Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

CIVIL ENGINEERING REPORT
INCORPORATING
WATER CYCLE MANAGEMENT STRATEGY

SSD-30923027

LOT 1 DP 1274322
EASTERN CREEK DRIVE
EASTERN CREEK NSW

Prepared For:
Charter Hall
Level 20, 1 Martin Place
SYDNEY NSW 2001

Prepared by:
Costin Roe Consulting
Level 1, 8 Windmill Street
WALSH BAY NSW 2000

***Rev*: D**

DOCUMENT VERIFICATION

Project Title	Compass 2 Warehouse & Distribution Centre
Document Title	Civil Engineering Report Incorporating Water Cycle Management Strategy
Project No.	Co13003.13
Description	SSD Report for proposed industrial development
Client Contact	Charter Hall c/- Tactical – Mr Nathan Cairney

	Name	**Signature**
Prepared by	Mark Wilson Xavier Cure	
Reviewed by	Mark Wilson	
Issued by		
File Name	13003.13-05d.rpt	

Document History

Date	**Revision**	**Issued to**	**No. Copies**
1 Dec. 2021	DRAFT	Tactical – Mr Nathan Cairney	PDF
2 Dec. 2021	A	Tactical – Mr Nathan Cairney	PDF
7 Dec. 2021	B	Tactical – Mr Nathan Cairney	PDF
10 Feb. 2022	C	Tactical – Mr Nathan Cairney	PDF
1 Mar. 2022	D	Tactical – Mr Nathan Cairney	PDF

EXECUTIVE SUMMARY

Charter Hall Holdings (Charter Hall - the Applicant) are seeking to construct an industrial development located at Lot 1 Eastern Creek Drive, Eastern Creek.

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 single level industrial warehouse distribution facility on a 4.8 Ha parcel of land. Works will include bulk earthworks, provision of services, building construction, and stormwater management.

Access to the development would be made via Eastern Creek Drive and in the future by the Honeycomb Drive extension (provisioned to be constructed in 2022).

Purpose of this assessment

This Water and Hydrology Impact Assessment has been prepared to address the following Secretary's Environmental Assessment Requirements (SEARs):

- Item Number 12: Ground and Water Conditions
- Item Number 13: Stormwater and Wastewater
- Item Number 14: Flooding Risk

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 discharges directly to a regional detention system which attenuates increased runoff to existing peak flows, as such the site discharge will not adversely affect any land, drainage system or watercourse as a result of the development.

Conclusion

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

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

TABLE OF CONTENTS

EXECUTIVE SUMMARY (i)

1 INTRODUCTION & SCOPE 6

1.1 Introduction 6

1.2 Consultation 6

1.3 SEAR's Responses 6

2 DEVELOPMENT SITE 13

2.1 Location 13

2.2 Existing Site Description 13

2.3 Proposed Development 14

3 SITE WORKS 16

3.1 Soil and Geological Conditions 16

3.2 Bulk Earthworks 16

3.3 Retaining Walls 17

3.4 Embankment Stability 19

3.5 Groundwater 19

3.6 Acid Sulphate Soils and Salinity 19

4 WATER CYCLE MANAGEMENT STRATEGY & DRAINAGE METHODOLOGY 20

4.1 Key Areas and Objectives 20

4.2 Existing Site Drainage 22

4.3 Eskdale Creek Regional Detention System 23

4.4 Proposed Surface Water Drainage System 26

4.5 Hydrologic Modelling and Analysis 27
4.5.1 Rainfall Data 27
4.5.2 Runoff Models 27

4.6 Hydraulics 28
4.6.1 General Requirements 28
4.6.2 Freeboard 28

4.6.3 Public Safety 28
4.6.4 Inlet Pit Spacing 28
4.6.5 Overland Flow (development lots) 28

4.7 Fire Water Containment 29

5 WATER QUANTITY MANAGEMENT 30

6 STORMWATER QUALITY, REUSE AND MAINTENANCE 31

6.1 Stormwater Quality Objectives 31

6.2 Proposed Stormwater Treatment System 31

6.3 Stormwater Quality Modelling 31

6.4 Stormwater Harvesting 32
6.4.1 Rainwater Tank Sizing 33

6.5 Stream Erosion Index 34

6.6 Maintenance and Monitoring 35

7 FLOODING AND OVERLAND FLOW 36

7.1 Introduction 36

7.2 Overland Flow & Flood Assessment Methodology 36

7.3 Existing Overland Flow and Flood Behaviour 36

7.4 Council Floodplain Management Requirements & NSW Floodplain Management Manual Requirements 38

7.5 Flood Assessment Conclusion 39

8 CONSTRUCTION SOIL AND WATER MANAGEMENT 40

8.1 Soil and Water Management General 40

8.2 Typical Management Measures 40

8.3 Other Management Measures 41

9 CONCLUSION 42

10 REFERENCES 43

1 INTRODUCTION & SCOPE

1.1 Introduction

Costin Roe Consulting Pty Ltd has been commissioned by Tactical Group, 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 an industrial development on the land.

This report presents a civil engineering assessment the property at Eastern Creek Drive, Eastern Creek. 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. **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.

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 8 November 2021, reference SSD-30923027.

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

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

Table 1.1 provides a summary of the SEARs General Requirements which relate to water and hydrology, and where these have been addressed in this report. **Table 1.2** provides a similar summary pertaining to specific Agency requirements.

Table 1.1. SEARs Warehouse and Distribution Centres Key Areas

SEAR's Key Item No. & Description	Issue & Assessment Requirements	How It Is Addressed	Location Within This Report
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.	We note the site is currently undeveloped though has had earthworks occur on the site as part of surrounding infrastructure works. The site was also used for stockpiling and storage of fill during the adjacent regional detention system construction and level changes occurred during these works. The site is noted to be located within an established industrial precinct. The proposed works involve filling and some minor cutting to the existing site. These works are noted to be similar in nature and scale to those which have occurred on surrounding developments. Geotechnical investigations also confirm there will be minimal impact to existing soil resources and soils. We note no riparian lands or watercourses are located	Refer to **Section 3** and geotechnical assessments by **WSP** for confirmation of soil resources and potential impacts.

SEAR's Key Item No. & Description	Issue & Assessment Requirements	How It Is Addressed	Location Within This Report
		within the property boundary. We note the site is located adjacent to a regional detention basin and Eskdale Creek realignment. The development though is clear of any riparian corridors or areas associated with these systems.	
	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.	We note no riparian lands or watercourses are located within the property boundary. We note the site is located adjacent to a regional detention basin and Eskdale Creek realignment. The development though is clear of any riparian corridors or areas associated with these systems. Refer to **Section 8** for soil and water management measures during construction, drawings in **appendix A** for associated erosion and sediment control drawings. 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 during construction.	Refer to **Section 4, 5 & 6** for assessment of water resources, hydrology (including quality and quantity), watercourses and riparian lands during operation.

SEAR's Key Item No. & Description	Issue & Assessment Requirements	How It Is Addressed	Location Within This Report
		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 existing 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**.	Refer to **Sections 4 & 6**
	Provide a detailed site water balance including identification of water requirements for the life of the development, and measures to ensure	Refer to infrastructure report prepared by Landpartners for water supply and wastewater assessments.	Refer to **Section 4, 5 & 6** for assessment of water resources, hydrology (including quality and quantity),

SEAR's Key Item No. & Description	Issue & Assessment Requirements	How It Is Addressed	Location Within This Report
	an adequate and secure water supply.		watercourses and riparian lands.
	Provide an assessment of salinity and acid sulfate soil impacts.	Refer to **Section 3** and geotechnical assessments by **WSP** for confirmation of soil resources and potential impacts.	Refer to **Section 3**
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	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 between Eastern Creek Drive and the regional detention basin. The stormwater management measures proposed have been consulted with Council in a pre-application meeting held on 31 March 2022. The pre-application meeting minutes confirm no on-site detentions measures are required for the development (due to the regional basin).	Refer to **Section 4, 5 & 6** for assessment of water resources, hydrology (including quality and quantity), watercourses and riparian lands during operation.

SEAR's Key Item No. & Description	Issue & Assessment Requirements	How It Is Addressed	Location Within This Report
	dispose of water. • demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse impacts on any downstream properties.		
	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 consideration to overland flow between Eastern Creek Drive and the regional detention basin. Refer **Section 4** and drawings in **Appendix A** for detailed assessment of the existing and post development conditions pertaining to the inter-allotment culverts and overland flow path.	Refer to **Section 4** and **Appendix A**
14. Flooding Risk	Identify any flood risk on-site having regard to adopted flood studies, the	The proposal requires consideration to overland flow between Eastern Creek Drive	Refer **Section 7** for assessments pertaining to

SEAR's Key Item No. & Description	Issue & Assessment Requirements	How It Is Addressed	Location Within This Report
	potential effects of climate change, and any relevant provisions of the NSW Floodplain Development Manual.	and the regional detention basin. The development floor level has been set allowing for freeboard to the overland flow path of greater than 0.5m during the 1% AEP flood event. Freeboard greater than 0.5m during the 1% AEP flood event has also been achieved to the adjacent regional detention basin. The requirements of council and NSW Floodplain Development Manual are met for this development.	flooding and overland flow.
	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.	The assessments show the overland flow between Eastern Creek Drive and the regional detention basin can be conveyed safely through the development site (with low hazard categorisation), flood planning considerations are met, and the site has suitable flood immunity to the known flood behaviour, acceptable flood risk has been demonstrated.	Refer **Section 7** for assessments pertaining to flooding and overland flow.

2 DEVELOPMENT SITE

2.1 Location

The property is located within the Blacktown City Council (BCC) local government area (LGA), as shown in **Figure 2.1.**

The site is located on the eastern side of Eastern Creek Drive in the suburb of Eastern Creek. The site is located within the *Eastern Creek Business Park Stage 3*, an established industrial precinct.

Figure 2.1. Site Location and Aerial Imagery (Source: Nearmap 17 October 2021)

2.2 Existing Site Description

The site area is 4.8Ha.

The site is roughly trapezoidal in shape with a blister fronting Eastern Creek Drive at the south-western corner. The property is approximately 300m wide with length varying between approximately 240m and 300m. The frontage along Eastern Creek Drive is approximately 48m.

To the north is Honeycomb Drive and the future Honeycomb Drive extension (which is yet to be constructed), to the east is a regional stormwater detention system, to the south is Eastern Creek Drive and existing industrial developments and to the west are further industrial developments.

The site generally grades down from west/ north-west to east/ south-east. The highest level is RL 68.5m AHD along the western boundary. The lowest level on the site is RL 62.5m at the south-eastern and north-eastern corners of the site. The level of the frontage at Eastern Creek Drive is RL 66m AHD. A temporary detention basin was previously located in the middle of the site which has now been filled in as part of the regional basin construction by Jacfin.

An existing trunk drainage system, comprising a twin (2 no.) 2400mm wide by 1500mm high reinforced box culverts is located on the southern boundary and conveys runoff from Eastern Creek Drive and the surrounding catchments to the regional detention system east of the development site.

2.3 Proposed Development

The proposed development is for a 24/7 operational warehouse and distribution centre at Lot 1 Eastern Creek Drive, Eastern Creek comprising:

- Minor earthworks involving cut and fill works;
- Site preparation works and servicing;
- Warehouse, main office, ancillary office, dock office, loading docks, carparking, forklift charging room;
- External hardstands and landscaping;

The indicative site layout prepared by Watch This Space Design has been included in **Figure 2.2**.

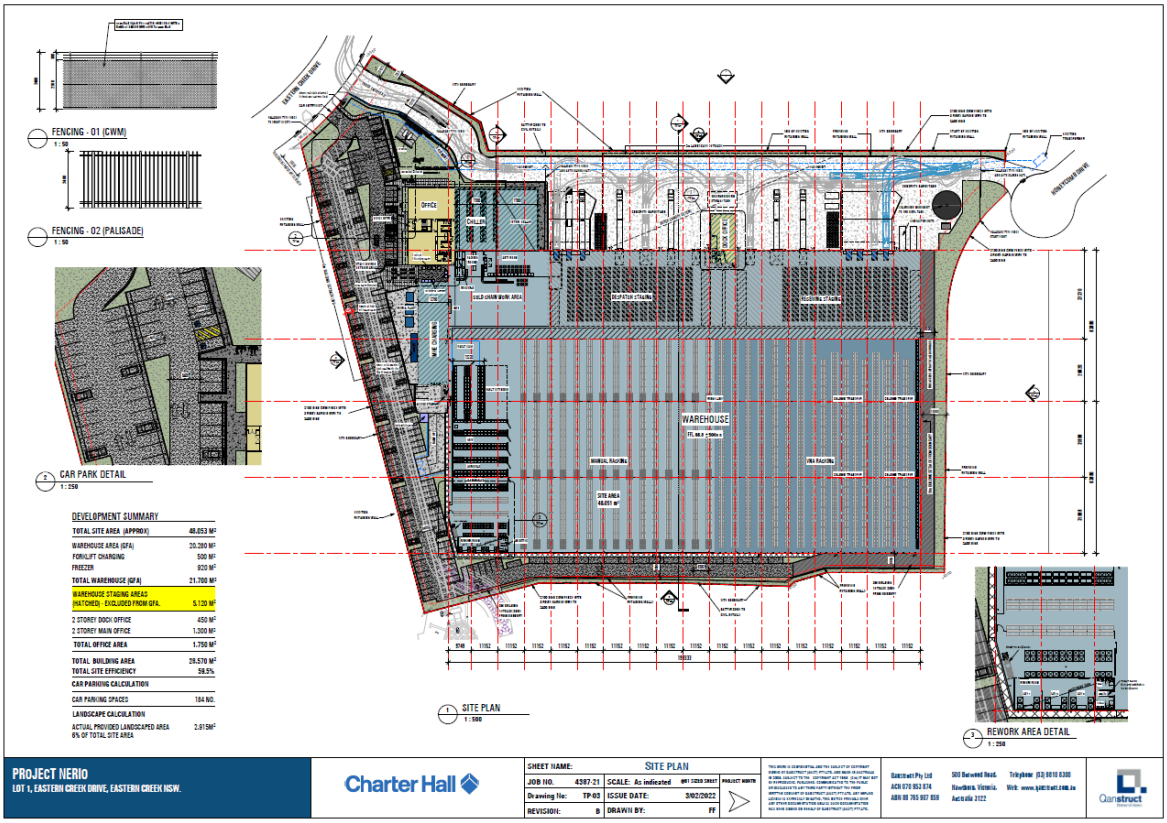


Figure 2.2. Proposed Development – Concept Layout Plan

The proposed carpark for the development is located at the southern region of the site and will be accessed via Eastern Creek Drive.

The Carpark will be constructed over a culvert located within a drainage easement (I) as shown on the DA subdivision plan. Access will need to be maintained to the culvert in the drainage easement. No structural footings or other in-ground structures are proposed within the easement which would obstruct access. The proposed car park over the culvert will also be graded to enable the existing overland flow behaviour and capacity is maintained. The design will need to comply with the requirements of H1 flood hazard vulnerability to ensure velocity x depth is < 0.3 with velocity <= 2m/s and depth <= 0.3m in the 1% AEP storm event.

3 SITE WORKS

3.1 Soil and Geological Conditions

Based on geotechnical desktop study by WSP and our knowledge of the area, the site is expected to exhibit characteristics consistent with Bringelly Shale Landscapes. Bringelly Shale is described as shale, claystone, laminate, and lithic sandstone.

Bore logs have confirmed that the site is underlain by fill material to depth of 0.3m to 2.5m below existing ground level (BEGL), transitioning to residual clay from 0.3m to 2.5m BEGL, then to extremely weathered rock (inferred Bringelly Shale) from 1.9m to 4.6m BEGL. The profile of the rock is inferred to slope from north-west to south-east.

It is expected that some of the existing fill material may need to be re-worked. The extent of re-work (i.e., remove and re-compact as engineered fill) will need to be confirmed on site during detailed investigations.

It is expected that some excavation through rock will be required to reach bulk excavation levels for the development at the north-western corner of the development and to install the stormwater drainage along the western boundary.

Ground water was possibly encountered along the east boundary of the site at a depth of 2.5m. Along the eastern boundary, the building foundations will likely be founded on engineered fill and no basement for the warehouse is proposed so groundwater will likely not be an issue for this development.

Acid sulphate soils are not likely to be present on the development site so are not considered to be an issue.

The residual clay material on site is likely to be classed as moderately to highly expansive. The warehouse foundations and ground floor slab will need to be designed to accommodate any shrink-swell movements. The warehouse foundations will need to be found on either stiff clay of suitable strength or engineered fill.

3.2 Bulk Earthworks

Bulk earthworks will be required to facilitate the development of the estate for industrial use. The earthworks will be undertaken to provide a large flat building pad, hardstand area and a car parking area. Earthworks are also required to facilitate access via Eastern Creek Drive and Honeycomb Drive and to provide an overland flow path through the site via the proposed carpark.

A high-level earthwork volume estimate assessment has been completed for the site. The estimated volumes are shown on the Costin Roe drawings in **Appendix A**.

The earthworks analysis has been completed to a level of detail to enable general pad levels to be set and to obtain an order of magnitude cut and fill volume estimate. Given the preliminary nature of the assessment, an upper and lower bound of earthworks volumes has been included to allow for contingency in cost planning estimates. The assessment in **Appendix A** is based on the earthworks using a building pad RL of 66.5m AHD.

The primary drivers for the proposed earthworks levels are minimising the extent of external retaining walls which would require interface with adjacent properties to the west and south while also minimising fill as much as practical.

The earthworks volume estimates are as follows:

	Apparent Volume	Upper Bound (+15%)	Lower Bound (-15%)
Cut (m^3)	-11,600	-13,340	-9,860
Fill (m^3)	81,350	+93,550	+69,150
Detail Excavation (@ 1250m^3/ Ha)	-6,025	-6,930	-5,120
Retaining Wall Allowance	-8,300	-9,545	-7,055
Balance (m^3)	+55,425	+63,735	+47,115
Topsoil removed (m^3) (@ 50 mm depth)	2,410	2,770	2,050

Table 2.1. Earthwork Volume Estimates

Given the order of magnitude of the volume of earthworks and concept nature of the earthworks modelling, fill importation is expected to be able to be achieved through detail modelling exercise. Consideration to bulking of cut materials including rock and clay materials should be allowed for. Bulking of clay would normally be expected to be 4% of the removed volume and rock bulking can be expected in the range of 8-12%.

Earthworks allowances for services trenches, retaining walls and detailed building excavation should also be made to avoid excessive unknown exports during later stages of the project. Allowances in the range of 1250-2500m^3/Ha can be expected depending on the type of development and final site layouts. This allowance is included in the earthworks assessment. As noted, an upper and lower bound of earthworks volumes has been included to allow for some of these items.

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

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

3.3 Retaining Walls

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

Retaining will be required along the northern and east boundaries noting this will be up to 6m in height. These are anticipated to comprise modular masonry block system (Keystone) with reinforced soil backfill.

Retaining on the western property boundary is also required. This wall, being in cut up to 2m in height, is anticipated to comprise reinforced concrete block system.

Design geometry of walls has been completed in accordance with *Table 6.3* and *Figure 6.3* of Blacktown City Councils *DCP Part E – Development in Industrial Areas, Section 6.2*. Refer **Figure 3.1** below.

Location and indicative heights of retaining walls are shown on drawing **Co13003.13-SSDA51 to SSDA54**.

■ **Controls**

Provision	Control
Embankment batters from property boundary	3m:1m (length to height ratio)
Maximum height of retaining wall elements	3m
Terraced fill greater than 3m in height	1.5m:3m (length to height ratio)

Table 6.3 Cut and fill requirements

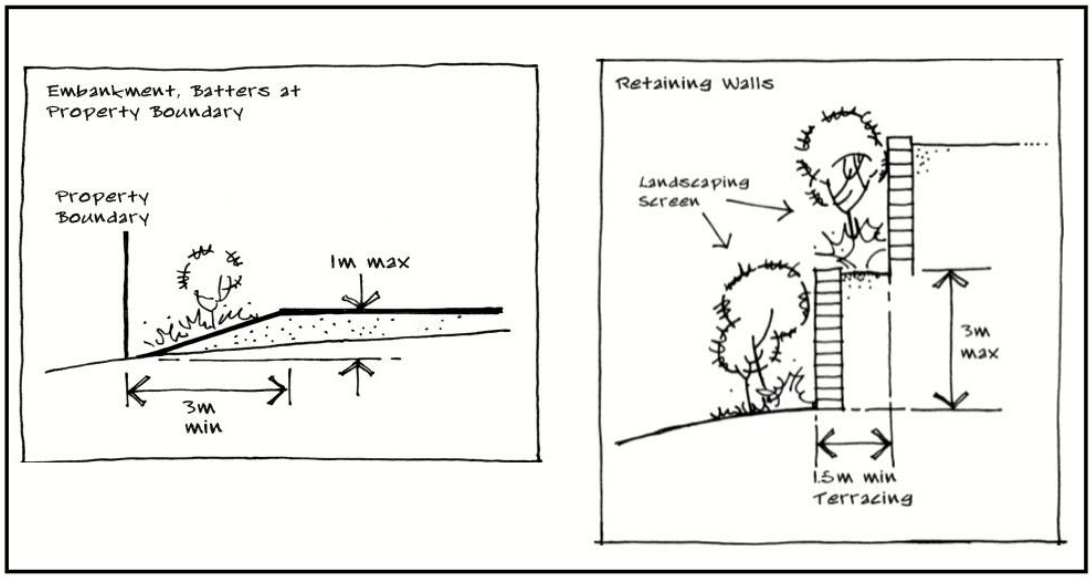


Figure 6.3 Embankment batter and retaining walls

Figure 3.1 DCP *Part E – Development in Industrial Areas* Figure 6.3 & Table 6.3

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.

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** of this report.

3.5 Groundwater

Groundwater was identified in a geotechnical investigation completed by WSP which was titled as *Compass 2 Warehouse & Distribution Centre, Ground Impact Assessment*. It is unlikely groundwater would be encountered as part of the works proposed. As there is limited opportunity to encounter groundwater, impact from groundwater and on groundwater systems as a result of development 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 and estate wide 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.

We note the **WSP** report and acid suflate risk maps show very low potential for acid sulfate potential.

The **WSP** 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. This WCMS has been prepared to inform DPIE, and relevant stakeholders, that the development is able to provide and integrate WCM measures into the stormwater management strategy for the development.

The key WCM targets which have been adopted in the design are included in **Table 4.1** following, and included in the drawings found in **Appendix A**

Table 4.1. WCM Targets

Element	Target	Reference
Water Quantity	Minimise flooding from increased stormwater runoff due to development	Blacktown City Council DCP Part J.
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%	Blacktown City Council Part J DCP
Flooding	Buildings set 0.5m above the 1% AEP flood level.	Blacktown City Council Part J DCP NSW Floodplain Development Manual.
Stream Health	Stream Erosion Index less than 3.5	Blacktown City Council Part J DCP
Water Supply	Reduce Demand on non-potable water uses. Provide 80% reduction of non-potable uses.	Blacktown City Council Part J DCP
Construction Stormwater Management & Erosion and Sediment Control	A construction stormwater management plan and appropriate associated erosion and sedimentation control measures must be described in the environmental assessment for all stages of construction to mitigate potential impacts to surrounding properties.	Landcom Blue Book Council DPI
Dangerous Goods and Fire Water Containment	In the event of a fire, containment of firewater runoff is required.	EPA

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. The site discharges to an existing regional detention system located on the land east of the property. The regional detention system provides attenuation requirements for this site (as confirmed by Blacktown City Council in the pre-application meeting dated 31 March 2021, as included in **Appendix D**) and surrounding catchments, as such a site specific system is not required or proposed.

  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 estate.

  A series of Stormwater quality improvement devises (SQID's) have been incorporated in the design of the estate. 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 two proprietary treatment systems. The treatment systems are proposed to be syphon actuated filtration systems housed in underground tanks. Refer to drawings **Co13003.13-DA40, DA41 & DA42.**
  - Some treatment will also be present by provision of rainwater reuse tanks on development sites through reuse and settlement within the tanks.

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

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

  The proposed development considered flooding and large rainfall events in relation to the adjacent regional detention system, and local runoff and overland flow paths including the overland flow from Eastern Creek Drive.

  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.

- *Stream Health (refer **Section 6.4**)*

  Stream Erosion Index (SEI) calculation has been made, in accordance with the methodology set out in Blacktown City Councils Water Sensitive Urban Design Handbook (2020). Blacktown City Council Require that the post development duration of stream forming flows shall be no greater than 3.5 times the pre-development duration of stream forming flows with a stretch target of 1.

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

  Rainwater reuse measures will be provided as part of future building development designs. Rainwater reuse will be required to reduce demand on non-potable uses by 80%. 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 period between the completion of the estate infrastructure works and development of individual lots.

- *Fire Water Containment (refer **Section 4.7**)*

  In the event of a fire, the intent is to ensure firewater runoff is contained on site for removal and disposal to an acceptable location in accordance with EPA requirements. The firewater runoff will be contained on site by a number of measures which will be finalised in detail design/ post approval documents. It is anticipated that containment areas including recess docks (approx. 700m^3 available), stormwater drainage system, within bunded warehouse area or similar could be adopted.

4.2 Existing Site Drainage

The site is currently undeveloped industrial zoned land, which has been described in **Section 2.2**.

The site currently sheds stormwater as sheet flow to the east and south-east, off the property to the regional detention system east of the site.

The site has minimal existing formal inground drainage systems, however a box culvert (2x 2400mm wide by 1500mm high RCBC) and overland flow swale are present

adjacent to the southern property boundary (refer **Figure 4.3** and **4.4**). This system is a trunk drainage line which carries runoff from the Eskdale Creek Catchment which comprises Eastern Creek Drive, Honeycomb Drive and surrounding properties, from Eastern Creek Drive to the Eskdale Creek regional detention system east of the property. The regional detention system is further described in **Section 4.3** of this document.

It is noted that the design allowances for the trunk drainage system is based on a design capacity which allows for the 1% AEP design flow (approx. $18m^3/s$) and 50% blockage of both inlet pits and the culvert system. Further discussion on the system and overland flow considerations is included in **Section 7**.

4.3 Eskdale Creek Regional Detention System

As noted, the site is located with the Eskdale Creek catchment, within Stage 3 of the Eastern Creek Business Park. Refer to **Figure 4.1** which shows the Eskdale Creek Catchment, as included in Calibre Consulting "*Eskdale Creek Catchment Stormwater Strategy Report – July 2016*".

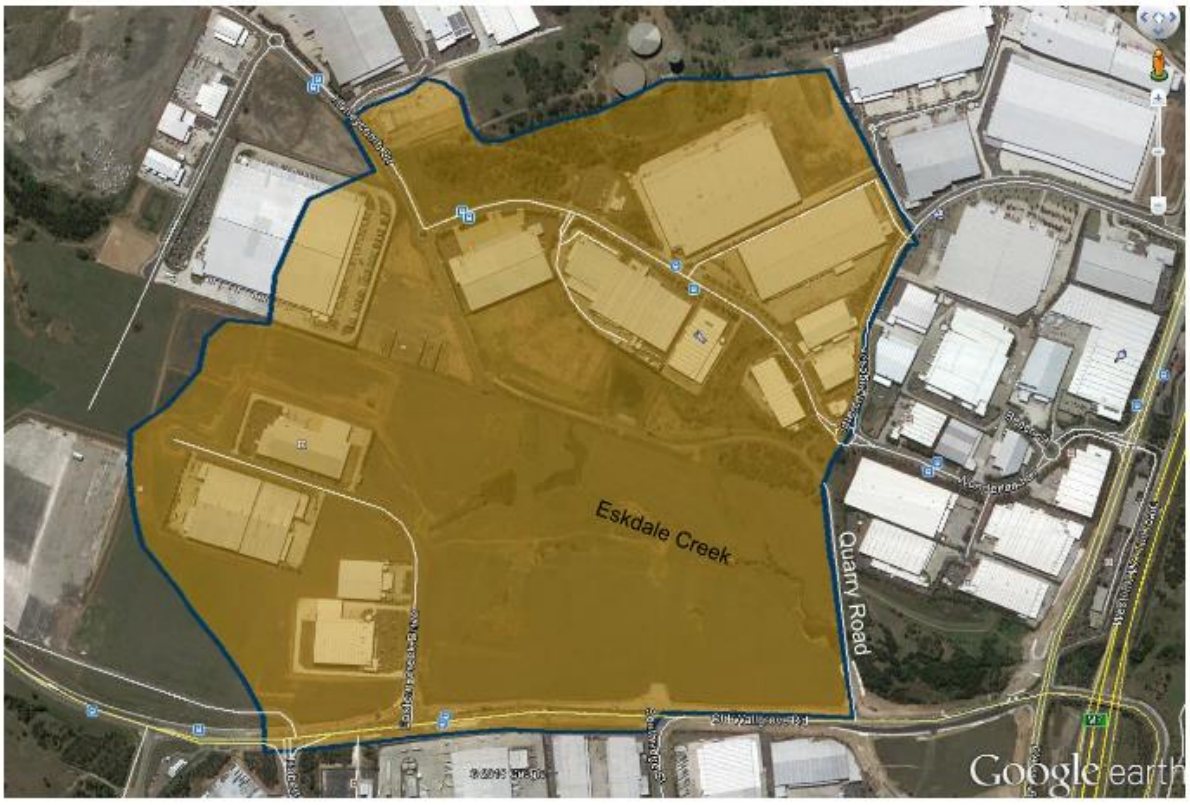


Figure 2-1: Eskdale Creek Catchment

Figure 4.1. Excerpt of Calibre Consulting *Figure 2-1*

A regional detention system, the Eskdale Creek Catchment Detention System, is located east of the development site. **Figure 4.2** shows the location of the Eskdale Creek Catchment Detention System. This system was constructed in two stages with two interconnected basins. As reported by Calibre the combined Stage 1 and 2 Basins have

a storage volume of 24,120m^3 in the 1% AEP. **Table 4.1** provides a summary of key storage and water levels for the two basins.

The regional detention system has been designed and constructed to attenuate runoff from all development within the catchment (including the subject site), and to provide water quality for road runoff. As such individual developments within the catchment do not need to provide site specific detention systems which have been provisioned for in the regional system. We note however, although individual development sites do not require their own detention systems, each site will need to allow for and include water quality treatment devices which achieve the objectives set out in **Section 4.1** of this report. The stormwater management measures required and proposed have been consulted with Council in a pre-application meeting held on 31 March 2022. The pre-application meeting minutes confirm no on-site detentions measures are required for the development (due to the regional basin). Refer **Appendix D** for pre-application notes and ***Item 7 Engineering (Drainage)*** for confirmation of OSD and WSUD requirements.

We note the storage volume associated with the subject site is 2,184m^3, being approx. 9% of the total basin volume and consistent with the proportion of the contributing precinct catchment.

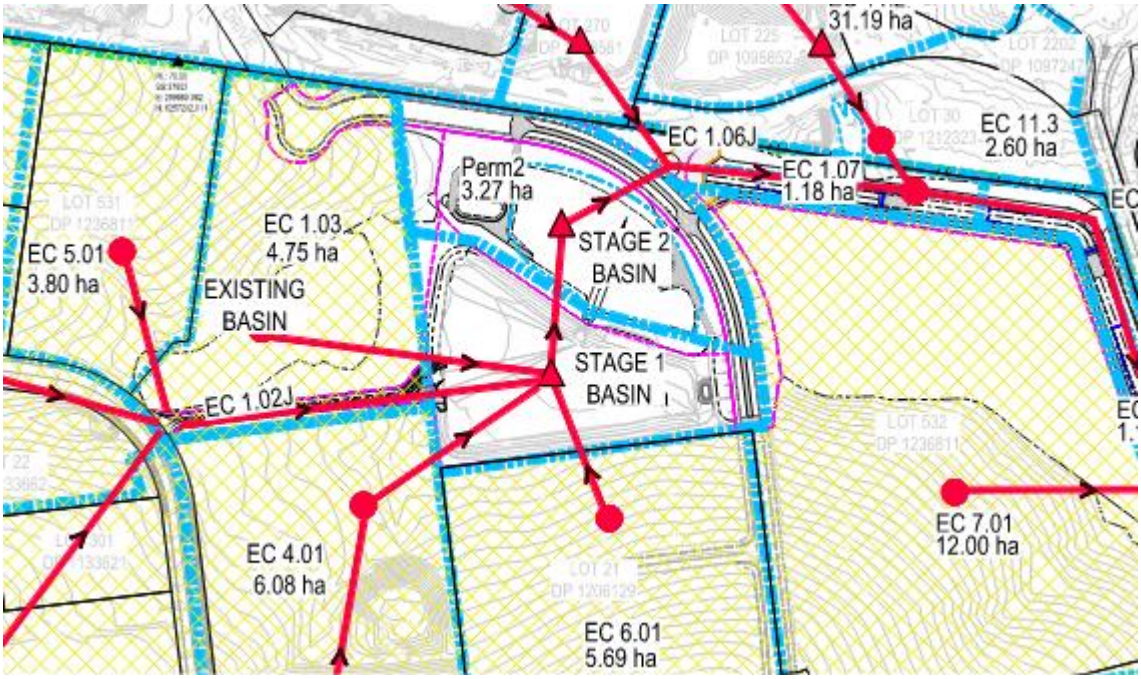


Figure 4.2. Location of Regional Basin

Table 4.1 Eskdale Creek Basin Summary

AEP (ARI)	Stage 1 Basin		Stage 2 Basin	
	Volume (m^3)	RL (mAHD)	Volume (m^3)	RL (mAHD)
50% (2yr)	3,030	60.88	6,150	59.35
5% (20yr)	11,430	61.24	7,840	59.49
1% (100yr)	13,920	61.37	10,200	59.68

The location and configuration of the inter-allotment trunk drainage culvert and swale which carries runoff from Eastern Creek Drive to the regional detention system (through the subject site) is shown in **Figure 4.3** and **Figure 4.4**. Further discussion on conveyance of overland flow in the pre and post development conditions is made in **Section 4.2** and **Section 7** of this report.

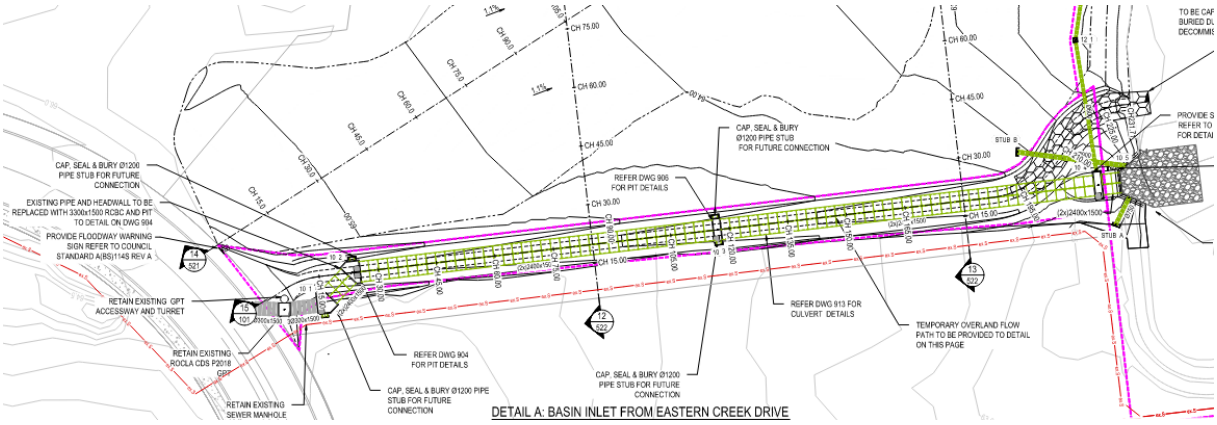


Figure 4.3. Location of Inter-allotment Drainage Line and Swale

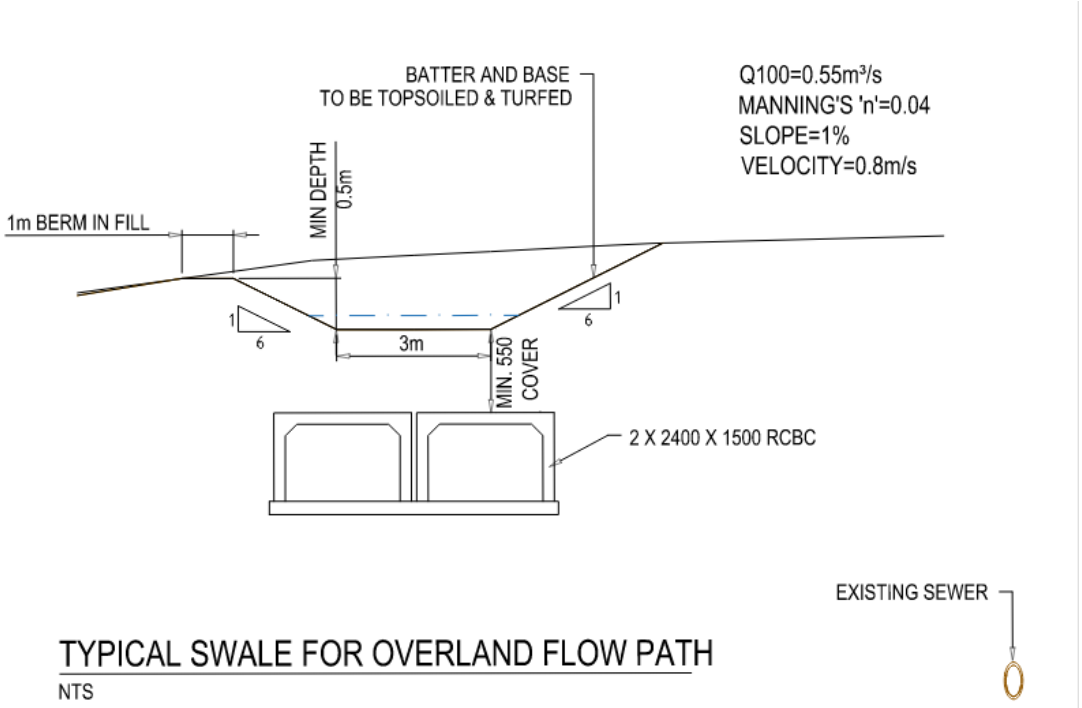


Figure 4.4. Typical Cross Section of Inter-allotment Drainage Line & Swale

4.4 Proposed Surface Water Drainage System

As required of the tenant brief the inground drainage system is to consist of a piped drainage system which has been designed to accommodate the 1 in 100-year ARI storm event (Q100). This results in the piped system being able to convey all stormwater runoff up to and including the Q100 event.

A typical major (Q100 overland) and minor (Q20 inground) drainage system, typically adopted as general engineering practice and the minimum requirements of Council, to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge as such is not relevant for this site, given the minor system in this instance caters for the capacity of the major.

We note that emergency overland flow paths (i.e., those for events greater than the 1% AEP), including that between Eastern Creek Drive and the Eskdale Basin, have been considered in the design layout. 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 culvert.

With reference to the drawings in **Appendix A,** the drainage system proposed can be described as follows:

- In-ground piped drainage system designed to the 1% AEP (1 in 100yr ARI);
- Site discharge via the existing inter-allotment drainage system.
- Treatment of stormwater via one of two proprietary filtration systems;
- Conveyance of overland flow from Eastern Creek Drive safely through the proposed carparking zone to the Eskdale Creek Regional Detention Systems.

4.5 Hydrologic Modelling and Analysis

4.5.1 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.

4.5.2 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	

4.6 Hydraulics

4.6.1 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.

4.6.2 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.

4.6.3 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.

4.6.4 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).

4.6.5 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.

4.7 Fire Water Containment

In the event of a fire, it is required that firewater runoff is contained on site for removal and disposal to an acceptable location in accordance with EPA requirements. The preliminary estimate of the required volume for containment is 702m^3, subject to detail design.

The firewater runoff will be contained on site by a number of measures which will be finalised in detail design/ post approval documents. It is anticipated that containment areas including recess docks (approx. 700m^3 available), stormwater drainage system, within bunded warehouse area or similar could be adopted.

We note the provision of an isolation valve to the hardstand drainage, and recess docks, has been included in the design documentation to ensure >702m^3 of storage is achieved on site. The final storage volume and containment strategy will be confirmed in post approval phase.

5 WATER QUANTITY MANAGEMENT

Blacktown City Council's Part J DCP and Water Sensitive Urban Design (WSUD) 2020 Developers Guideline require management of stormwater quantity for developments, 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.

Management of Stormwater Quantity has been considered for the site. As discussed in **Section 4.2** of this report, the property discharges directly into the Eskdale Creek Regional Detention System. The Eskdale Creek Regional Detention System is a circa 24,000m^3 detention system which was designed and constructed with provision for development of the subject site. Completion of Stage 2 construction occurred in 2020 and the system is now fully operational.

We note the storage volume associated with the subject site (provisioned for in the constructed basins) is 2,184m^3, being approx. 9% of the total basin volume and consistent with the proportion of the contributing precinct catchment.

The stormwater management measures proposed have been consulted with Council in a pre-application meeting held on 31 March 2022. The pre-application meeting minutes confirm no on-site detentions measures are required for the development (due to the regional basin). Refer **Appendix D** for pre-application notes and ***Item 7 Engineering (Drainage)*** for confirmation of OSD and WSUD requirements.

Given the provision of a regional stormwater detention system which reduces peak flows as required by Council and consistent with the Eastern Creek Business Park precinct, no on-site detention is required or proposed for the development, as confirmed by Blacktown City Council.

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.

Blacktown City Council has nominated, in *Part J* of their *DCP 2015*, 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 included in **Table 4.1**.

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 StormFilter (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.

It is noted that the regional stormwater system (Eskdale Creek Regional Basin) described in **Section 4.3** and **5** of this report does not provide any treatment for individual lots. Management of all site runoff treatment is to occur on-lot.

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.

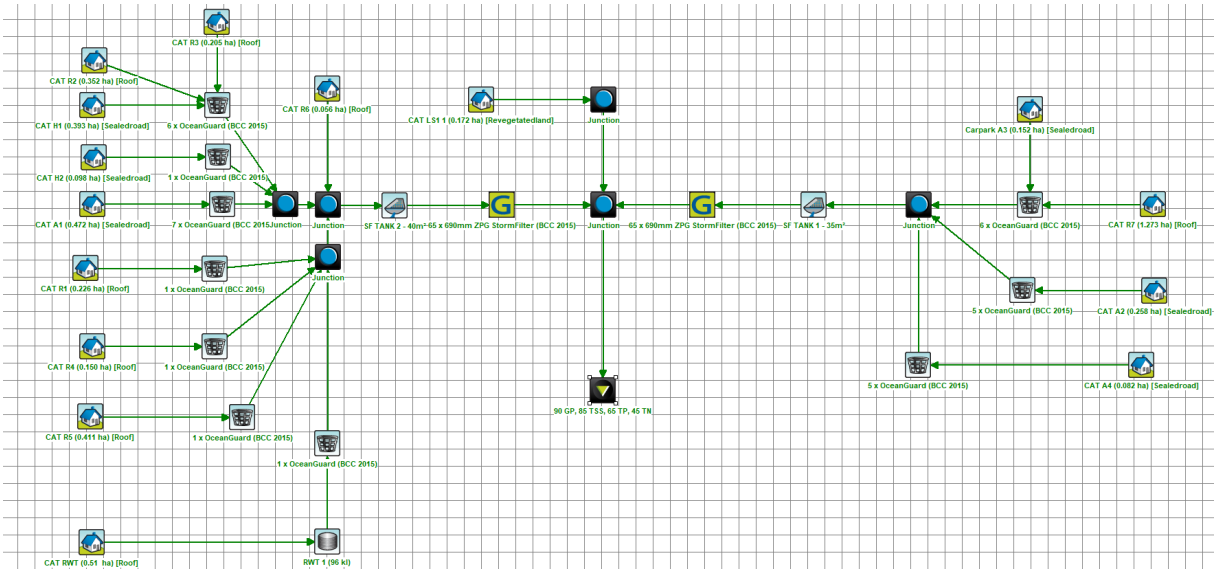


Figure 6.1. MUSIC model layout

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)	4110	461	88.8
Total Phosphorus (kg/yr)	9.49	3.1	67.4
Total Nitrogen (kg/yr)	75.7	41.2	45.6
Gross Pollutants (kg/yr)	873	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 Part J DCP 2015 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 by 80%.

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 80% reduction in non-potable water demand. Rainwater tank reuse demands were calculated based on typical water demands of toilets and irrigation of landscaped areas. Water demands for toilets was calculated using 0.1kL/day/ toilet. Water demands for irrigation of landscaped areas was calculated using 0.4kL/year/m^2.

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

27 Toilets	2.7 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)	765m^2	305 kL/year
TOTAL		**305 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.

Table 6.4. Rainwater Reuse Requirements

Roof Catchment (m^2)	Highflow Bypass (L/s)	Tank Size in MUSIC (kL)	Predicted Demand Reduction (%)	Provided Tank (kL)
5100	100	77	80	96

The MUSIC model, results summarised in **Table 6.4**, predicts that the reuse demands of 80% will be met for the development with the provision of a minimum 150 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 Stream Erosion Index

A Stream Erosion Index (SEI) calculation has been made, in accordance with the methodology set out in Blacktown City Councils Water Sensitive Urban Design Handbook (2020). Blacktown City Council Require that the post development duration of stream forming flows shall be no greater than 3.5 times the pre-development duration of stream forming flows with a stretch target of 1.

The SEI has been calculated for the site area relating to the new development.

The four following steps, as defined in the council document, were used in estimating the SEI:

1. Estimate the critical flow for the receiving waterway above which mobilisation of bed material or shear erosion of bank material commences.
2. Develop and run a calibrated MUSIC model of the area of interest for predevelopment conditions to estimate the mean annual runoff volume above the critical flow.
3. Develop and run a MUSIC model for the post developed scenario to estimate the mean annual runoff volume above the critical flow.
4. Use the outputs from steps 3 and 4 to calculate the SEI for the proposed scenario.

The critical flow for the receiving water (25% of the 2-year ARI) has been estimated at $0.027m^3/s$.

A pre-developed model was set up based on the site being modelled as 100% pervious agriculture land. The pre-development runoff volume, above the critical flow, based on the calibrated MUSIC model was calculated at 4.38 ML/yr.

The post-development runoff volume, above the critical flow, based on the post-developed MUSIC model was calculated at 12.88 ML/yr. The post development model is based on the MUSIC model submitted and approved as part of the development approval documentation. The model also includes an allowance for the regional stormwater detention system located in the adjacent lot.

This has been based on the proportion of the 4.81 Ha site over the total 53.8 Ha catchment draining to the regional Basin. An on-site detention system of 1015m^3, proportionate to the contributing site catchment, has been included the model to properly replicate the SEI at the receiving waters downstream of the estate detention measures.

The SEI for the development has been calculated at 2.94. This can be seen to be below the maximum allowable target of 3.5, hence the requirements of the SEI assessment have been met.

Refer to enclosures for MUSIC model Output relating to the SEI.

6.6 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 C** 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

An assessment pertaining to flooding and overland flow has been completed for the development.

The site is noted to be located adjacent to the Eskdale Creek Regional Detention Basin, and has a trunk drainage culvert which conveys runoff from the development sites in and around Eastern Creek Drive to the Eskdale Creek Basin. The basin is noted to provide stormwater attenuation for this site, and surrounding site as discussed, and the system is discussed in detail in **Section 4.2 & 4.3** of this report.

We provide the following assessments pertaining to overland flow and flooding associated with the Eskdale Creek Regional Detention Basin and trunk drainage system.

The site has minimal existing formal inground drainage systems, however a box culvert (2x 2400mm wide by 1500mm high RCBC) and overland flow swale are present adjacent to the southern property boundary (refer **Figure 4.3** and **4.4**). This system is a trunk drainage line which carries runoff from the Eskdale Creek Catchment which comprises Eastern Creek Drive, Honeycomb Drive and surrounding properties, from Eastern Creek Drive to the Eskdale Creek regional detention system east of the property.

7.2 Overland Flow & Flood Assessment Methodology

Our assessment relating to flooding and overland flow is based on the following items:

- Correspondence with Blacktown City Council (refer pre-DA notes in **Appendix D**).
- Basin 1 and 2 Design and WAE (Calibre Consulting, Ref: 15-004038, as provided by Blacktown City Council).
- Old Walgrove Road, Eastern Creek Industrial Estate – Eskdale Creek Catchment Stormwater Strategy Report (Calibre Consulting July 2016).

A DRAINS hydrologic and hydraulic assessment of the trunk drainage culverts and surrounding drainage was completed by our office based on the above WAE and design drawings, and verified using flow and hydraulic information included in the drawings and report.

7.3 Existing Overland Flow and Flood Behaviour

The Eskdale Creek Basin, trunk drainage line and emergency flow path is depicted on **Figure 7.1** below.

Key flow paths to the basin system are from the north, south and west. Discharge from the basin is to east toward Eastern Creek which is on the eastern side of the M7 Motorway.

Design drawings by Calibre Consulting (provided by Blacktown City Council) show the 1% AEP water level in the basin at RL 61.37m AHD. Storm events greater than the 1% AEP are not included in the available information, however based on a review of the design arrangement of the basin and the constructed overflow level of the basin (set at RL

62.6m AHD) and the defined catchment, the PMF water level is estimated as being below, or in the range of, RL 63.0m to RL 63.5m AHD.

Figure 7.1. Site, Eskdale Creek Basin and Emergency Overland Flow Path

In relation to the trunk drainage system, the design of the system (per Calibre) is based on a design capacity which allows for the 1% AEP design flow (approx. 18m^3/s) and 50% blockage of both inlet pits and the culvert system. The DRAINS hydrologic and hydraulic modelling completed by our office has verified this design condition. The existing overland flow swale (per **Figure 4.3**) provides an emergency flow for events greater than the 1% AEP with 50% blockage.

The DRAINS model layout for the post development conditions is shown as **Figure 7.2** below. The drains modelling shows that the trunk drainage system is able to convey the 1% AEP with 50% blockage, and no overland flow from Eastern Creek Drive. Councils WSUD Handbook 2020 requires assessment of culverts which have the potential for blockage to be assessed based on 50% blockage. This blockage condition has been adopted in the model.

We note that Councils requirements for safe conveyance of flow has been allowed for within the piped culvert system as per the Calibre Design and confirmed through our DRAINS modelling. We note that the provision for emergency overland flow has been allowed for in the design of the facility within the carparking area which is proposed along the southern boundary of the site – refer drawing **Co13003.13-SSDA47** in **Appendix A** and **Figure 7.3** for details. The emergency flow path allows for 4-5m^3/s of flow which is H1 Hazard Categorisation or lower.

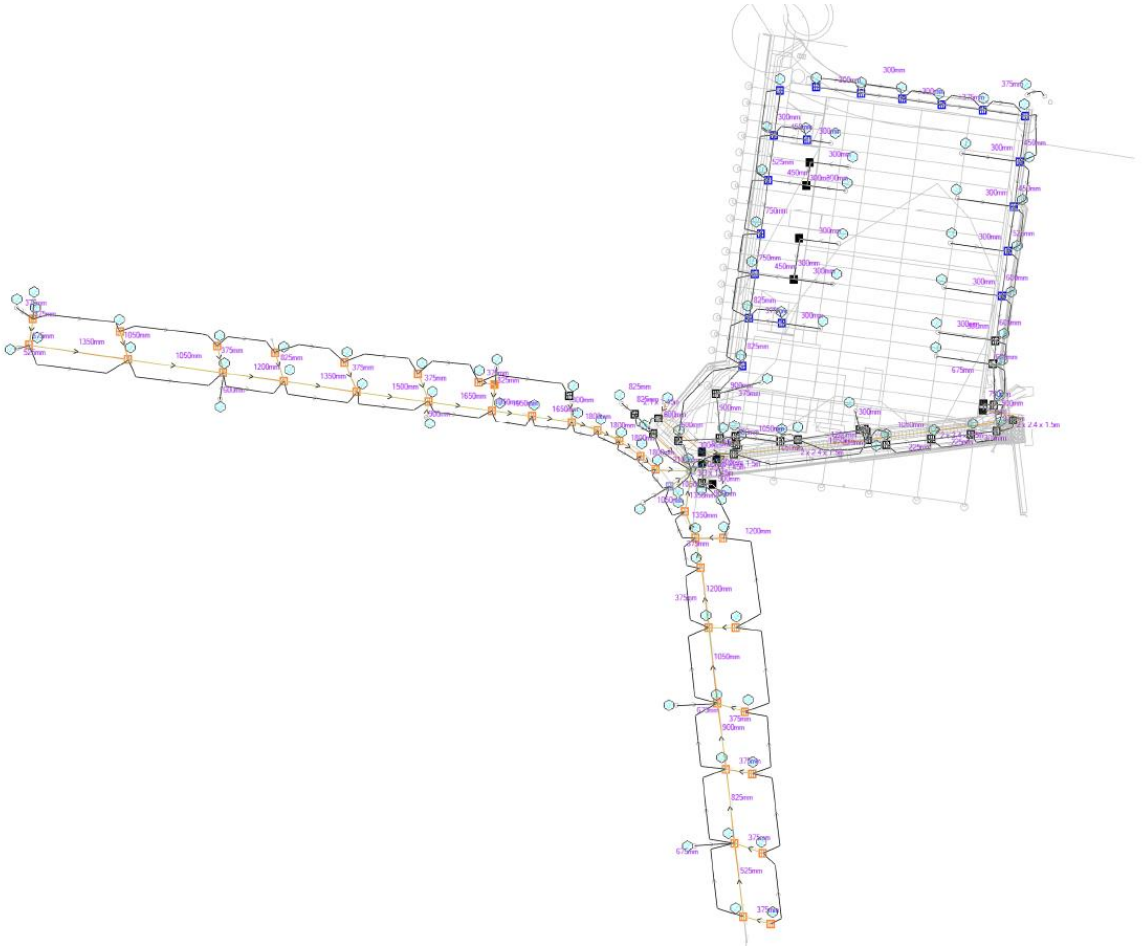


Figure 7.2. DRAINS Model Layout

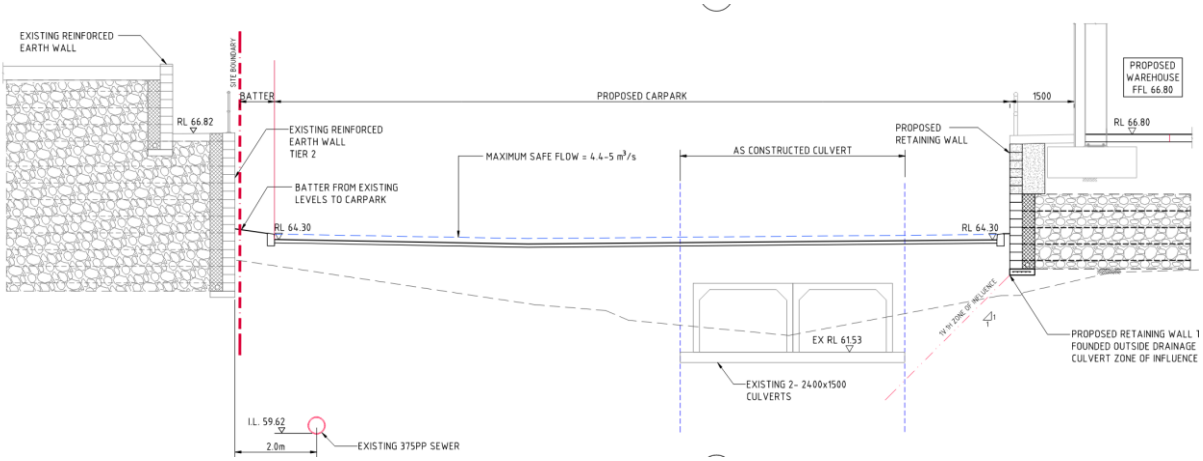


Figure 7.3. Emergency Overland Flow Section (per drawing Co13003.13-SSDA47)

7.4 Council 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.

The flood planning level (FPL) for business/ industrial to be at or above the 1% AEP (1 in 100-year ARI) flood level plus 0.5m freeboard. The FPL for this site is RL 61.87m AHD. We note the proposed building level is RL 66.8m AHD and the lowest level on the site is noted to be RL 64.0m AHD. All levels on the site are noted to be higher than the FPL and the PMF.

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, the site is not subject to mainstream or regional flooding, however trunk drainage and an emergency overland flow path between Eastern Creek Drive and the adjacent Eskdale Creek Catchment Regional Detention System is located on the southern boundary of the site. The overland flow path, as confirmed above is able to safely convey a flow of between 4-5m^3/s, and has the ability to convey flows of much greater capacity. The southern portion of the site is the only part of the site subject to PMF overland flow. Elsewhere the building, office and hardstand are all free from PMF or other overland flow, and able to have onsite refuge during an overland flow event.

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. As noted the site is not impacted by the regional PMF flood event and hence does not impact this event.

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 Council's flood information, the regional detention basin designs, and Eastern Creek Drive culvert system. This information confirms the site is not subject to mainstream regional flooding, however needs to consider the overland flow path from Eastern Creek Drive.

Allowance for conveyance of emergency overland flow (noting the 1% AEP flow with 50% blockage of the culverts is able to be conveyed without overland flow) has been included and assessed as part of the submission.

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**. The Staged ESCP considers initial site establishment, requirements during construction of roads and infrastructure and estate earthworks, completion of estate works and the period between this and development of individual lots.

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 estate and the period between completed of the estate infrastructure works and development of individual lots in the estate as included in the ESCP drawings **Appendix A**.

We note that a more detailed ESCP and Construction Soil and Water Management Plan forms part of the Construction Environmental Management Plan (CEMP) submitted in the EIS and prepared by the Principal Contractor. The measures in **Section 8** of this report will be generally consistent with those of the CEMP.

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 Eastern Creek Drive 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 Eastern Creek Drive, Eastern Creek, 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 Blacktown City Council requirements and ensuring acceptable impacts relating to the development.

The surrounding infrastructure, including the Eskdale Creek Regional Detention System, was designed and constructed provisioning for water quantity management for the surrounding catchment and developed site hydrology. As such the increase in local post development flows from the site will be managed prior to discharge to downstream waterways and 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

- Engineering Guide for Development (2005), Blacktown City Council
- Part J, Development Control Plan (2015), Blacktown City Council
- Water Sensitive Urban Design – Technical Guidelines for Western Sydney (May 2004), URS Australia Pty Ltd
- Stormwater Concept Plan for Stages 2 & 3, Proposed Industrial Subdivision, Old Wallgrove Road, Eastern Creek (2006), Brown Consulting
- 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

STATE SIGNIFICANT DEVELOPMENT APPLICATION
PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE, EASTERN CREEK, NSW, 2766

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C013003.13-SSDA10	DRAWING LIST AND LOCALITY PLAN
C013003.13-SSDA20	EROSION AND SEDIMENT CONTROL PLAN
C013003.13-SSDA25	EROSION AND SEDIMENT CONTROL DETAILS
C013003.13-SSDA30	BULK EARTHWORKS PLAN
C013003.13-SSDA35	BULK EARTHWORKS SECTIONS - SHEET 1
C013003.13-SSDA36	BULK EARTHWORKS SECTIONS - SHEET 2
C013003.13-SSDA40	STORMWATER DRAINAGE KEY PLAN
C013003.13-SSDA41	STORMWATER DRAINAGE PLAN - SHEET 1
C013003.13-SSDA42	STORMWATER DRAINAGE PLAN - SHEET 2
C013003.13-SSDA43	STORMWATER DRAINAGE PLAN - SHEET 3
C013003.13-SSDA44	STORMWATER DRAINAGE PLAN - SHEET 4
C013003.13-SSDA45	STORMWATER DRAINAGE DETAILS - SHEET 1
C013003.13-SSDA46	STORMWATER DRAINAGE DETAILS - SHEET 2
C013003.13-SSDA47	EMERGENCY OVERLAND FLOW PATH PLAN & SECTION
C013003.13-SSDA48	MUSIC CATCHMENT PLAN (F)
C013003.13-SSDA51	FINISHED LEVELS PLAN - SHEET 1
C013003.13-SSDA52	FINISHED LEVELS PLAN - SHEET 2
C013003.13-SSDA53	FINISHED LEVELS PLAN - SHEET 3
C013003.13-SSDA54	FINISHED LEVELS PLAN - SHEET 4
C013003.13-SSDA55	TYPICAL SECTIONS - SHEET 1
C013003.13-SSDA56	TYPICAL SECTIONS - SHEET 2

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 EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	10.02.22	F
ISSUED FOR EIS SUBMISSION	02.12.21	E
ISSUED FOR INFORMATION	01.12.21	D
ISSUED FOR INFORMATION	19.11.21	C
ISSUED FOR INFORMATION	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA10

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 005 606 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: DRAWING LIST & LOCALITY PLAN
DRAWING No: C013003.13-SSDA10
ISSUE: F

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS DATED 13.11.20.

- DENOTES SILT FENCE
- DENOTES DIVERSION DRAIN
- OVERLAND FLOW DIRECTION
- DENOTES SITE BOUNDARY
- STABALISED CONSTRUCTION ENTRANCE

DUST CONTROL NOTES:

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

SEDIMENT CONTROL BASIN NOTES:

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

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.

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C013003.13-SSDA25.

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

APPROXIMATE AREA OF DISTURBED SITE = 4.83ha

SEDIMENT BASIN 1:

CATCHMENT AREA	= 4.83ha
REQUIRED BASIN VOLUME	= 1165m³
BASE DIMENSIONS (L X W)	= 20.0m x 28.0m
TOP DIMENSIONS (L X W)	= 29.0m x 37.0m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.50m
PROVIDED BASIN VOLUME	= 1205m³

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

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

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

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

EASTERN CREEK DRIVE
STABILISED SITE ENTRY REFER TO DRAWING SSDA25 FOR DETAILS
SILT FENCE ONLY
PROVIDE CROSSING OVER DIVERSION DRAIN AS DETAILED ON DRG SSDA25.
KERB INLET PIT PROTECTOR REFER TO DRAWING SSDA25 FOR DETAIL. TYPICAL
DIVERSION DRAIN
SITE BOUNDARY
ALL SITE RUNOFF TO BE DIRECTED TO SEDIMENT BASIN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ON-SITE ADJUSTMENT TO ESC MEASURES ARE MADE & SITE RUNOFF IS DIRECTED TO THE SEDIMENT BASIN.
ONGOING CIVIL EARTHWORKS
LOT 1
4002
DP 1243178
DP 119856
HONEYCOMB DRIVE
PROPOSED EXTENSION OF HONEYCOMB DRIVE
DIVERSION DRAIN REFER TO DETAIL ON DRG SSDA25. PROVIDE NOMINAL 0.5% FALL ON PAD TO DIVERSION DRAIN. TYPICAL
PROVIDE SILT FENCE WITH CATCH DRAIN. REFER TO DETAILS ON DRAWING SSDA25
NOMINAL STOCKPILE LOCATION T.B.C ON SITE
DIVERSION DRAIN REFER TO DETAIL ON DRG SSDA25. PROVIDE NOMINAL 0.5% FALL ON PAD TO DIVERSION DRAIN. TYPICAL
SEDIMENT BASIN REFER TO NOTES
EMERGENCY OVERFLOW WEIR 5.5m WIDE, 150mm DEEP
CLEAN WATER TO BE PUMPED TO EXISTING POND.
EXISTING BASIN
EXISTING BASIN

EROSION AND SEDIMENT CONTROL PLAN
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	02.12.21	C
ISSUED FOR INFORMATION	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

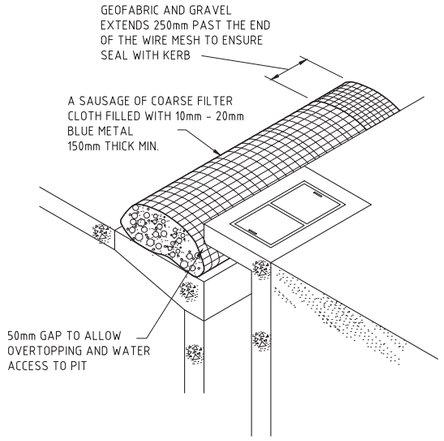
ARCHITECT: [watch this SPACE design]
CLIENT: Charter Hall
PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA 20

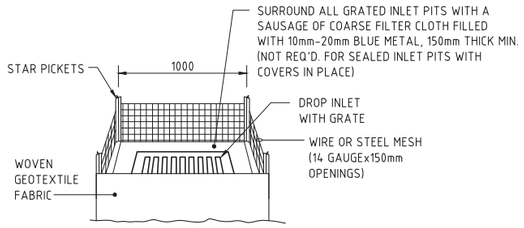
Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 005 496 488
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7600 Fax: (02) 9241-3731
email: mail@costinroe.com.au

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

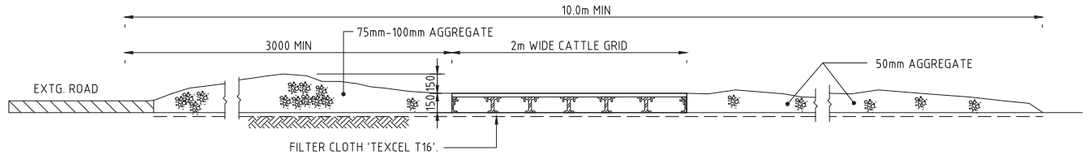
DRAWING TITLE: EROSION AND SEDIMENT CONTROL PLAN
DRAWING No. C013003.13-SSDA20
ISSUE C



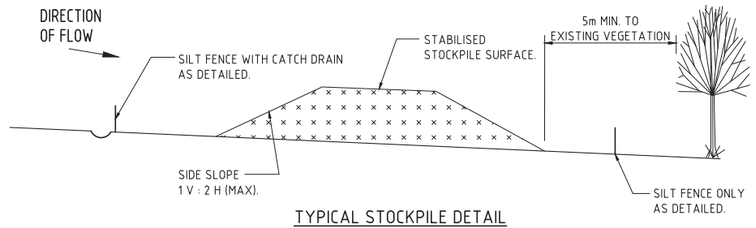
KERB INLET CONTROL
NTS



GRATED INLET PIT FILTER DETAIL
N.T.S



SECTION 1:20 (1 / SSDA20) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'
CAN BE MODIFIED TO INCLUDE A WHEEL BATH

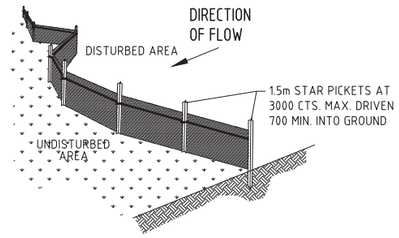


TYPICAL STOCKPILE DETAIL
N.T.S.

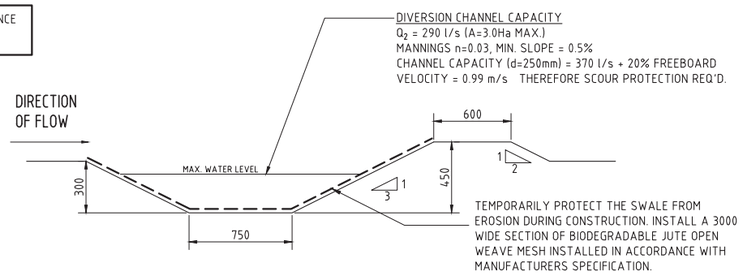
NOTE : ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.

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.

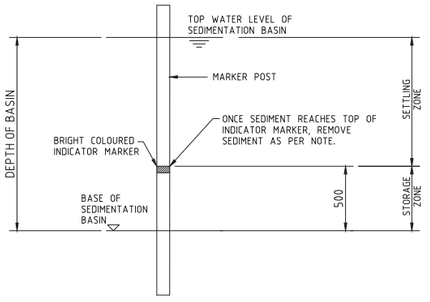


TYPICAL SILT FENCE DETAIL
N.T.S.
PROVIDE 1m RETURNS AT 30m INTERVALS.
TYPICAL



DIVERSION DRAIN SECTION
SCALE 1:20

TYPICAL CROSSING OVER DIVERSION CHANNEL
SCALE 1:20



SEDIMENT STORAGE MARKER
SCALE 1:20

NOTES:

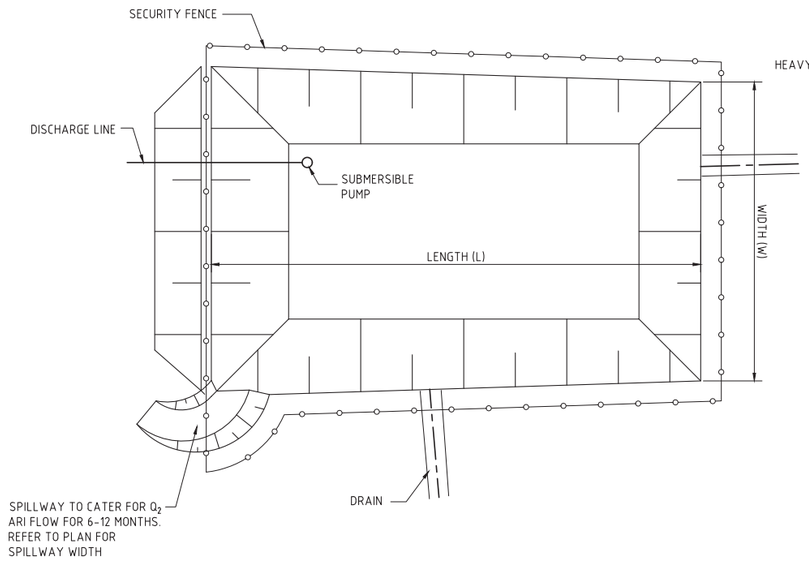
ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.

MINIMISE DISTURBED AREAS.

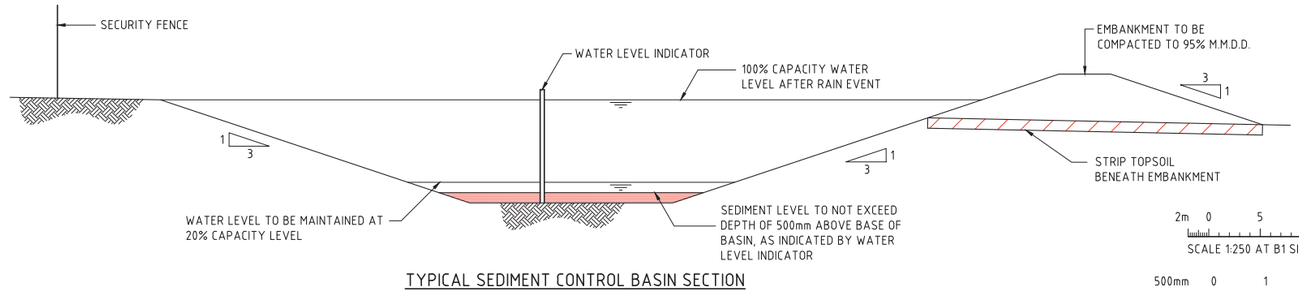
ROADS & FOOTPATHS TO BE SWEPT DAILY.

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 CEMP.



TYPICAL SEDIMENT CONTROL POND PLAN
SCALE 1:250



TYPICAL SEDIMENT CONTROL BASIN SECTION
SCALE 1:50

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

500mm 0 1 2 3 4 5m
SCALE 1:50 AT B1 SIZE SHEET

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	02.12.21	C
ISSUED FOR INFORMATION	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

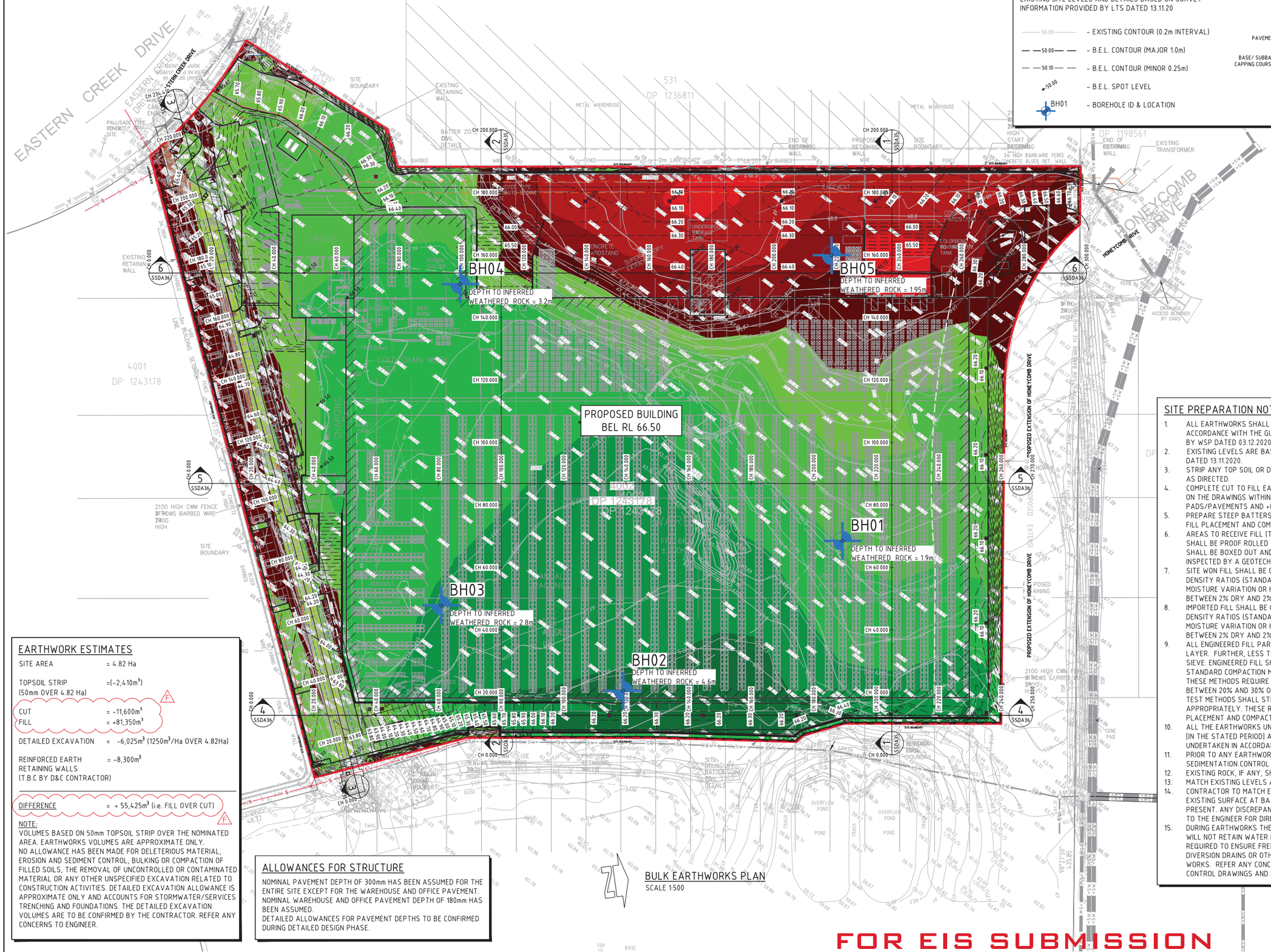
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA 25

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7600 Fax: (02) 9241-3721
email: mail@costinroe.com.au

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
EROSION AND SEDIMENT CONTROL DETAILS

DRAWING No. C013003.13-SSDA25 ISSUE C

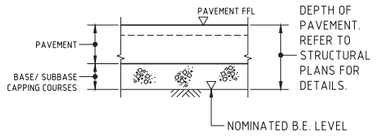


LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS DATED 13.11.20

- 50.00 – EXISTING CONTOUR (0.2m INTERVAL)
- —50.00— – B.E.L. CONTOUR (MAJOR 1.0m)
- —50.10— – B.E.L. CONTOUR (MINOR 0.25m)
- 50.00 – B.E.L. SPOT LEVEL
- BH01 – BOREHOLE ID & LOCATION



DEPTH OF PAVEMENT. REFER TO STRUCTURAL PLANS FOR DETAILS.

NOMINATED B.E.L. DETAIL
NTS

DEPTH RANGE

	No.	FROM DEPTH	TO DEPTH	COLOUR	DEPTH RANGE VOLUME
CUT	1	-3.000	-2.500		0m³
	2	-2.500	-2.000		255m³
	3	-2.000	-1.500		1423m³
	4	-1.500	-1.000		2546m³
	5	-1.000	-0.500		3395m³
	6	-0.500	0.000		4722m³
FILL	7	0.000	0.500		17780m³
	8	0.500	1.000		16265m³
	9	1.000	1.500		14311m³
	10	1.500	2.000		11868m³
	11	2.000	2.500		9006m³
	12	2.500	3.000		6146m³
	13	3.000	3.500		3335m³
	14	3.500	4.000		1483m³
	15	4.000	4.500		432m³
	16	4.500	5.000		19m³
	17	5.000	5.500		0m³

SITE PREPARATION NOTES:

1. ALL EARTHWORKS SHALL BE COMPLETED UNDER LEVEL 1 SUPERVISION GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL REPORT PROVIDED BY WSP DATED 03.12.2020 & 06.09.2021
2. EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY LTS TITLED 5117 001 DT DATED 13.11.2020.
3. STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED.
4. COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
5. PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION.
6. AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
7. SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
8. IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
9. ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 mm SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% RETAINED ON THE 37.5 mm SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 mm SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION
10. ALL THE EARTHWORKS UNDERTAKEN AND THE SUBGRADE CONDITION IN THE CUT AREAS (IN THE STATED PERIOD) ARE DOCUMENTED IN THE REPORTS AND HAVE BEEN UNDERTAKEN IN ACCORDANCE WITH THE SPECIFICATION.
11. PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
12. EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
13. MATCH EXISTING LEVELS AT BATTER INTERFACE.
14. CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.
15. DURING EARTHWORKS THE CONTRACTOR IS TO ENSURE ALL AREAS ARE FREE DRAINING & WILL NOT RETAIN WATER DURING RAINFALL. PROVIDE TEMPORARY MEASURES AS REQUIRED TO ENSURE FREE FLOWING RUNOFF THROUGH MANAGED DRAINAGE PATHS, DIVERSION DRAINS OR OTHER SUITABLE DISPOSAL METHOD AS AGREED DURING THE WORKS. REFER ANY CONCERNS TO THE ENGINEER. REFER TO EROSION AND SEDIMENT CONTROL DRAWINGS AND NOTES.

EARTHWORK ESTIMATES

SITE AREA	= 4.82 Ha
TOPSOIL STRIP (50mm OVER 4.82 Ha)	=(-2,410m³)
CUT	= -11,600m³
FILL	= +81,350m³
DETAILED EXCAVATION	= -6,025m³ (1250m³/Ha OVER 4.82Ha)
REINFORCED EARTH RETAINING WALLS (T.B.C BY D&C CONTRACTOR)	= -8,300m³
DIFFERENCE	= + 55,425m³ (i.e. FILL OVER CUT)

NOTE:
VOLUMES BASED ON 50mm TOPSOIL STRIP OVER THE NOMINATED AREA. EARTHWORKS VOLUMES ARE APPROXIMATE ONLY.
NO ALLOWANCE HAS BEEN MADE FOR DELETERIOUS MATERIAL, EROSION AND SEDIMENT CONTROL, BULKING OR COMPACTION OF FILLED SOILS, THE REMOVAL OF UNCONTROLLED OR CONTAMINATED MATERIAL OR ANY OTHER UNSPECIFIED EXCAVATION RELATED TO CONSTRUCTION ACTIVITIES. DETAILED EXCAVATION ALLOWANCE IS APPROXIMATE ONLY AND ACCOUNTS FOR STORMWATER/SERVICES TRENCHING AND FOUNDATIONS. THE DETAILED EXCAVATION VOLUMES ARE TO BE CONFIRMED BY THE CONTRACTOR. REFER ANY CONCERNS TO ENGINEER.

ALLOWANCES FOR STRUCTURE

NOMINAL PAVEMENT DEPTH OF 300mm HAS BEEN ASSUMED FOR THE ENTIRE SITE EXCEPT FOR THE WAREHOUSE AND OFFICE PAVEMENT.
NOMINAL WAREHOUSE AND OFFICE PAVEMENT DEPTH OF 180mm HAS BEEN ASSUMED.
DETAILED ALLOWANCES FOR PAVEMENT DEPTHS TO BE CONFIRMED DURING DETAILED DESIGN PHASE.

BULK EARTHWORKS PLAN
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	10.02.22	F
ISSUED FOR EIS SUBMISSION	07.12.21	E
ISSUED FOR EIS SUBMISSION	02.12.21	D
ISSUED FOR INFORMATION	01.12.21	C
ISSUED FOR INFORMATION	29.11.21	B
ISSUED FOR INFORMATION	19.11.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT '21		B1	AS SHOWN	C013003.13-SSDA 30

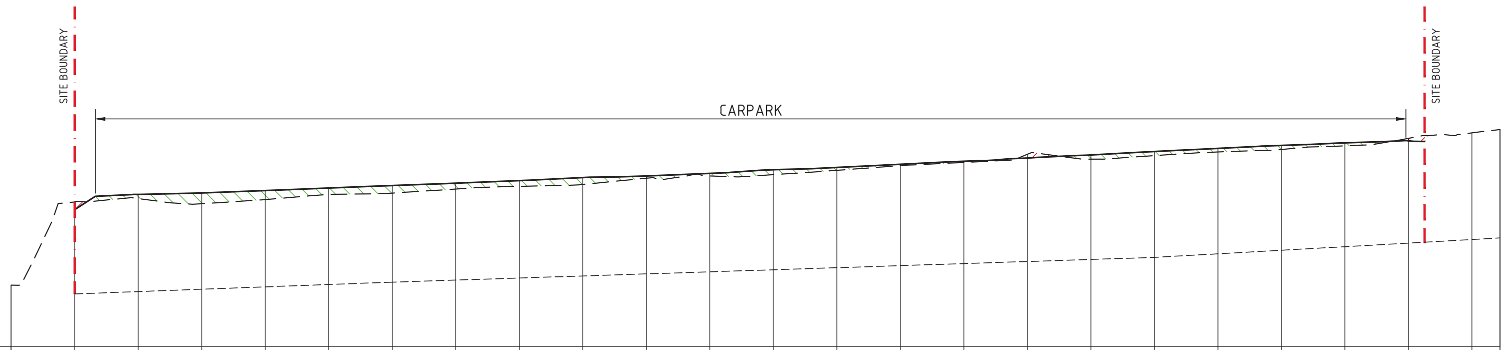
Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: BULK EARTHWORKS PLAN

DRAWING No: C013003.13-SSDA30 ISSUE: F

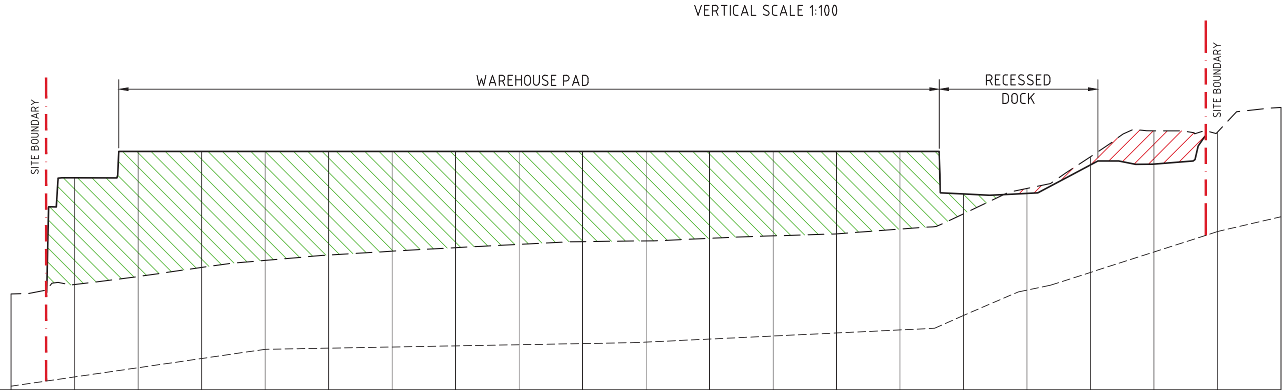


DATUM 59.00

CUT/FILL DEPTH			0.132	0.336	0.282	0.203	0.237	0.185	0.181	0.215	0.073	0.084	0.155	0.091	0.043	0.036	-0.120	0.133	0.128	0.113	0.127	0.094	-0.078		
BULK EARTHWORKS LEVEL			63.781	63.825	63.902	63.981	64.058	64.134	64.214	64.309	64.362	64.443	64.556	64.628	64.728	64.821	64.923	65.022	65.127	65.228	65.319	65.400	65.466		
EXISTING SURFACE LEVEL	60.93	63.545	63.649	63.489	63.619	63.777	63.822	63.949	64.033	64.094	64.289	64.359	64.401	64.538	64.685	64.786	65.043	64.889	65.000	65.115	65.192	65.306	65.544	65.715	65.82
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	234.410

SECTION 3

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

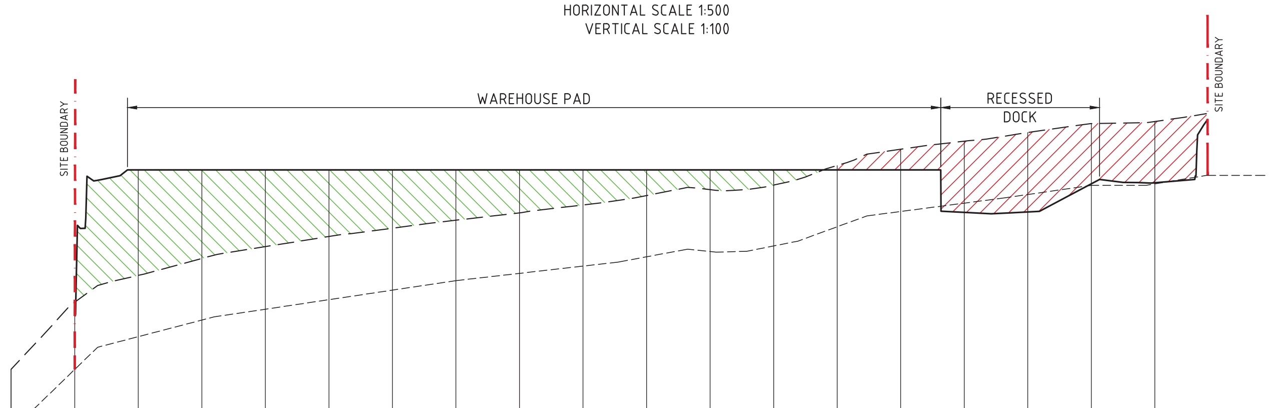


DATUM 59.00

CUT/FILL DEPTH		3.360	3.937	3.651	3.428	3.261	3.139	3.029	2.923	2.838	2.815	2.734	2.657	2.594	2.444	0.625	-0.156	-0.257	-1.050		
BULK EARTHWORKS LEVEL		65.672	66.500	66.499	66.499	66.499	66.499	66.499	66.499	66.499	66.500	66.500	66.500	66.500	66.500	65.163	65.180	66.075	66.100		
EXISTING SURFACE LEVEL	62.01	62.312	62.563	62.848	63.071	63.239	63.361	63.471	63.576	63.662	63.685	63.765	63.842	63.906	64.056	64.537	65.336	66.333	67.150	67.107	67.89
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000

SECTION 2

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



DATUM 59.00

CUT/FILL DEPTH			3.317	2.785	2.413	2.093	1.833	1.582	1.351	1.103	0.807	0.622	0.480	-0.138	-0.650	-2.239	-2.497	-1.893	-1.925		
BULK EARTHWORKS LEVEL			66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	65.163	65.179	66.063	66.096		
EXISTING SURFACE LEVEL	60.23	62.342	63.183	63.715	64.087	64.407	64.667	64.918	65.149	65.397	65.693	65.878	66.020	66.638	67.150	67.403	67.676	67.956	68.021		
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000

SECTION 1

HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

LEGEND:

- DENOTES BULK EARTHWORKS PROFILE
- DENOTES EXISTING PROFILE
- DENOTES INFERRED WEATHERED ROCK PROFILE
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	10.02.22	E
ISSUED FOR EIS SUBMISSION	02.12.21	D
ISSUED FOR INFORMATION	01.12.21	C
ISSUED FOR INFORMATION	29.11.21	B
ISSUED FOR INFORMATION	19.11.21	A

AMENDMENTS	DATE	ISSUE

ARCHITECT
[watch this SPACE design]

CLIENT
Charter Hall

PROJECT
PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

CONSULT AUSTRALIA

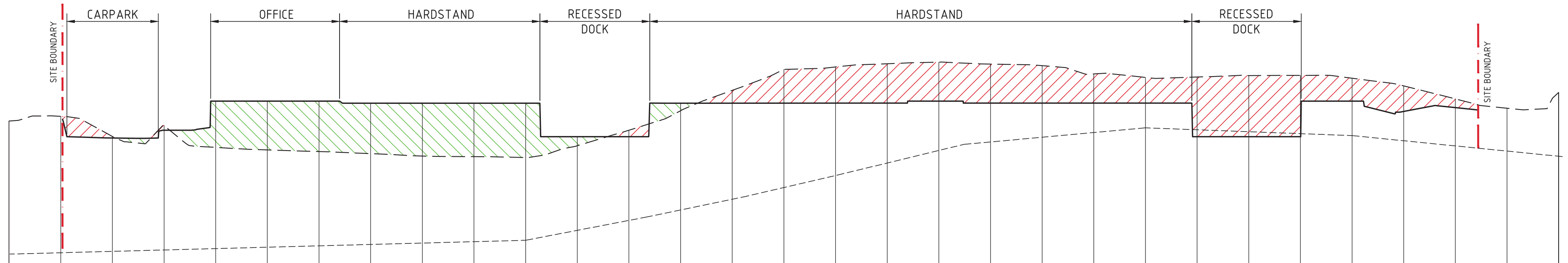
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA35

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
BULK EARTHWORKS SECTIONS
SHEET 1

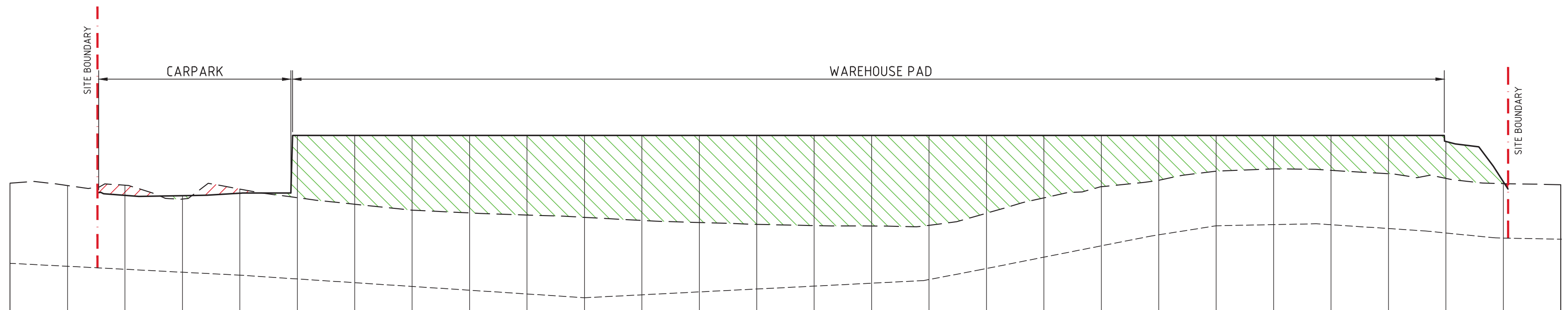
DRAWING No C013003.13-SSDA35
ISSUE E



DATUM 60.00

	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000
CUT/FILL DEPTH			-0.061	-0.181	1.791	1.889	1.952	1.952	2.045	2.069	2.103	0.349	-0.249	0.294	-0.495	-1.307	-1.398	-1.523	-1.505	-1.509	-1.449	-1.131	-0.995	-2.308	-2.365	-2.373	-0.884	-0.987	-0.337		
BULK EARTHWORKS LEVEL			65.071	65.372	66.500	66.500	66.500	66.420	66.420	66.420	66.420	65.122	65.122	66.420	66.420	66.420	66.420	66.420	66.500	66.421	66.421	66.421	66.421	65.121	65.121	65.122	66.500	66.102	66.247		
EXISTING SURFACE LEVEL	65.73	65.909	65.132	65.553	64.709	64.611	64.548	64.467	64.375	64.351	64.317	64.773	65.371	66.126	66.915	67.727	67.818	67.944	68.005	67.930	67.870	67.551	67.416	67.430	67.487	67.495	67.384	67.089	66.584	66.225	66.83
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000	280.000	290.000	300.000

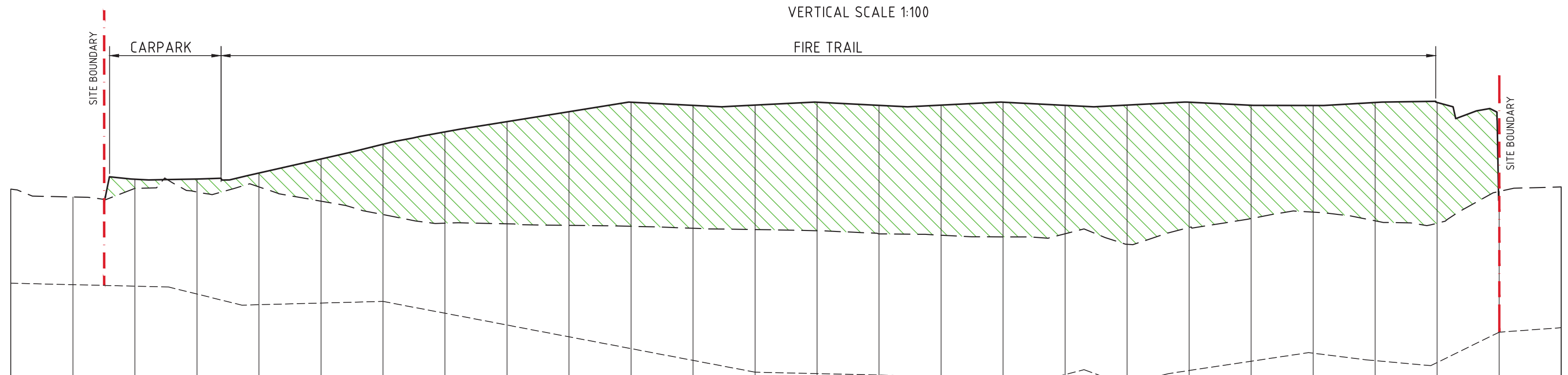
SECTION 6
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



DATUM 60.00

	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000
CUT/FILL DEPTH			-0.352	0.117	-0.144	2.169	2.397	2.601	2.699	2.773	2.854	2.962	3.034	3.098	3.141	3.156	3.133	2.711	2.176	1.788	1.562	1.248	1.167	1.216	1.333	1.285	0.066	
BULK EARTHWORKS LEVEL			64.413	64.400	64.487	66.499	66.499	66.499	66.499	66.499	66.499	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.500	66.288	64.886	
EXISTING SURFACE LEVEL	64.84	64.753	64.765	64.283	64.631	64.331	64.102	63.898	63.800	63.727	63.646	63.537	63.466	63.401	63.359	63.344	63.367	63.789	64.324	64.712	64.938	65.252	65.333	65.284	65.167	65.004	64.820	64.78
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000	260.000	270.000

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



DATUM 57.00

	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000
CUT/FILL DEPTH			0.300	0.416	0.446	1.359	2.267	2.943	3.294	3.665	4.001	3.964	4.012	4.142	4.144	4.194	4.341	4.142	4.487	4.038	3.649	3.441	3.813	3.893	-0.288	
BULK EARTHWORKS LEVEL			63.815	63.820	64.013	64.466	64.941	65.339	65.670	65.991	66.296	66.196	66.204	66.296	66.196	66.204	66.296	66.196	66.205	66.297	66.197	66.192	66.287	66.288	63.131	
EXISTING SURFACE LEVEL	63.50	63.241	63.515	63.403	63.567	63.107	62.674	62.396	62.377	62.326	62.296	62.232	62.192	62.154	62.052	62.010	61.956	62.055	61.718	62.259	62.547	62.752	62.474	62.395	63.420	63.56
CHAINAGE	0.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	130.000	140.000	150.000	160.000	170.000	180.000	190.000	200.000	210.000	220.000	230.000	240.000	250.000

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

LEGEND:

- DENOTES BULK EARTHWORKS PROFILE
- DENOTES EXISTING PROFILE
- DENOTES INFERRED WEATHERED ROCK PROFILE
- DENOTES AREA IN CUT
- DENOTES AREA IN FILL

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	11.02.22	E
ISSUED FOR EIS SUBMISSION	02.12.21	D
ISSUED FOR INFORMATION	01.12.21	C
ISSUED FOR INFORMATION	29.11.21	B
ISSUED FOR INFORMATION	19.11.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

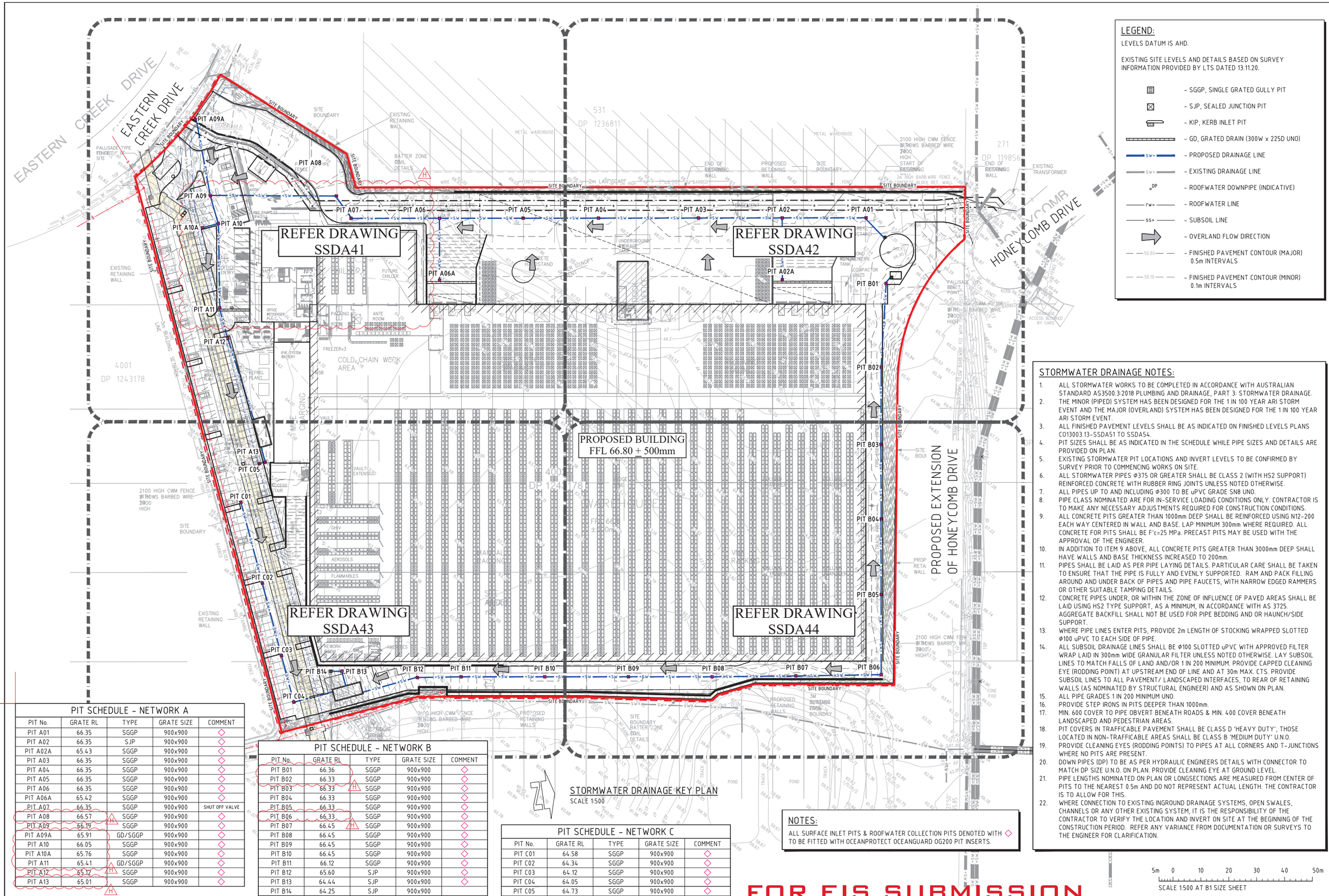
PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA36

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: BULK EARTHWORKS SECTIONS SHEET 2
DRAWING No: C013003.13-SSDA36
ISSUE: E



LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LTS DATED 13.11.20.

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

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 100 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS C013003.13-SSDA51 TO SSDA54.
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 Φ375 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 Φ300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c=25 MPa. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 9 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
13. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Φ100 uPVC TO EACH SIDE OF PIPE.
14. ALL SUBSOIL DRAINAGE LINES SHALL BE Φ100 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	66.35	SGGP	900x900	◇
PIT A02	66.35	SJP	900x900	◇
PIT A02A	65.43	SGGP	900x900	◇
PIT A03	66.35	SGGP	900x900	◇
PIT A04	66.35	SGGP	900x900	◇
PIT A05	66.35	SGGP	900x900	◇
PIT A06	66.35	SGGP	900x900	◇
PIT A06A	65.42	SGGP	900x900	◇
PIT A07	66.35	SGGP	900x900	SHUT OFF VALVE
PIT A08	66.57	SGGP	900x900	◇
PIT A09	66.19	SGGP	900x900	◇
PIT A09A	65.91	GD/SGGP	900x900	◇
PIT A10	66.05	SGGP	900x900	◇
PIT A10A	65.76	SGGP	900x900	◇
PIT A11	65.41	GD/SGGP	900x900	◇
PIT A12	65.12	SGGP	900x900	◇
PIT A13	65.01	SGGP	900x900	◇

PIT SCHEDULE - NETWORK B

PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT B01	66.36	SGGP	900x900	◇
PIT B02	66.33	SGGP	900x900	◇
PIT B03	66.33	SGGP	900x900	◇
PIT B04	66.33	SGGP	900x900	◇
PIT B05	66.33	SGGP	900x900	◇
PIT B06	66.33	SGGP	900x900	◇
PIT B07	66.45	SGGP	900x900	◇
PIT B08	66.45	SGGP	900x900	◇
PIT B09	66.45	SGGP	900x900	◇
PIT B10	66.45	SGGP	900x900	◇
PIT B11	66.12	SGGP	900x900	◇
PIT B12	65.60	SJP	900x900	◇
PIT B13	64.44	SJP	900x900	◇
PIT B14	64.25	SJP	900x900	

PIT SCHEDULE - NETWORK C

PIT No.	GRATE RL	TYPE	GRATE SIZE	COMMENT
PIT C01	64.58	SGGP	900x900	◇
PIT C02	64.34	SGGP	900x900	◇
PIT C03	64.12	SGGP	900x900	◇
PIT C04	64.05	SGGP	900x900	◇
PIT C05	64.73	SGGP	900x900	◇

STORMWATER DRAINAGE KEY PLAN
SCALE 1:500

NOTES:
ALL SURFACE INLET PITS & ROOFWATER COLLECTION PITS DENOTED WITH ◇ TO BE FITTED WITH OCEANPROTECT OCEANGUARD OG200 PIT INSERTS.

5m 0 10 20 30 40 50m
SCALE 1:500 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	02.12.21	F
ISSUED FOR INFORMATION	01.12.21	E
ISSUED FOR INFORMATION	29.11.21	D
ISSUED FOR INFORMATION	19.11.21	C
REVISED FOR UPDATED ARCHITECTURALS	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	10.02.22	H
ISSUED FOR EIS SUBMISSION	07.12.21	G

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

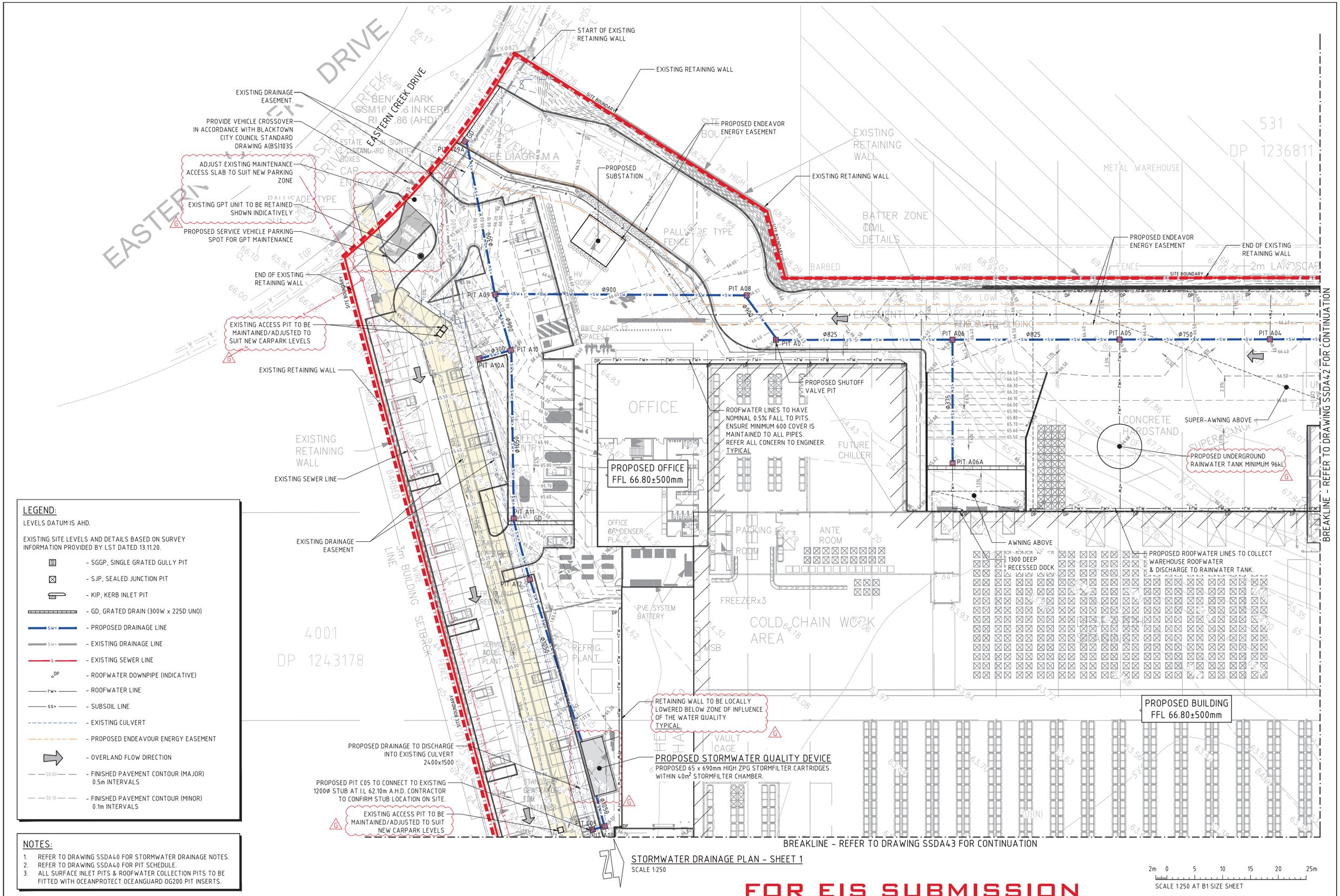
PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT '21		B1	AS SHOWN	C013003.13-SSDA 40

Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: STORMWATER DRAINAGE KEY PLAN
DRAWING No: C013003.13-SSDA40
ISSUE: H



LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LST DATED 13.11.20.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- sw> – PROPOSED DRAINAGE LINE
- sw> – EXISTING DRAINAGE LINE
- s – EXISTING SEWER LINE
- DP – ROOFWATER DOWNPIPE (INDICATIVE)
- rw> – ROOFWATER LINE
- ss> – SUBSOIL LINE
- EXISTING CULVERT
- PROPOSED ENDEAVOUR ENERGY EASEMENT
- OVERLAND FLOW DIRECTION
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

NOTES:

1. REFER TO DRAWING SSDA40 FOR STORMWATER DRAINAGE NOTES.
2. REFER TO DRAWING SSDA40 FOR PIT SCHEDULE.
3. ALL SURFACE INLET PITS & ROOFWATER COLLECTION PITS TO BE FITTED WITH OCEANPROTECT OCEANGUARD OG200 PIT INSERTS.

STORMWATER DRAINAGE PLAN - SHEET 1

SCALE 1:250

2m 0 5 10 15 20 25m

SCALE 1:250 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	02.12.21	F
ISSUED FOR INFORMATION	01.12.21	E
ISSUED FOR INFORMATION	29.11.21	D
ISSUED FOR INFORMATION	19.11.21	C
REVISED FOR UPDATED ARCHITECTURALS	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A
ISSUED FOR EIS SUBMISSION	10.02.22	G

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA41

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 085 406 445
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7600 Fax: (02) 9241-3721
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: STORMWATER DRAINAGE PLAN SHEET 1

DRAWING No: C013003.13-SSDA41 ISSUE: G

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LST DATED 13.11.20.

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

NOTES:

1. REFER TO DRAWING SSDA40 FOR STORMWATER DRAINAGE NOTES.
2. REFER TO DRAWING SSDA40 FOR PIT SCHEDULE.
3. ALL SURFACE INLET PITS & ROOFWATER COLLECTION PITS TO BE FITTED WITH OCEANPROTECT OCEANGUARD OG200 PIT INSERTS.

ROOFWATER LINES TO HAVE NOMINAL 0.5% FALL TO PITS. ENSURE MINIMUM 600 COVER IS MAINTAINED TO ALL PIPES. REFER ALL CONCERN TO ENGINEER. TYPICAL

PROPOSED ENDEAVOR ENERGY EASEMENT

END OF EXISTING RETAINING WALL

PROPOSED RETAINING WALL

START OF EXISTING RETAINING WALL

EXISTING RETAINING WALL

END OF EXISTING RETAINING WALL

EXISTING DRAINAGE PIT TO BE RETAINED

SUPER-AWNING ABOVE

PROPOSED UNDERGROUND RAINWATER TANK MINIMUM 96kL

PROPOSED DOCK OFFICE FFL 66.80

AWNING ABOVE

PROVIDE AERIAL LINES TO COLLECT WAREHOUSE ROOFWATER & DISCHARGE TO RAINWATER TANK.

1300 DEEP RECESSED DOCK

PROPOSED BUILDING FFL 66.80±500mm

CONVERT EXISTING KERB INLET PIT TO CLASS D BUTTERFLY GRATE AND MAKE GOOD. EXISTING CAPACITY = 0.136m³/s, PROPOSED CAPACITY = 0.152m³/s, ALLOWING FOR 50% BLOCKAGE.

PROPOSED SPRINKLER TANK MINIMUM. RL 66.80m A.H.D.

PROPOSED PUMP ROOM RL 66.80m A.H.D.

PROVIDE MAX 1V:3H BATTER TO HONEYCOMB DRIVE EXTENSION. FINAL BATTER ARRANGEMENT TO BE CONFIRMED IN CONJUNCTION WITH THE FUTURE HONEYCOMB ROAD EXTENSION DESIGN AND DETAILS, SUBJECT TO TIMING OF HONEYCOMB DRIVE TYPICAL

PROPOSED EXTENSION OF HONEYCOMB DRIVE

HONEYCOMB DRIVE

SITE BOUNDARY

BREAKLINE - REFER TO DRAWING SSDA41 FOR CONTINUATION

BREAKLINE - REFER TO DRAWING SSDA44 FOR CONTINUATION

STORMWATER DRAINAGE PLAN - SHEET 2

SCALE 1:250

2m 0 5 10 15 20 25m

SCALE 1:250 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	07.12.21	F
ISSUED FOR EIS SUBMISSION	02.12.21	E
ISSUED FOR INFORMATION	29.11.21	D
ISSUED FOR INFORMATION	19.11.21	C
REVISED FOR UPDATED ARCHITECTURALS	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A
ISSUED FOR EIS SUBMISSION	10.02.22	G

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA42

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: STORMWATER DRAINAGE PLAN SHEET 2

DRAWING No: C013003.13-SSDA42 ISSUE: G

LEGEND:

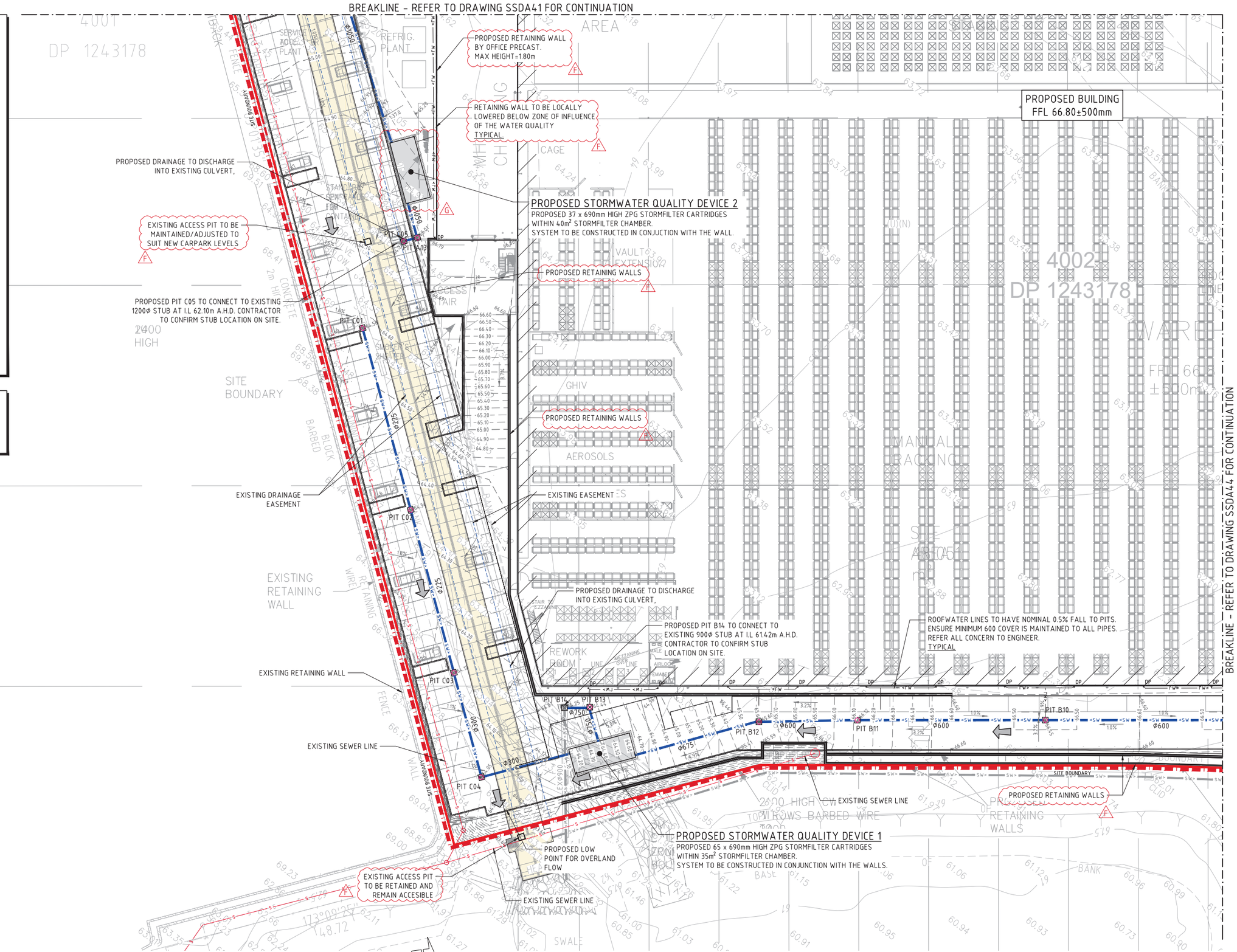
LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LST DATED 13.11.20.

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

NOTES:

1. REFER TO DRAWING SSDA40 FOR STORMWATER DRAINAGE NOTES.
2. REFER TO DRAWING SSDA40 FOR PIT SCHEDULE.
3. ALL SURFACE INLET PITS & ROOFWATER COLLECTION PITS TO BE FITTED WITH OCEANPROTECT OCEANGUARD OG200 PIT INSERTS.



STORMWATER DRAINAGE PLAN - SHEET 3

SCALE 1:250

2m 0 5 10 15 20 25m

SCALE 1:250 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	10.02.22	F
ISSUED FOR EIS SUBMISSION	02.12.21	E
ISSUED FOR INFORMATION	29.11.21	D
ISSUED FOR INFORMATION	19.11.21	C
REVISED FOR UPDATED ARCHITECTURALS	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT '21		B1	AS SHOWN	C013003.13-SSDA43

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 698 660
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: STORMWATER DRAINAGE PLAN SHEET 3

DRAWING No: C013003.13-SSDA43 ISSUE: F

BREAKLINE - REFER TO DRAWING SSDA42 FOR CONTINUATION

BREAKLINE - REFER TO DRAWING SSDA43 FOR CONTINUATION

PROPOSED BUILDING
FFL 66.80±500mm

4002
DP 1243178

WAREHOUSE
FFL 66.8
±500mm

PIT B02
PIT B03
PIT B04
PIT B05
PIT B06
PIT B07
PIT B08
PIT B09
PIT B10

SITE BOUNDARY

PROPOSED EXTENSION OF HONEYCOMB DRIVE

PROVIDE MAX 1V:3H BATTER TO HONEYCOMB DRIVE EXTENSION. FINAL BATTER ARRANGEMENT TO BE CONFIRMED IN CONJUNCTION WITH THE FUTURE HONEYCOMB ROAD EXTENSION DESIGN AND DETAILS, SUBJECT TO TIMING OF HONEYCOMB DRIVE
TYPICAL

PROVIDE MAX 1V:3H BATTER TO PROPOSED RETAINING WALL

PROPOSED RETAINING WALL

EXISTING EASEMENT

ROOFWATER LINES TO HAVE NOMINAL 0.5% FALL TO PITS. ENSURE MINIMUM 600 COVER IS MAINTAINED TO ALL PIPES. REFER ALL CONCERN TO ENGINEER.
TYPICAL

FINAL ARRANGEMENT AT BOUNDARY TO BE CONFIRMED IN CONJUNCTION WITH THE FUTURE HONEYCOMB ROAD EXTENSION DESIGN AND DETAILS, SUBJECT TO TIMING OF HONEYCOMB DRIVE.
TYPICAL.

PIPE AND PITS B06 TO B12 TO BE INSTALLED IN CONJUNCTION WITH RETAINING WALL CONSTRUCTION.

PROPOSED RETAINING WALLS

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LST DATED 13.11.20.

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

NOTES:

1. REFER TO DRAWING SSDA40 FOR STORMWATER DRAINAGE NOTES.
2. REFER TO DRAWING SSDA40 FOR PIT SCHEDULE.
3. ALL SURFACE INLET PITS & ROOFWATER COLLECTION PITS TO BE FITTED WITH OCEANPROTECT OCEANGUARD OG200 PIT INSERTS.

FINISHED LEVELS PLAN - SHEET 4

SCALE 1:250

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	10.02.22	F
ISSUED FOR EIS SUBMISSION	02.12.21	E
ISSUED FOR INFORMATION	29.11.21	D
ISSUED FOR INFORMATION	19.11.21	C
REVISED FOR UPDATED ARCHITECTURALS	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

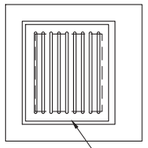
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT '21		B1	AS SHOWN	C013003.13-SSDA44

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 005 486 440
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

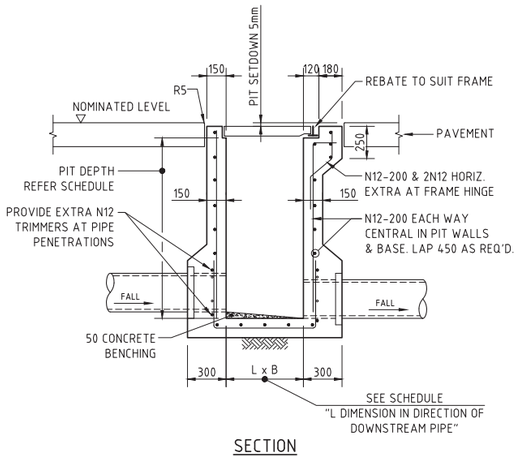
Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: STORMWATER DRAINAGE PLAN SHEET 4

DRAWING No: C013003.13-SSDA44 ISSUE: F

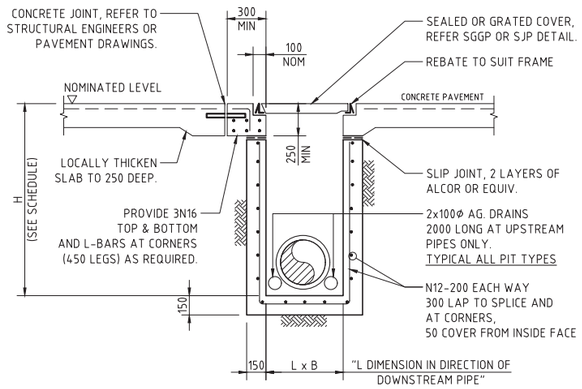


PLAN
SCALE 1:20



SECTION
SCALE 1:20

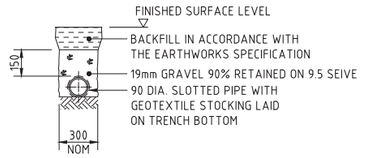
SINGLE GRATED GULLY PIT - SGGP



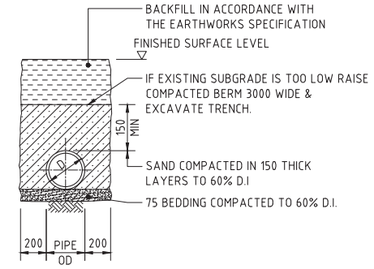
SECTION
SCALE 1:20

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

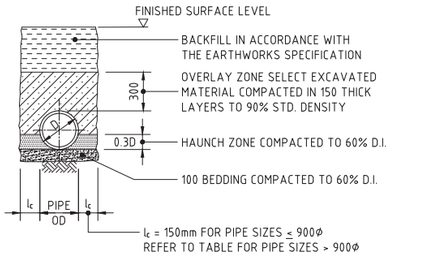
(ADOPT IN CONCRETE PAVEMENT FOR SGGP's & SJP's,
WHERE PITS ARE LOCATED IN THE CORNER OF SLAB
PANELS OR ADJACENT TO SLAB PANEL JOINTS)



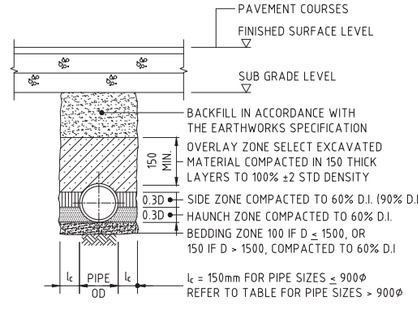
SUPPORT TO AGRICULTURAL DRAIN
SCALE 1:20



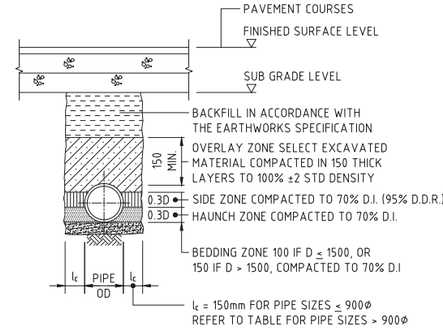
SUPPORT TO uPVC PIPES
SCALE 1:20



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

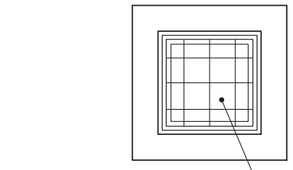


TYPE HS3 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT
SCALE 1:20
D ≤ 1050, MAX FILL = 6.0m
D > 1050, MAX FILL = 4.8m

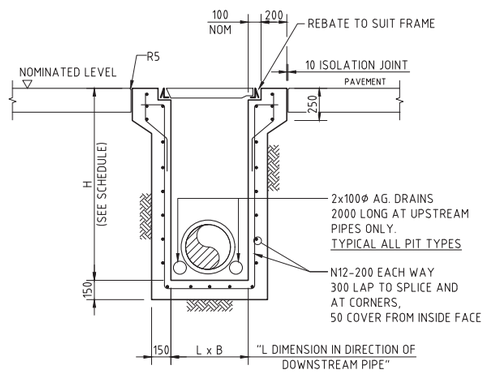
BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE (mm)	WEIGHT PASSING (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 50
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE WIDTH	
PIPE SIZE (mm)	l_c (mm)
≤ 900Ø	150
1050Ø	175
1200Ø	200
1350Ø	225
1500Ø	250
1650Ø	275
1800Ø	300
ENGINEER TO SPECIFY TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800Ø	

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	

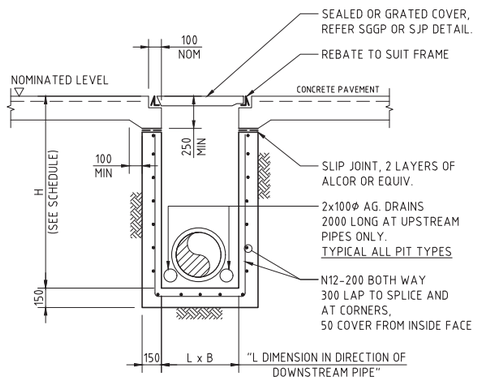


PLAN
SCALE 1:20



SECTION
SCALE 1:20

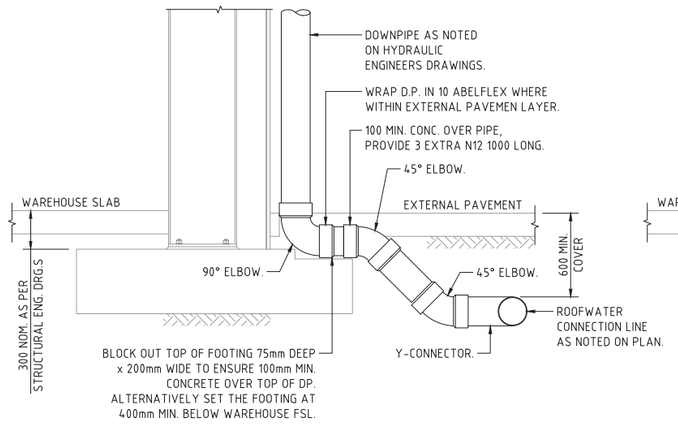
SEALED PIT - SJP



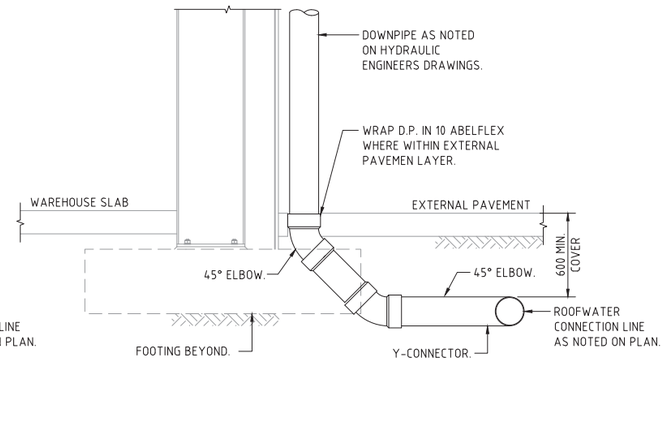
SECTION
SCALE 1:20

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

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



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



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

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	02.12.21	C
ISSUED FOR INFORMATION	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

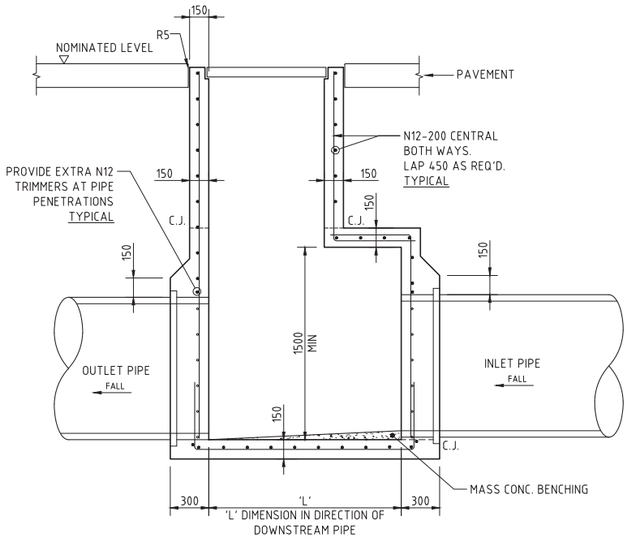
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA 45

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 494 440
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7099 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

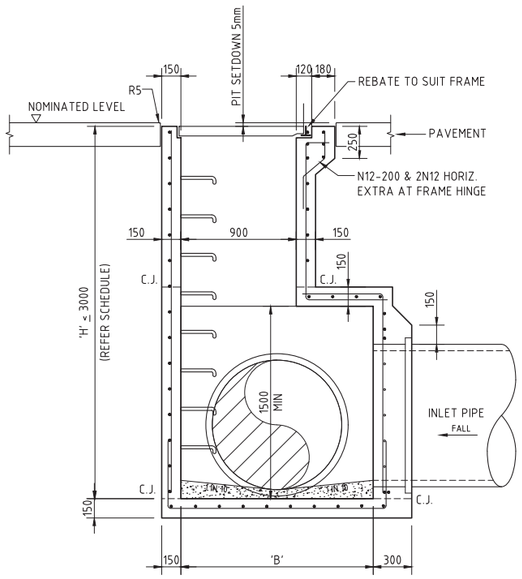
Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: STORMWATER DRAINAGE DETAILS SHEET 1

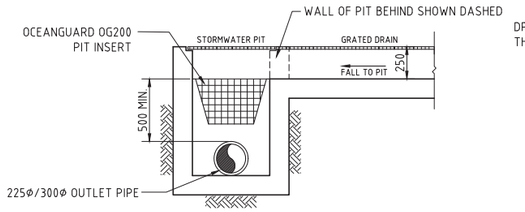
DRAWING No: C013003.13-SSDA45 ISSUE: C



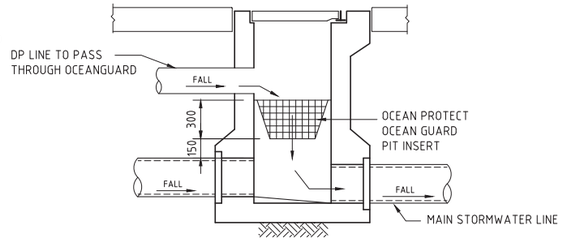
LONG SECTION
SCALE 1:20



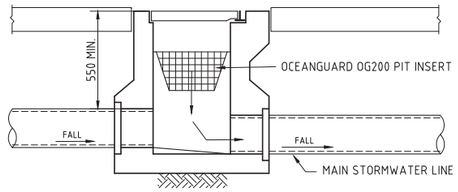
CROSS SECTION
SCALE 1:20



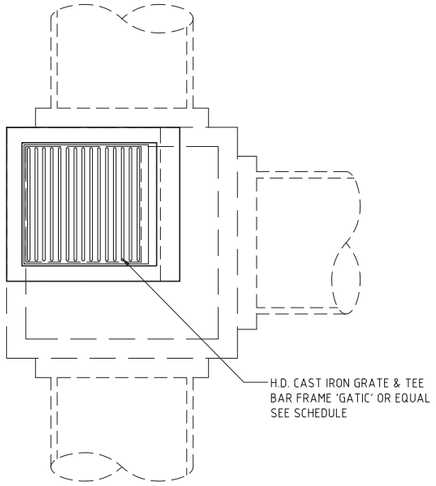
GRATED DRAIN/STORMWATER PIT WITH
OCEANGUARD CONFIGURATION
SCALE 1:20



ROOFWATER/STORMWATER PIT WITH
OCEANGUARD CONFIGURATION
SCALE 1:20



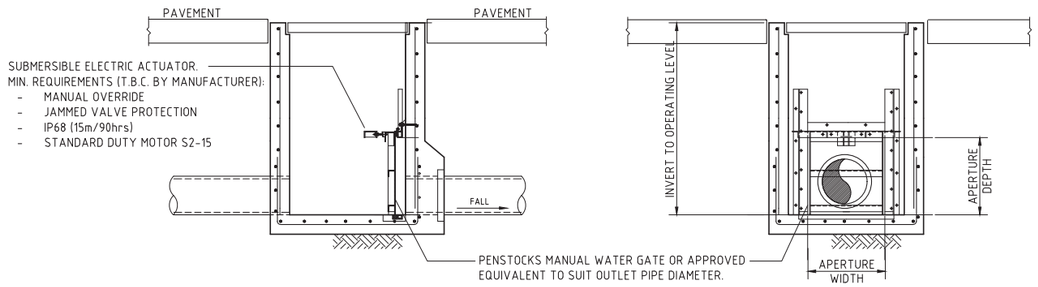
STORMWATER PIT WITH OCEANGUARD
CONFIGURATION
SCALE 1:20



PLAN
SCALE 1:20

TAPERED SINGLE GRATED GULLY PIT - SGGP

SUBSOIL NOT SHOWN
FOR CLARITY



LONG SECTION.
SCALE 1:20

CROSS SECTION.
SCALE 1:20

SHUTOFF VALVE PIT

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	02.12.21	D
ISSUED FOR INFORMATION	19.11.21	C
ISSUED FOR INFORMATION	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

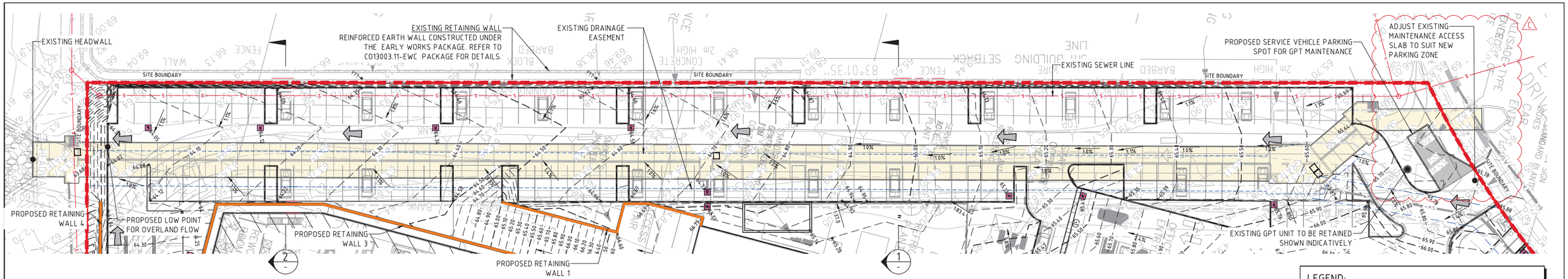
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA 46

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 6 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting
PRECISION | COMMUNICATION | ACCOUNTABILITY

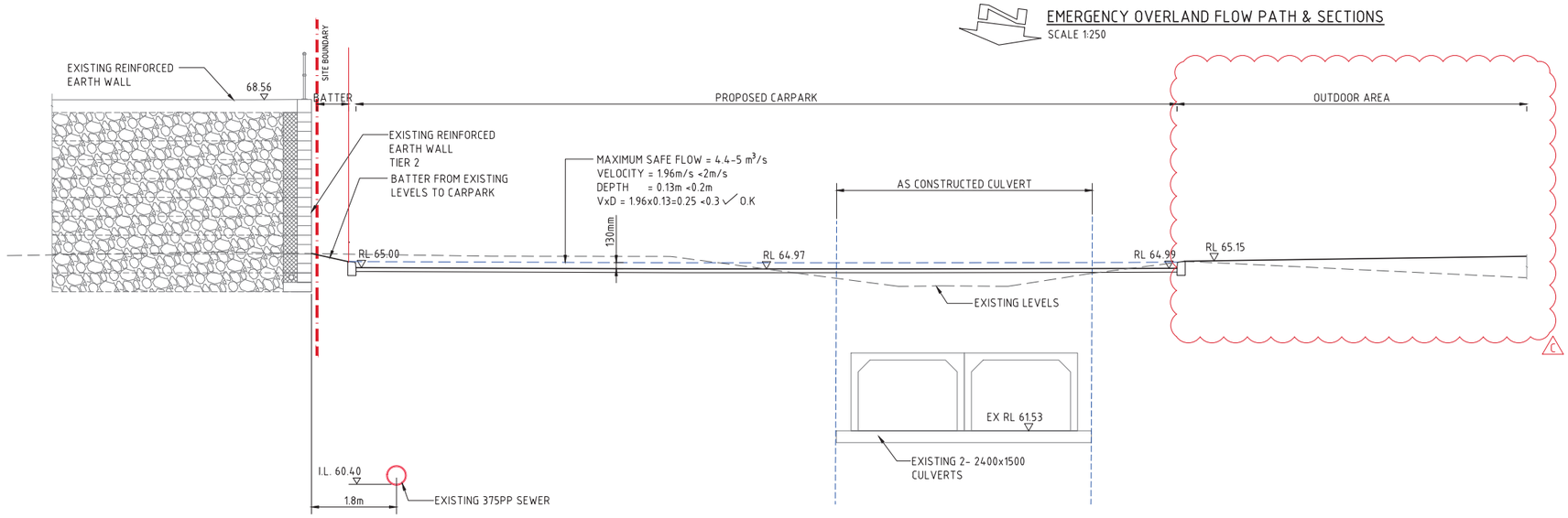
DRAWING TITLE: STORMWATER DRAINAGE DETAILS
SHEET 2

DRAWING No: C013003.13-SSDA46
ISSUE: D

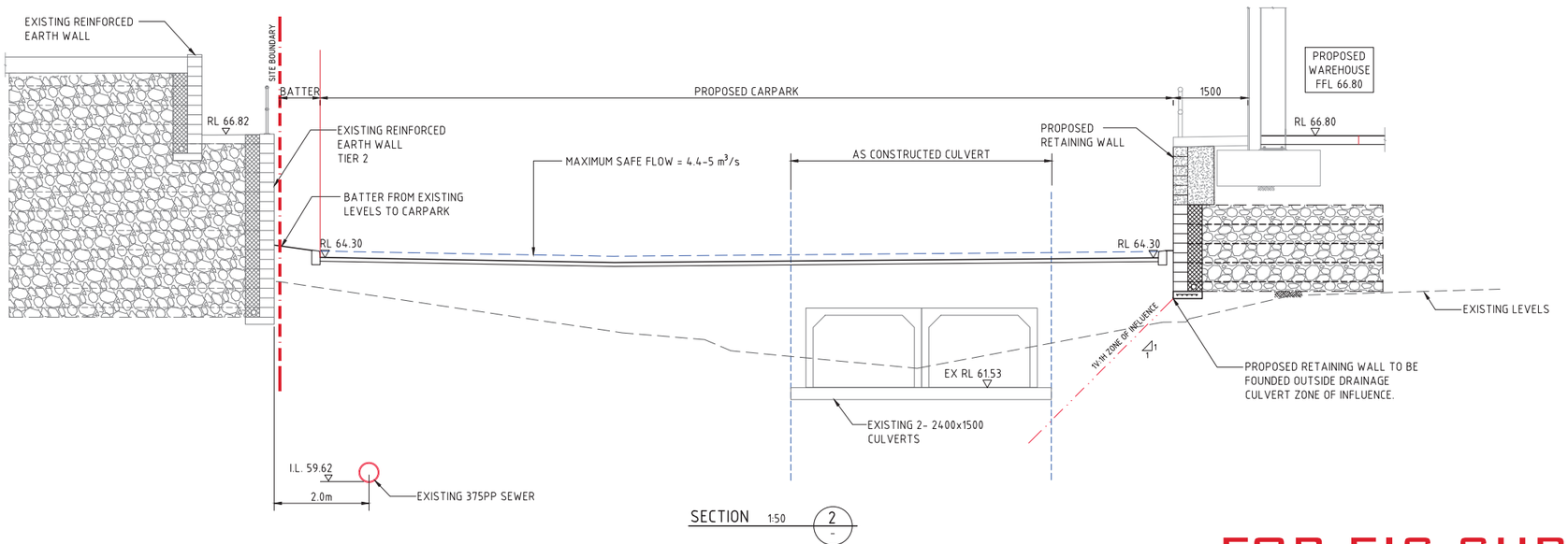


EMERGENCY OVERLAND FLOW PATH & SECTIONS

SCALE 1:250



SECTION 1:50 1



SECTION 1:50 2

LEGEND:

LEVELS DATUM IS AHD.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED RETAINING WALL
- EXISTING CULVERT
- OVERLAND FLOW DIRECTION
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

NOTE:

1. REFER TO DRAWING SSDA40 FOR STORMWATER DRAINAGE NOTES
2. REFER TO DRAWING SSDA51 FOR FINISHED LEVEL NOTES

500mm 0 1 2 3 4 5m
SCALE 1:50 AT B1 SIZE SHEET

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	10.02.22	C
ISSUED FOR EIS SUBMISSION	02.12.21	B
ISSUED FOR INFORMATION	01.12.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hill

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA47

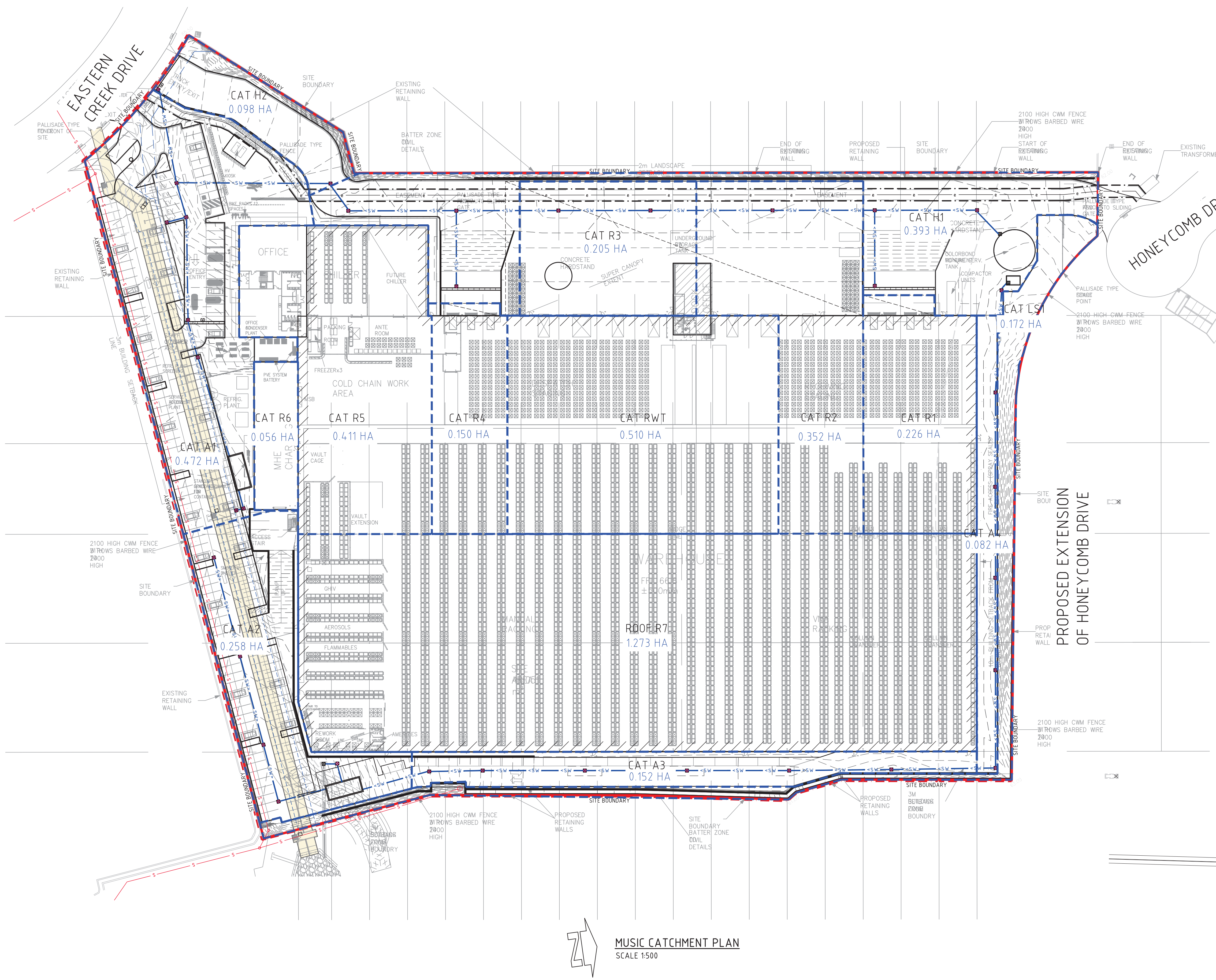
Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: EMERGENCY OVERLAND FLOW PATH PLAN & SECTIONS

DRAWING No: C013003.13-SSDA47 ISSUE: C



MUSIC CATCHMENT PLAN

SCALE 1:500

MUSIC CATCHMENT			
CATCHMENT	AREA (Ha)	% IMPERVIOUS	STORMWATER TREATMENT
R1	0.226	100	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
R2	0.352	100	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
R3	0.205	100	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
R4	0.150	100	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
R5	0.411	100	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
R6	0.056	100	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
R7	1.273	100	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
RWT	0.510	100	RAINWATER TANK/ STORMFILTER CARTRIDGES
H1	0.393	90	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
H2	0.098	90	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
A1	0.472	90	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
A2	0.258	95	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
A3	0.152	95	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
A4	0.082	100	OCEANGUARD OG 200 PIT INSERT/ STORMFILTER CARTRIDGES
LS1	0.172	0	BYPASS
TOTAL	4.810		

5m 0 10 20 30 40 50m

SCALE 1:500 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	10.02.22	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA 48

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

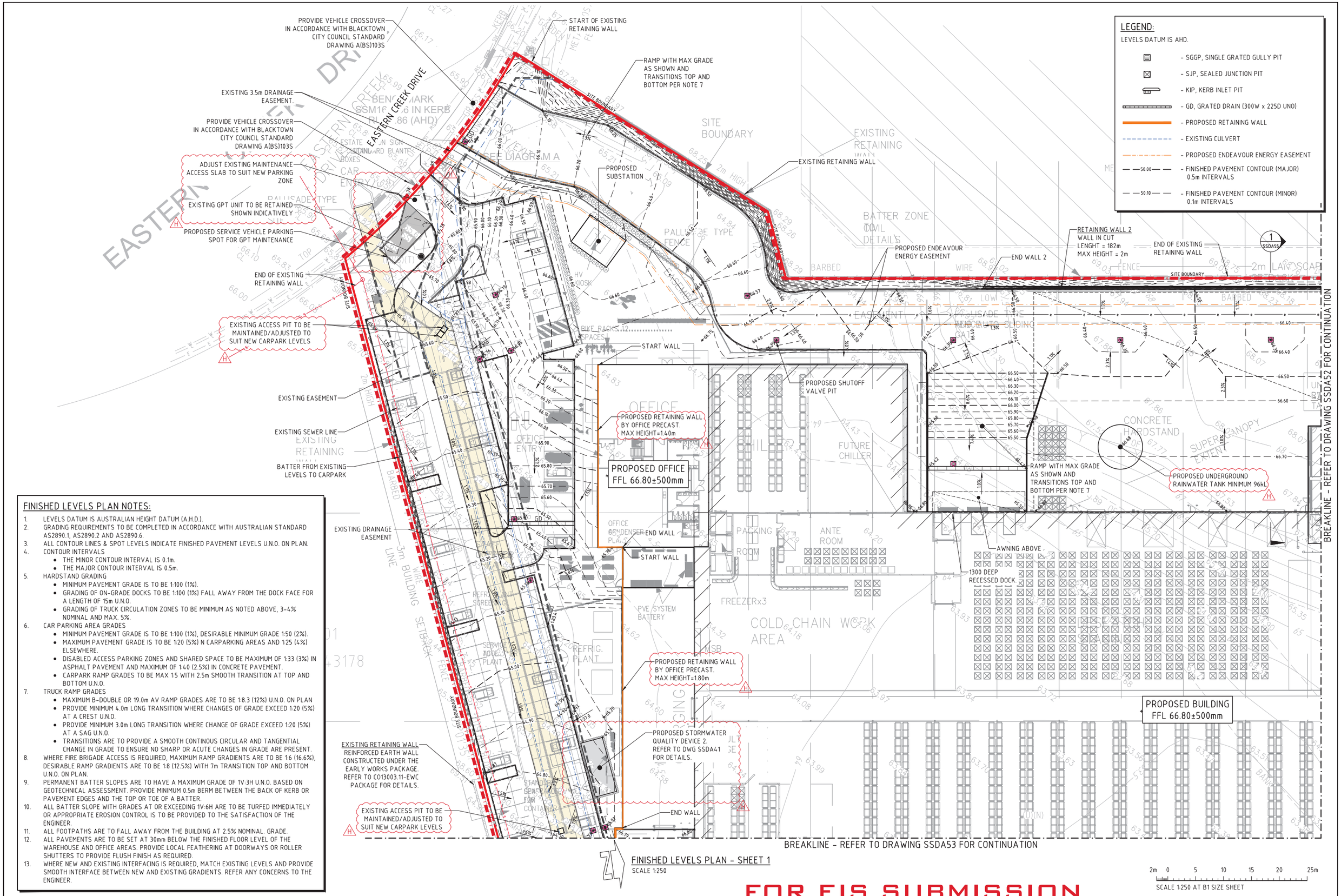
Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: MUSIC CATCHMENT PLAN

DRAWING No: C013003.13-SSDA48

ISSUE: A



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.

FINISHED LEVELS PLAN - SHEET 1
SCALE 1:250

2m 0 5 10 15 20 25m
SCALE 1:250 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	02.12.21	F
ISSUED FOR INFORMATION	01.12.21	E
ISSUED FOR INFORMATION	29.11.21	D
ISSUED FOR INFORMATION	19.11.21	C
REVISED FOR UPDATED ARCHITECTURALS	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A
ISSUED FOR EIS SUBMISSION	10.02.22	H
ISSUED FOR EIS SUBMISSION	07.12.21	G

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA51

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 695 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7099 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: FINISHED LEVELS PLAN SHEET 1

DRAWING No: C013003.13-SSDA51 ISSUE: H

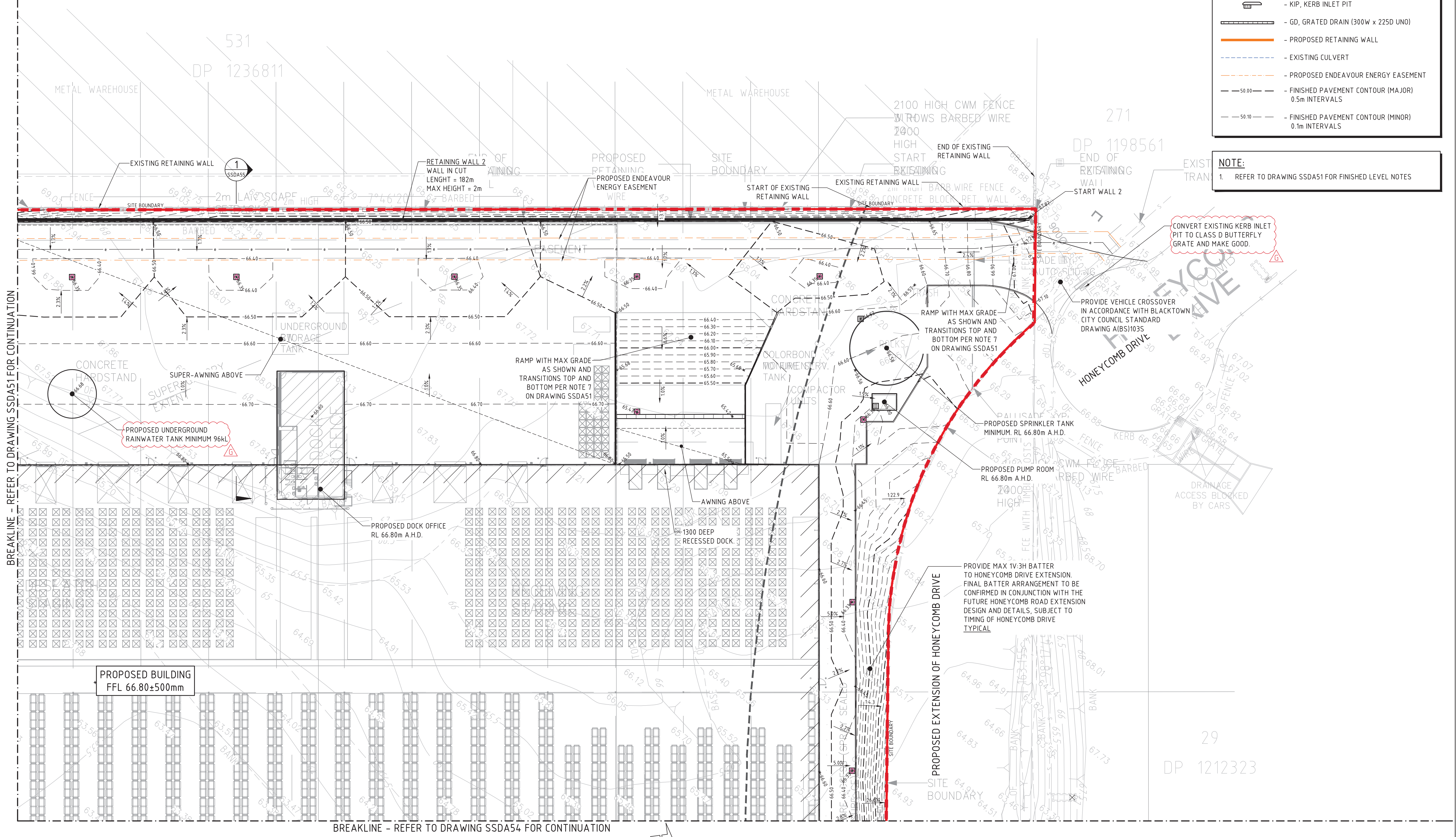
LEGEND:

LEVELS DATUM IS AHD.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED RETAINING WALL
- EXISTING CULVERT
- PROPOSED ENDEAVOUR ENERGY EASEMENT
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

NOTE:

1. REFER TO DRAWING SSDA51 FOR FINISHED LEVEL NOTES



531
DP 1236811
METAL WAREHOUSE
EXISTING RETAINING WALL
RETAINING WALL 2
WALL IN CUT
LENGHT = 182m
MAX HEIGHT = 2m
PROPOSED ENDEAVOUR ENERGY EASEMENT
START OF EXISTING RETAINING WALL
EXISTING RETAINING WALL
END OF EXISTING RETAINING WALL
START WALL 2
2100 HIGH CWM FENCE W/ ROWS BARBED WIRE
271
DP 1198561
CONVERT EXISTING KERB INLET PIT TO CLASS D BUTTERFLY GRATE AND MAKE GOOD.
PROVIDE VEHICLE CROSSOVER IN ACCORDANCE WITH BLACKTOWN CITY COUNCIL STANDARD DRAWING A(BS)103S
HONEYCOMB DRIVE
RAMP WITH MAX GRADE AS SHOWN AND TRANSITIONS TOP AND BOTTOM PER NOTE 7 ON DRAWING SSDA51
SUPER-AWNING ABOVE
PROPOSED UNDERGROUND RAINWATER TANK MINIMUM 96kL
PROPOSED SPRINKLER TANK MINIMUM. RL 66.80m A.H.D.
PROPOSED PUMP ROOM RL 66.80m A.H.D.
AWNING ABOVE
PROPOSED DOCK OFFICE RL 66.80m A.H.D.
1300 DEEP RECESSED DOCK.
PROVIDE MAX 1V:3H BATTER TO HONEYCOMB DRIVE EXTENSION. FINAL BATTER ARRANGEMENT TO BE CONFIRMED IN CONJUNCTION WITH THE FUTURE HONEYCOMB ROAD EXTENSION DESIGN AND DETAILS, SUBJECT TO TIMING OF HONEYCOMB DRIVE
TYPICAL
PROPOSED BUILDING
FFL 66.80±500mm
PROPOSED EXTENSION OF HONEYCOMB DRIVE
SITE BOUNDARY
29
DP 1212323
DRAINAGE ACCESS BLOCKED BY CARS
BREAKLINE - REFER TO DRAWING SSDA51 FOR CONTINUATION
BREAKLINE - REFER TO DRAWING SSDA54 FOR CONTINUATION

FINISHED LEVELS PLAN - SHEET 2

SCALE 1:250

2m 0 5 10 15 20 25m

SCALE 1:250 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	07.12.21	F
ISSUED FOR EIS SUBMISSION	02.12.21	E
ISSUED FOR INFORMATION	29.11.21	D
ISSUED FOR INFORMATION	19.11.21	C
REVISED FOR UPDATED ARCHITECTURALS	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A
ISSUED FOR EIS SUBMISSION	10.02.22	G

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT '21		B1	AS SHOWN	C013003.13-SSDA52

Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: FINISHED LEVELS PLAN SHEET 2

DRAWING No: C013003.13-SSDA52

ISSUE: G

LEGEND:

LEVELS DATUM IS AHD.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED RETAINING WALL
- EXISTING CULVERT
- PROPOSED ENDEAVOUR ENERGY EASEMENT
- 50.00 – FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 – FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

NOTE:

1. REFER TO DRAWING SSDA51 FOR FINISHED LEVEL NOTES

BREAKLINE - REFER TO DRAWING SSDA51 FOR CONTINUATION

4001 DP 1243178

AREA

REFRIG. PLANT

SERVICE ACCESS PLANT

PROPOSED RETAINING WALL BY OFFICE PRECAST. MAX HEIGHT=1.80m

RETAINING WALL TO BE LOCALLY LOWERED BELOW ZONE OF INFLUENCE OF THE WATER QUALITY TYPICAL.

PROPOSED STORMWATER QUALITY DEVICE 2. REFER TO DWG SSDA41 FOR DETAILS.

PROPOSED BUILDING FFL 66.80±500mm

EXISTING ACCESS PIT TO BE MAINTAINED/ADJUSTED TO SUIT NEW CARPARK LEVELS

END WALL 1

RETAINING WALL 1
WALL IN FILL
LENGHT = 36.50m
MAX HEIGHT = 2.8m

END WALL 3

VAULT EXTENSION

2100 HIGH CWM FENCE WITH 3 STRANDS BARBED WIRE 2400 HIGH

2m HIGH CONCRETE BLOCK BARBED WIRE RETAINING WALL

SITE BOUNDARY

START WALL 1

GHIV

AEROSOLS

RETAINING WALL 3
WALL IN FILL
LENGHT = 128.0m
MAX HEIGHT = 3.8m

EXISTING RETAINING WALL
REINFORCED EARTH WALL CONSTRUCTED UNDER THE EARLY WORKS PACKAGE. REFER TO C013003.11-EWC PACKAGE FOR DETAILS.

EXISTING RETAINING WALL

2 SSAD55

REWORK ROOM

AMENITIES

START WALL 3

END WALL 5

RETAINING WALL 4
WALL IN FILL
LENGHT = 276.50m
MAX HEIGHT = 3.0m

RETAINING WALL 5
WALL IN FILL
LENGHT = 157.50m
MAX HEIGHT = 3.0m

3 SSDA56

RAMP WITH MAX GRADE AS SHOWN AND TRANSITIONS TOP AND BOTTOM PER NOTE 7

4 SSDA56

END WALL 4

EXISTING ACCESS PIT TO BE RETAINED AND REMAIN ACCESIBLE

PROPOSED STORMWATER QUALITY DEVICE 1. REFER DRAWING SSDA43 FOR DETAILS

4002 DP 1243178

MANUAL RACKING

SITE BOUNDARY

BREAKLINE - REFER TO DRAWING SSDA54 FOR CONTINUATION

FINISHED LEVELS PLAN - SHEET 3

SCALE 1:250

2m 0 5 10 15 20 25m

SCALE 1:250 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	10.02.22	F
ISSUED FOR EIS SUBMISSION	02.12.21	E
ISSUED FOR INFORMATION	29.11.21	D
ISSUED FOR INFORMATION	19.11.21	C
REVISED FOR UPDATED ARCHITECTURALS	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT '21		B1	AS SHOWN	C013003.13-SSDA 53

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 698 660
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: FINISHED LEVELS PLAN SHEET 3

DRAWING No: C013003.13-SSDA53 ISSUE: F

BREAKLINE - REFER TO DRAWING SSDA52 FOR CONTINUATION

BREAKLINE - REFER TO DRAWING SSDA53 FOR CONTINUATION

PROPOSED BUILDING
FFL 66.80±500mm

4002
DP 1243178

WAREHOUSE
FFL 66.8
±500mm

SITE BOUNDARY

PROPOSED EXTENSION OF HONEYCOMB DRIVE

PROVIDE MAX 1V:3H BATTER TO HONEYCOMB DRIVE EXTENSION. FINAL BATTER ARRANGEMENT TO BE CONFIRMED IN CONJUNCTION WITH THE FUTURE HONEYCOMB ROAD EXTENSION DESIGN AND DETAILS, SUBJECT TO TIMING OF HONEYCOMB DRIVE TYPICAL

START WALL 4

PROVIDE MAX 1V:3H BATTER TO PROPOSED RETAINING WALL

PROPOSED RETAINING WALL

PROPOSED EXTENSION OF HONEYCOMB DRIVE

2100 HIGH CWM FENCE WITH 3 STRANDS BARBED WIRE ON TOP 2400 HIGH

FINAL ARRANGEMENT AT BOUNDARY TO BE CONFIRMED IN CONJUNCTION WITH THE FUTURE HONEYCOMB ROAD EXTENSION DESIGN AND DETAILS, SUBJECT TO TIMING OF HONEYCOMB DRIVE. TYPICAL.

START WALL 5

RETAINING WALL 5
WALL IN FILL
LENGHT = 157.50m
MAX HEIGHT = 3.0m

RETAINING WALL 4
WALL IN FILL
LENGHT = 276.50m
MAX HEIGHT = 3.0m

PROPOSED RETAINING WALLS

SITE BOUNDARY BATTER ZONE TO CIVIL DETAILS

3M BUILDING SETBACK ZONE BOUNDRY

LEGEND:

LEVELS DATUM IS AHD.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- KIP, KERB INLET PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED RETAINING WALL
- EXISTING CULVERT
- PROPOSED ENDEAVOUR ENERGY EASEMENT
- 50.00 - FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 - FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

NOTE:

1. REFER TO DRAWING SSDA51 FOR FINISHED LEVEL NOTES

FINISHED LEVELS PLAN - SHEET 4

SCALE 1:250

5m 0 10 20 30 40 50m

SCALE 1:500 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	10.02.22	F
ISSUED FOR EIS SUBMISSION	02.12.21	E
ISSUED FOR INFORMATION	29.11.21	D
ISSUED FOR INFORMATION	19.11.21	C
REVISED FOR UPDATED ARCHITECTURALS	12.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

AMENDMENTS DATE ISSUE

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA54

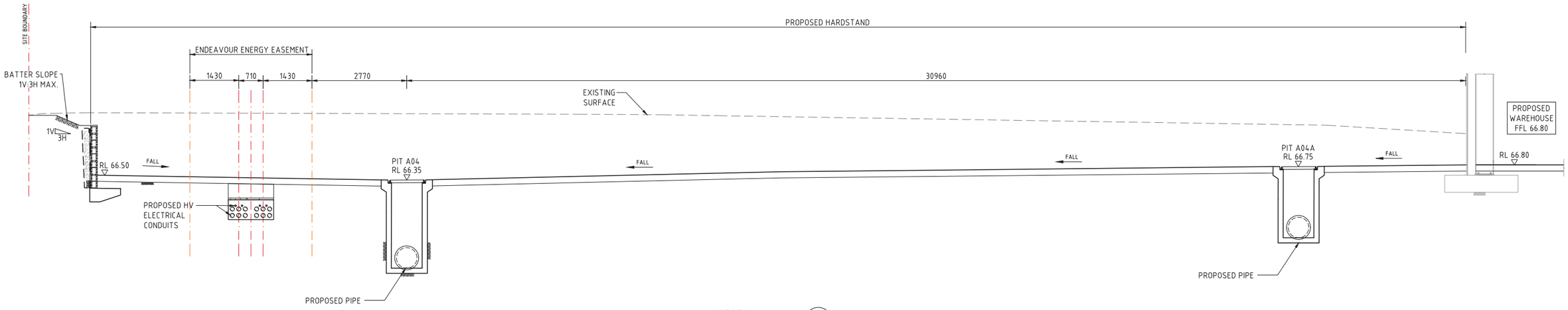
Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 488 440
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

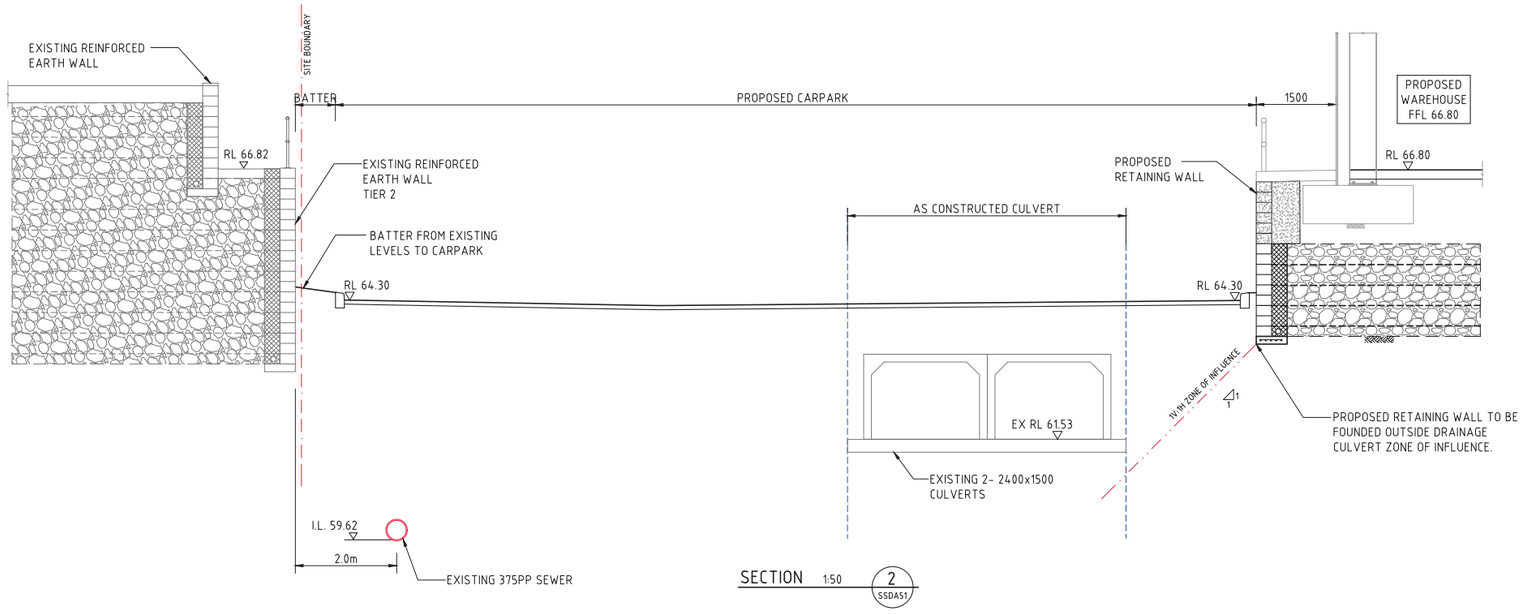
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: FINISHED LEVELS PLAN SHEET 4

DRAWING No: C013003.13-SSDA54 ISSUE: F



SECTION 1:50 (1 / SSDA51)



SECTION 1:50 (2 / SSDA51)

500mm 0 1 2 3 4 5m

SCALE 1:50 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	02.12.21	C
ISSUED FOR INFORMATION	19.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT '21		B1	AS SHOWN	C013003.13-SSDA 55

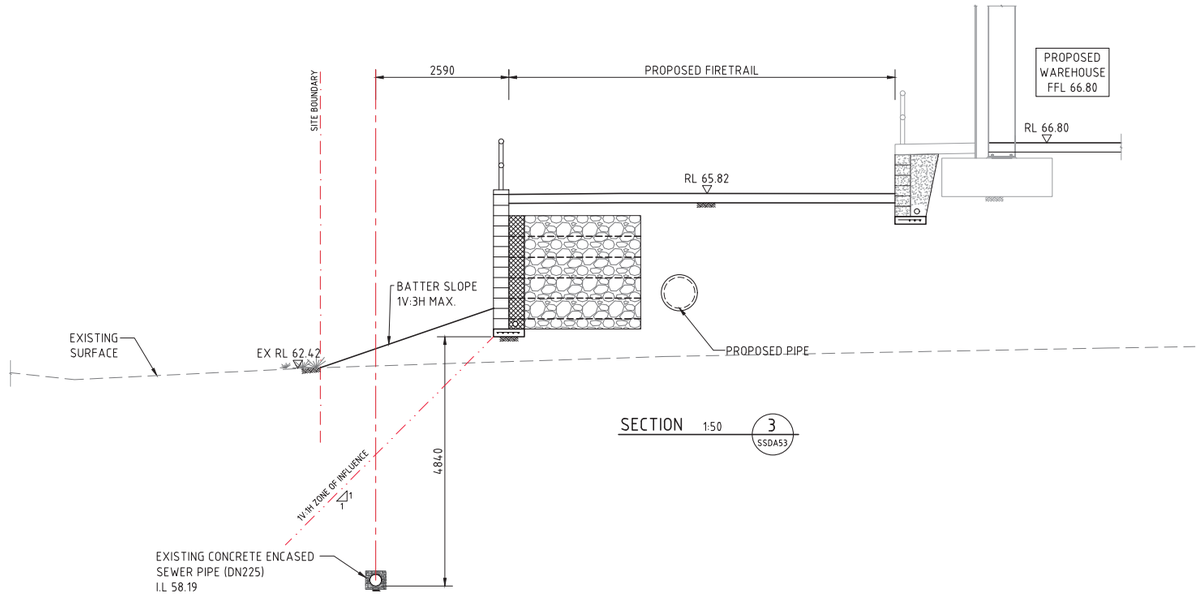
Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

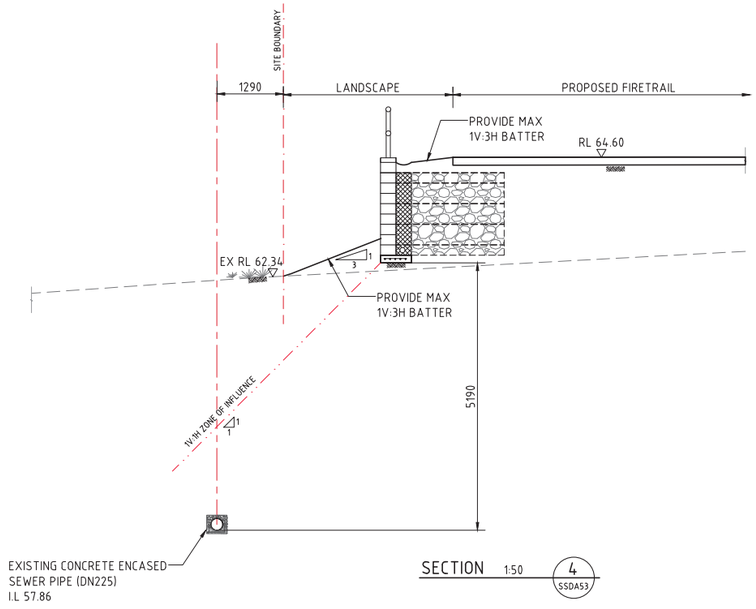
PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE: TYPICAL SECTIONS - SHEET 1

DRAWING No: C013003.13-SSDA55 ISSUE: C



SECTION 1:50 — 3 / SSDA53



SECTION 1:50 — 4 / SSDA53

500mm 0 1 2 3 4 5m
SCALE 1:50 AT B1 SIZE SHEET

FOR EIS SUBMISSION

AMENDMENTS	DATE	ISSUE
ISSUED FOR EIS SUBMISSION	02.12.21	C
ISSUED FOR INFORMATION	19.11.21	B
ISSUED FOR PRELIMINARY	29.10.21	A

ARCHITECT: [watch this SPACE design]

CLIENT: Charter Hall

PROJECT: PROPOSED INDUSTRIAL DEVELOPMENT
PROJECT NERIO, EASTERN CREEK DRIVE
EASTERN CREEK, NSW, 2766

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
S.M.	J.W.	OCT' 21		B1	AS SHOWN	C013003.13-SSDA 56

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3731
email: mail@costinroe.com.au ©

Costin Roe Consulting

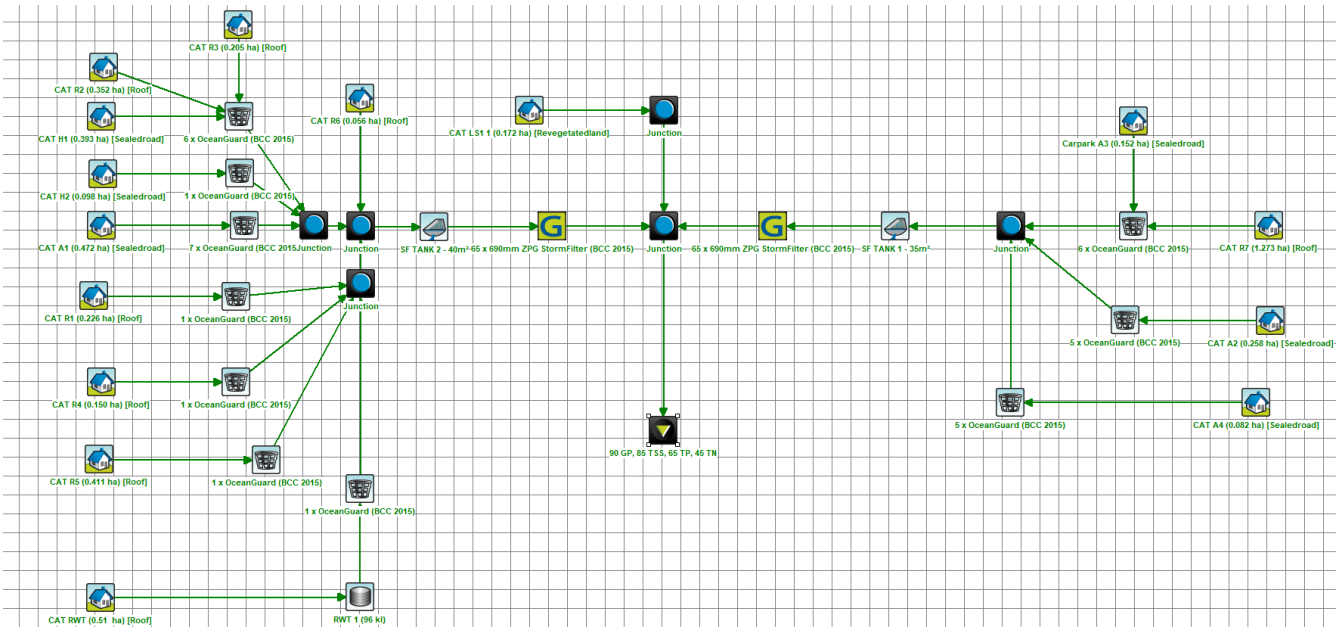
PRECISION | COMMUNICATION | ACCOUNTABILITY

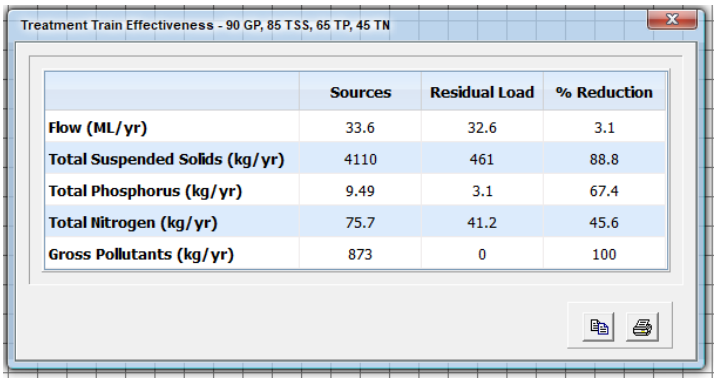
DRAWING TITLE: TYPICAL SECTIONS - SHEET 2

DRAWING No: C013003.13-SSDA56 ISSUE: C

Appendix B

MUSIC MODEL CONFIGURATION & PARAMETERS





Treatment Train Effectiveness - 90 GP, 85 TSS, 65 TP, 45 TN

	Sources	Residual Load	% Reduction
Flow (ML/yr)	33.6	32.6	3.1
Total Suspended Solids (kg/yr)	4110	461	88.8
Total Phosphorus (kg/yr)	9.49	3.1	67.4
Total Nitrogen (kg/yr)	75.7	41.2	45.6
Gross Pollutants (kg/yr)	873	0	100

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 Blacktown City Council DCP Part J and nominated in **Section 4.1** of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The MUSIC model "*Co13003.13 Rev.2.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 Blacktown City Council *MUSICLINK* parameters for clay soil and the layout of the MUSIC model is presented in **Appendix B**.

Modelling parameters used are based on the latest Blacktown City Council *MUSICLINK* parameters*).*

B.2 Rainfall Data

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

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

B.3 Rainfall Runoff Parameters

Parameter	**Value**
Rainfall Threshold	1.40
Soil Storage Capacity (mm)	170
Initial Storage (% capacity)	30
Field Capacity (mm)	70

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

B.4 Pollutant Concentrations & Source Nodes

Pollutant concentrations for source nodes are based on parameters adopted by the 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	1.20	0.17	-0.85	0.19	0.11	0.12
	Roads	1.20	0.17	-0.85	0.19	0.11	0.12
	Landscaping	1.2	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
	Landscaping	2.15	0.32	-0.6	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	Stormwater Treatment
Roof R1	0.226	Roof	100%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Roof R2	0.352	Roof	100%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Roof R3	0.205	Roof	100%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Roof R4	0.150	Roof	100%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Roof R5	0.411	Roof	100%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Roof R6	0.056	Roof	100%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Roof R7	1.273	Roof	100%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Roof RWT	0.510	Roof	100%	Rainwater Tank/ StormFilter Cartridges
Hardstand H1	0.393	Sealedroad	90%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Driveway H2	0.098	Sealedroad	90%	OceanGuard OG 200 Pit Insert/

				StormFilter Cartridges
Carpark A1	0.472	Sealedroad	90%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Carpark A2	0.258	Sealedroad	95%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Fire Trail A3	0.152	Sealedroad	95%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Fire Trail A4	0.082	Sealedroad	100%	OceanGuard OG 200 Pit Insert/ StormFilter Cartridges
Landscape LS1	0.172	RevegetatedLand	0%	Bypass
Total	4.81			

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.

Gross Pollutant Trap

Parameter	**Value**
Treatable Flow	0.020m^3/s (per OceanGuard)
Pollutant Reductions	
Per Ocean Protect Technical Guidelines	

Filtration Device (Ocean Protect StormFilters)

Parameter	**Value**
Treatable Flow	0.0016m^3/s (per ZPG Cartridge)
Pollutant Reductions	
Per Ocean Protect 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)	4110	461	88.8
Total Phosphorus (kg/yr)	9.49	3.1	67.4
Total Nitrogen (kg/yr)	75.7	41.2	45.6
Gross Pollutants (kg/yr)	873	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 Part J *DCP* 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 Council's requirements in an effective and economical manner.

Hydrocarbon and oil & grease removal cannot be modelled with MUSIC software. As an industrial estate with users for individual development sites not known, 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.

Further, the provision of an oil baffle within the treatment system which captures and contains hydrocarbons and oils has been included. This is considered a deemed to comply solution by Blacktown City Council.

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

Appendix C

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 topsoil 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 (OceanGuards & StormFilters)			
Refer to Manufacturers Operation and Maintenance Manual	Annually	Maintenance Contractor	Refer to Manufacturers Operation and Maintenance Manual

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
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 D
BLACKTOWN CITY COUNCIL PRE-DA MINUTES

Blacktown City Council

PAM Number: C21/11042

PRE-APPLICATION MEETING (PAM) MINUTES

Please note:

- A copy of these minutes must be submitted with any subsequent development application (DA).
- The information provided within these minutes are valid only at the time of issue.
- Please arrange a follow up PAM should you wish to discuss any changes to the proposed development.
- PAM advice is intended for those present at this pre-application meeting only. Those present should seek and rely on their own independent planning and/or legal advice on the development proposal.
- Any intended purchaser of the site is to seek and rely upon their own independent planning and/or legal advice, and attend a separate PAM with Council to discuss any proposed development of the site.

1. Executive Summary

Date of meeting: 31 March 2021

Site of proposal: Eastern Creek Drive, Eastern Creek (Lot 4002 DP 1243178).

Proposal: Warehouse and distribution facility on future Lot 1 (the subdivision of the lot currently under assessment by Council - DA-20-01525), comprising 2 tenancies, ancillary offices, 22 loading docks and 198 car parking spaces.

Representing the applicant: Eleisha Burton, Emma William, Theodore Berney, Mark Wilson, Andrew Cowan and associated consultants.

Council officers present: Pauline Daw (Coordinator Planning Assessment - Gateway), Emmanuel Boachie-Poku (Gateway Town Planner), Abdun Noor (Senior Traffic Management Officer), Laith Almoil (Gateway Engineer), Aneesh Singh (Team Leader Development Engineer).

2. Key environmental planning instruments (EPIs) and development control plans (DCPs) relevant to the site of this development proposal:

State Environmental Planning Policy (Western Sydney Employment Area) 2009	✓
State Environmental Planning Policy No. 55 – Remediation of Land	✓
Eastern Creek Precinct Plan Stage 3 – Prepared under SEPP 59	✓
Sydney Regional Environmental Plan No 20—Hawkesbury-Nepean River (No 2—1997)	✓

3. Key controls and development standards of particular relevance to this development proposal:

Land Zoning

The subject site is zoned IN1 (General Industrial) under State Environmental Planning Policy (Western Sydney Employment Area) 2009.

You are encouraged to confirm the zoning of the site by obtaining a Clause 10.7 Planning Certificate (formerly referred to as a Section 149 Planning Certificate).

Permissibility

Warehouse or distribution centre is listed as a permissible land use with consent in the IN1 (General Industrial) zone under State Environmental Planning Policy (Western Sydney Employment Area) 2009 subject to compliance with the relevant planning policies including the Eastern Creek Precinct Plan Stage 3 – Prepared under SEPP 59.

Development Contributions

Are Section 7.11 Contributions applicable? Yes ☒ No ☐

The applicable S7.11 contribution plan is *CP18 – Eastern Creek Stage 3.* For further information relating to Section 7.11 Contributions and any existing Voluntarily Planning Agreements (VPA) in place please contact Jenny Rodger; Council's Section 7.11 Coordinator on 98396000.

Note: The subject site is identified in an Industrial Release Area in the SEPP (WSEA) 2009 Industrial Release Area Map, therefore clause 29 applies. For further clarification on this matter, please liaise with the Department of Planning, Industry and Development (DPIE).

For developments in the Western Sydney Employment Area:

The plans must depict the location of any proposed subdivisional roads.

---

4. Will any NSW legislation cause the proposal to be integrated development (under Clause 4.46 of the *Environmental Planning & Assessment Act 1979*)?

	Yes	No
Fisheries Management Act 1994 *(*Note: the development will become integrated development if any permit under the Fisheries Management Act 1994 is required)*	☐	☒*
Heritage Act 1977 *(*Note: the development will become integrated development if any works are proposed to an item on the State Heritage Register)*	☐	☒*
Mine Subsidence Compensation Act 1961 *(*Note: the development will become integrated development if approval is sought to alter or erect improvements within a mine subsidence district or to subdivide land therein)*	☐	☒*
Mining Act 1992 *(*Note: the development will become integrated development if the proposal relates to the granting of a mining lease)*	☐	☒*
National Parks and Wildlife Act 1974 *(*Note: the development will become integrated development if a grant of Aboriginal heritage impact permit is required)*	☐	☒*
Petroleum (Onshore) Act 1991 *(*Note: the development will become integrated development if a grant of production lease is required)*	☐	☒*
Protection of the Environment Operations Act 1997 *(*Note: the development will become integrated development if an environmental protection licence under POEO Act 1997 is required)*	☐	☒*

Roads Act 1993 *(*Note: the development will become integrated development if it is proposed to erect a structure or carry out a work in, on or over a public road; or dig up or disturb the surface of a public road; or remove or interfere with a structure, work or tree on a public road; or pump water into a public road from any land adjoining the road; or connect a road, whether public or private to a classified road)*	☐	☒*
Rural Fires Act 1997 *(*Note: the development will become integrated development if authorisation under section 100B of RF Act 1997 is required)*	☐	☒*
Water Management Act 2000 *(*Note: the development will become integrated development if water use approval, water management work approval or a controlled activity approval under Part 3 of Chapter 3 of the Water Management Act 2000 is required).* *If the proposal is integrated development, additional fees of $140 (payable to Blacktown City Council) and $320 (payable to the referral agency) are required to be submitted with the DA. Please refer to NSW SixMaps for confirmation (https://maps.six.nsw.gov.au/)*	☐	☒*

Particular issues which should be addressed include, though are not limited to: –

All development applications	Are to be accompanied by a comprehensive written justification for consideration by Council at the time of the assessment for any departures from development controls and standards. No guarantee can be given that Council will support any variation until an assessment has been completed and DA determined. The applicant is to carefully check all relevant planning policy including development controls to ensure all relevant matters and documentation are included in any application. The DA must address the contextual aspects influencing urban form such as: - • Neighbourhood/locality context, street layout and hierarchy and prevailing development densities • Open space distribution and quality, topography, views and built form rhythm The DA must be accompanied by a context analysis of the existing prevailing built and natural features of the site/in the streetscape and provide a suitable design response. You are therefore required to submit a context/site analysis in the form of a scaled plan addressing the specific details and format requirements identified in the DA checklist.
Site Planning	• Ensure the site maintains a visually uncluttered and aesthetically pleasing appearance as viewed from Eastern Creek Drive, in this regard, no use is to be made of the areas within the front landscaped setback areas and within areas for parking and trucking manoeuvring) for storage of any materials or items such as bins, plant and equipment and the like • Ensure the development achieves adequate levels of natural lighting and ventilation, privacy, and spatial separation from the neighbouring properties • Ensure that there is sufficient provision for carparking within the site to meet Council's carparking DCP requirements.
Easements	It is the responsibility of the applicant to conduct a Property Title Search through NSW Land and Registry Services (LRS) for any easements affecting the property and annotate these on the site plans. Any proposed

	easements or encumbrances must be clearly indicated on plans submitted with the DA.
Street trees	Street tree planting is required. For information on the types of street trees required to be planted, please contact Rick Davis, Council's Open Space Policy & Tree Management Coordinator.
Landscaping	A comprehensive landscape concept plan is required.
Traffic	A comprehensive traffic impact statement prepared by a suitably qualified traffic engineer is to be submitted with the DA.
National Construction Code	All proposed works are to comply with the National Construction Code. A NCC compliance report is to be submitted with the DA.
Accessibility	An **Accessibility Report** from a suitably qualified accessibility consultant is required to confirm the design will be accessible from the boundary of the site to common areas of the site.
Waste management	A **waste management plan** (WMP) is to be submitted with the DA. A template for a WMP can be found at: https://www.blacktown.nsw.gov.au/Plan-build/Stage-3-preparing-an-application/What-makes-an-application-complete
Signage	Any signage proposed must be accompanied by a SEPP 64 Assessment and submitted with the DA.
Cut and fill and retaining walls	Details of any cut and fill are to be verified on a separate cut and fill plan. All retaining wall details (e.g. location, top-of-wall height, bottom-of-wall height, sections, elevations etc.) are to be clearly shown on plans and must be constructed of masonry material. **The cut and fill plan and details of retaining walls are to be submitted with the DA, and all relevant DCP controls for limiting cut and fill needs to be addressed by the applicant within the Statement of Environmental Effects.**
Compliance tables	Compliance tables are required to be included in the Statement of Environmental Effects (SEE) that demonstrate compliance with all relevant environmental planning policies including environmental planning instruments, development control plans and guidelines.
Submission requirements	• All Development Application are now required to be submitted in the Department of Planning Infrastructure and Environment's Planning Portal which can be accessed at https://www.planningportal.nsw.gov.au/ • You are to refer to the Environmental Planning and Assessment Regulation 2000 in addition to these PAM minutes for submission requirements for a development application. • You will also need to refer to the following website for documentation required by Blacktown Council to be submitted in the planning portal: https://www.blacktown.nsw.gov.au/Plan-build/Stage-4-Apply-for-a-certificate-or-application/Lodging-a-development-application • You will need to submit a completed development application checklist relevant to the proposed development (e.g. Subdivision, or Commercial, Retail and Industrial Development including alterations and additions, or Multi-unit residential development, including mixed use development) with your supporting documents when lodging your development application into the Planning Portal.

5. Key issues identified by the applicant

- Building footprint- including proposed setbacks and easement requirements
- Access to future Honeycomb Drive extension
- Relevance of current mapping (i.e. dam and watercourse transecting the site) given the extensive earthworks currently being undertaken
- Requirements of SEPP WSEA Clause 29 in relation to the proposed development - status of any existing VPAs?

6. Key planning issues arising from the PAM

The following points are made for your consideration arising from the pre-application meeting:

General:

- The proposed development involves the construction of a warehouse and distribution facility on future Lot 1 (currently there is a subdivision application for this lot under assessment by Council - DA-20-01525), comprising 2 tenancies, ancillary offices, 22 loading docks and 198 car parking spaces.
- The proponent should note that at time of writing this PAM report, DA-20-01525 has not yet been determined. The DA is currently on public notification ending on 28/04/2021.
- The proposed development the subject of this PAM assumes access to and from the site from both Eastern Creek Drive and future Honeycomb Road Extension. Please note that the extension and construction of Honeycomb Road is proposed under DA-20-01689. At the time of writing this PAM report DA-20-01689 has not been determined yet. In light of this, the proponent is to revise the current layout of the development to rely on access only from Eastern Creek Drive as we do not know yet when DA-20-01689 will be determined (i.e. if determined for approval and what conditions will be required to be satisfied before the Honeycomb Road Extension is built and dedicated to Council as public Road). Should the proposed development be designed to also rely on access from Honeycomb Road Extension, no Occupation Certificate will be granted until Honeycomb Road Extension is built to provide alternative access to the proposed warehouse/distribution units.
- It is noteworthy that the existing temporary detention basin which was located on proposed Lot 1 was approved for decommissioning under DA-16-04242. The advice from Council's Manager Asset Construction is that the timing for the regional basin to be completed by the developer and be functional is likely around the end of May- mid June 2021.
- The land the subject of this development is proposed as a residue lot under DA-20-01525. In light of this, any development on Proposed Lot 1 will require but are not limited to; drainage works, payment of Section 7.11 Contributions applicable and the consideration of relevant issues such as site contamination, salinity, and suitability of the site for the intended use for a warehouse and distribution facility. Therefore, any DA for the proposed warehouse development must be accompanied by site contamination reports, salinity reports, drainage plans and Council will impose Section 7.11 contribution upon any approval as these will not have already been satisfied under the residue lot application.
- For any information on the existing development approved or currently being assessed you are encouraged to make a request for relevant Development Applications and any associated modifications by completing an application under Government Information (Public Access) Act (GIPA) 2009 through the following link: https://www.blacktown.nsw.gov.au/About-Council/How-we-work/Access-to-our-information
- You are to provide full details of the proposed development including the end users (i.e. if known at the time of the lodgement of the DA), operational characteristics, any location of plant, tank and equipment within the site. Address the proposed number of staff, hours of operation, truck movements and designated transport routes in the SEE.

Orderly development

The proponent is to address in the Statement of Environmental Effects (SEE) and on the plans how one entry and exit to service both warehouse units will work for all types of trucks and vehicles access to and from the site and demonstrate how this will function in an orderly manner. Generally, car and truck entry and exit are required to be separated. Pedestrian access to the site is also to be separated from car access and truck access. You are also to demonstrate how NSW fire truck will be able to manoeuvre (i.e. turning paths in the carparking area to the north of the subject site) and access around the building in light of the location of the office building of proposed 'Warehouse A'. The DA will be referred to NSW Fire Brigade for comment.

Planning:

Compliance with relevant planning policy

- You are to address compliance with all the relevant environmental planning instruments and the development control plans applicable to the development in the SEE including the State Environmental Planning Policy (Western Sydney Employment Area) 2009.
- The proposed development is to fully comply with all relevant controls set out in the Eastern Creek Precinct Plan Stage 3- Prepared under SEPP 59, now part of the (SEPP) WSEA 2009.
- Any future uses proposed for the warehouse units must be permissible the IN1 General Industrial zone under (SEPP) WSEA 2009.

Compatibility of the proposal with the surrounding development

- Compatibility of all the uses proposed within the development is to be demonstrated.
- You are to ensure the materials and finishes proposed are of a high quality and sympathetic to the character of surrounding properties and the locality. Council encourages the use of lighter coloured finishes for roofing materials to reduce the impacts of urban heat island effect.
- Eastern Creek Drive is identified as a main collector road in Eastern Creek Precinct Plan Stage 3 Plan. The required minimum building setback from the property boundary to eastern Creek Drive is to be 10 metres. This setback area is to be landscaped and maintained as open areas only, so as to enhance the streetscape appearance of the development.

Car parking and traffic

- The proponent needs to demonstrate that there is sufficient car and truck parking on site for each warehouse unit and that there will be no traffic related issues resulting from the proposed development. The proposed use cannot create on street parking problems and must be able to cater for their own car and truck parking demands within the subject site.
- Note that the 203 carparking spaces provided for both warehouse units (based on Site and Ground Floor Plan, Drawing No. DA-03A, Rev 4) do not comply with the carparking requirements outlined in Eastern Creek Precinct Plan – Stage 3. Carparking is to be provided at the following rate:
    - Buildings 7,500sqm or less – 1 space per 100sqm or buildings greater than 7,500sqm – 1 space per 200sqm GFA only for the area in excess of 7,500sqm where there is a specific end user which would not demand a higher rate and where employee parking is adequately catered for;
    - 1 space per 40sqm GFA for Office
- Based on our calculation of the carparking, Warehouse A requires a minimum of 109 car spaces based on (11,800 m^2 warehouse area and 500m^2 office area) and Warehouse B requires 119 car spaces (13,800 m^2 warehouse area and 500m^2 office area) giving a total of 228 spaces. Council will not support a departure of 25 spaces especially when the specific end users are unknown and even if they are known this extent of departure is considered too great. The only areas that Council will consider to being excluded from carparking calculation for the development are amenity areas and also areas designated with line marking for only loading and unloading purposes as well as the other standard areas such as toilets, plant room etc. Where the loading and unloading area is to be shared for also storage purposes, they are to be included in calculation for the required parking generation for the site. Any areas nominated for storage also need to be included in the carparking rate of 1 per 75m^2
- You are to submit a traffic impact and carparking assessment statement from a qualified traffic consultant that addresses matters such as sperate entry & exits for cars and trucks and pedestrian access, truck parking and movements associated with both warehouse units and the cumulative impact on site.
- All vehicles and trucks must be able to enter and exit the site in a forward direction.
- Plans are to show truck swept paths and internal road circulation within the site.
- The traffic report must address and show compliant truck turning paths and sightlines.

Cut and fill

- Details of any cut and fill are to be verified on a separate cut and fill plan.
- Where retaining walls are proposed, the details of the retaining walls such as; location, top-of-wall height, bottom-of-wall height, sections, elevations and materials etc are to be provided with the DA.
- Retaining wall elements must not be greater than 3m in height. All retaining walls must be screened by vegetation. Where filling requires a retaining wall element to be greater than 3m in height, the retaining wall shall be terraced to allow for a ratio of 3m in height to 1.5m in length. Avoid long expanses of blank walls along public roads.

Landscaping, materials and finishes

- A landscaping plan is to be submitted with the DA.
- Details of external building materials, finishes and colours are to be submitted with the DA.
- Any tanks proposed are to be shown on the plans and properly screened if they are visible from the Eastern Creek Drive.

Waste management

- A waste management plan is to be submitted with the DA.

Owners consent

- All land owners to which the proposed development application relates are to provide consent to the lodgement of the development application.
- Please note, where the land is in company or charity ownership, it may be necessary to provide an ASIC or confirmation of authority respectively to support the owner's consent.
- A copy of any power of attorney will be required where owners consent relies upon it.

Development Contributions

Section 7.11 Contributions applicable? Yes ☒ No ☐

Note: the applicable S7.11 contribution plan is Contribution Plan No. CP 18 Eastern Creek Stage 3

7. Key matters raised by other sections of Council

The following comments are provided by other sections of Council. This advice does not necessarily consider the planning matters raised earlier in this report, and therefore need to be read with the above planning matters as context.

Building:

The following comments have been provided by Council's Team Leader Building:

- All proposed works are to comply with the National Construction Code (formerly known as Building Code of Australia). A NCC compliance report is to be submitted with the DA.
- An Accessibility Report from a suitably qualified accessibility consultant is required to confirm the design will be accessible from the boundary of the site to common areas of the site.
- The proposed development will need to meet NSW Fire Brigades' requirements for firefighting pressure and possible tank storage and fire truck access.

For building matters, please contact Council's Team Leader Building, John Dorahy on 9839 6000.

Engineering (Drainage):

The following comments have been provided by Council's Drainage Engineer:

On-site Stormwater Detention (OSD)

1. No water detention applies for the site.

WSUD

2. Water quality treatment is required for the development.
3. Council accepts bio-retention or proprietary systems to satisfy the water quality requirements. MUSIC is used to assess the performance of the water quality systems. Provide an electronic copy to Council for assessment.
4. Refer to Councils WSUD Standard Drawings, Plan No: A(BS)175M and the WSUD Developers Handbook for further requirements.
5. Refer to Section 4.2 of Part J of DCP 2015 for load reduction requirements.
6. Provide a MUSIC catchment plan and MUSIC model that match in terms of areas, treatment train names and bypasses (if any).
7. Provide an additional MUSIC model (pre-v-post) to demonstrate that the Stream Erosion Index (SEI) is <3.5 based on the technique in Council's WSUD Developers handbook. Provide all calculations.

Water Conservation

8. Water conservation is required for the commercial/Industrial development.
9. A Rainwater tank is required to meet the water conservation targets under Part J for the development. A minimum target of 80% reuse demand is to be achieved.
10. Non-potable water demand is to include landscape watering and toilet/urinal flushing.
11. MUSIC is generally used to assess the performance of the rainwater tank using the node water balance and an electronic copy of the MUSIC model needs to be provided to Council for assessment.
12. Refer to WSUD developers Handbook for further design requirements and usage rates.
13. Allow for a minimum usage rate of 0.1 kL/day/toilet or urinal and a minimum of 0.4 kL/m2/ year for landscape watering (excluding turfed areas).
14. Other daily reuse demands can be specified as per the WSUD developer handbook if proposed such as truck washing.
15. Where the development is used 6days/wk, the toilet/urinal usage can be discounted by 6/7.
16. All calculations (number of toilets etc.)/graphs/catchments and models are to be provided.

Other

17. It is Council's understanding that the box culverts were designed for the 1% AEP without blockage requirements. Hence the swale above the box culverts are to consider flows in case of blockages.
18. An overland runoff analysis will be required if the proposal encroaches on the trunk drainage (Culverts) and swale above the culverts recently constructed. (has this easement been registered, I realised Emmanuel had a plan showing the easement? How does he have this info? can I get this?)
19. The overland catchment is to be provided to Council with a reasonable contour intervals with area clearly shown.
20. Upstream catchment flowing to the low point onto eastern creek drive is to be modelled as 85% impervious. Consider any tailwater conditions within the culverts.
21. Provide a DRAINS model if proposing to encroach over the easement (pavement only) to ensure that the overland runoff is contained within the site and the velocity/depth relation is safe.
22. Refer to WSUD developer handbook for modelling requirements including hazard categories for carparking areas.
23. All pipe and pit blockages are to be modelled as per WSUD developer handbook.
24. Provide calculations of proposed paved swale and show cross sections and plan view with levels along the length of swale.
25. Provide a legal point of discharge for the site. Provide levels and sizes for the connection point.

For further advice on drainage engineering matters, please contact Council's Drainage Engineer, Laith Almoil on 9839 6000.

Traffic Engineering:

- The applicant is to submit a Traffic Impact Assessment Report.
- Council's Senior Traffic Management Officer raised concerns regarding how one entry and exit to service both warehouse units will be workable for all types of trucks and vehicles. The is to be explained and justified in the traffic report to be submitted with the DA. The layout, design and manoeuvring areas are to be detailed in the traffic report.
- The issues raised under the heading "carparking and Traffic" on Page 7 also needs to be met.
- The access driveway, ramps, circulation aisles, loading area and car parking arrangements must be designed in accordance with AS 2890.1, AS 2890.2 and AS 2890.6.
- For further information on carparking and traffic matters for the proposed development, please contact Abdun Noor; Council's Senior Traffic Management Officer on 98396000.

For advice on traffic engineering matters, please contact Council's Senior Traffic Management Officer, Abdun Noor, on 9839 6000.

Development Engineering:

For advice on development engineering matters, please contact Council's Team Leader of Development Engineering, Aneesh Singh on 9839 6000.

Environmental Health:

The following comments have been provided by Council's Environmental Health Officer:

- Vehicles and equipment shall only be washed/hosed down within a wash bay that drains to the sewer system in accordance with Sydney Water requirements.
- The wash bay to be bunded/graded so that wastewater is directed to a designated collection pit.
- The covered (roofed) materials storage bay should also be bunded.
- The site plan is to show the location of the proposed emulsion tank and any utilities or containment dikes which may be a part of the installation of the emulsion storage tank. All existing and proposed structures located on this property must be shown on your site plan. Distances from the tank to property lines and any structures must also be included.
- If a dispensing device which is not an integral part of the tank is to be used, the dispenser must also be shown on the plans with all piping and electrical connections shown.
- A plan indicating how this tank will be supported will also be required as well as details on how the tank will be connected to the foundation.
- Any additional details necessary including bunding, clean-up procedures (containment dike designs, etc.) will be required with the DA for assessment.

For further advice on environmental health matters, please contact Yael Lang, Council's Environmental Health Officer on 9839 6000.

---

8. Further consultation recommended? **YES ☐ NO ☒**

---

9. DA submission and supporting documentation:

Should you proceed with a DA, the information requirements are included with the DA form and must also include the following specific documentation: -

- Owner's consent

- The owner's names must match those recorded on Council's rates system. If the names differ, then proof of change of ownership must be provided. If there is more than one owner on Council's rates system, then all owners must sign. Where the owner is a company, owner's consent must be provided in the form of a letter on the company letterhead or stamped by the company seal and be signed by a Director of the company.
- Where the owner is a strata corporation, owner's consent must be on the strata corporation letterhead or stamped by the strata seal.
- If the owner company does not have company letterhead or a company seal, the owner's consent must be executed in accordance with Corporations Act 2001 (Cth) Section 127 – Execution of Documents. This requires the signature of two directors of the company, or a director and a company secretary, or by the sole director.
- If the owner's consent is signed on the owner's behalf by their legal representative, documentary evidence (eg Power of Attorney, Executor or Trustee) must be provided.
- Important: Applications lodged without complete owner's consent will be rejected.

- Statement of environmental effects - a comprehensive statement of environmental effects outlining the proposal's compliance with relevant planning controls and the anticipated impacts of the proposal (including any means to mitigate such impacts) must be submitted with any DA for the site, including a detailed table indicating compliance with the relevant numerical standards. DAs lodged without a statement of environmental effects will be rejected.
- DA submission will require all plans, elevations and cross-sections. If these plans are not drawn to scale or are illegible, the DA will be rejected.
- A survey plan of the property indicating existing levels to Australian Height Datum (AHD). Location and roof ridge and eave levels of dwellings on adjoining properties must also be indicated on the plans. Existing trees on site must be identified on the survey plan.
- Details of proposed external colours, materials and finishes (for new buildings).
- Proposed and existing ground level (including levels of adjoining properties), natural ground level and finished ground levels to AHD must be clearly indicated on the submitted plans (including all elevations and sections). DAs lodged without this information will be rejected.
- A BASIX Certificate. Note: All BASIX commitments for the DA stage **must** be shown on the DA plans. Failure to depict relevant commitments on the plans as relevant to DA stage will result in your DA being delayed.
- Detailed landscape calculations as part of a comprehensive landscape plan indicating suitable communal outdoor space with a component of deep soil which is capable of accommodating the planting of more substantial trees. Relevant landscaping calculations (overall and permeable) must be provided to demonstrate compliance against numerical controls.

Estimated Cost of Works

The DA must nominate the estimated cost of development (which includes consultant fees and GST) as defined in Clause 255 of the *Environmental Planning and Assessment Regulation 2000.* Development cost must be calculated in accordance with the Department of Planning & Industry and Environment's PS10-008.

Please note this must be accompanied by either a Cost Summary Report for development costs less than $3,000,000 or a Registered Quantity Surveyor's Detailed Cost Report for development costs more than $3,000,000. A Building Consultant must verify anything less than $3 million as per PS10-008.The report templates can be downloaded off Council's website.

State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004

Where the cost of works exceeds a capital investment value of $50,000, BASIX certification is required to be obtained for the proposal and submitted in support of the application. All relevant commitments listed in

BASIX Certificates must be shown on the drawings.

10. Limitation on the information provided in PAM minutes:

(a) This report is not a zoning certificate. Such a certificate can be purchased from Council by completing the relevant application form and payment of the appropriate fee.

(b) To confirm all the relevant environmental planning instruments applicable for a particular development site, a Section 10.7 Certificate will need to be purchased from Council.

(c) It is the responsibility of the applicant to ensure that a DA adequately addresses all relevant environmental planning instruments and DCPs.

(d) Council has provided the information in this report in response to the material provided by the prospective applicant. An applicant who requires independent professional advice must engage a consultant who is qualified to provide such advice.

(e) Information in this report concerning the permissibility of a particular form of development is provided in good faith at the time these minutes were prepared. Should the permissibility of the proposal be in doubt or the interpretation of development controls be unclear, you must seek guidance from a legal or town planning consultant.

(f) You are advised that any proposal must fully comply with the applicable planning controls. Applicants must substantiate compliance with the objectives of all prevailing planning controls.

(g) Council cannot pre-determine its position in regard to the merits of a development. Council's final decision regarding a development can only be made upon the lodgement of a DA and following Council's full and proper evaluation and determination of that application under Section 4.15 of the Environmental Planning and Assessment Act 1979 as amended. This report can in no way infer or imply that development consent may be granted.

(h) All local and State planning controls are constantly under review. While this report reflects the controls operating at the time of the meeting, the relevant policies and controls may alter between the time of this meeting and the lodgement of a DA. Assessment of any DA must be on the basis of the controls in force at the time the application is evaluated and determined.

(i) The information provided at the PAM and in this report is intended to assist in the preparation and lodgement of a DA. Although it is preliminary information, Council provides this service at no cost with the expectation that a prospective applicant will respond positively and take account of the information provided.

(j) Further investigation of the proposal and the site, as well as comments by statutory authorities and local residents as part of the assessment of the DA, may necessitate amendments to any proposed plans for development. Conditions will be applied to any development consent. Furthermore, Council may refuse to issue development consent for a DA which is considered unsatisfactory following an evaluation under Section 4.15 of the Environmental Planning and Assessment Act 1979.

(k) This meeting or the minutes provided do not guarantee that any variations sought to Council's controls will be granted. Such variations are proposed at the applicant's own risk and may result in a longer DA processing time.

(l) No guarantee can be given that this proposal will be approved until a full assessment of a DA has been made by the assessing town planner and development consent is granted, as other issues may be identified during the assessment process.

(m) Your DA will be delayed should inadequate information be lodged. It is in your interests to provide as much information as possible to assist in Council's assessment of the DA. Applications lodged without key documentation such as a statement of environmental effects, stormwater plans, owner's consent, plans drawn to scale and other specific information highlighted either in these minutes or within the relevant checklist will be rejected. There are no appeal rights under the EPA Act 1979 for rejected DAs.

(n) Please note that the information provided within these minutes are valid at the time of issue. Please arrange a follow up PAM should you wish to discuss any changes to the proposed development.

---

11. Acknowledgement of minutes:

.....
Gateway Town Planner

P. Daw
.....
Coordinator Planning Assessment - Gateway

22-04-2021
.....
Date

22-04-2021
.....
Date