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STORMWATER MANAGEMENT PLAN

SSD-10436

LOT 201, DP 1244593
ESR HORSLEY LOGISTICS PARK
HORSLEY PARK NSW

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1 INTRODUCTION

1.1 Background

Costin Roe Consulting Pty Ltd has been commissioned by Hansen Yuncken to prepare this *Stormwater Management Plan (SMP)* for the construction and operation of the Lot 201 development at the ESR Horsley Logistics Park, as approved by the NSW Department of Planning, Infrastructure & Environment (DPIE) SSD-10436 (dated 31 March 2021) consent.

The submission of the SMP for approval by DPIE has been completed in accordance with **Conditions of Consent (CoC) B32 – Stormwater Management**. This SMP forms part of the *Construction Environmental Management Plan* (CEMP) as required of **CoC C2** and the *Operational Environmental Management Plan (OEMP)* as required of **CoC C5.**

The SMP has been prepared in accordance with the reporting requirements of **CoC C1**.

The subject area of this SMP comprises the stormwater management plan for the Lot 201 DP 1244593. These works include drainage requirements for the proposed building development located on Lot 201.

It is further noted that this SMP has been completed with consideration to the Costin Roe Consulting "Ci*vil Engineering Report Incorporating Water Cycle Management Strategy* (Ref: **Co12990.05-02d.rpt**)" included in the Environmental Impact Statement (EIS) for the approved SSD-10436.

1.2 Scope

This SMP provides details of the design principles and construction requirements for stormwater management, as part of a CEMP & OEMP required for the DPIE submission approval under **CoC B32**.

This plan details the stormwater management procedures for water quantity and quality during construction and during operation as described in **Section 1.1** and **Section 2.2** of this SMP.

This SMP should be read in conjunction with the *Civil Engineering* design package, drawings **Co12990.09-C** as included in **Appendix A**.

1.3 Conditions of Consent Matrix

The SMP and associated stormwater design drawings have been completed in accordance with the approved stormwater management strategy and EIS approved in the NSW DPIE in SSD-10436.

We provide the following tables which confirms how and where, within the report or respective drawings and models, each of the requirements of SSD-10436 **CoC B30** through **B33** have been met.

SSD-10436 Consent Condition Matrix

CoC No.	***Item***	***Response***
Imported Soil		
B30	*The Applicant must:* *a) ensure that only VENM, ENM, or other material approved in writing by EPA is brought onto the site;* *b) keep accurate records of the volume and type of fill to be used; and* *c) make these records available to the Planning Secretary upon request.*	Response The requirement for VENM and ENM is included in **Section 3.4** of the **SMP**.
Erosion and Sediment Control		
B31	*Prior to the commencement of any construction, the Applicant must install and maintain suitable erosion and sediment control measures on-site, in accordance with the relevant requirements of the Managing Urban Stormwater:* *Soils and Construction - Volume 1: Blue Book (Landcom, 2004) guideline.*	Response The SMP and associated erosion and sediment control plans have been completed as required of *Managing Urban Stormwater - Soils and Construction Volume 1 (Landcom 2004)*, Council requirements and per accepted engineering and best practice. **Sections 3** through **7** of the SMP include procedures for maintaining erosion and sediment controls in efficient working order for the duration of construction, to ensure compliance with **CoC B31**.
Stormwater Management		
B32	*Prior to the commencement of construction of each warehouse, the Applicant must prepare a Stormwater Management Plan to the satisfaction of the Planning Secretary. The Stormwater Management Plan plan must form part of the CEMP and OEMP required by conditions C2 and C5 and must:* *a) be prepared by a suitably qualified and experienced person(s), in consultation with Council;* *b) detail the design of stormwater management system for the*	Response This SMP has been prepared for the applicant by Costin Roe Consulting Pty Ltd, civil and structural consulting engineers. Costin Roe Consulting is experienced in the preparation and implementation of *Stormwater Management Plans* for industrial developments of similar scope to this development. Recent similar projects include SSD approved developments such as Moorebank Intermodal Precinct, The Eastern Creek Business Park Stages 4 & 5, The Horsley Drive Business Park Stage 1 at Wetherill Park, Altis First Estate at Erskine Park, Prestons Industrial Estate at Prestons and the DEXUS Quarry at Greystanes.

CoC No.	Item	Response
	development generally in accordance with the conceptual design in the EIS; *c) be in accordance with applicable Australian Standards;* *d) ensure that the system capacity has been designed in accordance with Australian Rainfall and Runoff (Engineers Australia, 2016) and Managing Urban Stormwater: Soils and Construction - Volume 1: Blue Book (Landcom, 2004); and* *e) be prepared in accordance with the 327-335 Burley Road, Horsley Park Development Control Plan (March 2016).*	Consultation with Council has been undertaken as part of the SSD approval process**.** Refer to Section 11.2 of the report prepared by Costin Roe '*12990.05-02d.rpt*' dated 20 October 2020. The SMP and associated ESCP have been prepared in accordance with *Managing Urban Stormwater - Soils and Construction Volume 1 (Landcom 2004).* The SMP would require designs to be completed in accordance with, Australian & New Zealand Standard AS/NZS 3500.3:2003 Plumbing and drainage – Stormwater Drainage, Fairfield City Council requirements and per accepted engineering and best practice. In addition to the Fairfield City Council documents noted above, the SMP design are completed with consideration to *327-335 Burley Road, Horsley Park Development Control Plan (March 2016).*
B33	*The Applicant must:* *a) not commence construction until the Stormwater Management Plan required by condition B32 is approved by the Planning Secretary; and* *b) implement the most recent version of the Stormwater Management Plan approved by the Planning Secretary for the duration of the development.*	Response Construction is noted to not begin until the SMP is approved by the planning secretary. The responsibility for compliance of all CoC's required for construction remains with the applicant and the certifier. The most recent version of the SMP is to be adopted on site by the management team and provided to individual stakeholders. The responsibility to ensure the most recent version of the SMP is implemented remains with the applicant
Management Plan Requirements		
C1(a)	*Detailed Baseline Data*	Response Detailed baseline data pertaining to stormwater is included in **Section 2** and **Appendix C** of the SMP.
C1(b)	*Details of:* *(i) The relevant statutory requirements (including relevant approval, licence or lease conditions);*	Response Statutory requirements are included in **Section 3.3** of the SMP. Stormwater objectives and discharge control criteria, being the measure of performance and

CoC No.	*Item*	*Response*
	(ii) Any relevant limits or performance measures and criteria; and *(iii) The specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures.*	performance indicators, are provided in **Section 7** of the SMP.
C1(c)	*A description of the measures to be implemented to comply with the relevant statutory requirements, limits or performance measures and criteria*	Response Measures required to be implemented are included in the **Section 3** and **8** of the SMP.
C1(d)	*A program to monitor and report on the:* *(i) Impacts and environmental performance of the development* *(ii) Effectiveness of the management measures set out pursuant to paragraph (c) above.*	Response Inspection and monitoring requirements have been included in **Section 7** and **11** of the SMP. Additional reference to **Sections 3.6 to 3.10** should be made for contingency planning, incident classification and notification, environmental auditing and reporting, non-compliance, non-conformance and actions, and review and improvement requirements, respectively.
C1(e)	*A contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible.*	Response Reference to **Section 3.6** of the SMP for contingency planning.
C1(f)	*A program to investigate and implement ways to improve the environmental performance of the development over time.*	Response Reference to **Section 3.9** should be made for review and improvement requirements.
C1(g)	*A protocol for managing and reporting any:* *(i) Incident and any non-compliance (specifically including any exceedance of the impact assessment criteria);* *(ii) Complaint;*	Response Reference to **Sections 3.6 to 3.8** should be made for, incident classification and notification, environmental auditing and reporting, non-compliance, non-conformance and actions requirements respectively.

CoC No.	*Item*	*Response*
	(iii) Failure to comply with statutory requirements;	
C1(h)	*A protocol for periodic review of the plan.*	Response Reference to **Sections 3.10** should be made review and improvement requirements.

2 DEVELOPMENT SITE

2.1 Site Description

Lot 201 of DP1244593 is located on the southern side of Burley Road in the suburb of Horsley Park as shown in **Figure 2.1**. In 2013, Development Application DA893.1/2013 was approved. The parcel of land being reviewed as part of this assessment comprises Stage 2 of the original CSR Estate subdivision approval (refer **Section 2.3**).

Figure 2.1. Locality Plan (Nearmap, 2021)

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 RL83.00m AHD, is located on the western side of the site and the lowest level, at approximately RL 74.00m AHD, is in the middle portion of the site. It is noted that initial earthworks and grading works have been commenced by CSR for Stage 2 as per Nearmap image update. Earthworks and grading works has been completed for the portion of land which comprises Lot 201

Reference should be made to **Section 2.2** for the proposed development works and **Section 2.3** for discussion regarding the CSR Estate Works.

2.2 Proposed Development Description

The proposed development is for the construction of an industrial building over Lot 201, comprising an area of approximately 7.71 Ha. The proposed development layout is shown in **Figure 2.2**.

The development comprises a single large steel framed warehouse/ distribution type building with associated office space, car parking, fire access roads, truck circulation and truck loading and unloading areas.

Access to Lot 201 is made via the CSR Estate Access Road (refer **Section 2.3**).

Infrastructure works (including bulk earthworks, provision of services, drainage connections, road & intersection construction) have been completed by CSR under separate FCC approval as discussed in **Section 2.3**.

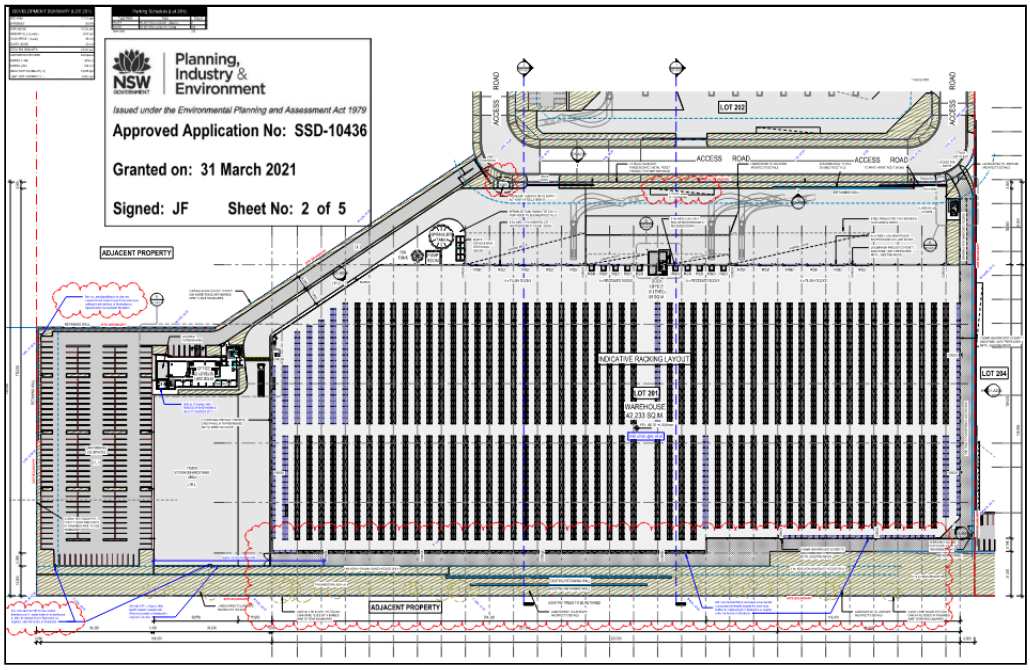


Figure 2.2. Proposed Development

2.3 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 has been completed and is currently being developed by others under separate approvals with FCC.

Stage 2 is located in the southern portion of the overall estate and includes the area subject to this application.

Stage 3 has not commenced construction and is noted to be outside the scope of this report.

The infrastructure works for *Stage 2* include bulk earthworks and infrastructure servicing construction including estate roadways, trunk drainage and individual drainage connections, water supply, sewer, power and telecommunications.

Bulk Earthworks plans provided by Calibre Group have been applied and approved through a Section 4.55 application with FCC for the infrastructure works. These works are currently being constructed and are close to being finalised, prior to possession of the development Lot by the applicant.

The *Stage 2* works will encompass the construction of the proposed 20m wide access road off the Burley Road reserve and a temporary turning head and stormwater infrastructure.

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 as shown in **Figure 2.3**. 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 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 9 & 10** of this report.

Figure 2.3. Lot Layout Plan As Approved Under DA893.1/2013

2.4 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.

2.5 Estate Earthworks

Bulk earthworks are currently being performed throughout the Stage 2 development area to facilitate the development of individual development site in the estate for industrial warehouse distribution use. The works have been approved by FCC and are being completed by CSR. The earthworks and site grading for Lot 201 have reached or are close to nearing completion.

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 2 development area include pads with nominal grading and levels between RL 90.5m AHD to RL 83.5m AHD. Site generally grade from the south-east to north/ north-west 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.

2.6 Site Earthworks

Minor earthworks only will 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 have been provided during detail design/ construction certificate stages of the development as included in **Appendix A**.

Soil erosion and sediment control measures including sedimentation basins will also be provided for the development – please refer to **Section 4 to 7** 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 **Section 4 to 7** 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.

2.7 Groundwater

Given the proposed works involve minor changes to the earthworks levels completed as part of this approval, the impact on the overall groundwater system as a result of the proposed earthworks over the site is expected to be low.

The effect on impact is considered to meet the requirements of the SEARS and initial responses by the NSW DPI.

2.8 Climate and Meteorology

The Horsley Park area experiences relatively mild temperatures and moderate rainfall, with a yearly average rainfall of about 780mm, based on records from the nearest observation site at Horsley Park since 1997 (Station 67119).

Typically, the wettest month (mean rainfall) is February, and driest is September. It is noted that July and August show similar mean rainfall amounts to September.

The annual mean minimum temperature is 12.1°C and the mean maximum temperature is 23.9°C. The hottest month is usually January (mean maximum of 30.1°C) and the coldest month is usually July (mean minimum of 5.8°C).

Climate statistics and average annual rainfall data and rainfall patterns relevant to this site (Horsley Park as sourced from Australian Bureau of Meteorology (BOM)) are included for reference in **Appendix C** of this **SMP**.

3 GENERAL REQUIREMENTS

3.1 Introduction & Reference Documents

This SMP has been prepared with the purpose of confirming the stormwater management strategy for the construction and operational phase of Lot 201 development approved under SSD-10436.

This SMP has been prepared to manage soil and stormwater runoff during construction and the guidelines in *Managing Urban Stormwater - Soils and Construction Volume 1 (Landcom 2004)* for any works during construction.

Contractors will ensure that all soil and water management is undertaken in accordance with this CSMP and the guidelines in *Managing Urban Stormwater - Soils and Construction Volume 1 (Landcom 2004)*.

This SMP has been prepared to manage stormwater runoff during operation and the guidelines in *327-335 Burley Road, Horsley Park DCP (March 2016)* for operation of the development.

The civil engineering and stormwater drainage designs are shown on drawings **Co12990.09-C** (refer **Appendix A**).

3.2 Roles and Responsibilities

1. The applicant and their management team are responsible for the implementation of this SMP during operational phase.
2. During construction all personnel have the responsibility to stop works if there is potential for a safety or environmental incident to occur per the SMP and CEMP.
3. The key roles and responsibilities for the Project personnel in relation to stormwater management are outlined below in **Table 3.1 and 3.2**.

Table 3.1 Roles and Responsibilities (During Construction)

Role	Responsibilities
Contractor's Project Manager (Contractor's PM)	Manage the delivery of the construction process in relation to soil and water quality management at the site in conjunction with the Contractor's EM. Provide for training in erosion and sediment control for personnel directly involved with the implementation of this plan, as required. Identify and allocate Project resources to implement the requirements of this plan. Oversee the implementation and maintenance of this plan.
Contractor's Construction	Communicate with all workers including sub-contractors regarding compliance with the SMP.

Role	Responsibilities
Manager (Contractor's CM)	Record and communicate volume of spoil imported to site to the Principal's Representative on a weekly basis. Coordinate the implementation and maintenance of erosion and sediment controls and provide support for the Contractor's EM.
Contractor Environmental Manager (Contractor's EM)	Co-ordinate to undertake monthly inspections and report on implementation of this plan. Recommend any improvements to the plan and site control measures in conjunction with the engineer. Develop, implement, monitor and update the progressive CESCPs as required. Direct works to be performed in accordance with this plan. Review works proposed within the riparian zone. Maintain site records confirming achievement of water quality objectives prior to discharge. Maintain relevant waste disposal records Co-ordinate the sampling and assessment of waters and sediments in control structures to enable classification and reuse, discharge or disposal in an appropriate manner on or off site. Maintain the site water quality register (8.2) Record environmentally relevant incidents. Manage and respond to reported incidents.
Site Supervisor	Present toolbox talks that include the requirements of this plan. Inform staff of their obligation to comply with EWMS and CESCPs and SMP. Communicate the volume of spoil imported to site on a daily basis to the Contractor's CM. Manage and respond to reported incidents. Approval to make new infrastructure operational. Co-ordinate and report on daily and weekly inspections. Co-ordinate inspection and monitoring of equipment washdowns, waste handling and other construction related activities that influence the site's management of soils and water.
All Personnel	Comply with the requirements of this SMP.

Role	Responsibilities
	Report any observed failure of ERSED infrastructure to the Contractor's EM or Site Supervisor. Report all environmental incidents to the Site Supervisor and/or the Contractor's EM.

Table 3.2 Roles and Responsibilities (During Operation)

Role	Responsibilities
Applicant/ Estate Owner	Provide for training in stormwater management for personnel directly involved with the implementation of this plan, as required. Identify and allocate Project resources to implement the requirements of this plan. Oversee the implementation and maintenance of this plan. Ensure all measures are performing adequately throughout the operation of the estate in perpetuity.
Estate Management Body	Ensure maintenance and monitoring of the stormwater management measures are undertaken in accordance with **Section 7** and **Appendix D**.
Individual Lot Owners/ Tenants	Ensure internal drainage systems function adequately and maintenance and monitoring of their own site-specific stormwater management measures (rainwater tanks, individual drainage system) are undertaken in accordance with **Section 7** and **Appendix D**. Ensure personnel are educated in the overall estate stormwater management conditions.

3.3 Legal and Regulatory Requirements

The below sets out the legislation and planning instruments considered in the preparation of this sub plan. It is noted that the regulatory framework for the project is set out in the *CEMP* and the *OEMP*.

The Project has been approved under the *Environmental Planning and Assessment Act* 1979 (EP&A Act).

The SMP has been prepared in accordance with the **CoC C2 and CoC C5** of SSD-10436 (as set out in **Section 1.3** of the SMP) and forms a subsection of the *CEMP* and *OEMP*. This plan is to be read in conjunction with the *CEMP*, the *OEMP* and any statutory requirements and other management measures included in the *CEMP & OEMP*.

The plan has been completed in accordance with all relevant approvals and regulatory framework.

Table 3.3 lists regulatory guidelines and documents relevant to the SMP.

Table 3.3. Regulatory Documents and Guidelines

Legislation	Description	Relevance to the CSWMP
Environmental Planning and Assessment Act 1979	This Act establishes a system of environmental planning and assessment of development Projects for the State.	The CoCs and obligations issued under Part 4 of the EP&A Act are addressed in this plan.
Protection of the Environmental Operations Act 1997	The objectives of this Act relate to the protection of the environment through pollution prevention and cleaner production, among others.	Relevant sections of the Act, including duties to report pollution incidents and disposal regulations have been incorporated into this plan and incident response procedures. A key legislative requirement applicable to construction soil and water management is Section 120 of the Protection of the Environment Operations Act 1997 which relates to pollution of waters and the need to implement all reasonable and feasible measures to minimise the risk of pollution of waters. Part 5.7 of the Act requires that a pollution incident causing or threatening material harm to the environment be notified to EPA and other relevant authorities as outlined in the CEMP. Material harm constitutes actual or potential harm to the health or safety of humans and/or ecosystems that is not trivial, or results in actual or potential loss or property damage of amounts in excess of $10,000 in total.
Contaminated Land Management Act 1979	The general object of this Act is to establish a process for investigating and (where appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation under Division 2 of Part 3, and to ensure that contaminated land is managed with regard to the principles of ecologically sustainable development.	Contamination on site must be assessed and managed in accordance with this act. Division 2, Part 3, Section 11-17 of this Act details requirements for the Management of Contaminated Land.
Water Management Act 2000	The objects of this Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations.	Although it is not envisaged that any construction activities would be undertaken on waterfront land, any waterfront activities that do occur would be conducted generally in accordance with the NSW Office of Water's Guidelines for Controlled Activities.
Fisheries Management Act 1994	The objectives of this Act seek to conserve fishery resources, fish stocks and key fish habitats.	This SMP has been prepared to maintain existing flow regimes surrounding the site and to contain water onsite within sediment basins until discharged with strict water quality requirements. No

Legislation	Description	Relevance to the CSWMP
		impacts to fisheries are envisaged as a result of Project construction.
Dangerous Goods Regulation (Road and Rail Transport) 2014	The main objects of this Regulation are to give effect to the standards, requirements and procedures of the Code so far as they apply to the transport of dangerous goods by land transport, and to promote consistency between the standards, requirements and procedures applying to the transport of dangerous goods by land transport and other modes of transport.	Provisions relating to the storage and transport of dangerous good, such as fuelling procedures and fuel storage, are incorporated into this plan.
Commonwealth Environmental Protection and Biodiversity Conservation Act 1999	The objectives of this Act seek to promote environmental protection, ecologically sustainable development, biodiversity conservation and the promotion of heritage, among others.	

Additional guidelines and standards considered in relation to the management of stormwater include:

- Fairfield City Council – DCP 2013
- Fairfield City Council, *Stormwater Management Policy* (September 2017)
- Fairfield City Council, *Specification for Roadworks and Drainage associated with subdivision or other development - Policy No. 4-515 (September 2011)*
- Fairfield City Council, *Western Sydney Employment Area – Lot 1 DP 106143 327-335 Burley Road, Horsley Park Development Control Plan* (March 2016)
- Managing Urban Stormwater – Soils and Construction Volume 1, 4th Edition (Landcom 2004);
- 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);
- Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004
- AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage.
- "Australian Rainfall and Runoff" (1987 Edition), Volumes 1 and 2 (AR&R).

3.4 General SMP Requirements

1. This document is noted to form a sub-plan as part of the *CEMP* as required under **CoC C2** to **C4** and the *OEMP* under **CoC C5** to **C7**.
2. This document and associated drawings are subject to further periodic review throughout the works and operational period to ensure the requirements and measures set out in this SMP are fit for purpose and allow for any changes which might occur during construction not envisaged during the initial preparation of the SMP.
3. All stormwater management control measures will conform to the standards and specifications contained in:
   (i) This SMP;
   (ii) Conditions of Consent; and
   (iii) the approved *CEMP, OEMP* and supporting documentation.
4. Any works that may cause significant soil disturbance and are ancillary to any activity for which regulatory body approval/ consent is required, will not commence before the issue of that approval/ consent.
5. Additional and/or alternative ESC measures are to be implemented in the event that site inspections, the site's incident response requirements (refer *CEMP*), or the regulatory authority, identifies that unacceptable off-site sedimentation is occurring as a result of the work activities.
6. Land-disturbing activities shall not cause unnecessary soil disturbance if an alternative construction process is available that achieves the same or equivalent outcomes.
7. It is noted that ongoing inspections and monitoring by the EM or ESC engineer/ specialist and the ER will be necessary throughout the works period. These inspections shall be undertaken in accordance with project conditions.
8. Appropriate additional erosion and sediment control measures will be implemented as required on site to suit changing site conditions, or other on-site conditions not included in the design documents, such that all reasonable and practicable measures are being taken to ensure acceptable water quality measures are installed. Only those works necessary to minimise or prevent environmental harm shall be conducted on-site prior to approval of the amended Erosion and Sediment Control Plan (ESCP).
9. Only VENM, ENM, or other imported fill material approved in writing by EPA is to be placed on the site, as required of **CoC B30**. Accurate records of the volume and fill are to be maintained on site, and made available to the Planning Secretary upon request.

3.5 Water Discharge Performance Criteria

The quality of discharge from the site/ sediment basins during construction is to satisfy the following Water Quality Objectives (WQOs) per Landcom Blue Book requirements:

- Water pH released from a controlled sediment basin outflow shall be within the range 6.5 to 8.5.
- Suspended Solids released from controlled sediment basin outflows will be no greater than 50mg/L, 75 NTU's (Nephelometric Turbidity Units) or other Turbidity measurement based on confirmed laboratory correlation. Correlation should be confirmed through laboratory assessment and in consultation with the EM or ESC engineer.
- Oils and Grease – no visible films or odour.
- Litter – no visible litter washed or blown from the site.

Records of confirmation of achievement of water quality objectives are to be maintained on site and to be provided on request to the ER and engineer/ ESC Specialist.

Use of NTU to confirm discharge is noted to require suitable calibration prior to use.

3.6 Contingency Planning

Reference to the unexpected finds protocols within the *CEMP* should be made pertaining to contingency management during construction.

Reference to contingency planning protocols within the *OEMP* during operational phase.

3.7 Incident Classification and Notification

It is the responsibility of all site personnel to report all environmental incidents to the Site Supervisor and/or the Contractor's EM during construction.

Incident response requirements including classification, responses, external notification and incident review protocol are set out in the *CEMP*. Reference to the *CEMP* should be made pertaining to all incident response protocol.

During operational phase it is the responsibility of the estate management to report and act on any environmental incidents. Refer to the OEMP for incident review requirements.

3.8 Environmental Auditing and Reporting

Auditing and reporting will be undertaken in accordance with the *CEMP* during construction. Refer to the *CEMP* for details.

Auditing and reporting will be undertaken in accordance with the *OEMP* during operation. Refer to the *OEMP* for details.

3.9 Non-compliance, Non-conformance and Actions

It is the responsibility of all site personnel to report non-compliances and non-conformances to the Site Supervisor and/or the Contractor's EM.

Non-compliances, non-conformances and corrective and preventative actions will be managed in accordance with the *CEMP* or *OEMP*.

3.10 Review and Improvement

The effectiveness of stormwater management measures will be confirmed through regular inspections, ongoing site inspections by the Construction Contractor, engineer and the ER during construction. Adjustments as required during the construction period will be made based on confirmed site conditions and effectiveness of the implemented measures.

Review and improvement of this plan will also be undertaken in accordance with the **CoCs** and the CEMP. Continuous improvement will be achieved by the ongoing evaluation of environmental management performance and effectiveness of this plan against environmental policies, objectives and targets.

During operation, effectiveness of stormwater management measures will be confirmed through regular inspections as set out in **Appendix D**. Adjustments as required will be made based on confirmed site conditions and effectiveness of the implemented measures. These will need to be made in conjunction with a suitably qualified engineer who specialises in stormwater and stormwater management.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure. Construction will be undertaken in accordance with the most recent, approved version of this SMP.

4 MANAGEMENT PHASES DURING CONSTRUCTION

4.1 Background

The SMP employs an Erosion & Sediment Control Plan (ESCP) which will be implemented to minimise water quality impacts in terms of sediment loading. The ESCP drawings are included in **Appendix A** of this SMP. The plan includes measures such as sediment fences, cut-off drains for sediment laden stormwater, diversion channels for clean stormwater run-off, sediment control basins, site access controls, limit of works and stockpile areas.

The following sections provide information to identify controls and procedures that will be incorporated into the *Erosion and Sediment Control* program.

It is expected that the construction period will be more than 6 months.

4.2 Pre-Construction

The following minimum requirements will be met prior to commencement of construction:

- Prior to the commencement of Bulk Earthworks, the contractor is to implement erosion and sediment controls on site, in accordance with the ESCP and Landcom Blue Book, as required of **CoC B31**. The ER is to provide written confirmation to the Planning Secretary Prior to commencement of Bulk Earthworks.
- Site access construction.
- Diversion banks (and/ or drains) will be created at the upstream boundaries of construction activities to ensure upstream runoff is diverted around any exposed areas. These diversion banks (and/ or drains) will be sufficiently stable to not contribute sediment or sediment laden water off-site. Catch drains will be created at the downstream boundary of construction activities.
- Sediment fences will be in accordance with *Blue Book Standard drawing SD 6-8* and constructed in locations specified on drawings, and on the upstream edges of the designated buffer strips and at the base of fill embankments.
- Rock check dams and/or gravel bags or sandbags will be placed along the catch drains to slow flow, reduce scour and capture some sediment from internal site water runoff. Refer to drawings for recommended locations.
- Construction of temporary sediment basins will be completed.
- Site personnel will be educated to the sediment and erosion control measures implemented on site.
- Areas for plant and construction material storage will be designated along with associated drains and spillage holding ponds and any contaminated soil management measures if required of a CEMP. These areas will remain separate to the SMP measures and detailed per the CEMP. Reference to the CEMP will be made pertaining to construction specific management measures and spill procedures.
- Sediment basins will be flocculated prior to any run off being received. An acceptable method is for water to be treated with gypsum at approximately 32

kg per 100m^3 of collected runoff, or as required to achieve the specified water quality targets.

- All exposed soils should be stabilised within 5 days of completion. Acceptable method would be to use a soil binder such as Ground Control (Complete Water Treatment), Stonewall (Vital Industries) or approved equivalent as noted in **Section 5.8**.
- Stockpile management to be completed as set out in ESCP (**Appendix A**) and **Section 5.3**.

4.3 During Construction

The following minimum requirements will be met during construction:

- Progressive re-vegetation of filled areas and filled batters.
- Maintenance of no-go zones and fencing around protected areas.
- Construction activities will be confined to the necessary construction areas.
- The provision of a stabilised site access to minimise the tracking of debris from tyres of vehicles leaving the site onto public roads. Construction exits will be nominated to manage the movement of construction access to defined locations. Refer to *Blue Book Standard Drawing SD 6-14*.
- Topsoil and temporary stockpile location will be nominated to coincide with areas already disturbed. Stockpiles will be sealed with soil binder within 20 days. A sediment fence will be constructed around the downstream side of the stockpile and a diversion drain at the upstream side if required.
- Regular inspection and maintenance of sediment fences, sediment basins and other erosion control measures will be made. Following rainfall events greater than 5mm inspection of erosion control measures and removal of collected material will be undertaken. Replacement of any damaged measures will be performed immediately.
- Spill response to be managed via procedures set out in CEMP and relevant subplans.

Site shutdowns are conducted in a manner that minimises potential environmental harm:

- Existing ground covers are protected from damage and retained as long as practicable.
- Procedures for initiating a long-term site shutdown (e.g. between completion of earthworks and building works) incorporate appropriate revegetation or approved stabilisation (per **Section 5.8**) of all soil disturbances unless otherwise stipulated within an approved site management plan.
- Stabilisation procedures associated with a programmed site shutdown commence at least 30 days prior to the nominated shutdown time.
- Appropriate stabilisation measure to be undertaken for short-term site shutdown (e.g. long weekend, Christmas, Easter) will be in accordance with measures set out in this CSMP and in consultation with the engineer.

- The adopted site stabilisation measures will not rely upon the longevity of non-vegetated erosion control blankets and short-term soil binders.

Soil erosion resulting from rainfall is minimised:

- Soil disturbing activities are programmed to minimise periods of soil exposure.
- Progressive stabilisation will be undertaken following construction and earthworks per **Section 5.8**.
- Appropriate additional measures will be considered and implemented in high risk areas (including batter slopes, temporary work areas, works adjacent to riparian zones, or other sensitive areas) as required during the construction period.

Soil erosion resulting from wind erosion is minimised:

- Erosion control measures used to control wind erosion are commensurate with soil exposure and the expected wind conditions in terms of speed and direction. Refer dust control notes ESCP in **Appendix A**.
- Stockpiles of erodible material (including loosely compacted or granular materials) are covered during periods of strong wind or when strong winds are imminent. Reference to Blue Book Standard drawing SD4-1 will be made pertaining to stockpile requirements including local provisions, covering and stabilisation requirements (refer also *Table 7-1* of *Blue Book*). Specific measures for stockpile stabilisation include wetting of surfaces & application of polymer binders. As a minimum, completed work surfaces should be compacted and free of excessive loose sediment. Refer **Section 5.3**.

4.4 Post Construction

Post construction, maintenance of all erosion and sediment controls are required until permanent stabilisation has occurred.

5 EROSION & SEDIMENT CONTROL

5.1 Land Disturbance

Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table 5.1,** and as defined in **Section 5.8** and stabilisation requirements included in **Table 5.2**.

Table 5.1 Limitations to access

Land Use or Zone	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the ESC Drawings (**Appendix A**).	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Access areas	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones on site. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries.
Remaining lands, No Go-Zones, areas outside approved construction or development areas.	Entry prohibited except for essential management works	
Minimise disturbed areas	Land disturbance and land filling activities must be undertaken: a) In a phased manner, b) With no disturbance (including vegetation clearing) of another area (other than the construction of erosion & sediment control measures and associated drainage for the separation of clean and dirty water.	Refer stabilisation requirements in **Section 5.8**, and **Table 5.2** of the **SMP**.
Riparian Corridors	No construction (including clearing and maintenance access) is permitted within the riparian corridor except for activities associated with vegetation, stormwater management and approved works.	

1. Prior to land clearing, areas of protected vegetation, and significant areas of retained vegetation and other protected areas will be clearly identified (e.g. with high-visibility tape, or light fencing) for the purposes of minimising the risk of unnecessary land clearing.
2. All practicable measures will be taken to minimise the removal of, or disturbance to, those trees, shrubs and ground covers (organic or inorganic) that are intended to be retained.
3. All land clearing will be completed in accordance with the CEMP.
4. Land clearing is limited to the minimum practicable during those periods when soil erosion due to wind, rain or surface water is possible.
5. Land clearing will be delayed as long as practicable and will be undertaken in conjunction with development of each stage of works.
6. All appropriate efforts shall be taken to delay the removal of, or disturbance to, existing ground cover (organic or inorganic) prior to land-disturbing activities.
7. Clearing will occur in a manner that minimises disturbance to existing ground cover (organic or inorganic).
8. Grubbing of the site will be immediately followed by temporary stabilisation measures (e.g. mulching), if required, prior to commencement of each stage of construction works.
9. Disturbance to natural watercourses (including bed and banks) and their associated riparian zones will be limited to the minimum practicable.
10. No land clearing will be undertaken unless preceded by the installation of adequate drainage and sediment control measures, unless such clearing is required for the purpose of installing such measures, in which case, only the minimum clearing required to install such measures will occur and only commencing following authorisation by the construction manager.

5.2 Site access

1. Prior to the commencement of site works and stages, the site entry and associated stabilised site access will be constructed in the specified location on ESCP drawings in **Appendix A**.
2. Site entry to be constructed in accordance with *Blue Book Standard drawing SD 6-14*.
3. Site access will be restricted to a single location and provide for a left in and left out slip lane and entry road. The location is at the agreed location with the DPIE. The proposed site access shown on ESCP drawings in **Appendix A**. Further details relating to access are provided in the *Construction Traffic Management Plan* (CTMP).
4. Site exit points will be appropriately managed to minimise the risk of sediment being tracked onto sealed, public roadways. The contractor will be required to take all reasonable measures to minimise tracking of sediment and/or dust to public roads.

5. Stormwater runoff from access roads and stabilised entry/exit points will drain to sediment controls shown on ESCP drawings in **Appendix A**.

5.3 Soil and stockpile management

1. Stockpiling of topsoil, imported fill and construction materials (sandstone, road base, engineering fill) will be necessary on the project.
2. Nominal locations for stockpiles have been shown on the ESCP's which will be subject to adjustment by the contractor during the works period. Reference to *Bluebook Standard Drawing SD4-1* should be made for best practice measures relating to both general fill and topsoil stockpiling will be implemented throughout the works period, unless superseded by the requirements of the Consent.
3. Stockpiling of imported fill should not occur for longer than 6 months before placement where possible.
4. Stockpiles must:
   (i) Be preferably 2m or less, though should not exceed an absolute maximum of 10m in height.
   (ii) Be benched over 4m in height
   (iii) Have a maximum slope of 1v:3h slopes; and
   (iv) Be stabilised if not worked on form more than 10 days
5. Additional mitigation measures for stockpile management are as follows:
   (i) For any stockpile heights greater than 4 m, benching will be implemented.
   (ii) Where reasonable and feasible, and to minimise the potential for erosion and sedimentation of stockpile(s), stockpile profiles would typically be at angle of repose (the steepest angle at which a sloping surface formed of loose material is stable or 1v:3h) with a slight concave slope to limit the loss of sediments off the slope, or through the profile and the formation of a toe drain.
   (iii) The top surface of the stockpile(s) will be slightly sloped to avoid ponding and increase run off.
   (iv) Topsoil stockpiles will be vegetated or otherwise suitably stabilised to minimise erosion.
   (v) Stockpiles will be protected from upslope stormwater surface flow through the use of catch drains, berms, or similar feature(s) to divert water around the stockpile(s) per *Blue Book SD4-1*. Stockpiles shall be placed at least 2m away from any channelised/concentrated flow paths. Sediment control measures are to be implemented as noted in item (vi) below;
   (vi) A sediment control device, such as a sediment fence, berm, or similar, will be positioned downslope of the stockpile to minimise sediment migration per *Blue Book SD4-1*.

(vii) Any water seepage from stockpiles will be directed by toe drains at the base of the stockpiles toward the sediment basins or check dams and away from the emplacement or extraction working face.

(viii) Newly formed stockpiles will be compacted (sealed off) using an effective construction method at the end of each working day to minimise water infiltration.

(ix) Haul roads would be located alongside the stockpile to the work/tipping area.

(x) Temporary sediment basins would be established in accordance with the **Section 6** of the **SMP**.

(xi) Any imported clean general fill material that would be subject to stockpiling within the Proposal site for more than a 10-day period without being worked on, would be subject to stabilisation works, to minimise the potential for erosion.

(xii) Where the material being stockpiled is less coarse or has a significant component of fines then surface and slope stabilisation would be undertaken. Methods for slope stabilisation may include one or a combination of the following:

– Application of a polymer to bind material together

– Application of hydro-seed or hydromulch

– Covering batters with mulch to provide ground cover.

– Covering batters with geofabric

– Use of a simple sprinkler system for temporary stockpiles, including use of radiating sprinkler nozzles to maintain fine spray over exposed surfaces.

– Other options identified by the Contractor.

(xiii) Topsoil stockpiles would be seeded with a grass/legume or nitrogen fixing species to assist in erosion control and reduce loss of beneficial soil nutrients and micro-organisms. The short-term vegetation cover crop is to be approved by the ER, Engineer/ ESC specialist prior to use.

6. All measures shall be taken to obtain the maximum benefit from existing topsoil and vegetation, including:

(i) Where the proposed area of soil disturbance does not exceed 2500m^2, and the topsoil does not contain undesirable weed seed, the top 100mm of soil located within areas of proposed soil disturbance (including stockpile areas) must be stripped and stockpiled separately from the remaining soil.

(ii) Where the proposed area of soil disturbance exceeds 2500m^2, and the topsoil does not contain undesirable weed seed, the top 50mm of soil must be stripped and stockpiled separately from the remaining topsoil, and spread as a final surface soil.

(iii) In areas where the topsoil contains undesirable weed seed, the affected soil must be suitably buried or removed from the site in accordance with the CEMP.

7. Stockpiles of erodible material that has the potential to cause environmental harm if displaced, will be:
   (i) Appropriately protected from wind, rain, concentrated surface flow and excessive up-slope stormwater surface flows.
   (ii) Located at least 2m from any hazardous area, retained vegetation, or concentrated drainage line, and separated by appropriate controls.
   (iii) Located up-slope of an appropriate sediment control measure.
   (iv) Provided with an appropriate protective cover (synthetic, mulch, vegetative, or spray on polymer) if the materials are likely to be stockpiled for more than 20 days during construction. Refer **Section 5.8**.
   (v) Provided with an appropriate protective cover (synthetic, mulch or vegetative) if the materials are likely to be stockpiled for more than 10 days during those months that have a high erosion risk.
   (vi) Provided with an appropriate protective cover (synthetic, mulch or vegetative) if the materials are likely to be stockpiled for more than 5 days during those months that have an extreme erosion risk.
8. A suitable flow diversion system will be established immediately up-slope of a stockpile of erodible material that has the potential to cause environmental harm if displaced, if the up-slope catchment area draining to the stockpile exceeds 1500m^2 or unless otherwise suggest by the EM or ESC inspector based on site-specific risk.

5.4 Building Works Management

1. Land-disturbing activities associated with building works will be undertaken in such a manner that allows for measures to be undertaken to:
   (i) allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities up to the specified design storm discharge;
   (ii) minimise soil erosion resulting from rain, water flow and/or wind;
   (iii) minimise adverse effects of sediment runoff, including safety issues;
   (iv) prevent, or at least minimise, environmental harm resulting from work-related soil erosion and sediment runoff;
   (v) ensure that the value and use of land/properties adjacent to the development (including roads) are not diminished as a result of the adopted ESC measures.
   (vi) All temporary office facilities, compounds and associated activities will be located such that any liquid effluent (e.g. process water, wash-down water, effluent from equipment cleaning, or plant watering), can be totally contained and treated within the site. Refer to CEMP for specific temporary office facility management measures.
2. Sediment (including clay, silt, sand, gravel, soil, mud and other soil-derived waste) deposited off the site as a direct result of an on-site activity, will be collected and the area appropriately cleaned/rehabilitated as part of an environmental incident response. This will be completed based on a site-

specific ESC program defined at time of the building approval or construction certificate for the building.

3. Adequate waste collection bins will be provided on-site and maintained such that potential and actual environmental harm resulting from such material waste is minimised. Refer *CEMP* for specific site and waste management requirements.
4. Concrete waste and chemical products, including petroleum and oil-based products, will be prevented from entering an internal water body, or an external drain, stormwater system, or water body. Refer *CEMP* for specific site and waste management requirements.
5. All flammable and combustible liquids, including all liquid chemicals if such chemicals that could potentially be washed or discharged from the development, are to be stored and handled on-site in accordance with relevant standards (such as *AS1940 The storage and handling of flammable and combustible liquids*). Refer *CEMP* for specific site and waste management requirements.
6. Trenches not located within roadways shall be backfilled, capped with topsoil, and compacted to a level at least 75mm above adjoining ground level and appropriately stabilised.
7. All stormwater, sewer line and other service trenches, not located within roadways or other construction areas, will be mulched and seeded, other otherwise appropriately stabilised within 7 days after backfilling.
8. No more than 150m of a stormwater, sewer line or other service trench will be open at any one time.
9. Site spoil will be lawfully disposed of in accordance with the approved *CEMP Appendix P* in a manner that does not result in ongoing soil erosion or environmental harm.
10. Imported fill material placed on site will comprise VENM or ENM per **CoC B30**, and be placed in accordance with the earthwork's specifications.
11. Construction tracking between finished and unfinished areas is to be restricted to dedicated haul roads and agreed construction pathways. Vehicles entering/exiting the site shall use the dedicated stabilised construction entry/exit. The existing wheel wash facility shall be utilised throughout the construction period in accordance with the CTMP.

5.5 Drainage control

1. Stormwater runoff entering the site from external areas, and non-sediment laden (clean) stormwater runoff entering a work area or area of soil disturbance, will be diverted around or through that area in a manner that minimises soil erosion and the contamination of that water for all discharges up to the specified design storm discharge.
2. During the construction period, all measures will be implemented to control flow velocities in such a manner than prevents soil erosion along drainage

paths and at the entrance and exit of all drains and drainage pipes during all storms up to the relevant design storm discharge.

3. All waters discharged during the construction phase will discharge onto stable land, in a non-erosive manner, and at a legal point of discharge.
4. "Clean" surface waters will be diverted away from sediment control devices and any untreated, sediment-laden waters.
5. During the construction period, roof water shall be managed in a manner that minimises soil erosion throughout the site, and site wetness within active work areas.
6. Proper drainage will be maintained. To this end drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that,
   - No low points exist that can overtop in a large storm event
   - Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams of installing additional diversion upslope.
   - Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).
   - Refer to **Section 7** for drainage site discharge and outlet requirements including scour protection.
7. Discharge of stormwater from the development is to be undertaken in such a way that ensures that no scour occurs and in accordance with outlet specific ESCP in **Appendix A**.

5.6 Erosion control

1. The application of liquid-based dust suppression measures will be undertaken to ensure that sediment-laden runoff resulting from such measures does not create a traffic or environmental hazard in accordance with **Section 5.8**.
2. All temporary earth banks, flow diversion systems, and embankments associated with constructed sediment basins or other flow diversion measures will be machine-compacted and stabilised per details. Bases of diversion drains to be geotextile protected, batters and embankments can be seeded and mulched for the purpose of establishing a temporary vegetative cover within 10 days after grading per **Section 5.8**. Short term drains or embankments should consider other acceptable stabilisation measures to suit construction program.
3. Unprotected slope lengths will not exceed an LS-Factor of 0.27 and nominal values as noted below (per *Blue Book Table A1*):
   a. 300m at 1%
   b. 80m at 1.5%
   c. 30m at 2%
   d. 12m at 3%

e. 5m at <6%

f. All slopes >6% to be stabilised.

4. The construction and stabilisation of earth batters steeper than 6:1 (H:V) must be staged such that no more than 3 vertical-metres of any batter is exposed to rainfall at any instant and that upstream water is diverted away from batters. Apply appropriate stabilisation as noted in **Section 5.6(2)** and **Section 5.8**.
5. All upstream catchments to be diverted (or otherwise managed) to that stormwater runoff does not flow directly down or across batter slopes. This could be achieved by diverting water around the batter or past the batter via an appropriately designed drainage chute.
6. Synthetic reinforced erosion control mats and blankets will not be placed within, or adjacent to, riparian zones and watercourses if such materials are likely to cause environmental harm to wildlife or wildlife habitats.
7. A minimum C-factor of 0.1 will be achieved (refer **Section 5.8**) on all non-completed earthworks exposed to accelerated soil erosion if further construction activities or soil disturbances are likely to be suspended for more than 20 days.

5.7 Sediment control

1. Optimum benefit must be made of every opportunity to trap sediment within the work site, and as close as practicable to its source. Sediment controls are to be installed prior to the commencement of work in the contributing catchment area. Sediment control is to be managed using the primary measures as set out in **Sections 5.1**-**5.8**, with controls to be used as secondary measures to the practices set out in this **SMP** and Landcom Blue Book;
2. Sediment fences and basins will be installed and operated to both collect and retain sediment.
3. The potential safety risk of a proposed sediment trap to site workers and the public will be given appropriate consideration, especially those devices located within publicly accessible areas.
4. All measures will be taken to prevent, or at least minimise, the release of sediment from the site.
5. Suitable all-weather maintenance access will be provided to all sediment control devices.
6. Sediment control devices will be de-silted and made fully operational after a sediment-producing event, whether natural or artificial, if the device's sediment retention capacity falls below 70% of its design retention capacity.
7. Materials, whether liquid or solid, removed from sediment control devices during maintenance or decommissioning, will be disposed of in a manner that does not cause ongoing soil erosion or environmental harm.

8. Refer to **Section 8** for management and operational requirements of sediment basins.

5.8 Site rehabilitation

1. All disturbed areas will be suitably stabilised per **Table 5.2** in the number of days noted, or prior to anticipated rainfall, whichever is the greater, from completion of formation.

Table 5.2. Stabilisation Requirements

Lands	Max. C-factor	Max. No. Days
Waterways and other areas subjected to concentrated flows, post construction	0.05	10 working days
Stockpiles, post construction	0.10	10 workings days
All lands, including waterways and stockpiles, during construction	0.15	20 working days of inactivity
Placed fill must be stabilised if not worked on for more than 10 days	0.10	10 working days of inactivity

2. A minimum C-factor of 0.05 will be achieved on all non-completed earthworks exposed to accelerated soil erosion if further construction activities or soil disturbances are likely to be suspended for more than 20 days.
3. No completed earthwork surface will remain denuded for longer than 60 days.
4. The type of ground cover or stabilisation applied to completed earthworks will be compatible with the anticipated long-term land use, environmental risk, and site rehabilitation measures.
5. Unless otherwise directed by the Site Supervisor or where directed by the approved revegetation plan, topsoil will be placed at a minimum depth of 75mm on slopes 4:1 (H:V) or flatter, and 50mm on slopes steeper than 4:1.
6. The pH level (soil: water 1:5) of topsoil will be adequate to enable establishment and growth of the specified vegetation.
7. Soil ameliorants will be added to the soil in accordance with the approved landscape/revegetation plans and/or soil analysis.
8. Soil density/compaction will be adjusted prior to seeding/planting in accordance with the approved VMP.
9. Temporary site stabilisation procedures must commence at least 30 days prior to the nominated site shutdown date. At least 70% stable cover (C-factor less than 0.05) of all unstable and/or disturbed soil surfaces will be achieved prior to the start of shutdown. The stabilisation works will not rely upon the longevity of non-vegetated erosion control blankets, or temporary soil binders unless appropriate management measures to ensure the required C-Factor can be achieved throughout the duration of the measure's implementation.
10. All unstable or disturbed soil surfaces will be adequately stabilised against erosion using acceptable methods of site stabilisation are set out in *Table A3* of the *Landcom Bluebook* to achieve a C-Factor of less than 0.05.
11. The C-factor, is a ratio which defines soil cover – "*the ratio of soil loss from land under specified plant or mulch condition to the corresponding loss from bare soil*".

Acceptable methods to stabilise per *Landcom Blue Book* and to meet the C-factor less than 0.05 are as follows and shown in *Blue Book Table A3*:

- Where warehousing is proposed, constructed pavements/ buildings more than 75% of area.
- Where warehousing is not proposed:
  - 70% grass cover over the disturbed area.
  - Wood chip at 27 t/Ha
  - 100mm recycled concrete road base.
  - Jute-matting
  - Hydromulching.
  - In-situ cement stabilisation/ lime stab.
  - soil binder such as Ground Control (Complete Water Treatment), Stonewall (Vital Industries). The use of polymer soil binders will be subject to on-site testing and verification, and confirmation of longevity and suitability of the application and specific location. It is expected that maintenance and ongoing re-application will be required if this method is adopted.
  - Other stabilisation per *Landcom Blue Book Table A3*.

12. Construction-stage sediment control basins shall be converted to permanent stormwater quantity and quality management devices (i.e. On-Site-Detention tanks) following completion of the civil works within the associated basin sub-catchment. The operational features of the permanent stormwater treatment system will be made fully operational (i.e. maintenance and/or reconstruction as required).

6 SEDIMENT BASIN OPERATION AND MANAGEMENT

6.1 General

1. This section of the report describes the general requirements for Sediment Basin, sizing and operation and management.
2. Sediment basins Type D construction.
3. Soil Hydrological Group D.
4. Basins to operate as wet basins and 5-day cycle. Basins are designed to retain sediment-laden water allowing adequate time for the treatment and gravitational settlement of fine sediment particles. Basins are not to be drained until adequate water quality is obtained in the basin as noted in **Section 6.2(4)**.
5. Sediment basins will be constructed prior to site disturbance to ensure that adequate rainfall runoff mitigation during construction has been made and in accordance with **CoC B31**.
6. Refer drawing **Co12990.09-C20** for basin sizing calculations and drawings **Co12990.09-C20 and C25** for basin locations, spillway details and basin details.
7. Basins shall be constructed in a manner that facilitates conversion to operational water quantity-and-quality management structures.
8. Basin sizing based on following parameters.
   a. Soil Texture Group F
   b. Soil Hydrological Group D
   c. Design Rainfall Depth 5 days
   d. 5-day, 85% percentile Rainfall event 31.5mm
9. Constructed sediment basins must be maintained and fully operational throughout the construction period and until each basin's catchment area achieves stabilisation with C-factor of 0.1 or permanent stabilisation per **Section 5.8**.
10. Before starting any clearing or construction, all the necessary materials and components will be on the site to avoid delays in implementing the sediment controls once works begin.
11. Required short-term sediment control measures will be installed downstream of the proposed earthworks to control sediment runoff during construction of the basin.
12. The area to be covered by the embankment, basin borrow pits (if required) and incidental works, together with an area extending beyond the limits of each for a distance not exceeding five (5) metres all around will be cleared of all trees, scrub, stumps, roots, dead timber and rubbish and disposed of in a suitable manner.
13. All holes made by grubbing within the embankment footprint will be filled with sound material, adequately compacted, and finished flush with the natural surface.

14. Spillway sizing has been provided to accommodate capacity for storm flows to the 1 in 10-year ARI storm event per Blue Book Requirements for the anticipated duration of basins being less than 6months. In the event that basins are in place longer than 6months, then the basin spillway should be reviewed and consideration to increasing the capacity to cater for 1 in 20-year ARI should be made.

6.2 Sediment Basin Operation

1. Type D basins will be operated as wet basins with the settled/ treated water decanted from the basin as soon as suitable.
2. Type D basin based on a maximum 5-day cycle. That being the filling, treatment and discharge of the basin is required within a 5-day period following cessation of rainfall.
3. Appropriate coagulation of sediment basins will be undertaken if the contained water does not achieve the specified water quality standard (TSS<50mg/L) within the required 5-day period. Refer notes on drawing **Co12990.09-C20.**
4. Recommended coagulant/ flocculant is gypsum at a dose rate between 32-50kg/ 100m^3 of sediment water. Dosage rates will be determined on site as required to achieve water quality requirements. Alternate flocculant products can be considered with consultation with the ESC or engineer.
5. Sediment basin water quality samples will be preferably taken at a depth no greater than 200mm above the level of settled sediment.
6. Discharged water will meet the discharge criteria defined in **Section 3.5** of the **SMP**. Testing to be completed using acceptable (and appropriately calibrated) field instrument or lab testing. Discharge is noted to meet requirements included in **Section 3.5**.
7. Settled sediment will be removed from sediment basins when the volume of the sediment exceeds the designated sediment storage volume (as nominated on the ESCP drawings), or the design maximum sediment storage elevation. Sediment marker and water level indicators to be provided in accordance with Landcom Blue Book requirements as detailed on drawing **Co12990.09-C20** in **Appendix A.**

6.3 Sediment Basin Maintenance

1. The sediment basin will be inspected during the following periods:
   a. During construction to determine whether machinery, falling trees, or construction activity has damaged any components of the sediment basin. If damage has occurred, it will be repaired.
   b. After each runoff event. Inspect the erosion damage at flow entry and exit points. If damage has occurred, the necessary repairs will be made.
   c. At least fortnightly in the absence of (b) above.
   d. Prior to, and immediately after, periods of "stop work" or site "shutdown".

2. Accumulated sediment will be cleaned out when it reaches the marker board/post, and restore the original storage volume restored. Place sediment in a disposal area or, if appropriate, mix with dry soil on the site.
3. Sediment will not be disposed of in a manner that will create an erosion or pollution hazard.
4. Removed sediment will be moved to a location for moisture conditioning and reuse as engineered site fill. Sediment intended for re-use should be confirmed as acceptable for use as engineered fill following testing and approval from the geotechnical engineer. The geotechnical engineer shall confirm whether the material conforms to the bulk earthworks filling specification. The location for moisture conditioning will be chosen such that it remains within the catchment of a sediment basin and erosion control system. Alternatively, sediment removed from basins shall be disposed of from site in an approved manner. The material shall be tested for any contaminants and be classified ,in accordance with EPA Waste Classification Guidelines, by an environmental consultant prior to disposal and in accordance with the *CEMP*.
5. All visible pipe connections will be checked for leaks, and repair, as necessary.
6. Fill material in the dam will be checked for excessive settlement, slumping of the slopes or piping between the conduit and the embankment; make all necessary repairs.
7. All trash and other debris will be removed from the basin and riser.
8. Submerged inflow pipes will be inspected and de-silted (as required) after each inflow event.

6.4 Sediment basin rehabilitation

1. Required drainage, erosion and sediment control measures during the decommissioning and rehabilitation or a sediment basin will comply with same standards specified for the normal construction works.
2. Upon decommissioning of a sediment basin, all water and sediment will be removed from the basin prior to removal of the embankment (if any). Any such material, liquid or solid, will be disposed of in a manner that will not create an erosion or pollution hazard.
3. A basin's catchment conditions associated with the staged decommissioning of the basin will comply with the specified sediment control standard.
4. If the permanent outlet structure is constructed prior to stabilisation of the up-slope catchment area, then this outlet structure will not be made operational.
5. The permanent stormwater treatment features (e.g. vegetation and filtration media) will be appropriately protected from the adverse effects of sediment runoff per the details provided on **Co12990.09-C20 and C25**.
6. A sediment basin will not be decommissioned until all up-slope site stabilisation measures have been implemented and are appropriately working

to control soil erosion and sediment runoff in accordance with the specified ESC standard and minimum permanent stabilisation works.

7. Immediately prior to the construction of the permanent stormwater treatment device, appropriate flow bypass conditions will be established to prevent sediment-laden water entering the device.
8. Immediately following the construction of the filter media of the permanent stormwater treatment device, the filter media will be covered by heavy-duty filter cloth (minimum Bidim A44 or equivalent) and a minimum 200mm layer of earth or sacrificial filter media. Such earth and filter cloth will not be removed from the device until suitable surface conditions being achieved within the basin's catchment area.
9. Immediately following the construction of the bioretention system an appropriate sediment forebay, filter or straw-bale system will be installed in a manner to prevent sediment intrusion into the device.
10. Plant establishment within the permanent stormwater treatment device will be delayed until sediment intrusion into the device is suitably under control.
11. Upon stabilisation of the contributing catchment being achieved, the operational features of the permanent stormwater treatment system will be made fully operational (i.e. maintenance and/or reconstruction as required).
12. Upon the approval of the engineer or site supervisor, the newly constructed permanent stormwater treatment features of the basin will be made operational if such actions do not prevent the site from operating at the required sediment control standard.

7 SITE INSPECTION AND MAINTENANCE DURING CONSTRUCTION

7.1 Site Inspection and Monitoring Introduction

Monitoring and reviewing of the effectiveness and condition of controls should be completed by the Construction Contractor's EM as set out in **Section 3.2** and as detailed in the *CEMP*. Auditing - as consistent and detailed within the CEMP. Regular inspections will be performed (daily and weekly – refer **Appendix F** for check sheets) by the Construction Contractor's representative in addition to the regular site inspections of performance of controls by the ESC or engineer.

The minimum inspections to be undertaken on the site will be completed per **Section 7.3(1)**.

7.2 Water Quality Monitoring

1. All water discharge performance to be in accordance with **Section 3.6** of this CSMP.
2. All water quality data, including dates of rainfall, dates of testing, testing results and dates of water release, must be kept in an on-site register. The register is to be maintained up to date for the duration of the approved works and be available on-site for inspection by environmental representative on request.
3. At nominated water monitoring sites, a minimum of 3 water samples must be taken and analysed, and the average result used to determine quality.
4. All environmentally relevant incidents must be recorded in a field log that must remain accessible to all relevant regulatory authorities.

7.3 Site Inspection and Monitoring

1. A self-auditing program (implemented by the Construction Contractor's EM) will be established based on the check sheets shown in **Appendix F**. Surface water monitoring points are indicated on the design drawings. A site inspection using the Check Sheet will be made by the Contractors EM:
    - At least weekly.
    - Immediately before site closure.
    - Immediately following rainfall events in excess of 5mm in any 24-hour period.
2. The self-audit will include:
    - Recording the condition of every sediment control device
    - Recording maintenance requirements (if any) for each sediment control device
    - Recording the volumes of sediment removed from sediment retention systems, where applicable
    - Recording the site where sediment is disposed
    - Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their information

3. The ESC engineer will complete a monthly inspection. The ESC engineer will oversee the installation and maintenance of all soil and water management works on the site. The ESC will prepare a monthly written summary that will provide recommendations for site implementation of measures.
4. The nominated responsible person (Construction Contractor's EM) will need to ensure that:
   - The plan is being implemented correctly
   - Repairs are undertaken as required
   - Essential modifications are made to the plan if and when necessary

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

Inspection and monitoring of equipment washdowns, waste handling and other construction related activities are to be completed in accordance with *CEMP*.

8 STORMWATER MANAGEMENT OBJECTIVES AND ADOPTED STRATEGY

8.1 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.

A WCMS has been prepared to inform the DPIE 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 City 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 8.1** following.

<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%

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%</td><td>Western City Employment Area – Fairfield City Council Development Control Plan 2016, Lot 1 DP106143, 327-335 Burley Road, Horsley Park</td></tr>
<tr><td>Flooding</td><td>Buildings and road set 500mm above 1% AEP.

No affectation to upstream downstream or adjoining properties as a result of development</td><td>NSW Floodplain Development Manual.</td></tr>
<tr><td>Water Supply</td><td>Reduce water consumption in non-residential properties by 40% consistent with the BASIX Scheme</td><td>FCC Stormwater Policy 2017</td></tr>
<tr><td>Erosion and Sediment Control</td><td>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.</td><td>Landcom Blue Book
Fairfield City Council
DPI</td></tr>
</table>

Table 8.1. WCM Targets

8.2 Proposed Estate Drainage System and Summary of Adopted Strategy

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 FCC 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 8.1** are to 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**. Refer Costin Roe Consulting drawings included in **Appendix A** for site specific drainage layout, stormwater management measures and civil engineering considerations.

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 9**)*

  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 one underground detention tank.

  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 based on the individual lot areas.

  Refer to **Section 9** of the document for detailed sizing of detention systems.

- *Stormwater Quality Management (Refer **Section 10**)*

  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 8.1** 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 the development catchment will be made via pit insert gross pollutant traps at each surface inlet pit.
  - Tertiary treatment of the development catchment will be made via one underground tank fitted with proprietary filters. Refer to drawings **Co12990.09-C.**
  - Some treatment will also be present by provision of rainwater reuse tanks on development site through reuse and settlement within the tank. Allowance for this treatment is included in MUSIC modelling produced for the development.

  Reference to **Section 10** of this document should be made for detailed Stormwater Quality modelling and measures.

- *Water Demand Reduction/ Rainwater Reuse*

  Rainwater reuse measures will be provided as part of the building development designs. Rainwater reuse will be required to reduce demand on non-potable uses by at 40%. The reduction in demand will target non-potable uses such as toilet flushing and irrigation. **Refer Section 8.3**.

8.3 Stormwater Harvesting

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

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. 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.

The final sizing of rainwater harvesting tanks will need to be assessed once the development layout and reuse demands for the facility are known in accordance with the NSW Department of environment and Conservation document Managing Urban Stormwater: Harvesting and Reuse.

8.4 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 basins. 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 basin design has sufficient capacity to cater for a rainfall intensity increase of 10% from current rainfall intensities.

9 WATER QUANTITY MANAGEMENT

9.1 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 9.1**, 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 City 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 9.1** below.

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

Table 9.1-PSD & SSR - Brown Consulting (June 2014) & Table 3 of DCP2016

9.2 Proposed Stormwater Quantity Management

Attenuation of stormwater runoff from the whole of the development is proposed to be managed through individual OSD systems on development lots. 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 9.2** below which shows PSD and SSR for Lot 201.

Lot	Area (Ha)	PSD (m3/s)		SSR (m3)	
		5yr ARI	100yr ARI	5yr ARI	100yr ARI
201	7.71	1.157	2.159	1310	2235

Table 7.2. PSD and SSR for Lot 201

10 WATER QUALITY MANAGEMENT

10.1 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 to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

Table 10.1. Estate Pollution Reduction Targets

Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	60%
Total Nitrogen	45%
Total Hydrocarbons	90%
Free Oil and Grease	90%

As set out in **Table 8.1 & 10.2**, 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 10.2. Individual Lot Pollution Reduction Targets

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

10.2 Proposed Stormwater Treatment System

Developed impervious areas of the development, 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 estate are based on a treatment train approach at the estate level to ensure that all the objectives above are met.

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

- All development lots will require on-lot treatment measures which meet the load-based percentage requirements noted in **Section 10.1** and **Section 8.1**.
- Lot systems will comprise proprietary filters and pit inserts, in combination with bio-retention basins; and
- A portion of the future building roofs will also provide a level of treatment via rainwater reuse and settlement within the rainwater tank.

The maintenance of the water quality measures (bio-retention and gross pollutant traps) will be made by each lot tenant at no cost or burden to council. Further discussion on maintenance are contained in **Section 10.6** of this document.

10.3 Stormwater Quality Modelling

Introduction

The MUSIC model 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 included in **Section 8.1 & 10.1** of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

The MUSIC model "*12990.05-REV 4.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**.

Rainfall Data

Six-minute pluviographic data 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

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

Pollutant Concentrations& Source Nodes

Pollutant concentrations for source nodes are based on values nominated by Fairfield City Council for industrial land use as per the **Table 10.3**:

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 10.3. Pollutant Concentrations

The MUSIC model has been setup with a treatment train approach based on the pollutant concentrations in **Table 10.3** above.

Treatment Nodes

Generic Treatment nodes for proprietary filters have been used in the modelling of the development.

Results

The Tables below show the results of the MUSIC analysis for each lot. The reduction rate is expressed as a percentage and compares the post-development pollutant loads without treatment versus post-development loads with treatment.

Table 10.4. Lot 201 MUSIC analysis results

	Source	**Residual Load**	**% Reduction**	**Target Met**
Total Suspended Solids (kg/yr)	8240	505	93.9	Y
Total Phosphorus (kg/yr)	17.3	3.87	77.6	Y
Total Nitrogen (kg/yr)	121	56.7	53	Y
Gross Pollutants (kg/yr)	1420	0	100	Y

These model results indicate that, through the use of the STM's in the treatment train, pollutant load reductions for Total Suspended Solids, Total Phosphorous, Total Nitrogen and Gross Pollutants will meet the load-based pollution reduction requirements.

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 bio-retention swales 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.

11 SITE INSPECTION AND MAINTENANCE DURING OPERATION

11.1 Site Inspection and Maintenance Introduction

It is important that each component of the water quantity measures, and water quality treatment train is properly operated and maintained. These need to be considered through the life cycle of the whole of the development. Confirmation of maintenance and monitoring regarding stormwater quality and quantity over the whole life of the development.

Auditing of the maintenance requirements for the system are to be completed by the applicant and their estate management team during operational phase.

During construction, inspection and maintenance is to be consistent and detailed within the CEMP and associated SMP. Regular inspections will be performed (daily and weekly per the provided check sheets) by the Construction Contractor's representative in addition to the regular site inspections of performance of controls by the ESC or engineer.

11.2 Water Quality Monitoring

1. All water discharge performance to be in accordance with **Section 8.1** of this SMP.
2. All water quality data, including dates of rainfall, dates of testing, testing results and dates of water release, must be kept in an on-site register. The register is to be maintained up to date for the duration of the approved works and be available on-site for inspection by environmental representative on request.
3. At nominated water monitoring sites, a minimum of 3 water samples must be taken and analysed, and the average result used to determine quality.
4. All environmentally relevant incidents must be recorded in a field log that must remain accessible to all relevant regulatory authorities.

11.3 Maintenance and Monitoring Plan

It is important that each component of the water quantity measures, and water quality treatment train is properly operated and maintained. These need to be considered through the life cycle of the whole of the development. Confirmation of maintenance and monitoring regarding stormwater quality and quantity over the whole life of the development. In order to confirm the maintenance and monitoring requirements of the operational aspects of the development, a *Maintenance and Monitoring Plan* has been prepared and included as **Appendix D**.

The maintenance plan and schedule included in **Appendix D** is provided for the permanent drainage systems required for the operational phase of the estate. Individual development lots will not require any additional management measures unless site specific operational requirements necessitate additional measures (e.g. firewater containment, additional treatment for operation aspects). These would be assessed on a merit based method for individual developments.

12 CONCLUSION

This SMP has been prepared to support a Construction Certificate Construction per requirements of **CoC B32** of SSD-10436. The site is the approved industrial development at Lot 201 DP 1244593, Horsley Park.

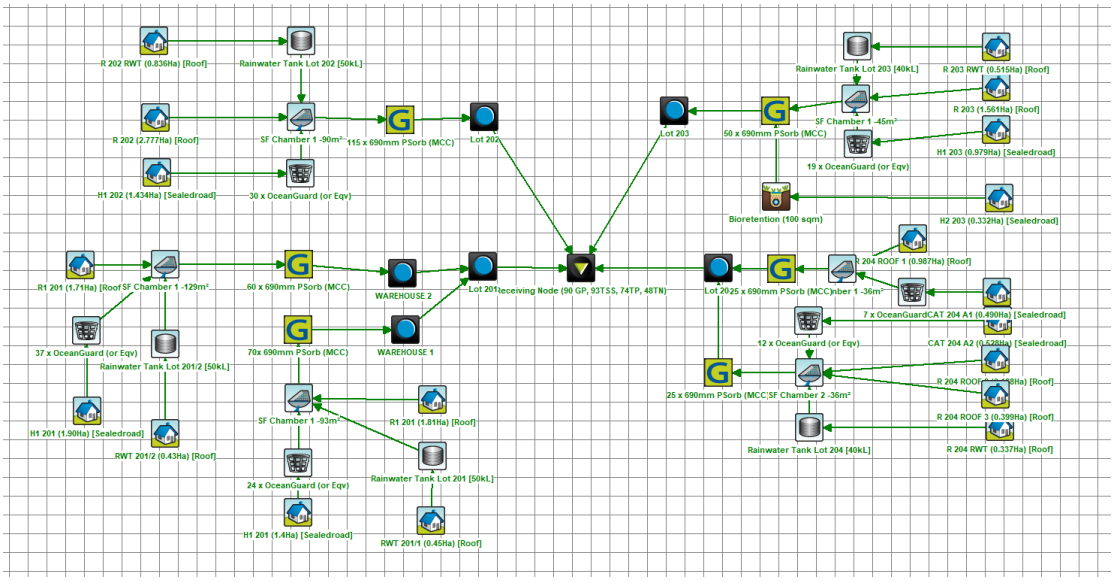
A civil engineering and stormwater management strategy for the site has been developed which provides a best practice solution within the constraints of the existing landform and proposed development layout.

During the construction phase, stormwater will be managed in accordance with the Landcom Blue Book requirements and an *Erosion & Sediment Control Plan* will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

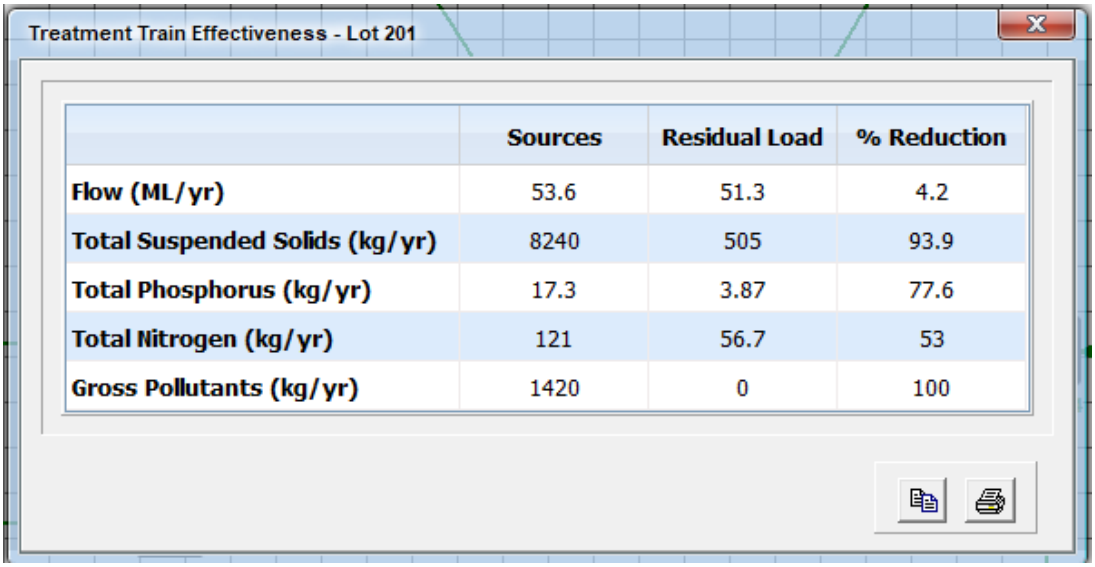
During operation, a stormwater management system comprising detention and water quality treatment train, will ensure that Council and DPIE stormwater Management Objectives are met and acceptable impacts (as defined and approved in the EIS) to the receiving waterways are achieved.

APPENDIX A
COSTIN ROE CONSULTING DRAWINGS

APPENDIX B
MUSIC RESULTS



Lot 201 Results



	Sources	Residual Load	% Reduction
Flow (ML/yr)	53.6	51.3	4.2
Total Suspended Solids (kg/yr)	8240	505	93.9
Total Phosphorus (kg/yr)	17.3	3.87	77.6
Total Nitrogen (kg/yr)	121	56.7	53
Gross Pollutants (kg/yr)	1420	0	100

APPENDIX C

Monthly Rainfall Data & Climate Statistics

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years		Plot	Map
Temperature																	
Mean maximum temperature (°C)	30.1	28.8	26.8	23.9	20.6	17.7	17.4	19.0	22.4	24.8	26.6	28.5	23.9	23	1997 2020		
Mean minimum temperature (°C)	18.0	17.8	16.1	12.9	9.0	7.2	5.8	6.4	9.3	11.8	14.4	16.2	12.1	23	1997 2020		
Rainfall																	
Mean rainfall (mm)	73.7	119.2	84.8	69.5	42.7	72.6	39.5	38.2	37.1	61.1	76.1	63.6	748.4	22	1997 2020		
Decile 5 (median) rainfall (mm)	64.2	92.2	60.8	58.0	21.6	52.0	26.0	26.6	26.2	48.7	57.2	61.4	714.7	23	1997 2020		
Mean number of days of rain ≥ 1 mm	7.6	7.2	8.1	6.7	5.1	6.2	5.1	4.0	4.8	5.8	7.0	6.9	74.5	23	1997 2020		
Other daily elements																	
Mean daily sunshine (hours)																	
Mean number of clear days																	
Mean number of cloudy days																	
9 am conditions																	
Mean 9am temperature (°C)	22.0	21.5	19.4	17.5	13.8	11.1	10.3	12.0	15.6	18.1	19.2	20.9	16.8	13	1997 2010		
Mean 9am relative humidity (%)	73	77	81	76	77	80	78	70	65	61	70	71	73	13	1997 2010		
Mean 9am wind speed (km/h)	10.1	9.7	8.9	10.5	10.7	10.3	10.8	11.7	12.2	12.5	11.8	10.7	10.8	13	1997 2010		
9am wind speed vs direction plot																	
3 pm conditions																	
Mean 3pm temperature (°C)	28.2	27.1	25.3	22.2	19.2	16.6	16.1	17.8	20.8	22.5	24.2	26.5	22.2	13	1997 2010		
Mean 3pm relative humidity (%)	49	53	54	53	52	55	50	42	42	45	50	48	49	13	1997 2010		
Mean 3pm wind speed (km/h)	19.4	17.0	14.8	14.4	13.0	12.9	13.9	16.1	18.1	19.8	19.5	19.9	16.6	13	1997 2010		
3pm wind speed vs direction plot																	

HORSLEY PARK EQUESTRIAN CENTRE AWS

Mean rainfall (mm)

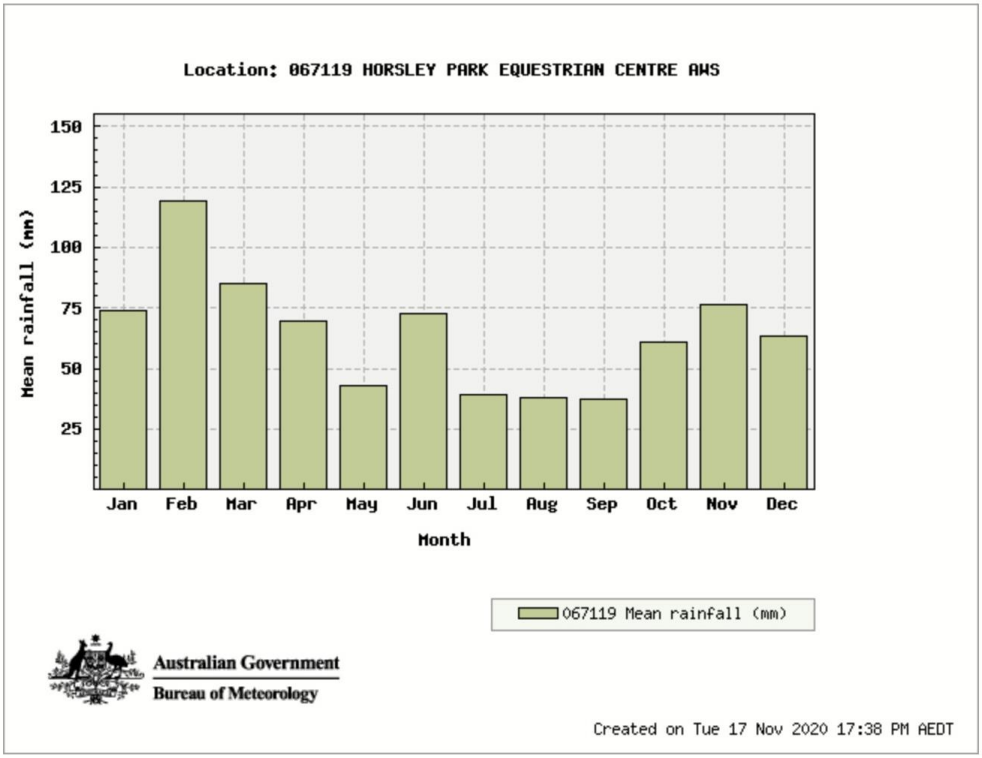
Site details

Site name: HORSLEY PARK EQUESTRIAN CENTRE A **Site number:** 067119 **Commenced:** 1997
Latitude: 33.85 °S **Longitude:** 150.86 °E **Elevation:** 100 m **Operational status:** Still Open

Yearly data | 30 year statistics | Comparison site | First statistic | Second statistic

Note: Only one option can be redrawn at a time

Include data for the year: 2020 Redraw



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean rainfall (mm) for years 1997 to 2020	73.7	119.2	84.8	69.5	42.7	72.6	39.5	38.2	37.1	61.1	76.1	63.6	778.1	23

12.3 = Not quality controlled

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APPENDIX D
OPERATIONAL STORMWATER MAINTENANCE PLAN

D1 MAINTENANCE AND MONITORING

D1.1 Introduction

It is important that each component of the water quantity measures, and water quality treatment train is properly operated and maintained. These need to be considered through the life cycle of the whole of the development. In order to achieve the design treatment objectives, a maintenance schedule has been prepared (refer to **Table D.1** below).

Note that inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the maintenance requirements below it is also recommended that inspections are made following heavy rainfall or major storm events. Event heavy rain inspections should be carried out as soon as practicable following an intense period of rainfall, (i.e. greater than 100mm over 48 hours), as measured at Horsley Park Weather Station No. 67119.

The maintenance requirements and schedule set out in this document are for the permanent drainage systems which will be required for the operational phase of the development (i.e. after roads, buildings and final stormwater measures are constructed and occupied).

D1.2 Types of Maintenance

Water Sensitive Urban Design (WSUD) assets require both proactive and reactive maintenance to ensure long term system health and performance.

Proactive maintenance refers to regular scheduled maintenance tasks, whereas reactive maintenance is required to address unscheduled maintenance issues. If an asset is not functioning as intended, then rectification may be required to restore the asset back to its intended functionality.

The preferred and recommended approach is for proactive maintenance.

Proactive Maintenance

Proactive maintenance is a set of scheduled tasks to ensure that the WSUD asset is operating as designed.

Proactive maintenance involves:

- Regular inspections of the WSUD asset;
- Scheduled maintenance tasks for issues that are known to require regular attention (e.g. litter removal, weed control); and
- Responsive maintenance tasks following inspections for issues which require irregular attention (e.g. sediment removal, mulching, and scour management).

Proactive maintenance in the first two years after the establishment period (construction and planting phases) are the most intensive and important to the long-term success of the treatment asset.

Proactive maintenance is a cost-effective means of reducing the long-term costs associated with operating stormwater treatment assets.

Maintenance activities specific to each WSUD asset type are detailed in the inspection and maintenance schedules and checklists provided in the report. The frequency of scheduled maintenance depends on the asset type and the issue being managed.

As a general guide, scheduled maintenance activities should be completed on a three to four-month cycle. The checklists provided should be used as a minimum guide to scheduled maintenance tasks and should be amended to suit site conditions and maintenance requirements.

Treatment assets should also be inspected at least once a year during or immediately after a significant rainfall event. This is important to confirm that the treatment system is functioning correctly under wet conditions.

A higher level of scheduled maintenance may be arranged for some treatment assets. This is often the case for treatment assets which are located in high profile locations (e.g. streetscapes and parklands), and where public amenity is considered to be a high priority. In these cases, a more frequent maintenance regime may be required to remove litter and weeds and to ensure vegetation health and cover is maintained to a high level.

Reactive Maintenance

Reactive maintenance is undertaken when a problem or fault is identified that is beyond the scope of proactive maintenance. Reactive maintenance may occur following a complaint about the WSUD asset (e.g. excessive odours or litter). Reactive maintenance often requires a swift response and may involve specialist equipment or skills.

Rectification

Rectification of a WSUD asset is undertaken when the system is not functioning as intended, and proactive and reactive maintenance activities are unable to return the asset to functional condition.

The lack of functional performance and therefore failure of a stormwater treatment asset may be related to many factors including inappropriate design, poor construction, and lack of regular maintenance or end of life cycle. In many cases, the design of assets has not included adequate consideration of the maintenance requirements, in terms of the system's ability to cope with catchment pollutant loads (i.e. sediments) and the frequency of maintenance required to maintain the system at a functional level.

Maintenance planning at the design phase is therefore crucial to both the long-term operating costs and the expected life cycle of the treatment system. In general, the expected lifecycle of a stormwater treatment asset (e.g. a bio-retention system) that has been well designed and constructed and is regularly maintained should be at least 15-20 years.

However, the lifecycle for each treatment system will be different and related to:

- whether the system has been designed, constructed and maintained according to best practice;

- catchment characteristics (influences the quality of the stormwater);
- the age and general health of the system; and
- the type of plants that have been used in the system.

Regular asset condition assessments should be undertaken to monitor the system condition and to inform where an asset is in terms of its expected lifecycle. Renewal of a system refers to replacing the main elements of the system including:

- infrastructure;
- removing deposited sediment, removing and replacing the topsoil (or filter media in the case of a bio-retention system) and profiling the topsoil level back to the design levels;
- re-planting; and
- pavement and sub-layers (in the case of permeable pavements).

A WSUD specialist may be required to assess whether a treatment system has reached the end of its life cycle and to provide advice on the renewal works.

Asset condition assessments can also identify assets that need to be rectified. The decision to continue with an increased maintenance regime or to rectify an asset, and over what timeframe, can be a difficult one to make. This is because certain maintenance items are more important to overall system function than others. For example, extended ponding on the surface of a bio-retention system or persistent scouring of a swale should be addressed more rapidly than recurrent weed problems.

D1.3 Routine Inspections and Maintenance Schedule for General Stormwater System

Routine inspections are to be carried out to assess the need for maintenance and are primarily concerned with checking the functionality of the stormwater drainage facilities; items such as drains, drainage pits, box culverts, detention tanks and rainwater reuse tank systems. Maintenance of these items is vitally important for the ongoing drainage and treatment of stormwater.

Should the inspection reveal that maintenance of any item is required, this is to be reported to the building management for action.

Items that are to be subject to Routine Inspections for Maintenance may comprise, but not be limited to those listed in the table below. This table is to be read in conjunction with the Stormwater design drawings.

It is vitally important that each component of the stormwater system is properly operated and maintained. In order to achieve the modelled and design treatment outcomes, a maintenance schedule has been prepared (below) to assist in the effective operation and maintenance of the various drainage and water quality components.

Table D.1. Maintenance Schedule

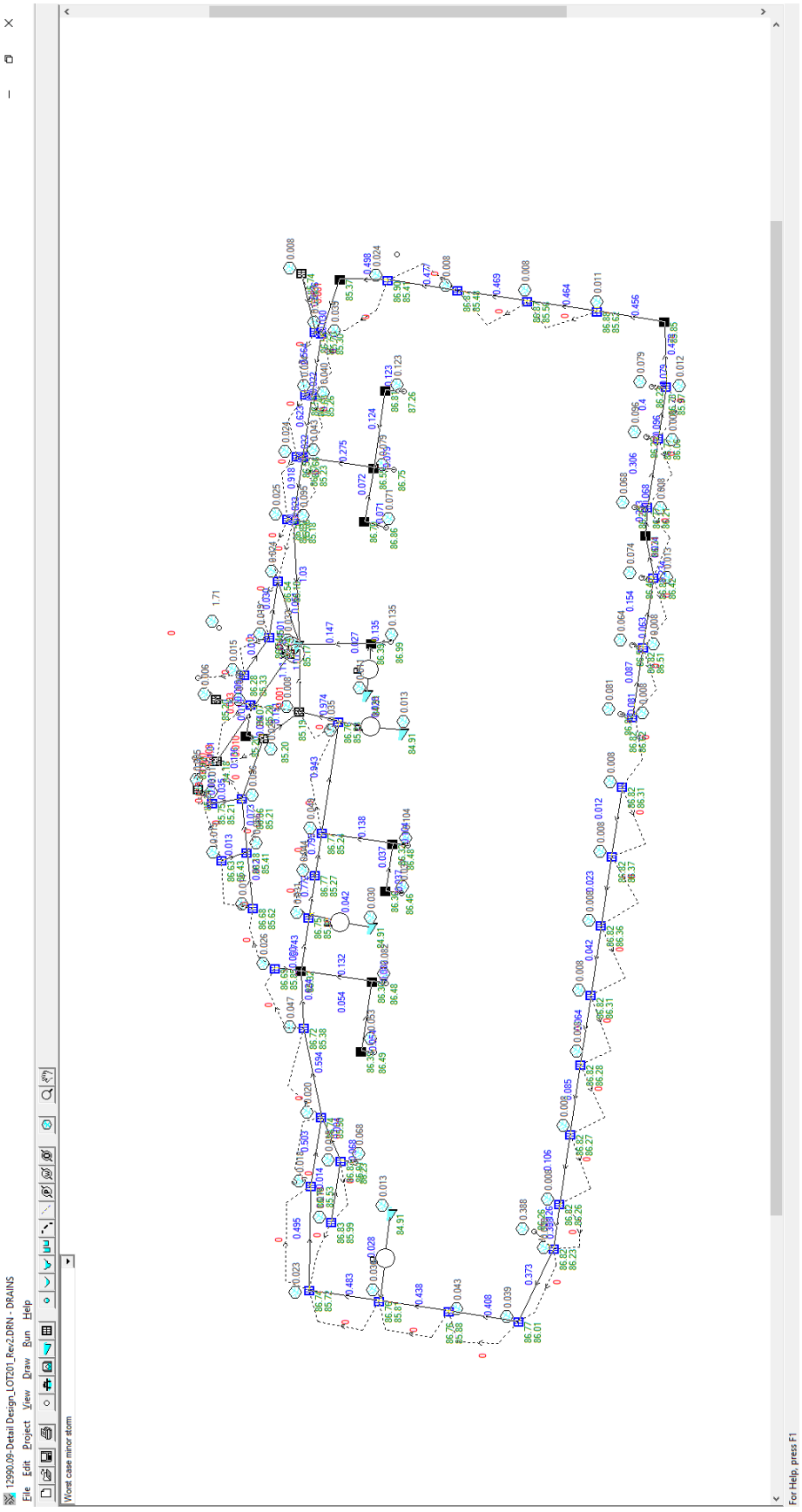
MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
SWALES/ LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Six monthly	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Six Monthly	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.
OSD TANK			
Check all items nominated for SWALES/ LANDSCAPED AREAS above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above
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.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
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 is clear.
Inspect storage areas and remove debris/ mulch/ litter etc likely to block screens/ grates.	Six Monthly Prior to and after Major Storm	Maintenance Contractor/ Owner	Remove debris and floatable materials.
Check attachment of orifice plate and screen to wall of pit	Annually Prior to and after Major Storm	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.
RAINWATER TANKS			
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

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
			depth as specified by the hydraulic consultant
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.
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.

APPENDIX E

DRAINS LAYOUT & OUTPUT



APPENDIX F

Daily and Weekly Site Inspection Forms

Daily Site Inspection

LOCATION . . . .

SITE SUPERVISOR . . . . . **DATE** . . . . . .

SIGNATURE . . . . . .

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

Item	Consideration	Assessment
1	All tradespeople working on the site have been informed of the erosion and sediment control requirements of the site.	. . . . .
2	All required builder identification, safety notices, and pollution (e.g. litter and sediment control) management signs are visible.	. . . . .
3	The work site and all erosion and sediment control measures do not represent a safety risk to tradespeople or the public.	. . . . .
4	Public roadways are clear of sediment.	. . . . .
5	Turfing on the footpath area is clear of sediment, sand and mud.	. . . . .
6	Entry/exit pads are clear of excessive sediment deposition.	. . . . .
7	Entry/exit pads have adequate available void spacing to trap sediment.	. . . . .
8	The construction site is clear of litter and unconfined rubbish.	. . . . .
9	Long-term (> 24 hours) soil/sand stockpiles are protected from wind, rain, and stormwater flow.	. . . . .
10	At end of day, all short-term soil/sand stockpiles located outside the sediment control zone have been removed and cleaned.	. . . . .
11	No dust problems exist on the site.	. . . . .
12	Up-slope “clean” water is being appropriately diverted through the site in a non-erosive manner.	. . . . .
13	Drainage lines are free of soil scour and sediment deposition.	. . . . .
14	Stormwater flow down exposed earth batters does not cause erosion.	. . . . .
15	Appropriate erosion controls of all finished soil disturbances have been discussed with the client.	. . . . .
16	Sediment fences have been correctly installed (e.g. fabric buried and standing up-slope of stakes) and are free of damage.	. . . . .
17	Sediment fences have been installed in a manner that will allow sediment-laden stormwater to temporarily pond and settle behind the fence rather than flow around the fence.	. . . . .
18	Appropriate sediment controls have been placed adjacent to, or around, stormwater inlets—as appropriate for the type of inlet.	. . . . .
19	All sediment traps are free of excessive sediment deposition.	. . . . .

20	Finished service trenches have been appropriately backfilled, compacted and stabilised.	. . . . .
21	All reasonable and practicable measures are being taken to control sediment runoff from the site.	. . . . .
22	The site is adequately prepared for potential storms.	. . . . .
23	Adequate stockpiles exist of ESC materials, such as extra sediment fence fabric.	. . . . .
24	Temporary downpipes have been correctly connected to any installed roof gutters.	. . . . .

Weekly Site Inspection

LOCATION . . . . . .

INSPECTION OFFICER . . . . . **DATE** . . . . . .

SIGNATURE . . . . . .

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

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