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CIVIL ENGINEERING REPORT
INCORPORATING
WATER CYCLE MANAGEMENT STRATEGY

SSD-32489140
520 GARDENERS ROAD
ALEXANDRIA NSW 2015

Prepared For:
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EXECUTIVE SUMMARY

Charter Hall Holdings (Charter Hall - the Applicant) are seeking to establish a state-of-the art multi-level industrial development located at 520 Gardeners Road.

The Proposal is considered State significant development (SSD) and accordingly, an Environmental Impact Statement (EIS) has been prepared to support the SSD Application for the Proposal. This Water and Hydrology Assessment has been prepared by Costin Roe Consulting to support the preparation of the EIS and assess the Proposal's impact on the surrounding environment in relation to soils and water including stormwater and stormwater management for both construction and operational phases of the development.

Proposal overview

The proposed development is for a multi-level industrial development on a 1.9 Ha parcel of land. Works will include minor bulk earthworks, provision of services, building construction, and stormwater management.

Access to the development would be made via Gardeners Road and Bourke Road.

Purpose of this assessment

This Water and Hydrology Impact Assessment has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) as they related to water and hydrology, including:

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

Construction impacts

During the construction phase, a Sediment and Erosion 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 gross pollutant traps (GPT's) and proprietary 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.

Further it has been confirmed that the development considers flood and overland flow planning requirements. The development does not impact or encroach on existing flood affected areas. The development does not increase runoff from existing conditions as such the site discharge will not adversely affect any land, drainage system or watercourse as a result of the development.

An existing inter-allotment drainage line is noted to traverse the project site and is proposed to be relocated to accommodate the new development. Assessment relating to the realignment will be undertaken based on ensuring no impact to upstream and downstream properties or drainage systems. Consultation with TfNSW has been

undertaken to obtain all necessary information pertaining to the recently constructed surrounding WestConnex road upgrades. This information will form part of the assessment.

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 & SCOPE

1.1 Introduction

Costin Roe Consulting Pty Ltd has been commissioned by Project Strategy, on behalf of Charter Hall, to undertake a *Civil Engineering Report & Water Cycle Management Strategy* (WCMS) to accompany a State Significant Development Application (SSDA) with the NSW Department of Planning, Industry and Environment (DPIE) for a multi-level industrial development on the land.

This report presents a civil engineering assessment the property at 520 Gardeners Road, Alexandria. This report provides an assessment of the civil engineering characteristics of the development site and technical considerations of the following aspects:

- Earthworks & geotechnical considerations;
- Water Cycle Management Strategy (WCMS).

The WCMS comprises several key areas of stormwater and water management which are provided below. These key areas have been established with the aim to reduce impacts from the development on the surrounding environment and neighbouring properties. The water cycle management strategy identifies the management measures required to meet the targets set. The key water cycle management areas assessed in this report are:

- Storm Water Quantity;
- Storm Water Quality;
- Water Supply and Reuse;
- Flooding; and
- Erosion and Sediment Control

A request for Planning Secretary's Environmental Assessment Requirements (SEAR's) to the DPIE has been made by the applicant. Reference to **Appendix C** should be made for SSD-32489140 SEAR's dated 30/11/2021. **Section 1.3** of this report for specific responses to civil engineering and water management related items included in the SEAR's.

1.2 Consultation

Consideration to the various stakeholders has been made in relation to the development, including Council and Transport for NSW (TfNSW) has been made during the assessment period.

Consultation with TfNSW has been made to assist with coordination of the proposed development with existing infrastructure and recent upgrade works in Gardeners Road and Bourke Road. Reference to the civil engineering drawings included in **Appendix A** shows overlays and coordination of the works completed by TfNSW based on provision of their work as constructed (WAE) drawings included in **Appendix E**.

Consultation with Sydney Water has been made to assist with coordination of the proposed stormwater drainage and on-site detention requirements. Reference should be

made to **Appendix F** and **Section 5** of this report for correspondence and OSD requirements respectively.

1.3 SEAR's Responses

This report supports the EIS for the proposal and to address the NSW Department of Planning and Environment SEARS letter dated 30 November 2021, reference SSD-32489140, NSW Department of Primary Industries (DPI) and NSW Office of Environment & Heritage (OEH).

We note the below "key issues and documentation" assessments are based on the Warehouse and Distribution Centre SEAR's document recently implemented (October 2021) by DPIE and received on 30 November 2021 and following key areas in the document:

- Item 12. Ground and Water Conditions,
- Item 13. Stormwater and Wastewater
- Item 14. Flooding Risk

Further reference to the EIS prepared by Urbis should be made for confirmation of how the SEAR's have been addressed for non-civil engineering related items.

Table 1.1 provides a summary of the SEARs Requirements which relate to water and hydrology, and where these have been addressed in this report.

Table 1.1. SEARs Warehouse and Distribution Centres Key Areas

SEAR's Key Item	Response and where addressed
12. Ground and Water Conditions	
Provide an assessment of the potential impacts on soil resources, including related infrastructure and riparian lands on and near the site.	Refer to **Section 3** and geotechnical assessments by **PSM** and environmental reporting by **JBS&G** for confirmation of soil resources and potential impacts. We note the site is currently a fully developed industrial facility. The proposed works involve minor filling to the existing site and will have minimal impact to existing soil resources. We note no riparian lands or watercourses are located near to the property. The nearest watercourse, Alexandra Canal, is 250m from the property.
Provide an assessment of the potential impacts on surface and groundwater resources (quality and quantity), including related infrastructure, hydrology, aquatic and groundwater dependent ecosystems, drainage lines, downstream assets and watercourses.	Refer to **Section 4, 5 & 6** for assessment of water resources, hydrology (including quality and quantity), watercourses and riparian lands during operation. We note no riparian lands or watercourses are located near to the property. The nearest watercourse, Alexandra Canal, is 250m from the property. Refer to **Section 8** for soil and water management measures during construction, drawings in **appendix A** for associated erosion and sediment control drawings, and **Appendix C** for a Draft Soil and Water Management Plan. These sections show proposed measures, based on the Landcom document *Managing Urban Stormwater – Soils & Construction Volume 1 ('Blue Book')(Landcom, 2004)*, are proposed during the construction of the development. Measures proposed will limit potential for offsite impact associated with water runoff and soils

SEAR's Key Item	Response and where addressed
	during construction. Consideration to management of salinity and acid sulphate has been made based on the recommendations of the geotechnical investigations and noted Landcom document.
Identify predicted water discharge points to surface/groundwater and consider discharge quality against relevant water quality criteria.	A surface water runoff including surface water runoff, water quality and water quantity has been completed. The key stormwater objectives, based on relevant water sensitive urban design criteria, have been set out in **Section 4.1** and **Section 6.1** of the report. Discharge from the site is noted to be made to existing public trunk drainage systems via the inter-allotment drainage line which traverses the property. **Section 6** provides demonstration of the key criteria being met, based on MUSIC modelling. Configuration of the proposed measures are shown on the Civil Design Drawings included in **Appendix A**.
Provide a detailed site water balance including identification of water requirements for the life of the development, and measures to ensure an adequate and secure water supply.	Refer to **Section 4, 5 & 6** for assessment of water resources, hydrology (including quality and quantity), watercourses and riparian lands. Refer to infrastructure report prepared by Landpartners for water supply and wastewater assessments.
Provide an assessment of salinity and acid sulfate soil impacts.	Refer to **Section 3** and geotechnical assessments by **PSM** and environmental reporting by **JBS&G** for confirmation of soil resources and potential impacts. We note the site is currently a fully developed industrial facility. The proposed works involve minor filling to the existing site and will have minimal impact to existing soil resources, including salinity and acid sulfate soils.

SEAR's Key Item	Response and where addressed
13. Stormwater and Wastewater	
Provide an Integrated Water Management Plan for the development that: • is prepared in consultation with the local council and any other relevant drainage or water authority. • details the proposed drainage design for the site including any on-site detention facilities, water quality management measures and the nominated discharge points, on-site sewage management, and measures to treat, reuse or dispose of water. • demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse impacts on any downstream properties.	Refer to **Section 4, 5 & 6** for assessment of water resources, hydrology (including quality and quantity), watercourses and riparian lands during operation. A surface water runoff including surface water runoff, water quality and water quantity has been completed. The key stormwater objectives, based on relevant water sensitive urban design criteria, have been set out in **Section 4.1** and **Section 6.1** of the report. Discharge from the site is noted to be made to existing public trunk drainage systems via the inter-allotment drainage line which traverses the property.
Where drainage infrastructure works are required that would be handed over to the local council, or other drainage or water authority, provide full hydraulic details and detailed plans and specification of proposed works that have been prepared in consultation with, and comply with the relevant standards of, the local council or other drainage or water authority	The proposal requires realignment of an existing inter-allotment drainage pipeline which carries runoff from Gardeners Road through the site and then north to Alexandra Canal. The pipe also provides legal point of discharge to the existing industrial facility on the property. Refer **Section 4** and drawings in **Appendix A** for detailed assessment of the existing and post development conditions pertaining to the inter-allotment pipe and proposed realignment.
14. Flooding Risk	
Identify any flood risk on-site having regard to adopted flood studies, the potential effects of climate change, and any relevant provisions of the NSW Floodplain Development Manual.	Refer **Section 7** for assessments pertaining to flooding and overland flow. Review of Councils adopted flood study (Alexandra Canal) and other various flood studies in the area (TfNSW M5 EIS SSI-6788) show there is no flooding

SEAR's Key Item	Response and where addressed
	in the 1% AEP and PMF events local to the development site. Consideration to siting the level above local roadway runoff and provision for freeboard to anticipated roadway and gutter flows of 0.5m has been allowed for in the design. We note allowances to divert an existing inter-allotment drainage line has been made in the design. There is no on-site overland flow associated with the inter-allotment drain. As the site is not identified with flooding in adopted local studies, we consider the requirements of council and NSW Floodplain Development Manual are met for this development.
Assess the impacts of the development, including any changes to flood risk on-site or off-site, and detail design solutions and operational procedures to mitigate flood risk where required.	Refer **Section 7** for assessments pertaining to flooding and overland flow. Review of Councils adopted flood study (Alexandra Canal) and other various flood studies in the area (TfNSW M5 EIS SSI-6788) show there is no flooding in the 1% AEP and PMF events local to the development site. As the site is clear of flood prone areas, the development does not result in any changes to flood conditions or flood risk. As such no detailed flood assessments are required or included as part of the documentation.

2 DEVELOPMENT SITE

2.1 Location

The proposed development is located in the suburb of Alexandria on Gardeners Road as shown in **Figure 2.1**.

The site is bounded on the west by Bourke Road, existing industrial development on the north and east, and residential apartments on the south.

Alexandria Canal is located approximately 250m to the north-west of the property.

Figure 2.1 Locality Plan

2.2 Existing Site Description

The site area is 1.9Ha.

The property currently comprises longstanding existing industrial development, being the site of a former Bunnings Warehouse. The site is currently fully developed as warehouse with existing parking and truck loading pavements. The existing warehouse has a floor level or RL 6.6m AHD.

Access to the site is available from the Bourke Road and Gardeners Road frontages.

Levels on the site vary between RL 6.3m AHD and RL 6.6m AHD.

Several easements are located on the property pertaining to Sydney Trains, energy providers, TfNSW and drainage. The drainage easement and relocation of this is discussed in more detail in **Section 4.2**.

2.3 Proposed Development

The proposed development is for the construction of a two-storey warehouse and distribution centre comprising 21,952 m^2 of warehouse and distribution GFA with 5,557 m^2 ancillary office space, landscaping at ground and second floor levels, bicycle, and car parking. The proposed multi-level industrial development is on the 1.9 Ha property. The development layout and perspective are shown in **Figures 2.2 & 2.3**.

Development works will include demolition, building construction, and stormwater management construction including new surface water runoff system and relocation of existing inter-allotment drainage.

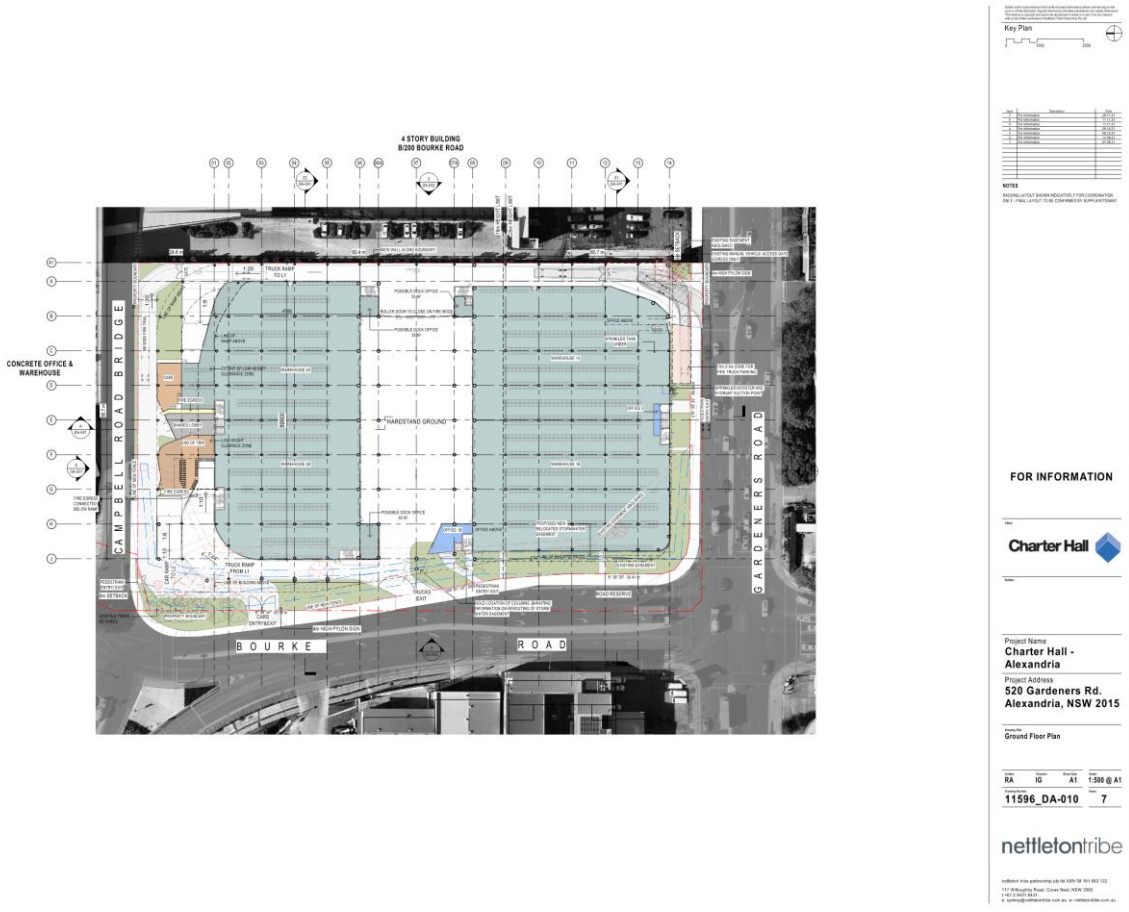


Figure 2.2. Development Layout (Source: Nettleton Tribe Architects)

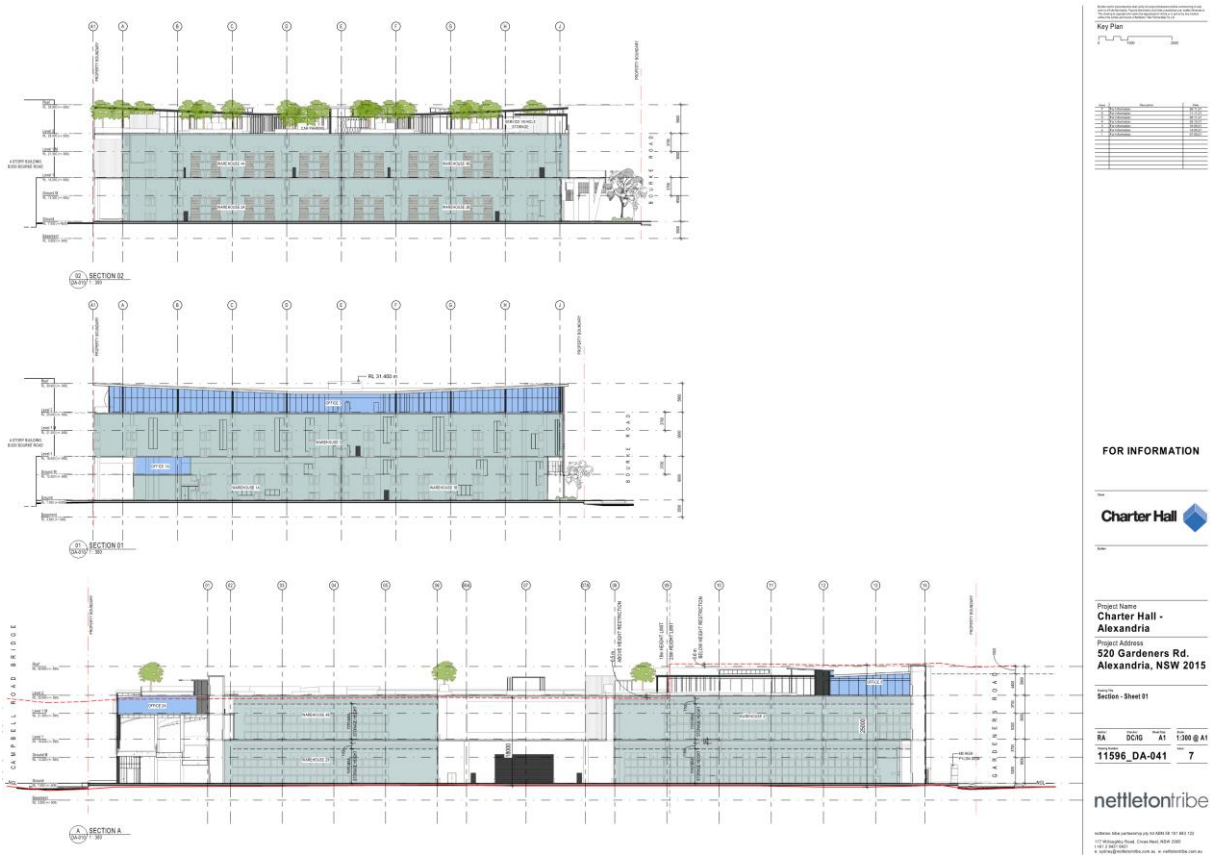


Figure 2.3. Development Perspective (Source: Nettleton Tribe Architects)

3 SITE WORKS

3.1 Soil and Geological Conditions

Assessments relating to soil have been undertaken by JBS&G (contamination and environmental, 61301/140011 dated 2 September 2021), and by PSM (geotechnical investigation – PSM4029-103L dated 27 August 2021).

As referenced in the investigation by PSM the 1:100 000 Geological Series Sydney Geological Map indicates that the site is underlain by medium to fine grained "marine" sand with podsols.

The PSM Geotechnical report confirms the subsoil profile as comprising pavements of 0.13-0.18m in depth over filling 0.25-0.32m in depth over natural sands to 2.35m deep over clay to 15m deep over extremely weathered shale bedrock.

3.2 Bulk Earthworks

Bulk earthworks on the site will be minor overall and limited to minor import to lift the new building to a level of RL 7.0m AHD. This requires raising the existing building by 0.4m. The increase in floor level is proposed to ensure the building is sited 0.5m above the level of Bourke Road (to ensure nuisance flooding from gutter flow is minimised). Final levels would be subject to a +/-0.5m variance to allow for variations in allowances for geotechnical conditions, final building layout and allowable building height, and drainage considerations.

Soil Erosion and Sediment Control measures, including sedimentation basins are to be placed in accordance with submitted drawings and the *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.

Minor retaining will be required along the northern and east boundaries noting this will be generally less than 1m in height.

Location and indicative heights of retaining walls are shown on drawing **CO14368.00-DA50**.

3.4 Embankment Stability

To assist in maintaining embankment stability permanent batters in clay will be no steeper than 3 horizontal to 1 vertical while temporary batters will be no steeper than 2 horizontal to 1 vertical. Based on the existing landform and minor changes to landform required for

the proposal, it is anticipated that batters and landscaped areas will be generally less than 1v:6h

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 *Soil and Water Management Plan* in **Section 8** and **Appendix C** of this report.

3.5 Groundwater

Groundwater was identified by PSM at depths between 2.0m and 2.5m below ground level. As there is limited excavation required for the development and the site is currently full developed, impact from groundwater and on groundwater systems are considered negligible.

Surface water management, including conveyance of surface runoff, management of water quantity (through on-site detention) and water quantity (through on-site management systems using WSUD principles and best practice pollution reduction objectives) has been proposed in the design.

3.6 Acid Sulphate Soils and Salinity

An assessment of the potential for acid sulphate soils has been requested as part of the SEAR's requirements.

Discussion on Acid Sulfate Soils has been included in the JBS&G report as listed in **Section 3.1**. The JBS&G report references the Botany Bay Acid Sulfate Soil Risk Map indicating the site existing on disturbed terrain which may include filled areas, which often occur during reclamation of low-lying swamps for urban development. Other disturbed terrain includes areas which have been mined or dredged or have undergone heavy ground disturbance through general urban development or construction of dams and levees. We note the PSM report profile does not suggest reclamation however further investigations are required to assess areas for acid sulfate potential.

The PSM investigation confirms soils are non-saline to moderately saline.

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.

Developing a WCMS at the SSD stage of the land development process provides guidance on urban water management issues to be addressed for the development as a whole.

This WCMS has been prepared to inform DPIE 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	Target	Reference
Water Quantity	Minimise flooding from increased stormwater runoff due to development	Council DCP 2012. On-site Detention Policy
Water Quality	Load-based pollution reduction targets based on an untreated urbanised catchment: Gross Pollutants 90% Total Suspended Solids 85% Total Phosphorus 65% Total Nitrogen 45% Total Hydrocarbons 90%	Section 3.7.3 Council DCP 2012
Flooding	Buildings set above the 1% AEP.	City of Sydney's *Floodplain Management Policy* NSW Floodplain Development Manual.
Water Supply	Reduce Demand on non-potable water uses. Provide 50-70% reduction of non-potable uses.	
Construction Stormwater Management &	A construction stormwater management plan and appropriate associated erosion and sedimentation control measures must be described in the	Landcom Blue Book Council DPIE

Element	Target	Reference
Erosion and Sediment Control	environmental assessment for all stages of construction to mitigate potential impacts to surrounding properties.	

A summary of the how each of the WCM objectives will be achieved are described 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 by limiting post-development discharge within the receiving waters to the pre-development peak, and to ensure no affectation of upstream, downstream or adjacent properties.

  Attenuation of stormwater runoff from the development is not required as the site is currently fully developed and existing trunk drainage systems available for discharge based on the fully developed site.

  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 pit inserts.
  - Tertiary treatment of the development will be made via one of three proprietary treatment systems. The treatment systems are proposed to be syphon actuated filtration systems housed in underground tanks. Refer to drawings **Co14368.00-DA40, DA41 & DA42.**
  - Some treatment will also be present by provision of rainwater reuse tanks on development site through reuse and settlement within the tanks. Allowance for this treatment is noted to not be included in MUSIC modelling produced for the development.

  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 the nearby Alexandra Canal, and local runoff and overland flow paths. We note

that the site is shown to be clear of any significant local overland flow paths for events up to the 1% AEP event.

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

The following measures have been incorporated in the design:

- All buildings are sited 500mm above the 1% AEP design flood level of local flow paths.
- Overland flow paths to manage runoff in large storm events have been made including achieving at least 500mm freeboard to building levels from the flow paths, noting that a greater level of flood immunity is provided to the building than that required by planning to ensure an appropriate level of risk to the building for the intended use.

- *Water Demand Reduction/ Rainwater Reuse (refer **Section 6.6**)*

  Rainwater reuse measures will be provided as part of this development design. Rainwater reuse will be required to reduce demand on non-potable uses by 50-70%. The reduction in demand will target non-potable uses such as toilet flushing and irrigation. **Refer Section 6.6**.

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

  A construction stormwater management plan and associated erosion and sediment control measures is proposed based on Landcom 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 the site which carries stormwater runoff from the existing warehouse and surrounds offsite to public drainage infrastructure.

An existing inter-allotment drain is located on the west of the site, beginning on the Gardeners Road boundary and traversing north to the laneway on the north of the property. This pipe, 825mm in diameter, carries runoff from Gardeners Road through the site to Campbell Road Bridge Lane (north of the site) and ultimately to Alexandra Canal (which is located 250m north-west of the property). The pipe also collects runoff from the site and included several pipe connections from the existing development. **Figure 4.1** shows the location of the existing inter-allotment drainage system.

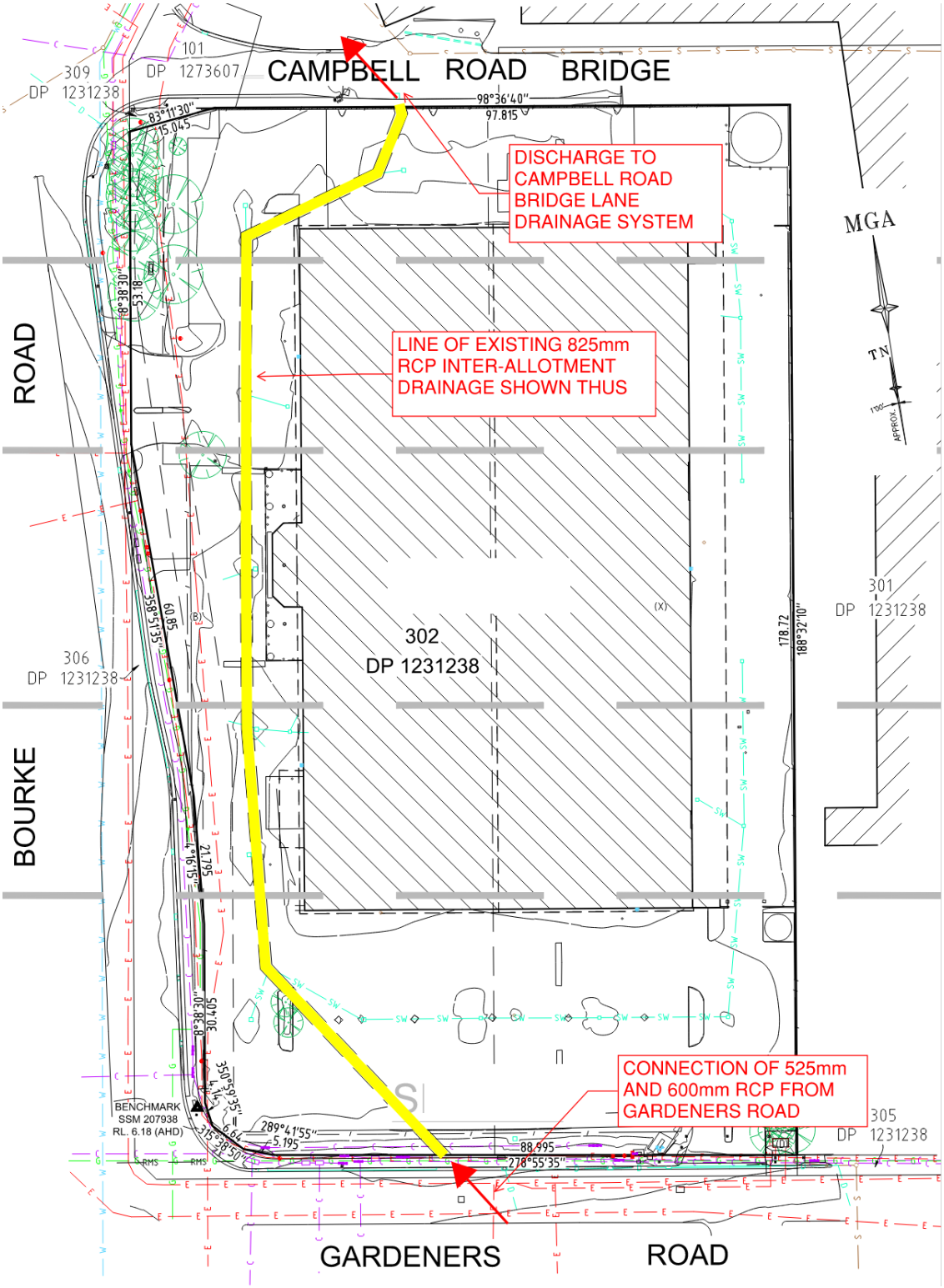


Figure 4.1. Location of Inter-allotment Drainage Line

The site is not affected by any overland flow paths, though an overland flow path is present north of the site in the laneway.

WAE drawings of the external roads works recently completed by TfNSW were sourced to confirm drainage connections and pipe configurations associated with the external road and inter-allotment drainage line – refer **Appendix E**. We note the TfNSW drawings incorrectly describe the existing pipe as a 750mm diameter RCP. The actual size of 825mm has been verified by detail survey, CCTV survey and is quoted on the easement deed.

4.3 Proposed Drainage System

As per general engineering practice and the guidelines of 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 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. The major system will be designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). 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.

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the standards of PCC and accepted engineering practice. 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 are mitigated, Council Water Quality Objectives are met and that the demand on potable water resources is reduced.

The proposed drainage system will be required to convey the overland flow from upstream catchments east of the property through the site.

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. Legal discharge for this site is via the existing inter-allotment drainage pipe.

It is noted that the existing inter-allotment drainage pipe will be re-routed within the site to accommodate the proposed development footprint. The existing easement will be extinguished, and new easement has been defined. Refer to drawing **Co14368.00-DA40.** The pipe route and lengths are proposed to be changed to suite the proposed

development. Hydraulic modelling, utilising DRAINS, was undertaken to ensure that the capacity of the existing system and capacity of the proposed system were as close as practically possible to confirm there would be no negative impacts due to the proposed re-route. Longsections have been included in the Civil Development Package which confirm that for the 5% AEP (1 in 20yr ARI) the HGL decreases by 0.11m, and in the 1% AEP (1 in 100yr ARI) the HGL increases by 0.011m, in the upstream pit located on Gardeners Road. Refer to drawing **Co14368.00-DA47.** This confirms that the capacity of the existing system and existing conveyance performance will be maintained in the proposed re-routing shown in the Civil Package.

The drainage system proposed can be described as follows:

- Site drainage system designed to the 5% AEP (1 in 20yr ARI);
- Diversion of the existing 825mm diameter inter-allotment drainage system.
- Connection of the new drainage system
- Treatment of stormwater via one of three proprietary filtration systems;
- Site discharge to public drainage system via the re-routed inter-allotment drainage line.

4.4 Hydrologic 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 4.1. DRAINS Parameters

Model	Model for Design and analysis run	Rational method	
	Rational Method Procedure	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 perform to 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 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 Overland Flow (development lots)

Dedicated flow paths have been designed to convey all storms up to and including the 100-year ARI. These flow paths will convey stormwater from the site to the detention systems prior to discharge.

5 WATER QUANTITY MANAGEMENT

City of Sydney Council's DCP 2012 and Sydney Water's On-Site Detention (OSD) policy require consideration of stormwater quantity management with the intent of minimising flooding from the increased stormwater run-off due to the development. Water quantity management may be made by providing a stormwater detention system (i.e. on-site detention), to limit the runoff discharged from private property or to provide an assessment which confirms on-site detention is not necessary for the development.

Sydney Water has confirmed that any development at 520 Gardeners Road, Alexandria does not require on-site detention, refer **Appendix F** for email correspondence with Sydney Water.

Management of Stormwater Quantity has been considered for the site. It is noted that the existing site is currently fully developed and does not contain a detention system. There is no increase in impervious site coverage hence no increased runoff as part of the proposal. As such the development will not adversely impact flooding upstream or downstream of the property without OSD.

The site is located in the lower end of the catchment and discharge will be routed, via existing trunk drainage systems, 250m to the nearby tidally influenced Alexandra Canal. Given the position in the catchment, local un-attenuated flows will peak well in advance of the main flood hydrograph in Alexandra Canal coming from the upstream catchments. The combined hydrograph in this situation will results in a double peak (small initial peak followed by larger extended peak) in the shorter duration storms. If traditional OSD were to be included, although local flows from the site would be reduced, the peak of flow from the site is drawn out over a longer period which would coincides with that of the larger and delayed peak flow within the Alexandra Canal. This will result in an overall increase in peak flows, hence an adverse effect would be achieved if OSD were to be provided.

It is considered that the combined peak flow runoff (from the local site catchment and larger Alexandra Canal catchment) in the Alexandra Canal will not increase as a result of the development (with the proposed flood management measures and without traditionally sized on-site detention).

Given the adverse effect if OSD were to be included, and there is no change to the runoff volume or peak flows, no OSD is required or proposed for the development.

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 Council.

City of Sydney Council have nominated, in *Section 3.7.3* of their *DCP 2012*, 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	85%
Total Phosphorus	65%
Total Nitrogen	45%

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 parking, roof, and hardstand areas is to be performed via the provision of pit inserts to all grated pits;
- Tertiary treatment is to be performed via Ocean Protect Stormfilters (or approved equivalent) prior to discharge from the site;
- A portion of the roof will also be treated via rainwater reuse and settlement within the rainwater tank.

6.3 Stormwater 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** 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.

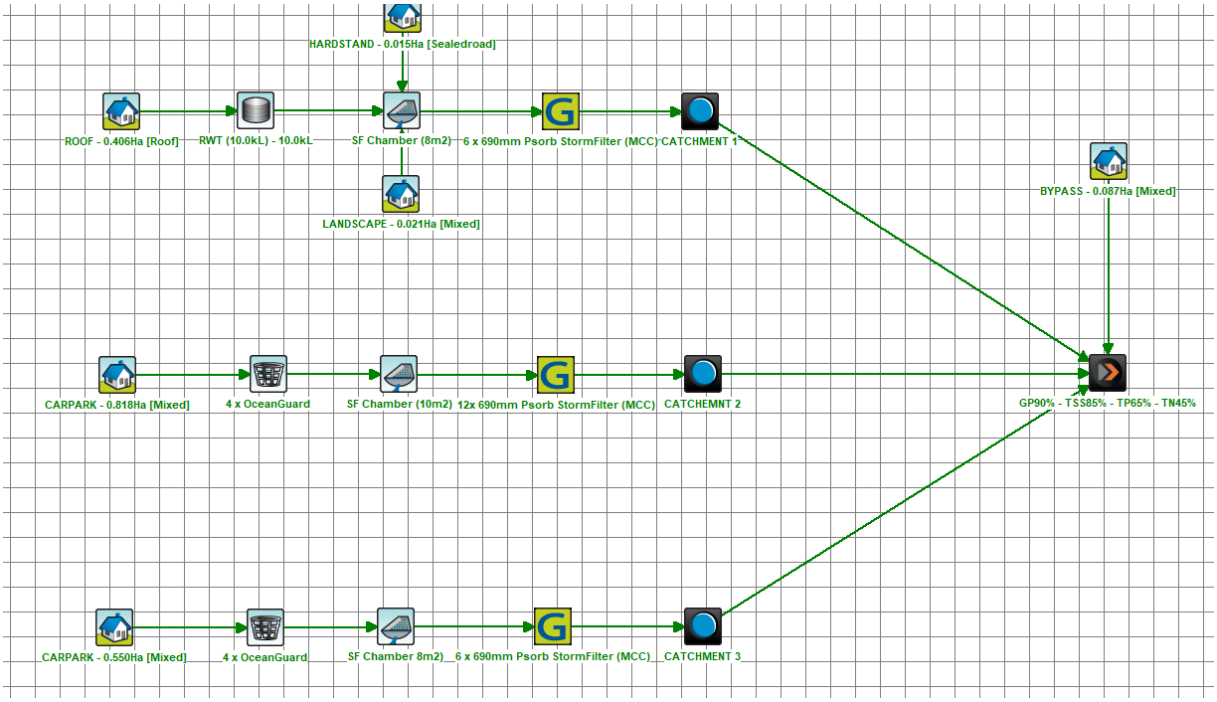


Figure 6.1. MUSIC model layout

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
Total Suspended Solids (kg/yr)	3050	447	85.4
Total Phosphorus (kg/yr)	5.57	1.95	65.0
Total Nitrogen (kg/yr)	45.6	24.4	46.5
Gross Pollutants (kg/yr)	484	0	100

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 DCP 2012 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, 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 in the range of 50-70%, subject to detail design.

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 50-70% 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 0.3kL/year/m^2.

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

20 Toilets	0.1 kL/day

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

Irrigated Area (0.3kL/year/m^2)	40m^2	12 kL/year
TOTAL		**12 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 have been made for high flow bypass which will be

managed by 300mm downpipe roofwater collection configuration along a portion of the northern elevation of the warehouse.

Roof Catchment (m^2)	Highflow Bypass (L/s)	Tank Size in MUSIC (kL)	Predicted Demand Reduction (%)	Provided Tank (kL)
4060	$1*10^5$	9.00	62.13	10.00

Table 6.4. Rainwater Reuse Requirements

The MUSIC model, results summarised in **Table 6.4**, predicts that the reuse demands of 50-70% will be met for the development with the provision of a minimum 10 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 stormwater system and water quality treatment train is properly operated and maintained. In order to achieve the design treatment objectives, an indicative maintenance schedule has been prepared and included as **Appendix D** to assist in the effective operation and maintenance of the various water quality components.

Inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the nominated frequency it is recommended that inspections are made following large storm events.

7 FLOODING AND OVERLAND FLOW

7.1 Introduction

A desktop review of overland flow and flooding in relation to the proposed development, and confirmation of that the requirements of City of Sydney's *Floodplain Management Policy* and assessments as required of the SEAR's have been met.

Our review and assessment have been based, review of detail survey (refer **Appendix E**), the proposed development and a desktop assessment of the site in relation to the flood modelling and documented flood behaviour included *Alexandra Canal Catchment Flood Study Report Final* (Ref: W4785). This report was prepared by Cardno on behalf of the City of Sydney Council dated 20 May 2014. This report will be referred to as the *Alexandra Canal Flood Study* from hereon.

It is noted that in the past, Council has directed our office to the *Alexandra Canal Flood Study* as being the appropriate document showing flooding which affects sites near the Alexandra Canal.

Costin Roe Consulting Pty Ltd have prepared this report and associated drawings, being engineers who specialise in stormwater engineering and flooding assessments.

We have included the following items as part of our review:

- Review of the Alexandra Canal Catchment Flood Study Report Final (Ref: W4785);
- M5 EIS SSI-6788 Flood Impact Assessment;
- Review of Councils Floodplain Management Policy in relation to the development including review of potential impacts of the development on existing flooding, and potential impacts on the development from flooding.

7.2 Alexandria Canal Flood Study

A flood study of the Alexandra Canal catchment was undertaken by Cardno for The City of Sydney Council in 2014. The study involved a hydrological and hydraulic assessment of the catchment at a regional level. The hydraulic model utilising the two-dimensional hydraulic model (TUFLOW), including one-dimension pits and pipes for the significant council pipe infrastructure. Flow output from contributing catchments is based on "rain-on-grid" and it is noted that no drainage infrastructure in individual lots has been included in the model, unless this forms part of council trunk or significant inter-allotment drainage infrastructure.

We provide excerpts of flooding associated with the 1% AEP storm event from the Alexandra Canal Flood Study in **Figures 7.1** and **7.2** below. **Figure 7.1** is noted to be an excerpt of *Flood Study Figure 6.13* and **Figure 7.2** an excerpt of *Flood Study Figure 6.20*.

We provide excerpts of flooding associated with the PMF storm event from the Alexandra Canal Flood Study in **Figures 7.3** and **7.4** below. **Figure 7.3** is noted to be an excerpt of *Flood Study Figure 6.14* and **Figure 7.4** an excerpt of *Flood Study Figure 6.21*.

Figure 7.1. Alexandra Canal - 1% AEP Flood Extent and Depths

Figure 7.2. Alexandra Canal - 1% AEP Flood Velocity

Figure 7.3. Alexandra Canal - PMF Flood Extent and Depths

Figure 7.4. Alexandra Canal - PMF Flood Velocity

With reference to **Figures 7.1** & **7.2**, no flooding or ponding water is shown to be within the property extent. Some minor ponding (depths less than 0.1m with velocity below 0.5m/s) is shown in councils regional flood study to be present adjacent to the site in adjoining properties. The ponding water demonstrated in the plan is considered to be a function of the modelling and indicative of surface water runoff which would be collected by site drainage systems which are not included in the regional model.

The site is shown to be clear of any significant flow paths and is not affected by mainstream flooding associated with the Alexandra Canal.

With reference to **Figures 7.3** & **7.4**, no flooding or ponding water is shown to be within the property extent. Some minor ponding (depths less than 0.1m with velocity below 0.5m/s) is shown in councils regional flood study to be present adjacent to the site in adjoining properties. The ponding water demonstrated in the plan is considered to be a function of the modelling and indicative of surface water runoff which would be collected by site drainage systems which are not included in the regional model.

7.3 M5 EIS Flood Study SSI-6788

A flood study was completed by Lyall and Associates on behalf of TfNSW for the construction of the M5 Motorway and WestConnex Interchange. The interchange and lead in construction required works to Gardeners Road and Bourke Road (as included in **Appendix F**). The study involved a hydrological and hydraulic assessment of the catchment at a regional level. The hydraulic model utilising the two-dimensional hydraulic model (TUFLOW), including one-dimension pits and pipes for the significant council pipe infrastructure. Flow output from contributing catchments is based on "rain-on-grid" and it is noted that no drainage infrastructure in individual lots has been included in the model, unless this forms part of council trunk or significant inter-allotment drainage infrastructure.

We provide excerpts of flooding associated with the 1% AEP storm event in **Figures 7.5** and **7.6** below. **Figure 7.5** is noted to be an excerpt of *Flood Study Figure 4.8* and **Figure 7.6** an excerpt of *Flood Study Figure 4.13*.

We provide excerpts of flooding associated with the PMF storm event in **Figure 7.7**. **Figure 7.7** is noted to be an excerpt of *Flood Study Figure 4.10*.

The figures show the site to be clear of flooding and flood hazard areas for the 1% AEP and PMF events.

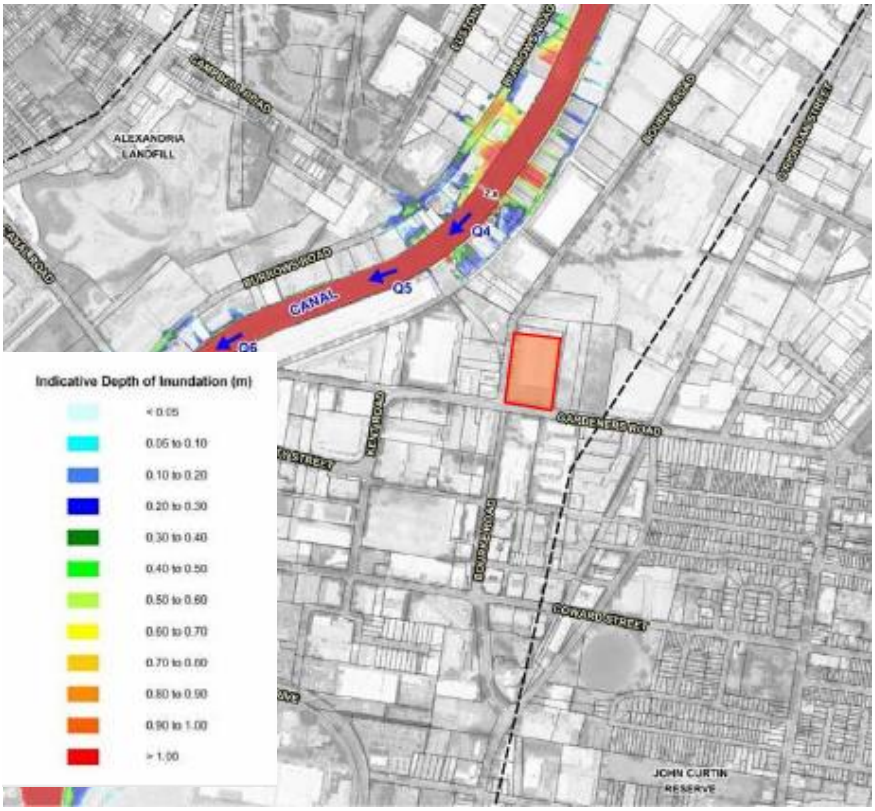


Figure 7.5. M5 EIS - 1% AEP Flood Extent and Depths

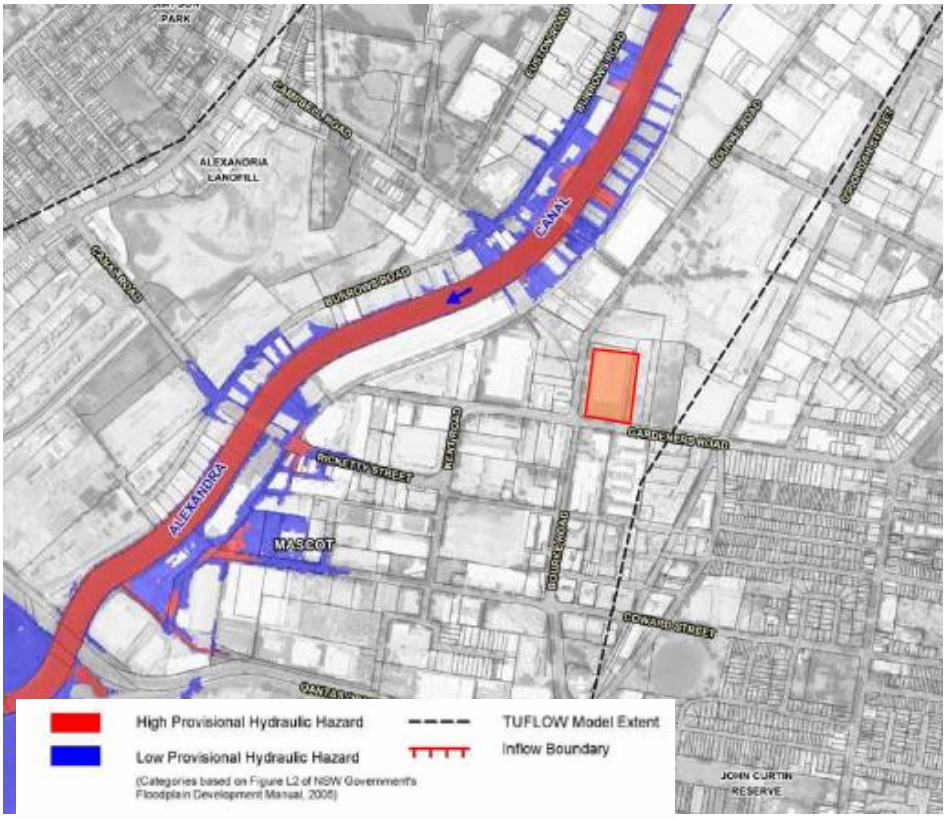


Figure 7.6. M5 EIS - 1% AEP Provisional Flood Hazard

Figure 7.7. M5 EIS - PMF Flood Extent and Depths

7.4 City of Sydney Floodplain Management Requirements & NSW Floodplain Management Manual Requirements

Councils *Floodplain Management Policy* provides relevant policy requirements relating to development in and around identified flood affected development sites.

The intent of the document is to ensure that new developments do not experience undue flood risk and that existing development is not adversely flood affected through increased damage or hazard as a result of new development.

Section 5 of the *Floodplain Management Policy* notes the flood planning level for business/ industrial to be at or above the 1% AEP (1 in 100-year ARI) flood level.

The PMF or extreme event provides an upper limit of flooding and associated consequences for the problem being investigated. It is used for emergency response planning purposes to address the safety of people.

As discussed in earlier sections of this report, there is no flooding shown on the site or surrounding roads.

We note the FFL of the proposed building has been sited a minimum of 0.5m above the gutter level to ensure the site is not affected by nuisance runoff and gutter flows in Gardeners Road and Bourke Road.

In relation to flood impact on the development or impact from the development on flooding, it is noted that the modelled 1% AEP flood extent does not encroach the subject property, hence no adverse impact to existing flood conditions or surrounding developments are associated with the proposed development.

Overall flood risk for the development, and from the development is considered low to negligible, and the development meets current council flood policy.

7.5 Flood Assessment Conclusion

A review of available flood studies has been made to determine flood behaviour in relation to the proposal.

Review of the available information, including Councils adopted flood study and new M5 EIS SSI-6788, shows the site is not subject to flooding or overland flow paths. As the site is not subject to flooding or overland flow, no detailed modelling or flood impact assessments are necessary for the development.

We note the floor level of the building has been set 0.5m above the gutter level to ensure nuisance flooding and gutter flows do not affect the operation of the development when operational.

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 Basins

Sediment basins have 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 F' soils. These soils are fine grained and require a relatively long residence time to allow settling.

Sediment basins for 'Type F' 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.

Sediment Fences

Sediment fences 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 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 Gardeners and/ or Bourke 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 State Significant Development Application for a Proposed Development at 520 Gardeners Road, Alexandria, 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 stormwater quantity and quality management strategy has been developed to consider peak flows and reduce pollutant loads in stormwater leaving this site. The stormwater management for the development has been designed in accordance with City of Sydney Council requirements and ensuring acceptable impacts relating to the development.

The hydrological assessment shows local post development flows from the site will be consistent with pre-development flows and demonstrates that the site discharge will not adversely affect any land, drainage system or watercourse as a result of the development.

During the construction phase, a Sediment and Erosion 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

- Section 3, Development Control Plan (2012), City of Sydney Council
- Floodplain Management Policy, City of Sydney Council
- Alexandra Canal Catchment Flood Study Report Final (Ref: W4785). 20 May 2014
- NSW Government (2005). *Floodplain Development Manual.*
- Managing Urban Stormwater: Harvesting and Reuse – 2006 (NSW DEC);
- Managing Urban Stormwater: Source Control – 1998 (NSW EPA);
- Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);
- Landcom (2004). *Managing Urban Stormwater – Soils and Construction* – 4th Edition.

Appendix A

DRAWINGS BY COSTIN ROE CONSULTING

PROPOSED INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD, ALEXANDRIA, NSW 2015
CIVIL DEVELOPMENT APPLICATION

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C014368.00-DA10	DRAWING LIST & GENERAL NOTES
C014368.00-DA20	EROSION & SEDIMENT CONTROL PLAN
C014368.00-DA25	EROSION & SEDIMENT CONTROL DETAILS
C014368.00-DA40	STORMWATER DRAINAGE PLAN
C014368.00-DA41	STORMWATER CATCHMENT PLAN - MUSIC
C014368.00-DA45	STORMWATER DRAINAGE DETAILS - SHEET 1
C014368.00-DA46	STORMWATER DRAINAGE DETAILS - SHEET 2
C014368.00-DA47	STORMWATER LONGSECTION - INTER-ALLOTMENT
C014368.00-DA50	FINISHED LEVELS PLAN
C014368.00-DA65	RETAINING WALL DETAILS

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 ITS 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.

SITE LOCATION PLAN
NTS

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	C
ISSUED FOR INFORMATION	19.11.21	B
ISSUED FOR INFORMATION	12.11.21	A

ARCHITECT

CLIENT Charter Hall

PROJECT
INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
	DW	SEP '21		A0	AS SHOWN	C014368.00-DA10

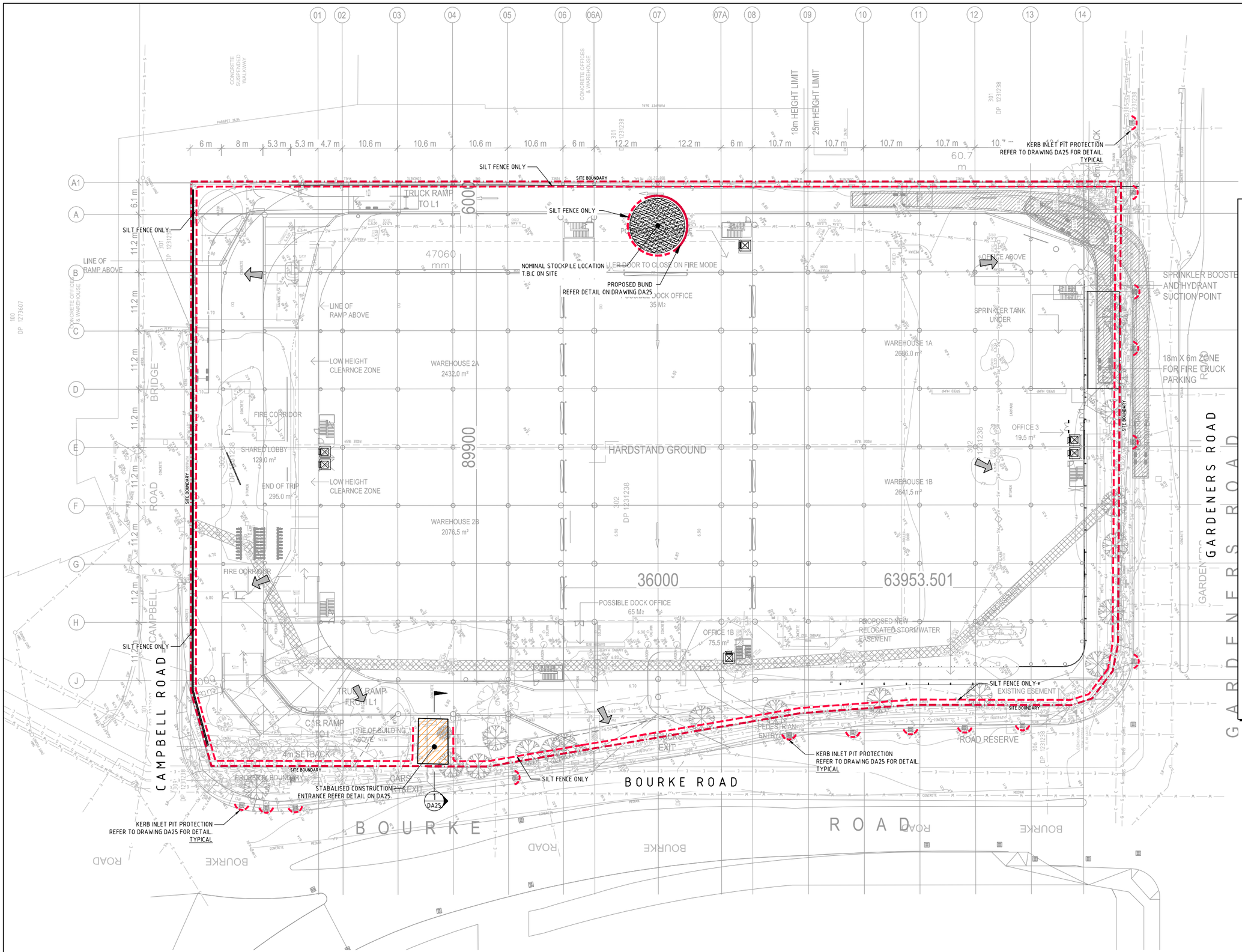
Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 8251-7600 Fax: (02) 8241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
DRAWING LIST AND LOCALITY PLAN

DRAWING No. C014368.00-DA10 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
- DENOTES CONSTRUCTION ENTRY
- DENOTES OVERLAND FLOW

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.

RUSLE CALCULATION:

TOTAL CATCHMENT AREA = 1.90 ha
DISTURBED CATCHMENT AREA = 1.90 ha

$A = R \times K \times LS \times P \times C$

1. 2-yr, 6-hr ARI (S) = 7.07;
2. RAINFALL EROSIVITY FACTOR (R)
   $R = 164.74(1.1177)^{S}\ S^{2.64444} = 1276$;
3. SOIL ERODIBILITY FACTOR (K) = 0.075;
4. LENGTH/GRADIENT FACTOR (LS) = 0.25;
5. EROSION CONTROL PRACTICE FACTOR (P) = 1.3;
6. COVER FACTOR (C) = 1.0

SOIL LOSS (A) = $31.10 m^3/ha/yr$
= $59.09 m^3/yr$

PER BLUE BOOK GUIDELINES SECTION 6.3.2.d, FOR SITES WITH AVERAGE ANNUAL SOIL LOSS (A) < $150 m^3/yr$, A SEDIMENT RETENTION BASIN MAY BE CONSIDERED UNNECESSARY.

EROSION AND SEDIMENT CONTROL PLAN

SCALE 1:250

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

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	B
ISSUED FOR INFORMATION	12.11.21	A

ARCHITECT

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED: DW | DRAWN: DW | DATE: SEP '21 | CHECKED: | SIZE: A0 | SCALE: AS SHOWN | CAD REF: C014368.00-DA20

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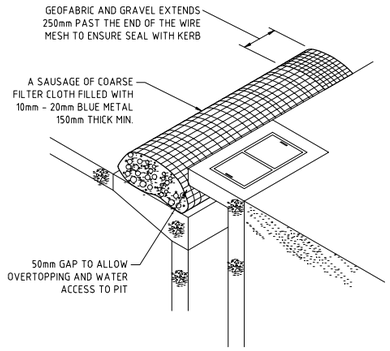
PRECISION | COMMUNICATION | ACCOUNTABILITY

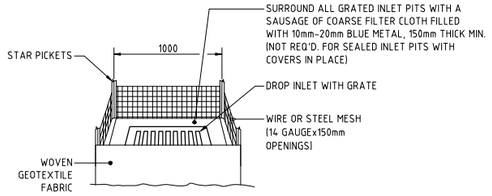
DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN

DRAWING NO: C014368.00-DA20 | ISSUE: B



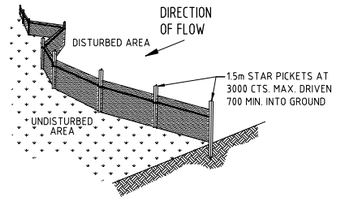
KERB INLET CONTROL

N.T.S



GRATED INLET PIT FILTER DETAIL

N.T.S



TYPICAL SILT FENCE DETAIL

N.T.S

NOTE: PROVIDE 1m RETURNS AT 30m INTERVALS. TYPICAL

NOTES:

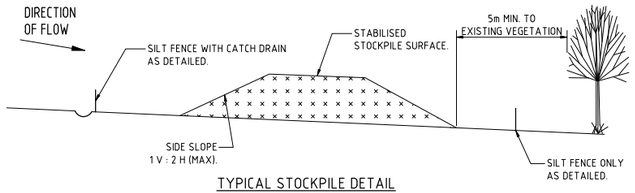
ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.

MINIMISE DISTURBED AREAS.

ROADS & FOOTPATHS TO BE SWEPT DAILY.

1.2m TURF TO BE PLACED BEHIND KERBS.

DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.

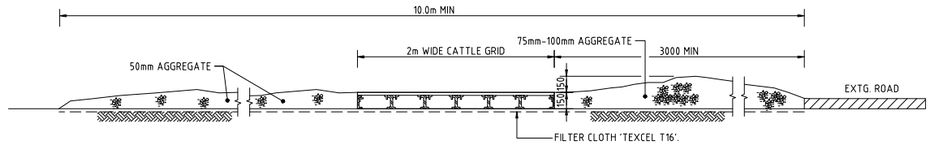


TYPICAL STOCKPILE DETAIL

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 / DA20) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	B
ISSUED FOR INFORMATION	12.11.21	A

ARCHITECT

CLIENT Charter Hall

PROJECT
INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
	DW	SEP '21		A0	AS SHOWN	C014368.00-DA25

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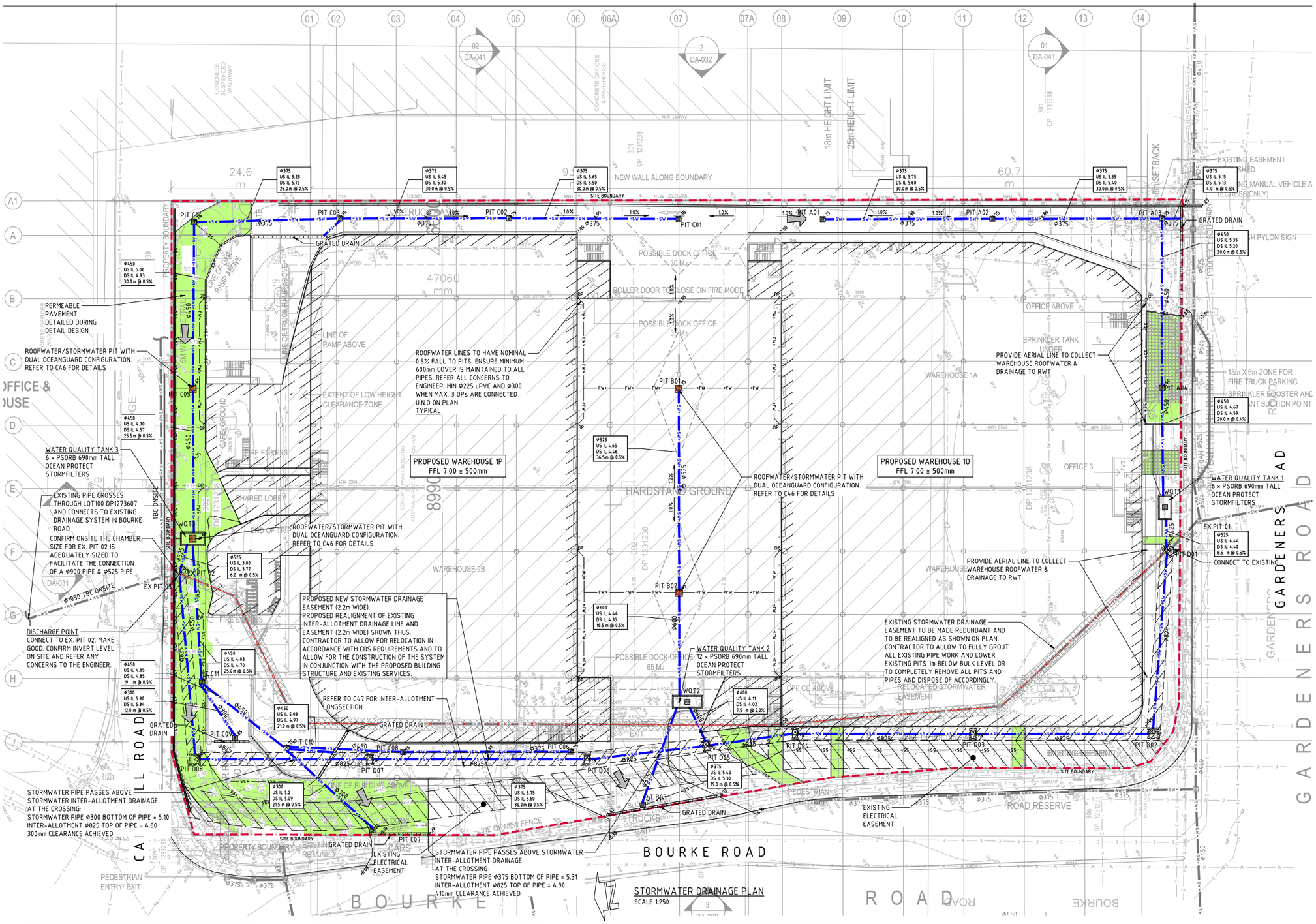
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
EROSION AND SEDIMENT CONTROL DETAILS

DRAWING No C014368.00-DA25

ISSUE B



STORMWATER DRAINAGE PLAN
SCALE 1:250

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON A PLAN OF SURVEY 51419 001DT_B BY LTS LOCKLEY 02/08/2021.

- SGGP, SINGLE GRATED GULLY PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- EXISTING DRAINAGE LINE TO BE REMOVED
- ROOFWATER DOWNPIPE (INDICATIVE)
- ROOFWATER LINE
- SUBSOIL LINE
- OVERLAND FLOW DIRECTION
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- PROPOSED EASEMENT RELOCATION 2.2m WIDE
- EXISTING ELECTRICAL EASEMENT
- PERMEABLE PAVEMENT

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3-2018 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 PLAN DA50.
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 6 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. ALL PIPE GRADES 1 IN 200 MINIMUM UNO.
16. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
17. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
18. 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.
19. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
20. 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.
21. 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.
22. 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.

PIT SCHEDULE - NETWORK A

PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT A01	6.75	SGGP	900×900	
PIT A02	6.75	SGGP	900×900	
PIT A03	6.75	SGGP	900×900	
PIT A04	6.50	SGGP	1200×1200	

PIT SCHEDULE - NETWORK B

PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT B01	6.75	SGGP	1200×1200	◇◇
PIT B02	6.75	SGGP	1200×1200	◇◇
PIT B03	6.42	SGGP	900×900	GD

PIT SCHEDULE - NETWORK C

PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT C01	6.65	SGGP	900×900	
PIT C02	6.75	SGGP	900×900	
PIT C03	6.75	SGGP	900×900	GD
PIT C04	6.75	SGGP	900×900	
PIT C05	6.65	SGGP	900×900	◇◇
PIT C06	6.75	SGGP	1200×1200	
PIT C07	6.20	SGGP	900×900	GD
PIT C08	6.75	SGGP	900×900	
PIT C09	6.85	SGGP	900×900	GD
PIT C10	6.75	SJP	900×900	GD
PIT C11	6.75	SGGP	900×900	

PIT SCHEDULE - NETWORK D

PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT D01	6.56	SJP	900×900	
PIT D02	0.98	SJP	900×900	
PIT D03	6.98	SJP	900×900	
PIT D04	6.98	SJP	900×900	
PIT D05	7.00	SJP	900×900	
PIT D06	6.80	SJP	900×900	
PIT D07	6.78	SJP	900×900	
PIT D08	6.85	SJP	900×900	

NOTE:
PITS TO BE FITTED WITH OCEAN PROTECT OCEAN GUARD OG200 PIT INSERTS SHOWN THUS ◇
NO OF PIT INSERTS IN OSD = 2
TOTAL NO OF PIT INSERTS = 8
REFER TO PIT SCHEDULE ABOVE

LEVELS NOTE:

LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

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

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	16.12.21	F
ISSUED FOR DEVELOPMENT APPLICATION	03.12.21	E
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	D
ISSUED FOR INFORMATION	19.11.21	C
ISSUED FOR INFORMATION	12.11.21	B
ISSUED FOR INFORMATION	17.09.21	A

ARCHITECT

CLIENT
Charter Hall

PROJECT
INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED DW | DRAWN DW | DATE SEP '21 | CHECKED | SIZE A0 | SCALE AS SHOWN | CAD REF: C014368.00-DA40

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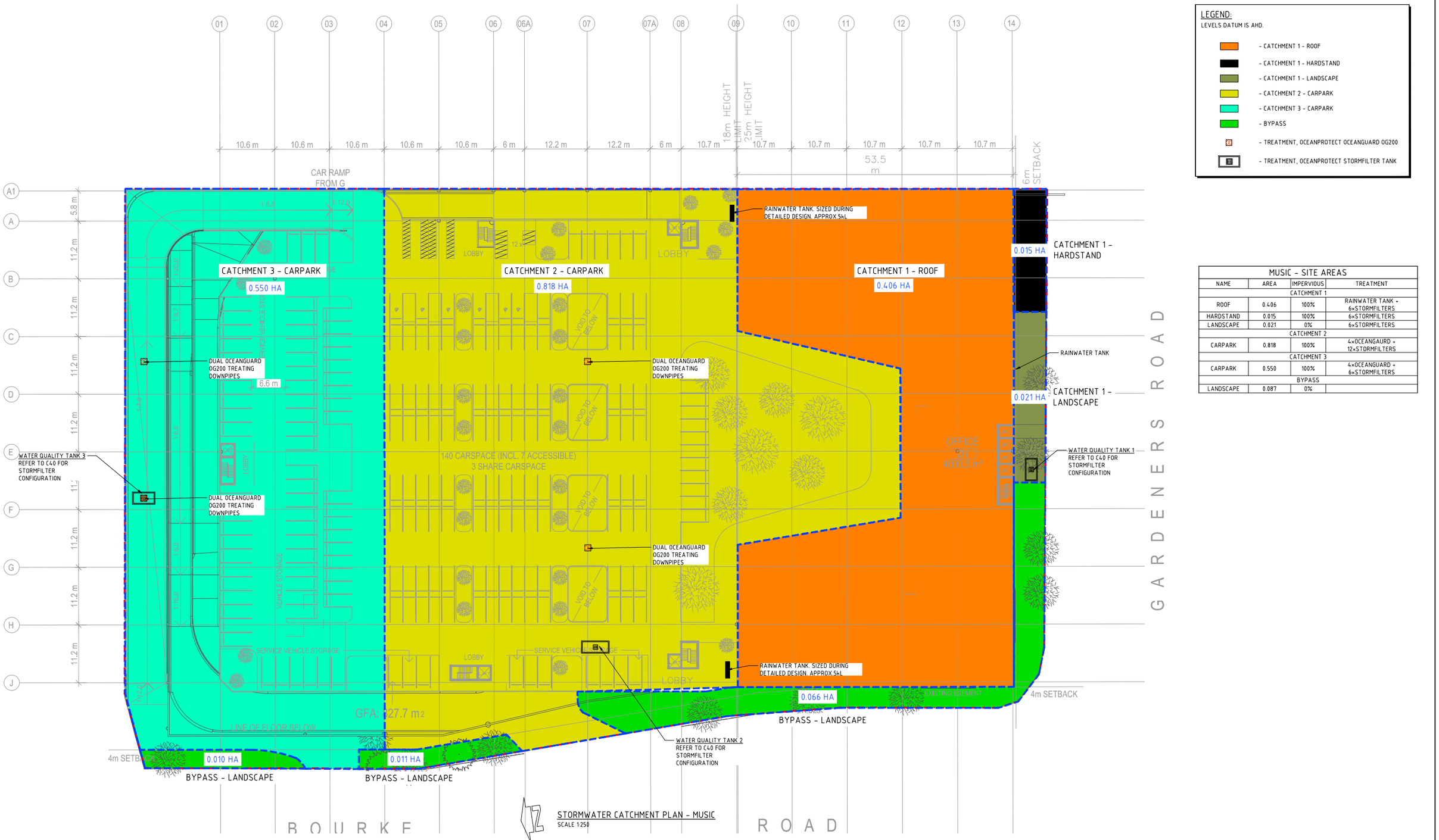
DRAWING TITLE
STORMWATER DRAINAGE PLAN

DRAWING No C014368.00-DA40 | ISSUE F



LEGEND:

LEVELS DATUM IS AHD.

- CATCHMENT 1 - ROOF
- CATCHMENT 1 - HARDSTAND
- CATCHMENT 1 - LANDSCAPE
- CATCHMENT 2 - CARPARK
- CATCHMENT 3 - CARPARK
- BYPASS
- TREATMENT, OCEANPROTECT OCEANGUARD OG200
- TREATMENT, OCEANPROTECT STORMFILTER TANK

MUSIC - SITE AREAS

NAME	AREA	IMPERVIOUS	TREATMENT
CATCHMENT 1			
ROOF	0.406	100%	RAINWATER TANK + 6×STORMFILTERS
HARDSTAND	0.015	100%	6×STORMFILTERS
LANDSCAPE	0.021	0%	6×STORMFILTERS
CATCHMENT 2			
CARPARK	0.818	100%	4×OCEANGAURD + 12×STORMFILTERS
CATCHMENT 3			
CARPARK	0.550	100%	4×OCEANGUARD + 6×STORMFILTERS
BYPASS			
LANDSCAPE	0.087	0%	

STORMWATER CATCHMENT PLAN - MUSIC

SCALE 1:250

2m 0 5 10 15 20 25m

SCALE 1:250 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	B
ISSUED FOR INFORMATION	19.11.21	A

ARCHITECT

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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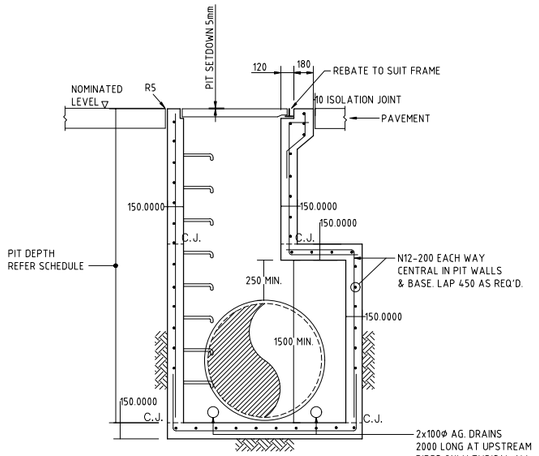
DRAWING TITLE: STORMWATER CATCHEMNT PLAN - MUSIC

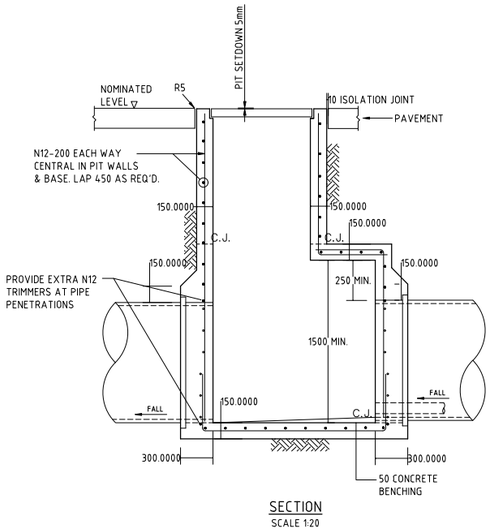
DRAWING No: C014368.00-DA41

ISSUE: B



SECTION
SCALE 1:20

TAPERED SINGLE GRATED GULLY PIT - SGGP



SECTION
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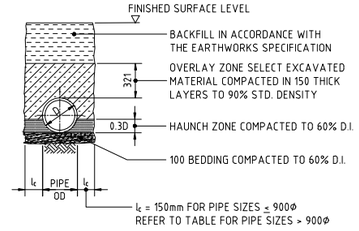
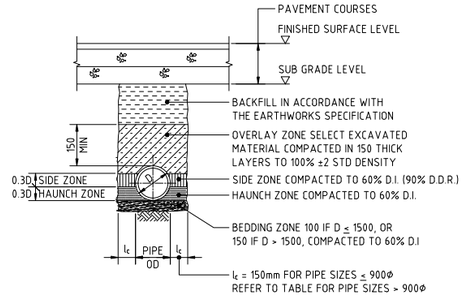
TAPERED SINGLE GRATED GULLY PIT - SGGP



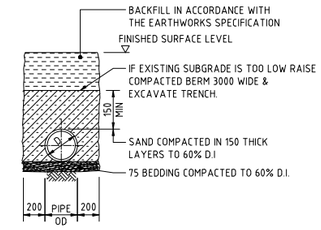
TYPE H1 SUPPORT TO CONCRETE PIPES AT LANDSCAPED AREAS

SCALE 1:20



TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

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



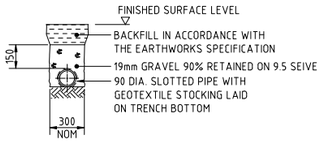
SUPPORT TO uPVC PIPES

SCALE 1:20

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	

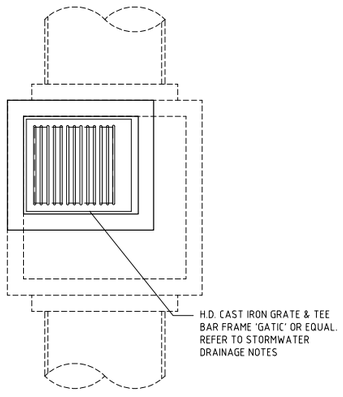
BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 50
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
9.5	100 TO 50
2.6	100 TO 30
0.60	50 TO 15
0.075	25 TO 0
SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725	



SUPPORT TO AGRICULTURAL DRAIN

SCALE 1:20

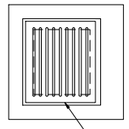


PLAN
SCALE 1:20

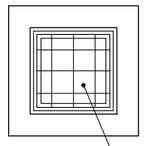
CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX. SIZE)	CEMENT TYPE	ADMIXTURE	F'c (MPa)
PIT	80	20	GP	NIL	32

NOTES:

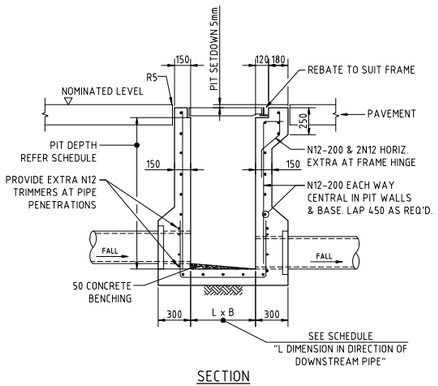
1. ALL REINFORCING TO HAVE 30 MIN. CLAER CONCRETE COVER.
2. FOR PITS DEEPER THAN 1200mm CLIMB RAILS SHALL BE PROVIDED.



PLAN
SCALE 1:20

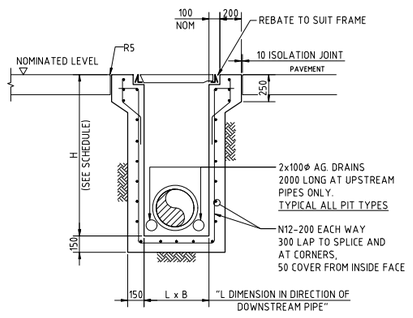


PLAN
SCALE 1:20



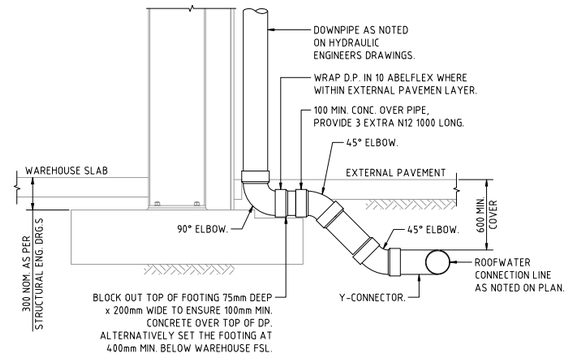
SECTION
SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP



SECTION
SCALE 1:20

SEALED PIT - SJP



DOWNPIPE TURN-UP DETAIL A

(AT FOOTING LOCATION)
SCALE 1:20

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	B
ISSUED FOR INFORMATION	12.11.21	A

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PROJECT
INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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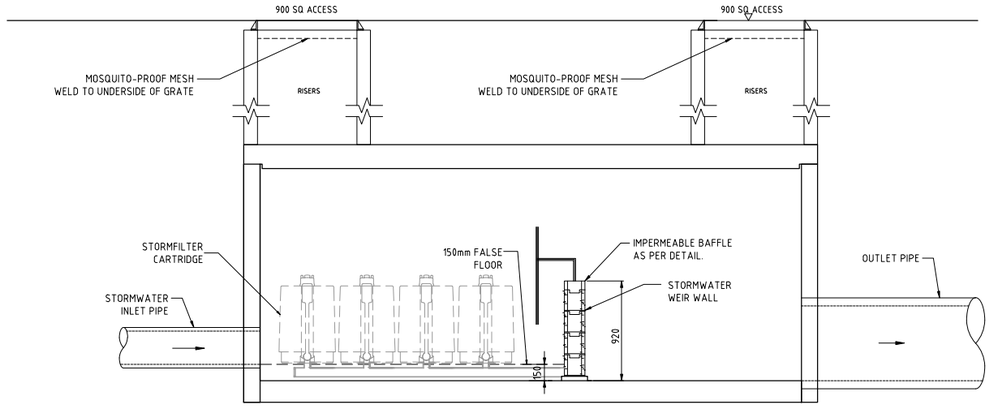
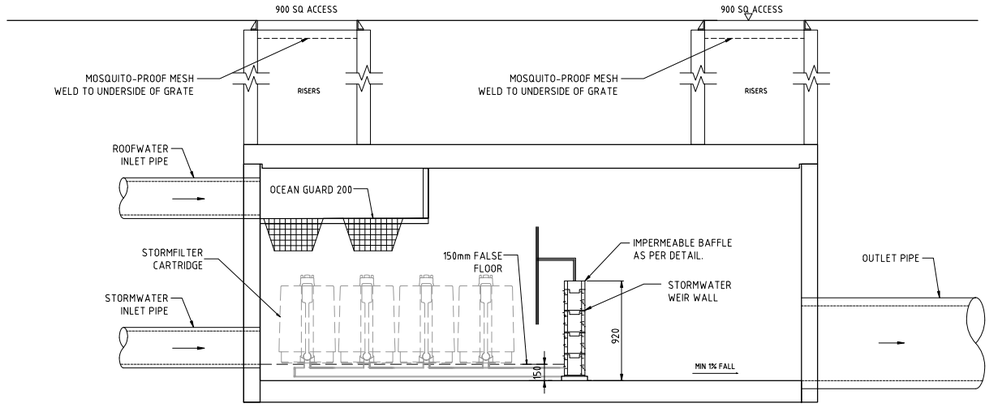
STORMWATER DRAINAGE
DETAILS - SHEET 1

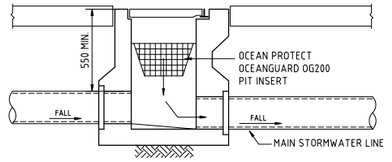
DRAWING No C014368.00-DA45 ISSUE B



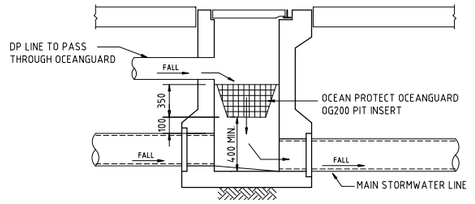
STORMFILTER CHAMBER TYPICAL DETAIL
SCALE 1:20



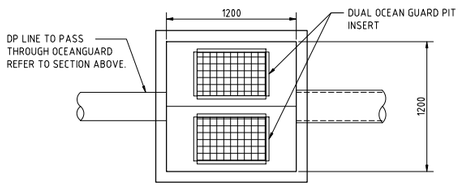
STORMFILTER CHAMBER TYPICAL DETAIL WITH OCEAN GUARD 200
SCALE 1:20



STORMWATER PIT WITH OCEANGUARD
CONFIGURATION



ROOFWATER/STORMWATER PIT WITH
OCEANGUARD CONFIGURATION
SCALE 1:20



ROOFWATER/STORMWATER PIT WITH DUAL
OCEANGUARD CONFIGURATION
SCALE 1:20

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

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STORMWATER DRAINAGE
DETAILS - SHEET 2

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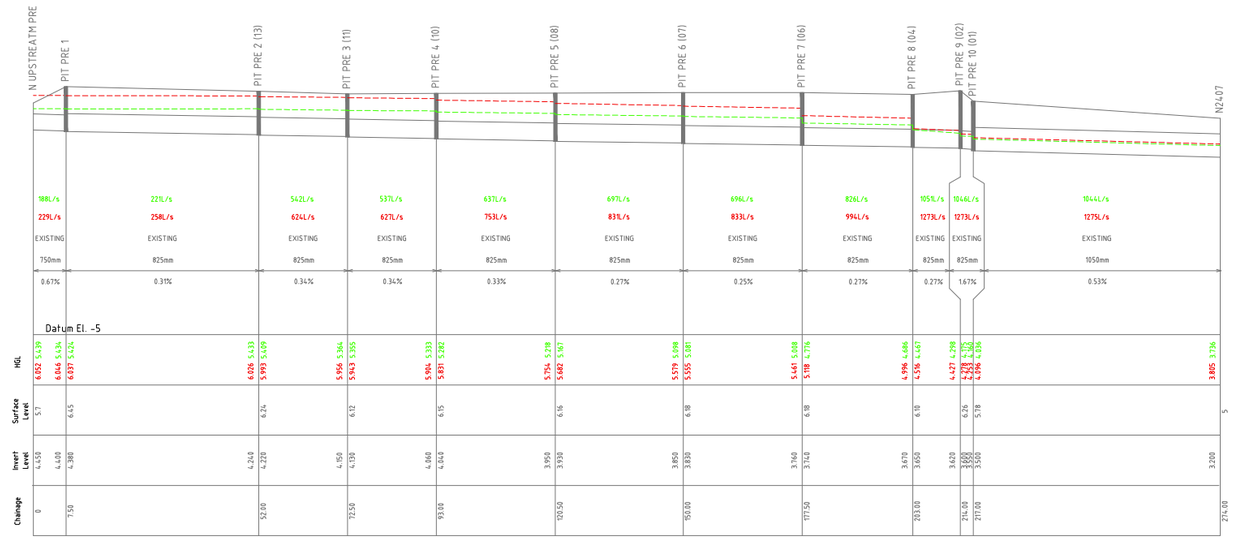
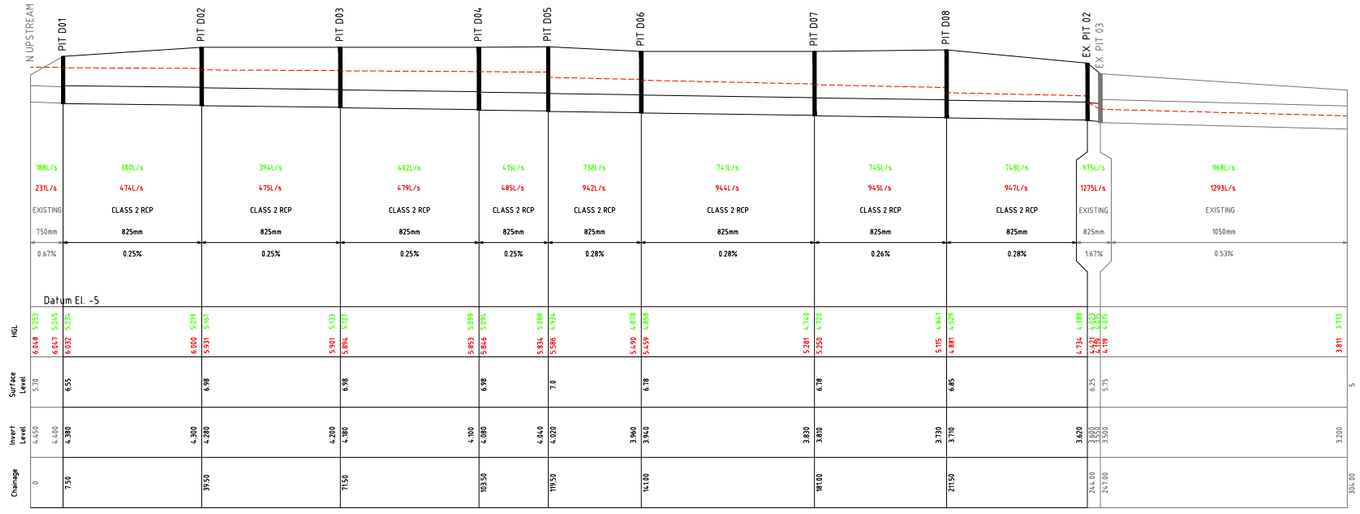
ISSUE B



PRE-DEVELOPED SCENARIO

SCALE 1:500 HORIZONTAL
SCALE 1:100 VERTICAL



POST-DEVELOPED SCENARIO

SCALE 1:500 HORIZONTAL
SCALE 1:100 VERTICAL

NOTE:

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

H.G.L & FLOWRATE SHOWN FOR Q100 A.R.I STORM EVENT

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

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AMENDMENTS	DATE	ISSUE
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ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	C
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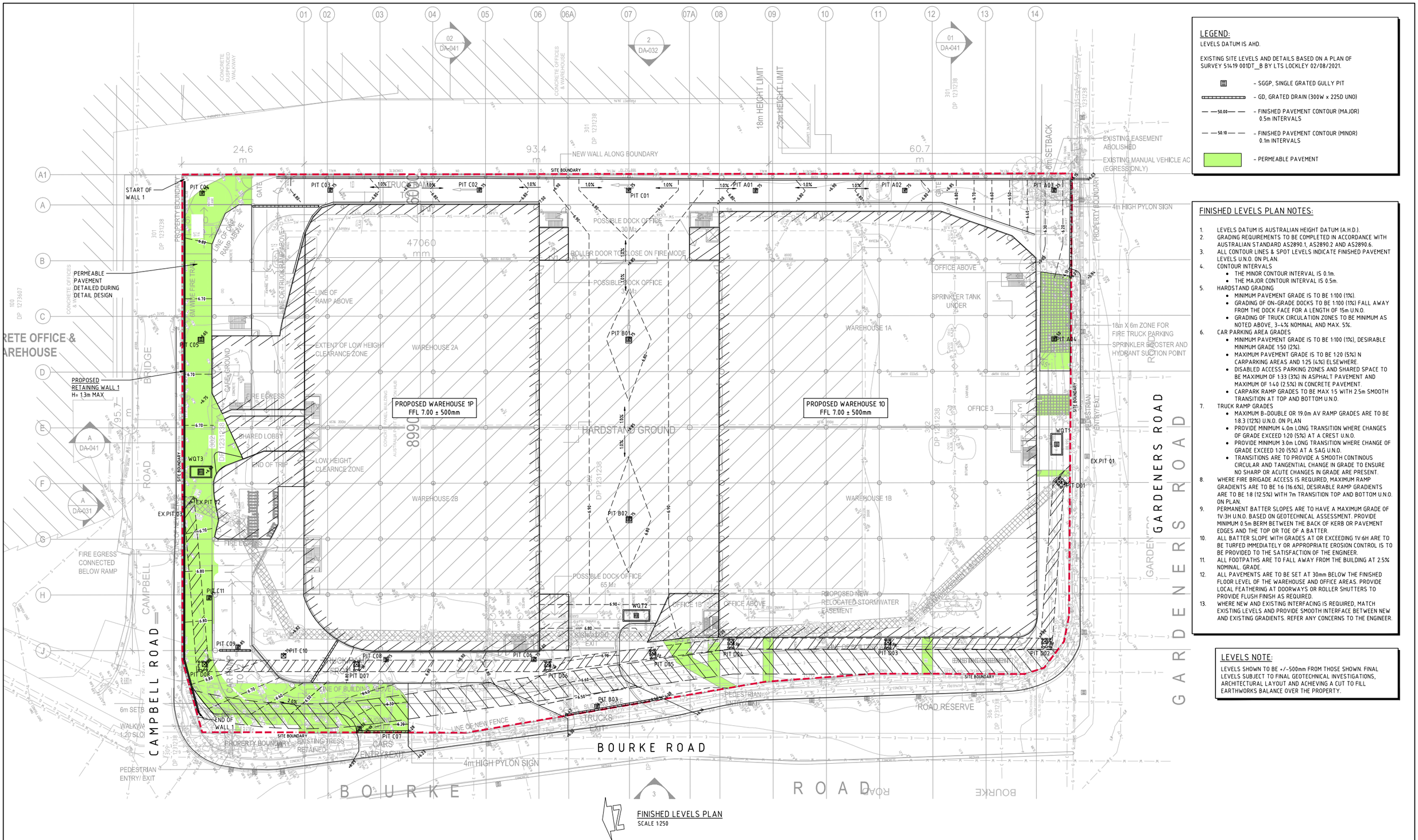
STORMWATER LONGSECTION
INTER-ALLOTMENT DRAINAGE

DRAWING No C014368.00-DA47 ISSUE D



FINISHED LEVELS PLAN
SCALE 1:250

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON A PLAN OF SURVEY 51419 001DT_B BY LTS LOCKLEY 02/08/2021.

- SGGP, SINGLE GRATED GULLY PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- —50.00— FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- —50.10— FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- PERMEABLE PAVEMENT

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.

LEVELS NOTE:

LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

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

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

FOR DEVELOPMENT APPLICATION

ISSUE	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	16.12.21	F
ISSUED FOR DEVELOPMENT APPLICATION	03.12.21	E
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	D
ISSUED FOR INFORMATION ONLY	19.11.21	C
ISSUED FOR INFORMATION ONLY	12.11.21	B
ISSUED FOR INFORMATION ONLY	17.09.21	A

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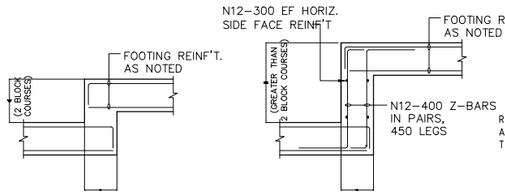
FINISHED LEVELS PLAN

DRAWING NO C014368.00-DA50 ISSUE F

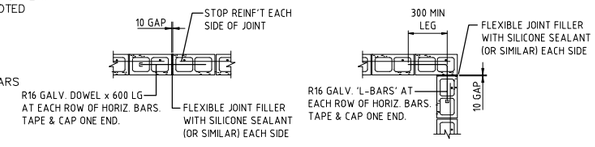


STEP HEIGHT 0mm TO 400mm

STEP HEIGHT GREATER THAN 400mm

TYPICAL WALL FOOTING STEPS

1:20



VERTICAL JOINT DETAIL

PROVIDE VERTICAL JOINTS IN BLOCKWORK 8.0M MAX. CENTRES

CORNER DETAIL

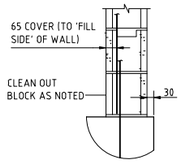
RETAINING WALL BLOCKWORK JOINTING DETAILS

1:20 SCALE

RETAINING WALL TYPE 1 SPECIFICATIONS FOR 20kPa SURCHARGE :				
RETAINED HEIGHT H1	BASE WIDTH B1	(THIN) STEM THICKNESS T1	REINF'T. X BARS	REINF'T. Y BARS
1600	1800	190	N16-400	N16-400
1400	1800	190	N16-400	N16-400
1200	1600	190	N16-400	N16-400
1000	1400	190	N16-400	N16-400
800	1200	190	N16-400	N16-400
600	1000	190	N16-400	N16-400

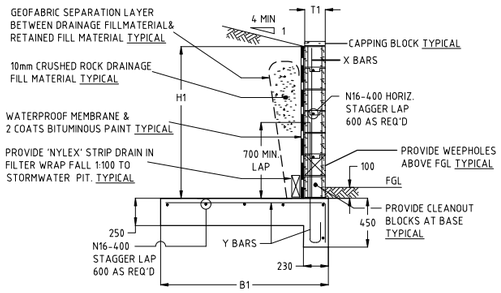
CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX. SIZE)	CEMENT TYPE	ADMIXTURE	F'_c (MPa)
CORE FILL	230	10	GP	NIL	20

NOTE :
ALL BLOCK CORES TO BE FULLY GROUTED.
NOTES SHOWN ARE TYPICAL FOR ALL WALLS.
ALL BASE KEYS TO BE POURED AGAINST UNDISTURBED NATURAL GROUND.



WALL VERTICAL REINF'T DETAIL TYPICAL

NOT TO SCALE



WALL WITH SINGLE STEM OF 190 BLOCK

1:20 SCALE

MASONRY BLOCKWORK

M1 ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3700.

M2 CLASS OF BLOCKS AND TYPE OF MORTAR SHALL BE AS LISTED BELOW :

MATERIAL:	CHARACTERISTIC UNCONFINED COMPRESSIVE STRENGTH, F'_{uc}:	MORTAR CLASSIFICATION:
CONCRETE BLOCKS	15 MPa	M3

M3 MORTAR ADMIXTURES SHALL NOT BE USED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.

M4 ALL MASONRY WALLS AND PIERS SUPPORTING SLABS AND BEAMS SHALL HAVE A PRE-GREASED GALVANISED STEEL SLIP JOINT BETWEEN CONCRETE SOFFIT AND THE TOP OF OF THE MASONRY ELEMENT U.N.O.

M5 ALL MASONRY SUPPORTING OR SUPPORTED BY CONCRETE FLOORS SHALL BE PROVIDED WITH VERTICAL JOINTS TO MATCH ALL CONTROL JOINTS IN THE CONCRETE.

M6 NON LOAD BEARING WALLS SHALL BE SEPARATED FROM CONCRETE ABOVE BY A 12mm THICK CLOSED CELL POLYETHYLENE STRIP.

M7 NO CHASES OR RECESSES ARE PERMITTED IN LOAD BEARING MASONRY WITHOUT THE APPROVAL OF THE ENGINEER.

M8 PROVIDE CLEANOUT HOLES AT BASE OF ALL WALLS. ROD CORE HOLES TO REMOVE PROTRUDING MORTAR FOLLOWING APPROVAL FROM THE ENGINEER.

M9 CORE FILLING GROUT TO HAVE A CHARACTERISTIC STRENGTH OF 20 MPa, 10mm AGGREGATE, 230mm SLUMP, MINIMUM CEMENT CONTENT = 300 kg/m³. GROUT FILL ALL BLOCK CORES.

M10 PROVIDE 65mm COVER TO REINFORCING BARS FROM THE OUTSIDE FACE OF THE BLOCKWORK IF REINFORCEMENT IS NOT TO BE PLACED CENTRALLY.

M11 PROVIDE VERTICAL CONTROL JOINTS AT 10 METRE MAX CENTRES, AND AT 5 METRE MAXIMUM FROM CORNERS IN ALL BRICKWORK WALLS

M12 PROVIDE VERTICAL CONTROL JOINTS AT 8 METRE MAX CENTRES, AND AT 4 METRE MAXIMUM FROM CORNERS IN ALL CONCRETE BLOCK WALLS.

M13 BACKFILL TO RETAINING WALLS TO BE FREE DRAINING GRANULAR MATERIAL U.N.O. PROVIDE SUBSOIL DRAIN BEHIND WEEP HOLES.

M14 DO NOT CONSTRUCT MASONRY WALLS ON SUSPENDED CONCRETE UNTIL SLAB HAS BEEN STRIPPED AND DE-PROPPED.

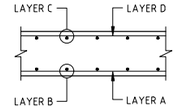
M15 ALL CAVITY CONSTRUCTION TO HAVE GALVANISED OR STAINLESS STEEL WALL TIES INSTALLED AS PER AS3700

REINFORCEMENT

R1 ALL REINFORCEMENT BARS ARE TO BE D500N U.N.O.

R2 ALL REINFORCEMENT WELDED MESHES TO BE GRADE 500L U.N.O.

R3 WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.



REINFORCEMENT PLACEMENT DETAIL

NOTE:
ATTENTION IS DRAWN TO THE FACT THAT DUE TO THE NATURE OF CONCRETE, CRACKING OF A NON-STRUCTURAL NATURE MAY OCCUR. REINFORCEMENT HAS BEEN ADDED TO THE SLABS TO MITIGATE THE EXTENT OF CRACKING, HOWEVER IT IS NOT POSSIBLE TO GUARANTEE COMPLETE ELIMINATION OF SLAB CRACKING.

CONCRETE

C1 ALL WORKMANSHIP AND MATERIAL SHALL BE IN ACCORDANCE WITH AS3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.

C2 READYMIX CONCRETE SUPPLY SHALL COMPLY WITH AS1379.

C3 CONCRETE QUALITY
ALL THE REQUIREMENTS OF THE ACSE SPECIFICATION DOCUMENT 1 (EDITION 6) SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

ELEMENT	STRENGTH GRADE (MPa)	SLUMP	MAX AGG SIZE	CEMENT TYPE
REFER TO PLANS				

C4 PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE AS1379.

C5 NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING.

C6 CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE AS FOLLOWS UNLESS SHOWN OTHERWISE.

EXPOSURE CLASSIFICATION TO AS3600:	CONCRETE GRADE:	CAST AGAINST GROUND:	CAST IN FORMS AND EXPOSED:	CAST IN FORMS NOT EXPOSED:
A1&A2	25	50mm	30mm	20mm(A1)
B1	32	60mm	40mm	-
B2	40	65mm	45mm	-

COVER REQUIREMENTS MAY NEED TO BE INCREASED TO SUIT FIRE RATING. EXPOSURE CLASSIFICATION SHALL BE AS INDICATED ON THE DRAWING.

DURABILITY REQUIREMENTS FOR CONCRETE.

EXPOSURE CLASSIFICATION TO AS3600:	MINIMUM CEMENT CONTENT:	MAXIMUM W/C RATIO:
A1&A2	280	0.56
B1	320	0.56
B2	390	0.46
C	450	0.40

C7 ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT 1 METRE CENTRES MAXIMUM BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS. USE PLASTIC CHAIRS IN EXPOSURE CONDITION GREATER THAN B1.

C8 CONCRETE SIZES DO NOT INCLUDE THICKNESSES OF APPLIED FINISHES.

C9 DEPTHS OF BEAMS ARE GIVEN FIRST AND INCLUDE SLAB THICKNESS.

C10 REFER TO ARCHITECT'S DETAILS, FOR CHAMFERS, DRIP GROOVES, REGLETS, ETC., MAINTAIN COVER TO REINFORCEMENT AT THESE DETAILS.

C11 NO HOLES, CHASES OR EMBEDMENT OF PIPES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.

C12 CONSTRUCTION JOINTS WHERE NOT SHOWN SHALL BE LOCATED TO THE APPROVAL OF THE ENGINEER.

C13 ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED WITH MECHANICAL VIBRATORS.

C14 USE ALIPHATIC ALCOHOLS SPRAYED OVER THE SURFACE PRIOR TO AND AFTER FINISHING TO REDUCE RATE OF EVAPORATION FROM THE SURFACE AND HELP CONTROL PLASTIC SHRINKAGE CRACKING. NOTE THAT THE USE OF ALIPHATIC ALCOHOLS IS NOT A SUBSTITUTE FOR CURING.

C15 COMMENCE CURING OPERATIONS PROMPTLY AFTER SURFACE FINISHING IS COMPLETE. CURING COMPOUNDS ARE TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND ARE TO BE CHECKED FOR COMPATIBILITY WITH PROPOSED FLOOR FINISHES. SOME COMPOUNDS MAY REQUIRE REMOVAL FOR GLUED DOWN FLOOR COVERINGS OR WET CURING AS DESCRIBED BELOW.

CONCRETE IS TO BE CURED BY KEEPING THE SURFACES CONTINUOUSLY WET FOR A PERIOD OF 3 DAYS, AND PREVENTING THE LOSS OF MOISTURE FOR A FURTHER 7 DAYS FOLLOWED BY A GRADUAL DRYING OUT.

C16 PROPPING WHICH SUPPORTS CONSTRUCTION OVER IS TO BE LEFT IN PLACE AS REQUIRED TO AVOID OVER STRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING

C17 THE ENGINEER SHALL BE GIVEN 48 HOURS NOTICE FOR REINFORCEMENT INSPECTIONS AND CONCRETE SHALL NOT BE DELIVERED UNTIL ENGINEERS APPROVAL IS OBTAINED.

C18 CONDUITS, PIPES ETC. SHALL ONLY BE LOCATED IN THE MIDDLE ONE THIRD OF SLAB DEPTH AND SPACED AT NOT LESS THAN 3 DIAMETERS OF THE CONDUIT, PIPES ETC. PIPES OR CONDUITS SHALL NOT BE PLACED WITHIN THE COVER TO REINFORCEMENT.

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A0 SIZE SHEET

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520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

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DRAWING TITLE
RETAINING WALL DETAILS

DRAWING No C014368.00-DA65 ISSUE B

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 km^2 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 3 of City of Sydney's DCP2012 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 "*Co13734.01 Rev.A.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 City of Sydney Council *MUSICLINK* parameters for sandy 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 *Draft NSW MUSIC Modelling Guidelines (2011).*

B.2 Rainfall Data

As per the recommendation of Table 3-1 of *Draft NSW MUSIC Modelling Guidelines (2011),* 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	66062 Sydney
Rainfall Period	1 January 1982 – 31 December 1986 (4 years)
Mean Annual Rainfall (mm)	1278
Evapo- transpiration	Sydney Monthly Areal PET
Model Time step	6 minutes

B.3 Rainfall Runoff Parameters

Parameter	**Value**
Rainfall Threshold for roads/paths	1.50
Rainfall Threshold for roofs	0.30
Soil Storage Capacity (mm)	195

Initial Storage (% capacity)	30
Field Capacity (mm)	135
Infiltration Capacity Coefficient a	250
Infiltration Capacity exponent b	1.3
Initial Depth (mm)	10
Daily Recharge Rate (%)	60
Daily Baseflow Rate (%)	45
Daily Seepage Rate (%)	0

B.4 Pollutant Concentrations & Source Nodes

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

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	-*	-*	-*	-*	-*	-*
	Roads	-*	-*	-*	-*	-*	-*
	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
	Roads	2.43	0.32	-0.30	0.25	0.34	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

Table B.1. Pollutant Concentrations

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.

Catchment	**Area (Ha)**	**Source Node**	**% Impervious**
CAT 1 – Roof	0.406	Roof	100
CAT 1 – Hardstand	0.015	Sealedroad	100
CAT 1 – Landscape	0.021	Mixed	100
CAT 2 – Carpark	0.818	Mixed	100
CAT 3 - Carpark	0.550	Mixed	100
BYPASS - Landscape	0.087	Bypass	0
Total			

Table B.2. Music Model Source Nodes

B.5 Treatment Nodes

Gross Pollutant Trap and Siphon-Actuated 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. Detention basin nodes were also introduced to the model using typical parameters contained in MUSIC modelling guidelines.

Pit Baskets – OceanGaurd

Parameter	**Value**
Treatable Flow	$0.02m^3/s$ (per Filter)
Pollutant Reductions	
Per Technical Guidelines	

Filtration Device (StormFilters)

Parameter	**Value**
Treatable Flow	$0.0009m^3/s$ (per PSorb Cartridge)
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.

	Source	**Residual Load**	**% Reduction**
Total Suspended Solids (kg/yr)	3050	447	85.4
Total Phosphorus (kg/yr)	5.57	1.95	65.0
Total Nitrogen (kg/yr)	45.6	24.4	46.5
Gross Pollutants (kg/yr)	484	0	100

Table B.3. MUSIC analysis results

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 2012* 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 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 and bio-retention systems we consider that the requirements of the Council have been met.

B.8 MUSIC Model Layout

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

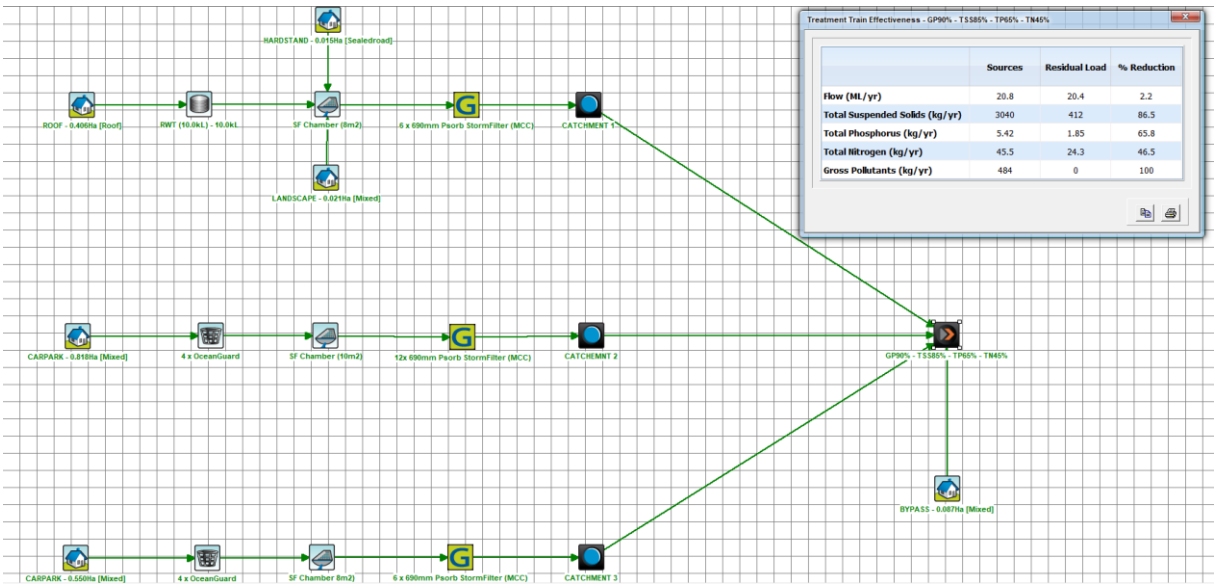


Figure B.8 MUSIC Model Layout

Appendix C

DRAFT SOIL AND WATER MANAGEMENT PLAN

C.1 Introduction

An erosion and sediment control plan (ESCP) is shown on drawing **Co14368.00-DA20** with details on **DA25**. 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 Staged ESCP considers initial site establishment, requirements during construction of development, 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 (1998) "The Blue Book"* and Penrith 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.

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	

Table C.1 Limitations to access

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 t_c 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.	.....

Appendix D

STORMWATER SYSTEM

DRAFT MAINTENANCE 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.
PROPRIETARY TREATMENT DEVICES (OceanSave SFEP)			
Refer to Manufacturers Operation and Maintenance Manuel	Annually	Maintenance Contractor	Refer to Manufacturers Operation and Maintenance Manuel

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
FUTURE 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			
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.

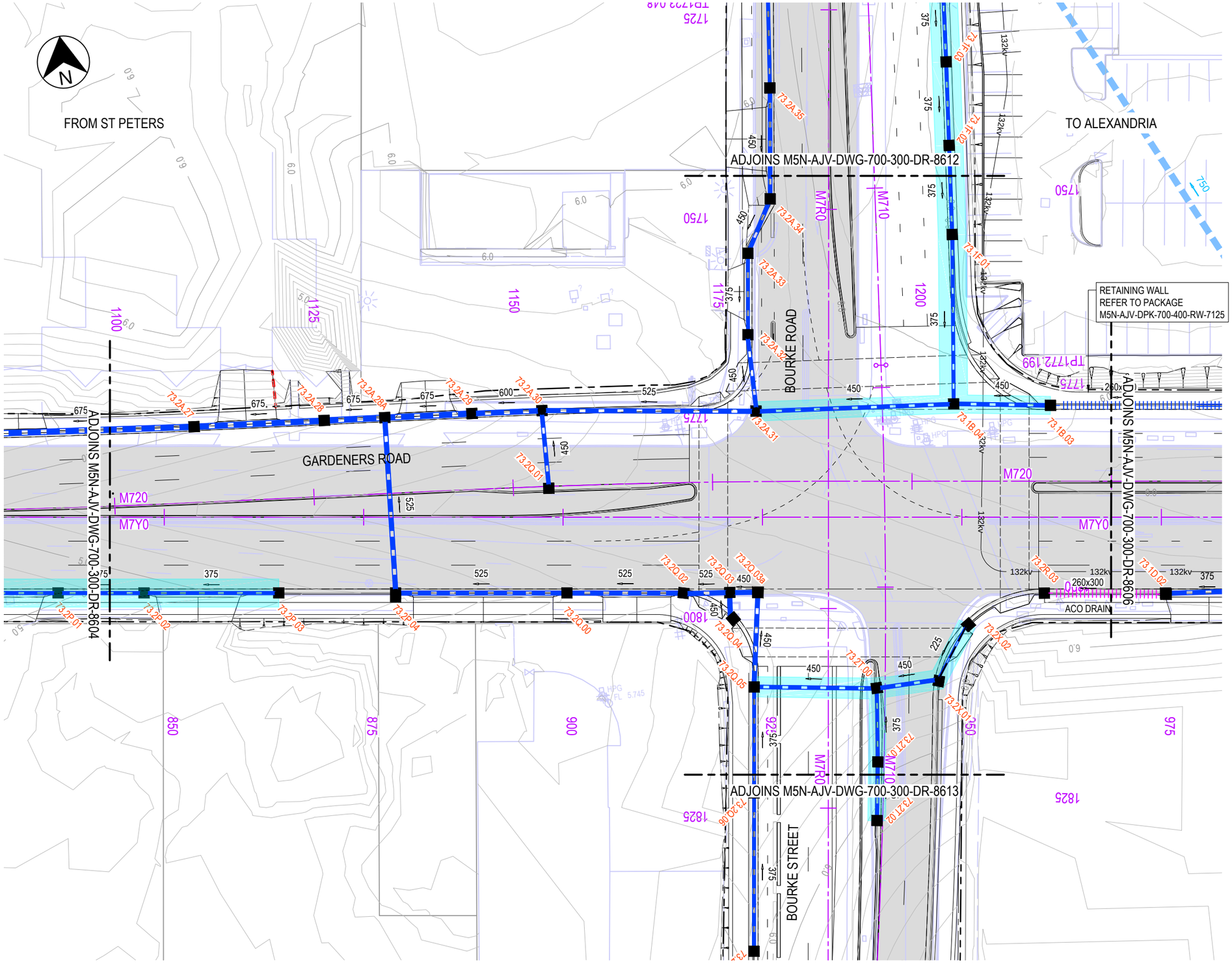
MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
Check attachment of orifice plate and screen to wall of pit	Annually	Maintenance Contractor	Remove grate and screen. Ensure plate or screen mounted securely, tighten fixings if required. Seal gaps if required.
Check orifice diameter is correct and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

Appendix E

TfNSW UPGRADE WORKS

WAE DRAINAGE LAYOUT DRAWINGS

A PERSON USING AJJV DRAWINGS AND OTHER DATA ACCEPTS THE RISK OF: USING THE DRAWING AND OTHER DATA IN ELECTRONIC FORM WITHOUT REQUESTING AND CHECKING THEM FOR ACCURACY AGAINST THE HARD COPY VERSION. USING THE DRAWINGS OR OTHER DATA FOR ANY PURPOSE NOT AGREED TO IN WRITING BY AJJV.



LEGEND

- PERMANENT WORKS BOUNDARY
- TEMPORARY WORKS BOUNDARY
- SURVEY
- CADASTRAL
- EXISTING & PROPOSED MERGED CONTOURS
- FUTURE ROADS BY OTHERS
- EXISTING PAVEMENT
- BRIDGE
- RETAINING WALL

EXISTING DRAINAGE

- EXISTING STORMWATER PIPE & PIT TO BE REMOVED / ABANDONED
- EXISTING STORMWATER PIPE, PIT & HEADWALL (TO REMAIN U.N.O.)
- EXISTING OVERLAND FLOW PATH DIRECTION

PROPOSED DRAINAGE

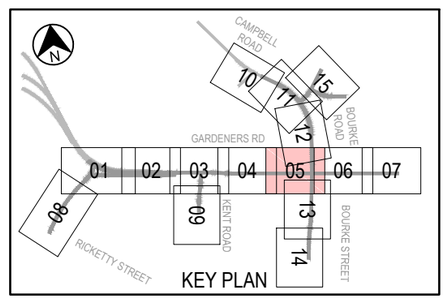
- 450 — SURFACE STORMWATER PIPE, SIZE & FLOW ARROW
- PIPE WITH CONCRETE ENCASEMENT
- GRATED DRAIN
- EXISTING STORMWATER PIT (TO BE MODIFIED)
- STORMWATER HEADWALL
- STORMWATER PIT
- STORMWATER QUALITY IMPROVEMENT DEVICE
- 7B.22.06 — STORMWATER PIT LABEL (DRAINAGE PIT NUMBER, DRAINAGE LINE NUMBER, PROJECT ZONE NUMBER)
- INDICATIVE SCUPPER LOCATION (REFER TO PACKAGE M5N-AJV-DPK-700-400-BR-7100)
- V-DRAIN - GRASS

PROPOSED PIPE NETWORK IN ADJACENT ZONES

- 450 — SURFACE STORMWATER PIPE, SIZE & FLOW ARROW
- STORMWATER PIT
- ACO DRAIN

NOTES

1. FOR GENERAL NOTES REFER TO DRAWING M5N-AJV-DWG-700-300-DR-8505 & DR-8506.



WORK AS EXECUTED

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DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING
M5N-AJV-MOD-700-300-DR-LOCAL S3.12da
M5N-AJV-MOD-700-300-RD-LOCAL S1.TXT
M5N-AJV-MOD-700-300-RD-LOCAL S3.TXT

REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
00	28.05.2018	ISSUED FOR CONSTRUCTION	R.DAVIES
01	30.10.2018	RE-ISSUED FOR CONSTRUCTION (CHANGE 240, CHANGE 100)	P.J.
02	19.06.2019	RE-ISSUED FOR CONSTRUCTION (RFI-02505)	D.B.
50	12.08.2020	WORK AS EXECUTED (M5N-RFI-CDS-10038, M5N-RFI-CDS-10149, M5N-RFI-CDS-10217)	

PROJECT BREAKDOWN STRUCTURE
M5N-AJV-DPK-700-300-DR-7035

SCALES ON A3 SIZE DRAWING
SCALE 1:500 (5 0 5 10) AT A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

WestConnex New M5

AURECON JACOBS NEW M5 JOINT VENTURE

PLOT DATE / TIME	PLOT BY
13/08/2020 22:01:11	msakthivel

TITLE	NAME	DATE
DRAWN	R.SANTANDER	18.01.2018
DRG CHECK	I.HALLIBURTON	18.01.2018
DESIGN	T.NIELSEN	18.01.2018
DESIGN CHECK	Y.CHEN	18.01.2018
ZONE MANAGER	F.BANNO	18.01.2018
DESIGN MANAGER	R.DAVIES	18.01.2018

CLIENT: Sydney Motorway Corporation — WestConnex

DOCUMENT NUMBER
M5N-AJV-DWG-700-300-DR-8605

WESTCONNEX NEW M5 — A3
ST PETERS LOCAL ROADS - GARDENERS ROAD DRAINAGE PLAN
SHEET 5 OF 15

RMS REGISTRATION No. DS2016/002598

ISSUE STATUS	EDMS No.	SHEET No.	REV
WORK AS EXECUTED		DR-8605	50

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL
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CIPA Application 221-0181 Page 41 of 56

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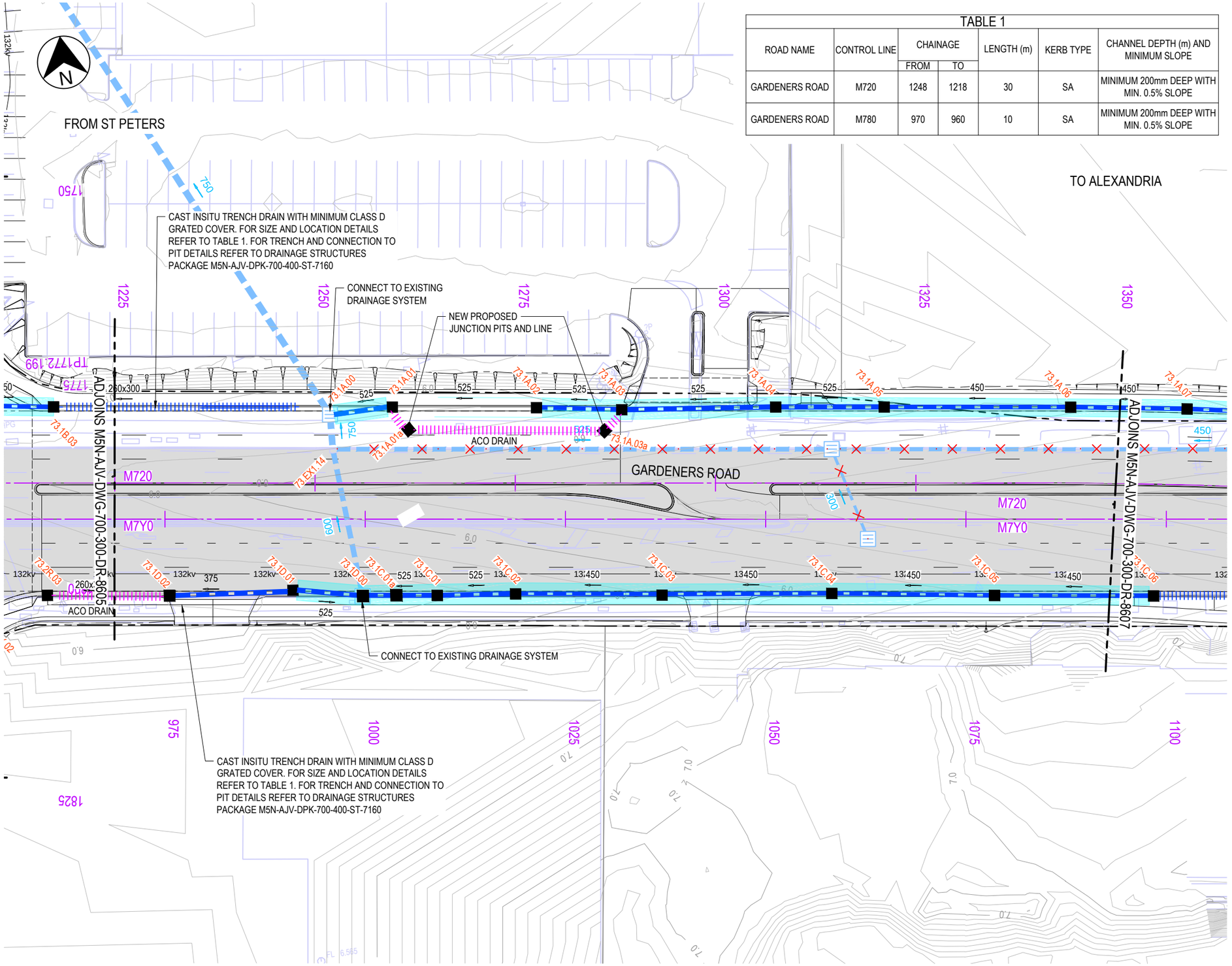


TABLE 1

ROAD NAME	CONTROL LINE	CHAINAGE		LENGTH (m)	KERB TYPE	CHANNEL DEPTH (m) AND MINIMUM SLOPE
		FROM	TO			
GARDENERS ROAD	M720	1248	1218	30	SA	MINIMUM 200mm DEEP WITH MIN. 0.5% SLOPE
GARDENERS ROAD	M780	970	960	10	SA	MINIMUM 200mm DEEP WITH MIN. 0.5% SLOPE

LEGEND

- PERMANENT WORKS BOUNDARY
- TEMPORARY WORKS BOUNDARY
- SURVEY
- CADASTRAL
- EXISTING & PROPOSED MERGED CONTOURS
- FUTURE ROADS BY OTHERS
- EXISTING PAVEMENT
- BRIDGE
- RETAINING WALL

EXISTING DRAINAGE

- EXISTING STORMWATER PIPE & PIT TO BE REMOVED / ABANDONED
- EXISTING STORMWATER PIPE, PIT & HEADWALL (TO REMAIN U.N.O.)
- EXISTING OVERLAND FLOW PATH DIRECTION

PROPOSED DRAINAGE

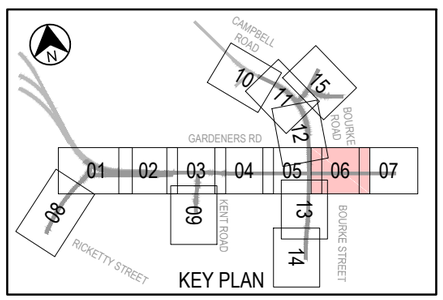
- SURFACE STORMWATER PIPE, SIZE & FLOW ARROW
- PIPE WITH CONCRETE ENCASEMENT
- GRATED DRAIN
- EXISTING STORMWATER PIT (TO BE MODIFIED)
- STORMWATER HEADWALL
- STORMWATER PIT
- STORMWATER QUALITY IMPROVEMENT DEVICE
- STORMWATER PIT LABEL (7B.22.06: DRAINAGE PIT NUMBER / DRAINAGE LINE NUMBER / PROJECT ZONE NUMBER)
- INDICATIVE SCUPPER LOCATION (REFER TO PACKAGE M5N-AJV-DPK-700-400-BR-7100)
- V-DRAIN - GRASS

PROPOSED PIPE NETWORK IN ADJACENT ZONES

- SURFACE STORMWATER PIPE, SIZE & FLOW ARROW
- STORMWATER PIT
- ACO DRAIN

NOTES

1. FOR NOTES AND LEGEND REFER TO DRAWINGS M5N-AJV-DWG-700-300-DR-8505 & 8506.
2. HOLD CLOUD No2. ON HOLD PENDING CONFIRMATION OF RETAINED DRAINAGE INFRASTRUCTURE.



WORK AS EXECUTED

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M5N-AJV-MOD-700-300-RD-LOCAL S1.TXT	01	30.10.2018	RE-ISSUED FOR CONSTRUCTION (RFI-03535, CHANGE 100)	P.J.
M5N-AJV-MOD-700-300-RD-LOCAL S3.TXT	02	19.06.2019	RE-ISSUED FOR CONSTRUCTION (RFI-02505 & 03535)	D.B.
	50	12.08.2020	WORK AS EXECUTED (M5N-RFI-CDS-07241, M5N-RFI-CDS-10149)	

PROJECT BREAKDOWN STRUCTURE: M5N-AJV-DPK-700-300-DR-7035

SCALES ON A3 SIZE DRAWING: SCALE 1:500 (5 0 5 10) AT A3

CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD

AURECON JACOBS NEW M5 JOINT VENTURE

PLOT DATE / TIME	PLOT BY
13/08/2020 22:04:30	msakthivel

TITLE	NAME	DATE
DRAWN	R.SANTANDER	18.01.2018
DRG CHECK	I.HALLIBURTON	18.01.2018
DESIGN	T.NIELSEN	18.01.2018
DESIGN CHECK	Y.CHEN	18.01.2018
ZONE MANAGER	F.BANNO	18.01.2018
DESIGN MANAGER	R.DAVIES	18.01.2018

CLIENT: Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER: M5N-AJV-DWG-700-300-DR-8606

WESTCONNEX NEW M5 — A3

ST PETERS LOCAL ROADS - GARDENERS ROAD DRAINAGE PLAN

SHEET 6 OF 15

RMS REGISTRATION No. DS2016/002598

ISSUE STATUS	EDMS No.	SHEET No.	REV
WORK AS EXECUTED		DR-8606	50

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

QIPA Application 221-0181 Page 42 of 56

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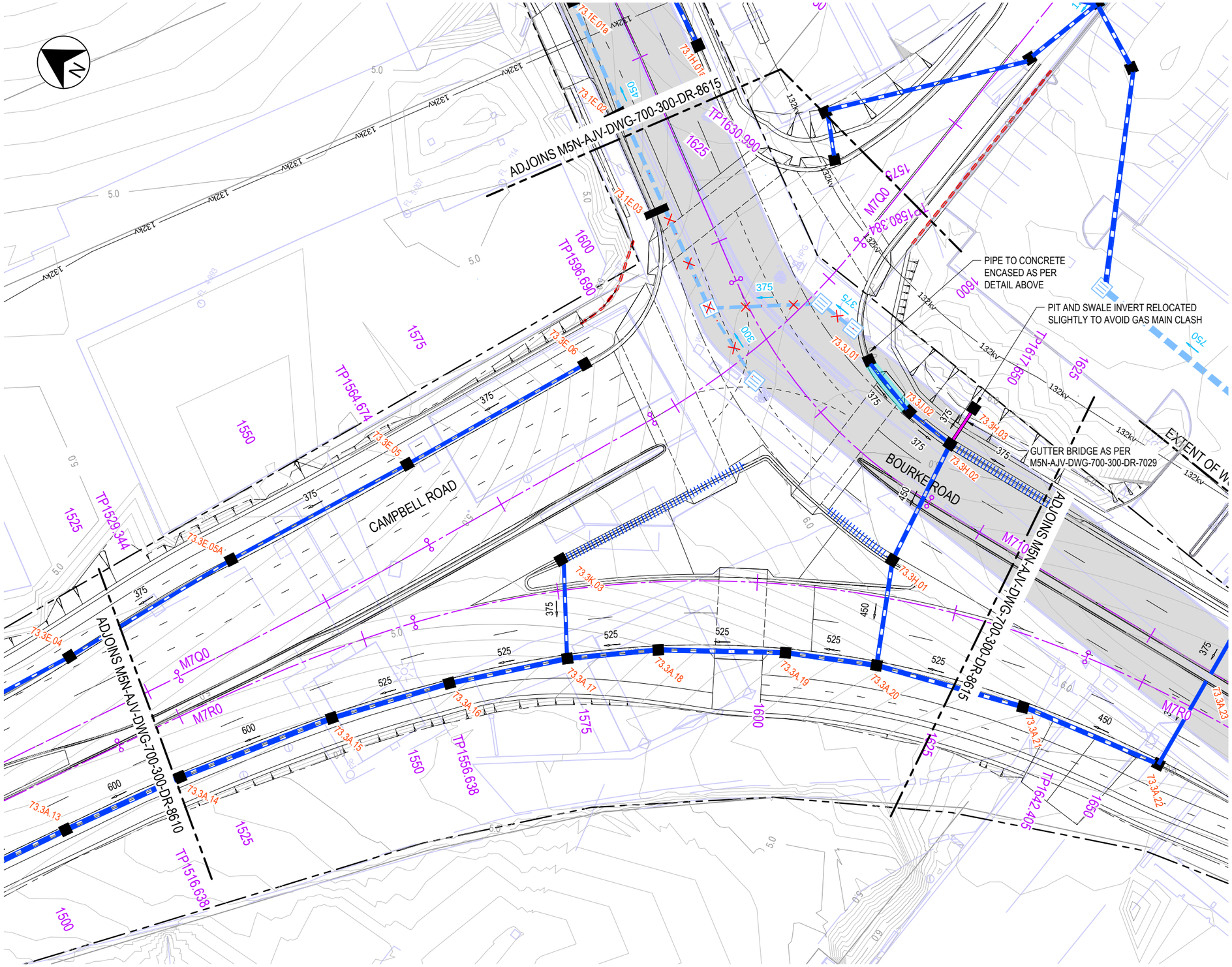


LEGEND

- PERMANENT WORKS BOUNDARY
- TEMPORARY WORKS BOUNDARY
- SURVEY
- CADASTRAL
- EXISTING & PROPOSED MERGED CONTOURS
- FUTURE ROADS BY OTHERS
- EXISTING PAVEMENT
- BRIDGE
- RETAINING WALL

EXISTING DRAINAGE

- EXISTING STORMWATER PIPE & PIT TO BE REMOVED / ABANDONED
- EXISTING STORMWATER PIPE, PIT & HEADWALL (TO REMAIN U.N.O.)
- EXISTING OVERLAND FLOW PATH DIRECTION

PROPOSED DRAINAGE

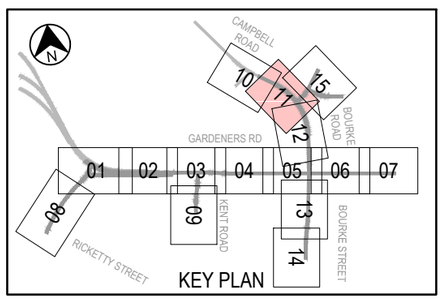
- 450 — SURFACE STORMWATER PIPE, SIZE & FLOW ARROW
- PIPE WITH CONCRETE ENCASEMENT
- GRATED DRAIN
- EXISTING STORMWATER PIT (TO BE MODIFIED)
- STORMWATER HEADWALL
- STORMWATER PIT
- STORMWATER QUALITY IMPROVEMENT DEVICE
- 7B.22.06 — STORMWATER PIT LABEL (DRAINAGE PIT NUMBER / DRAINAGE LINE NUMBER / PROJECT ZONE NUMBER)
- INDICATIVE SCUPPER LOCATION (REFER TO PACKAGE M5N-AJV-DPK-700-400-BR-7100)
- V-DRAIN - GRASS

PROPOSED PIPE NETWORK IN ADJACENT ZONES

- 450 — SURFACE STORMWATER PIPE, SIZE & FLOW ARROW
- STORMWATER PIT
- GUTTER BRIDGE

NOTES

1. FOR GENERAL NOTES REFER TO DRAWING M5N-AJV-DWG-700-300-DR-8505 & DR-8506.



WORK AS EXECUTED

DOCUMENT NUMBER
M5N-AJV-DWG-700-300-DR-8611

WESTCONNEX NEW M5 — A3

ST PETERS LOCAL ROADS - GARDENERS ROAD DRAINAGE PLAN

SHEET 11 OF 15

RMS REGISTRATION No. DS2016/002598

ISSUE STATUS	EDMS No.	SHEET No.	REV
WORK AS EXECUTED		DR-8611	50

DRAWING FILE LOCATION \ NAME
D:\12.8\M5N-AJV-DPK-700-300-DR-7035_50_dwg\M5N-AJV-DWG-700-300-DR-8601-8615_50.dwg

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
M5N-AJV-MOD-700-300-DR-LOCAL S3.12da	00	15.06.2018	ISSUED FOR CONSTRUCTION	R.DAVIES
M5N-AJV-MOD-700-300-RD-LOCAL S1.TXT	01	30.10.2018	RE-ISSUED FOR CONSTRUCTION (CHANGE 100)	P.J.
M5N-AJV-MOD-700-300-RD-LOCAL S3.TXT	50	12.08.2020	WORK AS EXECUTED (M5N-RFI-CDS-05094, M5N-RFI-CDS-09606)	

PROJECT BREAKDOWN STRUCTURE
M5N-AJV-DPK-700-300-DR-7035

SCALES ON A3 SIZE DRAWING
SCALE 1:500 (5 0 5 10) AT A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

AURECON JACOBS NEW M5 JOINT VENTURE

PLOT DATE / TIME	PLOT BY
13/08/2020 22:17:36	msakthivel

TITLE	NAME	DATE
DRAWN	R.SANTANDER	18.01.2018
DRG CHECK	I.HALLIBURTON	18.01.2018
DESIGN	T.NIELSEN	18.01.2018
DESIGN CHECK	Y.CHEN	18.01.2018
ZONE MANAGER	F.BANNO	18.01.2018
DESIGN MANAGER	R.DAVIES	18.01.2018

CLIENT: Sydney Motorway Corporation | WestConnex

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

GIPA Application 221-0181 Page 43 of 56

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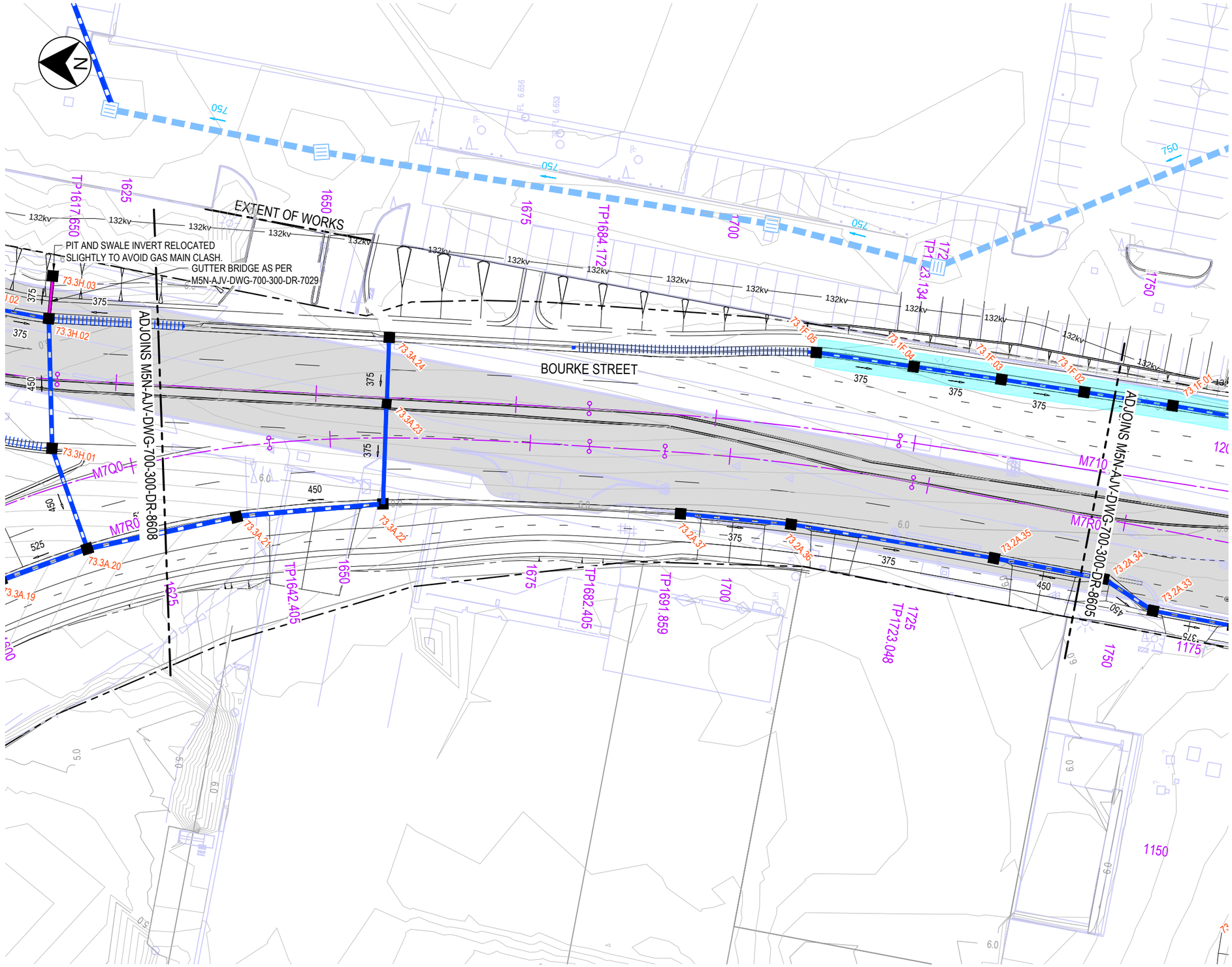


LEGEND

- PERMANENT WORKS BOUNDARY
- TEMPORARY WORKS BOUNDARY
- SURVEY
- CADASTRAL
- EXISTING & PROPOSED MERGED CONTOURS
- FUTURE ROADS BY OTHERS
- EXISTING PAVEMENT
- BRIDGE
- RETAINING WALL

EXISTING DRAINAGE

- EXISTING STORMWATER PIPE & PIT TO BE REMOVED / ABANDONED
- EXISTING STORMWATER PIPE, PIT & HEADWALL (TO REMAIN U.N.O.)
- EXISTING OVERLAND FLOW PATH DIRECTION

PROPOSED DRAINAGE

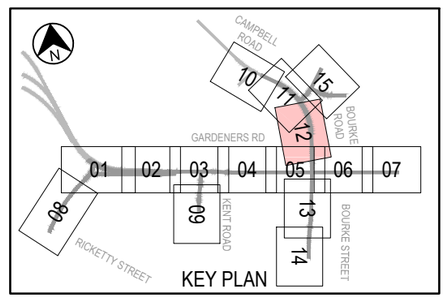
- 450 — SURFACE STORMWATER PIPE, SIZE & FLOW ARROW
- PIPE WITH CONCRETE ENCASEMENT
- GRATED DRAIN
- EXISTING STORMWATER PIT (TO BE MODIFIED)
- STORMWATER HEADWALL
- STORMWATER PIT
- STORMWATER QUALITY IMPROVEMENT DEVICE
- STORMWATER PIT LABEL
  - 7B.22.06
  - DRAINAGE PIT NUMBER
  - DRAINAGE LINE NUMBER
  - PROJECT ZONE NUMBER
- INDICATIVE SCUPPER LOCATION (REFER TO PACKAGE M5N-AJV-DPK-700-400-BR-7100)
- V-DRAIN - GRASS

PROPOSED PIPE NETWORK IN ADJACENT ZONES

- 450 — SURFACE STORMWATER PIPE, SIZE & FLOW ARROW
- STORMWATER PIT

NOTES

1. FOR NOTES AND LEGEND REFER TO DRAWINGS M5N-AJV-DWG-700-300-DR-8505 & 8506.



WORK AS EXECUTED

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

0 5 10 15 20 25 30 35 40 45 50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION \ NAME
D:\12.8\M5N-AJV-DPK-700-300-DR-7035_50_dwg\M5N-AJV-DWG-700-300-DR-8601-8615_50.dwg

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
M5N-AJV-MOD-700-300-DR-LOCAL S3.12da	00	15.06.2018	ISSUED FOR CONSTRUCTION	R.DAVIES
M5N-AJV-MOD-700-300-RD-LOCAL S1.TXT	01	30.10.2018	RE-ISSUED FOR CONSTRUCTION (CHANGE 100)	P.J.
M5N-AJV-MOD-700-300-RD-LOCAL S3.TXT	02	19.06.2019	RE-ISSUED FOR CONSTRUCTION (RFI-02505)	D.B.
	50	12.08.2020	WORK AS EXECUTED (M5N-RFI-CDS-05094, M5N-RFI-CDS-08084)	

PROJECT BREAKDOWN STRUCTURE
M5N-AJV-DPK-700-300-DR-7035

SCALES ON A3 SIZE DRAWING
SCALE 1:500 5 0 5 10 AT A3

CO-ORDINATE SYSTEM: MGA ZONE 56
HEIGHT DATUM: AHD

WestConnex New M5
CPB CONTRACTORS | DRAGADOS | SAMSUNG C&T | Golder Associates | AJJV AURECON JACOBS NEW M5 JOINT VENTURE | HASSELL

PLOT DATE / TIME	PLOT BY
13/08/2020 22:18:46	msakthivel

TITLE	NAME	DATE
DRAWN	R.SANTANDER	18.01.2018
DRG CHECK	I.HALLIBURTON	18.01.2018
DESIGN	T.NIELSEN	18.01.2018
DESIGN CHECK	Y.CHEN	18.01.2018
ZONE MANAGER	F.BANNO	18.01.2018
DESIGN MANAGER	R.DAVIES	18.01.2018

CLIENT
Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER
M5N-AJV-DWG-700-300-DR-8612

WESTCONNEX NEW M5 — A3

ST PETERS LOCAL ROADS - GARDENERS ROAD DRAINAGE PLAN

SHEET 12 OF 15

RMS REGISTRATION No. DS2016/002598

ISSUE STATUS	EDMS No.	SHEET No.	REV
WORK AS EXECUTED		DR-8612	50

GIPA Application 221-0181 Page 44 of 56

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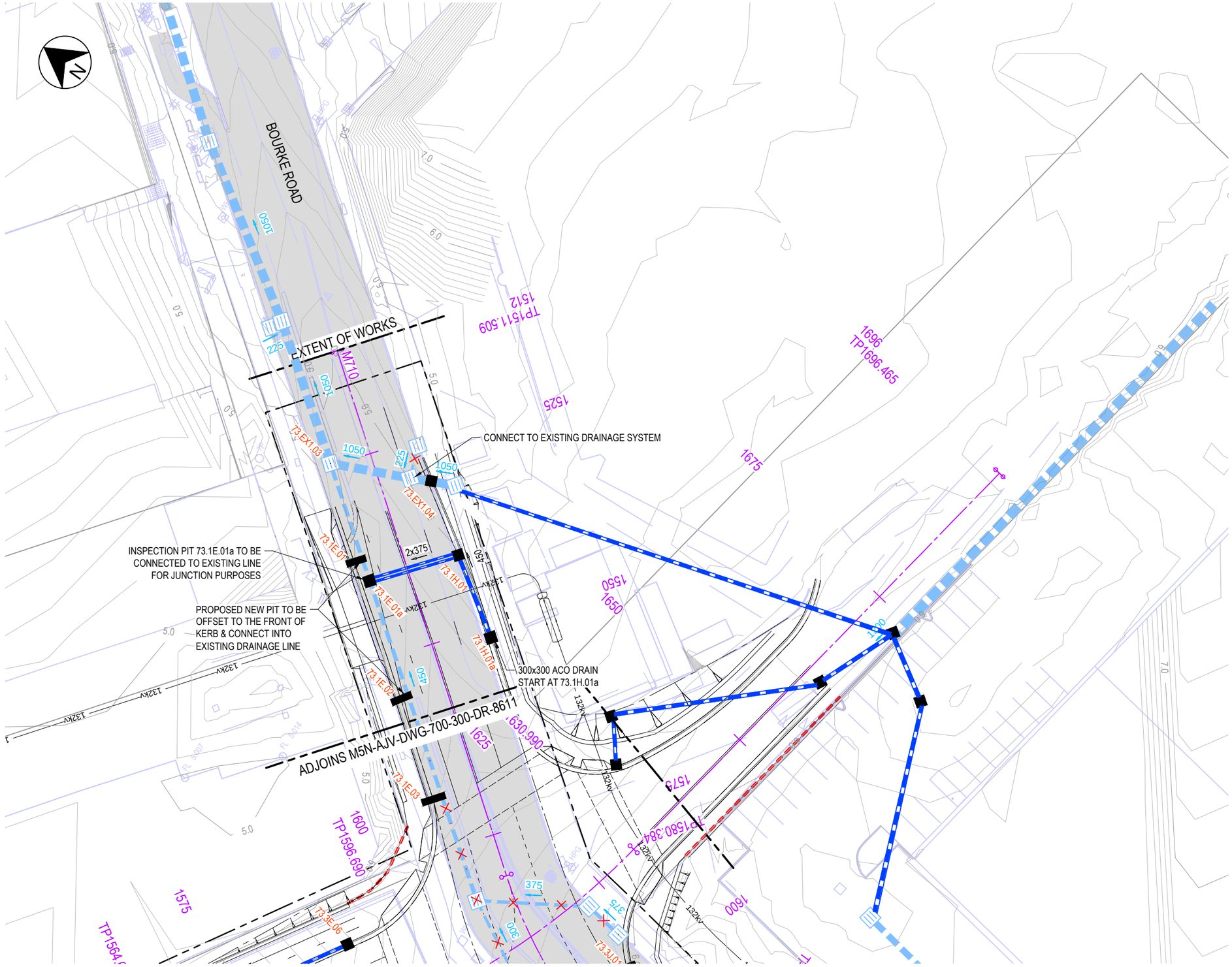


LEGEND

- PERMANENT WORKS BOUNDARY
- TEMPORARY WORKS BOUNDARY
- SURVEY
- CADASTRAL
- EXISTING & PROPOSED MERGED CONTOURS
- FUTURE ROADS BY OTHERS
- EXISTING PAVEMENT
- BRIDGE
- RETAINING WALL

EXISTING DRAINAGE

- EXISTING STORMWATER PIPE & PIT TO BE REMOVED / ABANDONED
- EXISTING STORMWATER PIPE, PIT & HEADWALL (TO REMAIN U.N.O.)
- EXISTING OVERLAND FLOW PATH DIRECTION

PROPOSED DRAINAGE

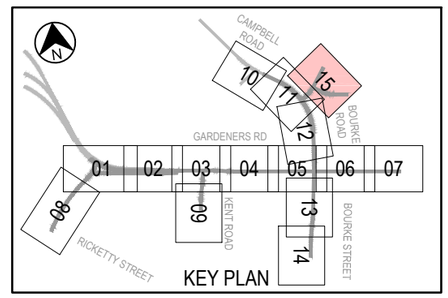
- 450 — SURFACE STORMWATER PIPE, SIZE & FLOW ARROW
- PIPE WITH CONCRETE ENCASEMENT
- GRATED DRAIN
- EXISTING STORMWATER PIT (TO BE MODIFIED)
- STORMWATER HEADWALL
- STORMWATER PIT
- STORMWATER QUALITY IMPROVEMENT DEVICE
- 7B.22.06 — STORMWATER PIT LABEL
  - DRAINAGE PIT NUMBER
  - DRAINAGE LINE NUMBER
  - PROJECT ZONE NUMBER
- INDICATIVE SCUPPER LOCATION (REFER TO PACKAGE M5N-AJV-DPK-700-400-BR-7100)
- V-DRAIN - GRASS

PROPOSED PIPE NETWORK IN ADJACENT ZONES

- 450 — SURFACE STORMWATER PIPE, SIZE & FLOW ARROW
- STORMWATER PIT

NOTES

1. FOR NOTES AND LEGEND REFER TO DRAWINGS M5N-AJV-DWG-700-300-DR-8505 & 8506.
2. HOLD CLOUD No2. ON HOLD PENDING CONFIRMATION OF RETAINED DRAINAGE INFRASTRUCTURE.



KEY PLAN

WORK AS EXECUTED

DRAWING FILE LOCATION \ NAME	PROJECT BREAKDOWN STRUCTURE
D:\12.8\M5N-AJV-DPK-700-300-DR-7035_50_dwg\M5N-AJV-DWG-700-300-DR-8601-8615_50.dwg	M5N-AJV-DPK-700-300-DR-7035

DESIGN MODEL FILE(S) USED FOR DOCUMENTATION OF THIS DRAWING	REV	DATE	AMENDMENT / REVISION DESCRIPTION	APPROVAL
M5N-AJV-MOD-700-300-DR-LOCAL S3.12da	00	15.06.2018	ISSUED FOR CONSTRUCTION	R.DAVIES
M5N-AJV-MOD-700-300-RD-LOCAL S1.TXT	01	30.10.2018	RE-ISSUED FOR CONSTRUCTION (RFI-03535 & CHANGE 100)	P.J.
M5N-AJV-MOD-700-300-RD-LOCAL S3.TXT	02	03.07.2019	RE-ISSUED FOR CONSTRUCTION (RFI-03535)	D.B.
	50	12.08.2020	WORK AS EXECUTED (M5N-RFI-CDS-07675)	

SCALES ON A3 SIZE DRAWING

SCALE 1:500 (5 0 5 10) AT A3

CO-ORDINATE SYSTEM: MGA ZONE 56 — HEIGHT DATUM: AHD

WestConnex New M5

CPB CONTRACTORS | DRAGADOS | SAMSUNG C&T | aJJV AURECON JACOBS NEW M5 JOINT VENTURE | Golder Associates | HASSELL

PLOT DATE / TIME	PLOT BY
13/08/2020 22:19:39	msakthivel

TITLE	NAME	DATE
DRAWN	R.SANTANDER	18.01.2018
DRG CHECK	I.HALLIBURTON	18.01.2018
DESIGN	T.NIELSEN	18.01.2018
DESIGN CHECK	Y.CHEN	18.01.2018
ZONE MANAGER	F.BANNO	18.01.2018
DESIGN MANAGER	R.DAVIES	18.01.2018

CLIENT: Sydney Motorway Corporation | WestConnex

DOCUMENT NUMBER: M5N-AJV-DWG-700-300-DR-8615

WESTCONNEX NEW M5

A3

ST PETERS LOCAL ROADS - GARDENERS ROAD DRAINAGE PLAN

SHEET 15 OF 15

RMS REGISTRATION No. DS2016/002598

ISSUE STATUS	EDMS No.	SHEET No.	REV
WORK AS EXECUTED		DR-8615	50

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DIPA Application 221-0181 Page 45 of 56

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Appendix F

SYDNEY WATER OSD REQUIRMENTS

From: Stormwater <Stormwater@sydneywater.com.au>
Sent: Thursday, 9 September 2021 10:50 AM
To: Peter Zeaiter
Cc: Xavier Cure
Subject: RE: [External] 520 Gardeners Road, Alexandria

Peter,

On Site Detention is not required for any development at this site at 520 Gardeners Road, Alexandria.

Best Regards

Jeya Jeyadevan
Senior Capability Assessor
Business Development
Sydney Water, Level 13, 1 Smith Street, Parramatta NSW 2150

Sydney WATER
Phone: 8849 6118
Mobile: 0409 318 827
jeya.jeyadevan@sydneywater.com.au

From: Peter Zeaiter <peter.zeaiter@costinroe.com.au>
Sent: Wednesday, 8 September 2021 11:42 AM
To: Stormwater <Stormwater@sydneywater.com.au>
Cc: Xavier Cure <Xavier.Cure@costinroe.com.au>
Subject: [External] 520 Gardeners Road, Alexandria

CAUTION: This email originated from outside the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

To whom it may concern,

Can you please confirm that OSD is not required for the below property?

Development address: 520 Gardeners Road, Alexandria (Lot 302 DP1231238)
Total site area: 1.9ha

This site is currently fully developed (as a former Bunnings Warehouse) and is proposed to be redeveloped as an industrial development.

Best Regards,

Peter Zeaiter
Civil Design Engineer

Costin Roe Consulting Pty Ltd
ABN 50 003 696 446
Level 1, 8 Windmill Street, Walsh Bay
PO Box N419, Sydney, NSW 1220 Australia
tel: +61 2 9251 7699 fax: +61 2 9241 3731 mobile: 0427 653 841
email: peter.zeaiter@costinroe.com.au
web: www.costinroe.com.au

Postal address: PO Box N419, Sydney NSW 1220
Phone: 02-9251 7699 Fax: 02-9241 3731
Email: mail@costinroe.com.au Email: mail@strataeng.com.au Web: www.costinroe.com.au

Offices in Sydney, Adelaide, Brisbane, Melbourne, Newcastle and Wollongong.

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Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

Costin Roe Consulting Pty Ltd.
Consulting Engineers
ABN 50 003 696 446
Level 1, 8 Windmill Street, Walsh Bay, Sydney, NSW 2000
PO Box N419, Sydney NSW 1220, Australia
Tel: +61 2 9251 7699 Fax: +61 9241 3731
email: mail@costinroe.com.au
web: www.costinroe.com.au

PROJECT: CO14368.00
INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD, ALEXANDRIA
NSW, 2015

DELIVER T0:
CHARTER HALL HOLDINGS PTY LTD

ATTENTION:
Theodore Berney
Theodore.Berney@charterhall.com.au

DOCUMENT TRANSMITTAL

	DAY	12	19	1	3	8	16						CURRENT
	MONTH	11	11	12	12	12	12						
	YEAR	21	21	21	21	21	21						
No.	**DRAWING TITLE**												
CO14368.00-DA10	DRAWING LIST & GENERAL NOTES	A	B	C	C								C
CO14368.00-DA20	EROSION SEDIMENT CONTROL PLAN	A	A	B	B								B
CO14368.00-DA25	EROSION SEDIMENT CONTROL DETAILS	A	A	B	B								B
CO14368.00-DA40	STORMWATER DRAINAGE PLAN	B	C	D	E		F						F
CO14368.00-DA41	STORMWATER CATCHMENT PLAN - MUSIC		A	B	B								B
CO14368.00-DA45	STORMWATER DRAINAGE DETAILS - SHEET 1	A	A	B	B								B
CO14368.00-DA46	STORMWATER DRAINAGE DETAILS - SHEET 2	A	A	B	B								B
CO14368.00-DA47	STORMWATER LONGSECTIONS - INTER-ALLOTMENT	A	B	C	C		D						D
CO14368.00-DA50	FINISHED LEVELS PLAN	B	C	D	E		F						F
CO14368.00-DA65	RETAINING WALL DETAILS	A	A	B	B								B
CO14368.00-DA90	FUNCTIONAL LAYOUT PLAN					A							A
	DISTRIBUTION	**NUMBER OF PRINTS (FT - FILE TRANSFER)**											
Client	CHARTER HALL HOLDINGS PTY LTD	FT	FT	FT	FT	FT	FT						
Project Manager													
Architect													
Surveyor													
Certifier													
Struct. Eng													
Council													
Lanscaper													
Traffic Auth.													
Q. Survey													
Contractor													
REASON FOR ISSUE X - Information P - Preliminary A - Approval PR - Pricing CC - Construction Certificate T - Tender C - Construction		X	X	A	A	X	A						
METHOD OF ISSUE P - Print O - Original A3 - A3 Print DWG - DWG File DX - DXF File PDF - PDF File		PDF	PDF	PDF	PDF	PDF	PDF						
SENT VIA M - Mail C - Courier E - Email H - Hand Delivered K - Collected F - Facsimile X - Express Post		E	E	E	E	E	E						
PREPARED BY		DW	DW	DW	DW	DW	DW						
ENGINEER'S INITIALS		MW	MW	MW	MW	MW	MW						

PROPOSED INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD, ALEXANDRIA, NSW 2015
CIVIL DEVELOPMENT APPLICATION

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C014368.00-DA10	DRAWING LIST & GENERAL NOTES
C014368.00-DA20	EROSION & SEDIMENT CONTROL PLAN
C014368.00-DA25	EROSION & SEDIMENT CONTROL DETAILS
C014368.00-DA40	STORMWATER DRAINAGE PLAN
C014368.00-DA41	STORMWATER CATCHMENT PLAN - MUSIC
C014368.00-DA45	STORMWATER DRAINAGE DETAILS - SHEET 1
C014368.00-DA46	STORMWATER DRAINAGE DETAILS - SHEET 2
C014368.00-DA47	STORMWATER LONGSECTION - INTER-ALLOTMENT
C014368.00-DA50	FINISHED LEVELS PLAN
C014368.00-DA65	RETAINING WALL DETAILS

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 ITS 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.

SITE LOCATION PLAN
NTS

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	C
ISSUED FOR INFORMATION	19.11.21	B
ISSUED FOR INFORMATION	12.11.21	A

ARCHITECT: nettleton tribe

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
	DW	SEP '21		A0	AS SHOWN	C014368.00-DA10

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PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: DRAWING LIST AND LOCALITY PLAN

DRAWING No: C014368.00-DA10 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
- DENOTES CONSTRUCTION ENTRY
- DENOTES OVERLAND FLOW

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.

RUSLE CALCULATION:

TOTAL CATCHMENT AREA = 1.90 ha
DISTURBED CATCHMENT AREA = 1.90 ha

$A = R \times K \times LS \times P \times C$

1. 2-yr, 6-hr ARI (S) = 7.07;
2. RAINFALL EROSIVITY FACTOR (R)
   $R = 164.74(1.1177)^S S^{0.6444} = 1276$;
3. SOIL ERODIBILITY FACTOR (K) = 0.075;
4. LENGTH/GRADIENT FACTOR (LS) = 0.25;
5. EROSION CONTROL PRACTICE FACTOR (P) = 1.3;
6. COVER FACTOR (C) = 1.0

SOIL LOSS (A) = $31.10 m^3/ha/yr$
= $59.09 m^3/yr$

PER BLUE BOOK GUIDELINES SECTION 6.3.2.d, FOR SITES WITH AVERAGE ANNUAL SOIL LOSS (A) < $150 m^3/yr$, A SEDIMENT RETENTION BASIN MAY BE CONSIDERED UNNECESSARY.

EROSION AND SEDIMENT CONTROL PLAN

SCALE 1:250

2m 0 5 10 15 20 25m

SCALE 1:250 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	B
ISSUED FOR INFORMATION	12.11.21	A

ARCHITECT: nettletonwebb

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED: DW | DRAWN: DW | DATE: SEP '21 | CHECKED: | SIZE: A0 | SCALE: AS SHOWN | CAD REF: C014368.00-DA20

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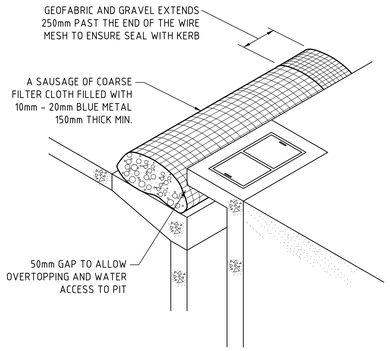
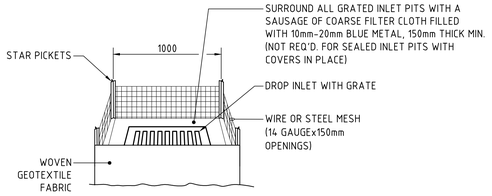
DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN

DRAWING No: C014368.00-DA20 ISSUE: B



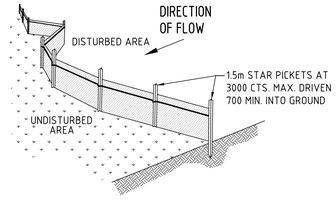
KERB INLET CONTROL

N.T.S



GRATED INLET PIT FILTER DETAIL

N.T.S



TYPICAL SILT FENCE DETAIL

N.T.S

NOTE: PROVIDE 1m RETURNS AT 30m INTERVALS. TYPICAL

NOTES:

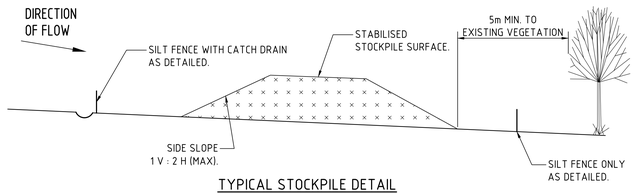
ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.

MINIMISE DISTURBED AREAS.

ROADS & FOOTPATHS TO BE SWEPT DAILY.

1.2m TURF TO BE PLACED BEHIND KERBS.

DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.

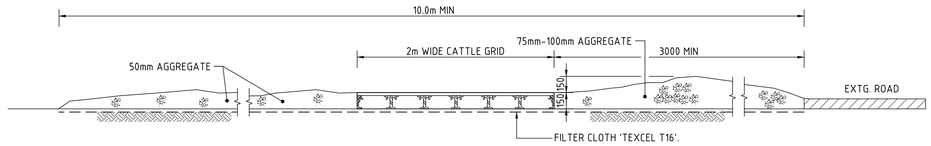


TYPICAL STOCKPILE DETAIL

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 / DA20) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

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ISSUED FOR INFORMATION	12.11.21	A

ARCHITECT: nettleton

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
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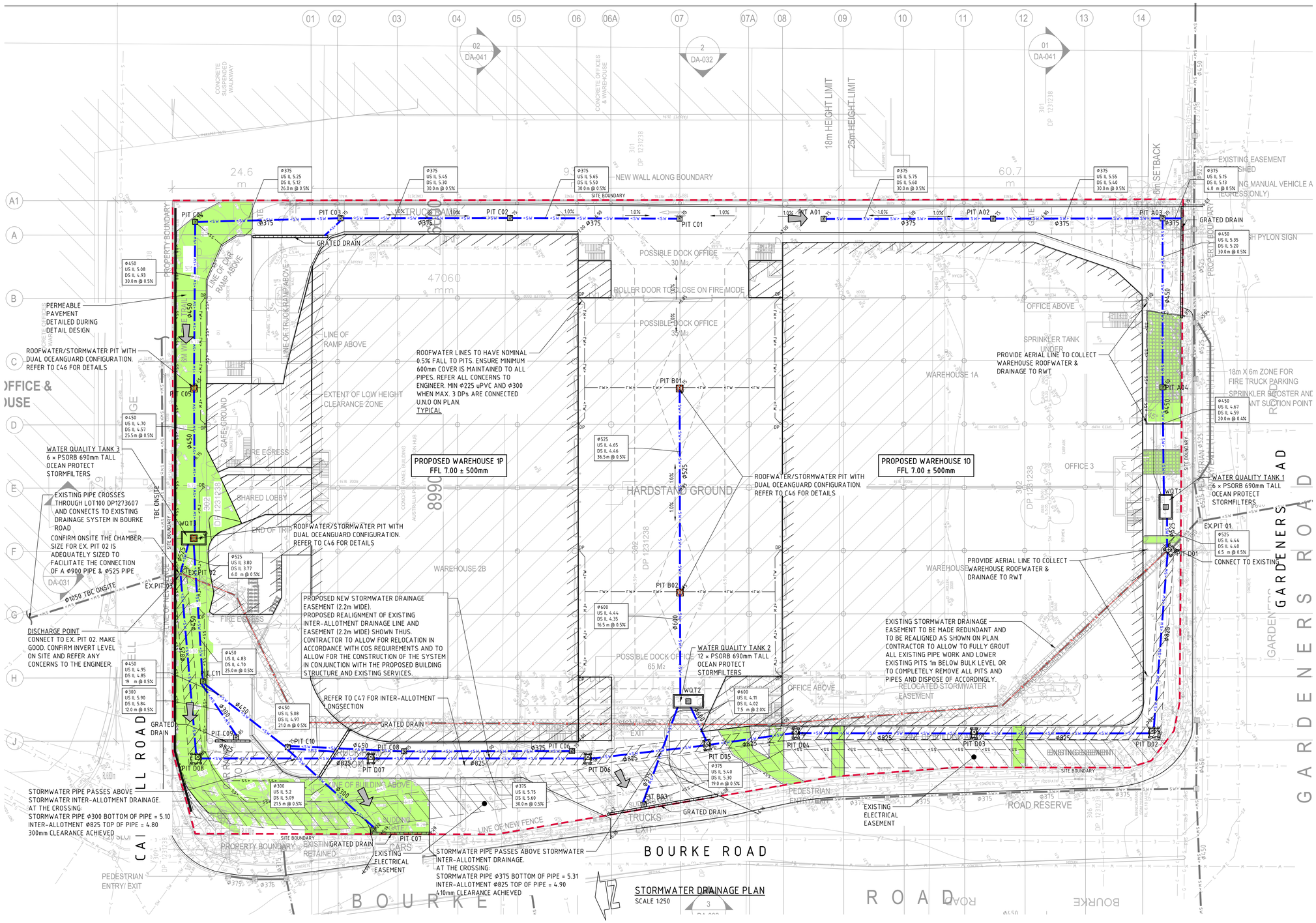
DRAWING TITLE: EROSION AND SEDIMENT CONTROL DETAILS

DRAWING No: C014368.00-DA25

ISSUE: B



LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON A PLAN OF SURVEY 51419 001DT_B BY LTS LOCKLEY 02/08/2021.

- SGGP, SINGLE GRATED GULLY PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- EXISTING DRAINAGE LINE TO BE REMOVED
- ROOFWATER DOWNPIPE (INDICATIVE)
- ROOFWATER LINE
- SUBSOIL LINE
- OVERLAND FLOW DIRECTION
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- PROPOSED EASEMENT RELOCATION 2.2m WIDE
- EXISTING ELECTRICAL EASEMENT
- PERMEABLE PAVEMENT

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3:2018 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 PLAN DA50.
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 6 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. ALL PIPE GRADES 1 IN 200 MINIMUM UNO.
16. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
17. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
18. 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.
19. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
20. 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.
21. 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.
22. 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.

PIT SCHEDULE - NETWORK A

PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT A01	6.75	SGGP	900×900	
PIT A02	6.75	SGGP	900×900	
PIT A03	6.75	SGGP	900×900	
PIT A04	6.50	SGGP	1200×1200	

PIT SCHEDULE - NETWORK B

PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT B01	6.75	SGGP	1200×1200	◇◇
PIT B02	6.75	SGGP	1200×1200	◇◇
PIT B03	6.42	SGGP	900×900	GD

PIT SCHEDULE - NETWORK C

PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT C01	6.65	SGGP	900×900	
PIT C02	6.75	SGGP	900×900	
PIT C03	6.75	SGGP	900×900	GD
PIT C04	6.75	SGGP	900×900	
PIT C05	6.65	SGGP	900×900	◇◇
PIT C06	6.75	SGGP	1200×1200	
PIT C07	6.20	SGGP	900×900	GD
PIT C08	6.75	SGGP	900×900	
PIT C09	6.85	SGGP	900×900	GD
PIT C10	6.75	SJP	900×900	GD
PIT C11	6.75	SGGP	900×900	

PIT SCHEDULE - NETWORK D

PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT D01	6.56	SJP	900×900	
PIT D02	0.98	SJP	900×900	
PIT D03	6.98	SJP	900×900	
PIT D04	6.98	SJP	900×900	
PIT D05	7.00	SJP	900×900	
PIT D06	6.80	SJP	900×900	
PIT D07	6.78	SJP	900×900	
PIT D08	6.85	SJP	900×900	

NOTE:

PITS TO BE FITTED WITH OCEAN PROTECT OCEAN GUARD OG200 PIT INSERTS SHOWN THUS ◇
NO OF PIT INSERTS IN OSD = 2
TOTAL NO OF PIT INSERTS = 8
REFER TO PIT SCHEDULE ABOVE

LEVELS NOTE:

LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

STORMWATER DRAINAGE PLAN

SCALE 1:250

2m 0 5 10 15 20 25m

SCALE 1:250 AT A0 SIZE SHEET

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	16.12.21	F
ISSUED FOR DEVELOPMENT APPLICATION	03.12.21	E
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	D
ISSUED FOR INFORMATION	19.11.21	C
ISSUED FOR INFORMATION	12.11.21	B
ISSUED FOR INFORMATION	17.09.21	A

ARCHITECT: nettleton tribe

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
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ALEXANDRIA, NSW 2015

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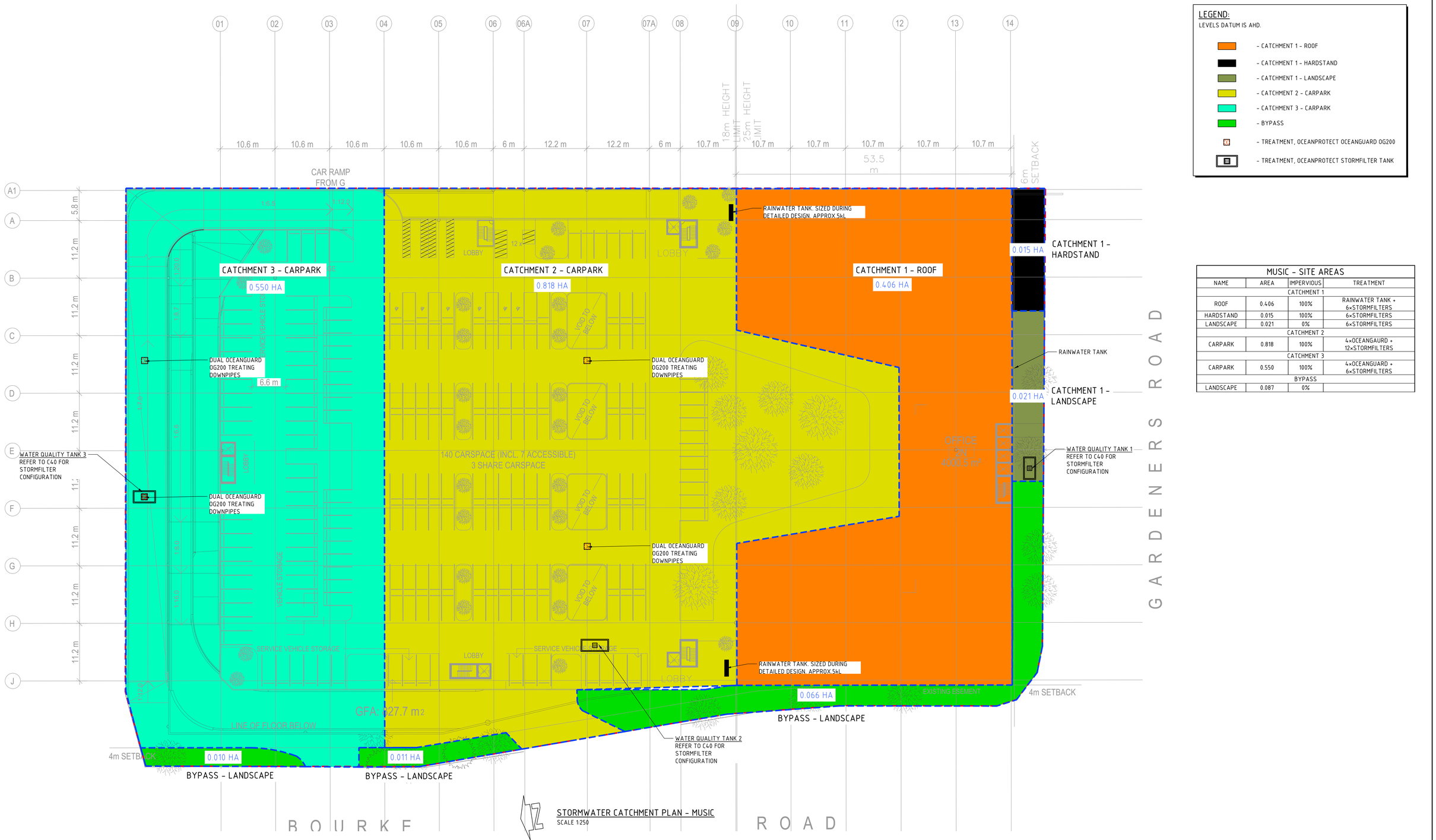
DRAWING TITLE: STORMWATER DRAINAGE PLAN

DRAWING No. C014368.00-DA40 ISSUE F



LEGEND:

LEVELS DATUM IS AHD.

- CATCHMENT 1 - ROOF
- CATCHMENT 1 - HARDSTAND
- CATCHMENT 1 - LANDSCAPE
- CATCHMENT 2 - CARPARK
- CATCHMENT 3 - CARPARK
- BYPASS
- TREATMENT, OCEANPROTECT OCEANGUARD OG200
- TREATMENT, OCEANPROTECT STORMFILTER TANK

MUSIC - SITE AREAS

NAME	AREA	IMPERVIOUS	TREATMENT
CATCHMENT 1			
ROOF	0.406	100%	RAINWATER TANK + 6×STORMFILTERS
HARDSTAND	0.015	100%	6×STORMFILTERS
LANDSCAPE	0.021	0%	6×STORMFILTERS
CATCHMENT 2			
CARPARK	0.818	100%	4×OCEANGAURD + 12×STORMFILTERS
CATCHMENT 3			
CARPARK	0.550	100%	4×OCEANGUARD + 6×STORMFILTERS
BYPASS			
LANDSCAPE	0.087	0%	

STORMWATER CATCHMENT PLAN - MUSIC

SCALE 1:250

2m 0 5 10 15 20 25m

SCALE 1:250 AT A0 SIZE SHEET

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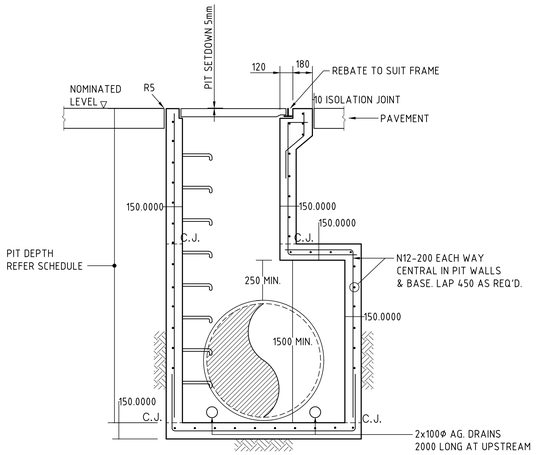
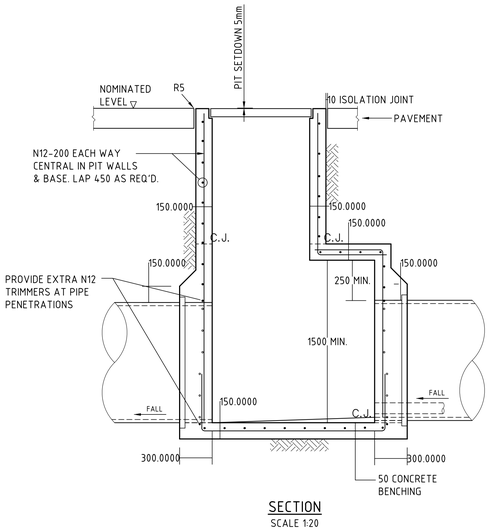
DRAWING TITLE: STORMWATER CATCHEMNT PLAN - MUSIC

DRAWING No: C014368.00-DA41 ISSUE: B



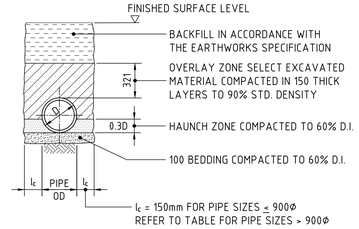
SECTION
SCALE 1:20

TAPERED SINGLE GRATED GULLY PIT - SGGP



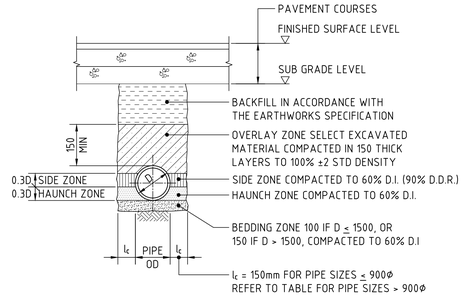
SECTION
SCALE 1:20

TAPERED SINGLE GRATED GULLY PIT - SGGP



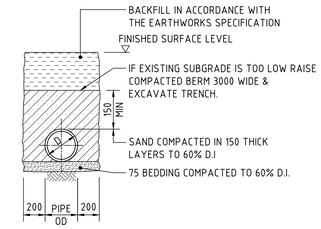
TYPE H1 SUPPORT TO CONCRETE PIPES AT LANDSCAPED AREAS

SCALE 1:20



TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

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



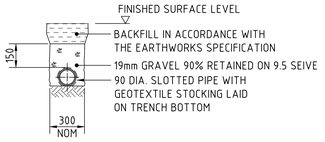
SUPPORT TO uPVC PIPES

SCALE 1:20

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	

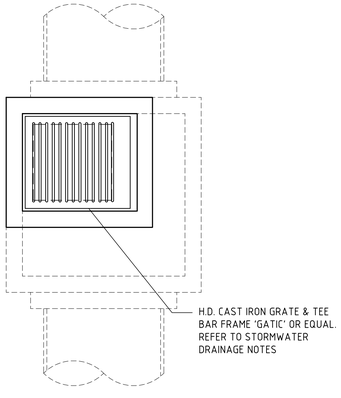
BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 50
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
9.5	100 TO 50
2.6	100 TO 30
0.60	50 TO 15
0.075	25 TO 0
SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725	



SUPPORT TO AGRICULTURAL DRAIN

SCALE 1:20

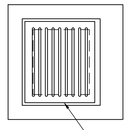


PLAN
SCALE 1:20

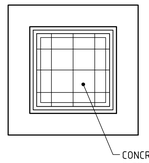
CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX. SIZE)	CEMENT TYPE	ADMIXTURE	F'c (MPa)
PIT	80	20	GP	NIL	32

NOTES:

1. ALL REINFORCING TO HAVE 30 MIN. CLAER CONCRETE COVER.
2. FOR PITS DEEPER THAN 1200mm CLIMB RAILS SHALL BE PROVIDED.



PLAN
SCALE 1:20



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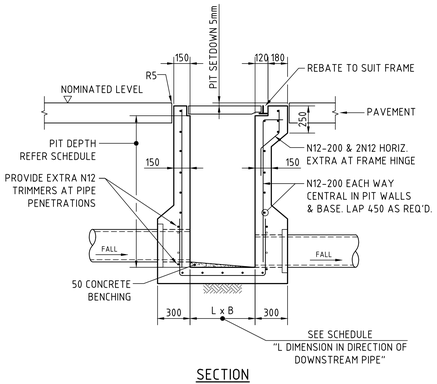
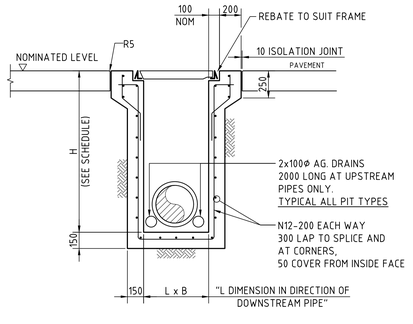
SCALE 1:20



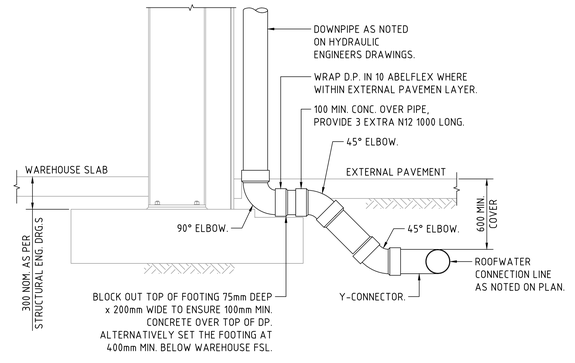
SECTION
SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP



SECTION
SCALE 1:20

SEALED PIT - SJP



DOWNPIPE TURN-UP DETAIL A

(AT FOOTING LOCATION)
SCALE 1:20

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

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	B
ISSUED FOR INFORMATION	12.11.21	A

ARCHITECT: nettleton tribe

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
	DW	SEP '21		A0	AS SHOWN	C014368.00-DA45

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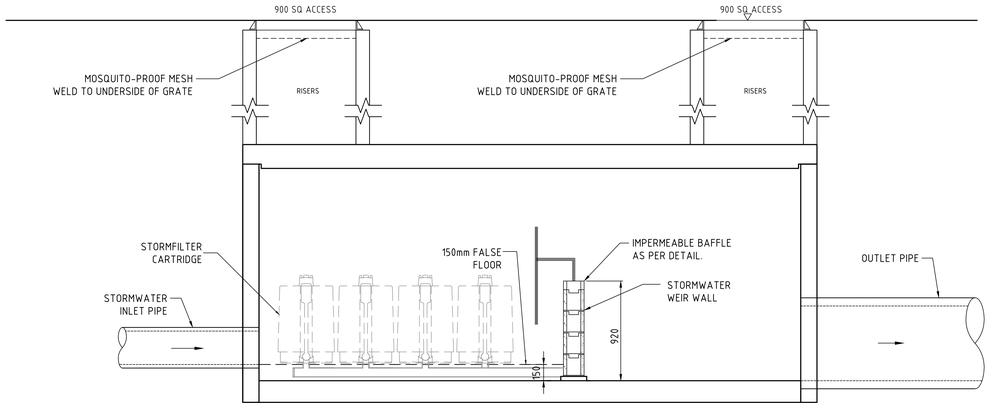
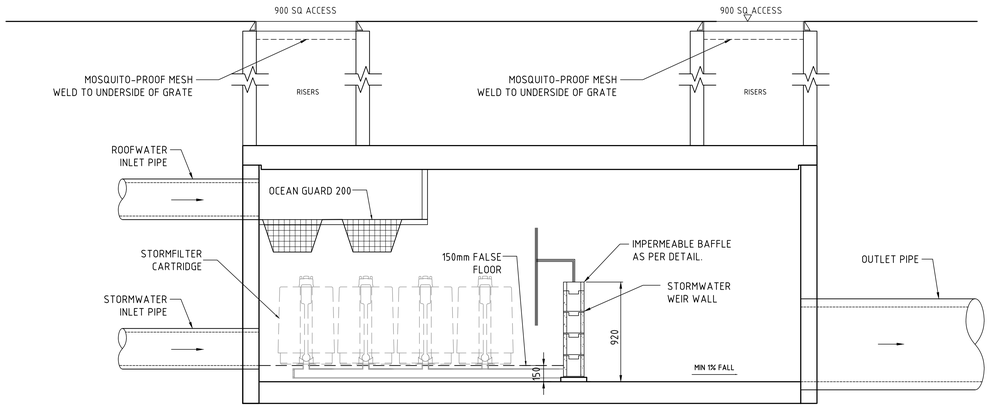
DRAWING TITLE: STORMWATER DRAINAGE DETAILS - SHEET 1

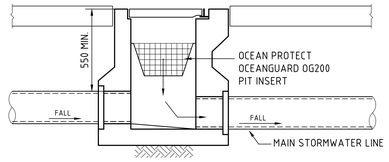
DRAWING NO: C014368.00-DA45 ISSUE: B



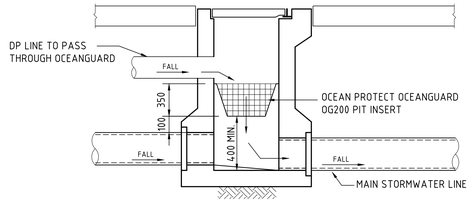
STORMFILTER CHAMBER TYPICAL DETAIL
SCALE 1:20



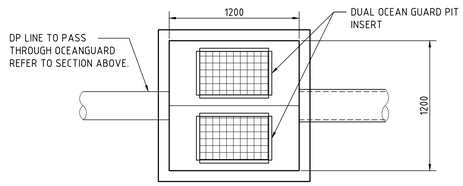
STORMFILTER CHAMBER TYPICAL DETAIL WITH OCEAN GUARD 200
SCALE 1:20



STORMWATER PIT WITH OCEANGUARD
CONFIGURATION



ROOFWATER/STORMWATER PIT WITH
OCEANGUARD CONFIGURATION
SCALE 1:20



ROOFWATER/STORMWATER PIT WITH DUAL
OCEANGUARD CONFIGURATION
SCALE 1:20

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

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	B
ISSUED FOR INFORMATION	12.11.21	A

ARCHITECT: nettleton tribe

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
	DW	SEP '21		A0	AS SHOWN	C014368.00-DA46

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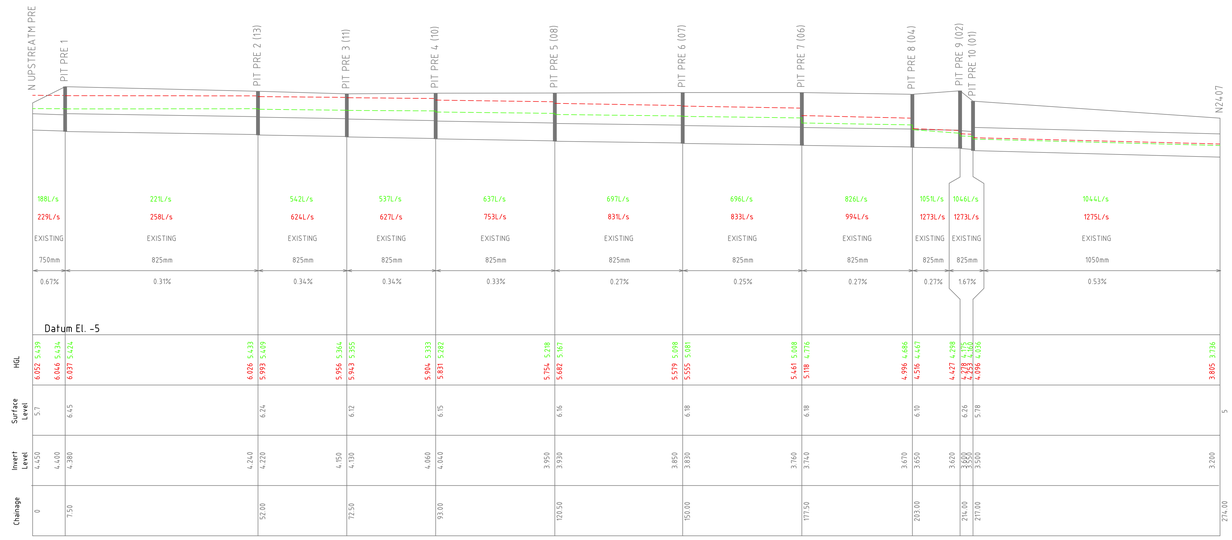
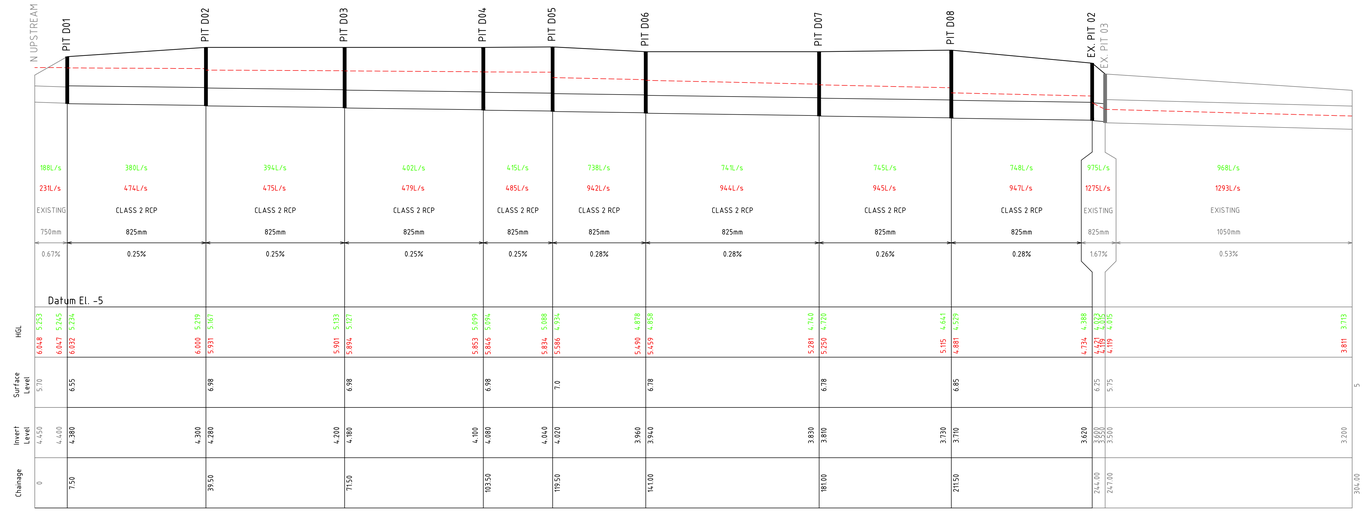
DRAWING TITLE: STORMWATER DRAINAGE
DETAILS - SHEET 2

DRAWING No: C014368.00-DA46
ISSUE: B



PRE-DEVELOPED SCENARIO

SCALE 1:500 HORIZONTAL
SCALE 1:100 VERTICAL



POST-DEVELOPED SCENARIO

SCALE 1:500 HORIZONTAL
SCALE 1:100 VERTICAL

NOTE:

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

H.G.L & FLOWRATE SHOWN FOR Q100 A.R.I STORM EVENT

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	16.12.21	D
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	C
ISSUED FOR INFORMATION	19.11.21	B
ISSUED FOR INFORMATION	12.11.21	A

ARCHITECT: nettleton.com.au

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
	DW	SEP '21		A0	AS SHOWN	C014368.00-DA47

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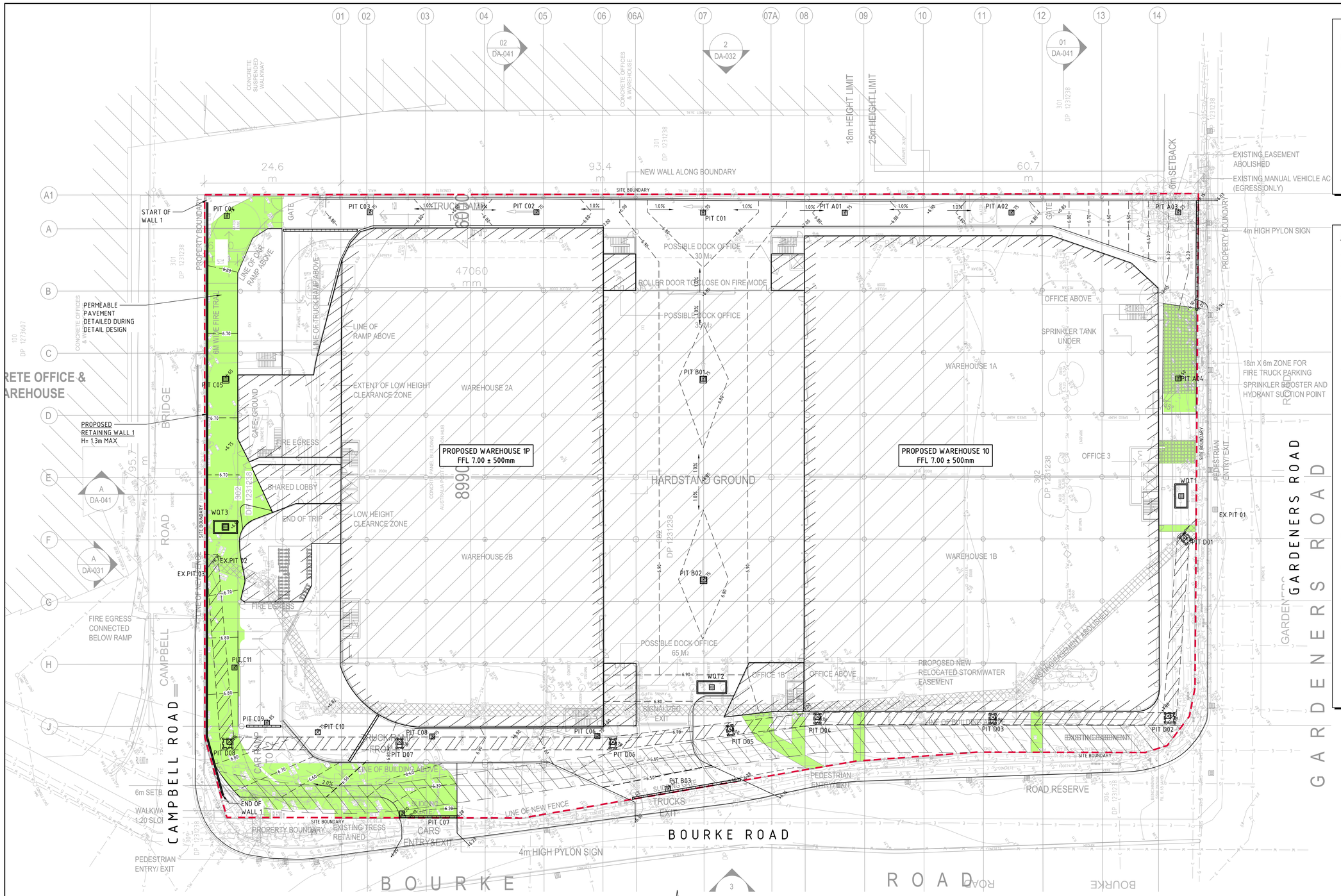
DRAWING TITLE: STORMWATER LONGSECTION INTER-ALLOTMENT DRAINAGE

DRAWING No: C014368.00-DA47 ISSUE: D



LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON A PLAN OF SURVEY 51419 001DT_B BY LTS LOCKLEY 02/08/2021.

- SGGP, SINGLE GRATED GULLY PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- PERMEABLE PAVEMENT

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.

LEVELS NOTE:

LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

FINISHED LEVELS PLAN

SCALE 1:250

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

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

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	16.12.21	F
ISSUED FOR DEVELOPMENT APPLICATION	03.12.21	E
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	D
ISSUED FOR INFORMATION ONLY	19.11.21	C
ISSUED FOR INFORMATION ONLY	12.11.21	B
ISSUED FOR INFORMATION ONLY	17.09.21	A

ARCHITECT: nettleton tribe

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
	DW	SEP '21		A0	AS SHOWN	C014368.00-DA50

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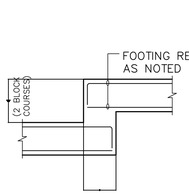
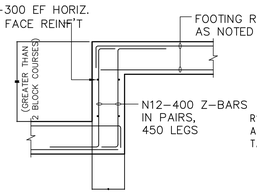
DRAWING TITLE: FINISHED LEVELS PLAN

DRAWING No: C014368.00-DA50 ISSUE: F

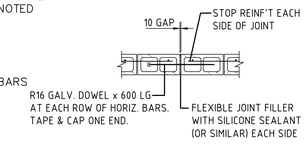


STEP HEIGHT
0mm TO 400mm



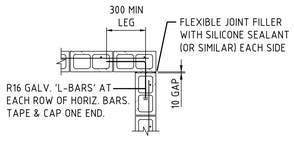
STEP HEIGHT
GREATER THAN 400mm

TYPICAL WALL FOOTING STEPS
1: 20



VERTICAL JOINT DETAIL

PROVIDE VERTICAL JOINTS IN
BLOCKWORK 8.0M MAX. CENTRES



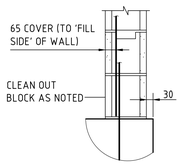
CORNER DETAIL

RETAINING WALL BLOCKWORK JOINTING DETAILS
1:20 SCALE

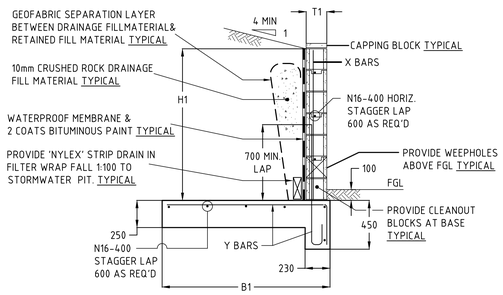
RETAINING WALL TYPE 1 SPECIFICATIONS FOR 20kPa SURCHARGE :				
RETAINED HEIGHT H1	BASE WIDTH B1	(THIN) STEM THICKNESS T1	REINF'T. X BARS	REINF'T. Y BARS
1600	1800	190	N16-400	N16-400
1400	1800	190	N16-400	N16-400
1200	1600	190	N16-400	N16-400
1000	1400	190	N16-400	N16-400
800	1200	190	N16-400	N16-400
600	1000	190	N16-400	N16-400

CONCRETE QUALITY					
ELEMENT	SLUMP	AGGREGATE (MAX. SIZE)	CEMENT TYPE	ADMIXTURE	F'c (MPa)
CORE FILL	230	10	GP	NIL	20

NOTE :
ALL BLOCK CORES TO BE FULLY GROUTED.
NOTES SHOWN ARE TYPICAL FOR ALL WALLS.
ALL BASE KEYS TO BE POURED AGAINST
UNDISTURBED NATURAL GROUND.



WALL VERTICAL REINF'T DETAIL
TYPICAL
NOT TO SCALE



WALL WITH SINGLE STEM OF 190 BLOCK
1:20 SCALE

MASONRY BLOCKWORK

M1 ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3700.

M2 CLASS OF BLOCKS AND TYPE OF MORTAR SHALL BE AS LISTED BELOW :

MATERIAL:	CHARACTERISTIC UNCONFINED COMPRESSIVE STRENGTH, F'_{uc}:	MORTAR CLASSIFICATION:
CONCRETE BLOCKS	15 MPa	M3

M3 MORTAR ADMIXTURES SHALL NOT BE USED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.

M4 ALL MASONRY WALLS AND PIERS SUPPORTING SLABS AND BEAMS SHALL HAVE A PRE-GREASED GALVANISED STEEL SLIP JOINT BETWEEN CONCRETE SOFFIT AND THE TOP OF OF THE MASONRY ELEMENT U.N.O.

M5 ALL MASONRY SUPPORTING OR SUPPORTED BY CONCRETE FLOORS SHALL BE PROVIDED WITH VERTICAL JOINTS TO MATCH ALL CONTROL JOINTS IN THE CONCRETE.

M6 NON LOAD BEARING WALLS SHALL BE SEPARATED FROM CONCRETE ABOVE BY A 12mm THICK CLOSED CELL POLYETHYLENE STRIP.

M7 NO CHASES OR RECESSES ARE PERMITTED IN LOAD BEARING MASONRY WITHOUT THE APPROVAL OF THE ENGINEER.

M8 PROVIDE CLEANOUT HOLES AT BASE OF ALL WALLS. ROD CORE HOLES TO REMOVE PROTRUDING MORTAR FOLLOWING APPROVAL FROM THE ENGINEER.

M9 CORE FILLING GROUT TO HAVE A CHARACTERISTIC STRENGTH OF 20 MPa, 10mm AGGREGATE, 230mm SLUMP, MINIMUM CEMENT CONTENT = 300 kg/m^3. GROUT FILL ALL BLOCK CORES.

M10 PROVIDE 65mm COVER TO REINFORCING BARS FROM THE OUTSIDE FACE OF THE BLOCKWORK IF REINFORCEMENT IS NOT TO BE PLACED CENTRALLY.

M11 PROVIDE VERTICAL CONTROL JOINTS AT 10 METRE MAX CENTRES, AND AT 5 METRE MAXIMUM FROM CORNERS IN ALL BRICKWORK WALLS

M12 PROVIDE VERTICAL CONTROL JOINTS AT 8 METRE MAX CENTRES, AND AT 4 METRE MAXIMUM FROM CORNERS IN ALL CONCRETE BLOCK WALLS.

M13 BACKFILL TO RETAINING WALLS TO BE FREE DRAINING GRANULAR MATERIAL U.N.O. PROVIDE SUBSOIL DRAIN BEHIND WEEP HOLES.

M14 DO NOT CONSTRUCT MASONRY WALLS ON SUSPENDED CONCRETE UNTIL SLAB HAS BEEN STRIPPED AND DE-PROPPED.

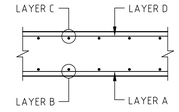
M15 ALL CAVITY CONSTRUCTION TO HAVE GALVANISED OR STAINLESS STEEL WALL TIES INSTALLED AS PER AS3700

REINFORCEMENT

R1 ALL REINFORCEMENT BARS ARE TO BE D500N U.N.O.

R2 ALL REINFORCEMENT WELDED MESHES TO BE GRADE 500L U.N.O.

R3 WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.



REINFORCEMENT PLACEMENT DETAIL

NOTE:

ATTENTION IS DRAWN TO THE FACT THAT DUE TO THE NATURE OF CONCRETE, CRACKING OF A NON-STRUCTURAL NATURE MAY OCCUR. REINFORCEMENT HAS BEEN ADDED TO THE SLABS TO MITIGATE THE EXTENT OF CRACKING, HOWEVER IT IS NOT POSSIBLE TO GUARANTEE COMPLETE ELIMINATION OF SLAB CRACKING.

CONCRETE

C1 ALL WORKMANSHIP AND MATERIAL SHALL BE IN ACCORDANCE WITH AS3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.

C2 READYMIX CONCRETE SUPPLY SHALL COMPLY WITH AS1379.

C3 CONCRETE QUALITY
ALL THE REQUIREMENTS OF THE ACSE SPECIFICATION DOCUMENT 1 (EDITION 6) SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

ELEMENT	STRENGTH GRADE (MPa)	SLUMP	MAX AGG SIZE	CEMENT TYPE
REFER TO PLANS				

C4 PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE AS1379.

C5 NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING.

C6 CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE AS FOLLOWS UNLESS SHOWN OTHERWISE.

EXPOSURE CLASSIFICATION TO AS3600:	CONCRETE GRADE:	CAST AGAINST GROUND:	CAST IN FORMS AND EXPOSED:	CAST IN FORMS NOT EXPOSED:
A1&A2	25	50mm	30mm	20mm(A1)
B1	32	60mm	40mm	-
B2	40	65mm	45mm	-

COVER REQUIREMENTS MAY NEED TO BE INCREASED TO SUIT FIRE RATING. EXPOSURE CLASSIFICATION SHALL BE AS INDICATED ON THE DRAWING.

DURABILITY REQUIREMENTS FOR CONCRETE.

EXPOSURE CLASSIFICATION TO AS3600:	MINIMUM CEMENT CONTENT:	MAXIMUM W/C RATIO:
A1&A2	280	0.56
B1	320	0.56
B2	390	0.46
C	450	0.40

C7 ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT 1 METRE CENTRES MAXIMUM BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS. USE PLASTIC CHAIRS IN EXPOSURE CONDITION GREATER THAN B1.

C8 CONCRETE SIZES DO NOT INCLUDE THICKNESSES OF APPLIED FINISHES.

C9 DEPTHS OF BEAMS ARE GIVEN FIRST AND INCLUDE SLAB THICKNESS.

C10 REFER TO ARCHITECT'S DETAILS, FOR CHAMFERS, DRIP GROOVES, REGLETS, ETC., MAINTAIN COVER TO REINFORCEMENT AT THESE DETAILS.

C11 NO HOLES, CHASES OR EMBEDMENT OF PIPES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.

C12 CONSTRUCTION JOINTS WHERE NOT SHOWN SHALL BE LOCATED TO THE APPROVAL OF THE ENGINEER.

C13 ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED WITH MECHANICAL VIBRATORS.

C14 USE ALIPHATIC ALCOHOLS SPRAYED OVER THE SURFACE PRIOR TO AND AFTER FINISHING TO REDUCE RATE OF EVAPORATION FROM THE SURFACE AND HELP CONTROL PLASTIC SHRINKAGE CRACKING. NOTE THAT THE USE OF ALIPHATIC ALCOHOLS IS NOT A SUBSTITUTE FOR CURING.

C15 COMMENCE CURING OPERATIONS PROMPTLY AFTER SURFACE FINISHING IS COMPLETE. CURING COMPOUNDS ARE TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND ARE TO BE CHECKED FOR COMPATIBILITY WITH PROPOSED FLOOR FINISHES. SOME COMPOUNDS MAY REQUIRE REMOVAL FOR GLUED DOWN FLOOR COVERINGS OR WET CURING AS DESCRIBED BELOW.

CONCRETE IS TO BE CURED BY KEEPING THE SURFACES CONTINUOUSLY WET FOR A PERIOD OF 3 DAYS, AND PREVENTING THE LOSS OF MOISTURE FOR A FURTHER 7 DAYS FOLLOWED BY A GRADUAL DRYING OUT.

C16 PROPPING WHICH SUPPORTS CONSTRUCTION OVER IS TO BE LEFT IN PLACE AS REQUIRED TO AVOID OVER STRESSING THE STRUCTURE DUE TO CONSTRUCTION LOADING

C17 THE ENGINEER SHALL BE GIVEN 48 HOURS NOTICE FOR REINFORCEMENT INSPECTIONS AND CONCRETE SHALL NOT BE DELIVERED UNTIL ENGINEERS APPROVAL IS OBTAINED.

C18 CONDUITS, PIPES ETC. SHALL ONLY BE LOCATED IN THE MIDDLE ONE THIRD OF SLAB DEPTH AND SPACED AT NOT LESS THAN 3 DIAMETERS OF THE CONDUIT, PIPES ETC. PIPES OR CONDUITS SHALL NOT BE PLACED WITHIN THE COVER TO REINFORCEMENT.

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

FOR DEVELOPMENT APPLICATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR DEVELOPMENT APPLICATION	01.12.21	B
ISSUED FOR INFORMATION	12.11.21	A

ARCHITECT: nettleton tribe

CLIENT: Charter Hall

PROJECT: INDUSTRIAL WAREHOUSE
520 GARDENERS ROAD,
ALEXANDRIA, NSW 2015

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
	DW	SEP '21		A0	AS SHOWN	C014.368.00-DA65

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DRAWING TITLE: RETAINING WALL DETAILS

DRAWING No: C014.368.00-DA65 ISSUE: B