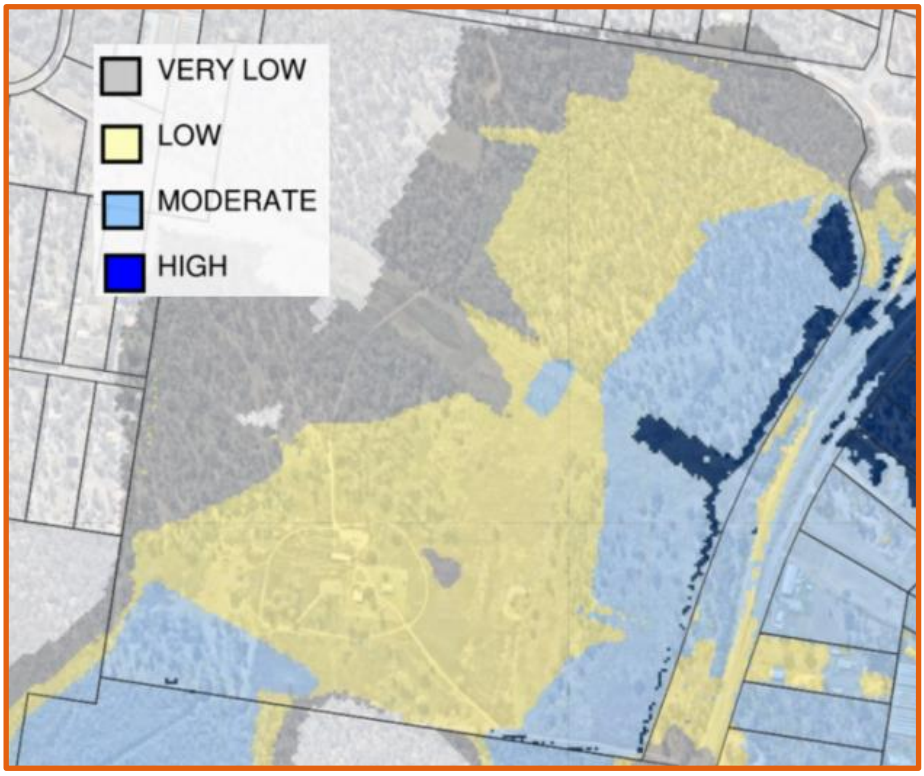


Figure 177 – Revised Hazard Mapping

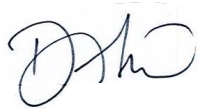
This report is developed based upon Base Case approved BEW levels, (including adjoining development for sensitivity testing) and has made reasonable assumptions on future finished surface levels of particular land use development areas to allow compliance demonstration with provisions of OM-05 Flood Hazard Overlay Code. In the event that the estate and adjoining development or land use changes in any significant form which may modify the moderate flood risk area (for example lower development envelope finish surface level than purported zone flood planning level for the 0.5% AEP at 2100), this report **must** be updated to analyse and reflect the changes made.

Importantly, it is noted that with the revised large event inundation areas, completed development finish surface levels and purported associated revised flood risk mapping there remains a future requirement to undertake review and revision to LCC current flood risk categories for the site and adjoining areas.



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