COSTIN ROE CONSULTING

CIVIL & STRUCTURAL ENGINEERS

CIVIL ENGINEERING REPORT INCORPORATING WATER CYCLE MANAGEMENT STRATEGY

SSD-71144719

HORSLEY LOGISTICS PARK STAGE 2

3 JOHNSTON CRESCENT, HORSLEY PARK, NSW

Prepared for:

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EXECUTIVE SUMMARY

ESR Australia Pty Ltd are seeking to construct an industrial development located at 3 Johnston Crescent, Horsley Park.

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

Proposal overview

The proposed development is for a multi-unit warehouse facility with associated offices on 8.67 Ha parcel of land. Works will include pavements & crossovers, determination of erosion and sediment controls, finished surface levels & surface grading, stormwater drainage (including drainage layout and management of quality and quantity in accordance with Fairfield City Council's Engineering Guideline), retaining walls and batter treatment. The existing site is noted to be comprised of open unpaved land, diversion drains, two temporary sediment basins and perimeter retaining walls.

Access to the development would be made from the east via Johnston Crescent.

Purpose of this assessment

This Civil Engineering Report has been prepared to address the following Secretary's Environmental Assessment Requirements (SEARs):

- Item Number 13: Water Management
- Item Number 14: Flood Risk
- Item Number 21: Infrastructure Requirements and Utilities

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. A preliminary sediment and erosion control plan has been prepared on drawing **Co12990.17-SSDA200** and **SSDA251**, **SSDA252**. Reference should also be made to **Section 8** of this report for Construction Soil and Water Management.

Operational impacts

During the operational phase of the development, the proposed stormwater quality treatment system incorporating the use of Ocean Protect Stormfilter filtration cartridges and pit baskets and 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.

During the operational phase of the development, the proposed stormwater discharge will be controlled by multiple on-site detention systems to ensure the post-

development peak flows do not exceed pre-development peak flows. The development does not increase runoff from existing conditions and, as such, the site discharge will not adversely affect any land drainage system or watercourse following completion of development works.

Further it has been confirmed that the development is outside the 1% AEP Flood extent, and a Flood/Overland Flow Study is not required for the development. The site has very low risk of flooding affectation from Ropes Creek or other regional flooding.

Conclusion

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

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

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1 INTRODUCTION & SCOPE

1.1 Introduction

Costin Roe Consulting Pty Ltd has been commissioned by ESR Australia Pty Ltd 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, Housing and Infrastructure (DPHI) for an industrial development on the land.

This report presents a civil engineering assessment of the property at 3 Johnston Crescent, Horsley Park. 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:

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

A request for SEAR's has been completed by ESR. Reference to **Appendix C** should be made for SSD_71144719 SEAR's dated 29 May 2024, and **Section 1.3** of this report for specific responses to civil engineering and water management related items included in the SEAR's.

The design has been completed in accordance with the *Stormwater Management Strategy* set as part of the approved *CSR Industrial Estate* as documented in Brown Consulting (now Calibre) *Stormwater Concept Plan (Ref: X13044 dated December 2013).* It is noted that the adopted Stormwater Management Strategy is consistent with the requirements of the site-specific *Development Control Plan* for the site "*Western Sydney Employment Area – Fairfield City Council Development Control Plan 2016, Lot 1 DP106143, 327-335 Burley Road, Horsley Park"* dated March 2016.

The consent authority the DPHI, however noting due consideration to Fairfield City Council (FCC) requirements and the engineering and policy requirements of FCC, included in their *Stormwater Management Policy September 2017,* have also been considered in the design, where relevant. It is noted that some

differences are present in the above noted DCP and current FCC policy. The engineering design has been completed in accordance with the DCP where differing requirements are present.

1.2 Consultation

Consideration to the various stakeholders has been made in relation to the development, including Council has been made during the assessment period. Consultation with Fairfield City Council and Heritage NSW has included email and telephone correspondence.

Reference should be made to **Appendix E** for email correspondence of the meeting held between Council and ESR on 26 June 2024.

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 29 May 2024, reference SSD-71144719.

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 DPHI and following key areas in the document:

- *Item 13. Water Management*
- *Item 14. Flood Risk*
- *Item 21. Infrastructure Requirements and Utilities*

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

Table 1.1 provides a summary of the SEARs General Requirements which relate to civil engineering related items, and where these have been addressed in this report.

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
13. Water Management	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.	An Integrated Water Management Plan 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.	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
	• outlines the water-related servicing infrastructure required by the development (informed by the anticipated annual and ultimate increase in servicing demand) and evaluates opportunities to reduce water demand (such as recycled water provision). • details the proposed drainage design (stormwater and wastewater) for the site including any on-site detention facilities, water quality management measures and nominated discharge points, on-site sewage management, and measures to treat, reuse or dispose of water. • demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse downstream impacts.	The site forms part of a recently approved industrial subdivision estate. The development of the land will incorporate the use of detention system and WSUD for the stormwater management to result in acceptable impact. Discharge from the site is noted to be made to existing drainage pit, ultimately draining into road drainage infrastructure in Johnston Crescent.	
	Where water and 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	Refer **Section 4** and drawings in **Appendix A** for detailed assessment of the existing and post development conditions pertaining to the existing site discharge points and overland flow path. It is noted that no new drainage infrastructure works, which are to be handed over to	Refer to **Section 4** and **Appendix A**

SEAR's Key Item No. & Description	Issue & Assessment Requirements	How It Is Addressed	Location Within This Report
	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	local council, Sydney Water or other authority, are proposed as part of this development.	
14. Flood Risk	Identify any flood risk on-site having regard to adopted flood studies, the potential effects of climate change, and any relevant provisions of the NSW Floodplain Development Manual.	Review of the Council's adopted flood studies indicate there is no flooding in the 1% AEP local events. The development is clear of flood risk as noted in **Section 7**.	Refer **Section 7** for confirmation from council regarding flooding and overland flow.
	Where the development could alter flood behaviour, affect flood risk to the existing community or expose its users to flood risk, provide a flood impact and risk assessment (FIRA) prepared in accordance with the Flood Impact ad Risk Assessment – Flood Risk management Guide LU01.	We confirm the development will not alter flood behaviour.	
	Detail design solutions and operational procedures to mitigate flood risk where required.	No flood mitigation solutions are required nor proposed for this development.	
21 Infrastructure Requirements and Utilities	In consultation with relevant service providers: • assess the impacts of the development on existing utility infrastructure and service provider assets surrounding the site. • identify any infrastructure required on-site and off-site to facilitate	The site has been services as part of the subdivision work completed by CSR. No upgrades or infrastructure delivery and staging plan are proposed for this development.	Refer to **Section 9**

SEAR's Key Item No. & Description	Issue & Assessment Requirements	How It Is Addressed	Location Within This Report
	the development and any arrangements to ensure that the upgrades will be implemented on time and be maintained. • provide an infrastructure delivery and staging plan, including a description of how infrastructure requirements would be co-ordinated, funded and delivered to facilitate the development.		

2 DEVELOPMENT SITE

2.1 Location

The proposed development is located within Fairfield City Council at 3 Johnston Crescent, Horsley Park. The property, Lot 301 of DP1244594, is located adjacently on the southern side of Burley Road in the suburb of Horsley Park as shown in **Figure 2.1**.

The parcel of land being reviewed as part of this assessment comprises Stage 3 of the original CSR Estate subdivision approval (refer **Section 2.3**).

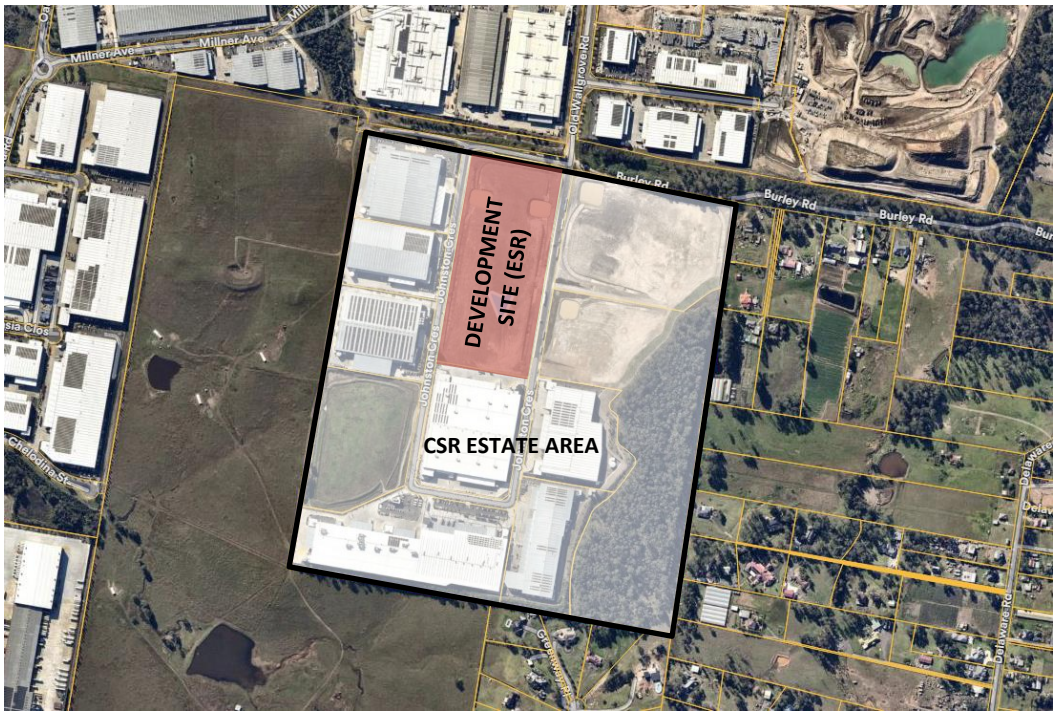


Figure 2.1. Site Location and Aerial Imagery (Source: Nearmap May 2024)

Review of the historical survey information shows that the land had varying levels across the entire site. The highest level on the site, at approximately RL83.40m AHD, is located on the southern side of the site and the lowest level, at approximately RL 80.00m AHD, is in the northern portion of the site. It is noted that initial earthworks and grading works have been completed by CSR for this development as per Nearmap image update.

2.2 Existing Site Description

The subject site consists of undeveloped land although infrastructure services and perimeter retaining walls and bulk earthworks have been completed.

The existing site comprises of retaining walls recently constructed along the frontages to Burley Road and Johnston Crescent. The site also incorporates erosion and sediment control measures such as diversion drains and sediment ponds to manage the stormwater drainage of the land during the earthworks / construction phase.

2.3 Proposed Development

The proposed development is for the construction of two industrial buildings over the land site area of 8.67 HA. Reference should be made to the architectural plan layout prepared by Nettleton Tribe as shown in **Figure 2.2** and **Figure 2.3**.

The plan layout shows development generally comprise two large warehouses; Warehouse A is approximately 20,783 sqm and is located on the northern portion of the land while Warehouse B is approximately 36,522 sqm and is located on the southern portion of the land. Both buildings are warehouse/distribution type buildings with associated office spaces, car park, fire access roads, truck circulation and truck loading and unloading areas.

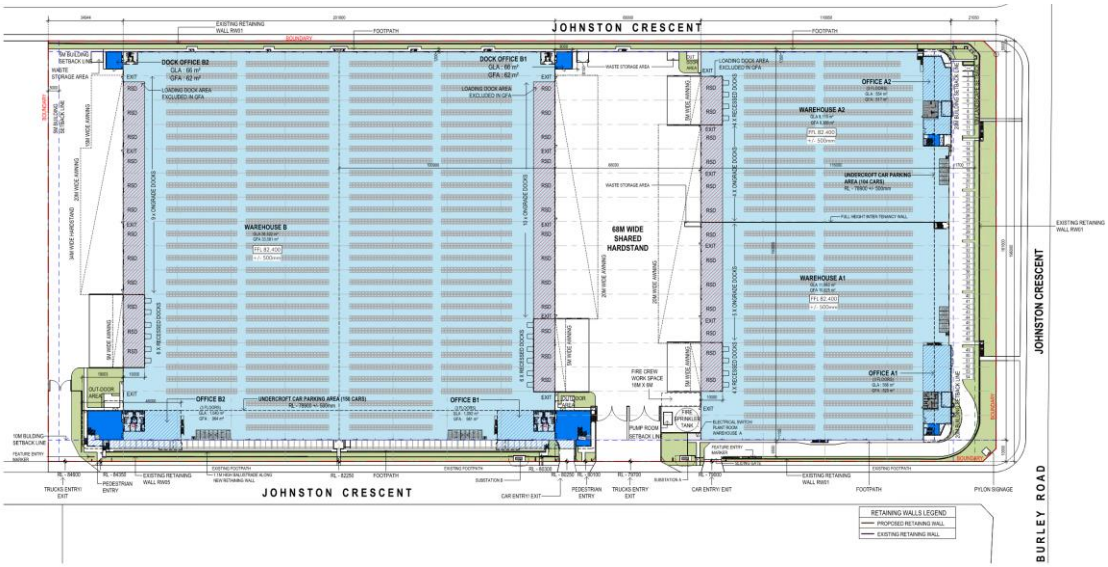


Figure 2.2. Proposed Development Architectural Layout Plan

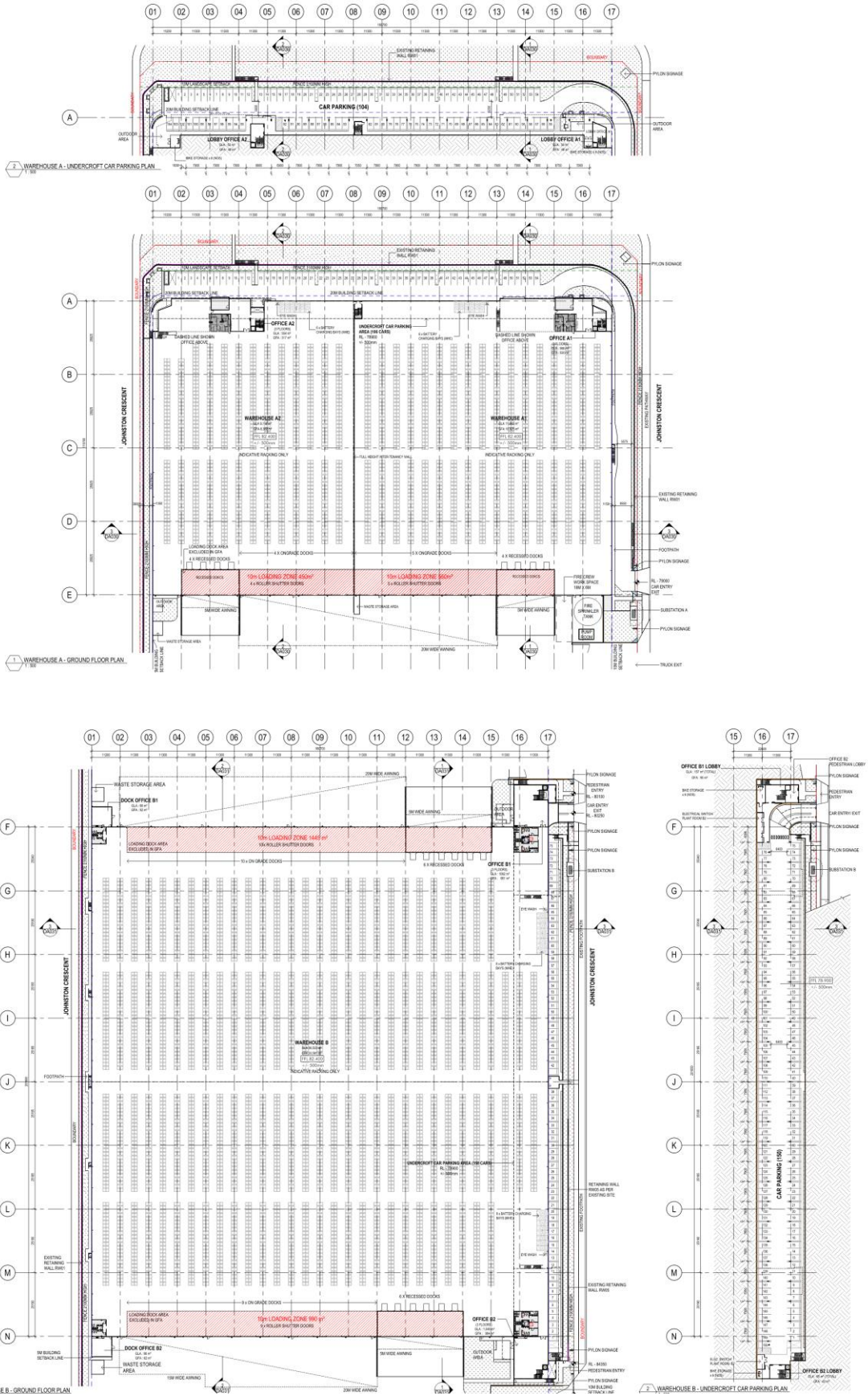


Figure 2.3. Proposed Development showing undercroft parking

2.4 CSR Estate Development Discussion

DA893.1/2013 was lodged with FCC in December 2013 & approved by the Land and Environment Court in July 2015. The approved DA included the proposed development of the 74.48 Ha estate which is proposed to be constructed in three stages.

Stage 1 & 2 has been completed and is currently being developed by others under separate approvals with FCC.

Stage 3 is located in the northern portion of the overall estate and includes the area subject to this application as shown in **Figure 2.4** below.

Bulk Earthworks plans provided by Calibre Group have been approved through a Section 4.55 application with FCC for the infrastructure works (refer **Appendix D**). These works are currently being constructed and will be finalised, or close to be finalised, prior to possession of the development lot by ESR.

Figure 2.4. Lot Layout Plan As Approved Under DA893.1/2013

The indicative master-planning for the site after the completion of all 3 stages incorporates an access road which loops the site, intersecting with Burley Road & the Reserved Road and provides access to development lots within the site. The new access road and associated intersections will be constructed to FCC requirements and ownership transferred to Fairfield Council. Large development lots will flank either side of the access road. Development lots will vary in size, typically in the order of 1.51 Ha to 13.35 Ha. The final layout will be

subject to market demands and the preferred architectural layout. Development lots will be sympathetic to the topography of the land.

The requirements for future developments and sites within the CSR land have been included in the site-specific *Development Control Plan* for the site "*Western City Employment Area – Fairfield City Council Development Control Plan 2016, Lot 1 DP106143, 327-335 Burley Road, Horsley Park"* dated March 2016. These include stormwater management requirements for water quantity and quality as set out in **Sections 5 & 6** of this report.

3 SITE WORKS

3.1 Site Geography

The site has historically (since mid-1970s) been utilised for extractive industry to enable the manufacturing of bricks. Prior to this it is expected that the ground surface once exhibited undulating terrain that was most likely covered in natural bush or grassland. Since the development of the brick manufacturing plant extensive excavation has occurred, reportedly up to 35m deep.

A preliminary geotechnical investigation was performed by Douglas Partners (DP) during October 2013. Furthermore, in the Statement of Environmental Effects for a Subdivision (December 2012) report by Brown Consulting, an analysis of the geotechnical report by Douglas Partners has been undertaken. The following summary is based on information contained in the Brown Consulting Report (December 2015).

"The geotechnical investigation by Douglas Partners was carried out to assess the subsurface conditions, which included a combination of cone penetration and boreholes, in order to provide information on:

- Depth of quarry pits.
- Preliminary extent of quarry pits.
- Composition of back fill material.
- Site preparation and earthworks; and
- Anticipated construction difficulties and potential solutions.

The report identifies several geotechnical constraints to the development on the site including:

- The presence of deep brick pits.
- The partial backfilling of the brick pits with large volumes of uncontrolled filling.
- The presence of many large stockpiles of soil and ripped rock (mostly clay and shale) situated both within the brick pits and scattered across the surrounding site areas; and
- The effects of the kilns on the soils below and surrounding the kilns within the existing brick manufacturing plant.

These geotechnical constraints do not include the existing brick manufacturing facility which includes several large warehouse and office buildings, kilns and areas of hardstand pavements which have not been assessed as part of the preliminary assessment as it was understood that they would be retained for some time in the future.

3.2 Estate Bulk Earthworks

Bulk earthworks have been performed throughout the CSR Stage 3 development area. Bulk earthworks and perimeter retaining walls have been constructed to facilitate the future development of the lots as industrial warehouse distribution use. The works have been approved by FCC and have been completed by CSR.

The approved design has been documented on Calibre Consulting "*Stage 3A Subdivision Design*" package 15-001115.17 (refer **Appendix D**).

The earthworks are being undertaken with the objective to provide large flat building pads, facilitate site access & to drain the site stormwater via gravity and to fill previous brick pits and other quarry works associated with CSR activities on the land.

Earthworks being performed for the Stage 3 development area include pads with nominal grading and levels between RL 83.2m AHD to RL 80.0m AHD. The site generally grades from the south to north of the stage area. Estate Erosion and Sediment Controls have been nominated on the Calibre design package and these measures should remain in place throughout the works period.

Retaining walls have also been constructed on the perimeter of the site to allow for future building works.

3.3 Site Bulk Earthworks

Minor earthworks will only be required as part of the industrial building development works. These works would include final trimming and shaping of the site to suit the detailed architectural site layout, final pavement and coordination of subgrade levels with slab profiles and grading to suit drainage requirements.

Details of earthworks would be provided during detail design/ construction certificate stages of the development. Detailed assessment of the earthworks level will be completed during detailed design stage and some adjustment to the final pad and building floor levels (within +/-500mm of those nominated on site layouts) may be required subject to final geotechnical testing, topsoil assessments and bulking/compaction allowances.

Soil erosion and sediment control measures including sedimentation basins will also be provided for the development – please refer to the Soil and Water Management Plan in **Section 5** of this report.

Any site-specific soil erosion and sediment control measures required to suit the ESR development layout will be performed in accordance with *Landcom Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book*. Please refer to the Soil and Water Management Plan in **Section 8** of this report.

Cut earthworks over the site will be minor, and no major changes or impacts to groundwater is expected because of these works. Reference should be made to drawings **Co12990.17-SSDA300** and **SSDA310** which include extent of earthworks and cut / fill depth across the site.

3.4 Retaining Walls

The civil engineering objective is to minimise retaining walls within the constraints of the site layout, allowing grading to suit industrial development and batters in landscaped areas where possible. Levels have been set to utilise the existing perimeter retaining wall where possible.

Location and indicative heights of retaining walls are shown on drawing **Co12990.17-SSDA50**.

The proposed development will require modifications to the existing perimeter retaining wall to align with the proposed building layout. It is proposed to reduce the height of the existing perimeter retaining wall along the northern and eastern frontage of the development site. No increase in height in the existing perimeter retaining wall is proposed as part of this development.

3.5 Embankment Stability

To assist in maintaining embankment stability, permanent batter slopes 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. This is in accordance with the recommended maximum batter slopes for residual clays and shale which are present in the area.

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**.

3.6 Supervision of Earthworks

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

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 SSDA stage of the land development process provides guidance on urban water management issues to be addressed for the estate and development as a whole.

This WCMS has been prepared to inform DPHI and FCC that the development is able to provide and integrate WCM measures into the stormwater management strategy for estate. It presents guiding principles for WCM across the precinct which includes establishing water management targets and identifying management measures required for future building developments to meet these targets, and to confirm consistency with the *Western Sydney Employment Area – Fairfield City Council Development Control Plan 2016, Lot 1 DP106143, 327-335 Burley Road, Horsley Park*.

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

Table 4.1. WCM Targets

<table>
<tr><th>Element</th><th>Target</th><th>Reference</th></tr>
<tr><td>Water Quantity</td><td>Maintaining or improving the volume of stormwater flows to estate infrastructure from development lots.

Storage Requirement (SSR) and Permissible Site Discharge (PSD) based on the individual lot areas as outlined below:

<table><tr><th>Attribute</th><th>5 year ARI</th><th>100 year ARI</th></tr><tr><td>PSD* ($m^3/s/ha$)</td><td>0.15</td><td>0.28</td></tr><tr><td>SSR* (m^3/ha)</td><td>170</td><td>290</td></tr></table></td><td>DPI

Table 3 of Western City Employment Area – Fairfield City Council Development Control Plan 2016, Lot 1 DP106143, 327-335 Burley Road, Horsley Park</td></tr>
<tr><td>Water Quality</td><td>Load-based pollution reduction targets based on an untreated urbanised catchment for whole of Estate:

Gross Pollutants 90%
Total Suspended Solids 85%
Total Phosphorus 65%
Total Nitrogen 45%
Total Hydrocarbons 90%</td><td>Western City Employment Area – Fairfield City Council Development Control Plan 2016, Lot 1 DP106143, 327-</td></tr>
</table>

Element	Target	Reference
	Load-based pollution reduction targets based on an untreated urbanised catchment for individual lots: Gross Pollutants 90% Total Suspended Solids 93% Total Phosphorus 74% Total Nitrogen 48% Total Hydrocarbons 90%	*335 Burley Road, Horsley Park*
Flooding	Buildings and road set 500mm above 1% AEP. No affectation to upstream downstream or adjoining properties as a result of development	NSW Floodplain Development Manual.
Water Supply	Reduce water consumption in non-residential properties by 40% consistent with the BASIX Scheme	FCC Stormwater Policy 2017
Erosion and Sediment Control	Appropriate erosion and sedimentation control measures must be described in the environmental assessment for all stages of construction to mitigate potential impacts to downstream areas.	Landcom Blue Book Fairfield City Council DPI

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 proposed to be managed via a series of measures provided on-lot for each individual development site.

The intention is for water quantity measures to be provided on each development lot. This will mean that the development can be assessed, approved and constructed without the need for estate level detention basins.

The site storage rate and site discharge rate has been defined for development lots in the estate DCP and allows for post development discharge to be limited to pre-development discharge, and also considers the roadways which do not include attenuation.

Reference to drawings **Co12990.17-SSDA400** to **SSDA402** should be made for location of the various stormwater management devices. These drawings are provided to demonstrate how the stormwater management objectives can be achieved. It is noted that these drawing are provided for information only and

the final system for each individual tank would depend on site constraints and final layout. It is noted that although a different system may be adopted, the required stormwater management objectives are to be met for the development as a whole.

Refer to **Section 5** of the document for detailed sizing of detention systems.

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

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

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

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

- Development sites will require full on lot treatment. The development lot will need to design and model stormwater treatment measures (which meet objectives per **Table 4.1**).
- Measures have been proposed for the development lot and include treatment trains of gross pollutant traps (GPT's) in the form of pit inserts, proprietary filters and rainwater tank. Reference to drawing **Co12990.17-SSDA400** should be made for a typical stormwater development strategy for the proposed site.

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 and CSR Estate is noted to be free from any known flooding or overland flow paths. Limited consideration to flooding and/ or overland flow from large rainfall events is required for the development.

- Water Demand Reduction/ Rainwater Reuse

Rainwater reuse measures will be provided as part of future building development design. Rainwater reuse will be required to provide a minimum rainwater tank which reduces demand on non-potable uses by at least 40%. The reduction in demand will target non-potable uses such as toilet flushing and irrigation. Refer to **Section 4.6**.

4.2 Existing / Estate Drainage System

The development site, which is located in the CSR Estate, had limited pre-existing formal drainage systems. As part of previous site uses, there was a warehouse facility and a brick quarry surrounded by dams & natural vegetation. The pre-construction site primarily drains to a small tributary of Ropes Creek on

the north of the estate, which connects to the main Ropes Creek channel downstream of the Sydney Water Pipeline, approximately 1km northwest of the site.

A trunk drainage system for minor storm events through a conventional pit and pipe system has now been constructed as part of the estate infrastructure and Stage 3 construction. Multiple lot discharge connection points, in the form of RCP pipe stubs, have been provided as part of the constructed estate drainage system for allowance for discharge and conveyance of individual lot developments. Refer **Section 2.3** and **Appendix D** for the estate drainage layout.

The minor system within the estate roads consists of a piped drainage system which has been designed and constructed to accommodate the 1 in 5-year ARI storm event (Q5), which is the minimum required by Fairfield City Council. Normal industry practice for an industrial facility is that the in-ground pipe system would be designed to cater for the 1 in 20-year ARI storm event (Q20) event to ensure suitable operation of the facility during the majority of storm events. The difference in design ARI's will result in the reduced ability for the site drainage to discharge effectively to the infrastructure drainage system. There is also the potential for surcharging of the site drainage system within the property or at the interface of the site and infrastructure drainage systems during storms in the range of 1 in 5 to 1 in 20-year ARI.

4.3 Proposed Surface Water Drainage System

As per general engineering practice, the client requirements, the guidelines of FCC and the Estate DCP, the proposed stormwater drainage system for the estate development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge.

The minor system is to consist of a piped drainage system which has been designed to accommodate the 1 in 20-year ARI storm event (Q20). This results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. The major system will be designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). The major system will employ the use of defined overland flow paths, such as roads and open channels, to safely convey excess run-off from the site.

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the standards of PCC and accepted engineering practice. Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage. Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (1988 Edition), Volumes 1 and 2 (AR&R).

Water management measures as set out in **Table 4.1** are to be adopted to address water quality, quantity and re-use requirements are to be considered in the design to ensure that any increase in the detrimental effects of pollution are mitigated, Water Quantity Objectives are met and that the demand on potable water resources is reduced.

The legal point of discharge is a point specified by Council (or other appropriate consent authority) 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 each development lot is to trunk drainage constructed by CSR as described in **Section 2.3** and **Appendix D**. Refer Costin Roe Consulting drawings included in **Appendix A** for site specific drainage layout, stormwater management measures and civil engineering considerations.

4.4 Climate Change

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

The effect on development has been assessed for a 10% increase in rainfall intensity. This increase is considered representative of potential climate change impacts for the Western Sydney area (being consistent with projected rainfall increases) in accordance with the New South Wales Department of Environment and Climate Change (DECC) 'Floodplain Risk Management Guideline Practical Consideration of Climate Change' (Table 1, October 2007).

This assessment shows that the proposed stormwater drainage system and stormwater management systems (including the proposed detention system) would have sufficient capacity to manage the increased peak flows and water volume with minor increase in hydraulic grade line and peak water level within the tanks. We confirm the increase in rainfall intensities will achieve the required minimum 0.5m freeboard to the proposed building pad levels in relation to local overland flow paths in and around the estate as nominated on the design drawings.

The site is noted to be situated well upstream from any tidally influenced receiving waters including expected potential sea level rise of 0.3m. We confirm the development will not affect or be affected by potential sea level rise due to the distance from the tidal influence river or stream system and/ or the Pacific Ocean.

An assessment on the stormwater on-site detention basin confirms that the current tank storage design has sufficient capacity to cater for a rainfall intensity increase of 10% from current rainfall intensities.

4.5 Site water Balance Objectives

A daily site water balance analysis was undertaken to determine the feasibility of the proposed rain and stormwater harvesting scheme and in particular the effects of various storage sizes for stormwater harvesting along with changes to demand.

The water balance utilised flows generated using a simple runoff calculation using historical rainfall data, analysed for various rainfall patterns including dry, mean and wet rainfall years. The purpose for modelling dry, mean and wet years was to assess the performance of various tank sizes given the changes to rainfall patterns.

4.6 Water Use Management Features

4.6.1 Existing

Existing water use features comprise Sydney Water Mains supply.
There are no existing rainwater harvesting systems, or water extractions as the proposed site is currently vacant.
There are no current irrigated landscaped areas.

4.6.2 Proposed

Proposed management measures for water use are as follows:

- Existing Sydney Water mains supply is proposed to be maintained throughout the duration of the proposed site operation.
- Stormwater harvesting throughout rainwater reuse to reduce demand on non-potable water uses.
- Sprinkler water storage via Sydney Water mains.

A concept diagram for the proposed re-use scheme is shown in **Figure 4.1** below.

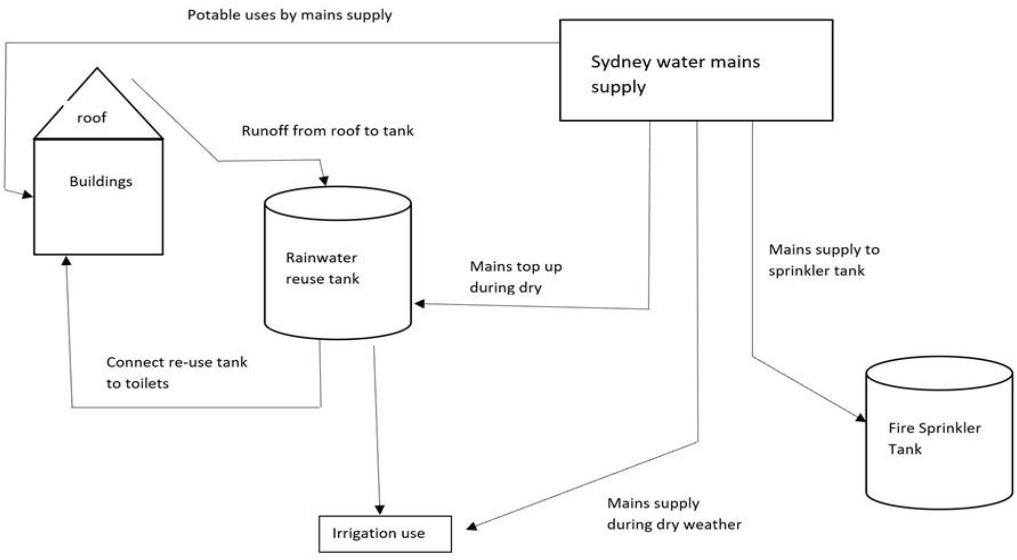


Figure 4.1. Water Cycle Management Schematic

A short description of the expected stormwater harvesting for the development is described below.

Stormwater Harvesting

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

Rainwater harvesting is proposed for this development, and rainwater tank sizing will be designed during detail design stage by the hydraulic consultant via a water balance assessment. Indicative rainwater tank size is provided in **Section 4.7.4** of this report. Rainwater tanks are to be sized with reference to the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*, using a simple water balance analysis to balance the supply and demand, based on the base water demands and the requirements of Council.

The water balance assessment will be based on local rainfall data and specific utilisation rates for the facility for re-use of non-potable applications. The expected reuse applications include internal uses such as toilet flushing, and external applications including irrigation. The aim is to reduce the water demand for the development by 40% as required in FCC Stormwater Policy 2017.

In general terms the rainwater harvesting system will be comprised the following elements:

- In-line tank for the collection and storage of rainwater.
- Overflow to the in-ground stormwater drainage system sized to cater for the catchment being drained to the tank. This will operate at times when the rainwater storage tank is full so that 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 to toilets and external irrigation areas, and any other uses as defined in the Construction Certificate stage of the design.
- Mains top up to Sydney Water system for prolonged periods of dry weather.
- First flush diverter and filters to ensure adequate quality of reuse water.
- Tank material will be steel or polymer and appropriately located to minimise visual impact.

4.7 Water Balance Assessment

4.7.1 Internal Base Water Demand

The proposed development is expected to generate 300 operational jobs. Assuming a two-shift roster, it is expected that there will be 150 employees on site per operational day.
Potable water demand is based on each employee using 25 litres per day for showering and inside tap use.
These rates give the following internal non-potable demand:

Potable Water 150 People 3.75 kL/day

Indoor non-potable water demand has been based on each employee using 15 litres of potable water per day for toilet flushing which is typical of an office environment which uses energy efficient flushing devices.
These rates give the following internal non-potable demand:

Toilet Flushing 150 People 2.25 kL/day

4.7.2 Fire Services Base Demand

The proposed sprinkler tanks for fire services require a storage of 300 kL. These are expected to be serviced twice yearly, hence total yearly demand of 600 kL has been allowed.

Fire Services 12.1 kL/day

4.7.3 Irrigation Base Water Demand

External water consumption within each landscaping system varies depending upon the nature of the irrigation system, species of planting, and the prevailing climate. For this development, the base case outdoor potable water demand has been modelled using a simple rainwater balance. The proposed irrigation system will be a drip-fed system with application rates averaging 10 L/m^2 (i.e. 10 mm/m^2). For the purposes of our analysis the average of this application rate has been used, in conjunction with the application regime shown in **Table 6.2**, to determine the monthly and total yearly demand.

Table 6.2. External Irrigation Application Schedule

Month	No. of Applications
January	11
February	11
March	10
April	9
May	8
June	4
July	4
August	4
September	8
October	9
November	10
December	12

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

Proposed Development	Irrigation tank=3500m^2	3570 kL/year
		9.8 kL/day

4.7.4 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 a simple water balance calculation to balance the supply and demand, based on the calculated base water demands and proposed roof catchment areas. Allowances in the calculation have been made for efficiency of collection, absorption/ evaporation losses.

Table 4.3. Rainwater Reuse Requirements

Lot	Roof Catchment to Rainwater Tank (m2)	Tank Size (kL)	Predicted Non-Potable Demand Reduction (%)
#3	10000	70	40

The water balance assessment predicts 40% reduction in non-potable will be met for the developments with the provision of rainwater tank as specified in **Table 4.3** above.

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

4.7.5 Overall Water Cycle Management

The following table 6.4 shows overall water cycle and each water source.

Table 4.4 Overall Water Cycle

Area	**Daily Demand (kL/ Day)**	
	Via Harvesting/ Reuse	**Via Mains**
Internal	1.32	7.48
External	3.92	5.88
Fire	-	12.1
Total	5.24	25.46

4.7.6 Operational Impact Assessment

Rainwater harvesting is proposed to reduce demand on non-potable applications.

An existing and reliable water supply is available during operations.

Impact on environment from water use is considered to be acceptable.

5 WATER QUANTITY MANAGEMENT

5.1 General Design Principles

Stormwater attenuation is required to limit post development flow rates to pre-development flow rates. This can be achieved through water quantity management via stormwater detention or "On-site Detention (OSD)", to ensure the cumulative effect of development does not have a detrimental effect on the existing stormwater infrastructure and watercourses located within their LGA downstream from the site.

As set out in **Table 5.1**, Site Storage Requirement (SSR) and Permissible Site Discharge (PSD) are based on controls included in the site-specific *Development Control Plan* (DCP) for the site "*Western Sydney Employment Area – Fairfield City Council Development Control Plan 2016, Lot 1 DP106143, 327-335 Burley Road, Horsley Park"* dated March 2016.

The requirements for detention as approved are set out in *Table 3 in Section 3.2* of the DCP, as originally formulated in the Stormwater Management Strategy completed by Brown Consulting is for each lot to construct their own detention system with based on the individual lot areas as outlined in excerpt **Table 5.1** below.

Attribute	5 year ARI	100 year ARI
PSD* ($m^3/s/ha$)	0.15	0.28
SSR* (m^3/ha)	170	290

Table 5.1-PSD & SSR - Brown Consulting (June 2014) & Table 3 of DCP2016

Attenuation of stormwater runoff from the whole of the development is proposed to be managed through several OSD systems on the development lot. The sizing of the development lot detention systems is noted to account for the road catchments remaining un-attenuated such that the total post-development runoff from the whole of the CSR estate is less than or equal to pre-development runoff as required of the DCP.

Refer to drawings included in **Appendix A** for location and general arrangement of detention systems, and **Table 5.2** below which shows PSD and SSR for each sub catchment area.

Tank ID	Area (Ha)	PSD (m3/s)		SSR (m3)	
		5yr ARI	100yr ARI	5yr ARI	100yr ARI
1	0.79	0.12	0.22	134	232
2	1.21	0.18	0.34	206	351
3	4.21	0.63	1.18	715	1220
4	2.55	0.38	0.71	435	740

Table 5.2. PSD and SSR for Development Catchments

6 STORMWATER QUALITY, REUSE AND MAINTENANCE

6.1 Pollution Target Parameters

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

The requirements for stormwater quality is to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reduction on develop catchment and are as follows:

Table 6.1. Estate Pollution Reduction Targets

Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	60%
Total Nitrogen	45%

As set out in **Table 4.1 & 6.2**, target rates for individual sites are greater than the base rates noted above, due to development sites being required to provide offset for untreated portions of the overall estate (e.g. the estate road and any other area which bypass treatment) so that the overall estate achieves the required pollution reductions.

Brown Consulting have used the MUSIC software package to model the water quality treatment, allowing for the untreated roads and other bypass areas, have quoted the required pollution reduction rates as follows:

Table 6.2. Individual Lot Pollution Reduction Targets

Gross Pollutants	90%
Total Suspended Solids	93%
Total Phosphorus	74%
Total Nitrogen	48%

6.2 Proposed Stormwater Treatment System

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

Components of the treatment train for the estate areas follows:

- Proposed developed lot will require on-lot treatment measures which meet the load-based percentage requirements noted in **Section 6.1** and **Section 4.1**.
- On-lot systems will comprise proprietary filters in combination with pit inserts.
- A portion of the building roofs will also provide a level of treatment via rainwater reuse and settlement within rainwater tank.

6.3 Stormwater Quality Modelling

6.3.1 Introduction

The MUSIC model was chosen to model water quality. This model has been released by the Corporative 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 100Km^2 and utilises a continuous simulation approach o model water quality.

By simulating the performance of stormwater management systems, MUSIC can be used to predict if these proposed system 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 included in Section4.1 & Section 6.1 of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The MUSIC model "12990.17-REV 1.sqz" was set up to examine the effectiveness of the water quality treatment train and to predict if council requirements have been achieved on an estate wide basis and on individual lots respectively. The layout of the MUSIC model is presented in **Appendix B**.

6.3.2 Rainfall Data

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

6.3.3 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

6.3.4 Pollutant Concentrations

Pollutant concentrations for source nodes are based on values nominated by Fairfield City Council for industrial land use as per the **Table 6.3**:

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	-1.11	0.48	0.14	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

Table 6.3. Pollutant Concentrations

The MUSIC model has been setup with a treatment train approach based on the pollutant concentrations in **Table 6.3** above.

6.3.5 Modelling Discussion

MUSIC modelling has been performed to assess the effectiveness of the selected treatment trains, at both an estate level and individual lot level, and to ensure that the pollutant retention requirements have been met.

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

Hydrocarbon removal cannot easily be modelled with MUSIC software. The proposed distribution/ storage facility would be expected to produce low source loadings of hydrocarbons. Potential sources of hydrocarbons would be limited to leaking engine sumps or for accidental fuel spills/leaks and leaching of bituminous pavements (car parking only). The potential for hydrocarbon pollution 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 pit inserts and filtration cartridges which are predicted to achieve a 90% reduction of this pollutant.

Given the expected low source loadings of hydrocarbons and removal efficiencies of the treatment devices we consider that the requirements of the FCC and the DCP have been met.

6.4 Stormwater Harvesting

Refer to **Section 6.6** for details on the stormwater harvesting system.

6.5 Maintenance and Monitoring

It is important that each component of the stormwater system and water quality treatment train is properly operated and maintained. In order to achieve the design treatment objectives, an indicative maintenance schedule has been prepared and included as **Appendix E** 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

Consideration to flooding has been made as part of the project assessment.

The South Creek Flood Study, The Updated South Creek Flood Study, by Worley Parsons, 8th May 2014 has been utilised to confirm the relationship between known flooding areas and overland flow paths with the development site.

The South Creek Study is a regional study commissioned by Penrith Council in-conjunction with Blacktown, Liverpool and Fairfield Councils. The study includes South Creek and associated tributaries, defining flood planning levels and hydraulic hazard zones along the creek, creek floodplain areas and tributaries.

The site is located within the Ropes Creek Catchment to the east of Ropes Creek as shown below in **Figure 7.1** below.

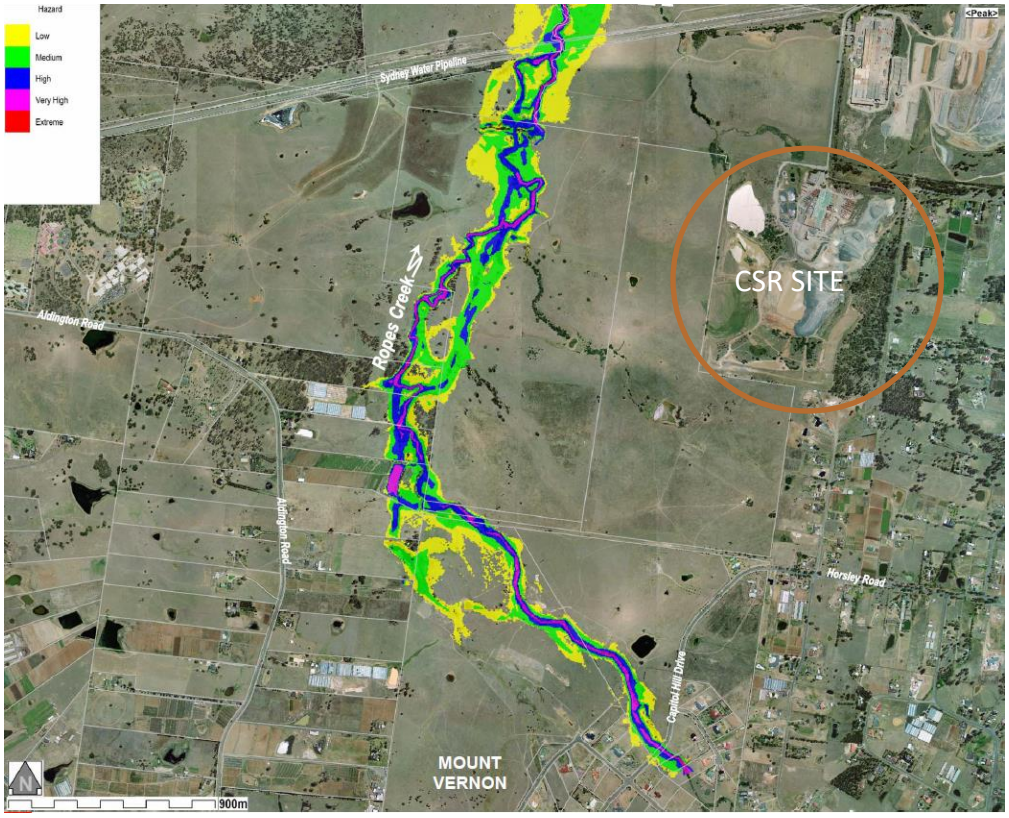


Figure 7.1-Provisional flood hazard mapping for the 1 in 100-year ARI flood. (Source: Worley Parsons)

Using the Fairfield City Council flood planning maps in conjunction with the Worley Parson's South Creek Flood Study, as depicted above it **Figure 7.1**, it can be concluded that the site has a very low risk of flooding affectation from Ropes Creek or other regional flooding. Further that there is no risk that the new development will affect known overland flow paths or other flood affected areas, given local drainage systems for the development are constructed per the recommendations included in this document.

The survey levels also show that the estate is not affected by any external catchments so flooding from local overland flow is also not considered to be a risk for the estate.

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. An *Erosion and Sediment Control Plan* (ESCP), or equivalent, would be implemented for the construction of the Proposal. The 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, several 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 the development, and completion of development works.

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

- Demolition and removal of existing buildings and retaining existing concrete slabs where possible.
- Erosion and sediment control installation.
- Grading of existing earthworks to suit building layout, drainage layout and pavements.
- Stormwater and drainage works.
- Service installation works.
- Building construction works.

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

8.2 Typical Management Measures

Sediment Basins

A sediment basin has been sized for this development based on the 5-day 85th percentile rainfall and located to ensure sediment concentrations in site runoff are within acceptable limits. Preliminary basin sizes have been calculated in accordance with the Blue Book and are based on "Type D" soils.

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 surrounding properties and 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 INFRASTRUCTURE SERVICES

9.1 Services Introduction

The subject site has been serviced with key municipal services as part of its previous subdivision completed by CSR. However, the site will require service connections to suit the new development layout.

An overview of the existing and proposed infrastructure requirements for the development is outlined in the following sections. The report considers the supply and management of the following services required for the development of the property:

- Potable Water (Drinking water);
- Wastewater (Sewer);
- Recycled Water;
- Electricity;
- Gas; and
- Communications

Specifically, the report provides an overview of the following information:

- Layout of existing service networks based on a general service plan prepared by Costin Roe Consulting, as shown on drawing **CO12990.17-SSDA150**;
- Dial Before You Dig (DBYD) information; and
- Indicative utility demands for the current development proposals where available.

An assessment of existing services infrastructure has been undertaken to determine the suitability of existing supply and the need for augmentation and or extensions to suit the proposal.

9.2 Potable Water (Drinking water)

Sydney Water is the servicing authority for potable water in the suburb of Horsley Park.

The existing potable water Sydney Water assets within the site area include:

- A 150mm oPVC line in Johnston Crescent on both east and west side of the development; and
- A 300mm DICLSC line in Reserved Road on the north of the development.

No connections are currently available from the existing potable water infrastructure to the development lot.

Formal advice from Sydney Water will come in the form of a Notice of Requirements at the issuance of a Development Approval for the development. This will confirm connections requirements to the subject site and the new development.

Detailed design to the requirements of Sydney Water will be prepared and approved by Sydney Water following the receipt of the Notice of Requirements, post development approval.

9.3 Wastewater (Sewer)

Sydney Water is the servicing authority for sewage disposal in the suburb of Horsley Park.

The existing Sydney Water wastewater assets within the site area include:

- A 225mm PP line within the development lot fronting the east of Johnston Crescent; and
- A 375mm GRP line in Reserved Road on the north of the development.

No connections are currently available from the existing wastewater infrastructure to the development lot.

Formal advice from Sydney Water will come in the form of a Notice of Requirements at the issuance of a Development Approval for the development. This will confirm connections requirements to the subject site and the new development.

Detailed design to the requirements of Sydney Water will be prepared and approved by Sydney Water following the receipt of the Notice of Requirements, post development approval.

9.4 Recycled Water

There is no recycled water infrastructure present in the vicinity of the proposed development.

9.5 Electricity

Endeavour Energy is the Electrical Authority in the site area. Endeavour Energy will issue approvals for the required electrical connection for the development site.

Edgewater Connections have been engaged to review electrical supply and any required extensions.

Edgewater Connections have contacted Endeavour Energy and provided confirmation that the electrical capacity at the frontage of the site (2MVA) is sufficient to cater for the expected maximum demand of 1.85MVA from the proposed development. If a large load customer requires more than 2MVA, additional capacity if available from Eastern Creek Zone Substation.

Reference should be made to the letter prepared by Edgewater Connections referenced: EWC5997 dated 12 March 2024.

9.6 Gas

Jemena is the gas Authority in the site area. Jeena will issue approvals for the required gas connections for the development site.

The existing Jemena gas assets within the site area include:

- A 150 ST 1050 kPa line in Reserved Road on the north of the development;
- A 160 PE 210 kPa line in Johnston Crescent on the west of the development.

No connections are currently available from the existing gas infrastructure to the development lot and any new connection will be subject to Jemena approval

9.7 Communications

NBN Co and Telstra are the relevant Communications Authority in the site area.

Existing NBN / Telstra services are available in Johnston Crescent and can be readily extended to the development site. The need for minor extensions will be confirmed with NBN Co / Telstra following issuance of the Development Approval.

10 CONCLUSION

This Civil Engineering Report has been prepared to accompany an SSDA to the NSW DPHI for the development of an 8.67 Ha land parcel located within the Stage 3 of the CSR Estate in Horsley Park.

An overview of FCC and DCP requirements for stormwater management and access has been provided to assist in the SSDA submission. Specific mention has been made to on-site detention and water quality requirements as required as part of the Water Cycle Management Plan for the development lot.

A strategy for the management of stormwater for the site has been provided based on the management measures to be provided as on-lot measures. This option is in the form of a series of combined detention and water quality tanks located at site discharge locations.

The water cycle management strategy has been prepared to ensure compliance with local Council requirements for drainage, water quantity management (on-site detention), water quality management (water sensitive urban design) and to mitigate adverse downstream impacts.

We recommend the strategies included in this report are adopted and integrated into the proposed development.

11 REFERENCES

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);

Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM);

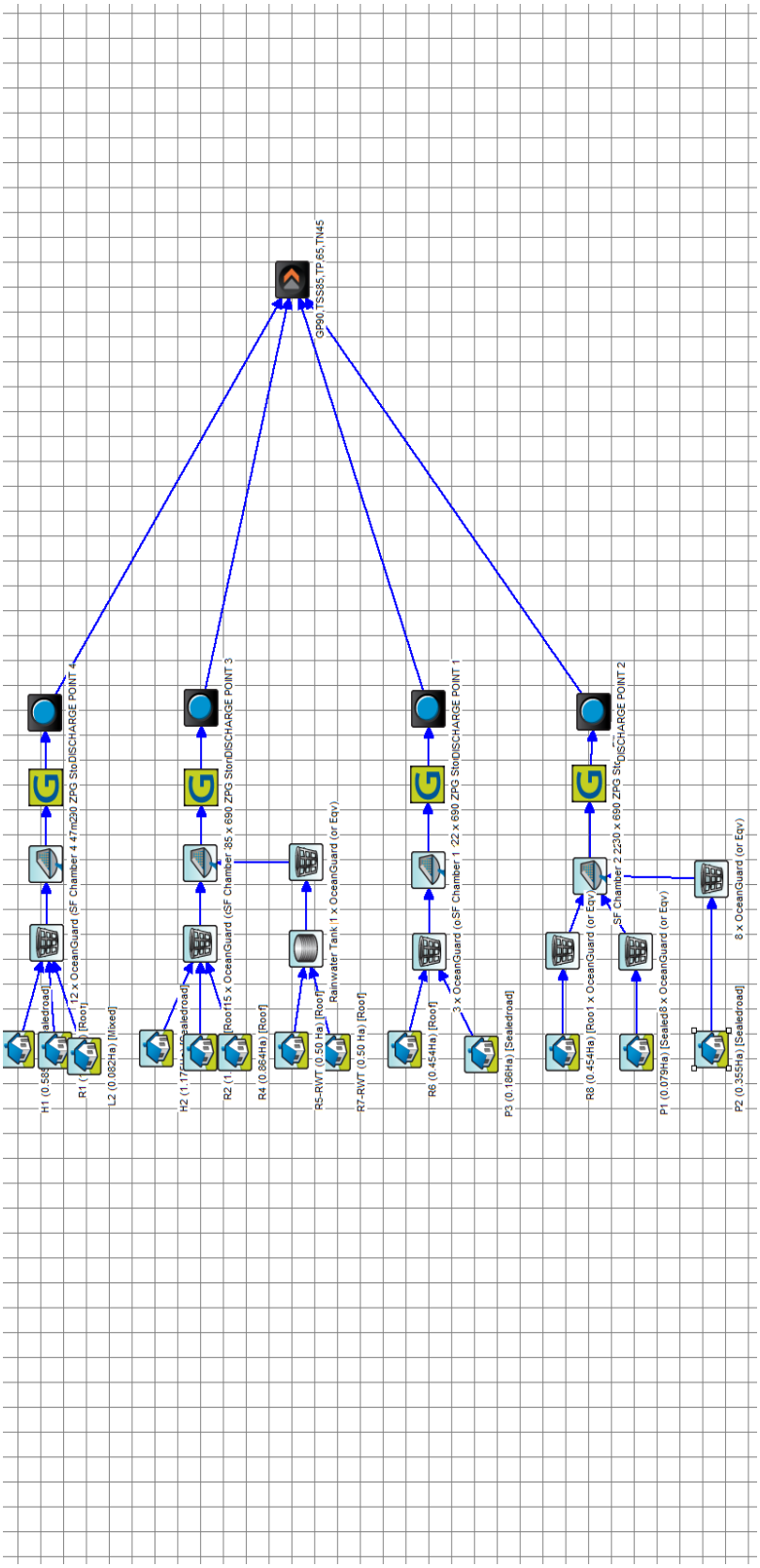
Fairfield City Council – Development Control Plan 2013,

Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004

Appendix A
Drawings By Costin Roe Consulting Pty Ltd
SSDA Drawings

Appendix B

MUSIC Layout



Appendix C
SSD SEAR's

Appendix D
Calibre Consulting "*Stage 3A Subdivision Design*" Reference Package 15-001115.17.

Appendix E
Email Correspondence for Council Meeting dated 26 June 2024