COSTIN ROE CONSULTING

CIVIL ENGINEERING ASSESSMENT
(INCORPORATING WATER QUALITY &
HYDROLOGY IMPACT ASSESSMENT)

PROPOSED SINGLE INDUSTRIAL FACILITY
88 NEWTON ROAD, WETHERILL PARK, NSW

Prepared for:

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EXECUTIVE SUMMARY

Centuria Capital Ltd (Centuria - the Applicant) are seeking to establish a state-of-the art single level distribution centre located at 88 Newton Road, Wetherill Park.

The Proposal will be subject to approval from Fairfield City Council and accordingly, a civil engineering design and associated engineering report has been prepared to support the application for the proposal. This assessment has been prepared by Costin Roe Consulting to support the development application and confirm the engineering and stormwater strategy for the development. This Water and Hydrology Assessment has been prepared by Costin Roe Consulting to support the application of the proposal and assess the Proposal's impact on the surrounding environment in relation to stormwater and stormwater management.

Proposal overview

Consent is sought for the construction and operation of a single level warehouse and distribution facility. The proposed works will comprise demolition of existing buildings and structures, construction and operational use of a single-storey warehouse and distribution centre with ancillary office space and amenities, on-site parking, landscaping and access, and other associated works including bulk earthworks, site preparation works and site clearance, as well as augmentation and construction of servicing utilities.

Purpose of this assessment

This Assessment has been prepared to address the Proposal as they related to water and hydrology, including:

- Stormwater Management including stormwater quantity and quality;
- Flooding; and
- Erosion & Sediment Control.

Construction impacts

During the construction phase, an Erosion and Sediment Control Plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

Operational impacts

During the operational phase of the development, the proposed stormwater quality treatment system incorporating the use of a treatment train of a gross pollutant trap and filtration is proposed to mitigate any increase in stormwater pollutant load generated by the development. Best management practices have been applied to the development to ensure that the quality of stormwater runoff is not detrimental to the receiving environment.

Water quantity management is performed in regional detention systems that manage runoff for the whole of the Wetherill Park Industrial Area. No site-specific on-site detention systems are required for this development site.

Further it has been confirmed that the development meets flood planning requirements and does not impact existing flood affected areas (as demonstrated via TUFLOW flooding

assessment completed by Catchment Simulation Solutions). This shows that local post development flows from the site, in conjunction with the flood management measures to be adopted in the flooding assessment demonstrates that the site discharge will not adversely affect any land, drainage system or watercourse, and will not increase flood risk in site or off site as a result of the development.

Conclusion

The hydrological assessment of the local site drainage confirms that recommended water quality and quantity measures will ensure that no adverse impacts result on receiving waterways as a result of the development.

The detail contained in this report provides sufficient information to show the consent authority that legal points of discharge and a suitable stormwater management strategy is available for the development and the requirements associated with the strategy. It is recommended the management strategies in this report be approved and incorporated into the future detailed design.

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1 INTRODUCTION

1.1 Introduction

Costin Roe Consulting Pty Ltd has been commissioned by Centuria to prepare this *Civil Engineering Report* in support of a proposed development application to Fairfield City Council.

Consent is sought for the construction and operation of a single level warehouse and distribution facility. The proposed warehouse and distribution facility would comprise storage and distribution of goods. Ancillary car parking has been provided on Site to facilitate operational phase of the proposed development. Ancillary offices, support space and staff amenities are also proposed.

This report provides a summary of the design principles and planning objectives for the following civil engineering components of the project:

- Stormwater Management including stormwater quantity and quality;
- Flooding; and
- Erosion & Sediment Controls during construction.

The objectives for the assessment are to ensure that potential for detrimental impacts on the environment are mitigated through provision of development which, based on the proposed Development Layout:

- responds to the topography and site constraints, considers flooding and flood planning requirements.
- provides an appropriate and economical stormwater management system which incorporates best practice in water sensitive urban design consistent with and mitigates impact to receiving waters through provision of water quality improvement measures to reduce pollutants from stormwater runoff from the development.

A set of drawings (refer **Appendix A**) have been prepared to accompany the impact assessment and show how the development and proposed civil engineering components (including site levels, stormwater drainage layout and water quantity and quality requirements) of the development can manage the potential for impact to the environment. These drawings are for development approval and impact assessment only and subject to change during detail design. Outcomes of the impact assessment would remain consistent in any future detail design process.

The application will be determined by a regional planning panel and is located within the Fairfield City Council (FCC) LGA. The requirements of the Fairfield City Council (FCC) *Stormwater Management Policy 2017* and Fairfield City Council *Development Control Plan 2024* have been considered in the setting proposed design and mitigation measures.

2 DEVELOPMENT SITE

2.1 Location & Description

The proposed development is located in the suburb of Wetherill Park at 88 Newton Road, as shown in **Figure 2.1.**

The site is irregular in shape and has an area of approximately 5.19 Ha. The proposed development is located in the suburb of Wetherill Park on the northern side of Newton Road, approximately 130m south of its intersection with Victoria Road. The site is located within an established area comprising industrial development known as the *Wetherill Park Industrial Estate* and is flanked by existing industrial development.

The existing site currently comprises an existing warehouse building, and an office building, carparking areas and storage areas.

An open concrete lined trunk drainage channel is located on the north of the property. This concrete channel conveys stormwater from the site and catchments within the Wetherill Park Industrial Estate to the north-east of the subject land. The trunk drainage line conveys runoff from the Wetherill Park Industrial Estate precinct to Prospect Creek via Council's Hassel Street Regional detention system.

Figure 2.1 - Locality Plan (Source: Mecone)

The closest residential property receivers are located approximately 550 m to the south of the site.

Newton Road grades from west to east/ north-east between RL 51.3m AHD to RL 43.94m. Levels on the site grade from south-west to the north. The highest level on the site is RL 51.45m AHD and the lowest level (other than in the stormwater channel) is RL 44.5m AHD adjacent to the stormwater channel on the north-east of the property.

The stormwater channel has a depth of approximately 2.2m. Inverts of the channel require survey confirmation.

The existing warehouse building has a floor level of RL 46.35m AHD and the office building is RL 46.4m AHD.

The site's has an existing drainage system comprising pits and pipes, with discharge to the trunk drainage channel toward the north-east of the property boundary. Refer to **Section 4** for a detailed description of the drainage.

There are existing Sydney Water sewer and water supply assets on the west of the property which are further discussed in **Section 2.3** of this report, and the infrastructure report by Landpartners.

2.2 Proposed Development

The proposed Development Application seeks approval for a single level warehouse and distribution centre which includes:

- demolition of existing structures and bulk excavation of the site
- earthworks and infrastructure construction, including vegetation clearing, installation of services and drainage infrastructure
- construction, fit out and use of a warehouse and distribution centre, with ancillary offices, hardstands, passenger vehicle parking, and access ramps
- landscaping.

The Development works will also include the construction of a new in-ground stormwater drainage system including new stormwater management systems.

The proposed access arrangements involve the relocation of vehicle crossovers on the southern frontage to Newton Road.

The development will also need to consider the existing Sydney Water assets which are further discussed in **Section 2.3** of this report, and the infrastructure report by Land Partners.

the requirements of the Fairfield City Council *Stormwater Management Policy 2017* have also been considered in the setting proposed design and mitigation measures.

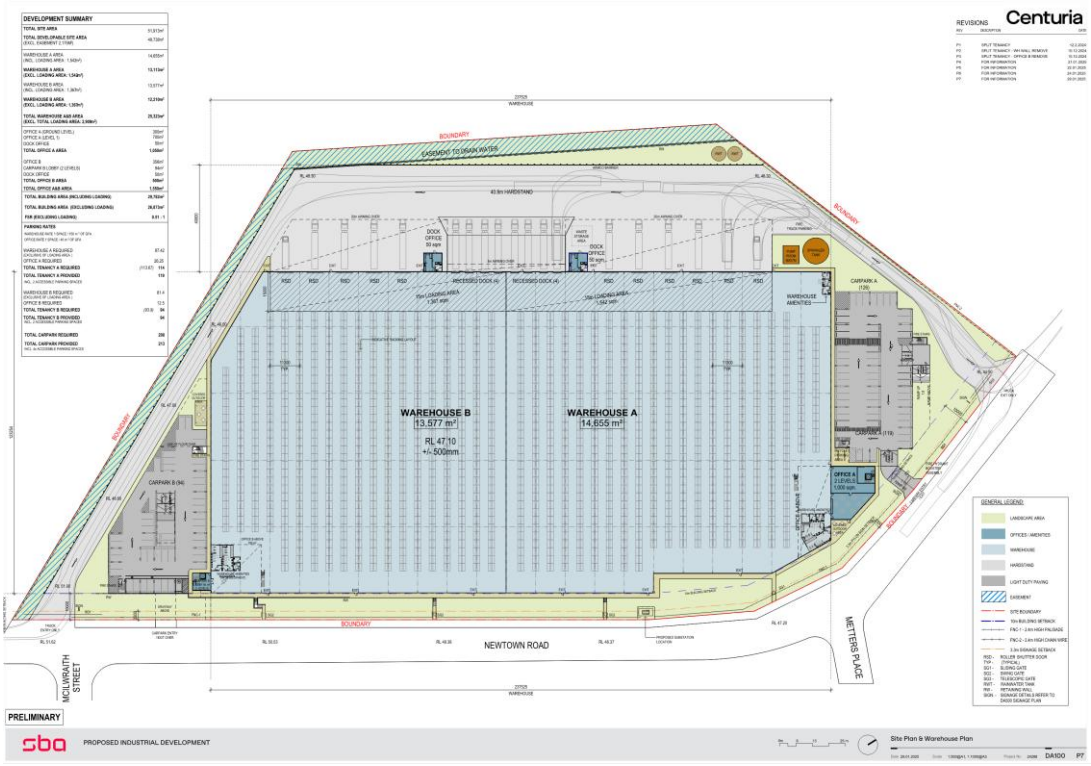


Figure 2.2 - Proposed Development Layout – Site Plan (SBA 2025)

2.3 Sydney Water Assets

It is also noted that there are existing Sydney Water assets on the western side of the property, adjacent to the western boundary of the property. As outlined by Landpartners in their infrastructure report (Report Ref: SY075852.000.1), there are three key assets for consideration as follows:

- a 1,350mm trunk water main within easement is located within the site adjacent to the western boundary of the property.
- a 225mm sewer main which bisects the site and would be located under the proposed building footprint. The sewer could possibly be concrete encased or deviated around the proposed building footprint.
- A 600mm sewer carrier is within the site adjacent to the western boundary of the property with a small portion encroaching into the site at the southern corner.

The mains noted above are shown in **Figure 2.3**. it is also noted that a 600mm trunk water main is also located in close proximity to the western boundary and 1350mm water main noted above and below.

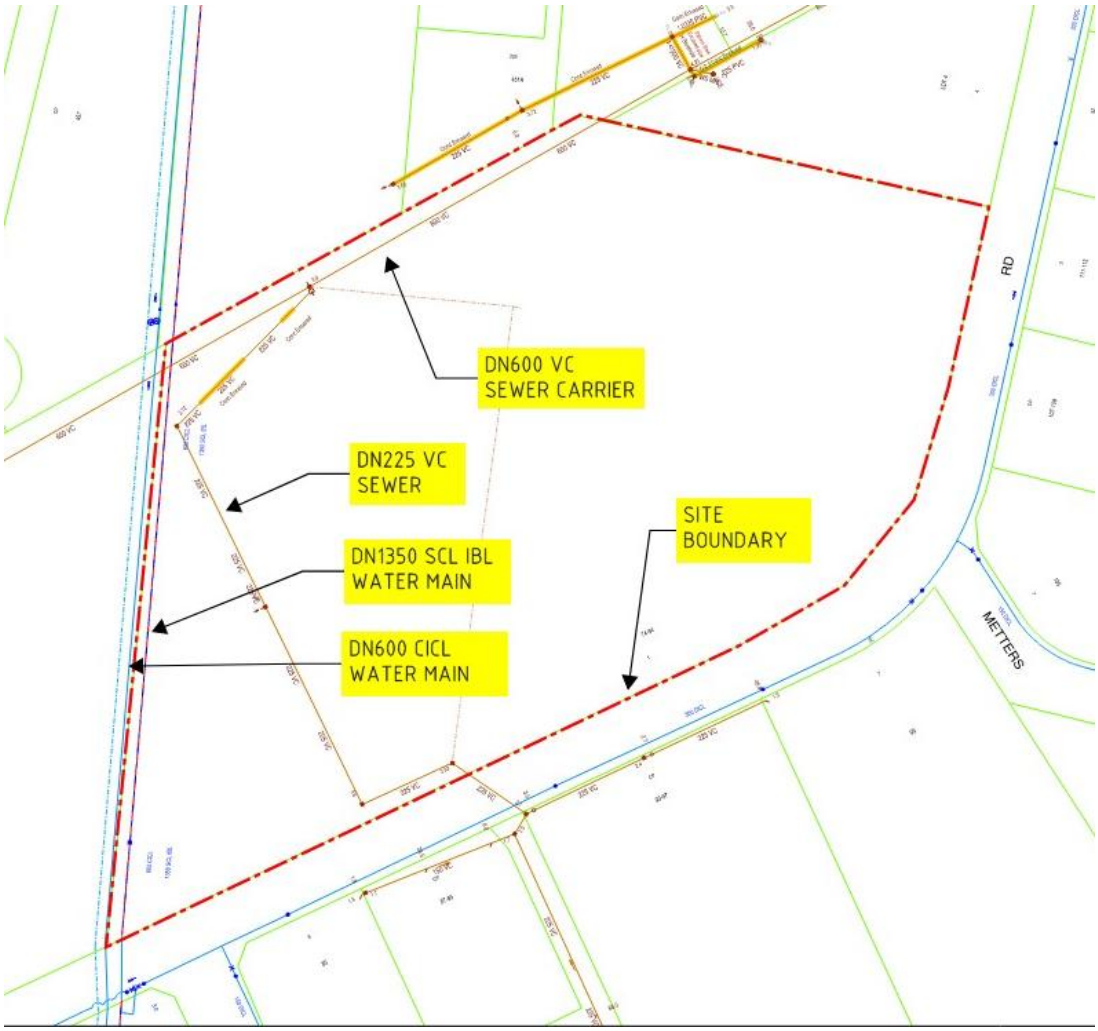


Figure 2.3 - Sydney Water Assets (BDYD July 2023)

We note that consultation with Sydney Water is ongoing and will be performed in parallel to the assessment process. The key items noted by Landpartners are included as follows. Further plans and sections have been prepared by our office to accompany the design application and included in drawing in **Appendix A.**

In relation to the 1350mm trunk water main, Landpartners reports that:

> *A 1,350mm trunk water main is constructed within the site adjacent to the western boundary of the site. The water main is laid within an easement for water main created by dealing R519583. The dealing outlines the rights Sydney Water enjoy the purpose of maintaining and renewing the water main. The dealing also outlines the restrictions placed on the registered proprietor of the land in regard to the easement area. The restrictions note:*
>
> *(i) No structure or building to be constructed within the easement area.*
>
> *(ii) No change of surface levels, construction of pavements in the easement area or parking vehicles without the prior consent of Sydney Water.*

The 1,350mm trunk water main is a critical asset of Sydney Water's distribution system. Any works adjacent to the water main will require a Building Plan Approval (BPA) from Sydney Water. Due to the nature of the water main an Out of Scope BPA process will be followed.

Noting the proximity of the 600mm watermain to the western boundary and 1350mm main, similar assessments described above will be necessary pertaining to the 600mm main.

In relation to the 225mm sewer main, Landpartners reports that:

A 225mm sewer reticulation line exists within the property. This sewer is available for connection by the proposed development. A section of the 225mm sewer will be diverted in accordance with Sydney Water's policy and guidelines for diversion and relocation of an existing sewer asset.

The section of the 225mm sewer that is to be diverted is proposed to be relocated under the proposed building footprint. Relocation of the sewer under the building will require the deviated section of the sewer to be concrete encased and structural design of the piering/footing system that supports the proposed building will ensure no loading will be placed on relocated sewer.

In relation to the 600mm sewer main, Landpartners reports that:

A 600mm concrete sewer carrier is constructed within the site adjacent to the N.W boundary of the property.

The 600mm concrete sewer carrier is noted to be within the site, however located within the easement and existing trunk drainage corridor. Works are proposed adjacent to the main and easement however clear of the system.

Refer to Landpartners report and drawings **CO15039.01-DA51 & DA52** in **Appendix A** for further detail.

3 SITE CONDITIONS AND EARTHWORKS

3.1 Soil and Geological Conditions

A geotechnical investigation has been undertaken by EP Risk and should be referred to for site soil and geological conditions.

It is noted that the site is currently developed with commercial buildings and pavements. Reference to soil contamination, environmental and geotechnical assessments are by others and will be made prior to detailed design.

As referenced in the investigation the 1:100 000 Sydney Geological Map (1983) indicates that the site is underlain by Ashfield Shale (Rwa) comprising black to dark-grey shale and laminate.

3.2 Bulk Earthworks

Bulk earthworks will be required to facilitate the development of the site for the proposed industrial use, lowering the basement final floor level to RL 47.10m AHD (+-500mm). The earthworks will be undertaken to provide a flat building pad and hardstand area. A high-level earthwork volume estimate assessment has been completed for the site. The estimated volumes are shown on the Costin Roe Consulting drawings in **Appendix A.**

The final adopted floor level is noted to be subject to a +/-0.5m variance. The design intent is for a cut to fill balance and minimal offsite export of soils. The floor level variance is to allow for unknown spoil allowances which may effect the design during detail stage from that know at the concept stage. Such items include geotechnical conditions, final building layout and structural floor and footing designs, drainage and any other unknown considerations at the concept EIS stage.

The earthworks analysis has been completed to a level of detail to enable general pad levels to be set and to obtain an order of magnitude cut and fill volume estimate. Given the preliminary nature of the assessment, an upper and lower bound of earthworks volumes has been included to allow for contingency in cost planning estimates.

A detailed assessment of the earthworks level will be completed during detailed design stage and some adjustment to the final pad and building floor levels (within +/-500mm) might occur.

The earthworks volume estimates are included in **Table 3.1.**

Table 3.1 - Earthwork Volume Estimates

	Lower Bound (-15%)	Apparent Volume	Upper Bound (+15%)
Cut (m^3)	-13,050	-15,350	-17,650
Fill (m^3)	+24,550	+ 28,900	+33,250
Detail Excavation (@ 1500m^3/ Ha)	-6 600	-7 600	-8 750
Balance (m^3)	+4,900	+5,950	+6,850

Spoil allowances for services trenches, retaining walls and detailed building excavation should also be made to avoid excessive unknown exports during later stages of the project. Allowances in the range of 1,250-2,500m3/Ha can be expected depending on the type of development and final site layouts. This allowance is included in the earthworks assessment (at 1500m3/Ha). As noted, an upper and lower bound of earthworks volumes has been included to allow for some of these items.

Soil Erosion and Sediment Control measures, including sedimentation basins are to be placed in accordance with submitted drawings and the DRAFT **Soil and Water Management Plan** in **Section 8** and **Appendix C** of this report.

All geotechnical testing and inspections performed during the filling operations will be undertaken to Level 1 geotechnical control, in accordance with AS3798-2007.

3.3 Retaining Walls

The civil engineering objective is to minimise retaining walls within the constraints of the masterplan layout, allowable grading to suit industrial development and batters in landscaped areas where possible.

Retaining will be required along hardstand areas, adjacent to the south-west property frontage and along the northern boundary adjacent to the open drainage channel.

Location and indicative heights of retaining walls are shown on drawing **CO15039.01-DA51 & DA52.**

3.4 Embankment Stability

It is noted in the Geotechnical report that the design of batters up to 3m height and above groundwater within engineered fill/residual soil can be 1V:2H for temporary batters and 1V:3H for permanent batters.

Permanent batters will also be adequately vegetated or turfed which will assist in maintaining embankment stability.

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the DRAFT **Soil and Water Management Plan** in **Section 8** and **Appendix C** of this report.

3.5 Groundwater

Groundwater analysis has been undertaken by EP Risk and reference to the geotechnical report should be made regarding groundwater.

Noting the site is generally comprised of sandstone bedrock, groundwater is not anticipated to be significant, and noting the site is currently fully developed that this new project would have any discernible impacts on groundwater or groundwater systems. Further commentary on groundwater should be referenced with the geotechnical assessments.

3.6 Acid Sulphate Soils and Salinity

Refer to geotechnical report by EP Risk for salinity and acid sulphate soils.

4 WATER CYCLE MANAGEMENT STRATEGY & DRAINAGE METHODOLOGY

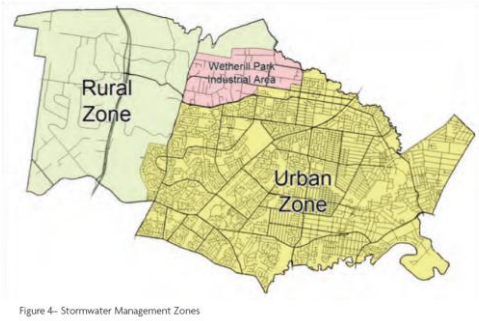
4.1 Key Areas and Objectives

Water Cycle Management (WCM) is a holistic approach that addresses competing demands placed on a region's water resources, whilst optimising the social and economic benefits of development in addition to enhancing and protecting the environmental values of receiving waters.

This WCMS has been prepared to inform Fairfield City Council that the development is able to provide and integrate WCM measures into the stormwater management strategy for the development. It presents guiding principles for WCM across the development which includes establishing water management targets and identifying management measures required.

Several WCM measures have been included in the WCMS and engineering design, which are set out in this report and the attached drawings. The key WCM elements and targets which have been adopted in the design are included in **Table 4.1** following.

Table 4.1 - WCM Targets

Element	Objectives	Reference
Surface Water & Water Quantity	<u>*Wetherill Park Industrial Area:*</u> OSD is not required within the Wetherill Park Industrial Area. The Wetherill Park industrial precinct includes two regional detention basins which manage runoff from the entire precinct prior to discharge into Prospect Creek.  Figure 4– Stormwater Management Zones	*Section 4.2* of Fairfield City Councils *Stormwater Management Policy 2017*
Water Quality	Protection of aquatic ecosystems, visual amenity and secondary contact recreation. Load-based pollution reduction targets based on an untreated urbanised catchment: Gross Pollutants 90%	*Section 6.2* of Fairfield City Councils *Stormwater Management Policy 2017*

	Total Suspended Solids 80% Total Phosphorus 55% Total Nitrogen 40% Total Hydrocarbons 90%	
Flooding	Buildings and habitable areas set 500mm above the 1% AEP storm event. No affectation to upstream downstream or adjoining properties as a result of development	Fairfield City Councils *Stormwater Management Policy 2017* NSW Floodplain Development Manual 2023.
Water Supply	Reduce Demand on non-potable water uses. Provide rainwater tanks which result in an 40% reduction of rainwater for industrial and commercial properties.	*Section 5.2* of Fairfield City Councils *Stormwater Management Policy 2017*
Erosion and Sediment Control	Appropriate erosion and sedimentation control measures must be described in the environmental assessment for all stages of construction to mitigate potential impacts to receiving trunk drainage channel.	Landcom Blue Book Council DPE

A summary of how each of the objectives has been achieved is included below. Reference to the relevant sections of the report should be made for further and technical details relating to the WCM measures:

- *Stormwater Quantity Management (Refer **Section 5**)*

  The intent of this criterion is to reduce the impact of urban development on existing drainage system, usually achieved by limiting post-development discharge within the receiving waters to the pre-development peak, and/or to ensure no affectation of upstream, downstream or adjacent properties.

  Attenuation of stormwater runoff from the development is not required noting the site is located within the Wetherill Park Industrial Precinct. This precinct is serviced by two regional detention systems which manage runoff from the precinct to Prospect Creek.

  Refer to **Section 5** of the document for further discussion pertaining to water quantity management.

- *Stormwater Quality Management (Refer **Section 6**)*

  There is a need to target pollutants that are present in stormwater runoff to minimise the adverse impact these pollutants could have on downstream receiving waters.

  The required pollutant reductions are included in **Table 4.1** of this document and MUSIC modelling has been completed to confirm the reduction objectives can be met for the development.

A series of Stormwater quality improvement devises (SQID's) have been incorporated in the design of the development. The proposed management strategy will include the following measures:

- Primary treatment of external areas will be made via 200um pit inserts.
- Tertiary treatment of the development will be made via a proprietary filtration system. The proposed system is the Ocean Protect Ocean Protect Jellyfish 3250 (offline unit). Refer to drawings **CO15039.01-SSDA40, SSDA41 & SSDA42.**
- Some treatment will also be present by provision of rainwater reuse tanks on development site through reuse and settlement within the tanks.

Reference to **Section 6** of this document should be made for detailed Stormwater Quality modelling and measures.

- *Flood Management (refer **Section 7**)*

  The proposed development considered flooding and large rainfall events in relation to local runoff and overland flow paths which influence the site, including the trunk drainage channel on the north of the property, and local runoff from catchments south of the property.

  It is confirmed that a Developers Agreement has been made with Fairfield City Council and one of their three preferred flood modellers, Catchment Simulation Solutions (CSS) has completed the flood (TUFLOW) modelling using Councils existing flood model in the pre-development conditions, then modified this model to assess the post-development conditions.

  The result of the modelling has been interpreted by Costin Roe Consulting, as required by Council.

  In relation to flood impact on the development, or impact from the development, as the site is clear of the 1% AEP and PMF flood extent there would be no adverse impact to existing flood conditions or surrounding developments are associated with the proposed development.

  Consideration to flood requirements has been made per Council Flood Management Policy. Refer **Section 7** for details.

- *Water Demand Reduction/ Rainwater Reuse (refer **Section 6.4**)*

  Rainwater reuse measures will be provided as part of this development design. Rainwater reuse will be required to reduce demand on non-potable use. The reduction in demand will target non-potable uses such as toilet flushing and irrigation. Refer **Section 6.4.**

- *Stormwater Management During Construction (refer **Section 8**)*

  A draft construction stormwater management plan and associated erosion and sediment control measures has been included in this document based on *Landcom Managing Urban Stormwater: Soils and Construction Volume 1 (The Blue Book*) and Council requirements. The management measures take a staged approach from initial site establishment, construction stages and the completion of the development site.

4.2 Existing Drainage System & Overland Flows

The site is currently a developed industrial property which has been described in **Section 2.2.**

An existing formal inground drainage is currently on site which carries stormwater runoff from the existing warehouse into the council drainage trunk drainage channel on the north of the property.

The existing drainage system will be demolished and made redundant as part of the demolition works proposed on the property. The existing discharge location (north-east of site) will be retained as the legal point of discharge for the new development.

4.3 Proposed Drainage System

As per general engineering practice and the guidelines of Fairfield City Council, the proposed stormwater drainage system for the development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge.

The minor system is to consist of a piped drainage system which has been designed to accommodate the 5% AEP (1 in 20-year ARI) storm event. This results in the piped system being able to convey all stormwater runoff up to and including the 5% AEP event. This meets the requirements of Fairfield Council and is the minimum recommended capacity for an industrial development.

The major system will be designed to cater for storms up to and including the 1% AEP (1 in 100-year ARI) storm event. The major system will employ the use of defined overland flow paths, such as roads and open channels, to safely convey excess run-off from the site (and overland flow from external sources), allowing for 500mm freeboard to the building floor levels.

The design of the stormwater system for this site will be based on relevant national design guidelines including:

- Australian Standard Codes of Practice and accepted engineering practice,
- the standards of Fairfield City Council, including their **Stormwater Management Policy 2017** (*Fairfield City Council 2017*) and Development Control Plan (*Fairfield City Council 2024*)
- Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage.
- Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (2019 Edition), Volumes 1 and 2 (AR&R).

Water quality and re-use are to be considered in the design to ensure that any increase in the detrimental effects of pollution is mitigated, Council Water Quality Objectives are met and that the demand on potable water resources is reduced.

The legal point of discharge is a point specified by Council where stormwater from a property can be discharged. The legal point of discharge is usually Council's stormwater infrastructure (where available), the street kerb and channel for smaller developments or downstream receiving waters like an existing stream or gully, lake, pond or waterbody. As noted, discharge from the property will be to existing outlet as shown on drawing **CO15039.01-DA41 and DA42.**

A drainage assessment has been completed and included in the application submission. This assessment demonstrates the site can adequately convey runoff from the 5% AEP (1 in 20 ARI) design event, without surcharging at any point and has adequate capacity throughout the system, in accordance with Fairfield City Councils stormwater requirements and industry standards.

Although the existing discharge pipe size (750mm) is less than the pipes draining to it (up to 900mm), due to the depth to invert, and confirmed drainage capacity, the need to upgrade this connection, or provide additional connections to the channel is unwarranted. Further, that in the event of an issue with the outlet conveyance there is adequate opportunity for overflow to the channel via the proposed surcharge pit at the outlet point. Refer Section on drawing **CO10539.01-DA56.**

4.4 Stormwater Hydrological Modelling and Analysis

4.4.1 Rainfall Data

Rainfall intensity Frequency Duration (IFD) data used as a basis for DRAINS modelling for the 2 to 100 Year ARI events, was taken from The Bureau of Meteorology Online IFD Tool.

4.4.2 Runoff Models

In accordance with the recommendations and standards of Council, the calculation of the runoff from storms of the design ARI has been calculated with the catchment modelling software DRAINS for internal drainage only.

Detailed hydraulic assessment of the internal drainage system will be calculated at detail/ construction certificate stage.

The design parameters for the DRAINS model are to be based on the recommendations as defined by council and parameters for the area and are as follows:

Table 4.2 - DRAINS Parameters

Model	Model for Design and analysis run		
	Rainfall and Runoff	ARR2019	
	Soil Type-Normal	3.0	
	Paved (Impervious) Area Depression Storage	1	mm
	Supplementary Area Depression Storage	1	mm
	Grassed (Pervious) Area Depression Storage	5	mm
AMC	Antecedent Moisture Condition (ARI=1-5 years)	2.5	
AMC	Antecedent Moisture Condition (ARI=10-20 years)	3.0	
AMC	Antecedent Moisture Condition (ARI=50-100 years)	3.5	
	Sag Pit Blocking Factor (Minor Systems)	0	
	On Grade Pit Blocking Factor (Minor Systems)	0	
	Sag Pit Blocking Factor (Major Systems)	0.5	
	On Grade Pit Blocking Factor (Major Systems)	0.2	

4.5 Hydraulics

4.5.1 General Requirements

Hydraulic calculations will be carried out utilising DRAINS modelling software during the detail design stage to ensure that all surface and subsurface drainage systems meet or exceed the required standard.

4.5.2 Freeboard

The calculated water surface level in open junctions of the piped stormwater system will not exceed a freeboard level of 150mm below the finished ground/ grate level, for the peak runoff from the Minor System runoff.

The calculated water surface for the peak runoff from the Major System runoff will not exceed a freeboard level of 500mm below the finished floor level of the building.

4.5.3 Public Safety

For all areas subject to pedestrian traffic, the Depth-Velocity product (dV) of the depth of flow, d (in metres), and the velocity of flow, V (in metres per second), will be limited to 0.4, for all storms up to the 100-year ARI.

For other areas, the dV product will be limited to 0.6 for stability of vehicular traffic (whether parked or in motion) for all storms up to the 100-year ARI.

4.5.4 Inlet Pit Spacing

The spacing of inlets throughout the site will be such that the depth of flow, for the major system design storm runoff, will not exceed the top of the kerb (150mm above gutter invert).

4.5.5 Local Overland Flow

Dedicated flow paths have been designed to convey runoff from the internal site catchments for all storms up to and including the 100-year ARI. These local flow paths will convey stormwater from the site catchments to the downstream discharge location.

5 WATER QUANTITY MANAGEMENT

The intent of the water quantity criterion is to manage the impact of urban development on the existing drainage system by limiting post-development discharge within the receiving waters to the pre-development peak, and/ or to ensure no affectation of upstream, downstream or adjacent properties where required due to development.

As set out in **Section 4.1** of this plan and included in *Section 4.2* of Council's *Stormwater Management Policy 2017*, there is no requirement for any site within the Wetherill Park Industrial Area to have on-site detention to management stormwater quantity. **Figure 5.1** shows Councils Stormwater management zones and the location of the project within the Wetherill Park Industrial Area.

Runoff from the Wetherill Park Industrial Area is noted to be managed by two regional detention systems, the Rosford Street and Hassal Street regional basins. These systems manage runoff from the precinct prior to and within Prospect Creek.

No OSD or other water quantity management is proposed or required for the development noting the local council requirements and management measures in place for the Wetherill Park Industrial Area.

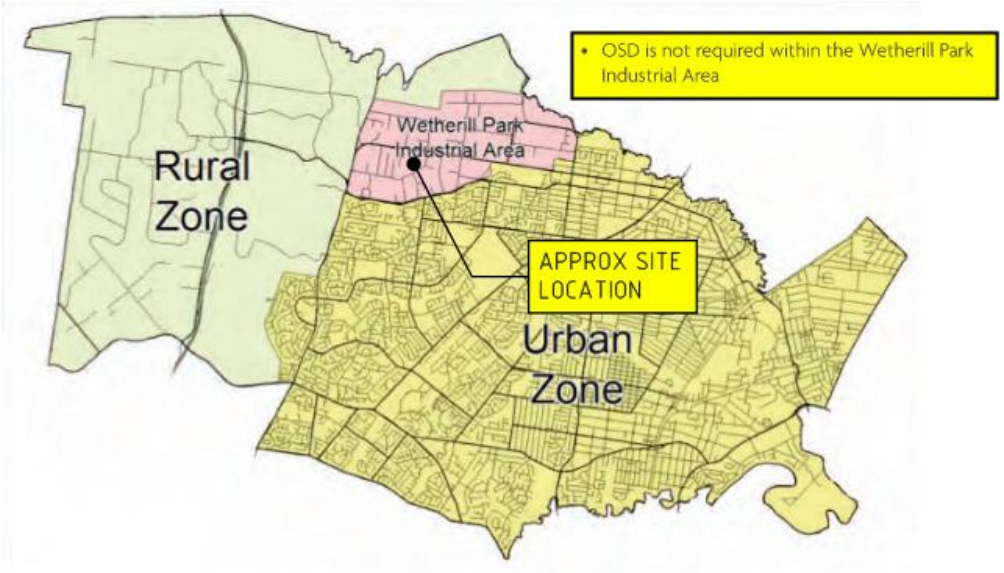


Figure 5.1 - Council Stormwater Management Zones (Excerpt of FCC Figure 4)

6 STORMWATER QUALITY, REUSE AND MAINTENANCE

6.1 Stormwater Quality Objectives

There is a need to provide a design which incorporates the principles of Water Sensitive Urban Design (WSUD) and to target pollutants that are present in the stormwater so as to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by the consent authority.

Fairfield City Council have nominated, in *Section 6* of their *Stormwater Management Policy 2017*, the requirements for stormwater quality to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

Gross Pollutants	90%
Total Suspended Solids	80%
Total Phosphorus	55%
Total Nitrogen	40%

6.2 Proposed Stormwater Treatment System

Developed impervious areas including roof, hardstand, car parking, roads and other extensive impervious areas are required to be treated by the Stormwater Treatment Measures (STM's). The STM's shall be sized according to the whole catchment area of the development. The STM's for the development shall be based on a treatment train approach to ensure that all the objectives above are met.

Components of the treatment train for the development are as follows:

- Primary treatment to the landscaped and hardstand areas is to be performed via the provision of pit inserts to all appropriate grated pits;
- Tertiary treatment is to be performed via Ocean Protect Jellyfish 3250 (offline unit) prior to discharge from the site;
- A portion of the roof will also be treated via rainwater reuse and settlement within the rainwater tank.

The proposed pit insert, being Oceanguard S200 inserts, are an effective and industry accepted method of providing primary treatment of stormwater in similar industrial facilities.

The specified pit inserts have been successfully used on many industrial projects in Western Sydney and have been accepted by Fairfield City Council on numerous projects as part of the development stormwater quality treatment train. Further they have SQIDEP verification, meaning they have passed the strictest industry verification approval process.

The proposed primary treatment system provides appropriate pre-treatment of stormwater and should be accepted by Council for this development.

6.3 Proposed Quality Modelling

The MUSIC model was chosen to model water quality. By simulating the performance of stormwater management systems, MUSIC can be used to predict if the proposed systems and changes to land use are appropriate for their catchments and capable of meeting specified water quality objectives (CRC 2002). The water quality constituents modelled in MUSIC, of relevance to this report, include Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN).

The pollutant retention criteria set as required by Council and nominated in **Section 4.1 & 6.1** of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The parameters used in the MUSIC model are presented in **Appendix B. Figure 6.1** below shows the MUSIC model layout.

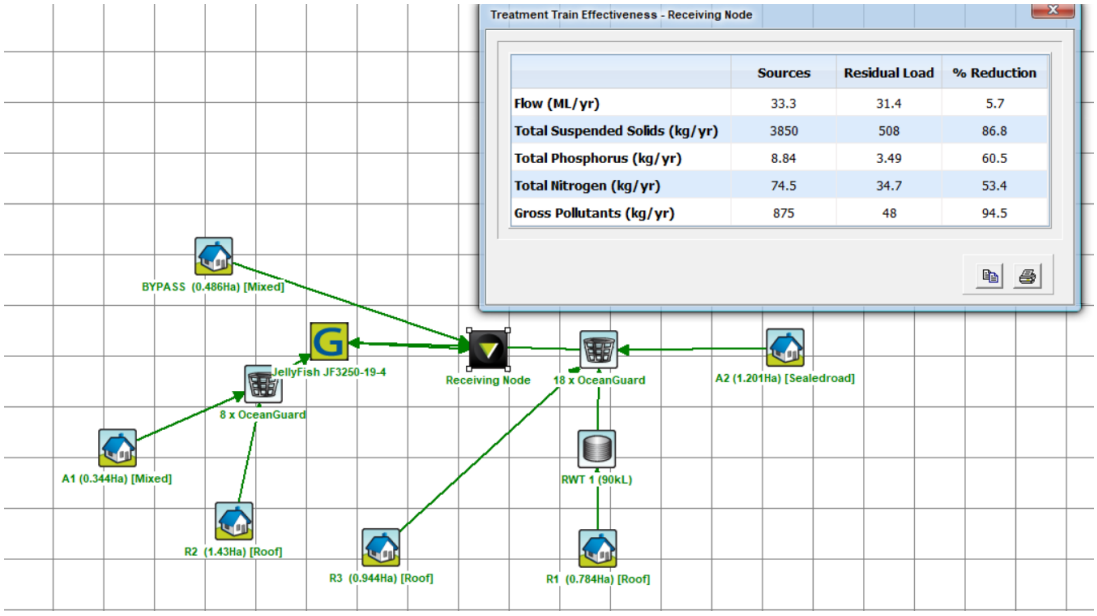


Figure 6.1 - MUSIC model layout

Table 6.1 shows the results of the MUSIC analysis. The reduction rate is expressed as a percentage and compares the post-development pollutant loads without treatment versus post-development loads with treatment.

Table 6.1 - MUSIC analysis results - % reductions

	Source	Residual Load	% Reduction Achieved	% Reduction Targets
Total Suspended Solids (kg/yr)	3850	508	86.8	80.0
Total Phosphorus (kg/yr)	8.84	3.49	60.5	55.0
Total Nitrogen (kg/yr)	74.5	34.7	53.4	40.0
Gross Pollutants (kg/yr)	875	48.0	94.5	90.0

MUSIC modelling has been performed to assess the effectiveness of the selected treatment trains and to ensure that the pollutant retention requirements of Council's Stormwater Policy 2017 have been met.

The MUSIC modelling has shown that the proposed treatment train of STM will provide stormwater treatment which will meet Council's and typical growth centre water quality reduction objective requirements in an effective and economical manner.

Given the expected low source loadings of hydrocarbons and oil/grease and removal efficiencies of the treatment devices we consider that the requirements of the Council have been met. Further discussion on hydrocarbons can be found in **Appendix B.**

6.4 Stormwater Harvesting

Stormwater harvesting refers to the collection of stormwater from the developments internal stormwater drainage system for re-use in non-potable applications. Stormwater from the stormwater drainage system can be classified as either rainwater, where the flow is from roof areas only, or stormwater where the flow is from all areas of the development.

For the purposes of this development, we refer to a rainwater harvesting system, where benefits of collected stormwater from roof areas over a stormwater harvesting system can be made as rainwater is generally less polluted than stormwater drainage.

Rainwater harvesting is proposed for this development with re-use for non-potable applications. Internal uses include such applications as toilet flushing while external applications will be used for irrigation. The aim is to reduce the water demand for the development by 40% as set out in *Section 5.2* of Councils *Stormwater Policy 2017*.

In general terms the rainwater harvesting system will be an in-line tank for the collection and storage of rainwater. At times when the rainwater storage tank is full rainwater can pass through the tank and continue to be discharged via gravity into the stormwater drainage system. Rainwater from the storage tank will be pumped for distribution throughout the development in a dedicated non-potable water reticulation system. This however would be subject to future detail design.

Rainwater tanks have been designed, using MUSIC software to balance the supply and demand, based on the below base water demands and to provide 40% reduction in non-potable water demand. Rainwater tank reuse demands were calculated based on typical water demands of toilets and irrigation of landscaped areas. Water demands for toilets was calculated using 0.1kL/day/ toilet. Water demands for irrigation of landscaped areas was calculated using 0.4kL/year/m2. It should be noted that both the ground floor and first floor office toilets (40 in total) and all the available landscaped areas (6540m2) have been allowed for in the reuse calculations to size the rainwater tanks.

The above rates result in the following internal non-potable demand:

40 Toilets	4 kL/day

The above regime for the landscaped area for the site gives the following yearly outdoor water demand:

Irrigated Area [All landscape]	7,703m2	3081 kL/year

6.4.1 Rainwater Tank Sizing

The use of rainwater reduces the mains water demand and the amount of stormwater runoff. By collecting the rainwater run-off from roof areas, rainwater tanks provide a valuable water source suitable for flushing toilets and landscape irrigation.

Rainwater tanks have been designed, using MUSIC software to balance the supply and demand, based on the calculated base water demands and proposed roof catchment areas. Allowances in the MUSIC model has been made for high flow bypass.

	Flow (ML/yr)	TSS (kg/yr)	TP (kg/yr)	TN (kg/yr)	GP (kg/yr)
Flow In	5.73	150.97	0.86	12.55	149.39
ET Loss	0.00	0.00	0.00	0.00	0.00
Infiltration Loss	0.00	0.00	0.00	0.00	0.00
Low Flow Bypass Out	0.00	0.00	0.00	0.00	0.00
High Flow Bypass Out	0.00	0.00	0.00	0.00	0.00
Pipe Out	3.82	92.93	0.56	8.25	0.00
Weir Out	0.02	0.42	0.00	0.04	0.00
Transfer Function Out	0.00	0.00	0.00	0.00	0.00
Reuse Supplied	1.90	30.18	0.26	3.89	0.00
Reuse Requested	4.54	0.00	0.00	0.00	0.00
% Reuse Demand Met	41.83	0.00	0.00	0.00	0.00
% Load Reduction	33.03	38.17	34.69	33.94	100.00

Figure 6.2 - Rainwater Tank Nodes Water Balance

Table 6.2 - Rainwater Tank 1 Reuse Requirements

Rainwater Tank	Roof Catchment (Ha)	Highflow Bypass (m3/s)	Tank Size in MUSIC (kL)	Predicted Demand Reduction (%)	Provided Tank (kL)
1	0.784	100	90	41.83	90

The MUSIC model, results summarised in **Table 6.2**, predicts that the reuse demands of 40% will be met for the development with the provision of a minimum 90 kL rainwater tank.

We note that the final configuration and sizing of the rainwater tanks is subject to detail design considerations and optimum site utilisation.

6.5 Maintenance and Monitoring

It is important that each component of the water quality treatment train is properly operated and maintained. In order to achieve the design treatment objectives, an indicative maintenance schedule has been prepared (refer to **Appendix D**) to assist in the effective operation and maintenance of the various water quality components.

Note that inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the maintenance requirements below it is also recommended that inspections are made following heavy rainfall or major storm events.

7 FLOODING AND OVERLAND FLOW

7.1 Flooding Introduction and Previous Studies

Flooding assessment for the Wetherill Park area has been completed for Council in their *Wetherill Park Overland Flow Study 2015* (the council report will be referred to as the *Council Flood Study* from hereon). The *Council Flood Study* was prepared for Council by Cardno.

As part of the pre-application consultation with Fairfield City Council, Council required modelling be undertaken using their existing model and as such has been completed by *Catchment Simulation Solutions (CSS)*. CSS are noted to be one of three Council Preferred Consultants who have access to Council's flood model and are able undertake the modelling. Council's requirements are for the interpretation of the results produced by CSS are to be completed by a different engineering consultancy experience in flooding and overland assessments, and in this regard the interpretation has been undertaken by Costin Roe Consulting and included in this report.

7.2 Existing Environment

The proposal has been identified by Council as being adjacent to medium risk flooding within the trunk drainage channel (northern side of property), and low risk flooding on the south of the property.

Figure 7.1 shows an excerpt of the 1% AEP (1 in 100-year ARI flood) extent per the FCC Study. This figure shows the site to be generally clear of the flood extent during the 1% AEP event, noting however some areas are shown to have shallow floodwaters (deemed to be a function of Councils modelling and not flood impacted as discussed further in **Section 7.3**).

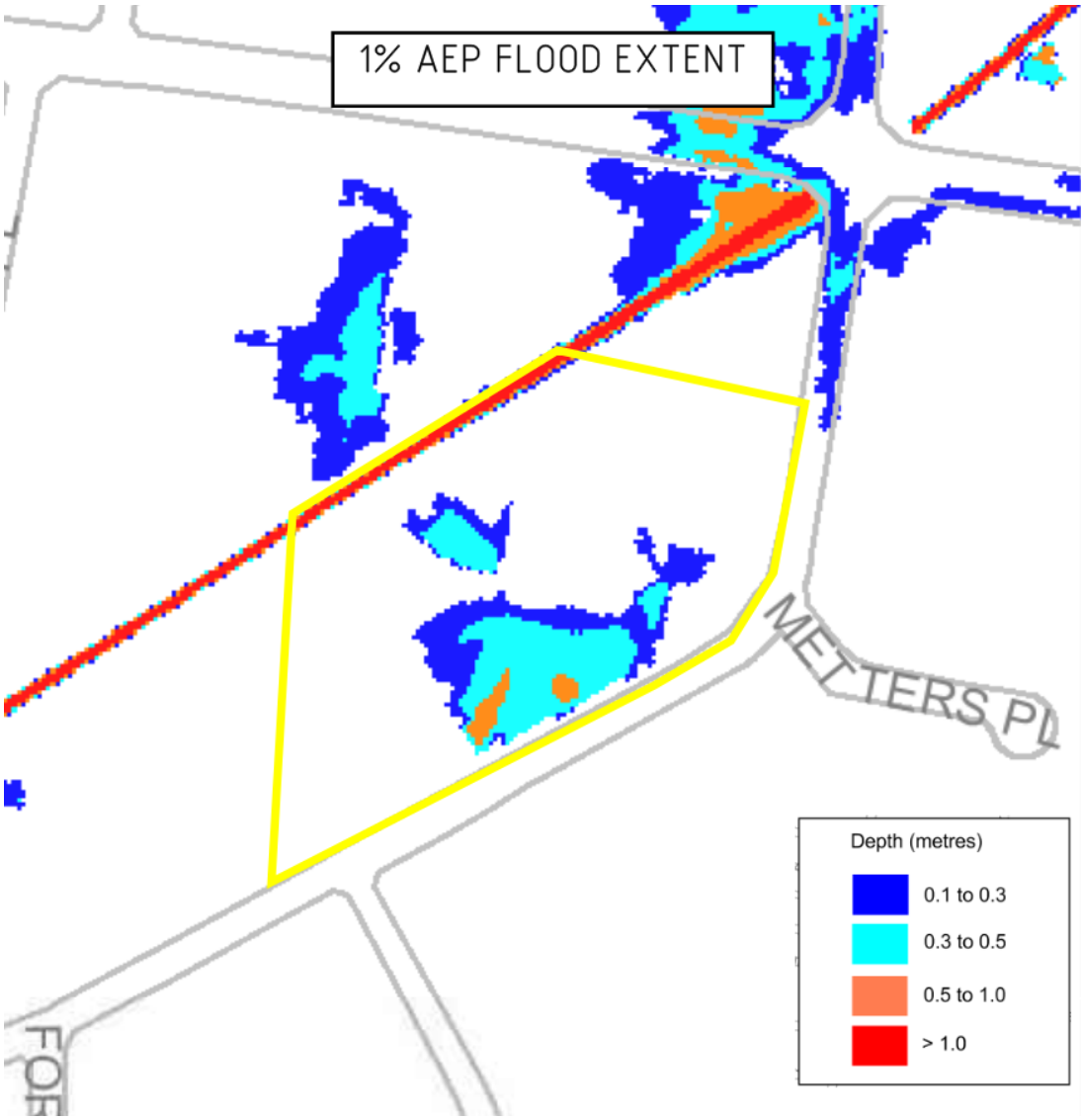


Figure 7.1 - Excerpt of 1 in 100-year ARI Flood Extent

Figure 7.2 shows an excerpt of the PMF flood extent per the FCC study. This figure shows the site to be affected by flooding during the PMF. The area noted in the southern area of the site (shown in **Figure 7.2**) is increased in addition to the over bank flow from the trunk drainage system on the north of the property.

Further review of flooding and site impacts is included in further parts of this report.

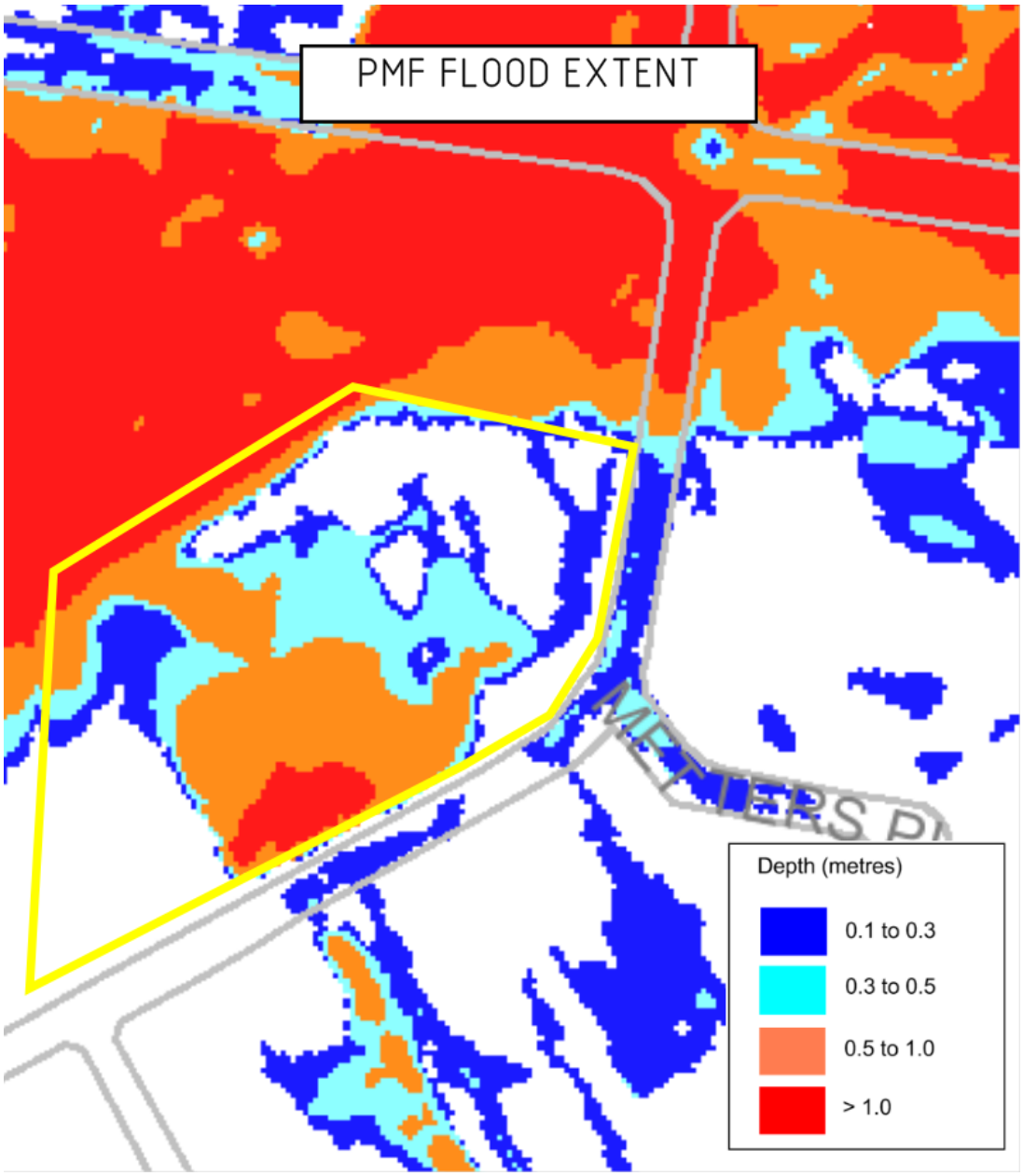


Figure 7.2 - Excerpt of PMF Flood Extent

7.3 Assessment Methodology

7.3.1 Hydrological Assessment of Existing Catchment

CSS have reproduced the existing Council flood model locally in the area of the proposed development, construction as a pre-development condition. The flood model comprises a two-dimensional hydrodynamic flood model based on the Tuflow modelling engine. The flood model used in Fairfield City Council flood studies, as referenced above, uses rain-on-grid hydrology. CSS have added additional survey and drainage information for the property and Newton Road to reflect the site-specific conditions not included in Councils regional flood model or assessments.

CSS has been supplied with a three-dimension digital terrain model of the proposed civil engineering design, and the proposed in-ground drainage system for use in their post developed flood assessment.

Pre and post developed flood scenarios have been compared to confirm the effect of the development on the existing conditions and to understand flood planning requirements for the precinct.

It is noted that the modelling of the pre-developed conditions has been based on limited information pertaining to the existing drainage system. The predeveloped conditions have been modelled without any existing private drainage systems included (noting that existing drainage systems are however present on the site). The post development conditions, and drainage layout however are known and as such were included in the post development modelling by CSS. Some differences in timing of discharge and the point of discharge between pre and post development conditions have been identified and discussed in further sections of the report.

7.3.2 Existing Flood Conditions

The existing flood scenario shows overland flow from four sources as described in **Section 7.2** of this report. **Figure 7.3** shows the pre-development flood levels for the 5% AEP (1 in 20 year ARI) event and **Figure 7.4** shows the flood output for the 1% AEP event.

Refer to **Appendix G, Figures G1 to G15** for flood depth, velocity and hazard categorisation for pre-development/ existing conditions.

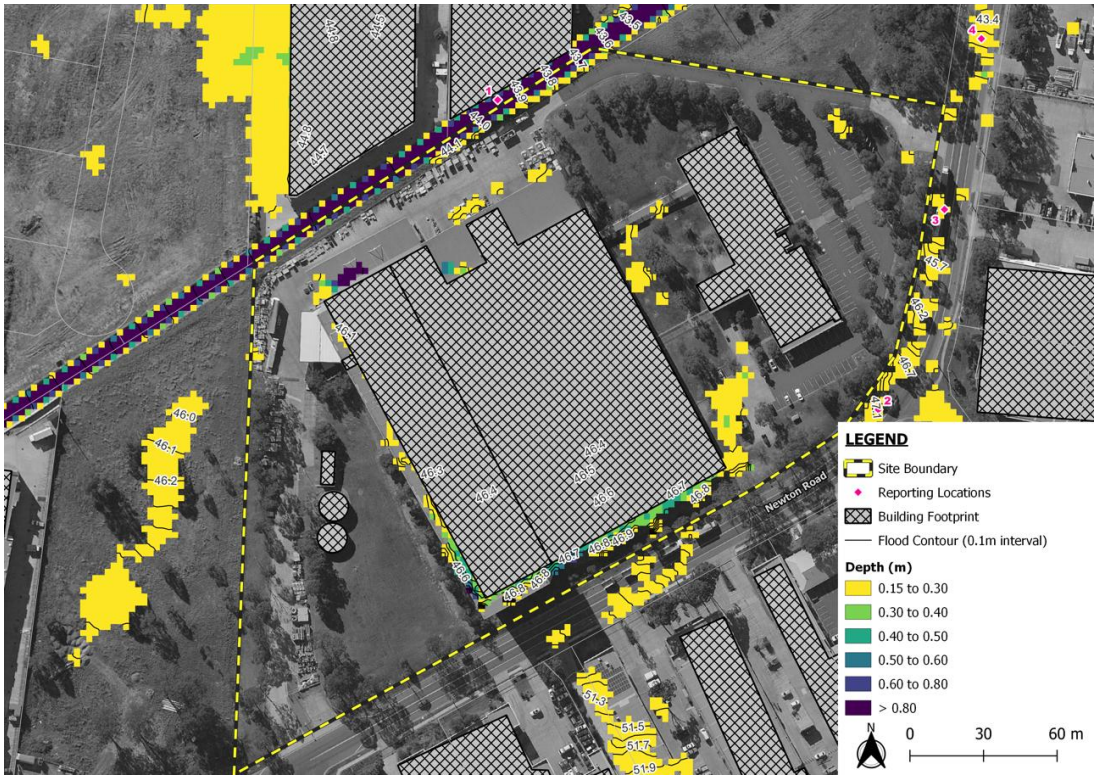


Figure 7.3 - Flood Depth Output – 5% AEP (1 in 20-year ARI), Pre-Development

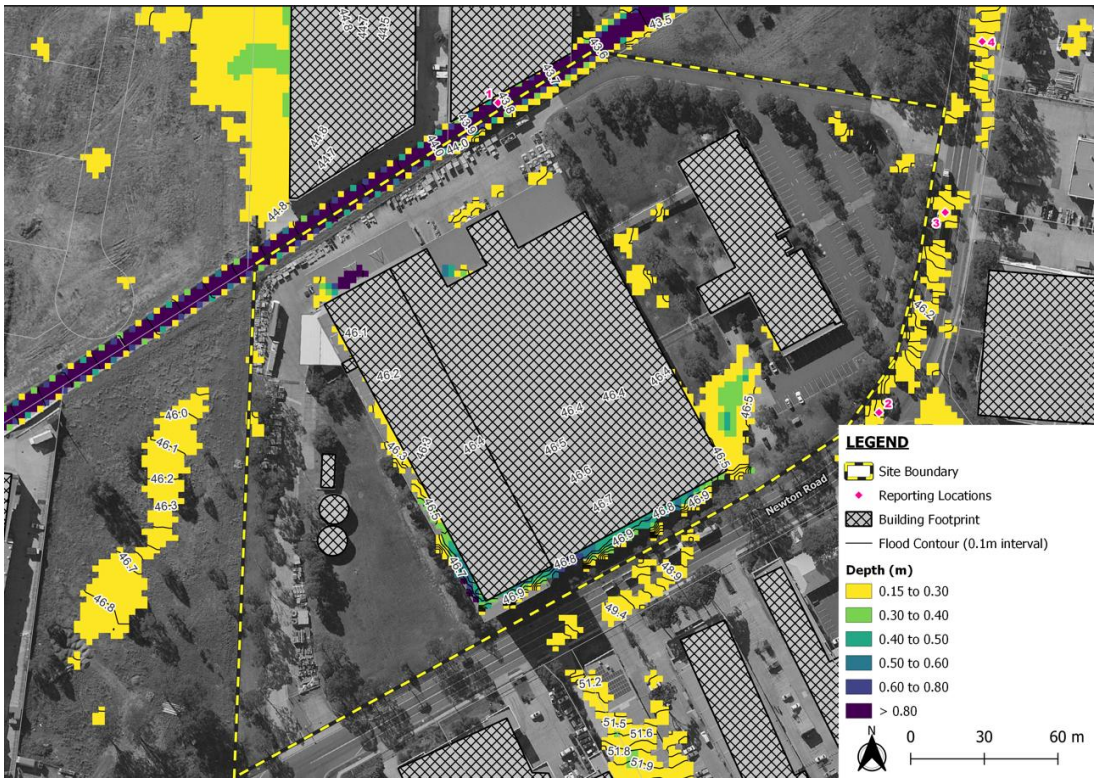


Figure 7.4 - Flood Depth Output – 1% AEP (1 in 100-year ARI), Pre-Development

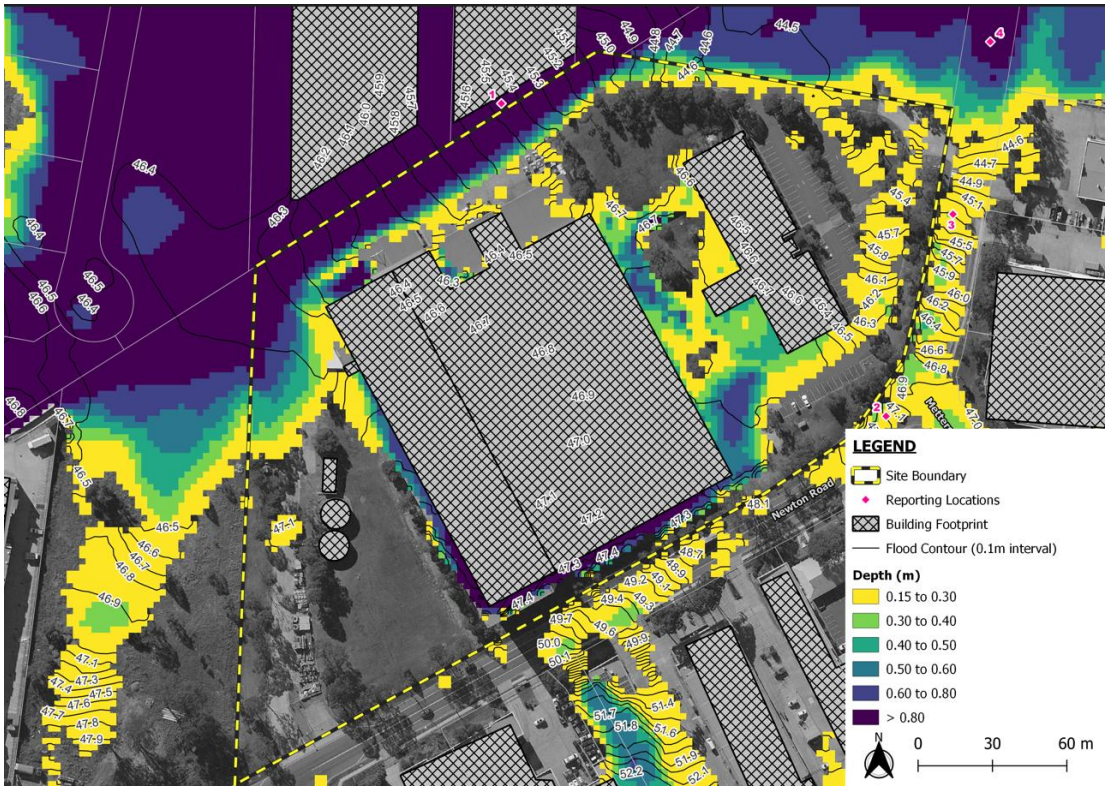


Figure 7.5 - Flood Depth Output - PMF, Pre-Development

7.3.3 Developed Site Flooding

The developed flood scenario for the 5% AEP, 1% AEP events and PMF event is shown in **Figure 7.6 to Figure 7.8**. Further details for other storms can be found in **Appendix G.**

The flood assessment shows the site is free from external flow paths in the storm events to the 0.2% AEP (1 in 500yr ARI) storm events.

The proposed internal drainage system is able to convey the required storm events to the point of discharge at the south-east corner of the development site.

Some minor areas of ponding are shown in the modelling output within the development site. These are noted to be a function of the modelling methodology, which comprises a simplified version of the proposed drainage system, in the model.

Refer to **Appendix G, Figures G16 to G30** for flood depth, velocity and hazard categorisation for post-development conditions.

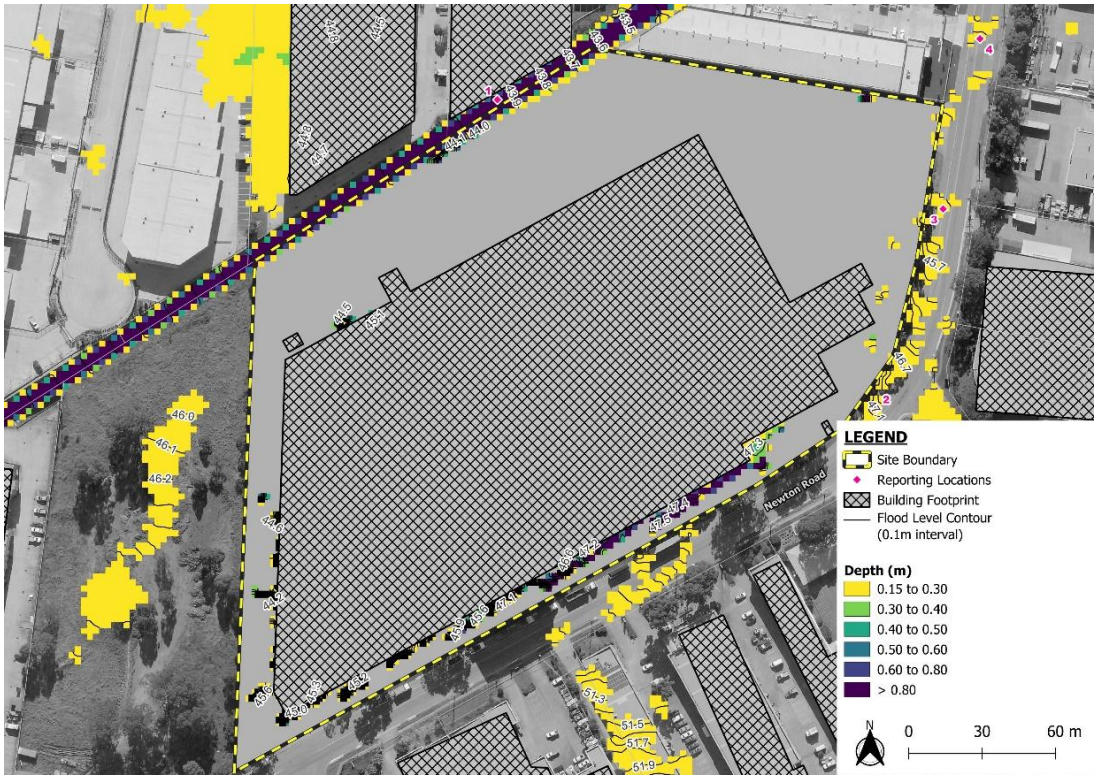


Figure 7.6 - Flood Depth Output – 5% AEP, Post Developed

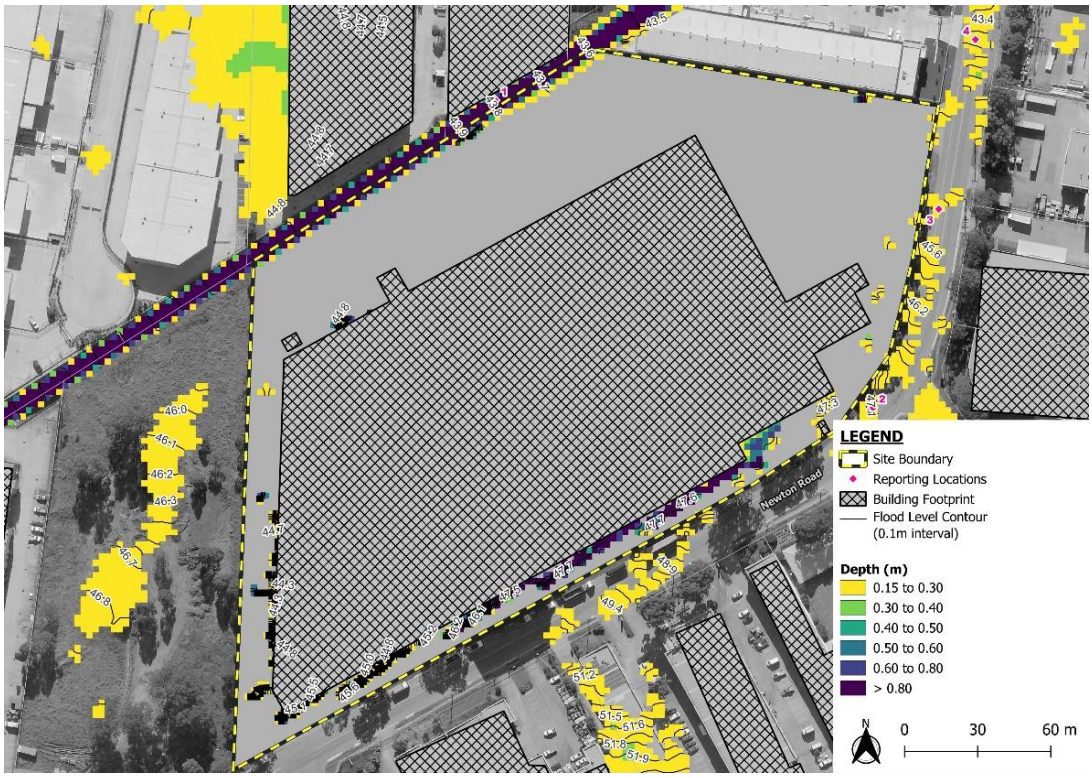


Figure 7.7 - Flood Depth Output – 1% AEP, Post Developed

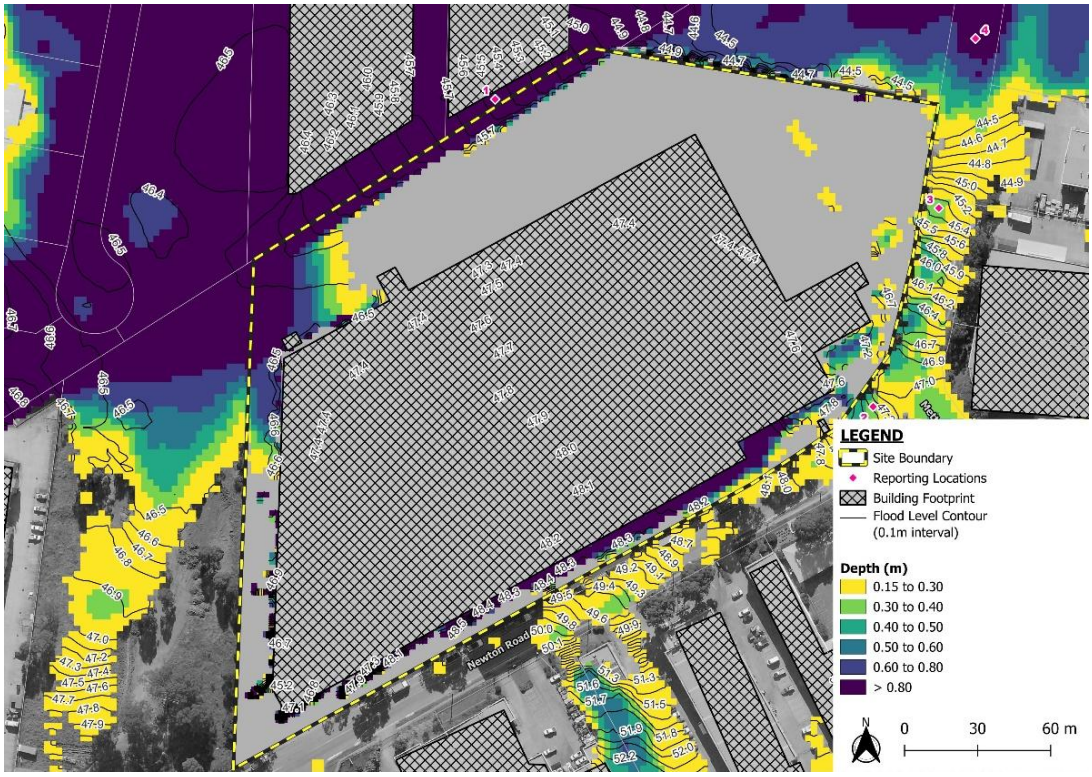


Figure 7.8 - Flood Depth Output - PMF, Post Developed

7.3.4 Flood Planning Level

The 1% AEP flood level within the trunk drainage system is RL 44.50m AHD. The flood planning level for the development is RL 45.00m AHD. This level is based on 0.5m freeboard to the noted 1% AEP flood level in the trunk drainage channel.

The development footprint is noted to be clear of flood affected areas and overland flow paths in the 1% AEP hence impact requirements are met for the development.

The proposed warehouse level is noted to be RL 47.10m AHD, hence meets requirements of flood planning and immunity.

7.3.5 Safety and Egress

Figure 7.2, **Figure 7.5** and **Figure 7.8** show the PMF flood extent.

The PMF extent can be seen to be generally clear of the development site. Due consideration to occupant safety will be necessary during the operation of the Proposal.

Inundation of areas around the site are shown in the pre and post developed conditions. It is noted that the inundation of surrounding roads would be short duration whilst heavy rainfall is also occurring (likely less than or around 30minutes). On-site refuge would be available during periods of intense rainfall and short duration overland flow.

The proposed facility should have a specific flood management plan which sets out flood warden, evacuation zones and responsible persons to be prepared prior to building occupation. The plan of management should be completed in conjunction with relevant Council and SES sub plans as required.

The NSW SES Local Controller is responsible for monitoring the flood risk over the area and for issuing flood warnings to the community. Any person or group occupying the precinct at the time of flood danger should adhere to any warnings issued. The warning message will normally be issued via SMS (phone text) by the SES. During periods of heavy or forecast heavy rainfall it is important that one or some of the occupants of a facility should be able to receive such messages. The occupants must then immediately follow the flood evacuation plan in this report or the instructions of the SES controller in the area.

7.4 Construction Impact Assessment

All construction works are noted to be clear of the 1% AEP flood extent.

As noted in **Section 2.4**, a SWMP and ESCP will be employed during construction that will ensure runoff is contained on site in accordance with the Blue Book and minimise impact to receiving waters.

Given that works are proposed clear of 1% AEP flooding and SWMP and ESCP measures will be employed, it is concluded that impact associated with flooding during construction can be mitigated.

Filling is proposed within the development site as shown on earthworks drawings **CO15039.01-DA31 and DA32**. Typical Sections have been provided on drawings **CO15039.01-DA55 and DA56** to show information including the 1% AEP extent and

levels, and the PMF levels in relation to the development. This information is provided to demonstrate the extent and minor filling in relation to the 1% AEP and PMF events adjacent to the channel.

We note filling is proposed at a distance of 3.5m from the top of bank to the open trunk drainage channel, and northern end of the site. We confirm there is no filling or loss of flood storage within the flood 1% AEP flood extent, being Councils defined flood event (DFE). There is minor filling within areas subject to the PMF flood event along the northern boundary and adjacent to the open channel. Councils prescriptive flood controls, and the NSW Floodplain Risk Management Manual 2023 do not preclude filling within the low-risk flood areas. Further, the PMF flood difference mapping shows general improvements throughout the broader floodplain in flooding during the PMF, and minor increases of 50mm or so locally to the development.

Overall, the proposal has minimal change in the PMF event (an event which has NO prescribed impact requirements), no impact in the 1% AEP event in relation to the channel and northern area of the site, and is permissible in accordance with Councils DCP Chapter 11, and Stormwater Manual 2017.

7.5 Operational Impact Assessment

As shown in **Sections 7.1 to 7.3** of this report, the development does not encroach on nor impact any flood affected areas. As such there will be no changes or impacts to existing flood conditions or impact as a result of the development. The assessment shows that there is no detrimental effect on surrounding properties due to flooding and the development.

Figure 7.9 shows flood difference (or afflux) for the 1 in 100-year ARI flood scenario.

Table 7.1 to **Table 7.4** show flood levels, flood depth, flood velocity, velocity times depth and differences for the various reporting points prepared by CSS.

The development can be seen to have no effect on surrounding roadways or adjacent properties.

Refer to **Appendix G, Figures G27 to G34**, and **Table 4.5** for flood depth difference, velocity difference between the pre and post development conditions for a range of storms which generally show either consistent pre and post development values or minor reductions offsite.

Figure 7.9 - Flood Afflux – 1 in 100 year

Figure 7.10 - Reporting Point Locations

Table 7.1 - Pre and Post Development Flood Levels

Reporting Location	Water Level (mAHD)								
	1% AEP			5% AEP			0.2% AEP		
	Existing	Developed	Difference	Existing	Developed	Difference	Existing	Developed	Difference
1	43.81	43.83	-0.02	43.95	43.97	-0.02	43.99	43.99	0.01
2	47.08	47.10	-0.01	47.06	47.07	-0.01	47.10	47.11	-0.01
3	45.15	45.16	0.00	45.14	45.14	0.00	45.17	45.18	0.00
4	43.55	43.55	-0.01	43.53	43.53	0.00	43.57	43.58	-0.01
5	43.20	43.21	-0.01	43.11	43.12	-0.01	43.40	43.40	0.00
6	43.19	43.19	0.00	42.85	42.86	-0.02	43.43	43.43	0.00
7	42.09	42.10	-0.01	41.95	41.95	-0.01	42.32	42.33	0.00

Reporting Location	Water Level (mAHD)					
	0.5% AEP			PMF		
	Existing	Developed	Difference	Existing	Developed	Difference
1	43.83	43.83	0.00	45.45	45.46	0.00
2	47.09	47.10	-0.01	47.19	47.10	0.09
3	45.16	45.17	0.00	45.28	45.20	0.08
4	43.56	43.56	-0.01	44.46	44.46	0.00
5	43.30	43.30	0.00	44.45	44.46	-0.01
6	43.30	43.30	0.00	44.61	44.61	-0.01
7	42.18	42.19	-0.01	43.47	43.48	-0.01

Table 7.2 - Pre and Post Development Flood Depth

Reporting Location	Depth (m)									
	1% AEP		5% AEP		0.2% AEP		0.5% AEP		PMF	
	Existing	Developed	Existing	Developed	Existing	Developed	Existing	Developed	Existing	Developed
1	1.89	1.92	2.03	2.07	2.10	2.10	1.94	1.95	3.55	3.55
2	0.10	0.09	0.09	0.07	0.12	0.10	0.11	0.10	0.31	0.16
3	0.12	0.13	0.11	0.10	0.14	0.16	0.13	0.14	0.33	0.26
4	0.14	0.14	0.12	0.11	0.16	0.18	0.15	0.16	1.05	1.06
5	0.34	0.35	0.25	0.26	0.54	0.55	0.44	0.44	1.58	1.59
6	0.51	0.52	0.16	0.20	0.75	0.76	0.63	0.63	1.92	1.93
7	0.63	0.64	0.48	0.46	0.86	0.87	0.72	0.73	2.00	2.00

Table 7.3 - Pre and Post Development Flood Velocity

Reporting Location	Velocity (m/s)								
	1% AEP			5% AEP			0.2% AEP		
	Existing	Developed	Difference	Existing	Developed	Difference	Existing	Developed	Difference
1	5.92	5.95	0.03	4.91	4.92	0.01	7.12	7.09	-0.02
2	1.15	1.14	-0.01	1.08	1.07	-0.01	1.14	1.16	0.02
3	1.32	1.29	-0.02	1.27	1.20	-0.07	1.43	1.40	-0.03
4	1.42	1.38	-0.04	1.34	1.34	0.00	1.52	1.49	-0.03
5	0.57	0.53	-0.04	0.47	0.45	-0.02	0.66	0.62	-0.04
6	0.47	0.46	-0.01	0.38	0.37	-0.01	0.50	0.50	0.00
7	0.17	0.16	-0.01	0.14	0.14	0.00	0.35	0.35	0.00

Reporting Location	Velocity (m/s)					
	0.5% AEP			PMF		
	Existing	Developed	Difference	Existing	Developed	Difference
1	6.67	6.66	-0.01	8.00	8.00	0.00
2	1.15	1.15	-0.01	1.65	1.74	0.09
3	1.37	1.33	-0.03	1.95	2.28	0.33
4	1.48	1.44	-0.03	2.18	2.49	0.30
5	0.61	0.57	-0.04	1.22	1.20	-0.02
6	0.46	0.45	-0.01	1.62	1.60	-0.02
7	0.28	0.27	0.00	0.42	0.42	0.00

Table 7.4 - Pre and Post Development Flood Velocity Times Depth

Reporting Location	Velocity Depth Product (m2/s)								
	1% AEP			5% AEP			0.2% AEP		
	Existing	Developed	Difference	Existing	Developed	Difference	Existing	Developed	Difference
1	11.54	11.46	-0.08	10.59	10.52	-0.08	15.11	15.12	0.00
2	0.13	0.12	-0.01	0.10	0.09	-0.01	0.15	0.14	-0.01
3	0.15	0.14	-0.01	0.13	0.12	-0.01	0.20	0.19	-0.01
4	0.20	0.19	-0.02	0.16	0.15	-0.01	0.25	0.24	-0.02
5	0.16	0.15	-0.02	0.12	0.11	-0.01	0.20	0.19	-0.02
6	0.15	0.14	0.00	0.05	0.05	0.00	0.38	0.38	0.00
7	0.10	0.10	0.00	0.04	0.04	0.00	0.30	0.30	0.00

Reporting Location	Velocity Depth Product (m2/s)					
	0.5% AEP			PMF		
	Existing	Developed	Difference	Existing	Developed	Difference
1	13.14	13.15	0.01	28.42	28.40	-0.02
2	0.14	0.13	-0.01	0.37	0.54	0.17
3	0.17	0.16	-0.01	0.48	0.74	0.26
4	0.22	0.21	-0.02	0.64	0.93	0.29
5	0.18	0.16	-0.02	1.36	1.28	-0.08
6	0.25	0.25	0.00	3.12	3.07	-0.05
7	0.20	0.20	0.00	0.67	0.67	0.00

7.6 Climate Change

An assessment has been undertaken for the effect of climate change on the development. The assessment takes into consideration potential effect from increased rainfall intensity and sea level rise.

The effect on development has been assessed for a 10-15% increase in rainfall intensity utilising the 0.5% AEP and 0.2% AEP flood event as proxies for climate change. This increase is considered representative of potential climate change impacts for the Western Sydney area (being consistent with projected rainfall increases in accordance with the New South Wales Department of Environment and Climate Change (DECC) 'Floodplain Risk Management Guideline Practical Consideration of Climate Change' (Table 1, October 2007). Modelling has been undertaken for the 0.5% AEP and 0.2% AEP and flood afflux results are shown in **Figure 7.11** & **Figure 7.12**.

This assessment shows that the proposed stormwater drainage system and stormwater management systems would have sufficient capacity to manage the increased peak flows and water volume with minor increase in hydraulic grade line and peak water levels. We confirm the increase in rainfall intensities will achieve the required minimum 0.5m freeboard to the proposed entry locations and building levels in relation to local overland flow paths in and around the Proposal as included in the modelled flood conditions.

The site is situated well upstream from any tidally influenced receiving waters including expected potential sea level rise of 0.3m. We confirm the development will not affect or be affected by potential sea level rise due to the plan distance and height differences from any tidally influenced water bodies.

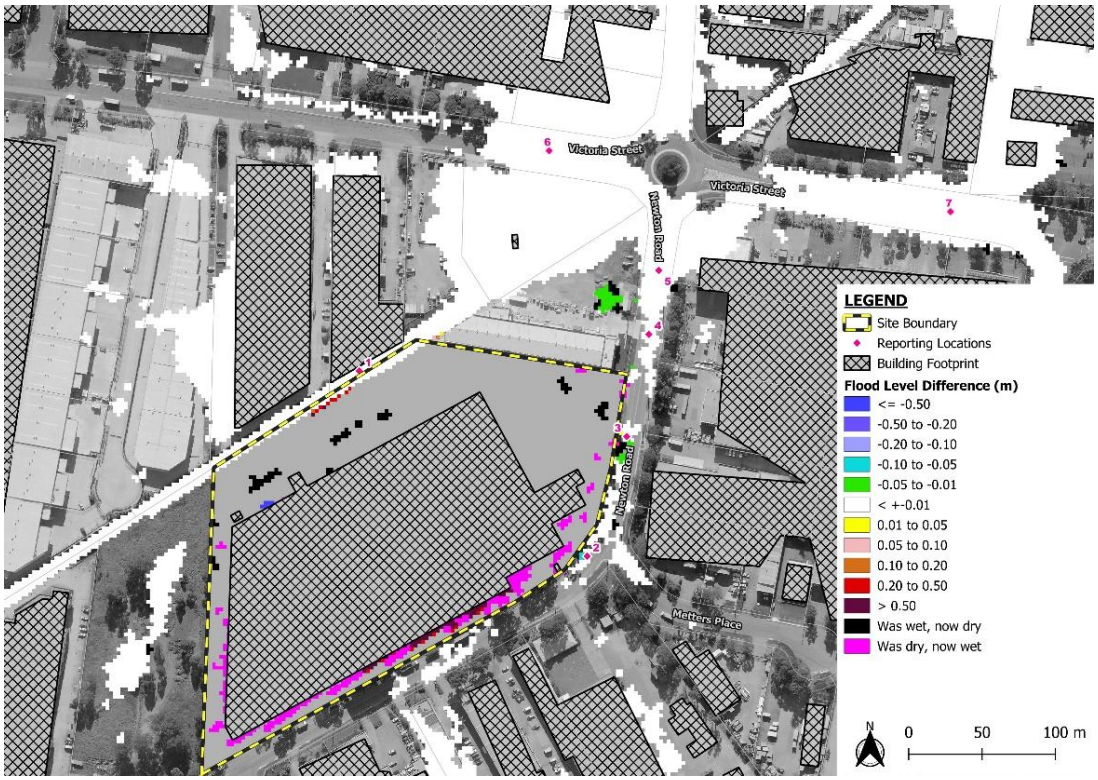


Figure 7.11 - 0.5% AEP Post Developed Flood Level Afflux

Figure 7.12 - 0.2% AEP Post Developed Flood Level Afflux

7.7 Confirmation of DCP Criteria

The following section provides responses to *the Fairfield City Council 2024 DCP Chapter 11 – Flood Risk Management - Schedule 4* for the items outlined in **Figure 7.13**, for an industrial development in a medium risk flood zone.

Three Tributaries /Canley Corridor /Prospect Creek/Cabramatta Creek /Georges River/Other Floodplains

Flood Risk Category	Land Use Risk Category	Planning Controls							
		Floor Level	Building Components	Structural Soundness	Flood Effects	Car Parking & Driveway Access	Evacuation	Management & Design	Fencing
Low Flood Risk	Critical Uses & Facilities								
	Sensitive and Hazardous Development	3	2	3	2	1, 3, 5, 6, 7	2, 3, 4	4, 5	
	Subdivision				2		5	1	
	Residential	2, 6, 7	1	2	2	1, 3, 5, 6, 7	2, 3		
	Commercial & Industrial	5, 6, 7	1	2	2	1, 3, 5, 6, 7	1 or 2, 3	2, 3, 5	
	Tourist Related Development	2, 6, 7	1	2	2	1, 3, 5, 6, 7	2, 3	2, 3, 5	
	Recreation & Non-Urban	1, 6	1	2	2	2, 3, 4, 6, 7	4, 3	2, 3, 5	
	Concessional Development	4, 7	1	2	2	6, 7, 8	2, 3	2, 3, 5	
Medium Flood Risk	Critical Uses & Facilities								
	Sensitive & Hazardous Development								
	Subdivision				1		5	1	1, 2, 3
	Residential	2, 6, 7	1	2	2	1, 3, 5, 6, 7	2, 3		1, 2, 3
	Commercial & Industrial	5, 6, 7	1	2	2	1, 3, 5, 6, 7	1, 3	2, 3, 5	1, 2, 3
	Tourist Related Development	2, 6, 7	1	2	2	1, 3, 5, 6, 7	2, 3	2, 3, 5	1, 2, 3
	Recreation & Non-Urban	1, 6	1	2	2	2, 3, 4, 6, 7	4, 3	2, 3, 5	1, 2, 3
	Concessional Development	4, 7	1	2	2	6, 7, 8	2, 3	2, 3, 5	1, 2, 3

Figure 7.13 - Schedule 4 Prescriptive Planning Controls

Confirmation of the DCP criteria is provided in Table 7.5. Overall compliance with the relevant Council DCP items including stormwater management, flooding, levels and earthworks, remain consistent between the assessed development and proposed revised layout.

Table 7.5. Relevant DCP Control and Response

No.	Control	Response
Floor Level		
5	The level of habitable floor areas is to be equal to or greater than the 100 year flood level plus freeboard. If this level is impractical for a development in a E1, E2, MU1 or E3 zone, the floor level should be as high as possible.	The flood planning level for the building is RL 45.0m AHD, based on the 1% AEP flood level within the trunk drainage system of RL 44.5m AHD plus 0.5m of freeboard. The proposed floor level of the warehouse and offices is RL 47.1m (i.e. 2.1m above the flood planning level). The proposed flood level achieves the requirements of Control 5.
6	Non-habitable floor levels to be equal to or greater than the 100 year flood level	The flood planning level for the building is RL 45.0m AHD, based on

No.	Control	Response
	plus freeboard where possible, or otherwise no lower than the 20 year flood level unless justified by a site specific assessment.	the 1% AEP flood level within the trunk drainage system of RL 44.5m AHD plus 0.5m of freeboard. The proposed floor level of the warehouse and offices is RL 47.1m (i.e. 2.1m above the flood planning level). The proposed flood level achieves the requirements of Control 6.
7	A restriction is to be placed on the title of the land, pursuant to S.88B of the Conveyancing Act, where the lowest habitable floor area is elevated more than 1.5m above finished ground level, confirming that the undercroft area is not to be enclosed.	There are no parts of the building that are elevated more than 1.5m above the finished ground level. This control is not applicable to the development.
Building Component		
1	All structures to have *flood compatible building components* below the 1% AEP flood level plus freeboard.	No buildings or other structures are proposed below the flood planning level, as such there are no requirement for the use of flood compatible building components on the development. Refer to Sections 6, 7, 8 and 13 on CRC drawing CO15039.01-DA56 for confirmation of the 1% AEP flood level in relation to the development and the development hardstand.
Structural Soundness		
2	Applicant to demonstrate that the structure can withstand the forces of floodwater, debris and buoyancy up to and including a 100 year flood plus freeboard, or a PMF if required to satisfy evacuation criteria (see below). An engineer's report may be required.	No buildings or other structures are proposed below the flood planning level, as such no requirement for the provision of an engineer's report or certification relating to forces of water is required. Refer to Sections 6, 7, 8 and 13 on CRC drawing CO15039.01-DA56 for confirmation of the 1% AEP flood level in relation to the development and the development hardstand.
Flood Effects		

No.	Control	Response
2	The flood impact of the development is to be considered to ensure that the development will not increase flood effects elsewhere, having regard to: (i) loss of flood storage; (ii) changes in flood levels and velocities caused by alterations to the flood conveyance; and (iii) the cumulative impact of multiple potential developments in the floodplain. An engineer's report may be required.	A detailed flood impact and risk assessment has been included in Section 7 of the CRC report. Section 7.5 specifically discusses impact in regard to the development. Noting the development does not encroach the 1% AEP flood extent, the assessment shows that in the 1% AEP event there is no loss of flood storage, minor offsite changes in flood levels result (less than or equal to 10mm) and there is no cumulative impact due to the development (noting also that the development is within a fully urbanised area).
Carparks, Access and Driveways		
1	The minimum surface level of open car parking spaces or carports shall be as high as practical, and not below: (i) the 20 year flood level; or (ii) the level of the crest of the road at the location where the site has access: (which ever is the lower). In the case of garages, the minimum surface level shall be as high as practical, but no lower than the 20 year flood level.	The level of the proposed car parking areas are all noted to be above the 1% AEP and generally above the PMF level. Given the carpark levels are all higher than the 1% AEP event, the requirement of Control 1 have been achieved.
3	Garages capable of accommodating more than 3 motor vehicles on land zoned for urban purposes, or enclosed car parking, must be protected from inundation by floods equal to or greater than the 100 year flood.	There are no proposed garages as part of the application. This control is not application to the application, however we note that (as outlined in Control 1 above) the parking areas are all above the 1% AEP event, hence the requirements of this control have been achieved.
5	Where the level of the driveway providing access between the road and parking space is lower than 0.3m below the 100 year flood, the following condition must be satisfied: • The depth of inundation on the driveway during a 100 year flood shall not be greater than the larger of: (i) the depth at the road; and (ii) the depth at	The levels of all driveways are noted to be higher than 0.3m above the 1% AEP flood event. The requirement of this control have been achieved.

No.	Control	Response
	the car parking space. A lesser standard may be accepted for single detached dwelling houses where it can be demonstrated that the risk to human life would not be compromised.	
6	Enclosed car parking and car parking areas accommodating more than 3 vehicles (other than on Rural zoned land), with a floor level below the 20 year flood level or more than 0.8m below the 100 year flood level, shall have adequate warning systems, signage and exits.	There are no proposed basements or enclosed parking areas. This control is not application to the application.
7	Restraints or vehicle barriers to be provided to prevent floating vehicles leaving a site during a 100 year flood.	The parking areas are all above the 1% AEP water level, as such this requirement is not applicable to the application.
Evacuation		
1	Reliable access for pedestrians or vehicles required during a 100 year flood	Access to and from the site remains consistent with the existing industrial use on the land. Reliable access is available to pedestrians and vehicles (during a 1% AEP event) via Newton Road toward the south-west. Access is also noted to be available to the north-east of the site (also in Newton Road), however this part of Newton Road is noted to have low hazard (H1) overland flow affectation.
3	The development is to be consistent with any relevant flood evacuation strategy or similar plan.	The application will result in similar flood risks to current conditions on the property, and evacuation would be available consistent with Fairfield City Council and SES flood response plans.
Management and Design		
2	Site Emergency Response Flood Plan required where floor levels are below the design floor level, (except for single dwelling-houses).	No floor levels are proposed below the design floor level. A site emergency response plan would not be required based on the requirements of this control.
3	Applicant to demonstrate that area is available to store goods above the 1% AEP flood level plus 500mmfreeboard.	The building floor level (where storage of goods is proposed) is noted to be

No.	Control	Response
		2.1m above the 1% AEP flood level plus 0.5m freeboard. Refer to Sections 6, 7, 8 and 13 on CRC drawing CO15039.01-DA56 for confirmation of the 1% AEP flood level in relation to the development and the development hardstand.
5	No storage of materials below the design floor level which may cause pollution or be potentially hazardous during any flood.	As noted for Control 3, storage of goods will be within an area which is 2.1m above the flood planning level. The PMF level (RL46.1m AHD) within the trunk drainage channel is also noted to be below the building and storage floor level. Based on storage being undertaken within the building then the requirements of this condition have been met.
Fencing		
1	Fencing within a High Flood Risk area, Boundary of Significant Flow or floodway will not be permitted except for permeable open type fences.	No fencing is proposed within high-risk areas or significant flow or floodway zones.
2	Fencing is to be constructed in a manner that does not obstruct the flow of floodwaters so as to have an adverse impact on flooding.	Fencing will typically comprise chain mesh or similar open construction that will not have adverse impact on flooding.
3	Fencing shall be constructed to withstand the forces of floodwaters or collapse in a controlled manner so as not to obstruct the flow of water, become unsafe during times of flood or become moving debris.	Fencing will be permeable, open type fences that can withstand floodwater if required. We note that fencing would generally be higher than the 1% AEP flood level with a 0.5m freeboard allowance.

7.8 Flooding Conclusion

Flood modelling has been undertaken by Fairfield City Council preferred flood modellers, *Catchment Simulation Solutions*. The assessment utilised Councils existing flood model, to then compare the post development flood scenario and to confirm the effect of the development on flooding.

The assessment shows that the proposed design allows for the conveyance of the existing flow paths without impact from the development.

The modelling shows that the site is free from external overland flow path. Further, that buildings are able to achieve sufficient flood immunity and safety within the precinct as a result of the proposed stormwater management strategy and stormwater management measures recommended to be included in the concept.

The assessment also confirms that the development will be free of flooding from the existing flow paths allowing for a minimum freeboard to the 1% AEP flood level of 500mm.

The assessment confirms that the proposed development meets councils flooding policy and the NSW Floodplain Manual 2023 recommendations. We confirm that no upstream, downstream or adjacent properties are adversely affected as a result of the development and the CSS modelling confirms acceptable flood management has been provided for the development.

8 CONSTRUCTION SOIL AND WATER MANAGEMENT

8.1 Soil and Water Management General

Without any mitigation measures and during typical construction activities, site runoff would be expected to convey a significant sediment load. A *Soil and Water Management Plan* (SWMP) and *Erosion and Sediment Control Plan* (ESCP), or equivalent, would be implemented for the construction of the Proposal. The SWMP and ESCPs would be developed in accordance with the principles and requirements of *Managing Urban Stormwater – Soils & Construction Volume 1 ('Blue Book') (Landcom, 2004)* with a staged approach.

In accordance with the principles included in the Blue Book, a number of controls have been incorporated into a preliminary Staged ESCP (refer to accompanying Drawings in **Appendix A**) and draft SWMP in **Appendix C.** The Staged ESCP considers initial site establishment, requirements during construction of development and, completion of development works.

Section 1 provides a summary of the construction works for the Proposal. While all construction activities have the potential to impact on water quality, the key activities are:

- Erosion and sediment control installation.
- Grading of existing earthworks to suit building layout, drainage layout and pavements.
- Stormwater and drainage works.
- Service installation works.
- Building construction works.

The sections below outline the proposed controls for management of erosion and sedimentation during construction of the Proposal. The staged approach is noted to consider initial site establishment, construction of the development and the completion of the development, as included in the ESCP drawings **Appendix A.**

8.2 Typical Management Measures

Sediment Basin

A sediment basin has been sized (based on 5 day 85th percentile rainfall) and located to ensure sediment concentrations in site runoff are within acceptable limits. Preliminary basin sizes have been calculated in accordance with the Blue Book and are based on 'Type D' soils. These soils contain a significant proportion of fine (<0.005mm) "dispersible" materials that will never settle unless flocculated.

Sediment basins for 'Type D' soils are typically wet basins which are pumped out following a rainfall event when suspended solids concentrations of less than 50 mg/L have been achieved.

Refer drawing **CO15039.01-DA20** for details of the proposed sediment basins, per the Blue Book Guidelines Section 6.3.3.

Sediment Fences & Diversion Drains

Sediment fences and diversion drains are located around the perimeter of the site to ensure no untreated runoff leaves the site. They have also been located around the existing drainage channels and proposed stockpiles on the site to minimise sediment migration into waterways and sediment basins.

Stabilised Site Access

For the proposal, stabilised site access is proposed at one location at the entry to the works area. This will limit the risk of sediment being transported onto Newton Road and other public roads.

8.3 Other Management Measures

Other management measures that will be employed are expected to include:

- Minimising the extent of disturbed areas across the site at any one time.
- Progressive stabilisation of disturbed areas or previously completed earthworks to suit the proposal once trimming works are complete.
- Regular monitoring and implementation of remedial works to maintain the efficiency of all controls.

It is noted that the controls included in the preliminary ESCP are expected to be reviewed and updated as the design, staging and construction methodology is further developed for the Proposal.

9 CONCLUSION

This Civil Engineering Report has been prepared to support the Development Application for a Proposed Development at 88 Newton Road, Wetherill Park, NSW.

A civil engineering strategy for the site has been developed which provides a best practice solution within the constraints of the existing landform and proposed development layout. Within this strategy a quality management strategy has been developed to consider peak flows and reduce pollutant loads in stormwater leaving this site. The stormwater quantity and on-site detention has been considered and determined to not be required for this proposed development. The stormwater management for the development has been designed in accordance with Fairfield City Council requirements and ensuring acceptable impacts relating to the development.

During the construction phase, an Erosion and Sediment Control Plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

During the operational phase of the development, a treatment train incorporating the use of a proprietary filtration system is proposed to mitigate any increase in stormwater pollutant load generated by the development. MUSIC modelling results indicate that the proposed STM are effective in reducing pollutant loads in stormwater discharging from the site and meet the requirements of Council's pollution reduction targets. Best management practices have been applied to the development to ensure that the quality of stormwater runoff is not detrimental to the receiving environment.

It is recommended the management strategies in this report be approved and incorporated into the future detailed design.

10 REFERENCES

- Managing Urban Stormwater: Source Control – 1998 (NSW EPA);
- Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);
- Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM);
- Fairfield City Council Citywide Development Control Plan - 2013.
- Stormwater Management Policy - 2017 (Fairfield City Council)
- Specification for Roadworks and Drainage associated with subdivision or other development Policy 0-60 (2011), Fairfield City Council
- Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004; and
- Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book, Landcom

11 APPENDICES

APPENDIX A
COSTIN ROE CONSULTING DRAWINGS

PROPOSED SINGLE LEVEL WAREHOUSE

88 NEWTON ROAD, WETHERILL PARK NSW 2164

DEVELOPMENT APPLICATION PACKAGE

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C015039.01-DA 10	DRAWING LIST & GENERAL NOTES
C015039.01-DA 11	GENERAL NOTES-SHEET 2
C015039.01-DA 15	EXISTING SERVICES PLAN
C015039.01-DA 20	EROSION AND SEDIMENT CONTROL PLAN
C015039.01-DA 25	EROSION AND SEDIMENT CONTROL DETAILS
C015039.01-DA 31	CONCEPT BULK EARTHWORKS PLAN-SHEET 1
C015039.01-DA 32	CONCEPT BULK EARTHWORKS PLAN-SHEET 2
C015039.01-DA 35	BULK EARTHWORKS SECTIONS - SHEET 1
C015039.01-DA 36	BULK EARTHWORKS SECTIONS - SHEET 2
C015039.01-DA 40	DRAWING KEY PLAN
C015039.01-DA 41	CONCEPT STORMWATER DRAINAGE PLAN-SHEET 1
C015039.01-DA 42	CONCEPT STORMWATER DRAINAGE PLAN-SHEET 2
C015039.01-DA 44	STORMWATER CATCHMENT PLAN- MUSIC MODEL
C015039.01-DA 45	CONCEPT STORMWATER DETAILS - SHEET 1
C015039.01-DA 46	CONCEPT STORMWATER DETAILS - SHEET 2
C015039.01-DA 51	FINISHED LEVELS PLAN - SHEET 1
C015039.01-DA 52	FINISHED LEVELS PLAN - SHEET 2
C015039.01-DA 55	TYPICAL SECTIONS - SHEET 1
C015039.01-DA 56	TYPICAL SECTIONS - SHEET 2
C015039.01-DA 57	TYPICAL SECTIONS - SHEET 3

GENERAL NOTES:

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
2. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.
3. ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE. ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS. ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT. REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.
4. DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
5. UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.
6. ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND IT'S SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.

LOCALITY PLAN
NTS

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	C
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA10

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CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: DRAWING LIST & GENERAL NOTES

DRAWING NO: C015039.01-DA10 ISSUE: C

SITE PREPARATION NOTES:

1. ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL _______________ PROVIDED BY ____________ DATED __________.
2. EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY LTS SURVEYORS TITLED 51145 001DT DATED12.10.20.
3. STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED.
4. COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
5. PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION.
6. AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
7. SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
8. IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
9. ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 mm SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% RETAINED ON THE 37.5 mm SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 mm SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION
10. ALL THE EARTHWORKS UNDERTAKEN AND THE SUBGRADE CONDITION IN THE CUT AREAS [IN THE STATED PERIOD] ARE DOCUMENTED IN THE REPORTS AND HAVE BEEN UNDERTAKEN IN ACCORDANCE WITH THE SPECIFICATION (EG. COSTIN ROE SITE PREPARATION NOTES IN DWG C013003.01-EWC10)
11. PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
12. EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
13. MATCH EXISTING LEVELS AT BATTER INTERFACE.
14. CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.
15. DURING EARTHWORKS THE CONTRACTOR IS TO ENSURE ALL AREAS ARE FREE DRAINING & WILL NOT RETAIN WATER DURING RAINFALL. PROVIDE TEMPORARY MEASURES AS REQUIRED TO ENSURE FREE FLOWING RUNOFF THROUGH MANAGED DRAINAGE PATHS, DIVERSION DRAINS OR OTHER SUITABLE DISPOSAL METHOD AS AGREED DURING THE WORKS. REFER ANY CONCERNS TO THE ENGINEER. REFER TO EROSION AND SEDIMENT CONTROL DRAWINGS AND NOTES.

SURVEY NOTE:

1. EXISTING SITE LEVELS AND DETAILS BASED ON A PLAN OF SURVEY '51145 001DT' BY 'LTS SURVEYORS' DATED 12.10.2020.

CONTAMINATION NOTE:

CONTAMINATED MATERIAL ENCOUNTERED DURING THE WORKS SHALL BE MANAGED IN ACCORDANCE WITH THE CONTAMINATION MANAGEMENT PLAN, WHICH FORMS PART OF THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN. A CAPPING LAYER CONSISTING OF CLEAN COMPACTED CLAY FILL (VENM ONLY) TO A MINIMUM DEPTH OF 100mm IS TO BE PROVIDED OVER THE SITE. CONTAMINATED MATERIAL CAN NOT BE REMOVED FOR OFF-SITE DISPOSAL.

DUST CONTROL NOTES:

1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE DUST CONTROL MEASURES ARE APPLIED AND MAINTAINED IN ACCORDANCE WITH THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN.
2. THE APPLICATION OF LIQUID BASED DUST SUPPRESSION MEASURES MUST BE SUCH THAT SEDIMENT LADEN RUNOFF RESULTING FROM SUCH MEASURES DOES NOT CREATE A TRAFFIC OR ENVIRONMENTAL HAZARD. (EG USING HAY BALES)
3. DUST GENERATION ASSOCIATED WITH WIND EROSION TO BE CONTROLLED USING WATER TRUCKS, DUST SUPPRESSING FOG, MIST GENERATORS, SEALANT PLACED OVER THE SOIL, SURFACE ROUGHENING OR RE-VEGETATION.
4. THE FOLLOWING ACTIVITIES SHALL BE ADOPTED, IF NECESSARY, TO MANAGE DUST CONTROL ON SITE:
   - LIMITING THE AREA OF SOIL DISTURBANCE AT ANY GIVEN TIME
   - REPLACING TOPSOIL AFTER COMPLETION OF EARTHWORKS.
   - PROGRAMMING WORK TO MINIMISE THE LIFE OF STOCKPILES.
   - TEMPORARILY STABILISING LONG-TERM STOCKPILES.
   - GRAVELLING UNSEALED ACCESS AND HAUL ROADS.
   - MINIMISING TRAFFIC MOVEMENT ON EXPOSED SURFACES.
   - LIMITING VEHICULAR TRAFFIC TO 15km/h.
   - RETAINING EXISTING VEGETATION AS WIND BREAKS.
5. OIL, LANDFILL GAS CONDENSATE OR ANY CONTAMINATED LEACHATE OR STORMWATER IS NOT TO BE USED FOR DUST SUPPRESSION.

EROSION CONTROL NOTES:

ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.

1. SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
2. HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER, PRIOR TO COMMENCEMENT OF EARTHWORKS, IMMEDIATELY AFTER CLEARING OF VEGETATION AND BEFORE REMOVAL OF TOP SOIL.
3. ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED AND MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
4. CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
5. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
6. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING, TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE, APPROVED LOCATION.
7. ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
8. ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
9. ALL FILL AREAS ARE TO BE LEFT WITH A BUND AT THE TOP OF THE SLOPE AT THE END OF EACH DAYS EARTHWORKS. THE HEIGHT OF THE BUND SHALL BE A MINIMUM OF 200mm.
10. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
11. AFTER REVEGETATION OF THE SITE IS COMPLETE AND THE SITE IS STABLE IN THE OPINION OF A SUITABLY QUALIFIED PERSON ALL TEMPORARY WORK SUCH AS SILT FENCE, DIVERSION DRAINS ETC SHALL BE REMOVED.
12. ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
13. ANY AREA THAT IS NOT APPROVED BY THE CONTRACT ADMINISTRATOR FOR CLEARING OR DISTURBANCE BY THE CONTRACTOR'S ACTIVITIES SHALL BE CLEARLY MARKED AND SIGN POSTED, FENCED OFF OR OTHERWISE APPROPRIATELY PROTECTED AGAINST ANY SUCH DISTURBANCE.
14. ALL STOCKPILE SITES SHALL BE SITUATED IN AREAS APPROVED FOR SUCH USE BY THE SITE MANAGER. A 6m BUFFER ZONE SHALL EXIST BETWEEN STOCKPILE SITES AND ANY STREAM OR FLOW PATH. ALL STOCKPILES SHALL BE ADEQUATELY PROTECTED FROM EROSION AND CONTAMINATION OF THE SURROUNDING AREA BY USE OF THE MEASURES APPROVED IN THE EROSION AND SEDIMENTATION CONTROL PLAN.
15. ACCESS AND EXIT AREAS SHALL INCLUDE SHAKE-DOWN OR OTHER METHODS APPROVED BY THE SITE MANAGER FOR THE REMOVAL OF SOIL MATERIALS FORM MOTOR VEHICLES.
16. THE CONTRACTOR IS TO ENSURE RUNOFF FROM ALL AREAS WHERE THE NATURAL SURFACE IS DISTURBED BY CONSTRUCTION, INCLUDING ACCESS ROADS, DEPOT AND STOCKPILE SITES, SHALL BE FREE OF POLLUTANTS BEFORE IT IS EITHER DISPERSED TO STABLE AREAS OR DIRECTED TO NATURAL WATERCOURSES.
17. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SLOPES, CROWNS AND DRAINS ON ALL EXCAVATIONS AND EMBANKMENTS TO ENSURE SATISFACTORY DRAINAGE AT ALL TIMES WATER SHALL NOT BE ALLOWED TO POND ON THE WORKS UNLESS SUCH PONDING IS PART OF AN APPROVED ESCP / SWMP.

SEDIMENT CONTROL BASIN NOTES:

1. TYPE D BASIN IS REQUIRED.
2. VOLUME OF THE BASINS SHALL BE AS NOMINATED ON DRAWING. NOMINAL POND LOCATIONS AND NOMINAL DIMENSIONS.
3. SEDIMENT BUILD UP TO NOT EXCEED 33% TOTAL CAPACITY OF BASIN.
4. DEWATERING OF BASIN TO BE PERFORMED TO THE BOTTOM OF THE SEDIMENT SETTLING ZONE FOLLOWING ACHIEVEMENT OF WQO's. MANAGEMENT OF DOSAGE AND DISCHARGE TO BE ACHIEVED WITHIN 5 DAYS OF THE INITIAL RAINFALL EVENT.
5. FOLLOWING DEWATERING PER NOTE 4, WATER LEVEL TO BE MAINTAINED AT 20% CAPACITY AFTER A FOUR DAY SETTLING PERIOD FOLLOWING A STORM EVENT.
6. WATER TO BE DOSED WITH GYPSUM TO ACCELERATE SETTLEMENT OF SUSPENDED SOLIDS AS REQUIRED.
7. GYPSUM DOSAGE RATE TO BE APPLIED AT APPROX. 32kg PER 100 CUBIC METRE OF COLLECTED RUNOFF.
8. THE USE OF ALUM (OR ANY OTHER ALTERNATIVE) AS A FLOCCULANT IS NOT RECOMMENDED. ALUM OR ANY OTHER FLOCCULANT IS TO BE USED ONLY FOLLOWING CONSULTATION WITH AND ACCEPTANCE FROM COUNCIL ESC OFFICERS.
9. DISCHARGE FROM POND IS PERMISSIBLE WHEN THE WATER PH IS 6.5-8.5 AND IS CLARIFIED TO AT OR BELOW A TSS OF 50mg/L. CLARIFICATION WOULD GENERALLY BE ACHIEVED IN 36-72 HOURS WITH THE USE OF GYPSUM. CORRELATION TESTS MUST BE UNDERTAKEN ON SITE TO ENSURE THIS IS ACHIEVED.
10. DEWATERING SHALL BE DONE IN SUCH A MANNER AS TO REMOVE THE CLEAN WATER (BEING WATER WITHIN THE ADOPTED CRITERIA) WITHOUT REMOVING OR DISTURBING THE SEDIMENT THAT HAS SETTLED. THE PUMP INTAKE PIPE IS NOT TO REST ON THE SETTLED SEDIMENT LAYER.
11. IF WATER EXCEEDS TSS OF 50mg/L DURING DEWATERING, PUMPING IS TO CEASE. RECORDS ARE TO BE KEPT (ON-SITE AT ALL TIMES) OF ALL MEASUREMENT PRIOR TO, DURING AND AFTER DISCHARGE. RECORDS TO BE MADE AVAILABLE TO COUNCIL OFFICERS UPON REQUEST.
12. PROVIDE SECURITY FENCE TO BASIN FOR SAFETY.

SEDIMENTATION BASIN NOTES:

1. REFER TO SEDIMENT & EROSION CONTROL NOTES.
2. FOR SEDIMENT AND EROSION CONTROL DETAILS, REFER TO THE LANDCOM 'BLUE BOOK' AND EXTRACTS ON DRAWING DA20.
3. SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWAER-THE BLUE BOOK'. CAPACITY BASED ON 5-DAY RAINFALL DEPTHS AT 85th PERCENTILE INTENSITY (32.2mm) IN THE LIVERPOOL CATCHMENT AREA.

NOTES:

1. ASSUME TYPE D SOIL (CLAY/SILTY CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)
3. REFER TO DRAWING DA20 FOR SEDIMENTATION BASIN CALCULATIONS

TABLE 1 - STABILISATION REQUIREMENTS AND TREATMENT METHODS

DURING CONSTRUCTION - TEMPORARY STABILISATION (DURING PERIODS OF INACTIVITY OR WHEN WORKS ARE ON HOLD)

LANDS	STABILISATION REQUIREMENT	TIMEFRAMES	TREATMENT METHODS - PRODUCTS	REMARKS
ALL LANDS	C-FACTOR = 0.15 (50% EQUIVALENT GROUND COVER[1]	APPLIES AFTER 20 WORKING DAYS OF INACTIVITY (EVEN THOUGH WORKS MIGHT CONTINUE LATER)	SOIL BINDER (I.E VITAL P47/STONEWALL OR EQUIVALENT[1])	- SPRAY ALL SURFACES WITH VITAL P47/STONEWALL OR EQUIVALENT[1]. - VITAL DILUTION RATE = 1:10(VITAL:WATER). -RE-APPLY/MAINTAIN AS NECESSARY (APPROX. EVERY 3-6 MONTHS WITHOUT SUITABLE VEGETATION COVER) TO ENSURE THE REQUIRED COVER IS PROVIDED.
			GEOTEXTILE, JUTE MATTING, BLACK PLASTIC OR EQUIVALENT[1]	- COVER ALL EXPOSED SOILS. - RE-APPLY/MAINTAIN AS NECESSARY TO ENSURE THE REQUIRED COVER IS PROVIDED.
WATERWAYS, DRAINAGE LINES AND CONCENTRATED FLOW AREAS	C-FACTOR = 0.05 (70% GRASS COVER OR EQUIVALENT GROUND COVER[1]	APPLIES AFTER 10 WORKING DAYS FROM COMPLETION OF FORMATION AND BEFORE THEY ARE ALLOWED TO CARRY CONCENTRATED FLOWS.	REFER TO THE DRAIN SPECIFICATIONS DETAILED ON THE PLAN FOR SPECIFIC LINING/STABILISATION REQUIREMENTS. EXAMPLE TREATMENT METHODS ARE SHOWN BELOW.	
			TEMPORARY LINING - GEOTEXTILE (I.E. BIDIM A24 OR EQUIVALENT[1])	- COMPLETE ANY SUBSOIL TREATMENT BEFORE LAYING THE MATTING. - INSTALL MATTING IN ACCORDANCE WITH SD 5-7. - RE-APPLY/MAINTAIN AS NECESSARY TO ENSURE THE REQUIRED COVER IS PROVIDED.
			JUTE MESH, SEEDING AND SOIL BINDER (I.E. VITAL P47/STONEWALL OR EQUIVALENT[1]) - LOW FLOWS TO MODERATE	- COMPLETE SUBSOIL TREATMENT (I.E. GYPSUM LIGHTLY RIPPED INTO SUBGRADE AT A RATE OF 5 TONNES/Ha). - PLACE TOPSOIL TO A DEPTH OF AT LEAST 75mm. - COMPLETE ANY FERTILISATION AND SEEDING BEFORE LAYING THE MATTING. - INSTALL MATTING IN ACCORDANCE WITH SD 5-7. - SPRAY ALL SURFACES WITH VITAL P47/STONEWALL OR EQUIVALENT[1]. - VITAL DILUTION RATE = 1L / m^2 OF DILUTED VITAL MIXTURE. - RE-APPLY/MAINTAIN AS NECESSARY TO ENSURE THE REQUIRED COVER IS PERMANENTLY MAINTAINED.
			JUTE MATTING (~350gsm) AND SEEDING OR EQUIVALENT[1]) - LOW FLOWS TO MODERATE	- COMPLETE SUBSOIL TREATMENT (I.E. GYPSUM LIGHTLY RIPPED INTO SUBGRADE AT A RATE OF 5TONNES/Ha). - PLACE TOPSOIL TO A DEPTH OF AT LEAST 75mm. - COMPLETE ANY FERTILISATION AND SEEDING BEFORE LAYING THE MATTING. - INSTALL MATTING IN ACCORDANCE WITH SD 5-7. - RE-APPLY/MAINTAIN AS NECESSARY TO ENSURE THE REQUIRED COVER IS PERMANENTLY MAINTAINED.
			TURF REINFORCEMENT MATTING (TRM) (E.G. TERRAMAT OR EQUIVALENT[1]) - MODERATE FLOWS	- COMPLETE SUBSOIL TREATMENT (I.E. GYPSUM LIGHTLY RIPPED INTO SUBGRADE AT A RATE OF 5TONNES/Ha). - PLACE TOPSOIL TO A DEPTH OF AT LEAST 75mm. - COMPLETE ANY FERTILISATION AND SEEDING BEFORE LAYING THE MATTING. - INSTALL MATTING IN ACCORDANCE WITH SD 5-7. - RE-APPLY/MAINTAIN AS NECESSARY TO ENSURE THE REQUIRED COVER IS PERMANENTLY MAINTAINED.
			ROCK LINING - HIGH FLOWS	- COMPLETE SUBSOIL TREATMENT (I.E. GYPSUM LIGHTLY RIPPED INTO SUBGRADE AT A RATE OF 5TONNES/Ha). - INSTALL GEOTEXTILE UNDERLAY (IF SPECIFIED) IN ACCORDANCE WITH SD 5-7. - INSTALL ROCK ARMOURING (TO THE DEPTH AND SIZE AS SPECIFIED ON THE PLAN). - RE-APPLY/MAINTAIN AS NECESSARY TO ENSURE THE REQUIRED COVER IS PROVIDED.
STOCKPILES	C-FACTOR = 0.10 (60% GRASS COVER OR EQUIVALENT GROUND COVER[1]	APPLIES AFTER 10 WORKING DAYS FROM COMPLETION OF FORMATION	SEEDING AND SOIL BINDER (I.E. VITAL P47/STONEWALL OR EQUIVALENT[1])	- APPLY SEED TO ALL STOCKPILE SURFACES (NOTE: SEEDING MAY NOT BE REQUIRED IF EXISTING SEEDBED IS PRESENT). -SPRAY ALL STOCKPILE SURFACES WITH VITAL P47/STONEWALL OR EQUIVALENT[1]. - VITAL DILUTION RATE = 1:10 (VITAL:WATER). - APPLICATION RATE = 1L / m2 OF DILUTED VITAL MIXTURE. - RE-APPLY/MAINTAIN AS NECESSARY TO ENSURE THE REQUIRED COVER IS PERMANENTLY MAINTAINED.
			GEOTEXTILE, JUTE MATTING, BLACK PLASTIC OR EQUIVALENT[1]	- COVER ALL EXPOSED SOILS. - RE-APPLY/MAINTAIN AS NECESSARY TO ENSURE THE REQUIRED COVER IS PROVIDED.
GENERAL SURFACES	C-FACTOR = 0.10 / 0.05 (60% / 70% GRASS COVER OR EQUIVALENT GROUND COVER[1]	C-FACTOR = 0.1 APPLIES AFTER 10 WORKING DAYS FROM COMPLETION OF FORMATION AND C-FACTOR = 0.05 APPLIES WITHIN A FURTHER 60 DAYS	TOPSOIL, SEEDING AND SOIL BINDER (I.E. VITAL P47/STONEWALL OR EQUIVALENT[1])	- REFER TO SD 7-1 - COMPLETE SUBSOIL TREATMENT (I.E. GYPSUM LIGHTLY RIPPED INTO SUBGRADE AT A RATE OF 5TONNES/Ha). - PLACE GYPSUM TREATED TOPSOIL TO A DEPTH OF AT LEAST 75mm. - APPLY ANY FERTILISERS REQUIRED. - APPLY SEED TO ALL SURFACES. - SPRAY ALL SURFACES WITH VITAL P47/STONEWALL OR EQUIVALENT[1]. - VITAL DILUTION RATE = 1:10 (VITAL:WATER). - APPLICATION RATE = 1L / m2 OF DILUTED VITAL MIXTURE. - RE-APPLY/MAINTAIN AS NECESSARY TO ENSURE THE REQUIRED COVER IS PERMANENTLY MAINTAINED.
			HYDROMULCH OR EQUIVALENT[1]	- REFER TO SD 7-1 - COMPLETE SUBSOIL TREATMENT (I.E. GYPSUM LIGHTLY RIPPED INTO SUBGRADE AT A RATE OF 5TONNES/Ha). - PLACE GYPSUM TREATED TOPSOIL TO A DEPTH OF AT LEAST 75mm. - APPLY HYDROMULCH WITH APPROVED SEED MIX TO SOIL SURFACE. - RE-APPLY/MAINTAIN AS NECESSARY TO ENSURE THE REQUIRED COVER IS PERMANENTLY MAINTAINED.

[1] - EQUIVALENT COVER/PRODUCT MUST ACHIEVE THE EQUIVALENT C-FACTOR WITH PROVEN RESEARCH/DOCUMENTATION TO VERIFY THIS.
STANDARD DRAWINGS REFERENCED CAN BE LOCATED IN THE 'SOILS & CONSTRUCTION, MANAGING URBAN STORMWATER - VOLUME 1' BOOK BY LANDCOM. ALTERNATIVE DETAILS MAY BE SOUGHT IN CONSULTATION WITH THE ENGINEER

TABLE 2 - LIMITATIONS TO ACCESS DURING CONSTRUCTION

LAND USE	LIMITATION	REMARKS
CONSTRUCTION AREAS	LIMITED TO 5 (PREFERABLE 2) METRES FROM THE EDGE OF ANY ESSENTIAL CONSTRUCTION ACTIVITY AS SHOWN ON ENGINEERING PLANS.	ALL SITE WORKERS SHOULD CLEARLY RECOGNISE THESE AREAS THAT, WHERE APPROPRIATE, ARE IDENTIFIED WITH BARRIER FENCING (UPSLOPE) AND SEDIMENT FENCE (DOWNSLOPE) OR SIMILAR MATERIALS.
ACCESS CORRIDORS	LIMITED TO A MAXIMUM WIDTH OF 7 METERS	THE SITE MANAGER WILL DETERMINE AND MARK THE LOCATION OF THESE ZONES ON SITE, THEY CAN VARY IN POSITION SO AS TO BEST CONSERVE EXISTING VEGETATION AND PROTECT DOWNSTREAM AREAS WHILE BEING CONSIDERATE OF THE NEEDS EFFICIENT WORKS ACTIVITIES. ALL SITE WORKERS WILL CLEARLY RECOGNISE THESE BOUNDARIES.
REMAINING LANDS, INCLUDING REVEGETATION AREA	ENTRY PROHIBITED EXCEPT FOR ESSENTIAL MANAGEMENT WORKS	THINNING OF GROWTH MIGHT BE NECESSARY, FOR EXAMPLE, FOR FIRE REDUCTION OR WEED REMOVAL.

REINFORCED EARTH RETAINING WALL NOTES:

1. ALL COMPONENTS AND INSTALLATION SHALL COMPLY WITH AS4678 AND THE STANDARDS REFERRED TO THEREIN.
2. MINIMUM HEIGHT (H) TO GEOGRID REINFORCEMENT LENGTH (L) TO BE 1.0.
3. MINIMUM BEARING CAPACITY OF FOUNDATION (BASED ON MINIMUM H/L RATIO OF 1.0) TO BE AS FOLLOWS :
   a. H MAX. 2.0m = 100 kPa
   b. H MAX. 3.5m = 150 kPa
   c. H MAX. 5.0m = 200 kPa

   BEFORE COMMENCEMENT OF CONSTRUCTION THE FOUNDATION SHALL BE INSPECTED AND VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER.
4. WHERE MINIMUM BEARING IS NOT ACHIEVABLE OR NOT MEETING DESIGN REQUIREMENT, THE FOUNDATION MATERIAL IS TO BE EXCAVATED AND REPLACED WITH APPROVED MATERIAL PLACED IN ACCORDANCE WITH THE FILLING SPECIFICATION TO A MINIMUM COMPACTION OF 100% SMDD AND PLACED WITHIN 2% OF OMC.
5. MINIMUM SURCHARGE LOADS TO BE APPLIED AS FOLLOWS U.N.O. ON PLAN:
   a. LIVE LOAD = 20 kPa
   b. DEAD LOAD = 5 kPa
   c. CONSTRUCTION TRAFFIC LIVE LOAD = 10 kPa
6. THE GEOGRIDS SHALL BE OF THE TYPE AND INDEX STRENGTH NOMINATED ON THE DRAWINGS. THE MINIMUM GEOGRIDS SHALL BE A SINGLE LENGTH IN THE DIRECTION OF DESIGN TENSION, NOT LAPPED, MAKING PROVISION FOR CONNECTION TO THE FACING ACROSS THE WHOLE WIDTH OF THE FACING AND PROVIDING FOR THE SPECIFIED ANCHORAGE WITHIN THE DESIGNATED ANCHORAGE ZONE. GEOGRIDS SHALL COVER THE WHOLE OF THE PLAN AREA BEHIND THE WALL FOR THE SPECIFIED ANCHORAGE LENGTH AND SHALL BE LAPPED WITH ADJACENT SECTIONS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
7. MINIMUM WALL EMBEDMENT AT THE TOE OF THE WALL TO BE 300mm.
8. DESIGN LIFE OF STRUCTURE IS TO BE 100 YEARS.
9. SELECT BACKFILL MATERIAL WITHIN THE REINFORCED SOIL BLOCK SHALL BE SOUND GRANULAR MATERIAL OF NATURAL OR INDUSTRIAL ORIGIN, NON-EXPANSIVE, FREE FROM ORGANIC OR OTHER DELETERIOUS MATERIAL CONFORMING TO THE PHYSICAL, CHEMICAL AND ELECTROCHEMICAL LIMITS AS SPECIFIED AND SHALL NOT BE SUBJECT TO BREAKDOWN UNDER COMPACTION. THE SELECT BACKFILL MATERIAL IS TO HAVE THE FOLLOWING PARAMETERS:
   a. MINIMUM INTERNAL FRICTION, Ø = 34°
   b. EFFECTIVE COHESION, C'= 0 kPa
   c. UNIT WEIGHT = 21 kN/m^3
   d. PH BETWEEN 4 AND 9.
10. SELECT BACKFILL IS TO BE PLACED AND COMPACTED IN LAYERS NOT MORE THAN 300mm (LOOSE). COMPACTION TO NOT LESS THAN 100% SMDD WILL BE ACHIEVED AND MATERIAL PLACED WITHIN 2% OF OMC. DENSITY TESTING SHALL BE PERFORMED IN EACH COMPACTED LIFT IN ACCORDANCE WITH AS3798.
11. PROVIDE A DRAINAGE LAYER DIRECTLY BEHIND THE FACING UNITS IN A MINIMUM 300mm WIDE 12-20mm AGGREGATE LAYER. FACING UNIT VOIDS TO BE FILLED WITH AGGREGATE. PROVIDE 100mm MINIMUM AG. DRAIN IN GEOTEXTILE SOCK AT TOE OF WALL FACING AND CONNECT TO DRAINAGE SYSTEM AT 30m MAX. SPACING.
12. THE NEED FOR A CHIMNEY DRAIN OR DRAINAGE AT THE REAR OF THE MASS SOIL BLOCK IS TO BE CONFIRMED ON SITE BY THE GEOTECHNICAL ENGINEER AND DESIGNER FOLLOWING PREPARATION OF THE FOUNDATION AND PRIOR TO CONSTRUCTION OF THE MASS SOIL BLOCK.
13. CONSTRUCTION EQUIPMENT WEIGHING MORE THAN 500kG STATIC WEIGHT IS TO BE KEPT BACK 1.5m FROM THE REAR FACE OF THE WALL FACING UNITS. COMPACTION OF THE SELECT FILL MATERIAL WITHIN THE 1.5m STRIP ADJACENT TO THE WALL SHALL BE ACHIEVED BY LIGHT MECHANICAL TAMPERS (VIBRATING PLATE, TRENCH COMPACTOR OR SIMILAR) TO GIVE THE SAME DENSITY AS IN THE REMAINDER OF THE SELECT FILL.
14. ALL DESIGN AND CONSTRUCT WALL SYSTEM TO BE COMPLETED IN ACCORDANCE WITH THESE NOTES.
15. TOP OF WALL HEIGHTS ARE NOTED TO ALIGN WITH FINISHED PAVEMENT HEIGHTS. THE CONTRACTOR AND THEIR DESIGN AND CONSTRUCT WALLING CONTRACTORS ARE TO ENSURE THAT ALL WALL STRAPS ARE INSTALLED BELOW THE DESIGN EARTHWORKS SUBGRADE. CONTRACTOR TO ALLOW FOR WALL STRAPS TO BE GRADED AWAY FROM THE FACE OF THE WALL OR OTHERWISE INSTALLED TO SUIT EARTHWORKS DESIGN LEVELS AND GRADES.
16. DIFFERENTIAL SETTLEMENT NOTE:
    FUTURE BUILDING AND SERVICE DESIGNERS TO CONSIDER DIFFERENTIAL SETTLEMENT OF REINFORCED EARTH WALL BLOCK AND GENERAL FILL AREAS. PARTICULAR ATTENTION TO BE DRAWN TO HEAVILY LOADED AREAS, OR DIFFERING LOADED AREAS (INCLUDING SPRINKLER TANK AND TRUCK PAVEMENT AREAS) AND WHERE SIGNIFICANT CHANGES IN OVERALL WALL HEIGHT OR FILL AMOUNTS ARE EXPERIENCED. IT IS THE RESPONSIBILITY OF THE FUTURE DESIGNERS TO ENSURE APPROPRIATE DESIGN CONSIDERATION TO DIFFERENTIAL SETTLEMENT ARE MADE DEPENDING ON THE DESIGN ELEMENT AND INTERACTION WITH RETAINED ELEMENTS AND GENERAL FILL MATERIAL.

RETAINING WALL NOTES:

1. ALL COMPONENTS AND INSTALLATION SHALL COMPLY WITH AS4678 AND THE STANDARDS REFERRED TO THEREIN.
2. MINIMUM BEARING CAPACITY OF FOUNDATION TO BE AS FOLLOWS :
   a. H MAX. 2.0m = 100 kPa
   b. H MAX. 3.5m = 150 kPa
   c. H MAX. 5.0m = 200 kPa

   BEFORE COMMENCEMENT OF CONSTRUCTION THE FOUNDATION SHALL BE INSPECTED AND VERIFIED BY A QUALIFIED GEOTECHNICAL ENGINEER.
3. WHERE MINIMUM BEARING IS NOT ACHIEVABLE OR NOT MEETING DESIGN REQUIREMENT, THE FOUNDATION MATERIAL IS TO BE EXCAVATED AND REPLACED WITH APPROVED MATERIAL PLACED IN ACCORDANCE WITH THE FILLING SPECIFICATION TO A MINIMUM COMPACTION OF 100% SMDD AND PLACED WITHIN 2% OF OMC.
4. MINIMUM SURCHARGE LOADS TO BE APPLIED AS FOLLOWS U.N.O.
5. ON PLAN :
   a. LIVE LOAD = 20 kPa
   b. DEAD LOAD = 5 kPa
   c. CONSTRUCTION TRAFFIC LIVE LOAD = 10 kPa
6. MINIMUM WALL EMBEDMENT AT THE TOE OF THE WALL TO BE 300mm MINIMUM UNLESS NOTED OTHERWISE.
7. DESIGN LIFE OF STRUCTURE IS TO BE 100 YEARS.
8. TIED WALLS ARE TO BE TEMPORARILY PROPPED AT TOP UNTIL SUCH TIME THE TOP OF WALL IS TIED TO THE SLAB AND 28-DAY CONCRETE STRENGTH HAS BEEN ACHIEVED.
9. CONSTRUCTION EQUIPMENT WEIGHING MORE THAN 500KG STATIC WEIGHT IS TO BE KEPT BACK 1.5m FROM THE REAR FACE OF THE WALL FACING UNITS. COMPACTION OF THE SELECT FILL MATERIAL WITHIN THE 1.5m STRIP ADJACENT TO THE WALL SHALL BE ACHIEVED BY LIGHT MECHANICAL TAMPERS (VIBRATING PLATE, TRENCH COMPACTOR OR SIMILAR) TO GIVE THE SAME DENSITY AS IN THE REMAINDER OF THE SELECT FILL.
10. ALL DESIGN AND CONSTRUCT WALL SYSTEM TO BE COMPLETED IN ACCORDANCE WITH THESE NOTES.
11. WALL ELEVATIONS ALLOW FOR NOMINAL EMBEDMENT DEPTHS. WHERE DESIGN AND CONSTRUCT (D+C) WALL SYSTEMS ARE PROPOSED IT IS THE CONTACTORS RESPONSIBILITY TO ALLOW FOR THE FINAL EMBEDMENT DEPTHS AS PER THE D+C DESIGN. ALLOWANCE FOR OVERALL WALL AREAS TO CONSIDER THE FINAL EMBEDMENT DEPTH.
12. WALL ELEVATIONS AND AREAS ARE BASED ON THE VERTICAL PLAN AREA. CONTRACTOR TO ALLOW ADDITIONAL SURFACE AREA WHERE WALLS ARE NOT VERTICAL OR HAVE BACKSLOPES.

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	C
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA11

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DRAWING TITLE: GENERAL NOTES - SHEET 2

DRAWING No: C015039.01-DA11 ISSUE: C

EXISTING SERVICES NOTES:

1. DURING THE EXECUTION OF WORKS, THE CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF EXISTING SERVICES. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED TO THE EXISTING SERVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE RELEVANT SERVICE AUTHORITY, AT NO COST TO THE PRINCIPAL.
2. WHERE IT IS NECESSARY TO REMOVE, DIVERT OR CUT INTO ANY EXISTING SERVICE, THE CONTRACTOR SHALL GIVE AT LEAST THREE (3) DAYS NOTICE OF ITS REQUIREMENTS TO THE SUPERINTENDENT, WHO WILL ADVISE WHAT ARRANGEMENTS SHOULD BE MADE FOR THE ALTERATION OF SUCH EXISTING WORKS.
3. EXISTING SERVICES HAVE BEEN PLOTTED FROM SUPPLIED DATA. THE ACCURACY IS NOT GUARANTEED. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING WORK. ALL CLEARANCES AND APPROVALS SHALL ALSO BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL NEW AND EXHUMED SERVICES THAT CROSS EXISTING AND FUTURE ROADS/PAVEMENTS WITHIN THE SITE SHALL BE BACKFILLED WITH DGB20 MATERIAL TO SUBGRADE LEVEL AND COMPACTED TO 98% STANDARD DENSITY RATIO. SUBJECT TO PRIOR APPROVAL FROM RELEVANT AUTHORITY.
5. ON COMPLETION OF SERVICES INSTALLATION, ALL DISTURBED AREAS SHALL BE RESTORED TO ORIGINAL, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AREAS, GRASSED AREAS AND ROAD PAVEMENTS.
6. CARE TO BE TAKEN WHEN EXCAVATING NEAR UTILITY SERVICES. NO MECHANICAL EXCAVATION TO BE UNDERTAKEN OVER SERVICES. LIAISE WITH RELEVANT AUTHORITY.
7. THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION AND REMOVAL IF REQUIRED OF ALL EXISTING SERVICES IN AREAS AFFECTED BY THE WORKS WITHIN THE CONTRACT AREA AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT. ALL TO REGULATORY AUTHORITY STANDARDS AND APPROVAL.
8. THE CONTRACTOR IS TO MAINTAIN EXISTING STORMWATER DRAINAGE FLOWS THROUGH THE ROADS AT ALL TIMES. MAKE DUE ALLOWANCE FOR ALL SUCH FLOWS AT ALL TIMES.
9. PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL OBTAIN THE SUPERINTENDENT'S APPROVAL OF THE PROGRAM FOR THE RELOCATION/CONSTRUCTION OF TEMPORARY SERVICES.
10. CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES AS REQUIRED TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
11. INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE OR DAMAGE TO THE ADJACENT RESIDENCES. CONTRACTOR TO GAIN APPROVAL OF THE SUPERINTENDENT FOR TIME OF INTERRUPTION.
12. THE CONTRACTOR SHALL UNDERTAKE A DIAL BEFORE YOU DIG (DBYD 1100) SERVICES SEARCH BEFORE THE COMMENCEMENT OF ANY WORKS.

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON ESTATE DEISGN INFORMATION PROVIDED BY LTS SURVEYORS DATED 12.10.20 REF 51145001DT

- W – EXISTING SYDNEY WATER MAIN
- S – EXISTING SEWER MAIN
- E – EXISTING UNDERGROUND ELECTRICAL
- T – EXISTING UNDERGROUND TELECOM
- G – EXISTING GAS
- SW – EXISTING STORMWATER

EXISTING SERVICES PLAN

SCALE 1:400

4m 0 10 20 30 40m

SCALE 1:400 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	C
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT/CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF
MC	ME	FEB 24	MW	A0	AS SHOWN	C015039.01-DA15

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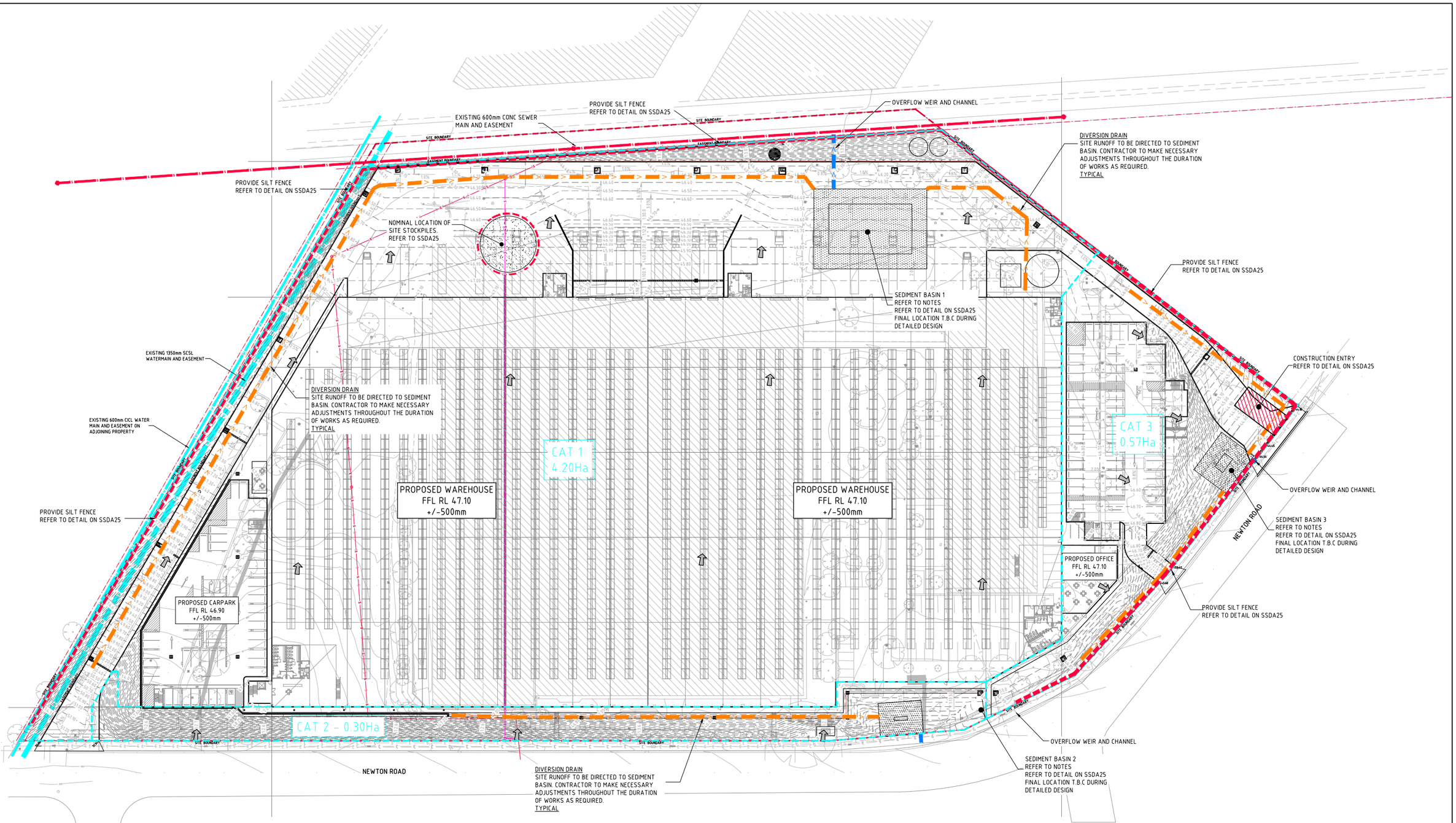
CRC COSTIN ROE CONSULTING — CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: EXISTING SERVICES PLAN

DRAWING No: C015039.01-DA 15 ISSUE: C



LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS.
TYPICAL (N.S.O.P.)

- DENOTES DIVERSION DRAIN
- DENOTES SILT FENCE WITH CATCH DRAIN
- DENOTES SILT FENCE ONLY
- CATCHMENT BOUNDARY
- DENOTES CONSTRUCTION ENTRY
- OVERLAND FLOW DIRECTION
- SEDIMENT BASIN (REFER TO PLAN)

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C015039.01-DA25.

SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK'.
CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (32.2mm).

APPROXIMATE AREA OF DISTURBED SITE = 5.07Ha

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:
1. ASSUME TYPE D SOIL (CLAY/SILTY CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

SOIL TYPE ASSESSED FROM GEOTECHNICAL REPORT PROVIDED BY XXXX TITLED XXXX DATED XXXX.

EROSION AND SEDIMENT CONTROL PLAN
SCALE 1:400

EROSION CONTROL NOTES:

REFER TO DRAWING DA11 FOR EROSION AND SEDIMENT CONTROL NOTES

SEDIMENT BASIN 1 DIMENSIONS:

CATCHMENT AREA	= 4.20 ha
DISTURBED AREA	= 4.20 ha
REQUIRED BASIN VOLUME	= 867m³
BASE DIMENSIONS (L X B)	= 25m x 15m
TOP DIMENSIONS (L X B)	= 34m x 24m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 872m³
Q10 WEIR PEAK FLOW	= 1.052m³/s
SPILLWAY WIDTH	= 4.0m
SPILLWAY DEPTH	= 0.3m

SEDIMENT BASIN 2 DIMENSIONS:

CATCHMENT AREA	= 0.30 ha
DISTURBED AREA	= 0.30 ha
REQUIRED BASIN VOLUME	= 75m³
BASE DIMENSIONS (L X B)	= 4m x 1m
TOP DIMENSIONS (L X B)	= 13m x 10m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 78m³
Q10 WEIR PEAK FLOW	= 0.091m³/s
SPILLWAY WIDTH	= 1.0m
SPILLWAY DEPTH	= 0.3m

SEDIMENT BASIN 3 DIMENSIONS:

CATCHMENT AREA	= 0.57 ha
DISTURBED AREA	= 0.57 ha
REQUIRED BASIN VOLUME	= 119m³
BASE DIMENSIONS (L X B)	= 5m x 3m
TOP DIMENSIONS (L X B)	= 14m x 12m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 119m³
Q10 WEIR PEAK FLOW	= 0.145m³/s
SPILLWAY WIDTH	= 1.0m
SPILLWAY DEPTH	= 0.3m

4m 0 10 20 30 40m
SCALE 1:400 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	D
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	C
ISSUED FOR DEVELOPMENT APPLICATION	10.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS
CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA20

CONSULT AUSTRALIA

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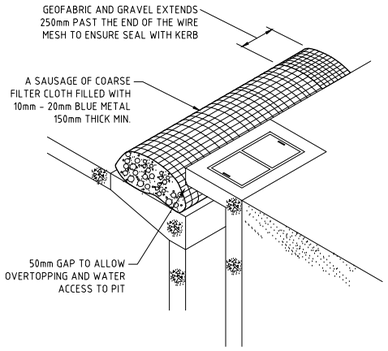
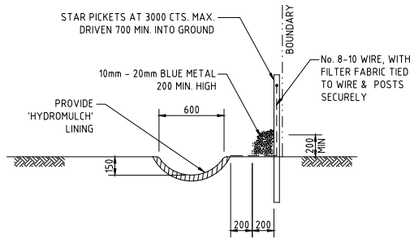
COSTIN ROE CONSULTING — CIVIL & STRUCTURAL ENGINEERS

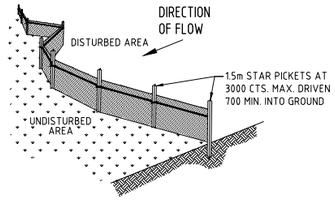
DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN
DRAWING No: C015039.01-DA 20 ISSUE: D



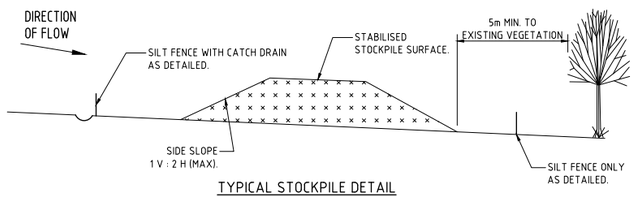
KERB INLET CONTROL
N.T.S



TYPICAL OPEN DRAIN & SILT FENCE
SCALE 1:20



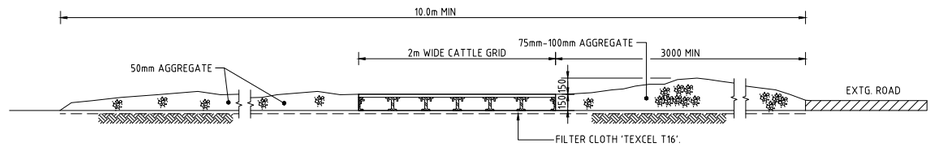
TYPICAL SILT FENCE DETAIL
N.T.S
NOTE: PROVIDE 1m RETURNS AT 30m INTERVALS. TYPICAL



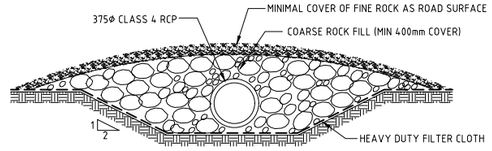
TYPICAL STOCKPILE DETAIL
N.T.S

STOCKPILE NOTES

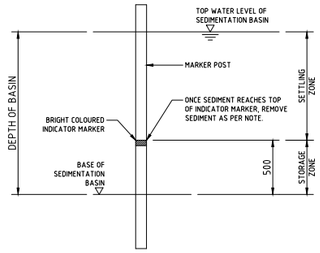
1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE USING WOOD CHIP MULCH - 16 TONNE/Ha.
5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.



SECTION 1:20 (1) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'

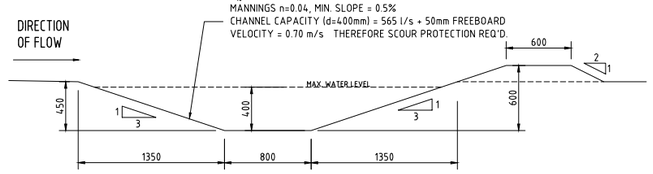


SECTION 1:20 (1)
TYPICAL CROSSING OVER DIVERSION CHANNEL



SEDIMENT STORAGE MARKER
SCALE 1:20

DIVERSION CHANNEL CAPACITY
Q_{10} = 560 l/s (A=5.0Ha MAX.)
MANNINGS n=0.04, MIN. SLOPE = 0.5%
CHANNEL CAPACITY (d=400mm) = 565 l/s + 50mm FREEBOARD
VELOCITY = 0.70 m/s THEREFORE SCOUR PROTECTION REQ'D.

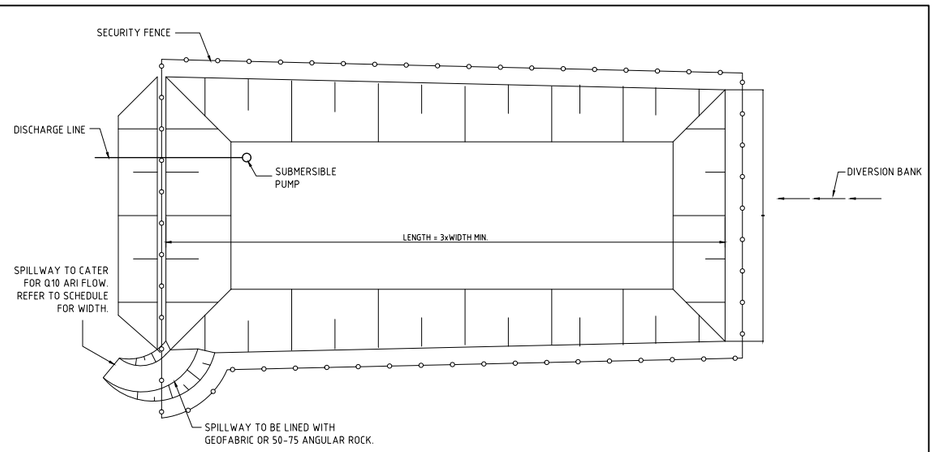


DIVERSION DRAIN SECTION -3500 WIDE
SCALE 1:20

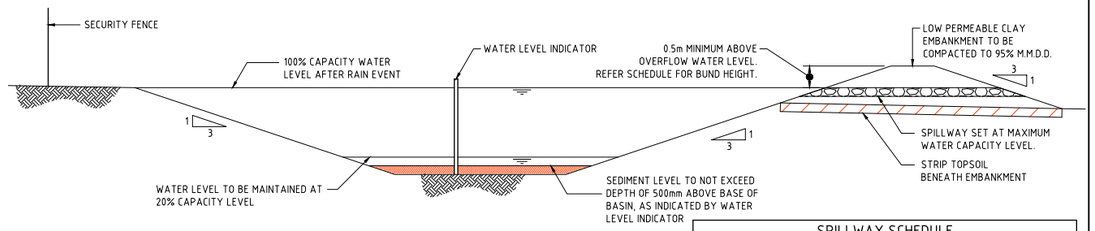
TEMPORARILY PROTECT THE SWALE FROM EROSION DURING CONSTRUCTION.

TEMPORARY DIVERSION DRAINS & EARTHEN CLEAN WATER DIVERSION DRAINS SHALL BE STABILISED BY:

a. TURF REINFORCEMENT; OR
b. GEOFABRIC LINER; OR
c. POLYMER HYDRAULIC SOIL STABILISER. DOSAGE TO BE TO MANUFACTURER'S SPECIFICATION FOR FLOW RATES NOMINATED. DOSAGE SHALL BE SUCH THAT C=0.05.



TYPICAL SEDIMENT CONTROL POND PLAN
SCALE 1:250



TYPICAL SEDIMENT CONTROL BASIN SECTION
SCALE 1:50

SPILLWAY SCHEDULE

CATCHMENT (Ha)	FLOW (m^3/s)	WIDTH (m)	FLOW DEPTH (m)	ROCK SIZE (mm)	BUND HEIGHT ABOVE SPILLWAY (m)
1	0.3	2	0.20	200	0.70
2	0.6	4	0.20	200	0.70
5	1.4	5	0.30	200	0.80
10	2.8	8	0.35	200	0.85
20	5.5	14	0.40	250	0.90
40	11.0	20	0.50	250	1.00

1. Erosion Hazard and Sediment Basins

Site Name: 74-94 Newton road

Site Location: Whetherill Park

Precinct/Stage: EROSION AND SEDIMENT CONTROLS

Other Details:

Site area	Sub-catchment or Name of Structure							Notes
	1	2	3					
Total catchment area (ha)	4.14	0.36	0.57					
Disturbed catchment area (ha)	4.14	0.36	0.57					
Soil analysis (enter sediment type if known, or laboratory particle size data)								
Sediment Type (C, F or D) if known	D	D	D					From Appendix C (if known)
% sand (fraction 0.02 to 2.00 mm)								Enter the percentage of each soil fraction. Eg. enter 10 for 10%
% silt (fraction 0.002 to 0.02 mm)								
% clay (fraction finer than 0.002 mm)								
Dispersion percentage								E.g. enter 10 for dispersion of 10%
% of whole soil dispersible								See Section 6.3.3(e). Auto-calculated
Soil Texture Group	D	D	D					Automatic calculation from above
Rainfall data								
Design rainfall depth (no of days)	5	5	5					See Section 6.3.4 and, particularly, Table 6.3 on pages 6-24 and 6-25.
Design rainfall depth (percentile)	85	85	85					
x-day, y-percentile rainfall event (mm)	32.2	32.2	32.2					
Rainfall R-factor (if known)								Only need to enter one or the other here
IFD: 2-year, 6-hour storm (if known)	10	10	10					
RUSLE Factors								
Rainfall erosivity (*R*-factor)	2210	2210	2210					Auto-filled from above
Soil erodibility (*K*-factor)	0.075	0.075	0.075					
Slope length (m)	200	100	100					
Slope gradient (%)	0.5	0.5	0.5					RUSLE LS factor calculated for a high rill/interrill ratio.
Length-gradient (*LS*-factor)	0.12	0.11	0.11					
Erosion control practice (*P*-factor)	1.3	1.3	1.3	1.3	1.3	1.3		
Ground cover (*C*-factor)	1	1	1	1	1	1		
Sediment Basin Design Criteria (for Type D/F basins only. Leave blank for Type C basins)								
Storage (soil) zone design (no of months)	2	2	2					Minimum is generally 2 months
Cv (Volumetric runoff coefficient)	0.64	0.64	0.64					See Table F2, page F-4 in Appendix F
Calculations and Type D/F Sediment Basin Volumes								
Soil loss (lha/yr)		26	23	23				
Soil Loss Class		1	1	1				See Table 4.2, page 4-13
Soil loss (m^3/ha/yr)		20	18	18				Conversion to cubic metres
Sediment basin storage (soil) volume (m^3)		14	1	2				See Sections 6.3.4(i) for calculations
Sediment basin settling (water) volume (m^3)		853	74	117				See Sections 6.3.4(i) for calculations
Sediment basin total volume (m^3)		867	75	119				

NB for sizing of Type C (coarse) sediment basins, see Worksheet 3 (if required).

2. Flow Calculations

Peak flow is given by the Rational Formula: $Q_Y = 0.00278 \times C_{10} \times F_Y \times I_{Y,\,tc} \times A$

where: Q_Y is peak flow rate (m^3/sec) of average recurrence interval (ARI) of "Y" years
C_{10} is the runoff coefficient (dimensionless) for ARI of 10 years.
F_Y is a frequency factor for "Y" years.
A is the catchment area in hectares (ha)
$I_{Y,\,tc}$ is the average rainfall intensity (mm/hr) for an ARI of "Y" years and a design duration of "tc" (minutes or hours)

Time of concentration (t_c) = $0.76 \times (A/100)^{0.38}$ hrs

Note: For urban catchments the time of concentration should be determined by more precise calculations or reduced by a factor of 50 per cent. Place an x in the appropriate row below to automatically halve the time of concentration for that sub-catchment.

Structure Details								Notes
Name	1	2	3					
Catchment Area (ha)	4.14	0.36	0.57					
Place an x here to halve tc	x	x	x					Place an x if disturbed catchment
Time of concentration (tc)	7	3	3					minutes
Rainfall Intensities								
1-year, tc	69.6	69.6	69.6					Enter the relevant rainfall intensities (in mm/hr) for each of the nominated rainfall events. The time of concentration (tc) determines the duration of the event to be used
2-year, tc	90.1	90.1	90.1					
5-year, tc	118	118	118					
10-year, tc	134	134	134					
20-year, tc	155	155	155					
50-year, tc	184	184	184					
100-year, tc	205	205	205					
C10 runoff coefficient	0.9	0.9	0.9					Use AR&R or Table F3, pg F-6
Frequency Factors								
FF, 1-year	0.8	0.8	0.8					Can use 0.8 for a construction site
FF, 2-year	0.85	0.85	0.85					Can use 0.85 for a construction
FF, 5-year	0.95	0.95	0.95					Can use 0.95 for a construction
FF, 10-year	1	1	1					Generally always 1
FF, 20-year	1.05	1.05	1.05					Can use 1.05 for a construction
FF, 50-year	1.15	1.15	1.15					Can use 1.15 for a construction
FF, 100-year	1.2	1.2	1.2					Can use 1.2 for a construction site
Flow Calculations								Notes
1-year, tc (m^3/s)	0.577	0.05	0.079					
2-year, tc (m^3/s)	0.753	0.069	0.109					
5-year, tc (m^3/s)	1.161	0.101	0.16					
10-year, tc (m^3/s)	1.388	0.121	0.191					
20-year, tc (m^3/s)	1.686	0.147	0.232					
50-year, tc (m^3/s)	2.152	0.191	0.302					
100-year, tc (m^3/s)	2.548	0.222	0.351					

NB for flow calculations on sediment basin spillways, see Worksheet 3 (if required).

3. Sediment Basin Spillway Design

Structure Details								
Structure Name	1	2	3					Auto-filled from Worksheet 1
Catchment Area (ha)	4.14	0.36	0.57					Auto-filled from Worksheet 1
Time of concentration (tc)	7	3	3					Auto-calculated assuming tc is halved
Rainfall Intensities (IFD Values)								
1 year, tc	52.51	52.51	52.51					Enter the relevant rainfall intensities (in mm/hr) for each of the nominated rainfall events. The time of concentration (tc) determines the duration of the event to be used.
2 year, tc	68.08	68.08	68.08					
5 year, tc	89.03	89.03	89.03					
10 year, tc	101.56	101.56	101.56					
20 year, tc	117.91	117.91	117.91					
50 year, tc	139.5	139.5	139.5					
100 year, tc	156.1	156.1	156.1					
C_{10} runoff coefficient	0.9	0.9	0.9					Use AR&R or Table F3, pg F-6
Design ARI event (select):	10	10	10					Select design ARI (years) from dropdown
Frequency Factor	1	1	1	#N/A	#N/A	#N/A	#N/A	Auto-filled based on selected ARI
Flow Calculation	1.052	0.091	0.145	#N/A	#N/A	#N/A	#N/A	Auto-calculated based on selected ARI

2m 0 5 10 15 20 25m
SCALE 1:250 AT A0 SIZE SHEET

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

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

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.02.25	C
ISSUED FOR INFORMATION	29.04.24	B
ISSUED FOR INFORMATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS
CLIENT: Centuria
PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164
DESIGNED: MC | DRAWN: MC | DATE: FEB 24 | CHECKED: MW | SIZE: A0 | SCALE: AS SHOWN | CAD REF: C015039.01-DA25

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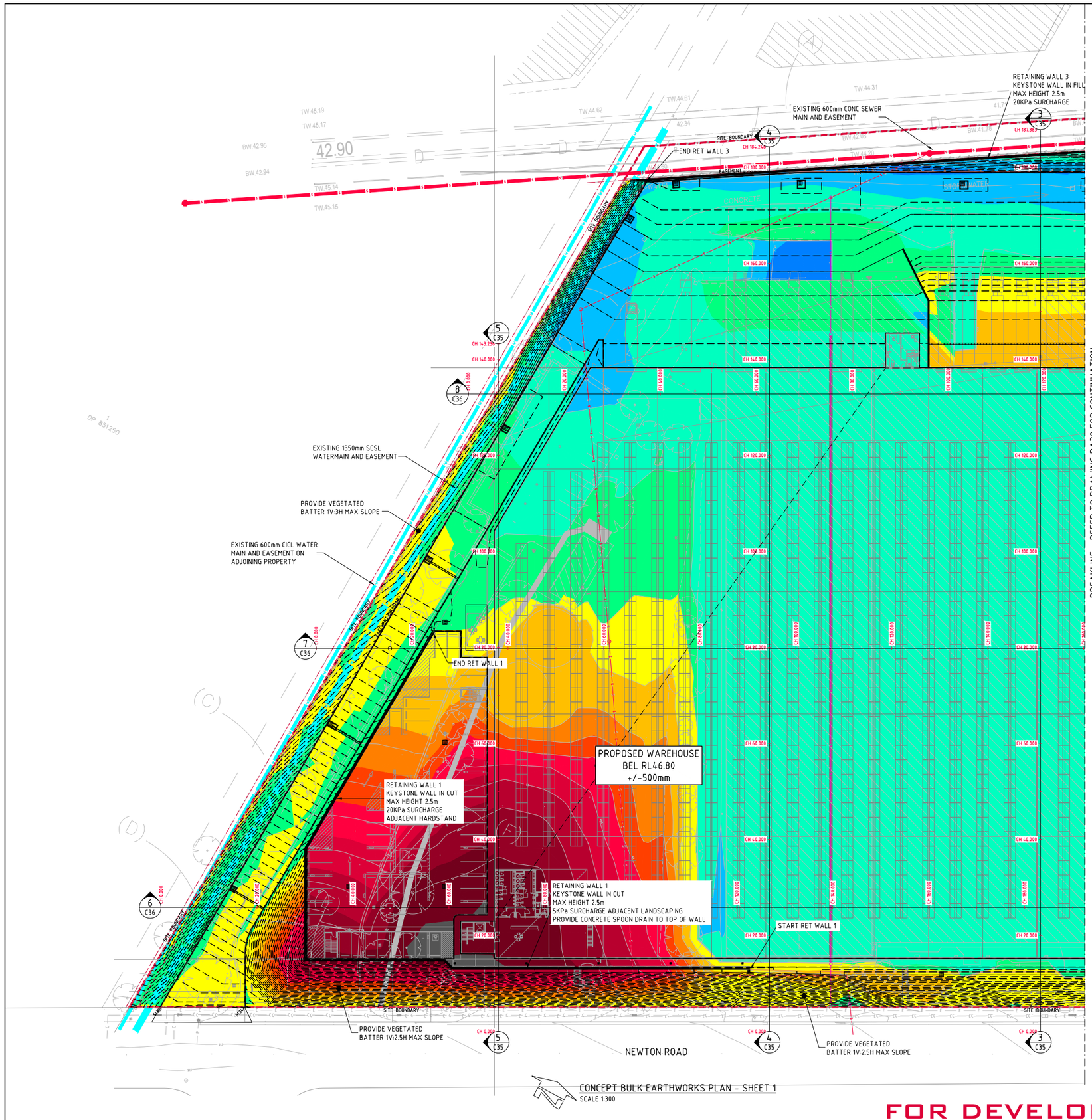
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: EROSION & SEDIMENT CONTROL DETAILS
DRAWING No: C015039.01-DA25 | ISSUE: C



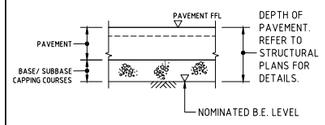
CONCEPT BULK EARTHWORKS PLAN - SHEET 1
SCALE 1:300

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS SURVEYORS DATED 12.10.20.

- 50.00 – EXISTING CONTOUR (0.2m INTERVAL)
- 50.00 – B.E.L. CONTOUR (MAJOR 1.0m)
- 50.10 – B.E.L. CONTOUR (MINOR 0.25m)
- 50.50 – B.E.L. SPOT LEVEL
- SGGP, SINGLE GRATED GULLY PIT
- W – EXISTING SYDNEY WATER MAIN
- S – EXISTING SEWER MAIN



NOMINATED B.E.L. DETAIL
NTS

SITE PREPARATION NOTES:

REFER TO DRAWING DA11 FOR SITE PREPARATION NOTES

DEPTH RANGE

No.	FROM DEPTH	TO DEPTH	COLOUR
1	-5.000	-4.500	
2	-4.500	-4.000	
3	-4.000	-3.500	
4	-3.500	-3.000	
5	-3.000	-2.500	
6	-2.500	-2.000	
7	-2.000	-1.500	
8	-1.500	-1.000	
9	-1.000	-0.500	
10	-0.500	0.000	
11	0.000	0.500	
12	0.500	1.000	
13	1.000	1.500	
14	1.500	2.000	
15	2.000	2.500	

CONCEPT EARTHWORK ESTIMATES

SITE AREA	= 5.07 Ha
DELETERIOUS MATERIAL STRIP	=(-10,100m³) (TO BE EXPORTED/REUSED) (200mm OVER 5.07 Ha)
CUT	= -15,350m³
FILL	= +28,900m³
ALLOWANCES	
DETAILED EXCAVATION (1,500m³/Ha)	= -7,600m³
DIFFERENCE	= +5,950m³ (i.e. IMPORT REQUIRED)

NOTE:
VOLUMES BASED ON 200mm DELETERIOUS MATERIAL STRIP OVER THE NOMINATED AREA. EARTHWORKS VOLUMES ARE APPROXIMATE ONLY. NO ALLOWANCE HAS BEEN MADE FOR DELETERIOUS MATERIAL, EROSION AND SEDIMENT CONTROL, BULKING OR COMPACTION OF FILLED SOILS, THE REMOVAL OF UNCONTROLLED OR CONTAMINATED MATERIAL OR ANY OTHER UNSPECIFIED EXCAVATION RELATED TO CONSTRUCTION ACTIVITIES. DETAILED EXCAVATION ALLOWANCE IS APPROXIMATE ONLY AND ACCOUNTS FOR STORMWATER/SERVICES TRENCHING AND FOUNDATIONS. THE DETAILED EXCAVATION VOLUMES ARE TO BE CONFIRMED BY THE CONTRACTOR. REFER ANY CONCERNS TO ENGINEER.

ALLOWANCES FOR STRUCTURE

	DEPTH OF PAVEMENT
INTERNAL	
WAREHOUSE	300mm
OFFICE	300mm
EXTERNAL	
HARDSTAND	300mm
CAR PARK	300mm
LANDSCAPING	300mm
PEDESTRIAN	300mm

FOR DEVELOPMENT APPLICATION

3m 0 5 10 15 20 25 30m
SCALE 1:300 AT A0 SIZE SHEET

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	D
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	C
ISSUED FOR DEVELOPMENT APPLICATION	10.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	26.03.24	A

ARCHITECT: SBA ARCHITECTS
CLIENT/CLIENT: Centuria
PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA31

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CRC COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

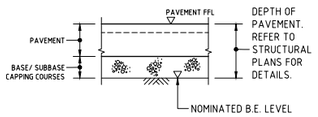
DRAWING TITLE: CONCEPT BULK EARTHWORKS PLAN SHEET 1
DRAWING No: C015039.01-DA 31
ISSUE: D

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS SURVEYORS DATED 12.10.20.

- 50.00 – EXISTING CONTOUR (0.2m INTERVAL)
- 50.00 – B.E.L. CONTOUR (MAJOR 1.0m)
- 50.10 – B.E.L. CONTOUR (MINOR 0.25m)
- 50.00 – B.E.L. SPOT LEVEL
- SGGP – SGGP, SINGLE GRATED GULLY PIT
- W – EXISTING SYDNEY WATER MAIN
- S – EXISTING SEWER MAIN



DEPTH OF PAVEMENT. REFER TO STRUCTURAL PLANS FOR DETAILS.

NOMINATED B.E.L. DETAIL
NTS

SITE PREPARATION NOTES:

REFER TO DRAWING DA11 FOR SITE PREPARATION NOTES

DEPTH RANGE			
No.	FROM DEPTH	TO DEPTH	COLOUR
1	-5.000	-4.500	
2	-4.500	-4.000	
3	-4.000	-3.500	
4	-3.500	-3.000	
5	-3.000	-2.500	
6	-2.500	-2.000	
7	-2.000	-1.500	
8	-1.500	-1.000	
9	-1.000	-0.500	
10	-0.500	0.000	
11	0.000	0.500	
12	0.500	1.000	
13	1.000	1.500	
14	1.500	2.000	
15	2.000	2.500	

ALLOWANCES FOR STRUCTURE

	DEPTH OF PAVEMENT
INTERNAL	
WAREHOUSE	300mm
OFFICE	300mm
EXTERNAL	
HARDSTAND	300mm
CAR PARK	300mm
LANDSCAPING	300mm
PEDESTRIAN	300mm

BREAKLINE – REFER TO DRAWING DA31 FOR CONTINUATION

RETAINING WALL 3
KEYSTONE WALL IN FILL
MAX HEIGHT 2.5m
20KPa SURCHARGE

START RET WALL 3

END RET WALL 1

RETAINING WALL 2
KEYSTONE WALL IN FILL
MAX HEIGHT 2.5m
20KPa SURCHARGE

START RET WALL 2

PROPOSED WAREHOUSE
BEL RL46.80
+/-500mm

PROVIDE VEGETATED BATTER 1V:2.5H MAX SLOPE

SITE BOUNDARY

EASEMENT BOUNDARY

NEWTON ROAD

DP 4 851250

BENCHMARK SSM 7...

CONCEPT BULK EARTHWORKS PLAN – SHEET 2
SCALE 1:300

3m 0 5 10 15 20 25 30m
SCALE 1:300 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

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ARCHITECT: SBA ARCHITECTS

CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA 32

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CONSULT AUSTRALIA

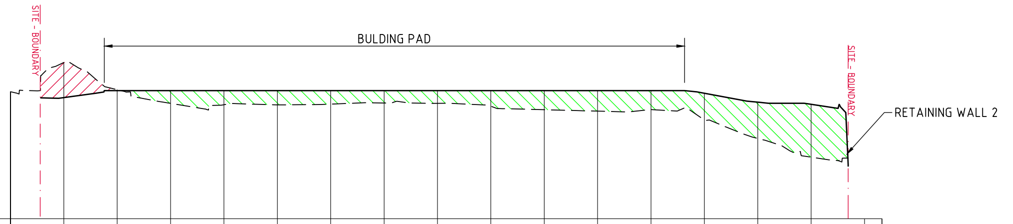
CRC COSTIN ROE CONSULTING | CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: CONCEPT BULK EARTHWORKS PLAN SHEET 2

DRAWING No: C015039.01-DA 32 ISSUE: D

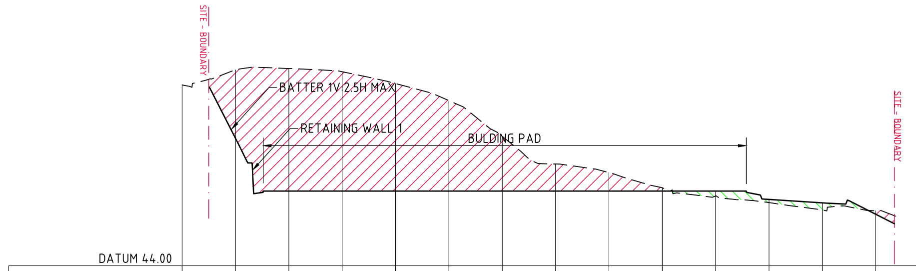
LEGEND:

- —— DENOTES BULK EARTHWORKS PROFILE
- – – DENOTES EXISTING PROFILE
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL



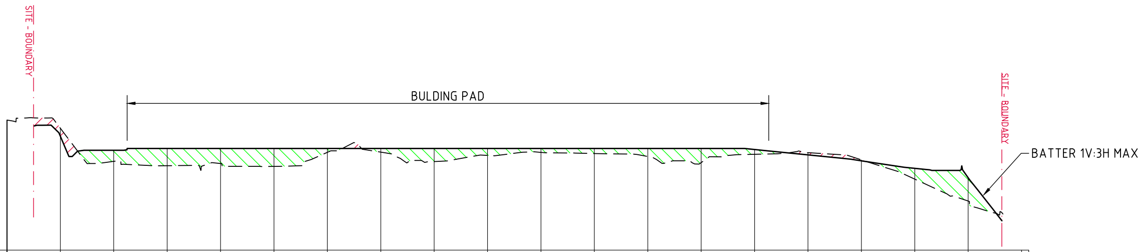
CUT/FILL DEPTH		-1.315	-0.036	0.478	0.528	0.534	0.506	0.465	0.476	0.586	0.714	0.769	0.710	1.005	1.359	1.980		
BULK EARTHWORKS LEVEL		46.538	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.702	46.367	46.287		
EXISTING SURFACE LEVEL	46.76	47.853	46.836	46.322	46.272	46.266	46.294	46.335	46.324	46.214	46.086	46.031	46.090	45.697	45.009	44.307		
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	163.264

SECTION BULK EARTHWORKS 1
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



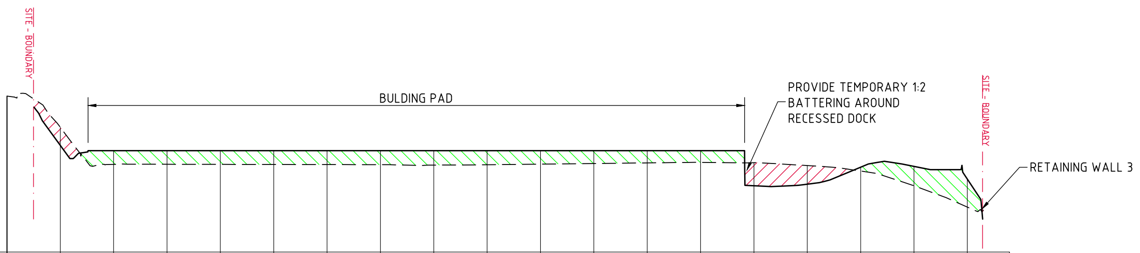
CUT/FILL DEPTH		-2.566	-4.591	-4.470	-4.025	-3.388	-2.048	-1.013	-0.691	-0.124	0.186	0.116	0.264	-0.134		
BULK EARTHWORKS LEVEL		48.772	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.483	46.356	45.928		
EXISTING SURFACE LEVEL	50.77	51.339	51.391	51.270	50.825	50.188	48.848	47.813	47.491	46.924	46.614	46.367	46.092	46.062		
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	143.236

SECTION BULK EARTHWORKS 5
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



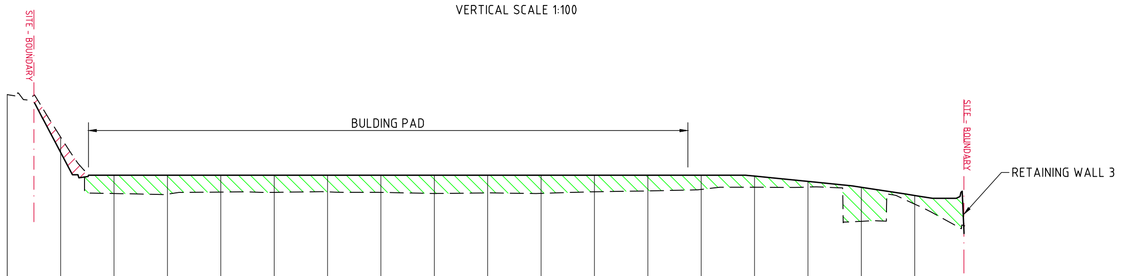
CUT/FILL DEPTH		-0.299	0.414	0.643	0.559	0.669	0.143	0.135	0.489	0.257	0.144	0.190	0.298	0.527	0.177	-0.084	-0.032	0.403	0.864		
BULK EARTHWORKS LEVEL		47.260	46.735	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.762	46.561	46.341	46.058	45.701		
EXISTING SURFACE LEVEL	47.87	47.560	46.321	46.157	46.241	46.131	46.657	46.665	46.311	46.543	46.656	46.610	46.502	46.273	46.585	46.645	46.373	45.655	44.837		
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	191.327

SECTION BULK EARTHWORKS 2
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



CUT/FILL DEPTH		-0.677	0.515	0.512	0.515	0.519	0.523	0.527	0.542	0.529	0.506	0.483	0.460	0.442	-0.864	-0.698	0.144	0.726	1.047	
BULK EARTHWORKS LEVEL		46.996	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	45.483	45.544	46.179	46.210	45.732	
EXISTING SURFACE LEVEL	48.84	47.674	46.285	46.288	46.285	46.281	46.277	46.273	46.258	46.271	46.294	46.317	46.340	46.358	46.347	46.241	46.035	45.484	44.685	
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	187.883

SECTION BULK EARTHWORKS 3
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



CUT/FILL DEPTH		-0.575	0.687	0.708	0.632	0.643	0.625	0.645	0.686	0.665	0.681	0.622	0.590	0.533	0.418	0.211	1.272	0.324		
BULK EARTHWORKS LEVEL		47.650	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.766	46.565	46.347	46.038		
EXISTING SURFACE LEVEL	49.81	48.225	46.113	46.092	46.168	46.157	46.175	46.155	46.114	46.135	46.119	46.178	46.210	46.267	46.348	46.354	45.075	45.714		
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	184.246

SECTION BULK EARTHWORKS 4
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SIZE SHEET

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	D
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ISSUED FOR INFORMATION ONLY	26.03.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA35

CONSULT AUSTRALIA

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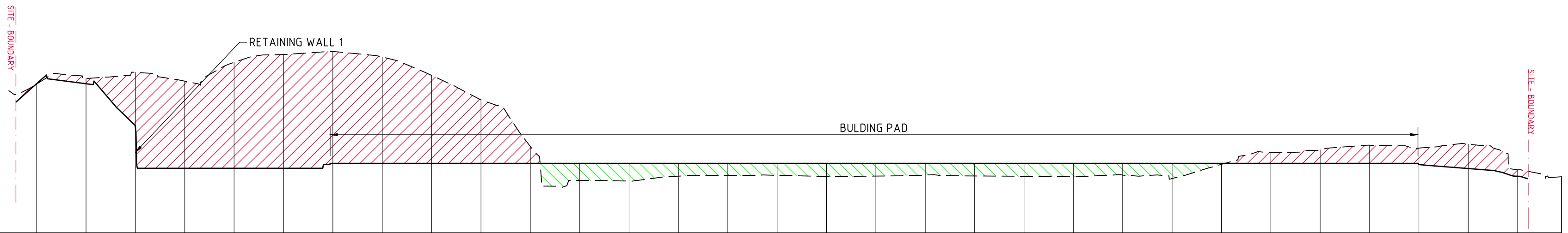
CRC COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: CONCEPT BULK EARTHWORKS SECTIONS SHEET 1

DRAWING No: C015039.01-DA35 ISSUE: D

LEGEND:

- DENOTES BULK EARTHWORKS PROFILE
- DENOTES EXISTING PROFILE
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL

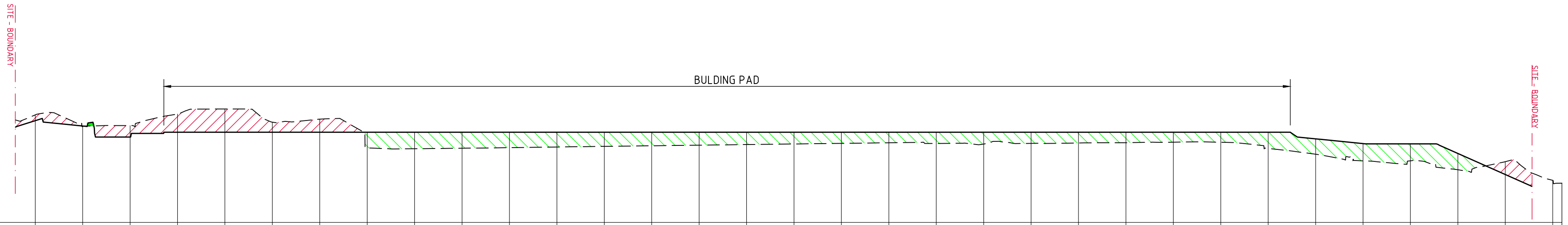


DATUM 44.00

CUT/FILL DEPTH		0.012	-0.208	-2.258	-3.537	-4.301	-4.615	-4.543	-4.316	-3.571	-2.578	-0.684	0.695	0.720	0.521	0.496
BULK EARTHWORKS LEVEL		50.035	50.032	48.237	46.600	46.600	46.600	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800
EXISTING SURFACE LEVEL		50.023	50.241	50.494	50.137	50.901	51.215	51.343	51.116	50.371	49.378	47.484	46.105	46.080	46.279	46.304
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000

CUT/FILL DEPTH	0.487	0.535	0.517	0.477	0.512	0.527	0.544	0.477	0.615	0.042	-0.445	-0.551	-0.737	-0.670	-0.989	-0.259	
BULK EARTHWORKS LEVEL	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.749	46.589	46.277	
EXISTING SURFACE LEVEL	46.313	46.265	46.283	46.323	46.288	46.273	46.256	46.323	46.185	46.758	47.245	47.351	47.537	47.418	47.579	46.535	46.25
CHAINAGE	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000	310.000	318.908

SECTION BULK EARTHWORKS 6
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

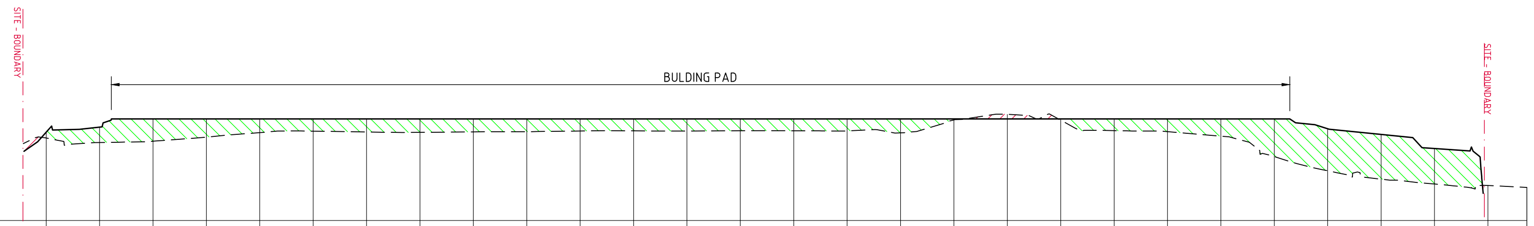


DATUM 43.00

CUT/FILL DEPTH		-0.243	0.021	-0.480	-0.768	-0.981	-0.426	-0.553	0.661	0.694	0.673	0.649	0.621	0.595	0.570	0.544
BULK EARTHWORKS LEVEL		47.288	47.063	46.600	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800
EXISTING SURFACE LEVEL		47.531	47.042	47.080	47.568	47.781	47.226	47.353	46.139	46.106	46.127	46.151	46.179	46.205	46.230	46.256
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000

CUT/FILL DEPTH	0.519	0.494	0.468	0.443	0.471	0.497	0.468	0.450	0.442	0.417	0.421	0.681	0.648	0.727	0.716	0.688	-0.542		
BULK EARTHWORKS LEVEL	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.523	46.323	46.312	45.906	45.020		
EXISTING SURFACE LEVEL	46.281	46.306	46.332	46.357	46.329	46.303	46.332	46.350	46.358	46.383	46.379	46.119	45.875	45.596	45.596	45.218	45.562	44.774	44.66
CHAINAGE	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000	310.000	320.000	330.000	331.951

SECTION BULK EARTHWORKS 7
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



DATUM 43.00

CUT/FILL DEPTH		0.219	0.573	0.835	0.684	0.513	0.459	0.489	0.504	0.486	0.482	0.453	0.448	0.454	0.444	0.445
BULK EARTHWORKS LEVEL		46.303	46.490	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800
EXISTING SURFACE LEVEL		46.084	45.916	45.965	46.116	46.287	46.341	46.311	46.296	46.314	46.318	46.347	46.352	46.346	46.356	46.355
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000

CUT/FILL DEPTH	0.450	0.523	0.037	-0.170	0.050	0.441	0.479	0.646	1.409	1.571	1.674	1.325		
BULK EARTHWORKS LEVEL	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.800	46.431	46.220	45.691		
EXISTING SURFACE LEVEL	46.350	46.277	46.763	46.970	46.750	46.359	46.321	46.154	45.391	44.860	44.546	44.366	44.309	44.24
CHAINAGE	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	287.284

SECTION BULK EARTHWORKS 8
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SIZE SHEET

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	D
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ISSUED FOR INFORMATION ONLY	26.03.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA36

CONSULT AUSTRALIA

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COSTIN ROE CONSULTING
CIVIL & STRUCTURAL ENGINEERS

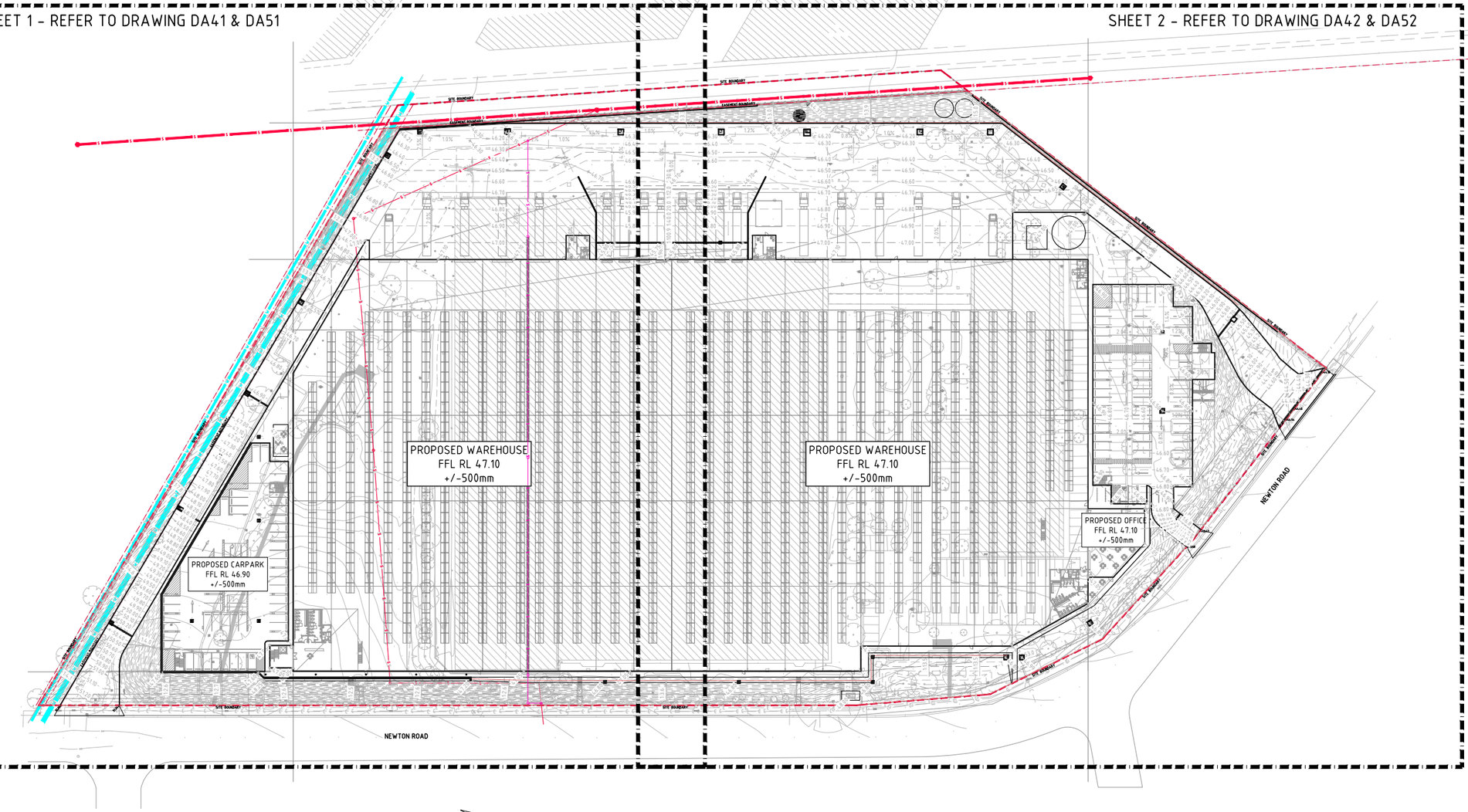
DRAWING TITLE: CONCEPT BULK EARTHWORKS SECTIONS SHEET 2

DRAWING No: C015039.01-DA36

ISSUE: D

SHEET 1 - REFER TO DRAWING DA41 & DA51

SHEET 2 - REFER TO DRAWING DA42 & DA52



DRAWING KEY PLAN
SCALE 1:500

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS DA51 & DA52.
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c=25 MPa. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 9 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
13. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
14. ALL SUBSOIL DRAINAGE LINES SHALL BE Ø100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
15. WHERE SUBSOIL DRAINAGE PASSES UNDER A PAVEMENT OR A SLAB, UNSLOTTED UPVC ARE TO BE PROVIDED UNLESS NOTED OTHERWISE.
16. ALL PIPE GRADES 1 IN 200 MINIMUM UNO.
17. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
18. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
19. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY', THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
20. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
21. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
22. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.
23. WHERE CONNECTION TO EXISTING INGROUND DRAINAGE SYSTEMS, OPEN SWALES, CHANNELS OR ANY OTHER EXISTING SYSTEM, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION AND INVERT ON SITE AT THE BEGINNING OF THE CONSTRUCTION PERIOD. REFER ANY VARIANCE FROM DOCUMENTATION OR SURVEYS TO THE ENGINEER FOR CLARIFICATION.

FINISHED LEVELS PLAN NOTES:

1. LEVELS DATUM IS AUSTRALIAN HEIGHT DATUM (A.H.D.).
2. GRADING REQUIREMENTS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS2890.1, AS2890.2 AND AS2890.6.
3. ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
4. CONTOUR INTERVALS
   - THE MINOR CONTOUR INTERVAL IS 0.1m.
   - THE MAJOR CONTOUR INTERVAL IS 0.5m.
5. HARDSTAND GRADING
   - MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%).
   - GRADING OF ON-GRADE DOCKS TO BE 1:100 (1%) FALL AWAY FROM THE DOCK FACE FOR A LENGTH OF 15m U.N.O.
   - GRADING OF TRUCK CIRCULATION ZONES TO BE MINIMUM AS NOTED ABOVE, 3-4% NOMINAL AND MAX. 5%.
6. CAR PARKING AREA GRADES
   - MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%), DESIRABLE MINIMUM GRADE 1:50 (2%).
   - MAXIMUM PAVEMENT GRADE IS TO BE 1:20 (5%) N CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
   - DISABLED ACCESS PARKING ZONES AND SHARED SPACE TO BE MAXIMUM OF 1:33 (3%) IN ASPHALT PAVEMENT AND MAXIMUM OF 1:40 (2.5%) IN CONCRETE PAVEMENT.
   - CARPARK RAMP GRADES TO BE MAX 1:5 WITH 2.5m SMOOTH TRANSITION AT TOP AND BOTTOM U.N.O.
7. TRUCK RAMP GRADES
   - MAXIMUM B-DOUBLE OR 19.0m AV RAMP GRADES ARE TO BE 1:8.3 (12%) U.N.O. ON PLAN
   - PROVIDE MINIMUM 4.0m LONG TRANSITION WHERE CHANGES OF GRADE EXCEED 1:20 (5%) AT A CREST U.N.O.
   - PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGE OF GRADE EXCEED 1:20 (5%) AT A SAG U.N.O.
   - TRANSITIONS ARE TO PROVIDE A SMOOTH CONTINOUS CIRCULAR AND TANGENTIAL CHANGE IN GRADE TO ENSURE NO SHARP OR ACUTE CHANGES IN GRADE ARE PRESENT.
8. WHERE FIRE BRIGADE ACCESS IS REQUIRED, MAXIMUM RAMP GRADIENTS ARE TO BE 1:6 (16.6%), DESIRABLE RAMP GRADIENTS ARE TO BE 1:8 (12.5%) WITH 7m TRANSITION TOP AND BOTTOM U.N.O. ON PLAN.
9. PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H U.N.O. BASED ON GEOTECHNICAL ASSESSMENT. PROVIDE MINIMUM 0.5m BERM BETWEEN THE BACK OF KERB OR PAVEMENT EDGES AND THE TOP OR TOE OF A BATTER.
10. ALL BATTER SLOPE WITH GRADES AT OR EXCEEDING 1V:6H ARE TO BE TURFED IMMEDIATELY OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
11. ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL. GRADE.
12. ALL PAVEMENTS ARE TO BE SET AT 30mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS. PROVIDE LOCAL FEATHERING AT DOORWAYS OR ROLLER SHUTTERS TO PROVIDE FLUSH FINISH AS REQUIRED.
13. WHERE NEW AND EXISTING INTERFACING IS REQUIRED, MATCH EXISTING LEVELS AND PROVIDE SMOOTH INTERFACE BETWEEN NEW AND EXISTING GRADIENTS. REFER ANY CONCERNS TO THE ENGINEER.

FOR DEVELOPMENT APPLICATION

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SIZE SHEET

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	D
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	C
ISSUED FOR DEVELOPMENT APPLICATION	10.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA40

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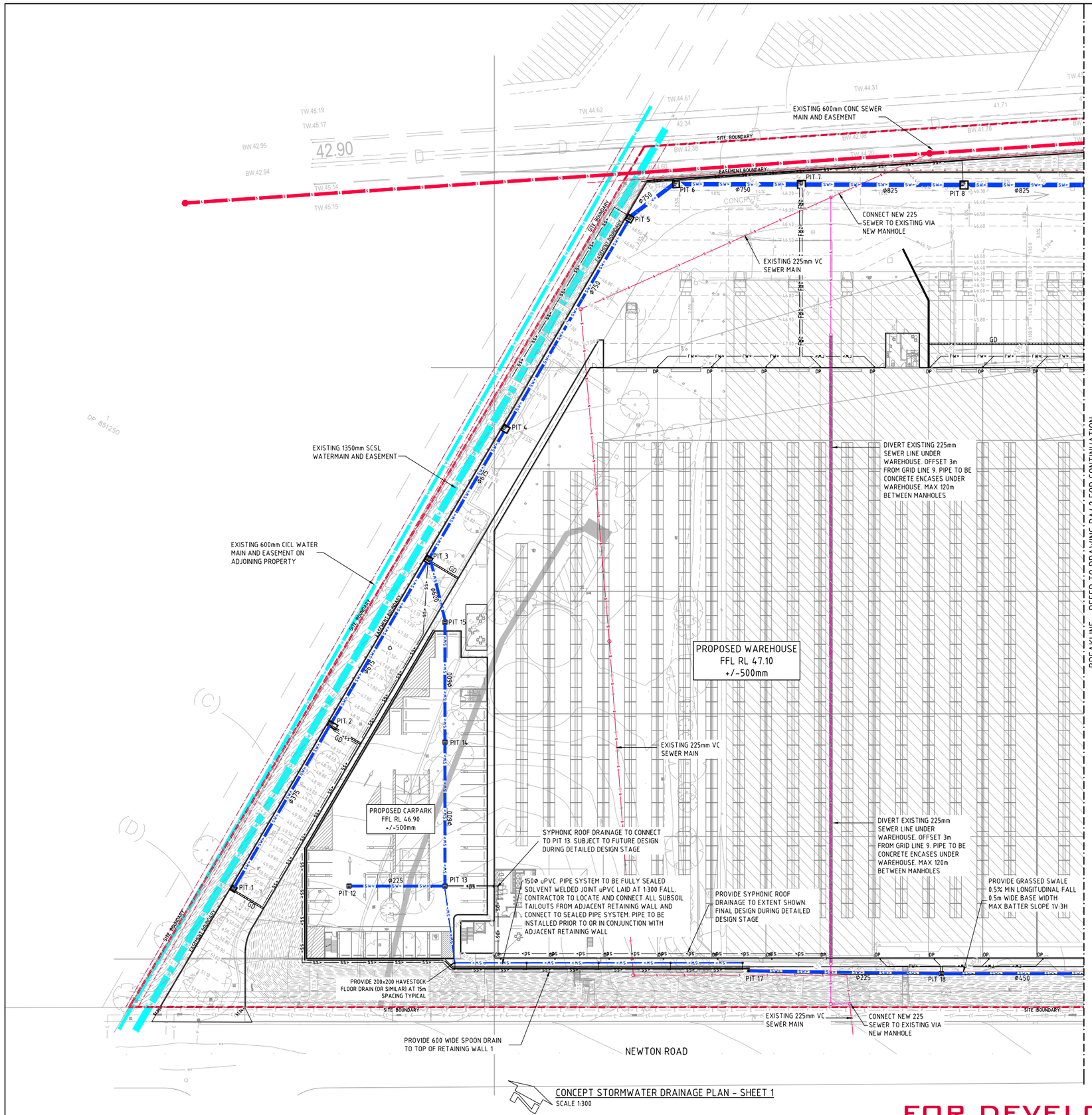
CONSULT AUSTRALIA

COSTIN ROE CONSULTING — CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: DRAWING KEY PLAN

DRAWING No: C015039.01-DA 40 ISSUE: D



CONCEPT STORMWATER DRAINAGE PLAN – SHEET 1
SCALE 1:300

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON ESTATE DEISGN INFORMATION PROVIDED BY LTS SURVEYORS DATED 12.10.20 REF 51145001DT

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- ROOFWATER DOWNPIPE (INDICATIVE)
- ROOFWATER LINE
- EXISTING SYDNEY WATER MAIN
- EXISTING SEWER MAIN
- SUBSOIL LINE
- OVERLAND FLOW DIRECTION
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

STORMWATER DRAINAGE NOTES:

REFER TO DRAWING SSDA40 FOR STORMWATER NOTES
ALL INLET PITS TO BE FITTED WITHC OCEAN PROTECT OCEANGUARD PIT BASKET

PIT SCHEDULE

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
PIT 1	50.30	SGGP	900x900	○
PIT 2	48.30	SGGP	1800x900	○ 900SQ RISER
PIT 3	46.92	SGGP	1200x1200	○ 900SQ RISER
PIT 4	46.60	SGGP	1200x1200	○ 900SQ RISER
PIT 5	46.45	SGGP	1200x1200	○ 900SQ RISER
PIT 6	46.15	SGGP	1200x1200	○ 900SQ RISER
PIT 7	46.15	SGGP	1500x1500	○ 900SQ RISER
PIT 8	46.25	SGGP	1500x1500	○ 900SQ RISER
PIT 9	46.25	SGGP	1800x1800	○ 900SQ RISER
PIT 10	46.15	SGGP	1500x1500	○ 900SQ RISER
PIT 11	44.37	SGGP	1500x1500	○ 900SQ RISER
PIT 12	46.80	SGGP	900x900	○
PIT 13	46.80	SGGP	900x900	○
PIT 14	46.80	SGGP	900x900	○
PIT 15	47.00	SGGP	900x900	○
PIT 16	45.75	SGGP	900x900	○
PIT 17	47.20	SGGP	900x900	○
PIT 18	46.80	SGGP	900x900	
PIT 19	46.80	SGGP	900x900	
PIT 20	46.80	SGGP	900x900	
PIT 21	46.80	SGGP	900x900	
PIT 22	46.80	SGGP	900x900	○
PIT 23	46.99	SGGP	1200x1200	○ 900SQ RISER
PIT 24	46.85	SGGP	1200x1200	○ 900SQ RISER
PIT 25	46.30	SGGP	1200x1200	○ 900SQ RISER
PIT 26	46.50	SGGP	1500x1500	○ 900SQ RISER
PIT 27	45.65	SGGP	1500x1500	○ 900SQ RISER
PIT 28	46.65	SGGP	1500x1500	○ 900SQ RISER
PIT 29	46.20	SGGP	1500x1500	○ 900SQ RISER
PIT 30	46.15	SGGP	1500x1500	○ 900SQ RISER
PIT 31	46.50	SGGP	900x900	○

○ -DENOTES PIT TO THE FITTED WITH OCEAN PROTECT OCEANGUARD PIT INSERT

FOR DEVELOPMENT APPLICATION

3m 0 5 10 15 20 25 30m
SCALE 1:300 AT A0 SIZE SHEET

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	E
ISSUED FOR DEVELOPMENT APPLICATION	06.06.24	D
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	C
ISSUED FOR DEVELOPMENT APPLICATION	10.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS
CLIENT/CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
ML	ML	FEB 24	MW	A0	AS SHOWN	C015039.01-DA41

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DRAWING TITLE: CONCEPT STORMWATER DRAINAGE PLAN SHEET 1
DRAWING No: C015039.01-DA 41
ISSUE: E

LEGEND:

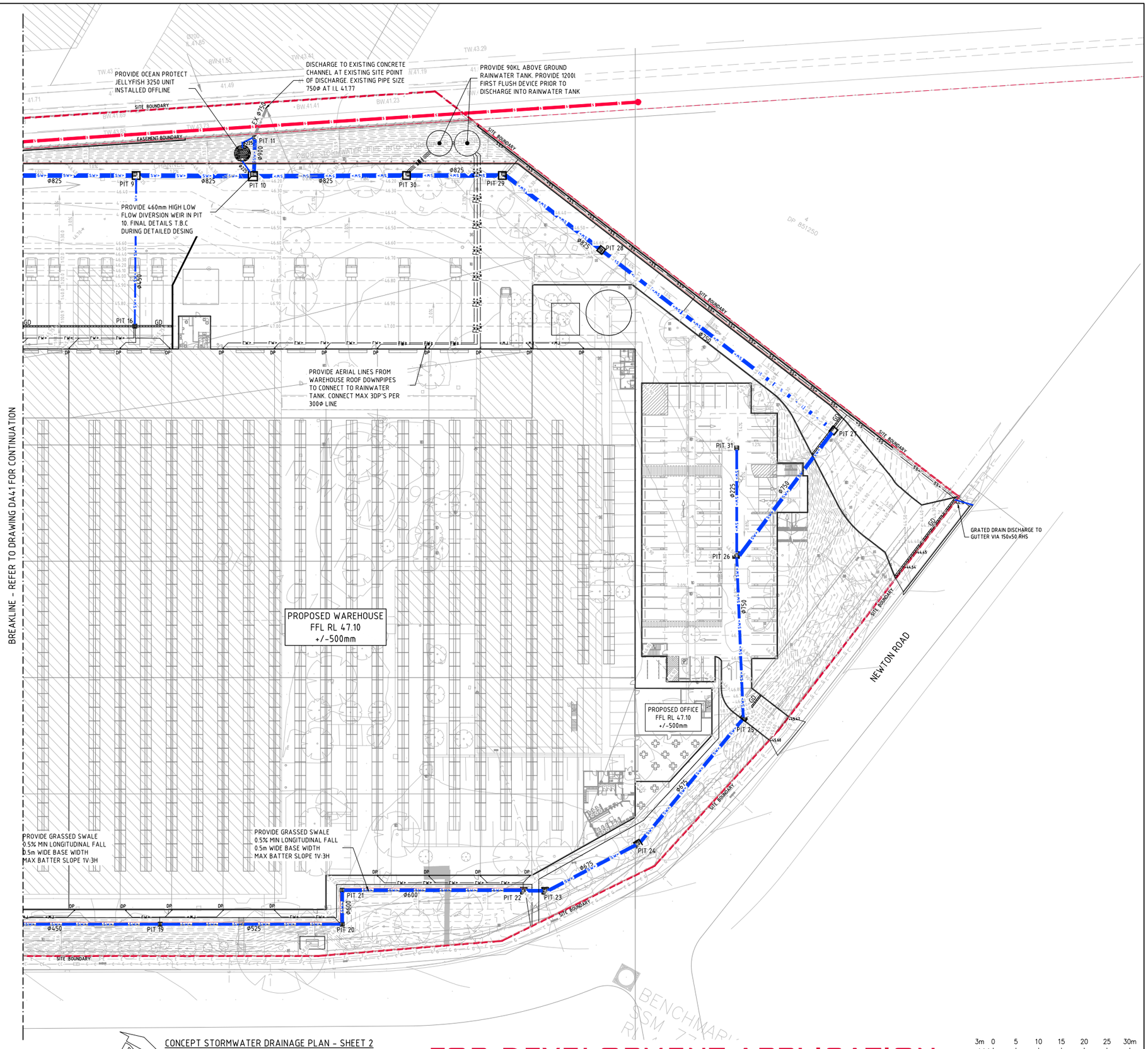
LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON ESTATE DEISGN INFORMATION PROVIDED BY LTS SURVEYORS DATED 12.10.20 REF 51145001DT

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- ROOFWATER DOWNPIPE (INDICATIVE)
- ROOFWATER LINE
- EXISTING SYDNEY WATER MAIN
- EXISTING SEWER MAIN
- SUBSOIL LINE
- OVERLAND FLOW DIRECTION
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

STORMWATER DRAINAGE NOTES:

REFER TO DRAWING SSDA40 FOR STORMWATER NOTES
ALL INLET PITS TO BE FITTED WITHC OCEAN PROTECT OCEANGUARD PIT BASKET



CONCEPT STORMWATER DRAINAGE PLAN - SHEET 2
SCALE 1:300

FOR DEVELOPMENT APPLICATION

3m 0 5 10 15 20 25 30m
SCALE 1:300 AT A0 SIZE SHEET

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	E
ISSUED FOR DEVELOPMENT APPLICATION	06.06.24	D
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	C
ISSUED FOR DEVELOPMENT APPLICATION	10.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS
CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
ML	ML	FEB 24	MW	A0	AS SHOWN	C015039.01-DA42

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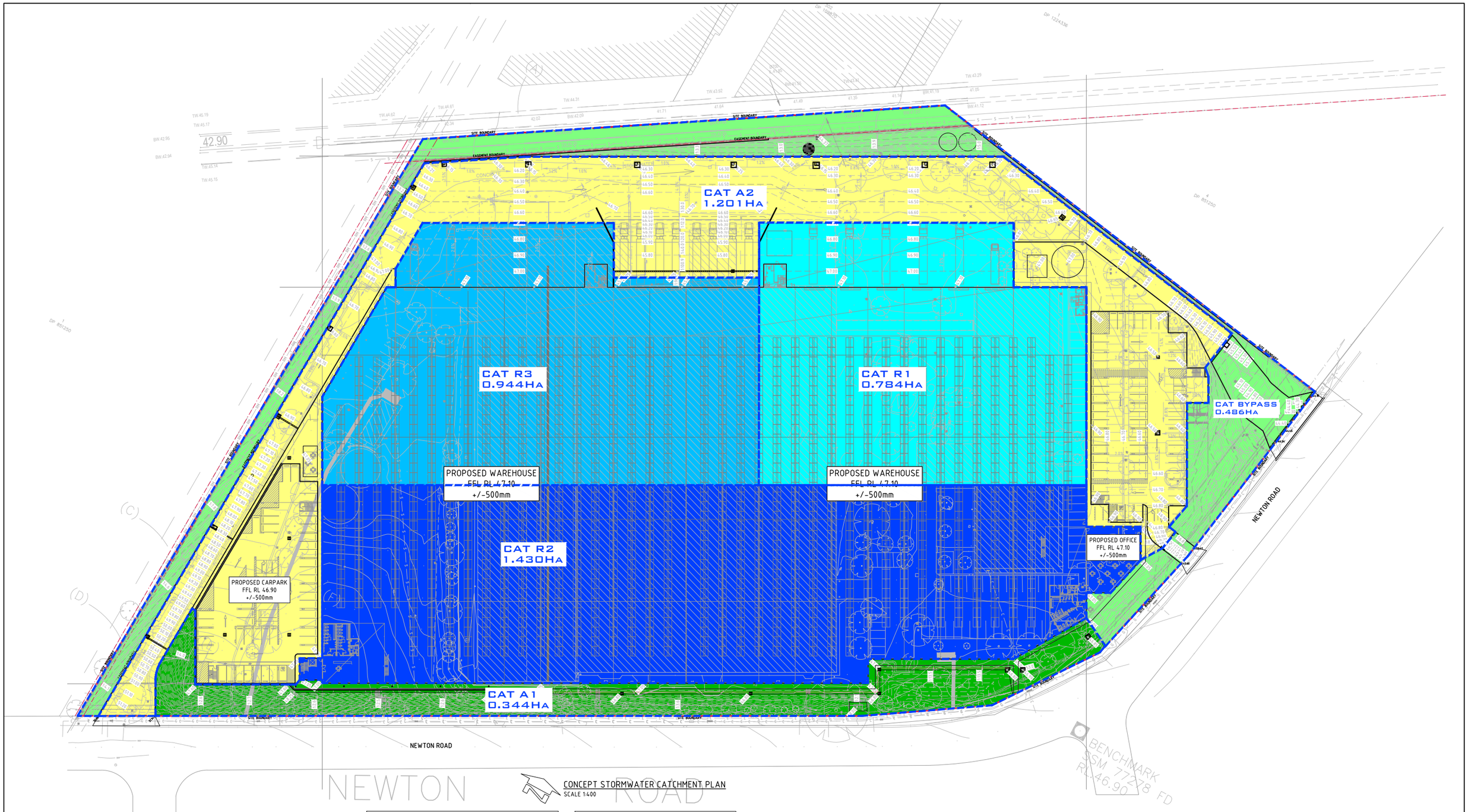
DRAWING TITLE: CONCEPT STORMWATER DRAINAGE PLAN SHEET 2
DRAWING No: C015039.01-DA 42
ISSUE: E



CONCEPT STORMWATER CATCHMENT PLAN
SCALE 1:400

SUB-CATCHMENT AREAS - MUSIC

No.	CATCHMENT AREA (Ha)	% IMPERVIOUS	TREATMENT SYSTEM
ROOF R1	0.784	100	OCEANGUARD + RAINWATER TANK
ROOF R2	1.430	100	OCEANGUARD + JELLYFISH
ROOF R3	0.944	100	OCEANGUARD + RAINWATER TANK
LANDSCAPE A1	0.344	10	OCEANGUARD + JELLYFISH
HARDSTAND A2	1.201	90	OCEANGUARD + JELLYFISH
BYPASS	0.486	70	NONE
TOTAL	5.189		

LEGEND:

- DENOTES CATCHMENT ROOF R1
- DENOTES CATCHMENT ROOF R2
- DENOTES CATCHMENT ROOF R3
- DENOTES CATCHMENT LANDSCAPE A1
- DENOTES CATCHMENT HARDSTAND A2
- DENOTES BYPASS AREA

NOTE:
ALL INLET PITS TO BE FITTED WITH OCEAN PROTECT OCEAN GUARD INSERTS.

FOR DEVELOPMENT APPLICATION

4m 0 10 20 30 40m
SCALE 1:400 AT A0 SIZE SHEET

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	D
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	C
ISSUED FOR DEVELOPMENT APPLICATION	10.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS
CLIENT: Centuria
PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA44

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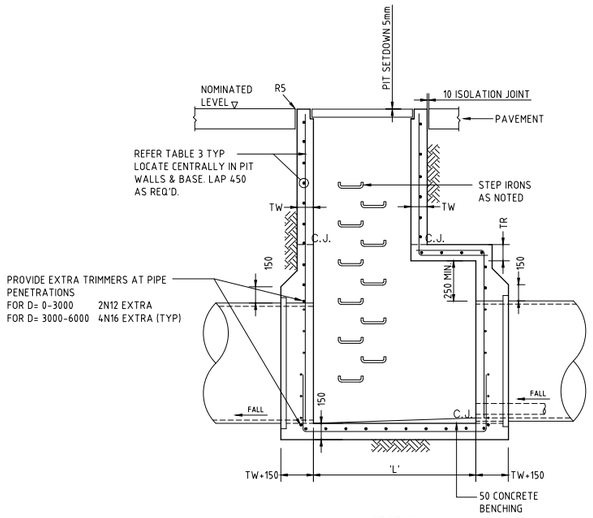
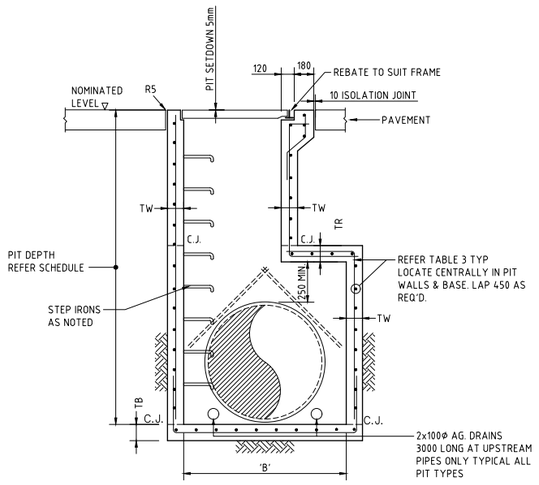
DRAWING TITLE: CONCEPT STORMWATER CATCHMENT PLAN MUSIC MODEL
DRAWING No: C015039.01-DA 44
ISSUE: D



SECTION
SCALE 1:20

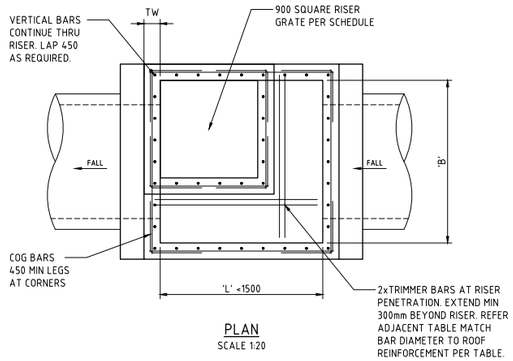


SECTION
SCALE 1:20

CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX. SIZE)	CEMENT TYPE	ADMIXTURE	F'c (MPa)
PIT	80	20	GP	NIL	32

NOTES:

1. WHERE GULLY PIT IS LOCATED ON KERB RETURNS OR BULB OF CUL-DE-SACS PROVIDE CURVED PRECAST CONCRETE LINTELS.
2. SAG PITS SHALL HAVE LINTEL PLACED CENTRALLY ABOUT THE GRATE.
3. ALL REINFORCING TO HAVE 30 MIN. CLEAR CONCRETE COVER.
4. FOR PITS DEEPER THAN 1200mm STEP IRONS SHALL BE PROVIDED.

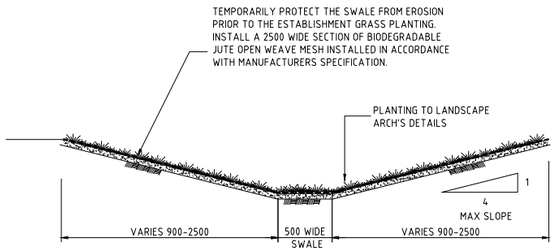


PLAN
SCALE 1:20

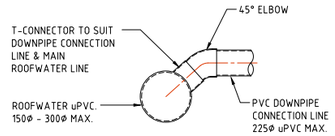
TABLE 1 - TAPERED CLASS D PIT REINFORCEMENT & WALL THICKNESS - MAXIMUM SHORT SPAN 1500mm						
DEPTH 'H'	WALL THICKNESS 'TW'	WALL REINFORCEMENT	ROOF THICKNESS 'TR'	ROOF REINFORCEMENT	BASE THICKNESS 'TB'	BASE REINFORCEMENT
<1.5m	150mm	N12-200 EACH WAY	150mm	N12-200 EACH WAY	150mm	N12-200 EACH WAY
1.5m-3.0m	200mm	N12-200 EACH WAY	200mm	N12-200 EACH WAY	200mm	N12-200 EACH WAY
3.0m-4.5m	200mm	N16-200 EACH WAY	200mm	N16-200 EACH WAY	200mm	N12-200 EACH WAY
4.5-6.0	250mm	N16-200 EACH WAY	250mm	N16-200 EACH WAY	250mm	N16-200 EACH WAY

TAPERED SINGLE GRATED GULLY PIT - SGGP

SUBSOIL NOT SHOWN FOR CLARITY.



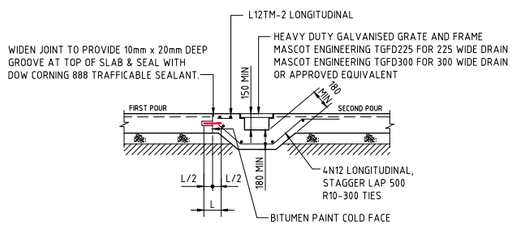
TYPICAL SWALE DETAIL
1:20
ADOPT AS REQUIRED



DOWN PIPE CONNECTION TO uPVC PIPE

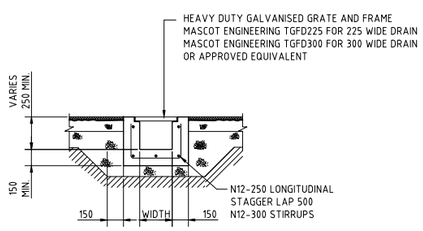
1. PROPRIETARY T-PIECE CONNECTORS SHALL BE USED TO WHERE DIRECT CONNECTIONS ARE REQUIRED TO uPVC PIPES .
2. ALL JOINTS TO BE SEALED WITH SOLVENT WELDED JOINTS.
3. THE PVC PIPE SHALL NOT PROTUDE BEYOND THE INNER SURFACE OF THE STORMWATER PIPE.

DOWNPIPE CONNECTION DETAILS
SCALE 1:20



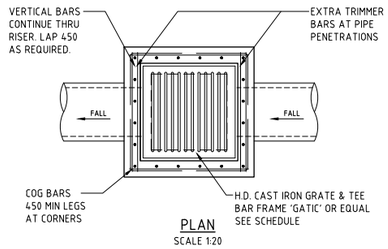
FALL 1:100 TO PITS

DOWEL JOINT AND GRATED DRAIN DETAIL-HARDSTAND
SCALE 1:20

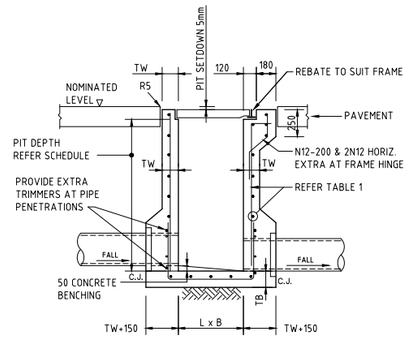


FALL 1:100 TO PITS

GRATED DRAIN DETAIL IN ASPHALT
SCALE 1:20



PLAN
SCALE 1:20



SEE SCHEDULE
L DIMENSION IN DIRECTION OF DOWNSTREAM PIPE

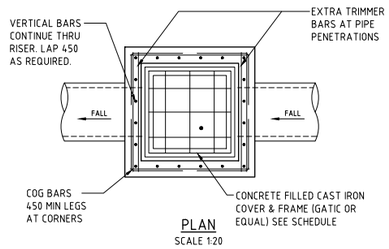
SECTION
SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP

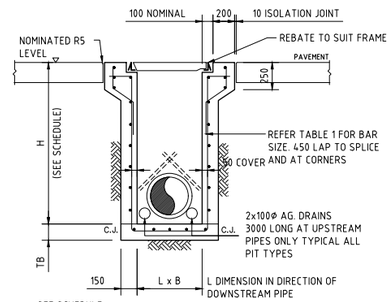
CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX. SIZE)	CEMENT TYPE	ADMIXTURE	F'c (MPa)
PIT	80	20	GP	NIL	32

NOTES:

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



PLAN
SCALE 1:20

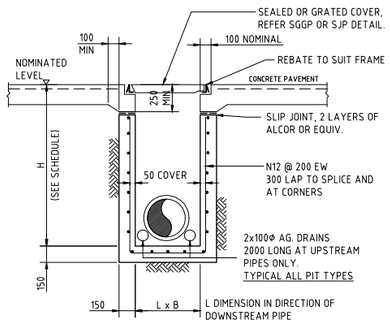


SEE SCHEDULE
L DIMENSION IN DIRECTION OF DOWNSTREAM PIPE

SECTION
SCALE 1:20

SEALED PIT - SP

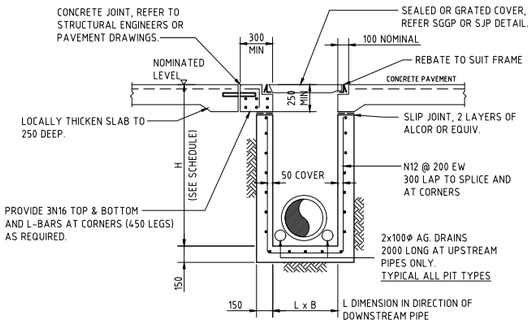
TABLE 2 - CLASS D <1200mm SQUARE PIT REINFORCEMENT & WALL THICKNESS				
DEPTH 'H'	WALL THICKNESS 'TW'	WALL REINFORCEMENT	BASE THICKNESS 'TB'	BASE REINFORCEMENT
< 1.0m	150mm	-	150mm	-
1.0m-3.0m	150mm	N12-200 EACH WAY	150mm	N12-200 EACH WAY
3.0m-4.5m	200mm	N12-200 EACH WAY	200mm	N12-200 EACH WAY
4.5-6.0	200mm	N16-200 EACH WAY	200mm	N16-200 EACH WAY



SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL GRATE/COVER SUPPORT CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENTS FOR SGGP's & SJP's, WHERE JOINTS ARE NOT LOCATED WITHIN PROXIMITY OF THE GRATE)



SECTION
SCALE 1:20

SJP/CIS & SGGP/CIS (CAST IN SLAB) PIT DETAIL GRATE/COVER SUPPORT CAST-INTO PAVEMENT SLAB

(ADOPT IN CONCRETE PAVEMENT FOR SGGP's & SJP's, WHERE PITS ARE LOCATED IN THE CORNER OF SLAB PANELS OR ADJACENT TO SLAB PANEL JOINTS)

100mm 0 200 400 600 800 1000mm
SCALE 1:10 AT A0 SIZE SHEET

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

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	C
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF)
ME	ME	FEB 24	MW	A0	AS SHOWN	C015039.01-DA 45

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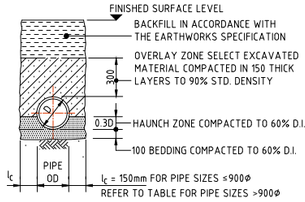
DRAWING TITLE: CONCEPT STORMWATER DETAILS - SHEET 1

DRAWING No: C015039.01-DA45 ISSUE: C



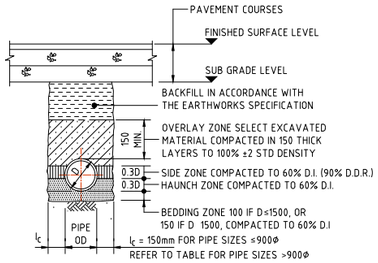
TYPE H1 SUPPORT TO CONCRETE PIPES AT LANDSCAPED AREAS

SCALE 1:20

BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 50
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

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

ENGINEER TO SPECIFY TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800Φ



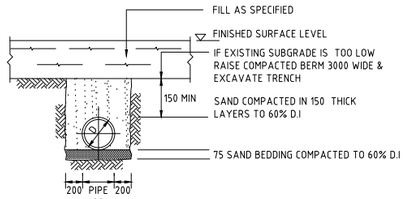
TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

SCALE 1:20
D ≤1350, MAX FILL = 4.0m
D >1350, MAX FILL = 3.0m

BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 50
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

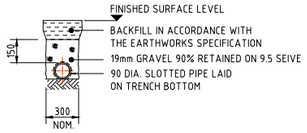
SIDE ZONE WIDTH	
PIPE SIZE (mm)	l_c (mm)
≤ 900Φ	150
1050Φ	175
1200Φ	200
1350Φ	225
1500Φ	250
1650Φ	275
1800Φ	300

ENGINEER TO SPECIFY TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800Φ



SUPPORT TO uPVC PIPES

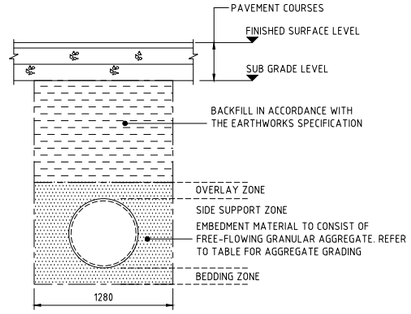
SCALE 1:20



SUPPORT TO AGRICULTURAL DRAIN

FOR USE UNDER CAR PARK PAVEMENTS/LANDSCAPED AREAS
SCALE 1:20

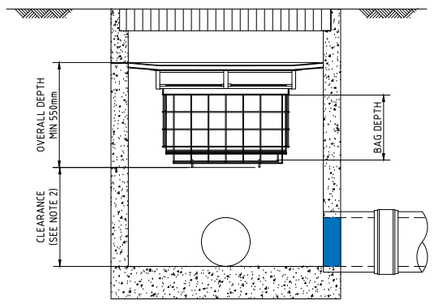
TYPICAL AGGREGATE GRADING			
	% PASSING BY MASS		
SIEVE SIZE	NOMINAL SIZE OF SINGLE-SIZE AGGREGATE		
(mm)	10mm	7mm	5mm
26.5	–	–	–
19	–	–	–
13.2	100	–	–
9.5	85–100	100	–
6.7	–	85–100	100
4.75	0–20	–	85–100
2.36	0–5	0–20	0–40
0.075	0–2	0–2	0–2



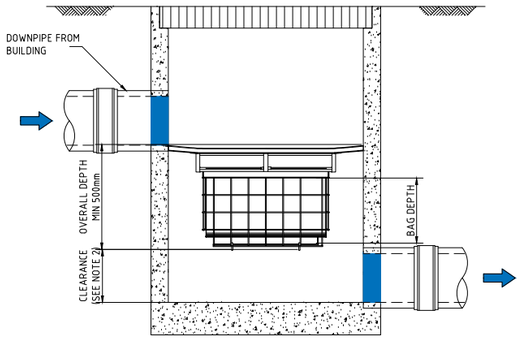
SUPPORT TO STORMPRO HDPE PIPES UNDER PAVEMENT

SCALE 1:20
PIPES TO BE INSTALLED AS PER REQUIREMENTS OF STORMPRO NSTALLATION GUIDE

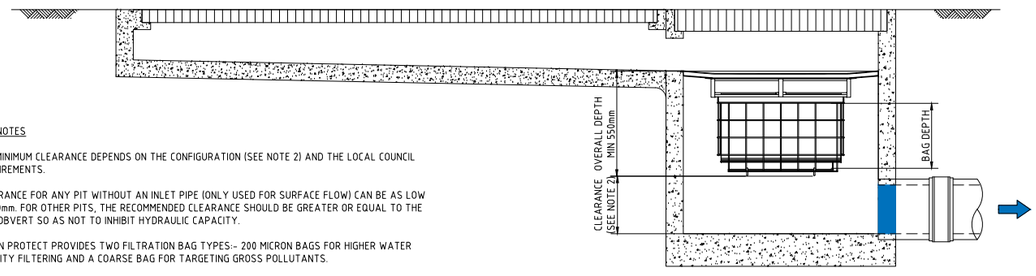
MINIMUM TRENCH DIMENSIONS									
NOMINAL DIAMETER (mm)	150mm	225mm	300mm	375mm	450mm	525mm	600mm	750mm	900mm
MINIMAL TRENCH WIDTH (mm)	470mm	560mm	745mm	830mm	1115mm	1200mm	1280mm	1435mm	1700mm
MINIMAL DEPTH OF BEDDING ZONE (mm)	100mm	100mm	100mm	100mm	150mm	150mm	150mm	150mm	150mm
MINIMAL DEPTH OF OVERLAY ZONE (mm)	150mm	150mm	150mm	150mm	150mm	150mm	150mm	150mm	200mm



SURFACE FLOW CONFIGURATION



PIPE FLOW CONFIGURATION

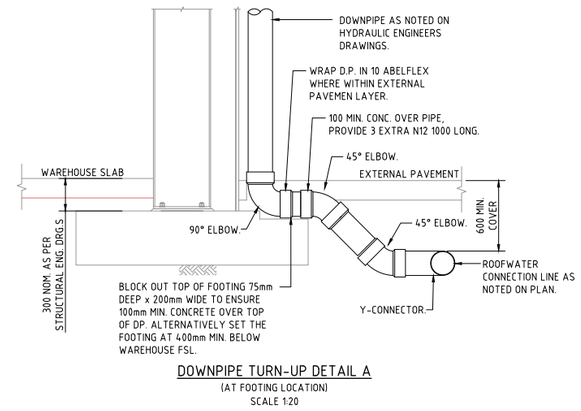


GRATED STRIP DRAIN CONFIGURATION

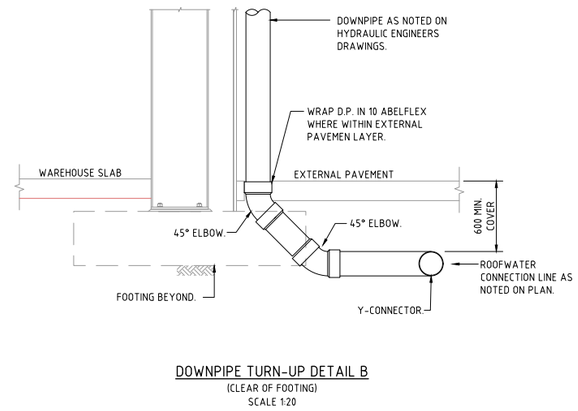
GENERAL NOTES

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.

OCEAN PROTECT OCEANGUARD DETAILS



DOWNPIPE TURN-UP DETAIL A
(AT FOOTING LOCATION)
SCALE 1:20



DOWNPIPE TURN-UP DETAIL B
(CLEAR OF FOOTING)
SCALE 1:20

100mm 0 200 400 600 800 1000mm
SCALE 1:10 AT A0 SIZE SHEET

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

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	C
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS
CLIENT: Centuria
PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164
DESIGNED MC | DRAWN MC | DATE FEB 24 | CHECKED MW | SIZE A0 | SCALE AS SHOWN | CAD REF) C015039.01-DA46
CONSULT AUSTRALIA
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DRAWING TITLE: CONCEPT STROMWATER DETAILS - SHEET 2
DRAWING No C015039.01-DA 46
ISSUE C

EXISTING 600mm CONC SEWER MAIN AND EASEMENT

RETAINING WALL 3 KEYSTONE WALL IN FILL MAX HEIGHT 2.5m 20KPa SURCHARGE

SITE BOUNDARY

END RET WALL 3

EASEMENT BOUNDARY

CONNECT NEW 225 SEWER TO EXISTING VIA NEW MANHOLE

EXISTING 225mm VC SEWER MAIN

EXISTING 1350mm SCSL WATERMAIN AND EASEMENT

PROVIDE VEGETATED BATTER 1V:3H MAX SLOPE

EXISTING 600mm CICL WATER MAIN AND EASEMENT ON ADJOINING PROPERTY

RECESSED DOCK 1300 DEEP

DIVERT EXISTING 225mm SEWER LINE UNDER WAREHOUSE. OFFSET 3m FROM GRID LINE 9. PIPE TO BE CONCRETE ENCASES UNDER WAREHOUSE. MAX 120m BETWEEN MANHOLES

END RET WALL 1

PROPOSED WAREHOUSE FFL RL 47.10 +/-500mm

EXISTING 225mm VC SEWER MAIN

RETAINING WALL 1 KEYSTONE WALL IN CUT MAX HEIGHT 2.5m 20KPa SURCHARGE ADJACENT HARDSTAND

PROPOSED CARPARK FFL RL 46.90 +/-500mm

DIVERT EXISTING 225mm SEWER LINE UNDER WAREHOUSE. OFFSET 3m FROM GRID LINE 9. PIPE TO BE CONCRETE ENCASES UNDER WAREHOUSE. MAX 120m BETWEEN MANHOLES

RETAINING WALL 1 KEYSTONE WALL IN CUT MAX HEIGHT 2.5m 5KPa SURCHARGE ADJACENT LANDSCAPING PROVIDE CONCRETE SPOON DRAIN TO TOP OF WALL

START RET WALL 1

CONNECT NEW 225 SEWER TO EXISTING VIA NEW MANHOLE

EXISTING 225mm VC SEWER MAIN

PROVIDE SUSPENDED RAMP WALKWAY MAX GRADE 1:20

EXISTING STREET SIGN TO BE RELOCATED OUT OF NEW DRIVEWAY

EXISTING TELECOMMUNICATIONS PITS TO BE RELOCATED OUT OF NEW DRIVEWAY

PROVIDE INDUSTRIAL DRIVE CROSSING IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL REQUIREMENTS

PROVIDE VEGETATED BATTER IN CUT 1V:2.5H MAX SLOPE

NEWTON ROAD

BREAKLINE - REFER TO DRAWING DA52 FOR CONTINUATION

FINISHED LEVELS PLAN - SHEET 1
SCALE 1:300

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON ESTATE DEISGN INFORMATION PROVIDED BY LTS SURVEYORS DATED 12.10.20 REF 51145001DT

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- EXISTING SYDNEY WATER MAIN
- EXISTING SEWER MAIN
- PROPOSED 225mm SEWER MAIN
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- FINISHED PAVEMENT SPOT HEIGHT

FINISHED LEVELS NOTES:

REFER TO DRAWING DA40 FOR FINISHED LEVELS NOTES

3m 0 5 10 15 20 25 30m
SCALE 1:300 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	D
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	C
ISSUED FOR DEVELOPMENT APPLICATION	10.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT/CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	ME	FEB 24	MW	A0	AS SHOWN	C015039.01-DA51

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DRAWING TITLE: FINISHED LEVELS PLAN SHEET 1

DRAWING No: C015039.01-DA51

ISSUE: D

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON ESTATE DEISGN INFORMATION PROVIDED BY LTS SURVEYORS DATED 12.10.20 REF 51145001DT

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- W – EXISTING SYDNEY WATER MAIN
- S – EXISTING SEWER MAIN
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- 50.10+ – FINISHED PAVEMENT SPOT HEIGHT

FINISHED LEVELS NOTES:

REFER TO DRAWING DA40 FOR FINISHED LEVELS NOTES

BREAKLINE - REFER TO DRAWING DA51 FOR CONTINUATION

PROPOSED WAREHOUSE
FFL RL 47.10
+/-500mm

PROPOSED OFFICE
FFL RL 47.10
+/-500mm

START RET WALL 3

END RET WALL 2

START RET WALL 2

RETAINING WALL 2
KEYSTONE WALL IN FILL
MAX HEIGHT 2.5m
20KPa SURCHARGE

PROVIDE VEGETATED BATTER
IN CUT 1V:2.5H MAX SLOPE

PROVIDE INDUSTRIAL DRIVE CROSSING
IN ACCORDANCE WITH FAIRFIELD CITY
COUNCIL REQUIREMENTS

PROVIDE INDUSTRIAL DRIVE CROSSING
IN ACCORDANCE WITH FAIRFIELD CITY
COUNCIL REQUIREMENTS

SITE BOUNDARY

EASEMENT BOUNDARY

DP 4 851250

NEWTON ROAD

BENCHMARK SSM 7...

FINISHED LEVELS PLAN - SHEET 2
SCALE 1:300

3m 0 5 10 15 20 25 30m
SCALE 1:300 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	E
ISSUED FOR DEVELOPMENT APPLICATION	06.06.24	D
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	C
ISSUED FOR DEVELOPMENT APPLICATION	10.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA 52

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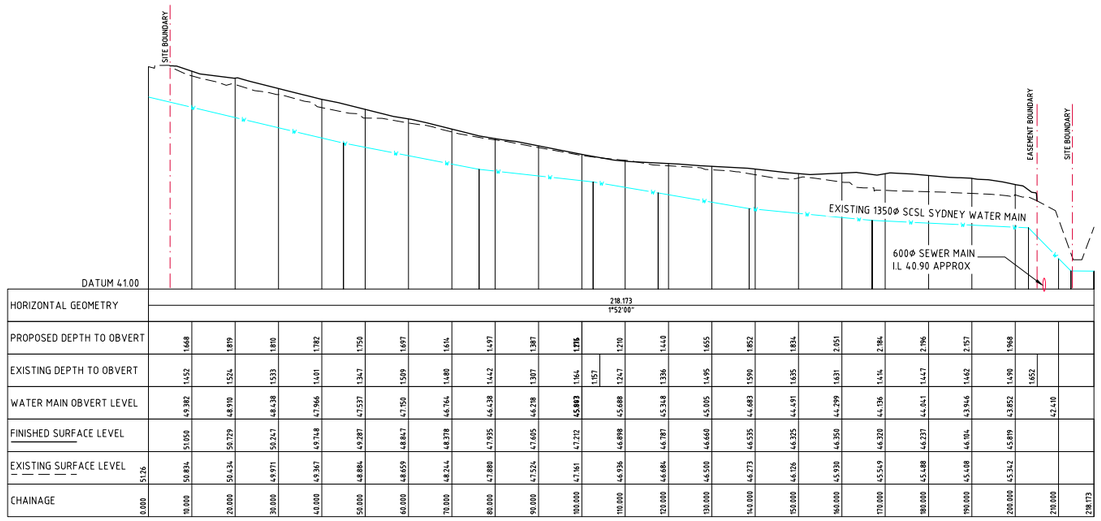
DRAWING TITLE: FINISHED LEVELS PLAN
SHEET 2

DRAWING NO: C015039.01-DA 52

ISSUE: E



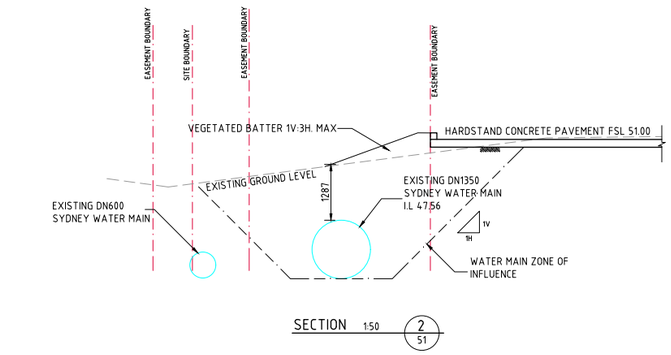
SECTION CL 1350mm WATER MAIN (1/51)
HORIZONTAL SCALE 1:250
VERTICAL SCALE 1:50
WATER MAIN LEVELS ARE BASED ON POTHOLE SURVEY AND ARE SHOWN APPROXIMATE ONLY

NOTE:

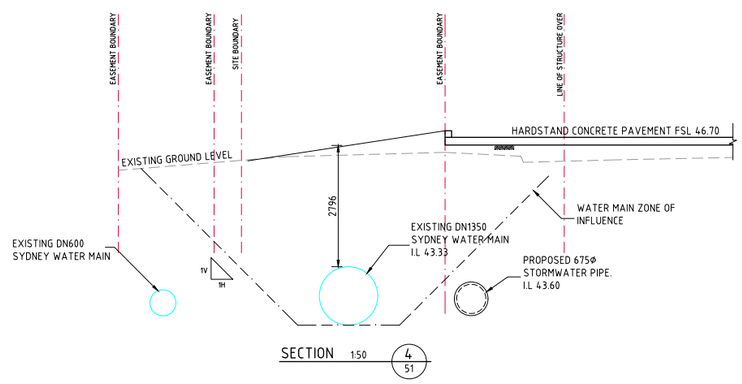
- SECTIONS OF SYDNEY WATER ASSETS ARE PROVIDED FOR INFORMATION ONLY.
- DRAWINGS SHOW THE GENERAL ARRANGEMENT OF THE PROPOSED WORKS & GEOMETRICAL RELATIONSHIP TO THE EXISTING SYDNEY WATER ASSETS.
- DRAWINGS DO NOT SHOW ANY PROPOSED PROTECTION DETAILS OR CONCEPT PROTECTION DETAILS ASSOCIATED WITH THE WORKS.
- THESE DRAWINGS ARE INTENDED TO BE USED TO INFORM THE ASSESSMENT OF THE REQUIREMENTS ASSOCIATED WITH THE SYDNEY WATER ASSETS AND CONSULTATION WITH SYDNEY WATER.

LEGEND:

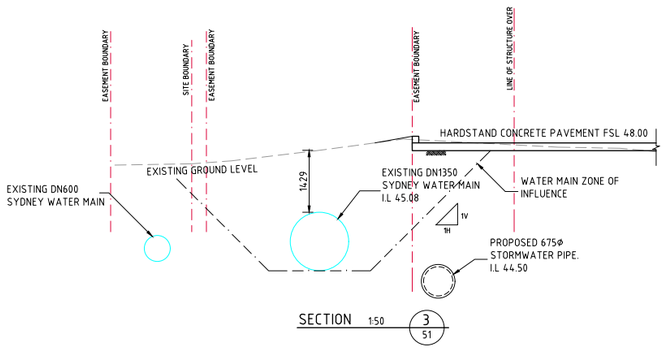
- DENOTES BULK EARTHWORKS PROFILE
- DENOTES EXISTING PROFILE
- DENOTES WATER MAIN OBVERT PROFILE



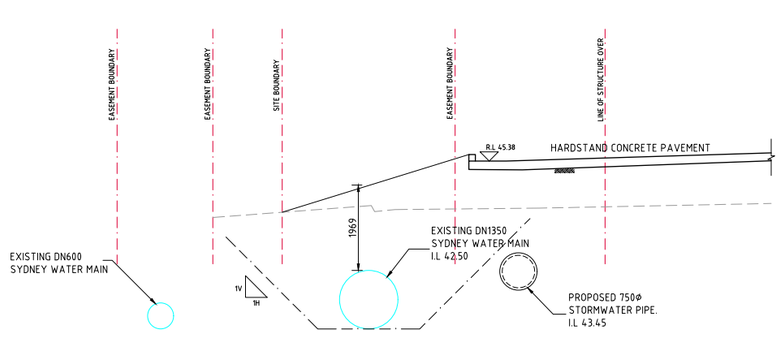
SECTION 1:50 (2/51)



SECTION 1:50 (4/51)



SECTION 1:50 (3/51)



SECTION 1:50 (5/51)

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SIZE SHEET

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SIZE SHEET

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

FOR DEVELOPMENT APPLICATION

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ISSUED FOR DEVELOPMENT APPLICATION	29.02.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS
CLIENT/CLIENT: Centuria
PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA 55

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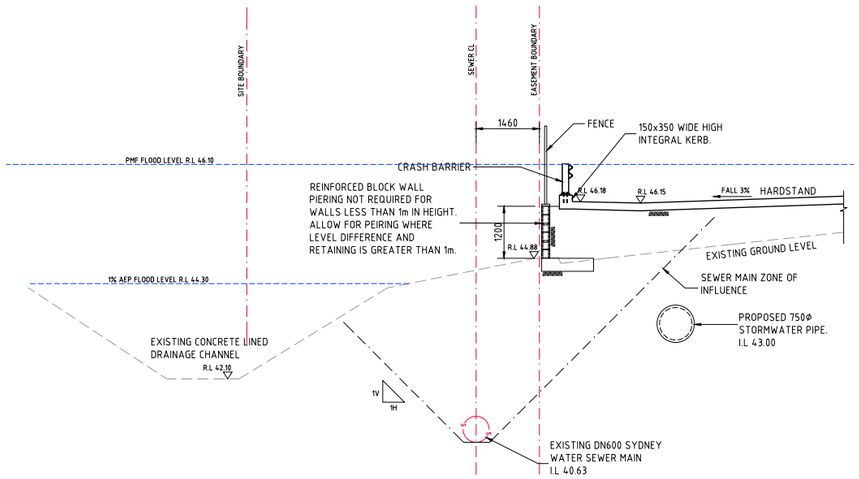
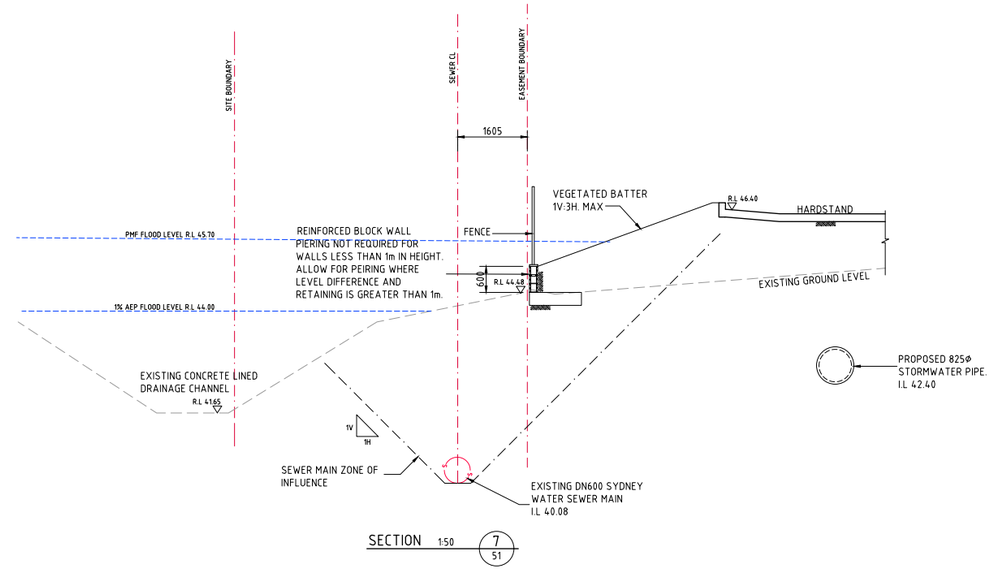
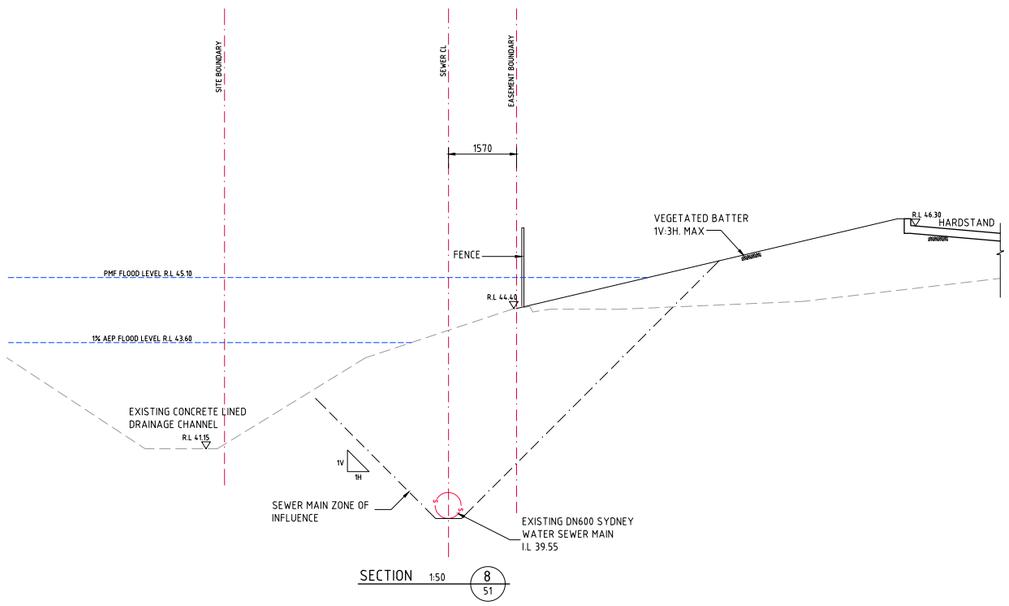
DRAWING TITLE: TYPICAL SECTIONS-SHEET 1
DRAWING No: C015039.01-DA 55
ISSUE: C



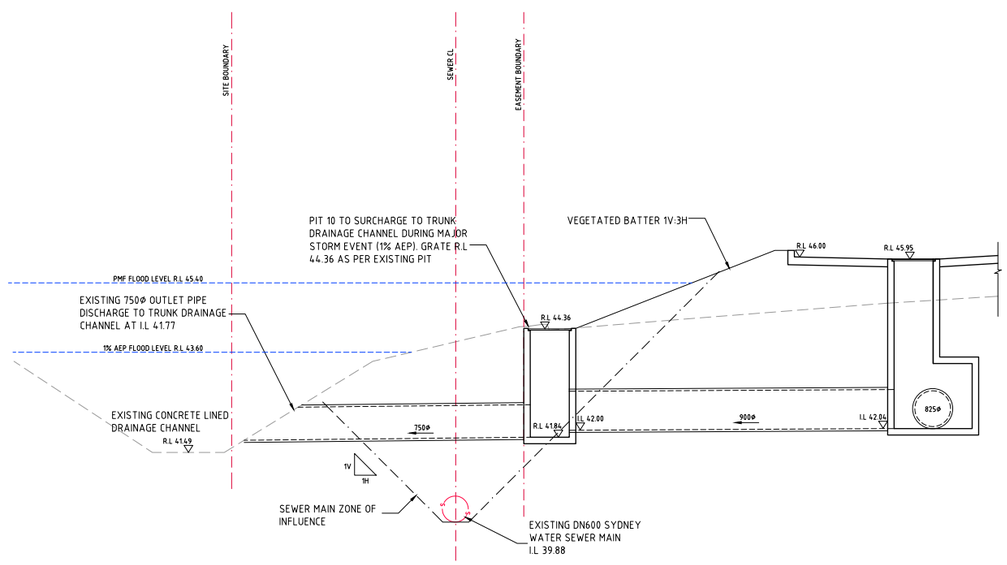
SECTION 1:50 6/51



SECTION 1:50 7/51



SECTION 1:50 8/51



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

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	12.02.25	D
ISSUED FOR DEVELOPMENT APPLICATION	06.06.24	C
ISSUED FOR DEVELOPMENT APPLICATION	29.04.24	B
ISSUED FOR DEVELOPMENT APPLICATION	15.02.24	A

ARCHITECT: SBA ARCHITECTS

CLIENT/CLIENT: Centuria

PROJECT: PROPOSED WAREHOUSE
88 NEWTON ROAD, WETHERILL PARK NSW 2164

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA56

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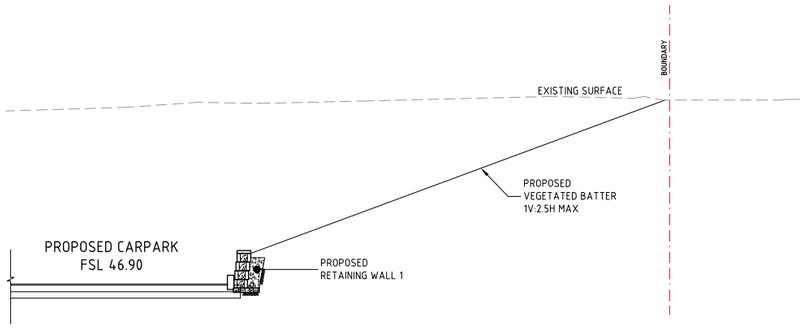
COSTIN ROE CONSULTING — CIVIL & STRUCTURAL ENGINEERS

DRAWING TITLE: TYPICAL SECTIONS-SHEET 2

DRAWING No: C015039.01-DA56 ISSUE: D



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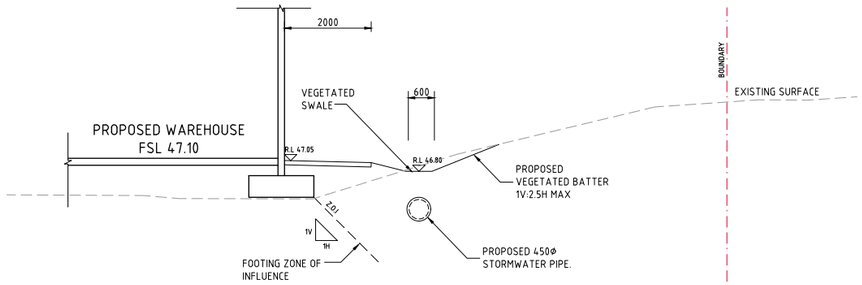

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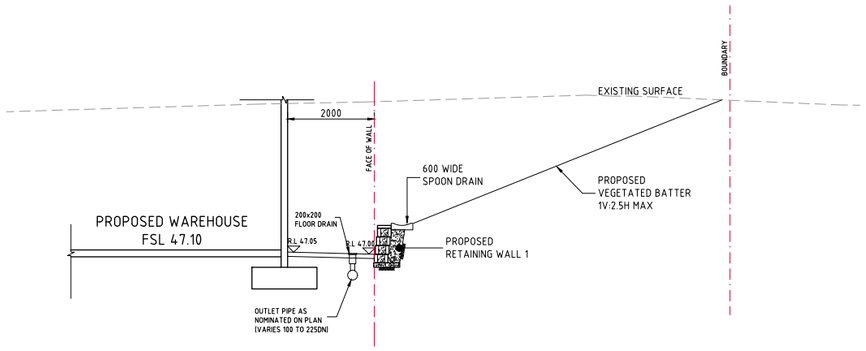

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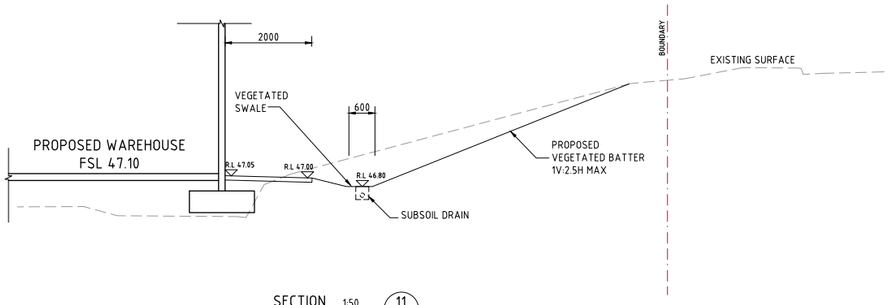

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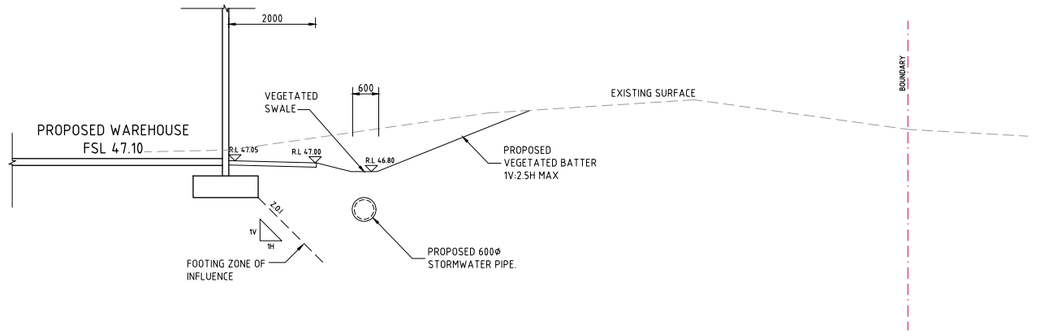

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SCALE 1:50 AT A0 SIZE SHEET

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ARCHITECT: SBA ARCHITECTS

CLIENT/CLIENT: Centuria

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DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
MC	MC	FEB 24	MW	A0	AS SHOWN	C015039.01-DA57

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DRAWING TITLE: TYPICAL SECTIONS-SHEET 3

DRAWING NO: C015039.01-DA57 ISSUE: C

APPENDIX B
MUSIC MODEL CONFIGURATION & PARAMETERS

B.1 Introduction

The MUSIC modelling software was chosen to model water quality. This model has been released by the Cooperative Research Centre for Catchment Hydrology (CRCCH) and is a standard industry model for this purpose. MUSIC (the Model for Urban Stormwater Improvement Conceptualisation) is suitable for simulating catchment areas of up to 100 km2 and utilises a continuous simulation approach to model water quality.

By simulating the performance of stormwater management systems, MUSIC can be used to predict if these proposed systems and changes to land use are appropriate for their catchments and are capable of meeting specified water quality objectives (CRC 2002). The water quality constituents modelled in MUSIC and of relevance to this report include Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN).

The pollutant retention criteria set out in Section 5 of Fairfield City Council's Stormwater Policy 2017 and nominated in **Section 6.1** of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The MUSIC model "*15039.00-Rev1.sqz*" was set up to examine the effectiveness of the water quality treatment train and to predict if council requirements have been achieved. The model was set up using the latest *WaterNSW Standard* MUSIC parameters for sandy clay loam soil and the layout of the MUSIC model is presented in **Appendix B.8.**

Modelling parameters used are based on those nominated in the Sydney Catchment Management Authority (SCA) *document Using Music in Sydney's Drinking Water Catchment – A Sydney Catchment Authority Standard (2012)* and *NSW MUSIC Modelling Guidelines (2015)*.

B.2 Rainfall Data

As per the recommendation of Section 3 of *NSW MUSIC Modelling Guidelines (2015),* six-minute pluviographic data for the Sydney Meteorological Office Station was sourced from the Bureau of Meteorology (BOM) as nominated below. Evapo-transpiration data for the period was sourced from the Sydney Monthly Areal PET data set supplied with the MUSIC software.

Input	**Data Used**
Rainfall Station	67035 Liverpool (Whitlam)
Rainfall Period	1 January 1967 – 31 December 1976 (10 years)
Mean Annual Rainfall (mm)	857
Evapo- transpiration	Sydney Monthly Areal PET
Model Time step	6 minutes

B.3 Rainfall Runoff Parameters

Parameter	**Value**
Rainfall Threshold for roads/paths	1.40
Rainfall Threshold for roofs	0.30
Soil Storage Capacity (mm)	170
Initial Storage (% capacity)	30
Field Capacity (mm)	70

Infiltration Capacity Coefficient a	210
Infiltration Capacity exponent b	4.7
Initial Depth (mm)	10
Daily Recharge Rate (%)	50
Daily Baseflow Rate (%)	4
Daily Seepage Rate (%)	0

B.4 Pollutant Concentrations & Source Nodes

Pollutant concentrations for source nodes are based on parameters adopted by the WaterNSW as per **Table B.1.**

Table B.1. - Pollutant Concentrations

Flow Type	Surface Type	TSS (log_{10} values)		TP (log_{10} values)		TN (log_{10} values)	
		Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Baseflow	Roof	-*	-*	-*	-*	-*	-*
	Sealed Roads	1.20	0.17	-0.85	0.19	0.11	0.12
	Revegetated Land	1.15	0.17	-1.22	0.19	-0.05	0.12
	Other Impervious Areas	-*	-*	-*	-*	-*	-*
	Pervious Areas	1.20	0.17	-0.85	0.19	0.11	0.12
Stormflow	Roof	1.30	0.32	-0.89	0.25	0.30	0.19
	Sealed Roads	2.43	0.32	-0.30	0.25	0.34	0.19
	Revegetated Land	1.95	0.32	-0.66	0.25	0.30	0.19
	Other Impervious Areas	2.15	0.32	-0.60	0.25	0.30	0.19
	Pervious Areas	2.15	0.32	-0.60	0.25	0.30	0.19

* Base flows are only generated from pervious areas, therefore these parameters are not relevant to impervious areas.

The MUSIC model has been setup with a treatment train approach based on the pollutant concentrations in Table B.1 above.

The relevant stormwater catchment sizes are listed below in Table B.2 and their configuration within the MUSIC model.

Table B.2. - Music Model Source Nodes

Catchment	Area (Ha)	Source Node	% Impervious	Stormwater Treatment
ROOF R1	0.784	Roof	100	Rainwater Tank/ JellyFish
ROOF R2	1.430	Roof	100	OceanGuard/JellyFish
ROOF R3	0.944	Roof	100	Rainwater Tank/ JellyFish
LANDSCAPE A1	0.344	Mixed	10	OceanGuard/JellyFish
HARDSTAND A2	1.201	Sealedroad	90	OceanGuard/JellyFish
BYPASS	0.486	Mixed	50	None

B.5 Treatment Nodes

Pit basket and Filtration device treatment nodes have been used in the modelling of the development as provided by the suppliers of the products based on testing completed by the product manufacturers.

Pit Baskets – OceanGaurd

Parameter	**Value**
Treatable Flow	0.02m3/s (per Filter)
Pollutant Reductions	
Per Technical Guidelines	

Filtration Device (JellyFish JF3250-19-4)

Parameter	**Value**
Treatable Flow	0.105m3/s
Pollutant Reductions	
Per Technical Guidelines	

B.6 Results

Table B.3 shows the results of the MUSIC analysis. The reduction rate is expressed as a percentage and compares the post-development pollutant loads without treatment versus post-development loads with treatment.

Table B.3. - MUSIC analysis results

	Source	Residual Load	% Reduction Achieved	% Reduction Targets
Total Suspended Solids (kg/yr)	3850	508	86.8	85.0

Total Phosphorus (kg/yr)	8.84	3.49	60.5	55.0
Total Nitrogen (kg/yr)	74.5	34.7	53.4	40.0
Gross Pollutants (kg/yr)	875	48.0	94.5	90.0

The model results indicate that, through the use of the STM in the treatment train, pollutant load reductions for Total Suspended Solids, Total Phosphorous, Total Nitrogen and Gross Pollutants will meet the requirements of Council's DCP 2017 on an overall catchment basis.

B.7 Modelling Discussion

MUSIC modelling has been performed to assess the effectiveness of the selected treatment trains and to ensure that the pollutant retention requirements of Council have been met.

The MUSIC modelling has shown that the proposed treatment train of STM will provide stormwater treatment which will meet Councils requirements in an effective and economical manner.

Hydrocarbon and oil & grease removal cannot be modelled with MUSIC software. As an industrial development with users, the exact levels of hydrocarbons would not be known however given the expected use of the site as a warehouse distribution centre these pollutants would not be expected to be large. Potential sources of hydrocarbons and/or oil & grease which drain to the stormwater system would be limited to leaking engine sumps or for accidental fuel spills/leaks and leaching of bituminous pavements (car parking only). The potential for these pollutants is low and published data from the CSIRO indicates that average concentrations from industrial sites are in the order of 10mg/L and we would expect source loading from this site to be near to or below this concentration. Hydrocarbon pollution would also be limited to surface areas which will be treated via OceanProtect OceanGuard absorbent material, and Jellyfish system which are predicted to reduce this pollutant.

Given the expected low source loadings of hydrocarbons and oil/grease and removal efficiencies of the treatment devices we consider that the requirements of the Council have been met.

B.8 MUSIC Model Layout

The model was set up using the latest Council parameters for sandy clay loam soil and the layout of the MUSIC model is presented below.

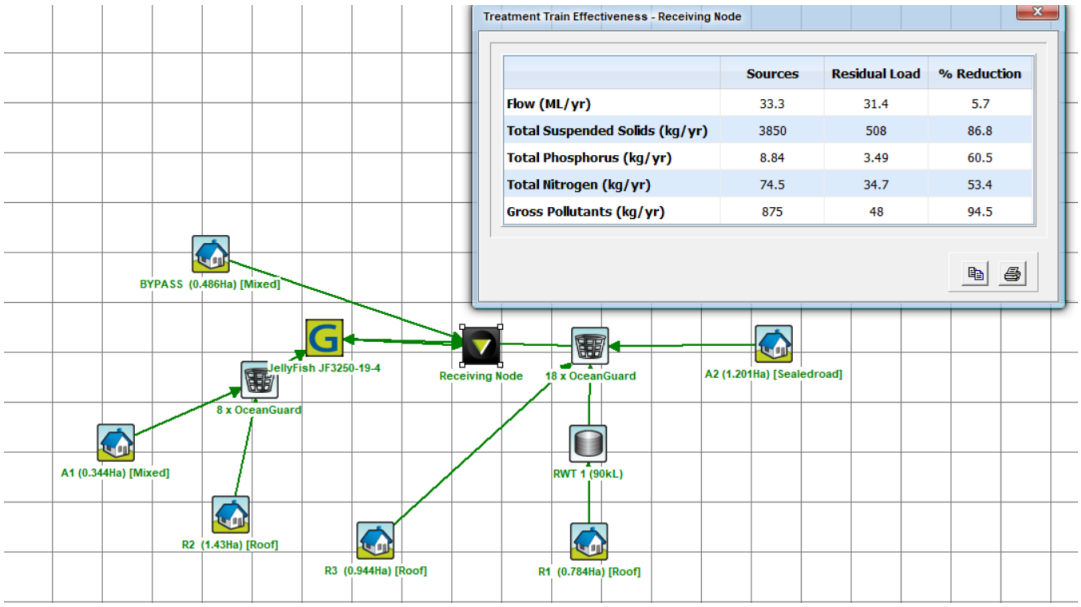

Figure B.8 - MUSIC Model Layout

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APPENDIX C
DRAFT SOIL AND WATER MANAGEMENT PLAN

C.1 Introduction

An erosion and sediment control plan (ESCP) is shown on drawing **CO15039.01-SSDA20** with details on **SSDA25**. These are conceptual plans only providing sufficient detail to clearly show that the works can proceed without undue pollution to receiving waters. A detailed plan will be prepared once consent is given and before works start.

The ESCP considers initial site establishment, requirements during construction of the development, and completion of development.

C.2 General Conditions

1. The ESCP will be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued in relation to development at the subject site.
2. Contractors will ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in *Managing Urban Stormwater, Soils and Construction (2004) "The Blue Book"* and Fairfield City Council specifications.
3. All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to down slope areas.

C.3 Land Disturbance

1. Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table C.1.**

Table C.1 Limitations to access

Land Use	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans.	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Access areas	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries.
Remaining lands	Entry prohibited except for essential management works	

C.4 Erosion Control Conditions

1. Clearly visible barrier fencing shall be installed as shown on the plan and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.
2. Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried, and topsoils remain on the surface at the completion of works.
3. Where practicable, schedule the construction program so that the time from starting land disturbance to stabilisation has a duration of less than six months.
4. Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.
5. Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.
6. Where practical, foot and vehicular traffic will be kept away from all recently established areas
7. Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as law a gradient as practical but not steeper than:
    - 2H:1V where slope length is less than 7 metres
    - 2.5H:1V where slope length is between 7 and 10 metres
    - 3H:1V where slope length is between 10 and 12 metres
    - 4H:1V where slope length is between 12 and 18 metres
    - 5H:1V where slope length is between 18 and 27 metres
    - 6H:1V where slope length is greater than 27 metres
8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event.
9. During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in sufficient quantities, soil binders and/or dust retardants will be used, or the surface will be left in a cloddy state that resists removal by wind.

C.5 Pollution Control Conditions

1. Stockpiles will not be located within 5 metres of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways. Silt/ sediment fences and appropriate stabilisation of stockpiles are to be provided as detailed on the drawings.
2. Sediment fences will:
    a. Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.

b. Have a catchment area not exceeding 720 square meters, a storage depth (including both settling and settled zones) of at least 0.6 meters, and internal dimensions that provide maximum surface area for settling, and

c. Provide a return of 1 metre upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20-year tc discharge.

3. Sediment removed from any trapping device will be disposed in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.
4. Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.
5. Temporary soil and water management structures will be removed only after the lands they are protecting are stabilised.

C.6 Waste Management Conditions

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance service will be provided at least weekly.

C.7 Site Inspection and Maintenance

1. A self-auditing program will be established based on a Check Sheet. A site inspection using the Check Sheet will be made by the site manager:
   - At least weekly.
   - Immediately before site closure.
   - Immediately following rainfall events in excess of 5mm in any 24-hour period.

   The self-audit will include:
   - Recording the condition of every sediment control device
   - Recording maintenance requirements (if any) for each sediment control device
   - Recording the volumes of sediment removed from sediment retention systems, where applicable
   - Recording the site where sediment is disposed
   - Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their information
2. In addition, a suitably qualified person will be required to oversee the installation and maintenance of all soil and water management works on the site. The person shall be required to provide a short monthly written report. The responsible person will ensure that:
   - The plan is being implemented correctly
   - Repairs are undertaken as required

- Essential modifications are made to the plan if and when necessary

The report shall carry a certificate that works have been carried out in accordance with the plan.

3. Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.
4. Proper drainage will be maintained. To this end drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that,
   - No low points exist that can overtop in a large storm event
   - Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams of installing additional diversion upslope.
   - Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).
5. Sand/soil/spoil materials placed closer than 2 meters from hazard areas will be removed. Such hazard areas include and areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.
6. Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.
7. Excessive vegetation growth will be controlled through mowing or slashing.
8. All sediment detention systems will be kept in good, working condition. In particular, attention will be given to:
   a) Recent works to ensure they have not resulted in diversion of sediment laden water away from them
   b) Degradable products to ensure they are replaced as required, and
   c) Sediment removal, to ensure the design capacity or less remains in the settling zone.
9. Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.
10. Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.
11. Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site stabilised
12. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

EROSION AND SEDIMENT CONTROL
WEEKLY SITE INSPECTION SHEET

LOCATION . . . . . .
INSPECTION OFFICER . . . . . **DATE** . . . . . .
SIGNATURE . . . . . .

Legend: □ OK □ Not OK N/A Not applicable

Item	Consideration	Assessment
1	Public roadways clear of sediment.	. . . . .
2	Entry/exit pads clear of excessive sediment deposition.	. . . . .
3	Entry/exit pads have adequate void spacing to trap sediment.	. . . . .
4	The construction site is clear of litter and unconfined rubbish.	. . . . .
5	Adequate stockpiles of emergency ESC materials exist on site.	. . . . .
6	Site dust is being adequately controlled.	. . . . .
7	Appropriate drainage and sediment controls have been installed prior to new areas being cleared or disturbed.	. . . . .
8	Up-slope "clean" water is being appropriately diverted around/through the site.	. . . . .
9	Drainage lines are free of soil scour and sediment deposition.	. . . . .
10	No areas of exposed soil are in need of erosion control.	. . . . .
11	Earth batters are free of "rill" erosion.	. . . . .
12	Erosion control mulch is not being displaced by wind or water.	. . . . .
13	Long-term soil stockpiles are protected from wind, rain and stormwater flow with appropriate drainage and erosion controls.	. . . . .
14	Sediment fences are free from damage.	. . . . .
15	Sediment-laden stormwater is not simply flowing "around" the sediment fences or other sediment traps.	. . . . .
16	Sediment controls placed up-slope/around stormwater inlets are appropriate for the type of inlet structure.	. . . . .
17	All sediment traps are free of excessive sediment deposition.	. . . . .
18	The settled sediment layer within a sediment basin is clearly visible through the supernatant prior to discharge such water.	. . . . .
19	All reasonable and practicable measures are being taken to control sediment runoff from the site.	. . . . .
20	All soil surfaces are being appropriately prepared (i.e. pH, nutrients, roughness and density) prior to revegetation.	. . . . .
21	Stabilised surfaces have a minimum 70% soil coverage.	. . . . .
22	The site is adequately prepared for imminent storms.	. . . . .
23	All ESC measures are in proper working order.	. . . . .

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APPENDIX D
STORMWATER SYSTEM
DRAFT MANAGEMENT SCHEDULE

Maintenance Action	Frequency	Responsibility	Procedure
Swales/ Landscaped Areas			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Six monthly	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Six Monthly	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.
Inlet & Junction Pits			
Inside of pits	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of pits	Four Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.
Pit Inserts			
PIT INSERTS: Refer to manufacturer operation and maintenance manual.	3 Monthly/ After Major Storm Refer to manufacturer 's O&M manual.	Maintenance Contractor Refer to manufacturer's O&M manual.	Refer to manufacturer operation and maintenance manual.

Proprietary Treatment Devices (Oceanprotect Jellyfish)			
Refer to Manufacturers Operation and Maintenance Manuel	Annually	Maintenance Contractor	Refer to Manufacturers Operation and Maintenance Manuel
Rainwater Tank			
Check for any clogging and blockage of the first flush device	Monthly	Maintenance Contractor	First flush device to be cleaned out
Check for any clogging and blockage of the tank inlet -leaf/litter screen	Six monthly	Maintenance Contractor	Leaves and debris to be removed from the inlet leaf/litter screen
Check the level of sediment within the tank	Every two years	Maintenance Contractor	Sediment and debris to be removed from rainwater tank floor if sediment level is greater than the maximum allowable depth as specified by the hydraulic consultant
Stormwater System			
General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.
Tanks (If Applicable)			
Inspect and remove any blockage from orifice	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen to inspect orifice.
Inspect trash screen and clean	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen if required to clean it.
Inspect flap valve and remove any blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate. Ensure flap valve moves freely and remove any blockages or debris.
Inspect pit sump for damage or blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate & screen. Remove sediment/ sludge build up and check orifice and flap valve are clear.
Inspect storage areas and remove debris/ mulch/ litter etc likely to block screens/ grates.	Six Monthly	Maintenance Contractor/ Owner	Remove debris and floatable materials.

Check attachment of orifice plate and screen to wall of pit	Annually	Maintenance Contractor	Remove grate and screen. Ensure plate or screen mounted securely, tighten fixings if required. Seal gaps if required.
Check orifice diameter is correct and retains sharp edge.	Five yearly	Maintenance Contractor	Compare diameter to design (see Work-as-Executed) and ensure edge is not pitted or damaged.
Check screen for corrosion	Annually	Maintenance Contractor	Remove grate and screen and examine for rust or corrosion, especially at corners or welds.
Inspect overflow weir and remove any blockage	Six monthly	Maintenance Contractor/ Owner	Ensure weir is free of blockage.
Inspect walls for cracks or spalling	Annually	Maintenance Contractor	Remove grate to inspect internal walls, repair as necessary.
Check step irons	Annually	Maintenance Contractor	Ensure fixings are secure and irons are free from corrosion.

The maintenance schedule provided is for guidance only. The initial sizing of the stormwater treatment Jellyfish unit, completed in conjunction with Ocean protect includes mass loading calculations, which confirm the appropriate sizing of the system including the sump storage requirements. This ensures that the anticipated maintenance regime is not onerous and in accordance with the manufacturer's recommendations and six monthly intervals.

Ultimately, the maintenance will depend on the site conditions, though will be within expected ranges noted in the draft maintenance schedule.

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APPENDIX E
FLOOD MODELLING OUTPUT

CATCHMENT SIMULATION SOLUTIONS

EXISTING FLOOD OUTPUT

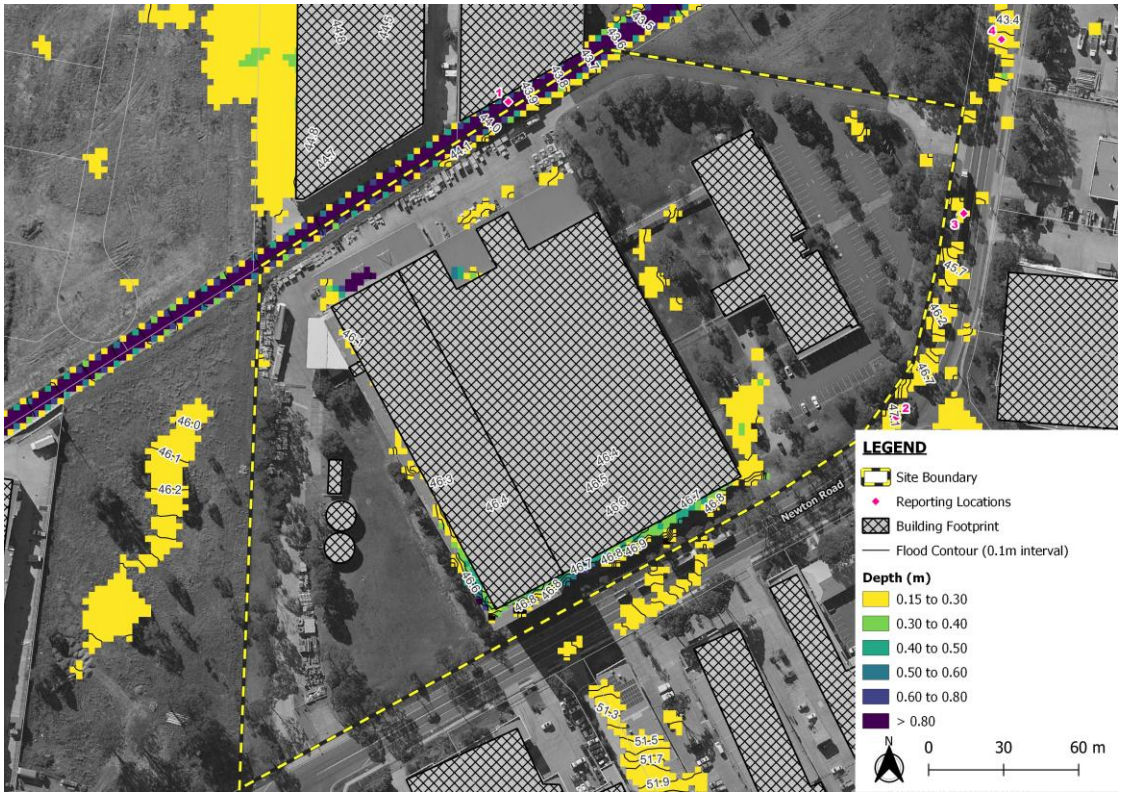

Figure G1- 5% AEP Flood Depths (Existing)

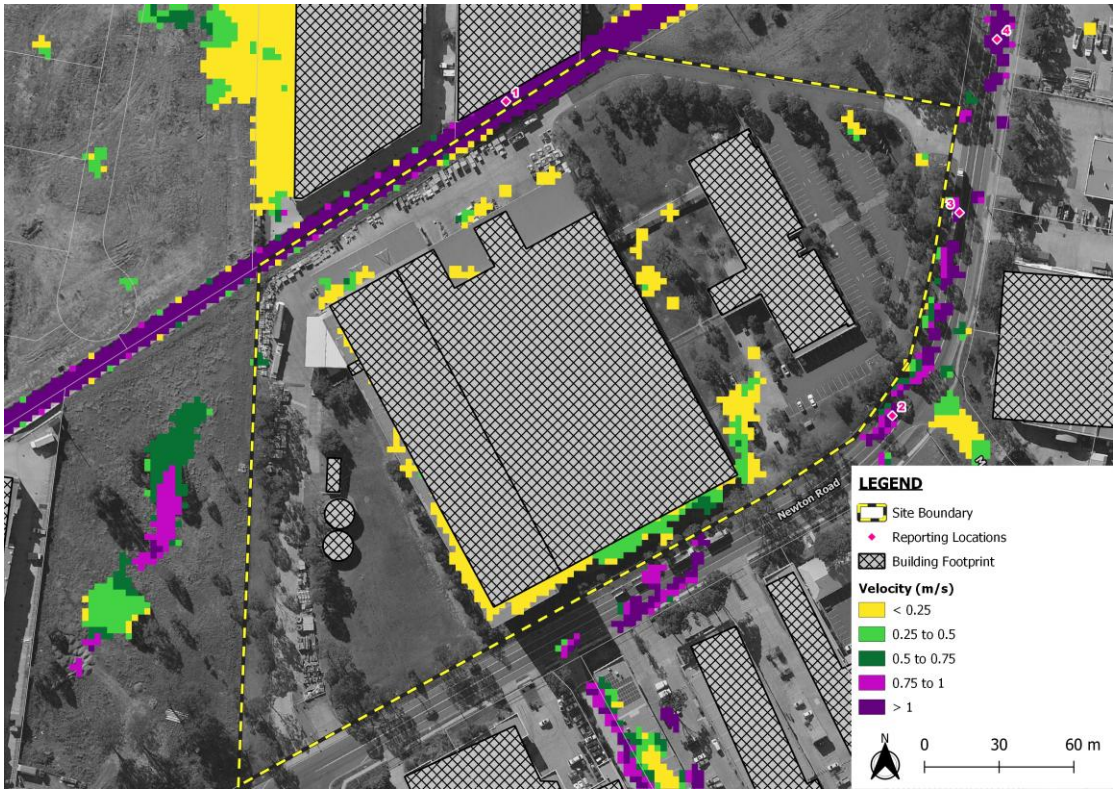

Figure G2-5% AEP Flood Velocity (Existing)

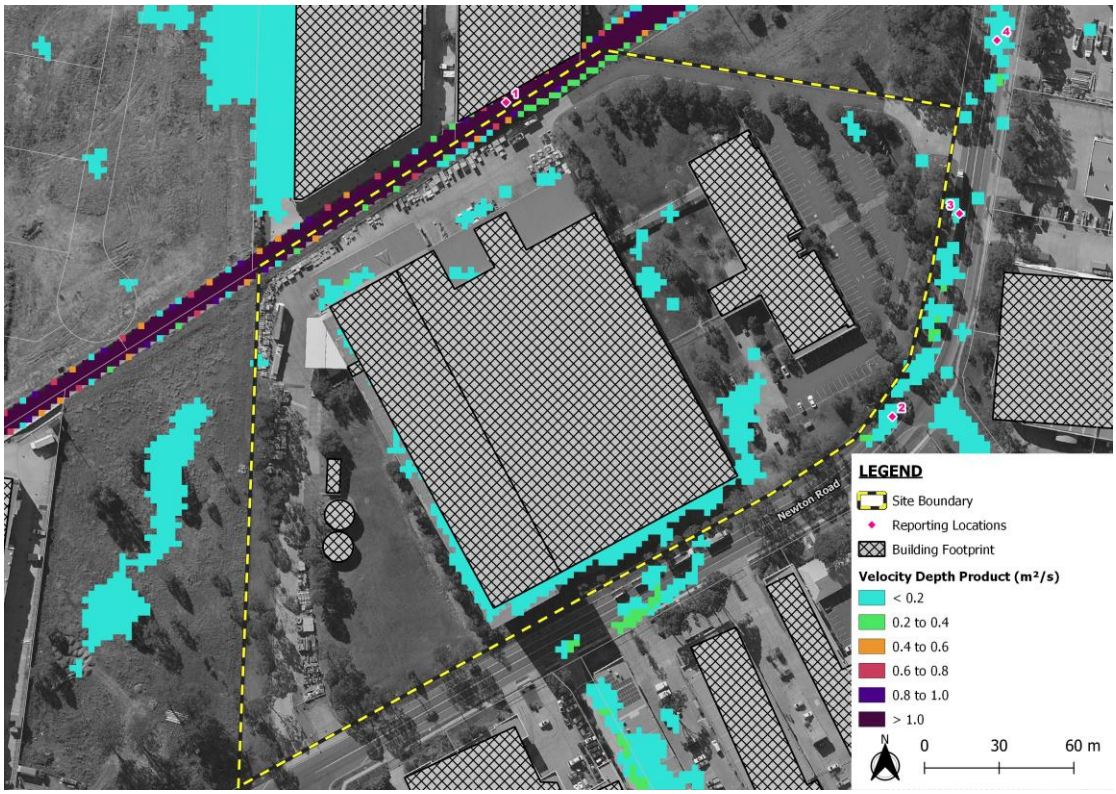

Figure G3- 5% AEP Velocity Depth (Existing)

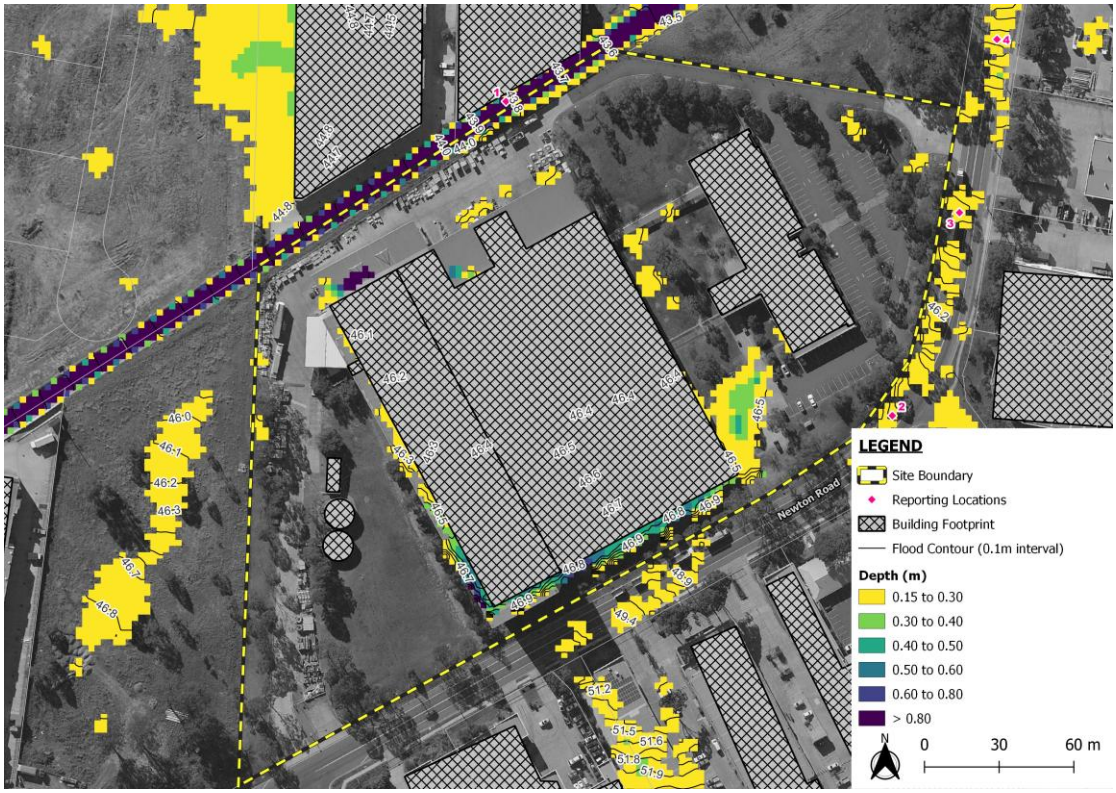

Figure G4- 1% AEP Flood Depth (Existing)

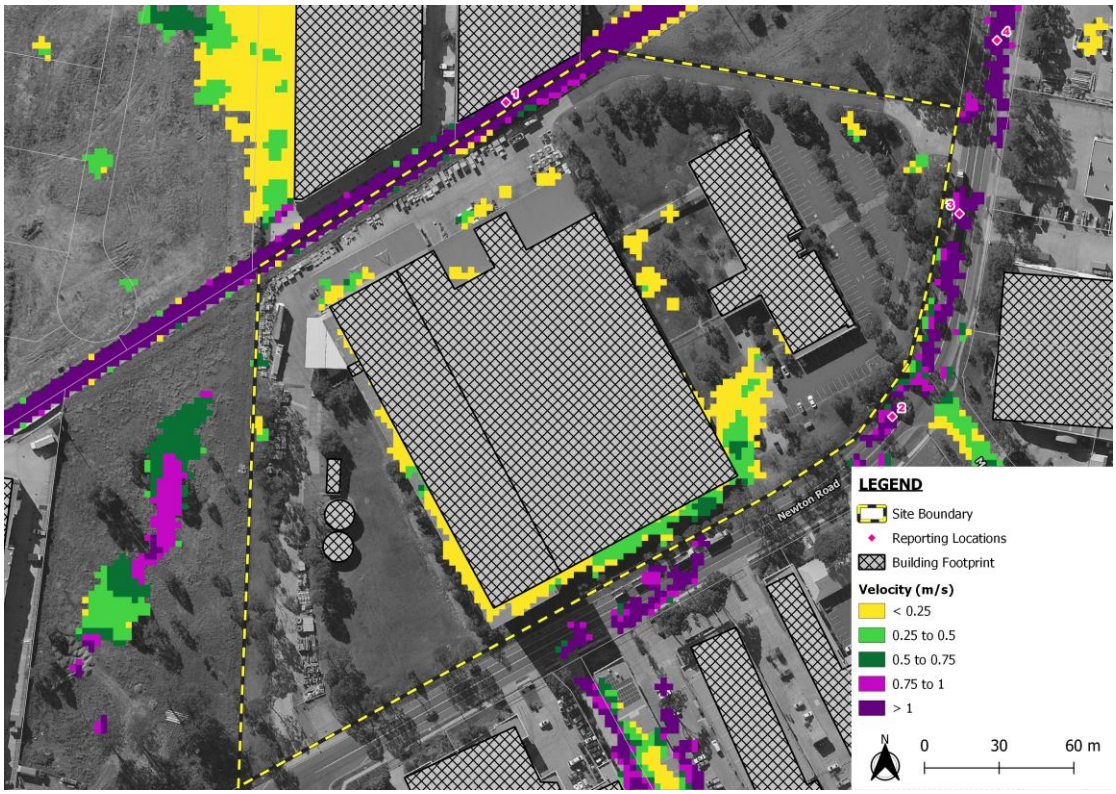

Figure G5- 1% AEP Flood Velocity (Existing)

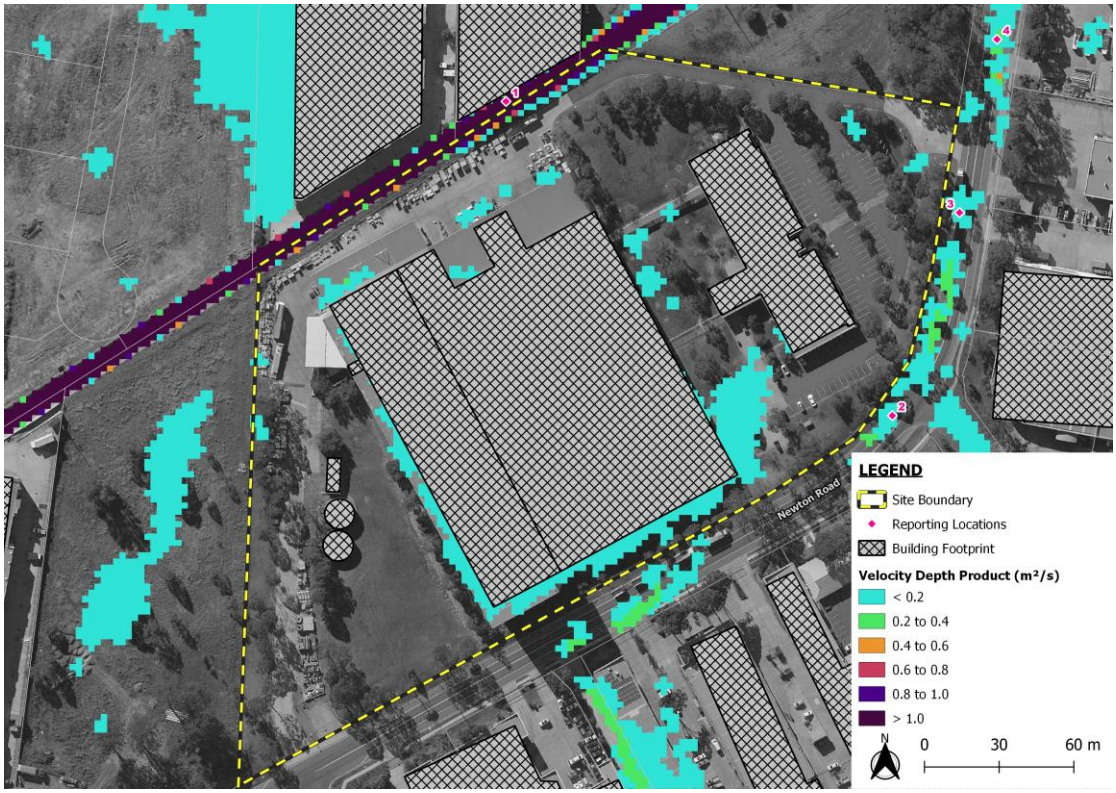

Figure G6- 1% AEP Velocity Depth (Existing)

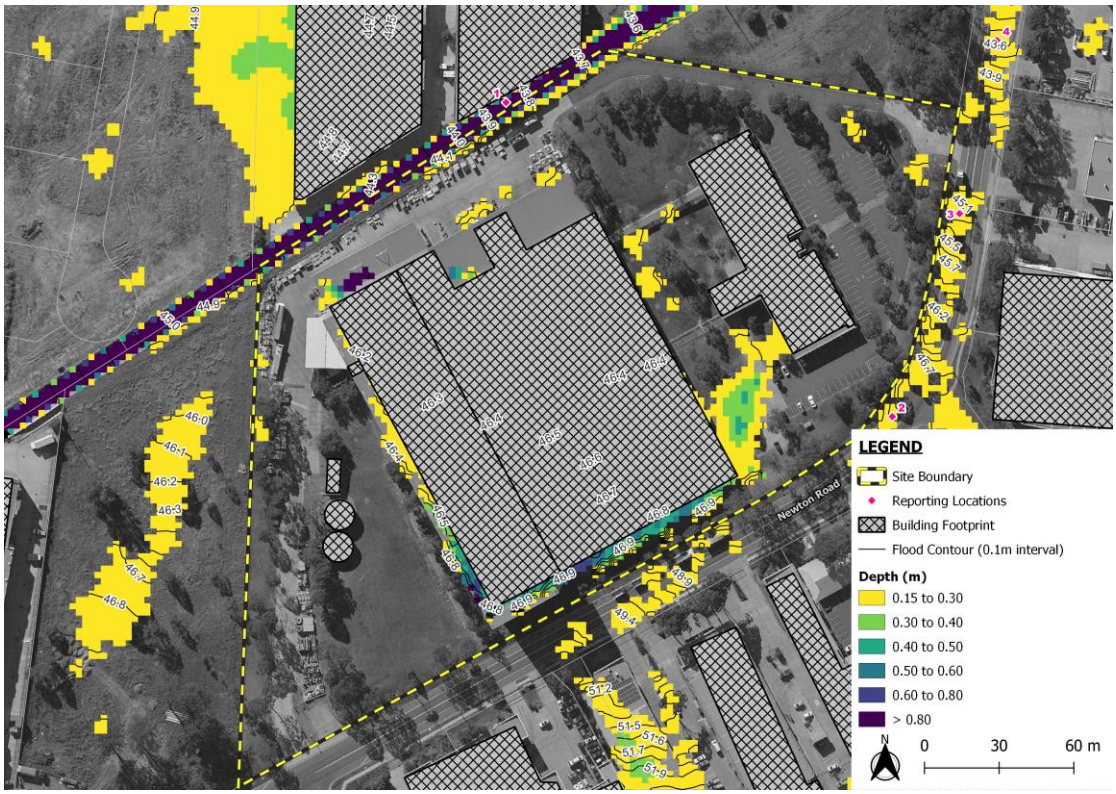

Figure G7- 0.5% AEP Flood Depth (Existing)

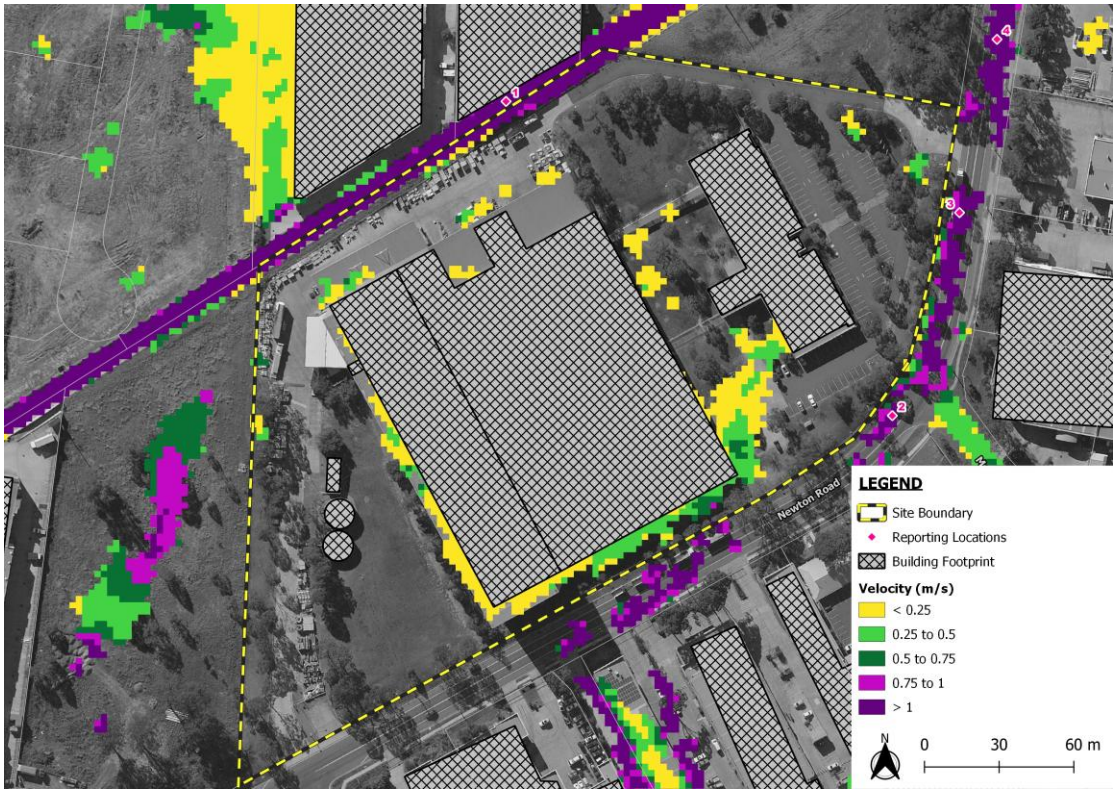

Figure G8- 0.5% AEP Flood Velocity (Existing)

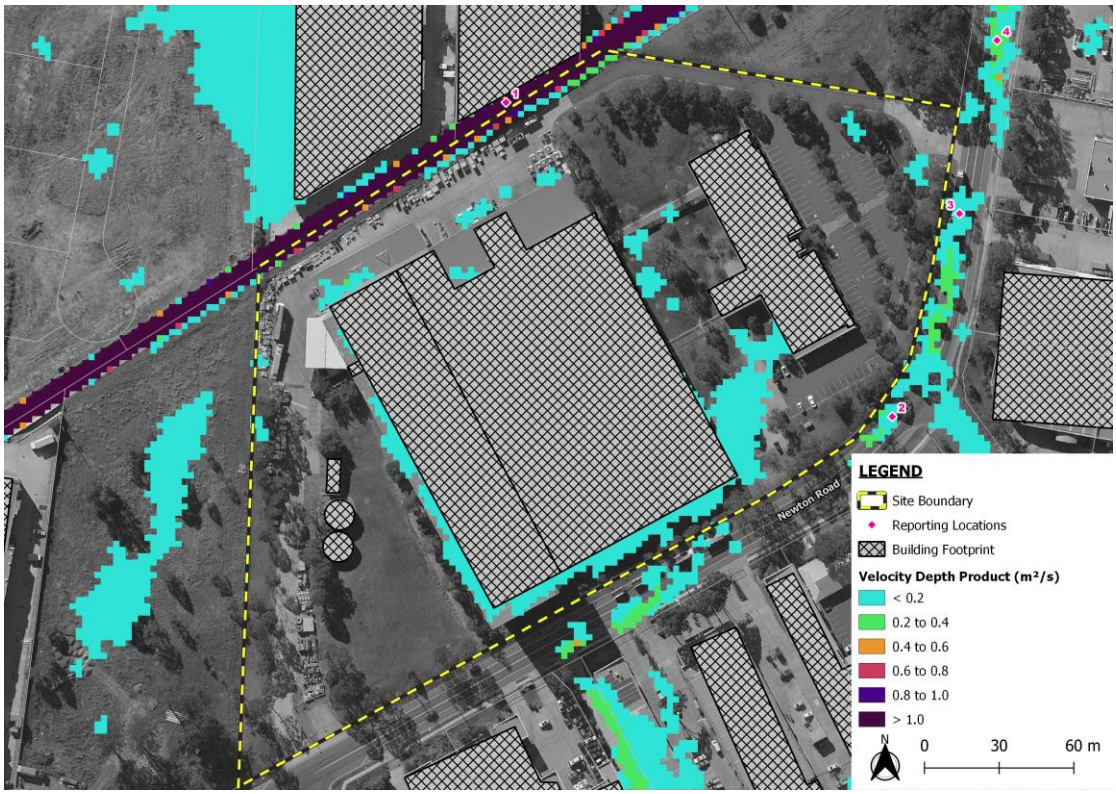

Figure G9- 0.5% AEP Velocity Depth (Existing)

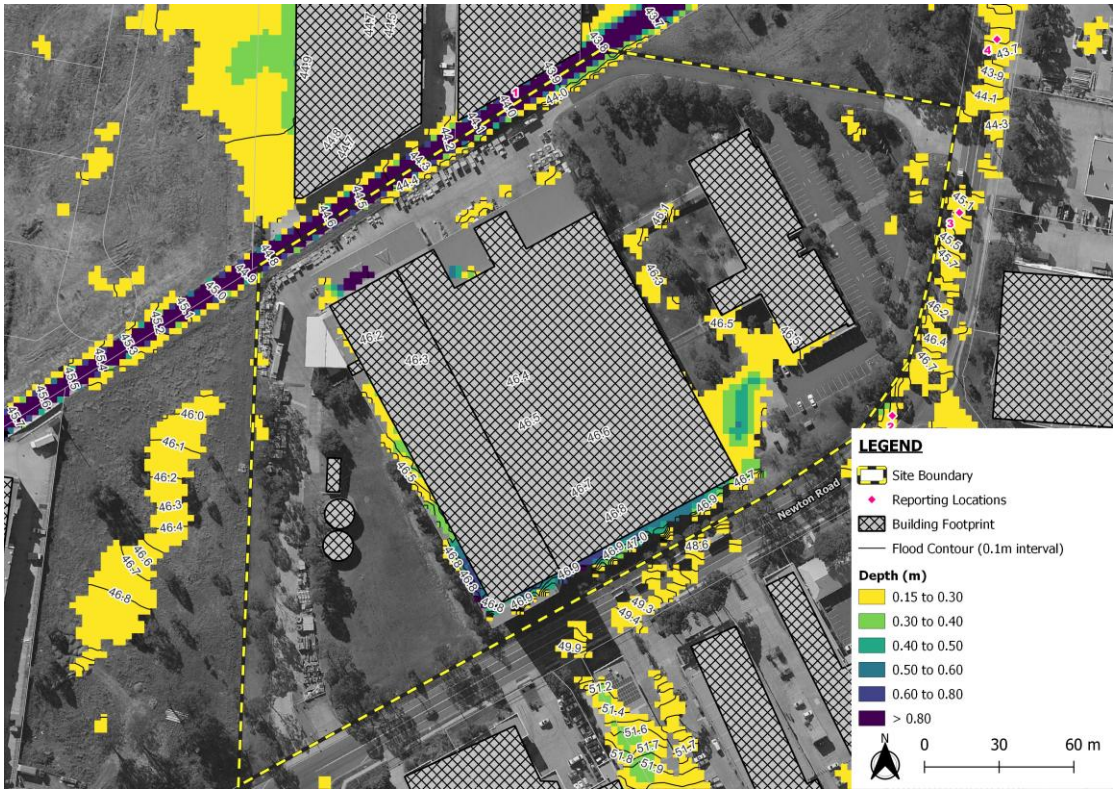

Figure G10- 0.2% AEP Flood Depth (Existing)

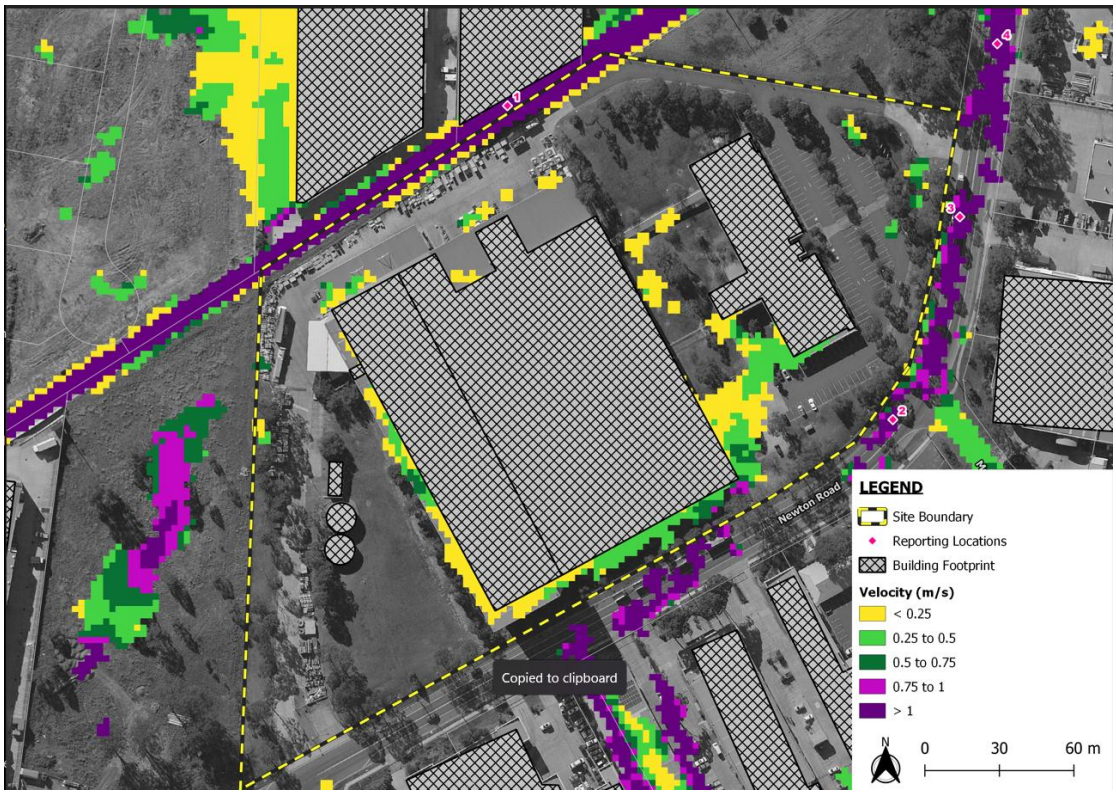

Figure G11- 0.2% AEP Flood Velocity (Existing)

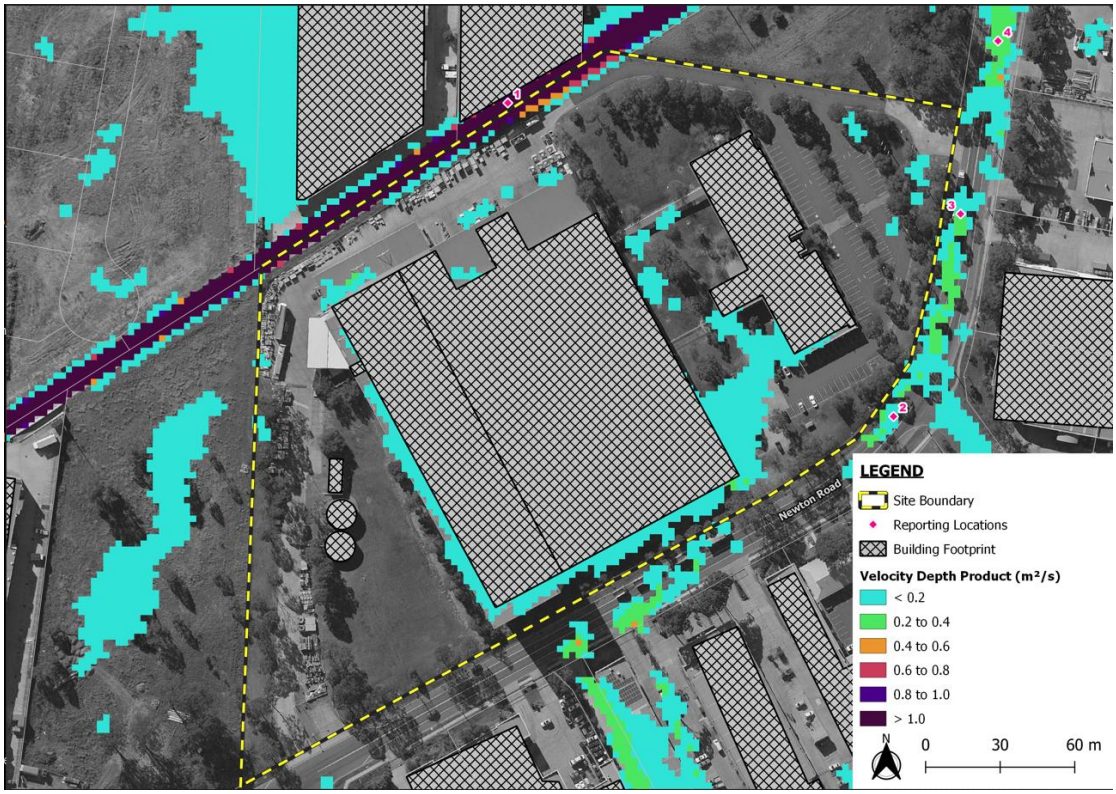

Figure G12- 0.2% AEP Velocity Depth (Existing)

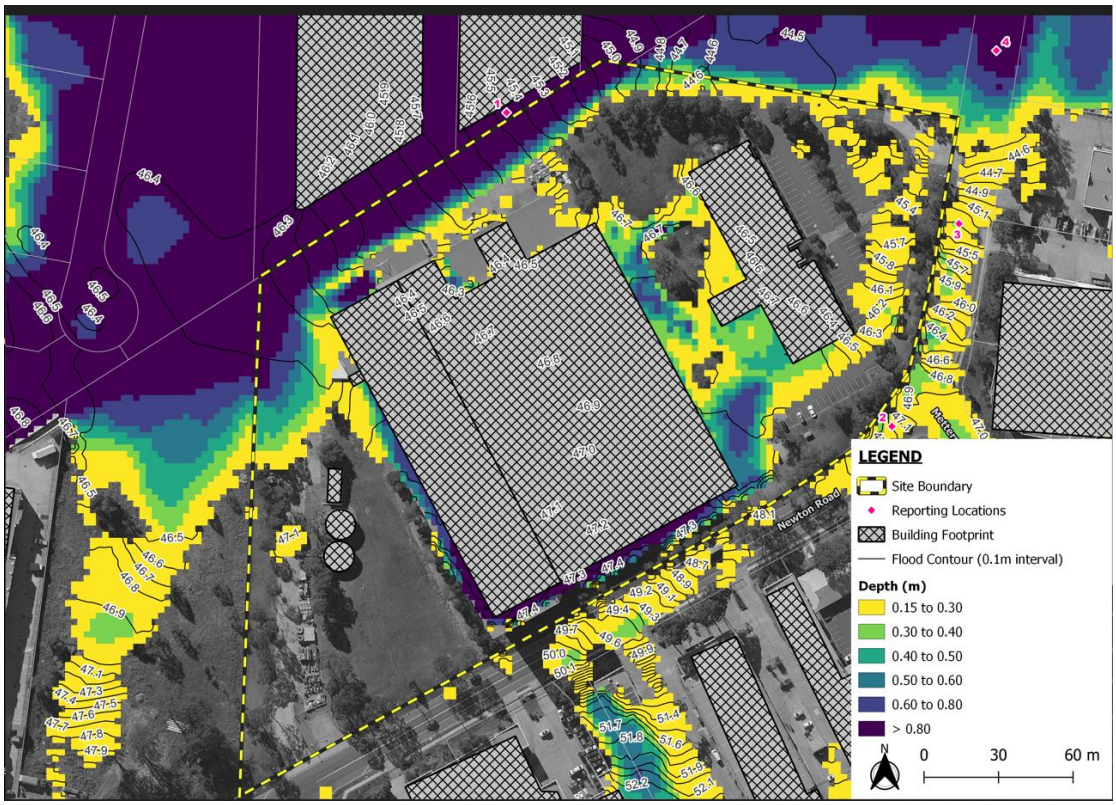

Figure G13- PMF AEP Flood Depth (Existing)

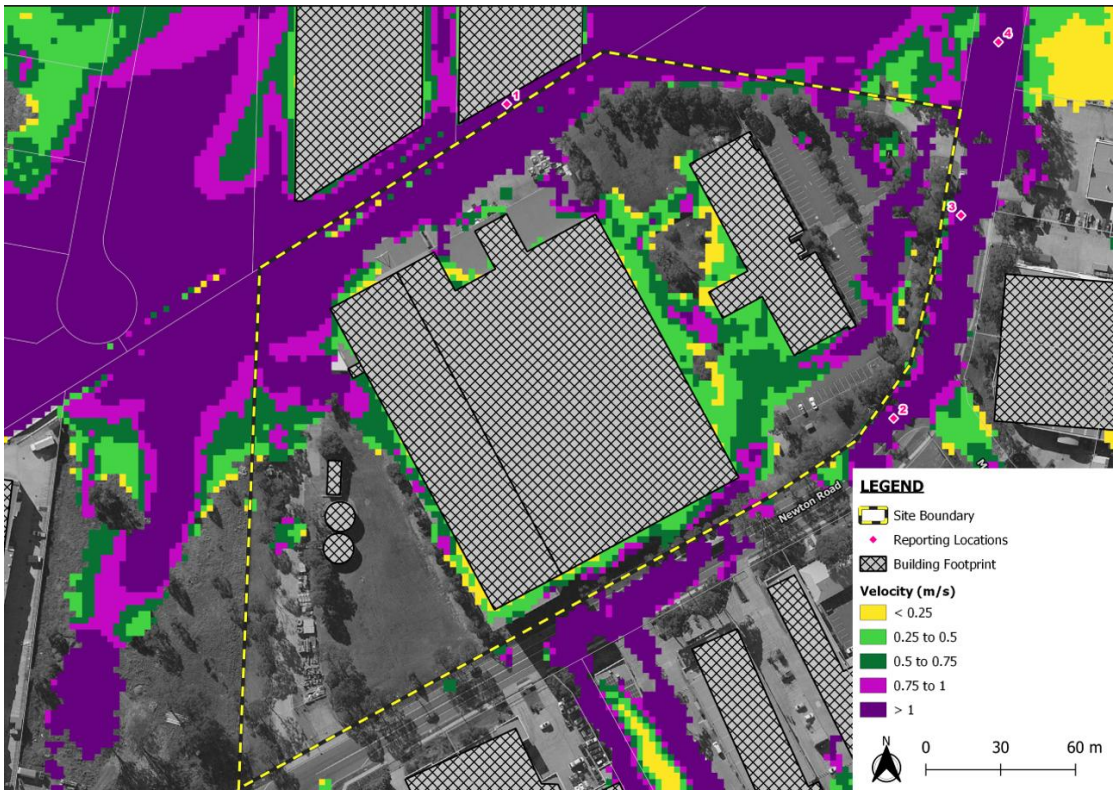

Figure G14- PMF AEP Flood Velocity (Existing)

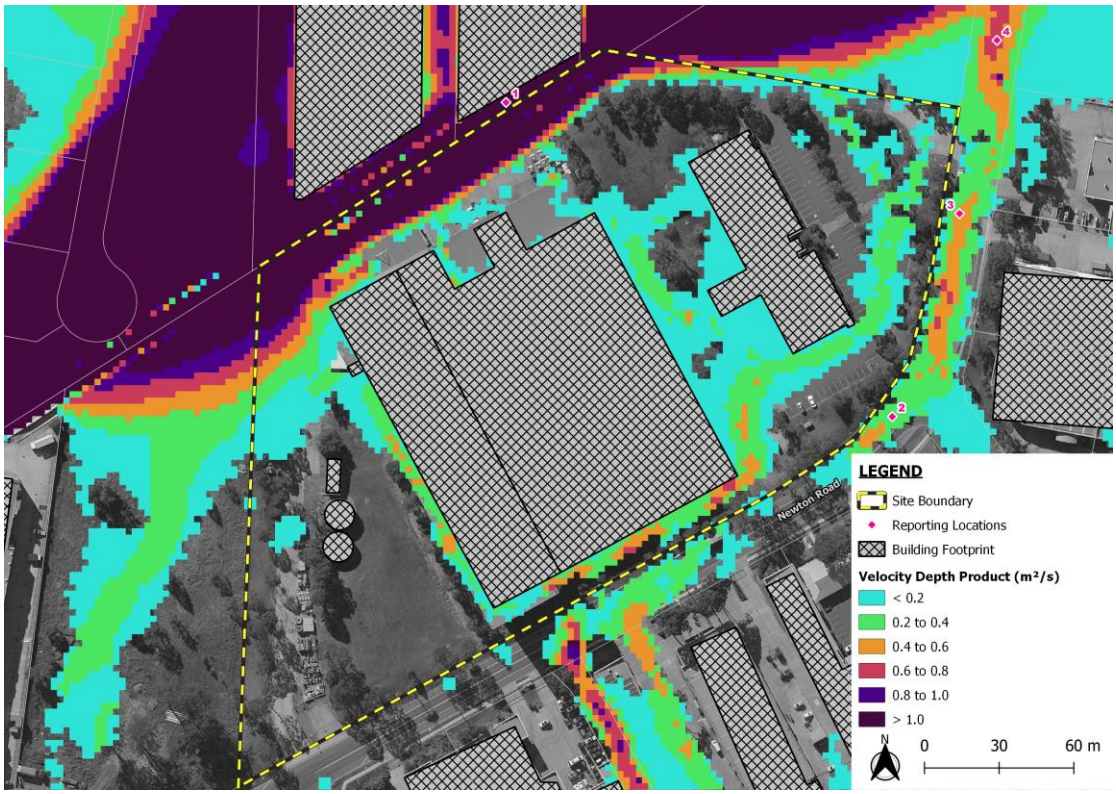

Figure G15- PMF AEP Velocity Depth (Existing)

POST DEVELOPMENT FLOOD OUTPUT

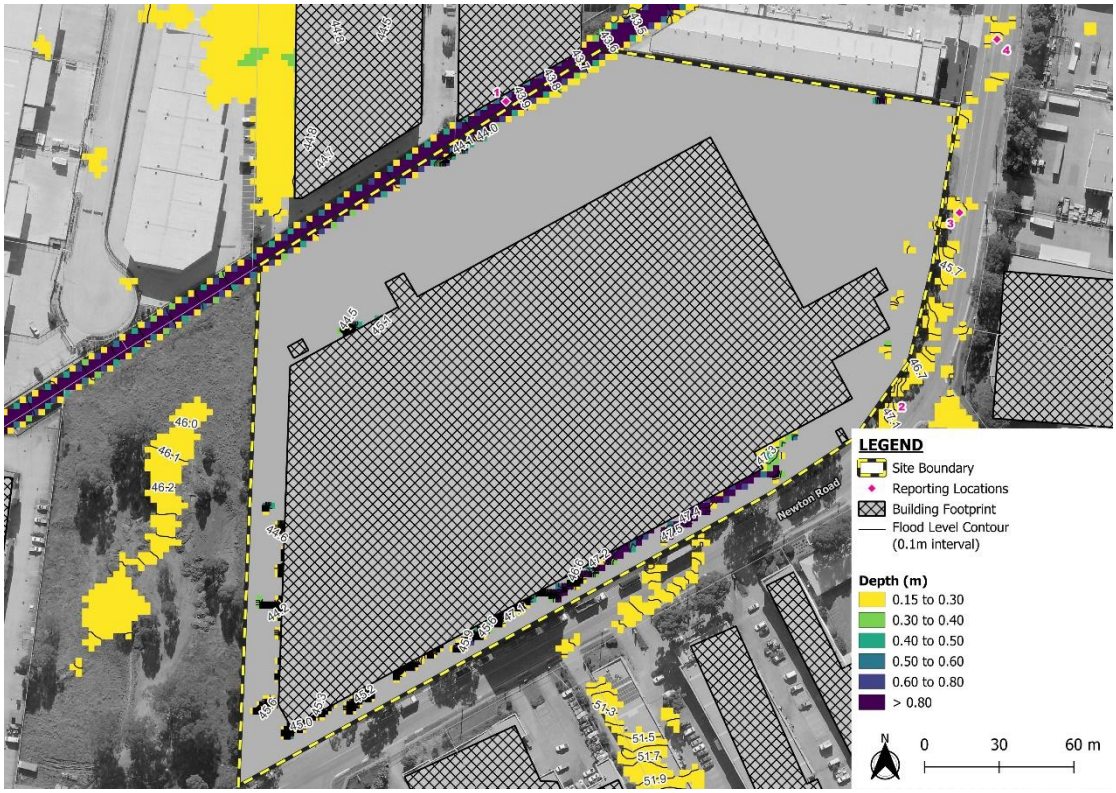

Figure G16- 5% AEP Flood Depth (Post Development)

Figure G17-5% AEP Flood Velocity (Post Development)

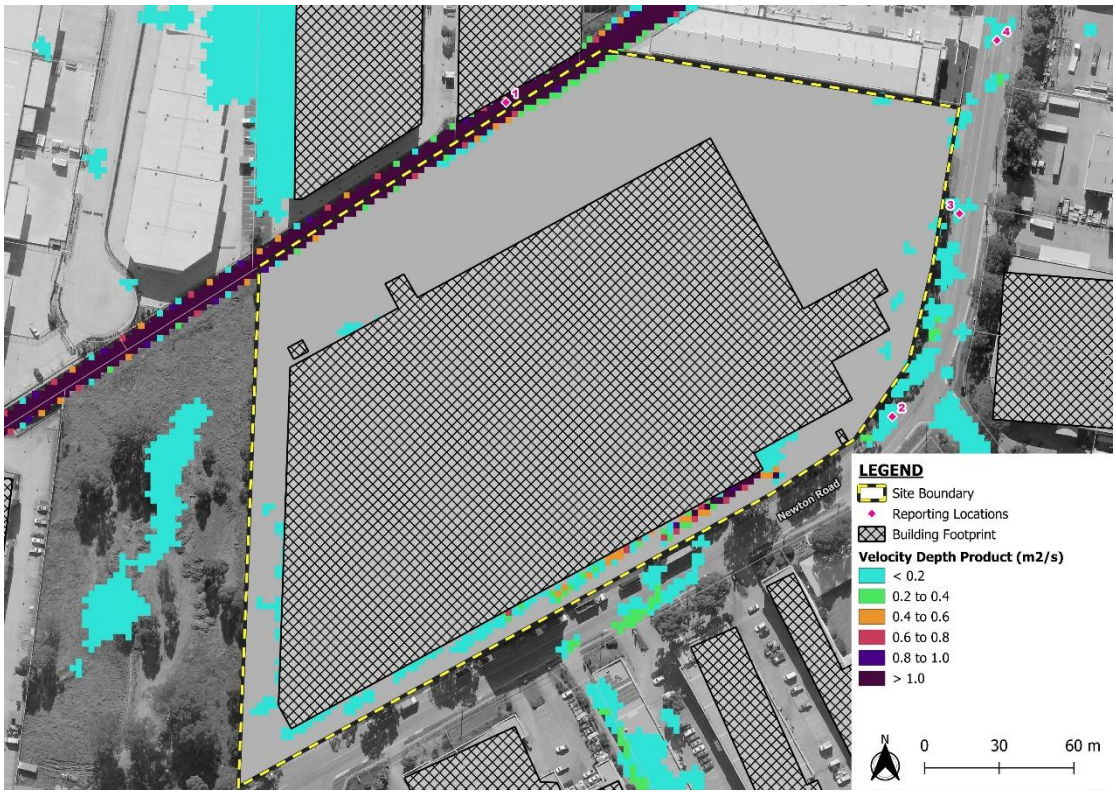

Figure G18-5% AEP Velocity Depth (Post Development)

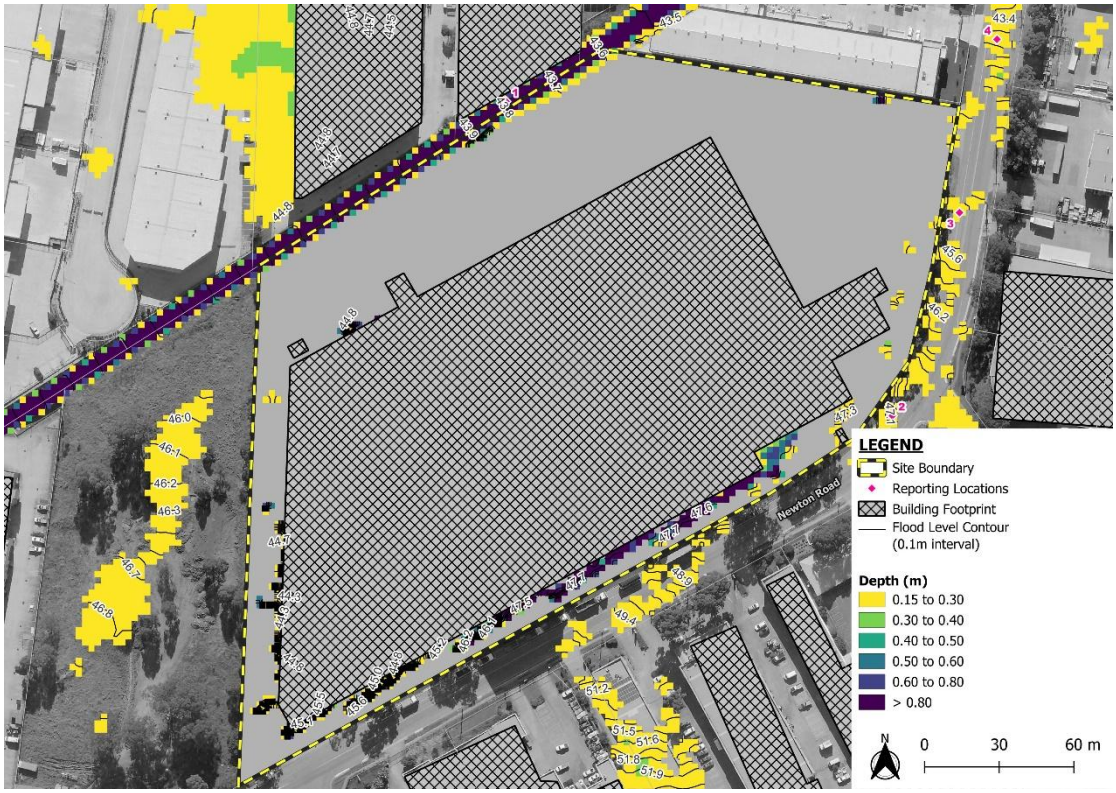

Figure G19- 1% AEP Flood Depth (Post Development)

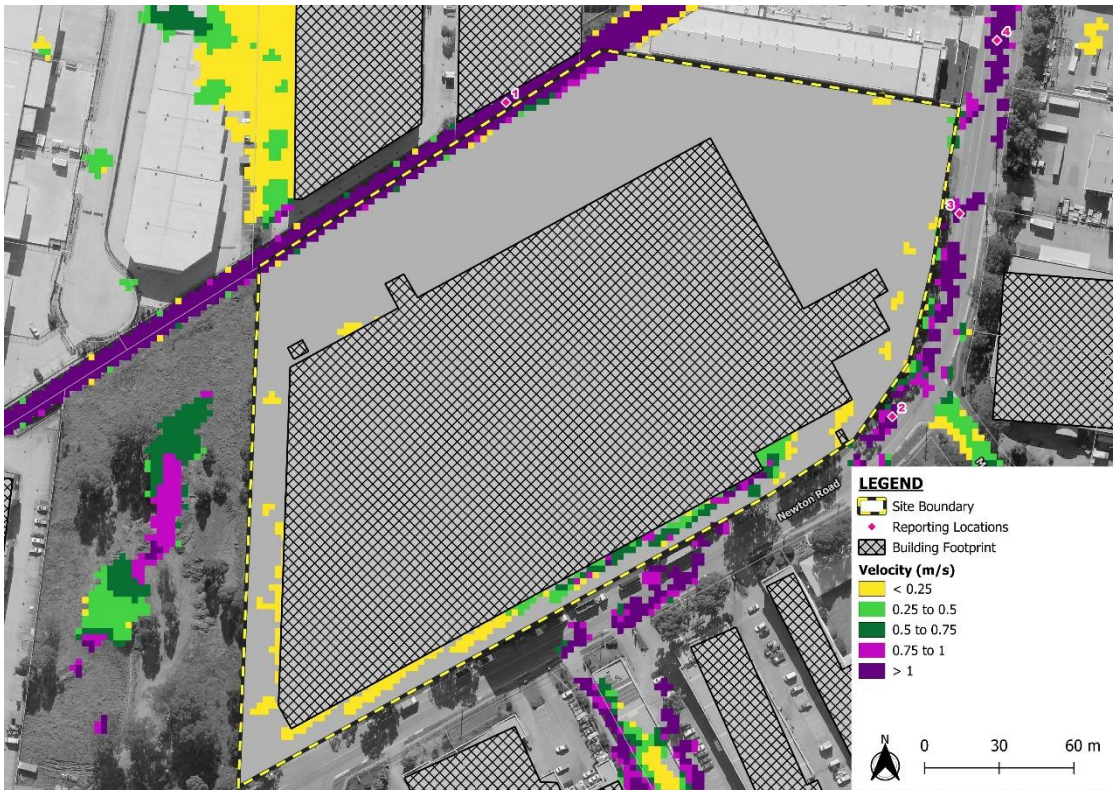

Figure G20- 1% AEP Flood Velocity (Post Development)

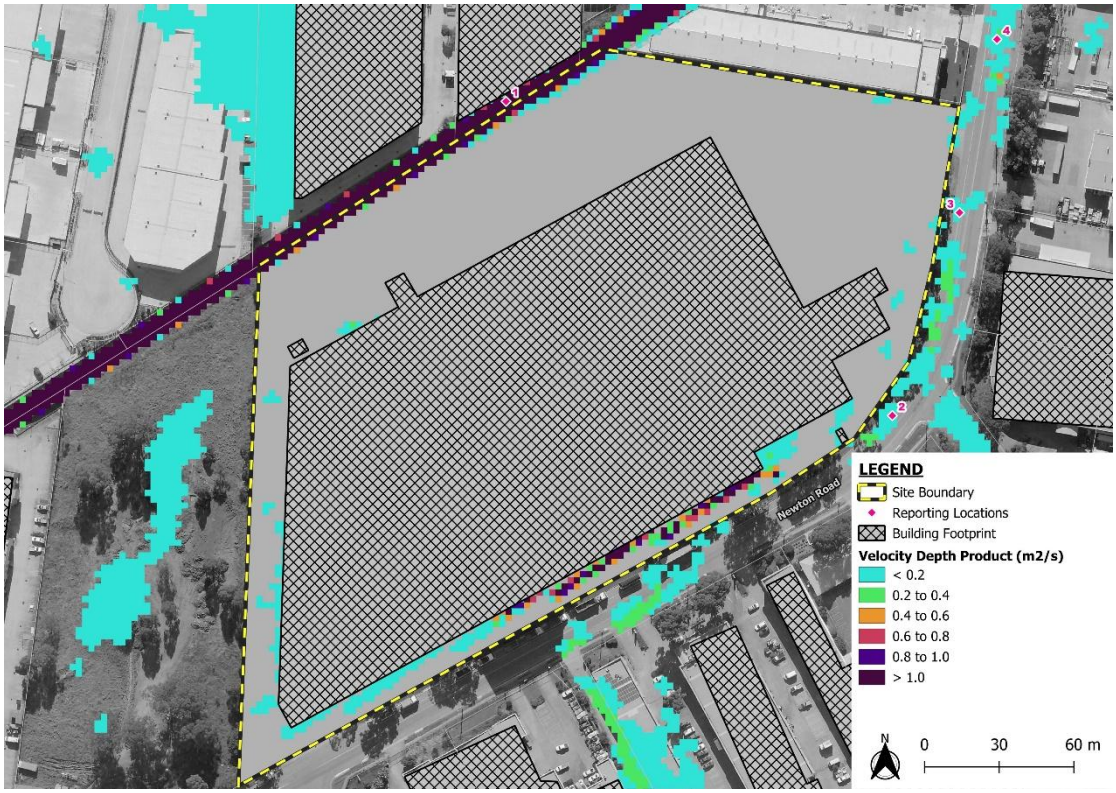

Figure G21- 1% AEP Velocity Depth (Post Development)

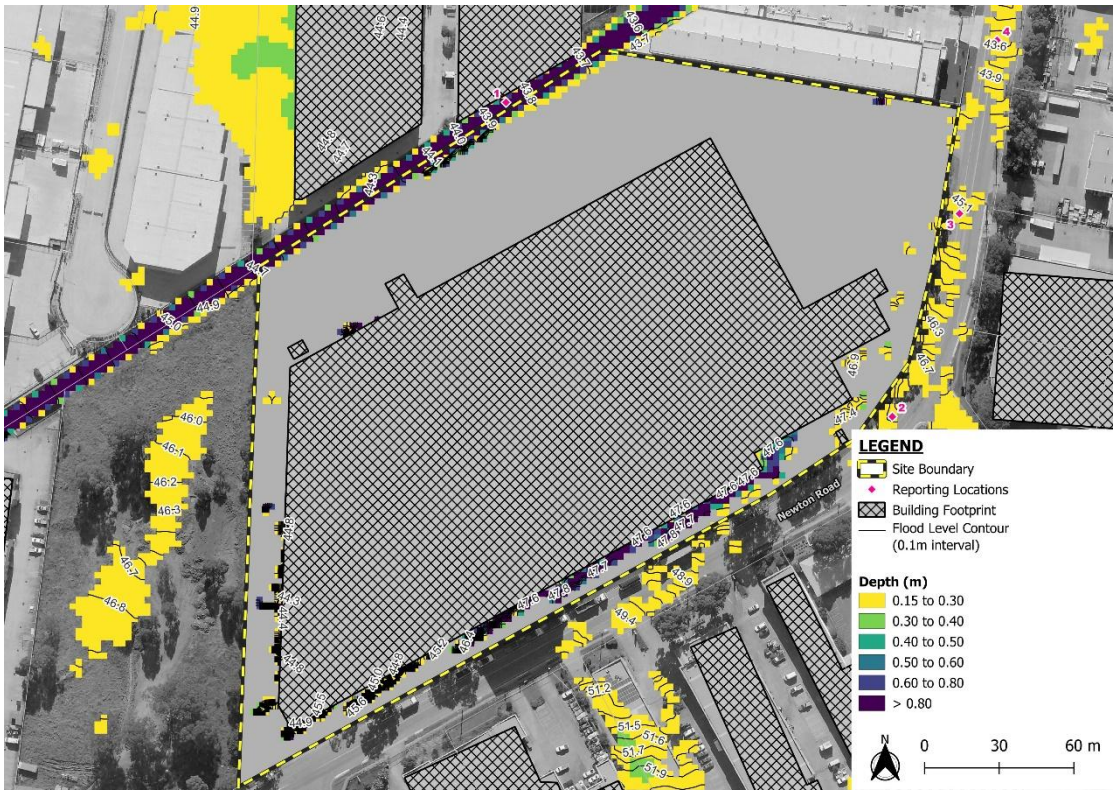

Figure G22- 0.5% AEP Flood Depth (Post Development)

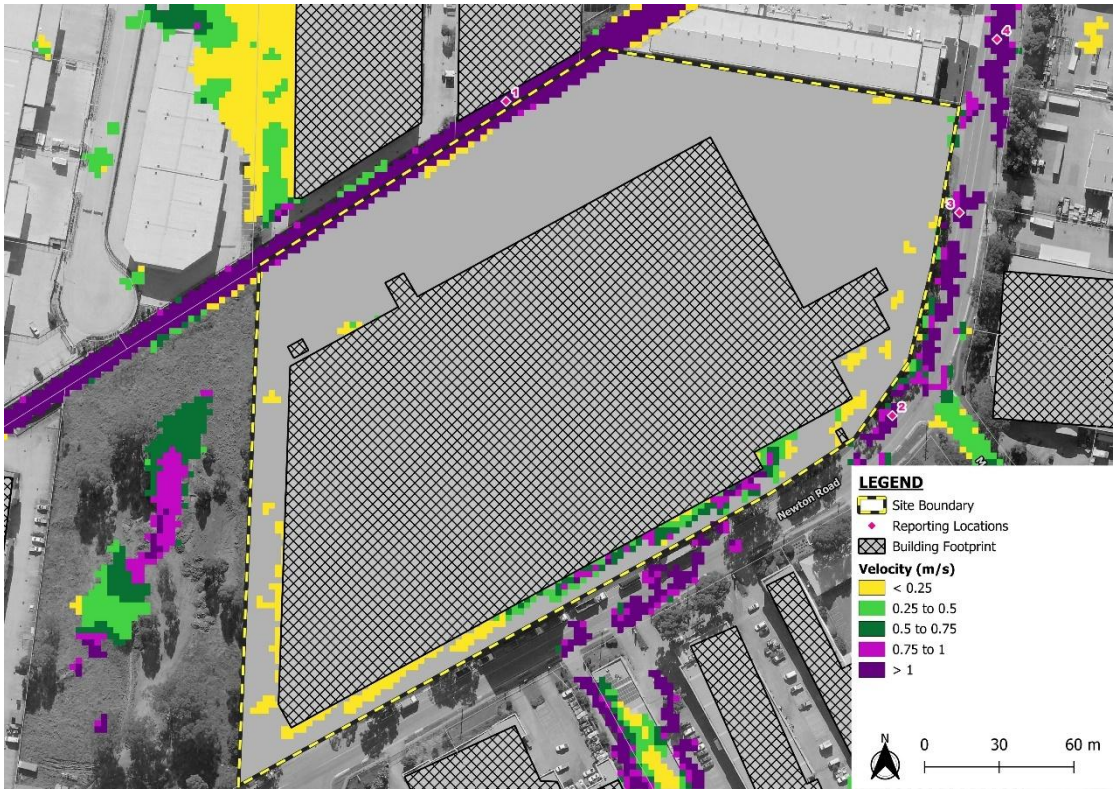

Figure G23- 0.5% AEP Flood Velocity (Post Development)

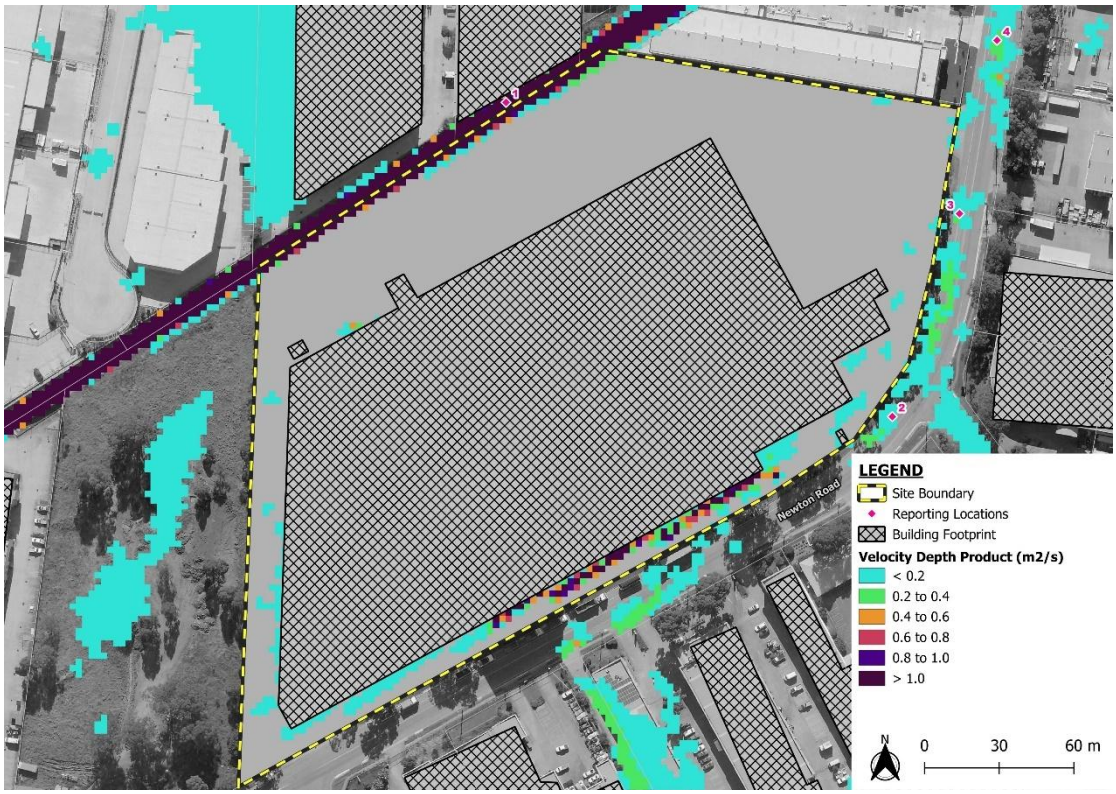

Figure G24- 0.5% AEP Velocity Depth (Post Development)

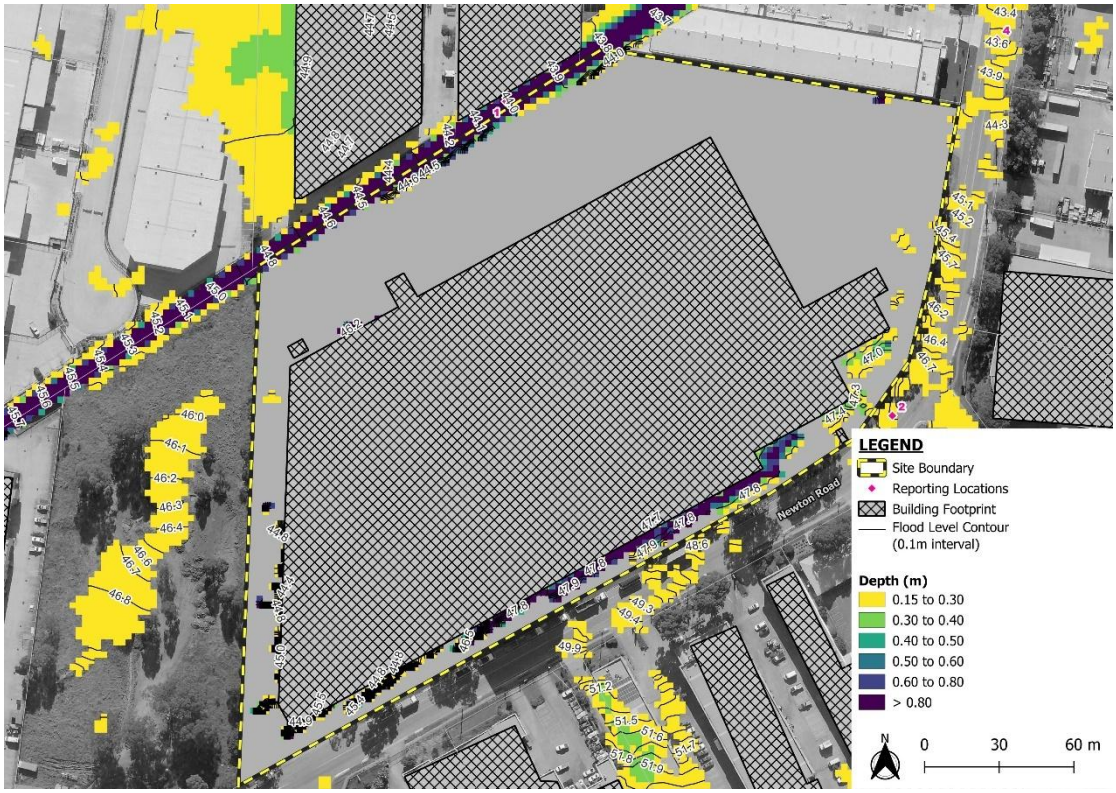

Figure G25- 0.2% AEP Flood Depth (Post Development)

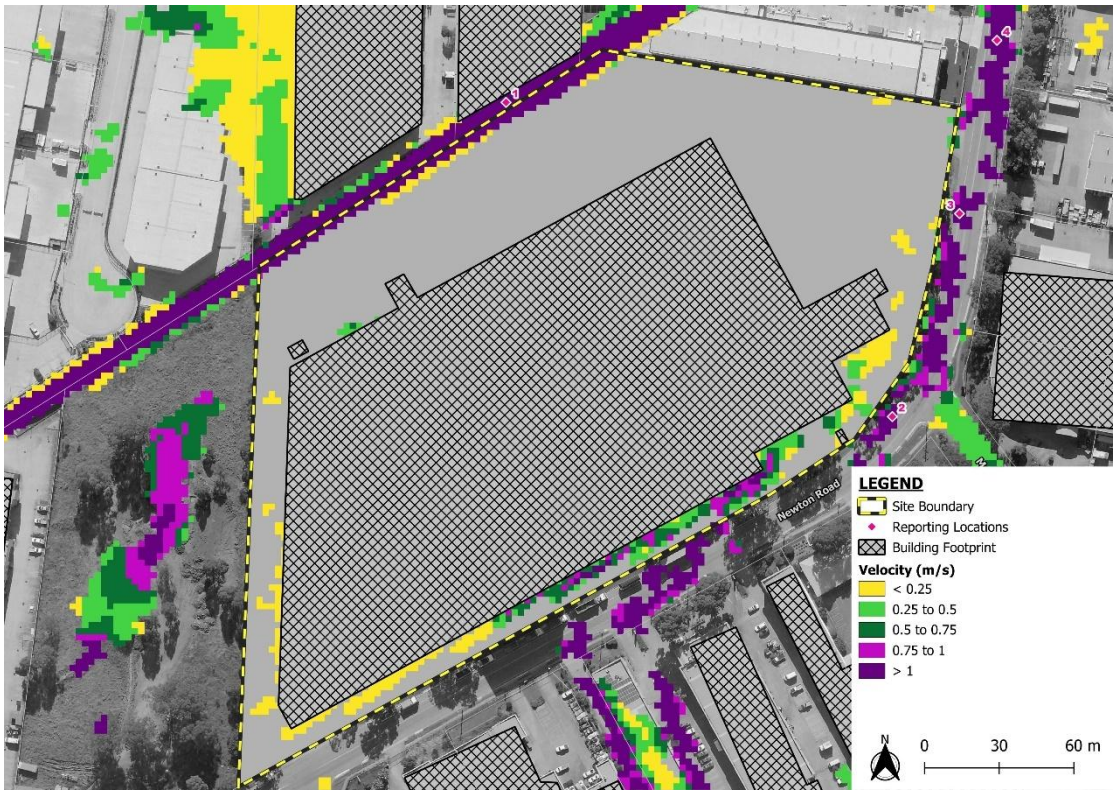

Figure G26- 0.2% AEP Flood Velocity (Post Development)

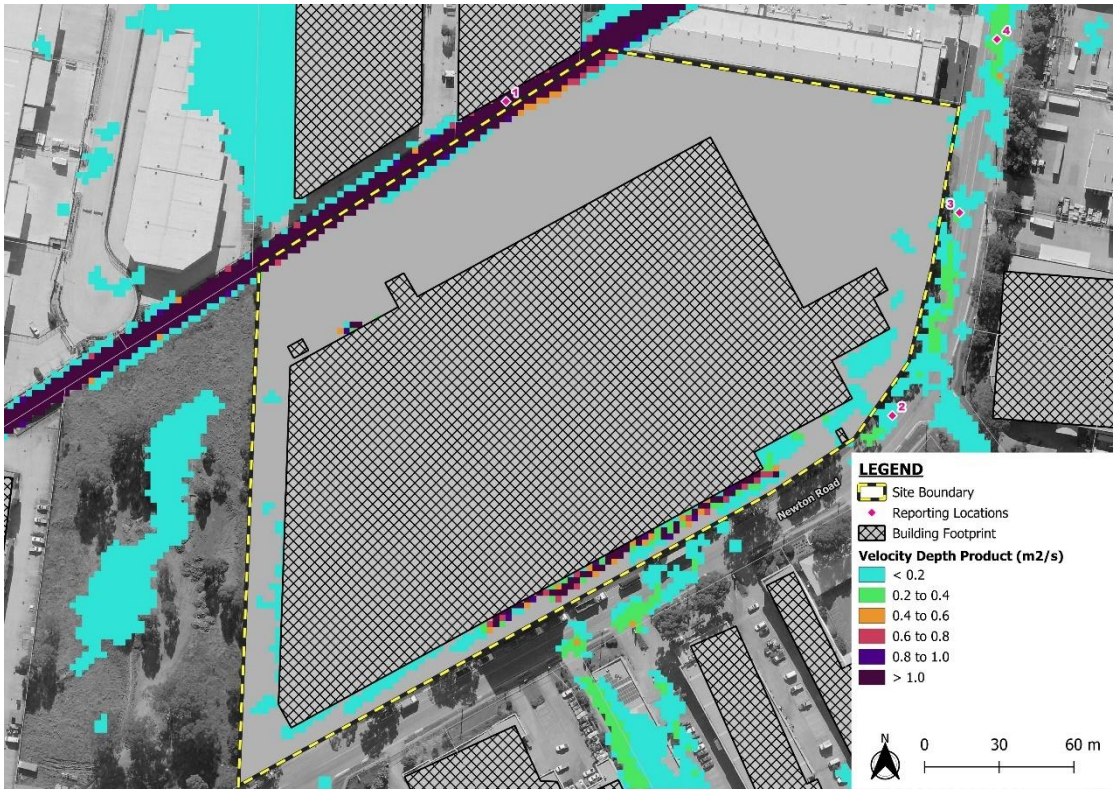

Figure G27- 0.2% AEP Velocity Depth (Post Development)

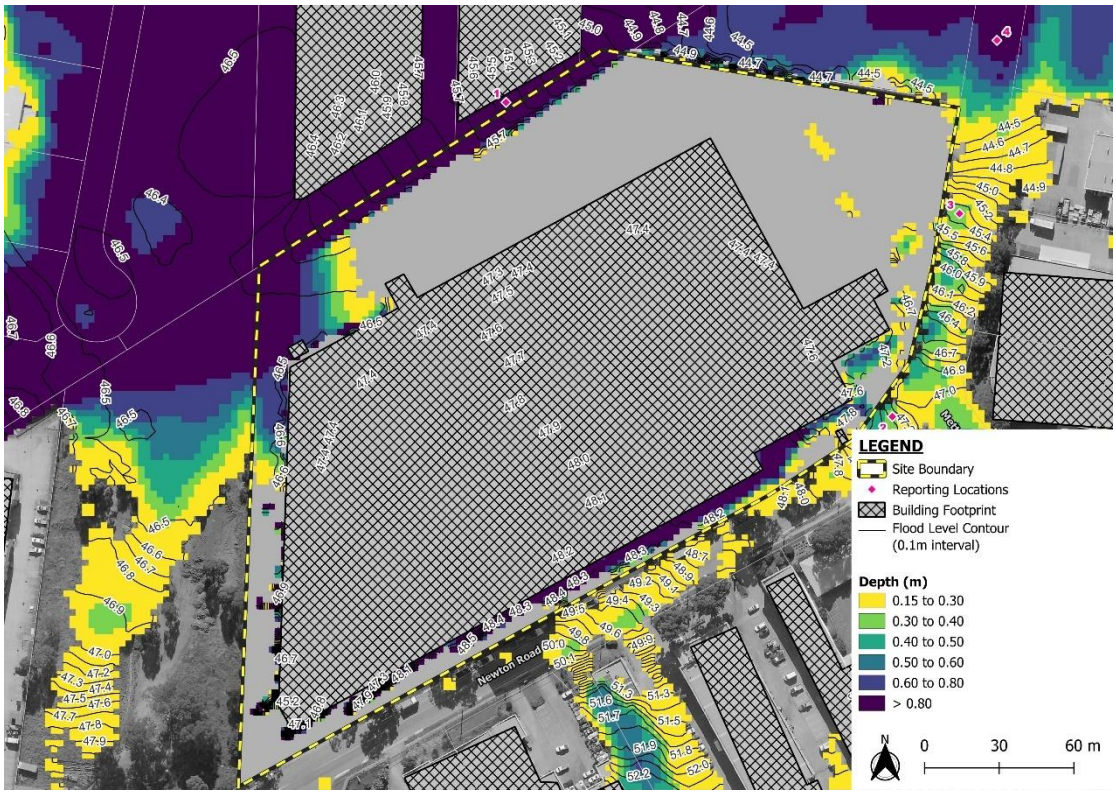

Figure G28-PMF AEP Flood Depth (Post Development)

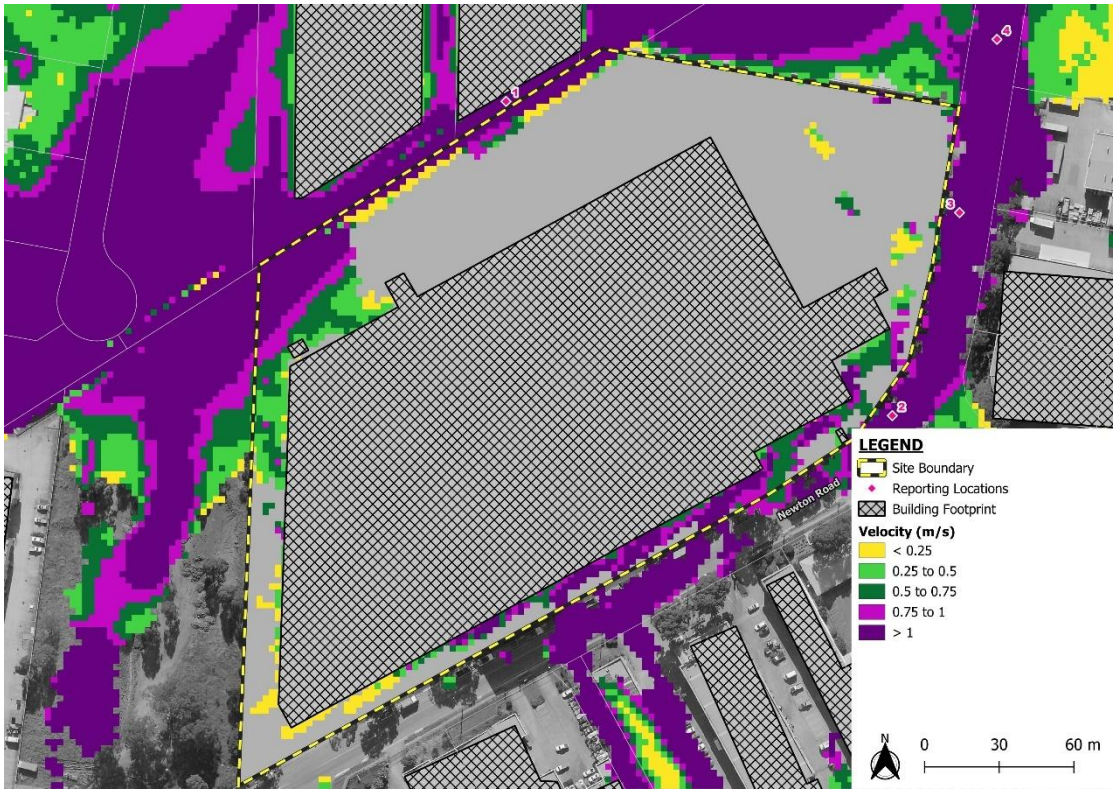

Figure G29-PMF AEP Flood Velocity (Post Development)

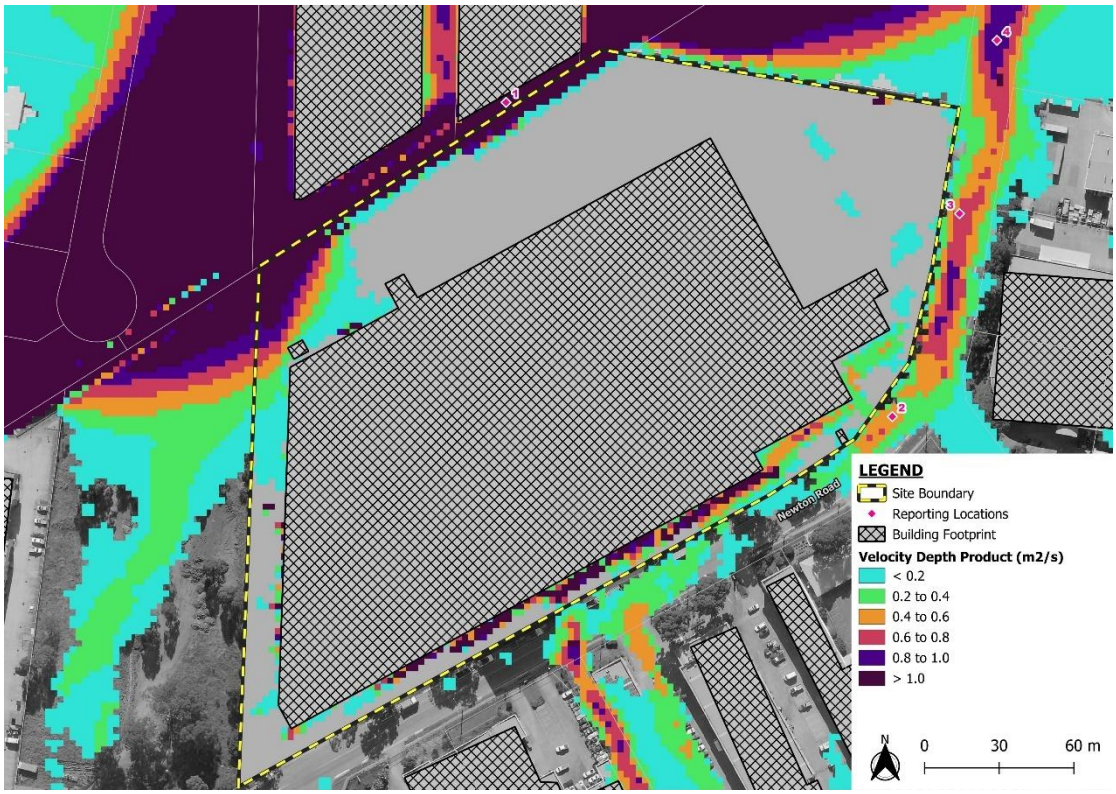

Figure G30- PMF AEP Velocity Depth (Post Development)

PRE AND POST DEVELOPMENT COMPARISONS

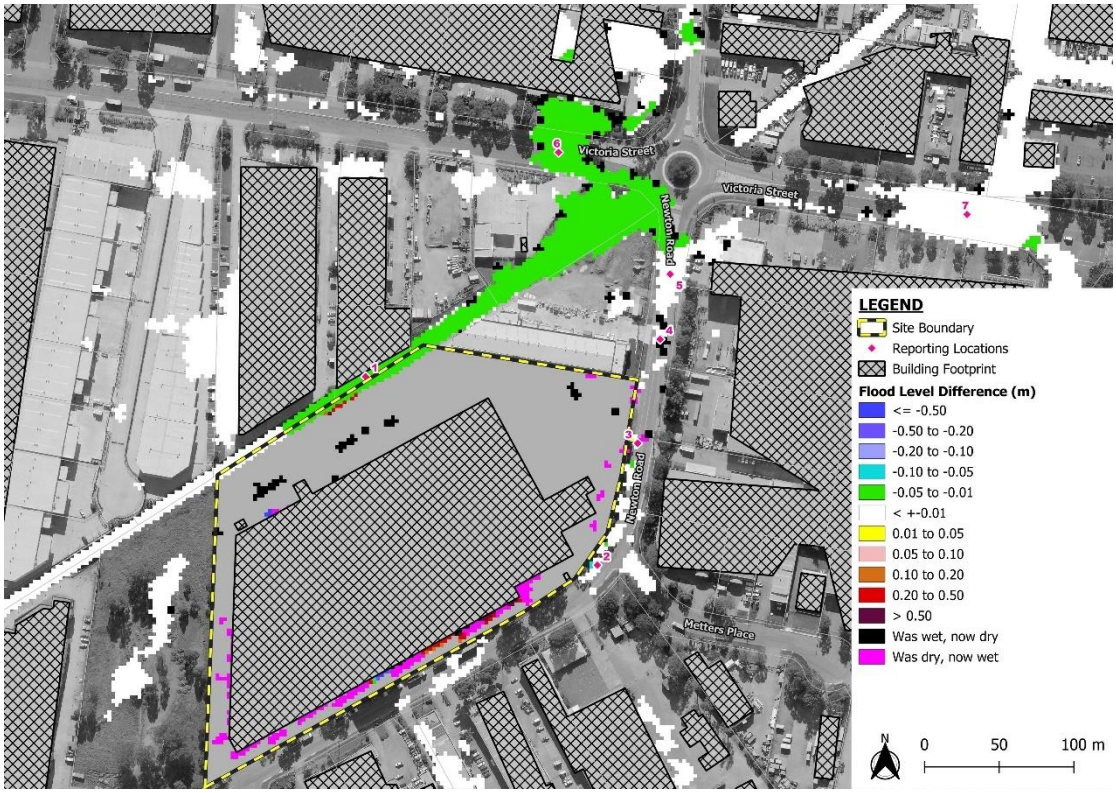

Figure G31- 5% AEP Flood Depth (Differences)

Figure G32- 5% AEP Flood Velocity (Differences)

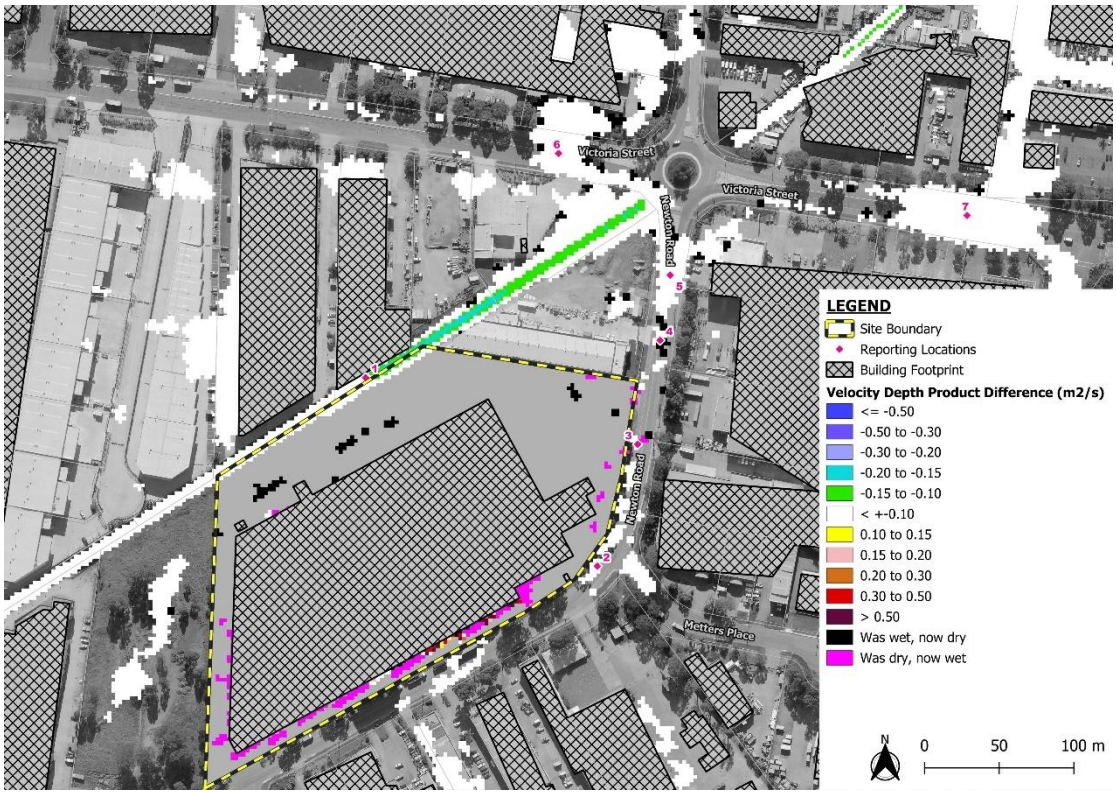

Figure G33- 5% AEP Velocity Depth (Differences)

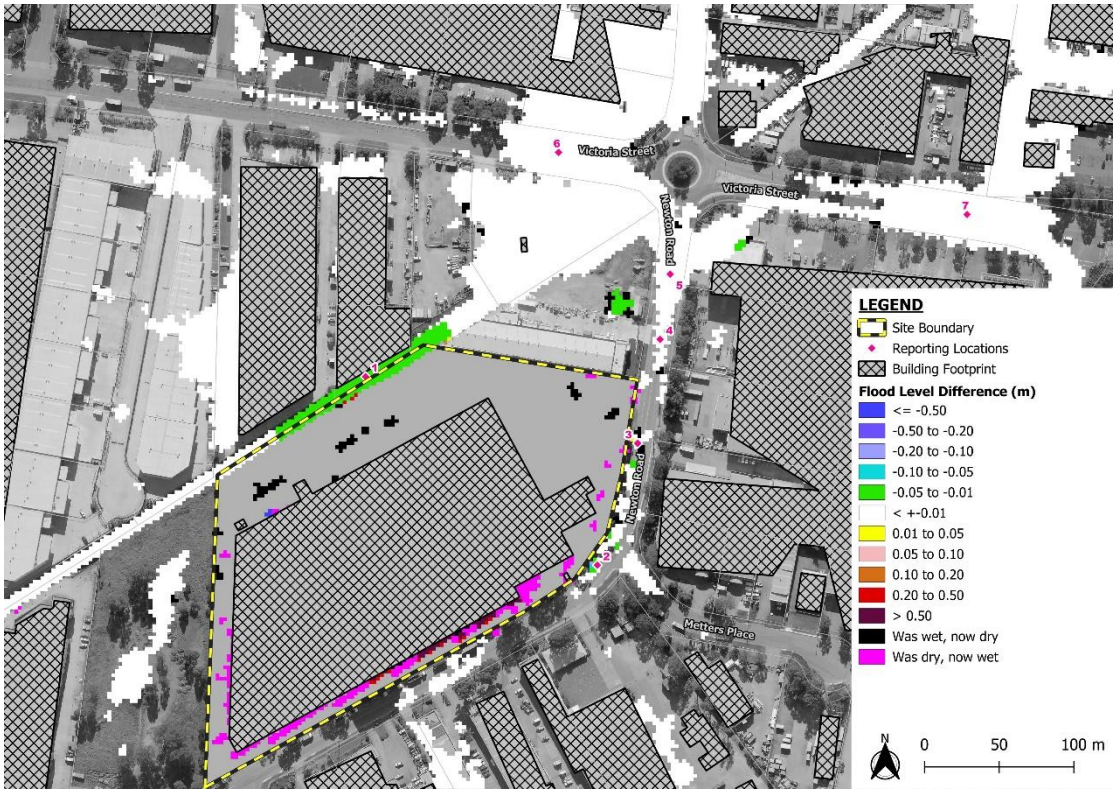

Figure G34- 1% AEP Flood Depth (Differences)

Figure G35- 1% AEP Flood Velocity (Differences)

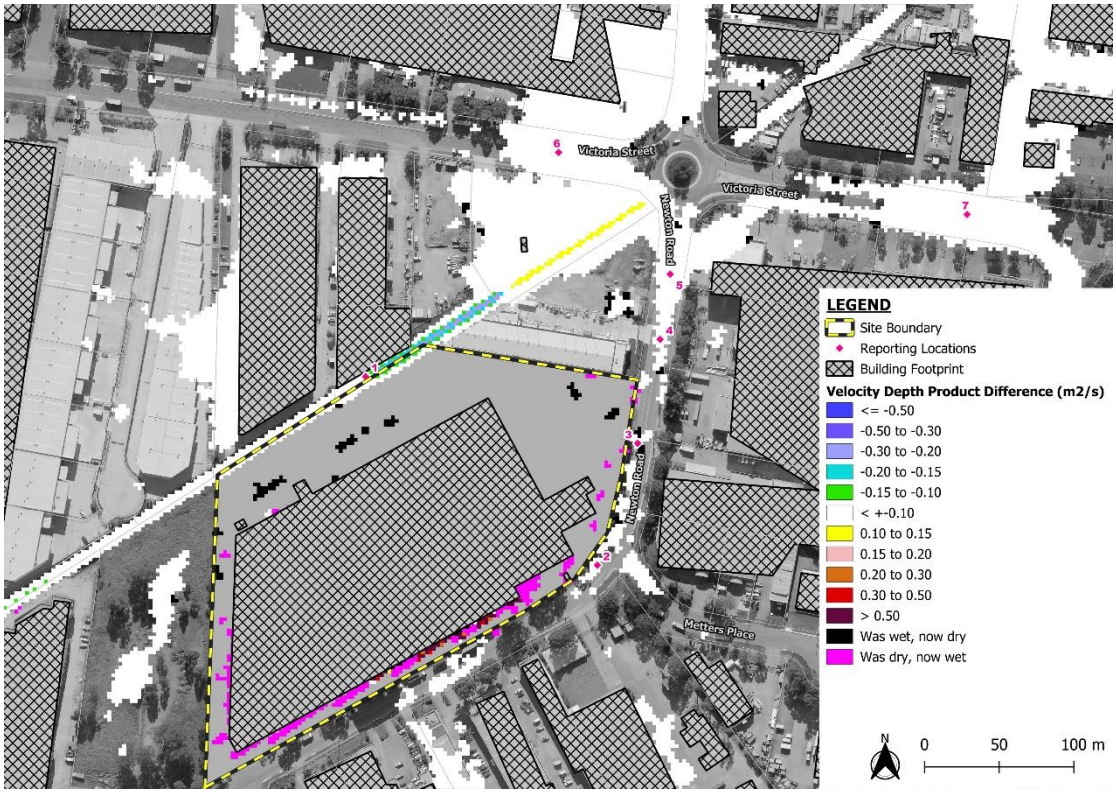

Figure G36- 1% AEP Velocity Depth (Differences)

Figure G37 -0.5% AEP Flood Depth (Differences)

Figure G38- 0.5% AEP Flood Velocity (Differences)

Figure G39-0.5% AEP Velocity Depth (Differences)

Figure G40- 0.2% AEP Flood Depth (Differences)

Figure G41- 0.2% AEP Flood Velocity (Differences)

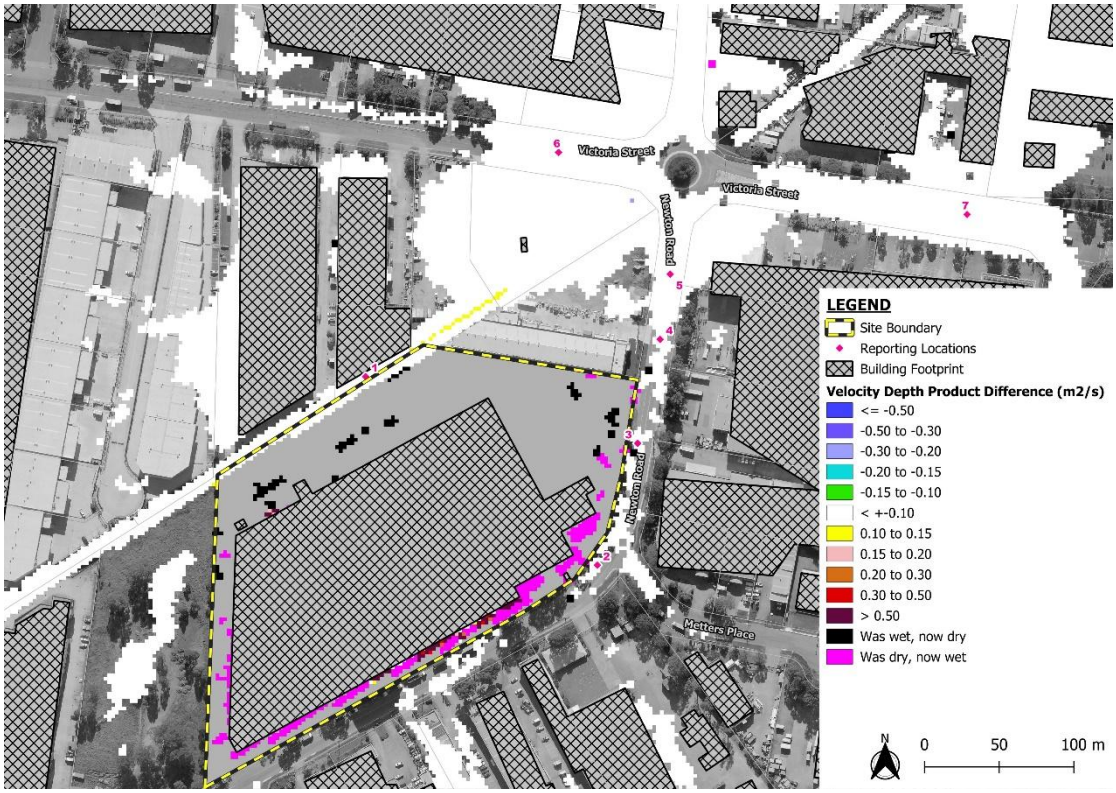

Figure G42-0.2% AEP Velocity Depth (Differences)

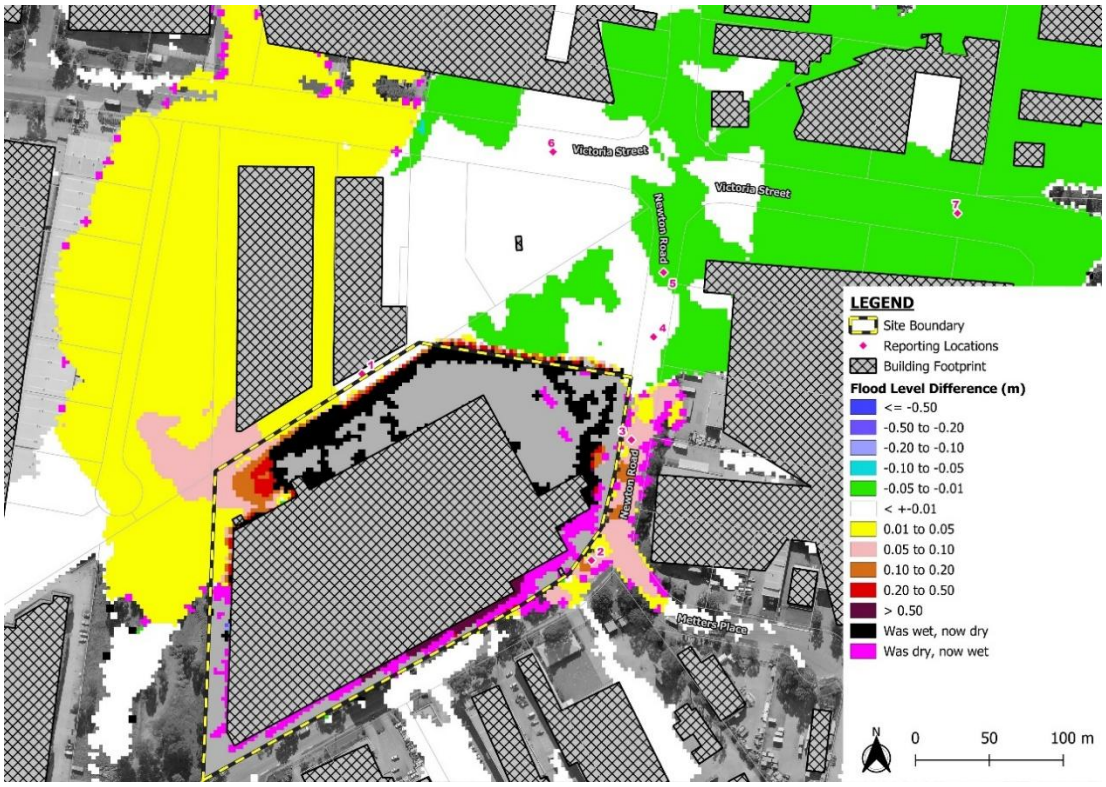

Figure G43-PMF AEP Flood Depth (Differences)

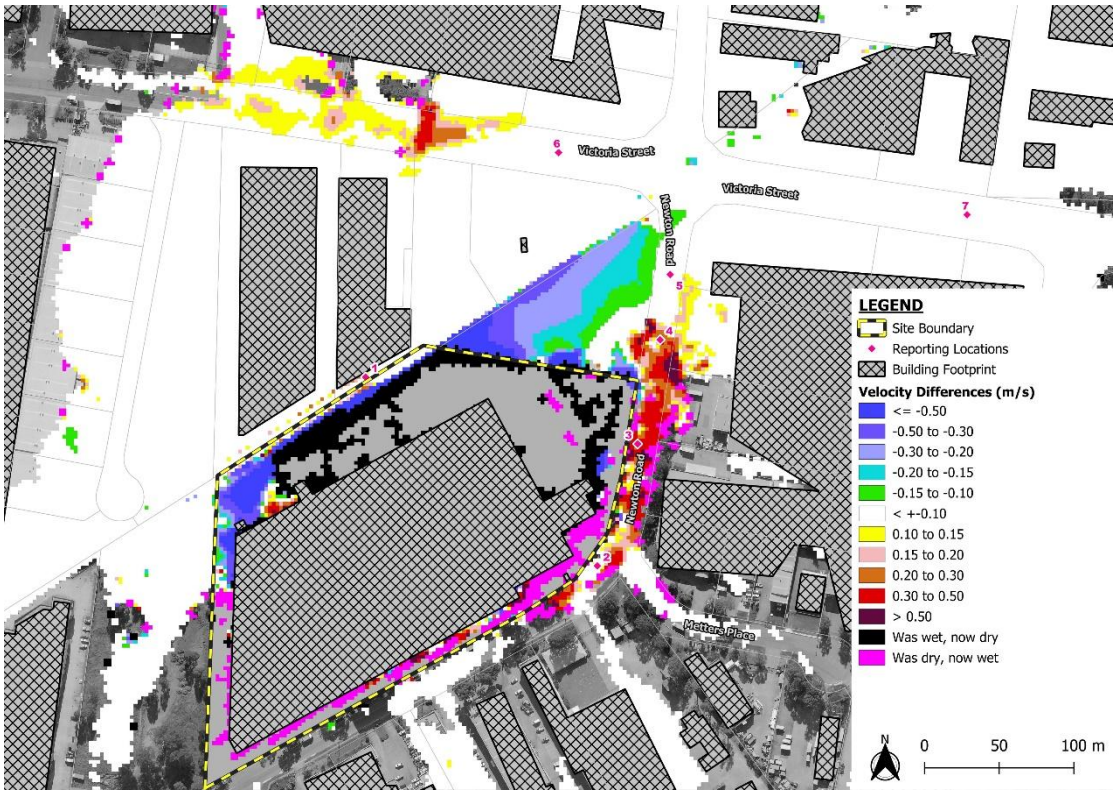

Figure G44-PMF AEP Flood Velocity (Differences)

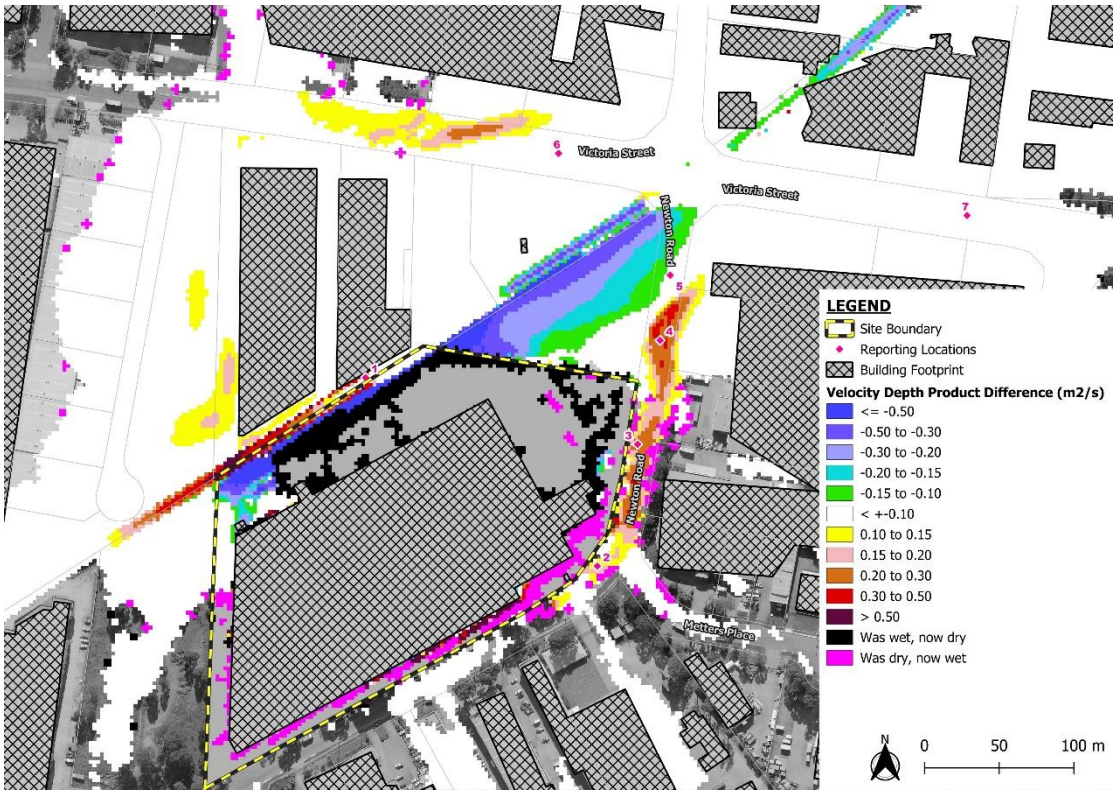

Figure G45-PMF AEP Velocity Depth (Differences)


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