



SSDA-97711727

Bulk Earthworks, Rehabilitation and Quarrying

Surface Water Impact Assessment

Goodman Property Services (Aust) Pty Limited

BNTL02053_0001-REP-001-3-SWIA

26 JUNE 2026

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Rev	Date	Description	Author	Reviewer	Project Mgr.	Approver
0	9/03/2026	Client Issue	Chris Bonomini	Susan Shield	Chris Bonomini	Adam Wyatt
1	12/03/2026	Client Issue	Chris Bonomini	Susan Shield	Chris Bonomini	Adam Wyatt
2	24/06/2026	Updated report	Sarah Green Goldberg	Susan Shield	Sarah Green Goldberg	Susan Shield
3	26/06/2026	Updated report	Sarah Green Goldberg	Susan Shield	Sarah Green Goldberg	Susan Shield
Signatures:						

EXECUTIVE SUMMARY

Overview

This Surface Water Impact Assessment (SWIA) has been prepared by Engeny Australia Pty Ltd (Engeny) to address the site-specific Secretary's Environmental Assessment Requirements (SEARs) received in respect of the proposed State Significant Development Application (SSDA) No. 97711727. The proposed development includes Rehabilitation, Quarrying and Bulk Earthworks and is being undertaken by Goodman Property Services (Aust) Pty Ltd (Applicant) on behalf of Goodman Western Sydney Pty Limited as trustee for the Goodman Western Sydney Trust (Owner). The development is located at 225 - 245 Martin Road, Bradfield, NSW 2556. The SSDA seeks approval for the following (the Project):

- Site Preparation works only (i.e. no buildings, retaining walls or other infrastructure works).
- Rehabilitation of areas disturbed by historic mining and brick-making operations under major project approval MP10_0014 and MP10_0033.
- Bulk Earthworks to the site to align with the Connecting to Country and Precinct Plan principles including both the disturbed and undisturbed portions to capture the following proposed works:
 - Rehabilitation of Pits 1 & 2 using predominantly on-site fill (Engineered fill import required).
 - Preparation of the remaining site area to Bulk Earthwork Levels (BEL) (not including detailed trimming) for the proposed industrial development as considered under SSDA 97688711.
- Quarrying and Export of Bringelly Shale and Clay from select areas of Pit 1 & 2 to rectify the previous approved pit designs to ensure they are geotechnically stable to suit the proposed industrial masterplan.
- Vegetation Removal of 6.97 ha over land that is not certified under the Growth Centre SEPP.
 - Species being cleared involve species protected under both the BC Act and EPBC Act.
 - EPBC Act Referral completed on a precautionary measure given small amount of EPBC listed communities.
- Demolition of any remaining structures on the site.
- Rehabilitation of identified and unidentified contamination and, if required, the construction of a containment cell in the proposed northeastern corner of the site (currently identified as Lot 55 of DP 3050). The containment cell is proposed to trigger Designated Development threshold due to the proposed upper limit storage volume of 100,000 m³.
- Relocation of the Jemena Gas main predominantly burdening Lot 3 of DP127878.
- If required through an Aboriginal Cultural Heritage Assessment Report (ACHAR), relocation and reburial of artefacts.

The SWIA documents the assessment methods and results, initiatives to avoid and minimise surface water impacts, and additional mitigation and management measures proposed to address residual impacts not able to be avoided.

Site Context and Potential Impacts

The Site is currently an operational Quarry and historically had a Brickmaking Facility. The structures and hardstand areas used for the quarry operations are located in the central portion of the Site, connected by an internal road network. In addition, three pits are located along the southern and south-east portion of the Site.

Land to the north of the Site is predominantly characterised by a mix of rural, agricultural, landscape industries and, residential properties accessed by Lawson and Martin Roads with several sites are subject to existing SSDAs for industrial / warehouse developments. Both Martin and Lawson Roads intersect with Elizabeth Drive, a major Arterial Road that provides access to the Western Sydney International Airport (WSIA) site and the broader regional road network including the M7, Northern Road and the future M12.

While land to the south of the Site is currently rural, it is subject to the Ingham Property Group (IPG) Master Plan which was approved on 11 July 2025. The approved Master Plan covers 184 hectares and aims to support over 12,400 jobs. Further to the south-west of the Site, is Bradfield City Centre, a 114 hectare planned urban development adjacent to the WSIA site.

The suburb of Kemps Creek is located to east of Wianamatta-South Creek which bounds the Site. This land is characterised by a mix of open space, rural, agricultural, emerging urban development, and residential properties that are non-initial precincts under the Western Sydney

Aerotropolis Precinct but intended for employment generating uses. The western side of the Site is bound by Badgerys Creek, with the WSIA site located to the west of the creek.

The SSDA has the potential for the following impacts to the receiving surface water environment (excluding flooding which is addressed in a separate the Project *Flood Impact and Risk Assessment* (Colliers, 2026):

- Degradation of receiving water quality due to discharge of water containing elevated levels of pollutants including sediment and hydrocarbons (e.g. spills of fuel or oils).
- Geomorphological changes and a reduction in stream stability due to high discharge flows.
- Hydrological flow regimes in Badgerys Creek and Wianamatta-South Creek due to reduction in catchment draining directly to the creeks or increased discharges relative to the existing quarry operation.
- Reduced catchment yield and therefore, a reduction in water availability to downstream water users due to water being contained (to reduce the likelihood of pollution of receiving waters) and reused on site (to minimise water import demands).

Impact Assessment

Water Quality

Controlled discharges of surplus water to Badgerys Creek, including discharge of pit water via Sediment Dam B (SD B) drawn from Pit Sump 1 and Pit Sump 2, will continue in accordance with the Site Environment Protection Licence (EPL) 684 conditions only when construction water demands cannot consume dirty stormwater within the required sediment basin dewatering period (i.e. five days to restore the design settling zone volume). Controlled discharges to Wianamatta-South Creek may be required and if undertaken, EPL 684 will be varied to allow licensed discharges to Wianamatta-South Creek with water quality limit conditions consistent with those currently approved for discharges to Badgerys Creek.

The Project Water Management System (WMS) will include sediment basins. The sediment basins will be designed, constructed and managed to enable treatment of at least 80% of average annual Site runoff to achieve a Total Suspended Sediment (TSS) concentration of less than or equal to 50 mg/L and pH in the range of 6.5 - 8.5. These design standards are in accordance with construction phase stormwater management targets applying to developments with exposed areas greater than 2,500 m² contained in *Technical guidance for achieving Wianamatta-South Creek stormwater management targets* (NSW Department of Planning and Environment, 2022). Water balance modelling has demonstrated that the proposed sediment basins (refer to Section 5.2.2) can achieve the construction phase stormwater management targets.

Comparison of baseline water quality in Badgerys Creek and Wianamatta-South Creek with water stored on-site indicates that controlled discharges, following appropriate water treatment as required, can occur without degrading receiving water quality. As such, no significant impacts to either Badgerys Creek or Wianamatta-South Creek water quality are expected.

Geomorphology

The maximum theoretical controlled discharge rate (assuming discharges can occur 24 hours per day, seven days per week) from the Project WMS is that required to simultaneously dewater the settling zones of all proposed sediment basins (69,880 kL) within five days of runoff generating rainfall is 0.162 m³/s (162 L/s). Flood modelling undertaken by Colliers (2026) for Badgerys Creek and Wianamatta-South Creek for the 4EY storm event (i.e. 4 exceedances per year or 3 month recurrence interval) indicated peak flows ranging of 3.0 m³/s and 3.2 m³/s at two locations adjacent to the Site in Badgerys Creek and 14.1 m³/s and 14.3 m³/s at two locations adjacent to the Site in Wianamatta-South Creek.

Assuming discharges are limited to 8 hours per day, the instantaneous discharge rate from the entire Site would be up to approximately 0.5 m³/s is only approximately 17% of modelled Badgerys Creek 4EY flow and approximately 4% of modelled Wianamatta-South Creek 4EY flow, no impacts to stream geomorphology or stream stability are expected as a consequence of controlled discharges.

Hydrological Flow Regimes

Badgerys Creek is ephemeral and therefore flows infrequently during periods of rainfall with pools of water present along the creek during times of no rain (Advisian, 2019). Wianamatta-South Creek is a perennial watercourse, however, the flow duration curve presented in Figure 3.3 indicates no flow in the creek for approximately 35% of the time. Discharges from the Site have the potential to alter the hydrological regimes in both Badgerys Creek and Wianamatta-South Creek by increasing the percentage of time flow is present and altering the natural wetting / drying cycle within the creeks.

Water balance modelling predicts discharges will occur for between 9 and 157 days/year. As the minimum predicted discharge days will occur during dry years (i.e. when there will naturally be fewer natural flow in the creeks) and the maximum discharge days in wet years (i.e. when there will be more natural flow events in the creeks), the changes to hydrological regimes in both Badgerys Creek and Wianamatta-South Creek are expected to be inconsequential.

Catchment Yield and Water Users

The water management system for the existing quarry operation contains runoff (up to a design storm event) from the disturbed areas of the Site to reduce the likelihood of pollution of receiving waters. Captured runoff is primarily used to supply operational water demands as a first priority, with surplus water disposed of via irrigation of farm areas in preference to controlled discharges to Badgerys Creek.

Given the extent of the disturbed areas associated with the Site will increase to up to approximately 154 ha from the current 75 ha (as of February 2026), the natural runoff to Badgerys Creek and Wianamatta-South Creek will be further reduced. If the flows returned to Badgerys Creek and Wianamatta-South Creek associated with controlled and uncontrolled discharges from the Site are not considered, the reduction in catchment yield for associated with the increased catchment from which runoff is contained is estimated to be approximately:

- 5% for Badgerys Creek based on creek catchment upslope of the Site (1,500 ha).
- 1% for Wianamatta-South Creek based on creek catchment upstream of the Site (8,200 ha).

While the Project is expected to typically be self-sufficient with respect to operational water demands (i.e. using water captured in sediment basins), the water balance indicates the potential requirement to source additional water from water sources other than Site runoff to meet operational demands during dry periods (short term and long term). Minor water shortfalls will be supplemented from the Site Sydney Water mains supply, with consideration of other water sources (e.g. licensed surface water extraction) for more significant or ongoing shortfalls.

Conclusions

An assessment of the potential impacts on surface water impacts associated with the Project was undertaken and the following conclusions have been drawn from the assessment outcomes:

- Water balance modelling indicates that Project will have an adequate water source (i.e., captured rainfall runoff) for most climate conditions and suitable supplementary water supplies are available to meet any demand shortfalls (i.e. Sydney Water supply).
- The proposed WMS is comprised of 20 sediment dams. All the proposed dams will be exempt from water licensing requirements in accordance with Schedule 4, Part 7, Item 70 of the *Water Management (General) Regulation 2025*, as they will be used for the purpose of contamination prevention. Surface water take from these water sources is therefore exempt from water access licensing requirements and annual take limitations are not applicable.
- Water balance model results indicate that the Project will be required to undertake controlled discharges of stormwater runoff captured in the WMS to ensure construction phase stormwater management targets contained in in *Technical guidance for achieving Wianamatta-South Creek stormwater management targets* (NSW Department of Planning and Environment, 2022) are achieved.
- An assessment of the potential impacts of controlled discharges to either Badgerys Creek or Wianamatta-South Creek indicates that measurable negative impacts to water quality, stream geomorphology and hydrological regimes are unlikely.
- Reductions in rainfall runoff volumes reporting to downstream users due to the Project WMS catchment area are considered negligible.

Mitigation and Management

Table 1 provides a summary of the mitigation and management measures to address the potential impacts on surface water resources associated with the Project.

TABLE 1: SUMMARY OF POTENTIAL IMPACTS AND MITIGATION/MANAGEMENT MEASURES

Potential Impact	Mitigation/Management
Degradation of receiving water quality due to discharge of water containing elevated levels of pollutants including sediment and hydrocarbons (e.g. spills of fuel or oils).	- Sediment basins will be designed, constructed and managed to enable treatment of at least 80% of average annual Site runoff to achieve a TSS concentration of less than or equal to 50 mg/L and pH in the range of 6.5 - 8.5 in accordance with construction phase stormwater management targets applying to developments with exposed areas greater than 2,500 m² contained in Technical guidance for achieving Wianamatta-South Creek stormwater management targets (NSW Department of Planning and Environment, 2022). - Chemical coagulants and flocculants used will be selected based on guidance provided in the International Erosion Control Association (IECA) Chemical coagulants and flocculants fact sheet. - All chemicals, including hydrocarbons, will be stored in accordance with relevant standards and guidelines (e.g. <i>AS1940:2017 The storage and handling of flammable and combustible liquids</i>). - Mobile plant and equipment will be routinely inspected and maintained to reduce the likelihood of fuel and/or oil leaks that could contaminate surface water. - Spill kits will strategically located around the Site with spill response procedures and spill response training for personnel implemented in line with the current quarry operation.
Hydrological flow regimes in Badgerys Creek and Wianamatta-South Creek due to reduction in catchment draining directly to the creeks or increased discharges relative to the existing quarry operation.	The cumulative number of controlled discharge days will be monitored throughout the calendar year (for comparison with water balance predictions) and stream condition monitoring will be undertaken on a quarterly basis to collectively identify any potential impacts associated with changes to hydrological regimes.
Geomorphological changes and a reduction in stream stability due to high discharge flows.	Controlled discharges to either Badgerys Creek or Wianamatta-South Creek will be limited to a maximum instantaneous flow rate of less than the peak flows from the 4EY storm event in Badgerys Creek and Wianamatta-South Creek.
Reduced catchment yield and therefore, a reduction in water availability to downstream water users due to water being contained (to reduce the likelihood of pollution of receiving waters) and reused on site (to minimise water import demands).	All the proposed dams within the WMS will be exempt from water licensing requirements in accordance with Schedule 4, Part 7, Item 70 of the <i>Water Management (General) Regulation 2025</i>, as they will be used for the purpose of contamination prevention. Surface water take from these water sources is therefore exempt from water access licensing requirements and annual take limitations are not applicable. Should surface water extraction be required, the Applicant will obtain a WAL, water supply work approval and sufficient entitlement in the Upper Wianamatta-South Creek Management Zone of the Wianamatta-South Creek Water Source in accordance with NSW legislation (i.e. <i>Water Management Act 2000</i>, <i>Water Management (General) Regulation 2025</i> and the <i>Greater Metropolitan Region Unregulated River WSP 2023</i>).

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1. INTRODUCTION

1.1 Project Overview

This Surface Water Impact Assessment (SWIA) has been prepared by Engeny Australia Pty Ltd (Engeny) to address the site-specific Secretary's Environmental Assessment Requirements (SEARs) received in respect of the proposed State Significant Development Application (SSDA) No. 97711727. The proposed development includes Rehabilitation, Quarrying and Bulk Earthworks and is being undertaken by Goodman Property Services (Aust) Pty Ltd (Applicant) on behalf of Goodman Western Sydney Pty Limited as trustee for the Goodman Western Sydney Trust (Owner). The development is located at 225 - 245 Martin Road, Bradfield, NSW 2556 (the Site, refer to Figure 1.1).

This SSDA seeks approval for the following (the Project):

- Site Preparation works only (i.e. no buildings, retaining walls or other infrastructure works).
- Rehabilitation of areas disturbed by historic mining and brick-making operations under major project approval MP10_0014 and MP10_0033.
- Bulk Earthworks to the site to align with the Connecting to Country and Precinct Plan principles including both the disturbed and undisturbed portions to capture the following proposed works:
 - Rehabilitation of Pits 1 & 2 using predominantly on-site fill (Engineered fill import required).
 - Preparation of the remaining site area to Bulk Earthwork Levels (BEL) (not including detailed trimming) for the proposed industrial development as considered under SSDA 97688711.
- Quarrying and Export of Bringelly Shale and Clay from select areas of Pit 1 & 2 to rectify the previous approved pit designs to ensure they are geotechnically stable to suit the proposed industrial masterplan.
- Vegetation Removal of 6.97 ha over land that is not certified under the Growth Centre SEPP.
 - Species being cleared involve species protected under both the BC Act and EPBC Act.
 - EPBC Act Referral completed on a precautionary measure given small amount of EPBC listed communities.
- Demolition of any remaining structures on the site.
- Rehabilitation of identified and unidentified contamination and, if required, the construction of a containment cell in the proposed northeastern corner of the site (currently identified as Lot 55 of DP 3050). The containment cell is proposed to trigger Designated Development threshold due to the proposed upper limit storage volume of 100,000 m³.
- Relocation of the Jemena Gas main predominantly burdening Lot 3 of DP127878.
- If required through an Aboriginal Cultural Heritage Assessment Report (ACHAR), relocation and reburial of artefacts.
- Figure 1.2 presents the finished landform and key features at the completion of the Project.

Additionally, this SSDA application seeks to rely on already existing authority approvals issued under MP10_0014 (subject to any applicable modifications). These are as follows:

- Mining Lease 1771.
- Environment Protection Licence 684 (EPL 684).
- Groundwater Access Licence WAL24346.
- Groundwater Supply Works Approval No. 10WA109463.

It is important to note that a number of the proposed activities being sought for approval under this SSDA have previously been assessed and approved under MP10_0014. The existing DA relates to approximately 70 ha of Net Developable Area (NDA), with the new portion of site approximately 36 ha NDA. Cumulatively the area is approximately 116 ha NDA.

This report further outlines the approved activities currently being undertaken on the Site in Section 4.1.

1.1.1 The Site

The Site is identified as 225 - 245 Martin Road, Bradfield, NSW 2556. The key features of the Site are presented in Table 1.1.

TABLE 1.1: SITE FEATURES

Aspect	Description
Land Configuration	Lot 1 DP 1278780 Lot 2 DP 1278780 Lot 3 DP 1278780 Lot 55 DP 3050 Lot 56 DP 3050
Existing land use(s)	The Site is currently an operational Quarry and historically had a Brickmaking Facility. The structures and hardstand areas used for the quarry operations are located in the central portion of the Site, connected by an internal road network. In addition, three pits are located along the southern and south-east portion of the Site.
Surrounding Land Use	Surrounding land uses include: • North: Land to the north is predominantly characterised by a mix of rural, agricultural, landscape industries and, residential properties accessed by Lawson and Martin Roads. It is noted that several sites are subject to existing SSDAs for industrial / warehouse developments. Both Martin and Lawson Roads intersect with Elizabeth Drive, a major Arterial Road that provides access to the Western Sydney International (WSI) site and the broader regional road network including the M7, Northern Road and the future M12. • South: The land to the south is currently rural however is subject to the IPG Master Plan which was approved on 11 July 2025. The approved Master Plan covers 184 hectares and aims to support over 12,400 jobs. Inghams Property Group has allocated around 625,467 m² for employment space, focusing on advanced manufacturing, logistics, and community services. The plan includes a mix of industrial and commercial zones, a local centre, and accessible public green spaces near the WSI site. Further to the south-west of the Site, is Bradfield City Centre, a 114 hectare planned urban development adjacent to WSI site. Designed to be a hub for innovation, advanced industries, and economic growth, it has the potential to create 20,000 jobs and provide 10,000 homes, including affordable housing. The Bradfield City Master Plan prioritises sustainability, integrating green spaces, climate-resilient infrastructure, and a commitment to achieving net-zero emissions. • East: Further east of the Wianamatta-South Creek which bounds the Site, is the suburb of Kemps Creek. This land is characterised by a mix of open space, rural, agricultural, emerging urban development, and residential properties that are non-initial precincts under the Western Sydney Aerotropolis Precinct (WSAP) but intended for employment generating uses • West: To the immediate west of the Site, bound by Badgerys Creek, is the WSI site. Located in the suburb of Badgerys Creek, WSI is a major federal infrastructure project designed to accommodate Sydney's future aviation needs. Set to commence operations in 2026, WSI will initially handle 10 million passengers annually and operate 24/7. Badgerys Creek Road also travels in a north-south direction to the west of the Site. It provides a north-south connection between Elizabeth Drive and the Northern Road.
Site Access and road network	The Site is currently accessible from Martin Road which is located at the north-eastern boundary.

BULK EARTHWORKS, REHABILITATION AND QUARRYING | BNTL02053_0001-REP-001-3-SWIA

LEGEND

Finished Landform

Watercourses

Finished Landform

Subject Site

Suite 2, Level 5, 45 Hunter Street, Newcastle NSW 2300 PO Box 787 Newcastle NSW 2300 www.engeny.com.au P: 02 4926 1225		N	0100200 m Scale in metres (1:11,000 @ A4) Map Projection: Transverse Mercator Horizontal Datum: Geocentric Datum of Australia Vertical Datum: Australia Height Datum Grid: Map Grid of Australia, Zone 56	Figure 1.2: Finished Landform Goodman Group Engeny does not give any warranty nor accept any liability in relation to the completeness or accuracy of the maps, which may be inherently reliant upon the completeness and accuracy of the input data and the agreed scope of works.	Job Number: BNTL02053_0001 Revision: 0 Drawn: LS Checked: CB Date: 11/3/2026
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1.2 Related Applications/Activities

1.2.1 SSDA 97688711 – 14 warehouse buildings, Active Open Space & amenities precinct (including a cafe) and internal site infrastructure works

The SSDA seeks approval for the construction, fit-out (including office and standard warehouse racking) and operation of 14 warehouse buildings, Active Open Space & amenities precinct (including a café) and internal site infrastructure works.

This application assumes the bulk earthworks are completed under SSDA 97711727.

1.2.2 Part 5 Activity – External Works Lead in Roads and Services

The Applicant is proposing access to the Site via the following route which will be upgraded to be in accordance with the Precinct Plan

- Part 1 - Martin Road / Elizabeth Drive intersection upgrades:
 - It is expected that these works will be approved by way of amendment to the existing Part 5 approval by Transport for New South Wales (TfNSW).
 - It is understood that Transport for NSW will construct the work with a target completion date of December 2029.

Part 2 - 4 - Martin Road / East West Collector Road / Lawson Road Upgrades:

- Further to Part 1, access to the site is proposed to be constructed concurrently as follows:
 - Part 2 - Access from the Martin Road / Elizabeth Drive intersection will continue down Martin Road and join the future East / West collector road identified within the Precinct Plan through Lot 36 DP 3050.
 - The portion of road between the Intersection and future East / West collector road will be upgraded with a temporary access strategy that is consistent with Condition DS5 of the Precinct Plan.
- Part 3 - The East / West collector road through Lot 36 DP 3050 is proposed to be delivered in ultimate form consistent with the Precinct Plan., connecting Martin Road and Lawson Road.
- Part 4 - From the East / West Collector Road connection on Lawson Road, the portion of Lawson Road South through to the Site will be upgraded in ultimate form consistent with the Precinct Plan.

The Applicant is currently in discussions with Liverpool City Council (Council) to undertake these works on behalf of Council.

- It is expected that these works are completed by December 2029, based on a commencement date of June 2028.

It is the Applicants expectation that the above-mentioned works (Parts 1 - 4) are completed prior to the receipt of the first building Occupation Certificate (expected December 2029).

Notwithstanding the above, the Applicant notes that access to the site under SSD 97711727 will continue to be via Martin Road based on the intersection upgrades completed under MP10_0014.

1.3 Project Terminology and Definitions

Table 1.2 provides a list of terminology (including abbreviations) and associated definitions used in this SWIA.

TABLE 1.2: PROJECT TERMINOLOGY

Term/Abbreviation	Definition
Applicant	Goodman Property Services (Aust) Pty Ltd
BLR	Basic Landholder Rights (with respect to surface and groundwater extraction)
°C	Degrees centigrade
cm	Centimetres
DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water

Term/Abbreviation	Definition
DCP	Development Control Plan
DECC	Department of Environment and Climate Change (now DCCEEW)
DPE	Department of Planning and Environment (now DPHI)
DPHI	NSW Department of Planning, Housing and Infrastructure
EC	Electrical Conductivity
EPA	Environment Protection Authority
EPL	Environment Protection Licence
ha	Hectare
kL	Kilolitres
km	Kilometres
m	Metres
m ³	Cubic metres
mg/L	Milligrams per litre
ML	Megalitres
mm	Millimetres
μS/cm	Micro Siemens per centimetre
NATA	National Association of Testing Authorities
NRAR	Natural Resources Access Regulator
NTU	Nephelometric Turbidity Units
SEPP	State Environment Planning Policy
SSDA	State Significant Development Application
SWIA	Surface Water Impact Assessment
SWMP	Soil and Water Management Plan
The Blue Book	Managing Urban Stormwater - Soils and Construction Volume 1 (Landcom, 2004) and Volume 2 (DECC, 2008)
The Project	The activities to be undertaken on the Site as described in Section 1.1 of this SWIA.
The Site	The land consisting of Lots 1, 2 and 3 of DP 1278780 and Lot 55 and 56 of DP 3050 on which the development will take place.
WBM	Water Balance Model
WMS	Water Management System
WSIA	Western Sydney International Airport
WSP	Water Sharing Plan

1.4 Relevant Policies, Guidelines and Legislation

The following policies, guidelines and legislation have been considered in this assessment:

- *Water Management Act 2000.*
- *Water Management (General) Regulation 2025.*
- Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2023 Background and changes (NSW DCCEEW, 2024).
- Technical guidance for achieving Wianamatta-South Creek stormwater management targets (NSW Department of Planning and Environment (DPE), 2022).
- Guidelines for instream works on waterfront land (DPE, 2022).
- Waterfront Land e-tool (Natural Resources Access Regulator (NRAR), 2020).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Australian and New Zealand Governments and Australian state and territory governments, 2018) (ANZG).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Australian and New Zealand Environment and Conservation Council 2000) (ANZECC 2000).
- Managing Urban Stormwater: Soils & Construction Volume 1 (Landcom, 2004), Volume 2 (Department of Environment and Climate Change (DECC), 2008).
- Guidelines for Controlled Activities on Waterfront Land (DPE, 2022).
- Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Department of Primary Industries (DPI), 2003).
- Policy & Guidelines for Fish Habitat Conservation & Management (DPE, 2013).
- State Environment Planning Policy (Biodiversity and Conservation) 2021.

1.5 Surface Water Impact Assessment – Purpose and Scope

The SWIA was undertaken to identify and assess the impacts to the receiving surface water and specifically address the Secretary's Environmental Assessment Requirements and agency advice (refer to Section 2) relevant to the following surface water. Further, the SWIA process was undertaken to identify controls, mitigation and management measures to reduce the likelihood of surface water impacts. The following surface water aspects are addressed in this SWIA:

- Surface water quality including compliance with discharge licensing conditions and relevant water quality objectives.
- Surface water extraction and the requirements for licensing of surface water take and potential impacts to catchment yield and water users.
- Geomorphological, hydrological and riparian values with respect to the volume and frequency of discharges and existing stream condition and flow regimes.

It should be noted that site and receiving environment impacts associated with flooding are addressed in the Project *Flood Impact and Risk Assessment* (Colliers, 2026).

1.6 Structure of this Report

An overview of the SWIA report structure is provided in Table 1.3.

TABLE 1.3: SWIA REPORT STRUCTURE

SWIA Section	Content Summary
Section 1 Introduction	Provides an overview of the Project, related development applications and activities, Project terminology, legislative framework, the SWIA purpose and scope and the structure of the SWIA report.
Section 2 Summary of Assessment	Presents the Secretary's Environmental Assessment Requirements and agency advice relevant to potential surface water impacts as well as a summary of the SWIA response/outcomes with respect to the Secretary's Environmental Assessment Requirements and agency advice.
Section 3 Surface Water Context	Provides surface water context including the local climate, existing watercourses, catchment context, flow regimes, water quality, surface water extraction and water users.
Section 4 Water Management	Details of the current Site water management system and the proposed Site water management approach throughout, and at the completion of, the bulk earthworks.
Section 5 Water Balance	Provides a summary of the water balance model development for the Project and the results of water balance modelling including the predicted water demands, water import requirements and discharges (controlled and uncontrolled).
Section 6 Surface Water Monitoring	Details the proposed surface water monitoring program (discharge and receiving water quality, site and receiving water quantity and stream health).
Section 7 Surface Water Licensing	Provides a summary of the anticipated water licensing and approval requirements for the Project based on the assessment undertaken and the proposed water management strategy including licensing for water extraction, approvals for works on waterfront land and variations to the existing Site Environment Protection Licence.
Section 8 Impact Assessment	Provides a summary of the expected impacts to surface water associated with the Project based on the assessment undertaken.
Section 9 Mitigation and Management Measures	Provides a summary of the mitigation and management measures that will be implemented as part of the Project to reduce the likelihood of negative impacts to the receiving surface water environment and its users.
Section 10 Conclusions	Presents the overall conclusions with respect to the acceptability of predicted surface water impacts.
Section 11 References	Provides a list of documents referenced in the preparation of the SWIA.
Section 12 Qualifications	Details qualifications with respect to the preparation and use of this SWIA.

2. SUMMARY OF ASSESSMENT

Sections 2.1 to 2.3 provided a summary of the against the Project SEARs, Agency Requirements and Western Sydney Planning Controls/Guidelines relevant to this SWIA. It should be noted that site and receiving environment impacts associated with flooding are addressed in the Project the Project *Flood Impact and Risk Assessment* (Colliers, 2026).

2.1 Secretary's Environmental Assessment Requirements

Table 2.1 presents the Secretary's Environmental Assessment Requirements (SEARs) for the Project, where the requirement is addressed in this SWIA and a summary of the assessment outcomes.

TABLE 2.1: SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS

Item	Report Section	Summary of Response
Water – including:		
- A detailed site water balance, including a description of site water demands, water disposal methods (inclusive of volume and frequency of any water discharges), water supply infrastructure and water storage structures;	Section 5	A detailed site water balance with the required information is provided in the referenced section of this SWIA. The water balance indicates the requirement for controlled discharges to manage water surpluses and potential water imports to supplement operational demands subject to prevailing climatic conditions.
- Identification of any licencing requirements or other approvals under the Water Act 1912 and/or Water Management Act 2000;	Section 7	Surface water licensing and approval requirements for the Project are provided in the referenced section of this SWIA and include: • A variation of the Site environment protection licence to – Provided for additional and or relocated discharge points. – Revise limit conditions to include a 50 mg/L TSS given Wianamatta-South Ck construction stormwater management targets are based on TSS. • All the proposed dams in the WMS will be exempt from water licensing requirements in accordance with Schedule 4, Part 7, Item 70 of the <i>Water Management (General) Regulation 2025</i>, as they will be used for the purpose of contamination prevention. Surface water take from these water sources is therefore exempt from water access licensing requirements and annual take limitations are not applicable. • The Project may require extraction of surface water. Should surface water extraction be required, Goodman will obtain a water access licence, water supply work approval and sufficient entitlement in the Upper Wianamatta-South Creek Management Zone of the Wianamatta-South Creek Water Source in accordance with NSW legislation (i.e. <i>Water Management Act 2000</i>, <i>Water Management (General) Regulation 2025</i> and the <i>Greater Metropolitan Region Unregulated River WSP</i>).
- an assessment of the likely impacts on the quality and quantity of existing surface and ground water resources, including a detailed assessment of proposed water discharge quantities and quality against receiving water quality and flow objectives;	Sections 8.1, 8.2 and 8.3	A detailed assessment of the impacts to surface water quality and quantity is provided in the referenced section of this SWIA. The water quality assessment indicates no significant impacts to receiving water: • Water quality. • Geomorphological and hydrological values. • Catchment yield and water users.
- an assessment of the likely impacts of the development on aquifers, watercourses, riparian land, water-related infrastructure, and other water users;	Sections 8.1, 8.2 and 8.3	A The water quality assessment indicates no significant impacts to receiving water: • Water quality. • Geomorphological and hydrological values. • Catchment yield and water users.
- consideration of any impacts to land adjoining the site, including in relation to stormwater runoff / flooding and water quality;	-	Addressed in the Project <i>Flood Impact and Risk Assessment</i> (Colliers, 2026).
- a detailed description of the proposed water management system, water monitoring program, erosion and sediment control measures, and other measures to mitigate surface and groundwater impacts;	Sections 4.2 and 6	A detailed description of the proposed water management system, water monitoring program and erosion and sediment controls are provided in the referenced sections of this SWIA.

2.2 Agency Requirements

Table 2.2 to Table 2.6 present the associated agency requirements for the Project, where the requirement is addressed in this SWIA and a summary of the assessment outcomes.

TABLE 2.2: LIVERPOOL CITY COUNCIL

Item	Report Section	Summary of Response
Flooding		
The site is traversed by overland flow paths and is affected by mainstream flooding from Wianamatta South Creek to the east and Badgerys Creek to the west.	-	Noted.
External stormwater runoff from upstream catchments running through the site must not be obstructed and is to be appropriately conveyed and managed within the site.	Section 4.2	No external stormwater runoff from upstream catchments running through the Site will be obstructed.
The proposal should include details of stormwater strategy, including drainage design plans for the proposed work.	Section 4.2	The proposed stormwater strategy and drainage design for the proposed works has been included in this SWIA.
A detailed flood impact assessment must be undertaken using 2D hydraulic modelling for both pre- and post-development conditions. The assessment must demonstrate that the proposed work will not result adverse flooding impacts on adjoining upstream and downstream properties for a range of storm events up to and including the 1% AEP event.	-	Addressed in the Project <i>Flood Impact and Risk Assessment</i> (Colliers, 2026).
Post-development stormwater discharges from the site must not exceed pre-development discharge rates at site boundaries for storm events up to the 1% AEP event. On site detention system will require to be incorporated into the proposed work to control post-development flows. Flood modelling that incorporates the detention system and site drainage facility must be provided to confirm compliance with this requirement. Relevant flood mapping for pre-and post-development conditions also be included.	-	Addressed in the Project <i>Flood Impact and Risk Assessment</i> (Colliers, 2026).
ENZ corridors within the site must be preserved and excluded from the proposed work.	-	Noted – addressed by others.
Detailed cut and fill plans must be provided, ensuring consistency with the site's intended future land use.	-	Noted – addressed by others.
Soil erosion and sediment control measures, including sedimentation basins, must be implemented in accordance with Managing Urban Stormwater: Soils and Construction (The Blue Book). These measures should ensure effective collection and treatment of sediment and pollutants during and after construction, prior to discharge into downstream receiving waters.	Sections 4.2 and 5.2.2	Erosion and sediment control measures including the provision of sediment basins will be implemented and have been shown to achieve the construction phase stormwater management objectives contained in <i>Technical guidance for achieving Wianamatta-South Creek stormwater management targets</i> (NSW DPE, 2022).
Future subdivision proposals for the site must include detailed stormwater plans and a comprehensive stormwater management report addressing both quantity and quality controls. The report is to be supported by hydrologic and hydraulic modelling, as well as MUSIC modelling for water quality treatment facilities.	-	Noted – to be considered in any future subdivision proposals.
The proposal must comply with relevant provisions of the Western Sydney Aerotropolis Precinct Plan and Western Sydney Aerotropolis Development Control Plan 2022 in relation to bulk earthwork and rehabilitation works.	-	Refer to Table 2.7.
Air & Water Quality Management		
Consideration must be given to the incorporation of appropriate safeguards during site preparation, bulk earthworks and site remediation and validation to prevent the generation of wind-blown dust and contamination of overland flow and surface waters.	Sections 4.2, 5.2.2, 6 and 8.1	An assessment of potential water quality impacts concluded that no significant impacts associated with the Project were likely. Further detail is provided in the referenced sections of the SWIA.

Item	Report Section	Summary of Response
Sewage Management		
Development proposed to rely on any form of on-site sewage management, and/or on properties not currently connected to Sydney Water's reticulated sewerage service, shall incorporate the provisions of Council's On-site Sewage Management Standard.	Section 4.2	Noted – addressed by others.
Additional Recommendations		
The scope of stormwater management plan should include the integration of biofiltration systems and rock-lined channels in natural areas, the installation of raingardens within landscaped and open space areas (refer to the Erosion and Sediment Control Plan, Appendix A – Civil Plan). A Vegetation Management Plan (VMP) covering the area between the Local Industrial Street and Badgerys Creek, and ENZ zoned land, Wianamatta / South Creek and the first order watercourse in the north-west portion. The VMP should include the following components: - Stormwater management, including the installation of biofiltration systems and rock-lined or riprap scour protection channels connecting to the creek systems. The biofiltration systems should address all the stormwater discharge points - Soil erosion control measures integrated with soft engineering solutions. - Creek line embankment stabilisation works, integrated with rock armouring in areas where erosion or embankment collapse is likely to occur. - Revegetation works using suitable native species. - Bush regeneration activities. - Weed control measures. - Site protection measures, including the retention and maintenance of existing or installing a new permanent fencing.	-	These recommendations are not applicable to the bulk earthworks SSDA 97711727.
It is highly recommended to incorporate the following measures: 1. Raingardens within the landscaped open space areas of all 14 buildings, using native plant species relevant to the local ecological communities. 2. Biofiltration systems to capture and improve overall surface and stormwater runoff (including management of all stormwater discharge points to natural interfaces) prior to entering the waterbodies or stormwater basins located in the following areas: a. North-East (adjacent to Building 3B) b. South-East (adjacent to Buildings 4 and 5) c. South-West (adjacent to Buildings 13 and 14) d. North-West (adjacent to Building 8) 3. These stormwater basins should be further connected to the creek line systems through rock-lined or riprap scour protection channels to control erosion and manage flow velocity. 4. Inclusion of the open space areas on the eastern and western sides within the scope of the Vegetation Management Plan (VMP).	-	These recommendations are not applicable to the bulk earthworks SSDA 97711727.

TABLE 2.3: WESTERN SYDNEY INTERNATIONAL AIRPORT (WSIA)

Item	Report Section	Summary of Response
Consideration of any impacts to the WSI owned land adjoining the site, including in relation to stormwater runoff / flooding, water quality, odour, interface landscaping, air quality, and noise. This is to include an assessment for both during construction and operation to ensure there are no adverse impacts to WSI operations.	Section 8.1	An assessment of potential water quality impacts concluded that no significant impacts associated with the Project were likely. Further detail is provided in the referenced sections of the SWIA. Potential flooding impacts the Project <i>Flood Impact and Risk Assessment</i> (Colliers, 2026). Potential odour, interface landscaping, air quality, and noise impacts are addressed by others.

TABLE 2.4: ENVIRONMENT PROTECTION AUTHORITY

Item	Report Section	Summary of Response
The EIS surface water quality assessment must:		
7.1. Demonstrate that all practical measures to prevent, control, abate or mitigate water pollution have been implemented, including a description of options that were explored (such as reuse to avoid a discharge or treatment).	Sections 4.2 and 5.2.2	Proposed water management measures including the provision of sediment basins will be implemented and water reuse have been shown to achieve the construction phase stormwater management objectives contained in <i>Technical guidance for achieving Wianamatta-South Creek stormwater management targets</i> (NSW DPE, 2022).
7.2. Provide details of the proposal that are essential for predicting and assessing potential impacts to receiving waters. This could include (but is not limited to):	Sections 3.5, 4.2 and 5.2.2	The necessary details of the proposal that are essential for predicting and assessing potential impacts to receiving waters are provided in the referenced sections.
a. Site layout, including details of the existing and proposed water management system.		
b. Drainage map for the entire site identifying sub-catchments, flow paths, drainage infrastructure, design sizing of structures, water storages, discharge points, and any potential flow paths to receiving waters.		
c. How stormwater will be managed in all phases of the project. Information should include, where appropriate, measures to avoid or minimise erosion, leachate generation, and sediment mobilisation at the site.		
d. Any in-water activities (such as piling or dredging).		
7.3. Include water balance(s) for ground and surface water, including any intake and discharge locations, volumes, frequency and duration.	Section 5	A water balance was prepared for the proposed Project water management system and details are provided in the referenced section of this SWIA.
7.4. Identify and estimate the quality and quantity of all pollutants that may be introduced into the water cycle by source and discharge point, including residual discharges after mitigation measures are implemented. This should be undertaken for construction and operational phases.	Sections 5.2.2 and 8.1	Modelling indicates that the proposed Project water management system over 80% of average annual runoff will be reused or be treated and discharged to achieve the Wianamatta-South Creek catchment stormwater management. Discharges will be undertaken in accordance with EPL limit conditions. Further detail is provided in the referenced sections of this SWIA.
7.5. Include a water pollution impact assessment undertaken consistent with the guidance available at https://www.epa.nsw.gov.au/your-environment/water/managing-water-pollution-in-nsw/environment-protection-licensing/water-pollution-discharge-assessments . The level of assessment should be commensurate with the risk to the environment and human health.	Section 8.1	Modelling indicates that the proposed Project water management system over 80% of average annual runoff will be reused or be treated and discharged to achieve the Wianamatta-South Creek catchment stormwater management. Discharges will be undertaken in accordance with EPL limit conditions. Further detail is provided in the referenced section of this SWIA.

Item	Report Section	Summary of Response
7.6. Describe any surface water quality monitoring programs, including proposed monitoring locations, frequency and indicators of surface water quality. Analytical limits of reporting should have regard to any identified guideline values. Water quality monitoring should be undertaken in accordance with the Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (2004) available at: Approved methods for the sampling and analysis of water pollutants in NSW EPA	Section 6	An extensive surface water monitoring program will be implemented throughout all phases of the Project that are considered to be appropriate for the identification of potential Project impacts on surface water resources and for the assessment of the proposed water management system performance.
7.7. The EIS must describe how stormwater will be managed in all phases of the project, including details of how stormwater and runoff will be managed to minimise pollution. Information should include measures to be implemented to minimise erosion, leachate and sediment mobilisation at the site. The EIS should consider the guidelines Managing urban stormwater: soils and construction, vol. 1 (Landcom 2004) and vol. 2 (A. Installation of services; C. Unsealed roads; D. Main Roads; E. Mines and quarries) (DECC, 2008).	Section 4.2	Proposed water management measures including the provision of sediment basins will be implemented and water reuse have been shown to achieve the construction phase stormwater management objectives contained in <i>Technical guidance for achieving Wianamatta-South Creek stormwater management targets</i> (NSW DPE, 2022).

TABLE 2.5: DEPARTMENT OF PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT - FISHERIES

Item	Report Section	Summary of Response
Assessment of the potential impacts of site stormwater on KFH.	Section 8.2	Badgerys Creek and Wianamatta-South Creek are mapped as key fish habitat as both watercourse are >3 Strahler stream order. An assessment of the Projects impacts to water quality and hydrological regimes indicated no significant impacts to the receiving waters. Further detail is provided in the referenced section of this SWIA.

TABLE 2.6: DEPARTMENT OF CLIMATE CHANGE, ENERGY, THE ENVIRONMENT AND WATER (DCCEEW)

Item	Report Section	Summary of Response
Waterway Health		
12. The EIS must address sections 2.3 Stormwater, Water Sensitive Urban Design and Integrated Water Management and 2.5.5 Erosion and Sediment Control of the Western Sydney Aerotropolis Development Control Plan.	-	Refer to Table 2.7
13. The EIS, in accordance with the Technical guidance for achieving Wianamatta-South Creek stormwater management targets (DPE, 2022) (Tech guide), must include a proposed Erosion and Sediment Control plan for construction phase (Chapter 2 in Tech guide) and a Water and Stormwater Management plan for operational phase (Table 7 of Tech guide) demonstrating the approach and timing for meeting stormwater quality and quantity targets.	Sections 4.2 and 5.2.2	Proposed water management measures including the provision of sediment basins will be implemented and water reuse have been shown to achieve the construction phase stormwater management objectives contained in <i>Technical guidance for achieving Wianamatta-South Creek stormwater management targets</i> (NSW DPE, 2022).
14. To demonstrate the construction phase stormwater quality targets are met, a detailed ESCP should:		
- Be developed and certified by a Certified Professional in Erosion and Sediment Control (CPESC) or a qualified and experienced civil engineer with at least 5 years' experience in the development of site-specific soil and water management plans	Section 4.2	This SWIA commits to the update of the Site Soil and Water Management Plan by a CPESC or a qualified and experienced civil engineer with at least 5 years' experience in the development of site-specific soil and water management plans to capture the soil and water management requirements of the Project.
- Illustrate appropriate controls, that when implemented will achieve the construction phase stormwater quality targets in Table 2 of the Tech Guide	Sections 4.2 and 5.2.2	Proposed water management measures including the provision of sediment basins will be implemented and water reuse have been shown to achieve the construction phase stormwater management objectives contained in <i>Technical guidance for achieving Wianamatta-South Creek stormwater management targets</i> (NSW DPE, 2022).
- Be prepared in accordance with the Blue Book (NSW Government 2004)	Section 4.2	This SWIA commits to the preparation of progressive erosion and sediment control drawings will be prepared in accordance with <i>Managing Urban Stormwater – Soils and Construction Volume 1</i> and <i>Volume 2</i> (hereafter collectively referred to as the Blue Book) that will detail temporary controls to be implemented as sediment basins are established to achieve the construction phase stormwater management objectives contained in <i>Technical guidance for achieving Wianamatta-South Creek stormwater management targets</i> (NSW DPE, 2022).
- Be prepared in accordance with the WSUD design considerations set out in Chapter 3 of the Tech Guide (especially WSUD measures)	-	This recommendation is not applicable to the bulk earthworks SSDA 97711727.
- Provide conceptual designs that include the site, catchment and key features of the ESCP on scaled drawings.	Section 4.2	This SWIA commits to the preparation of progressive erosion and sediment control drawings will be prepared in accordance with <i>Managing Urban Stormwater – Soils and Construction Volume 1</i> and <i>Volume 2</i> (hereafter collectively referred to as the Blue Book) that will detail temporary controls to be implemented as sediment basins are established to achieve the construction phase stormwater management objectives contained in <i>Technical guidance for achieving Wianamatta-South Creek stormwater management targets</i> (NSW DPE, 2022).
15. As the site area is larger than 2,500 m ² , the Tech Guide provides best practice initiatives strengthening the elements in the Blue Book. This involves designing and implementing sediment controls that treat at least 80% of the average annual runoff volume (i.e. 80% hydrological effectiveness) to 50 mg/L TSS or less, and pH in the range 6.5–8.5. To achieve these construction phase targets, the design of the basins generally needs to:	Sections 4.2 and 5.2.2	Proposed water management measures including the provision of sediment basins will be implemented and water reuse have been shown to achieve the construction phase stormwater management objectives contained in <i>Technical guidance for achieving Wianamatta-South Creek stormwater management targets</i> (NSW DPE, 2022).

Item	Report Section	Summary of Response
- Be sized and operated in accordance with either a Type-A or Type-B sediment basin as documented in International Erosion Control Association (IECA,2008)	-	The proposed sediment basins will be enlarged Type D basins rather than either Type A or Type B basins. Water balance modelling predicts that the proposed type D sediment basins sized will achieve the 80% hydrologic efficiency target. A meeting was held on 5 December 2025 between Goodman and CPHR. During this meeting Goodman presented their stormwater management strategy for the Site with the presentation provided to CPHR thereafter. The proposed use of Type D sediment basins was described in this meeting and in the presentation and was accepted by CPHR at the time.
- Be provided with an automated system of flocculant dosing and a suitable supply of flocculant/coagulant, with the type of flocculant/coagulant determined based on the IECA chemical coagulants and flocculants fact sheet (IECA 2018)	Section 4.2	The dosing systems to be implemented will be determined during detailed design, however, based on current Site water management practises, it is anticipated that Alum (aluminium sulphate) will be the selected chemical coagulant.
- Have markers within each basin to show the maximum sediment storage level and any additional water storage capacity for water reuse	Section 6	Sediment basin quantity monitoring requirements and methodology, including the requirement to monitor water and sediment inventories, are part of an extensive surface water monitoring program that will be implemented throughout the Project.
- Limit discharge from the primary outlet system to 50 mg/L TSS, with a pH within the range of 6.5–8.5	Section 3.8, 4.2 and 7.1.3	The Site EPL 684 will be varied to include relocated/additional discharge points as required as well as the pH range limits for all controlled discharges.
- Be operational before any disturbance occurs in the catchment upslope of the basin.	Section 4.2	This SWIA commits to the only disturbance within a given catchment that will occur prior to the required sediment basin being operational, is for the construction of the required sediment basin.
Water and soils		
17. The EIS must map the following features relevant to water and soils including:		
- Acid Sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map).	-	Noted – addressed by others.
- Rivers, streams, wetlands, estuaries (as described in s.4.2 of the BAM).	Section 3.2	Mapping of rivers, streams, wetlands, etc is provided in the referenced section of this SWIA.
- Wetlands as described in s.4.2 of the BAM.	-	No wetlands are mapped by NSW hydrography spatial data set between the Site and the confluence of Wianamatta-South Creek with the Hawkesbury River.
- Groundwater.	-	Addressed in <i>Bulk Earthworks – Groundwater Assessment Report</i> (Arcadis, 2026)
- Groundwater dependent ecosystems.	-	Addressed in <i>Bulk Earthworks – Groundwater Assessment Report</i> (Arcadis, 2026)
- Proposed intake and discharge locations.	Sections 4.1 and 4.2	Initially, the Project will continue controlled discharges to Badgerys Creek at the existing licensed discharge location with farm dam and sediment basins spilling to either Badgerys Creek or Wianamatta-South Creek as per the existing operation. Proposed sediment basins will spill to either Badgerys Creek or Wianamatta-South Creek as indicated in Section 4.2 of this SWIA. The location for controlled discharges from the proposed sediment basins to either Badgerys Creek or Wianamatta-South Creek (if required) will be determined during the detailed design phase of the Project and be the subject of an EPL variation.

Item	Report Section	Summary of Response
18. The EIS must describe background conditions for any water resource likely to be affected by the development, including existing surface and groundwater.	Section 3	The background conditions of the surface water resources likely to be affected by the development are described in the referenced section.
19. The EIS must assess the impact of the development on hydrology, including:		
- Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.	Section 8	Project impacts to the immediate receiving waters downstream of the Site are addressed in the referenced section of this SWIA. The assessment did not identify any significant impacts. Potential impacts associated with flooding are addressed in the <i>Project Flood Impact and Risk Assessment</i> (Colliers, 2026).
- Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.	-	Addressed in the <i>Project Biodiversity Development Assessment Report</i> (SLR, 2026).

2.3 Assessment Against Relevant Western Sydney Guidelines/Plans

The required aspects of the Western Sydney Aerotropolis Phase 2 Development Control Plan (DCP) 2024 have also been considered and are listed in Table 2.7.

It should be noted that there are also other western Sydney guidelines/plans that apply to this development, but under the hierarchy of documents the DCP (refer to Table 2.7) provides the required level of information for this SWIA.

Other plans consider and with controls detailed in the DCP include:

- Precinct Plan – Aerotropolis Core, Badgerys Creek and Wianamatta-South Creek Precincts (Western Sydney Aerotropolis Precinct Plan published 24 March 2022).
- State Environmental Planning Policy (SEPP) – Precincts - Western Parkland City 2021.
- Western Sydney Development Control Plan.

TABLE 2.7: WESTERN SYDNEY AEROTROPOLIS PHASE 2 DCP 2024

Item	Report Section	Summary of Response
Section 2.3 Stormwater, Water Sensitive Urban Design and Integrated Water Management		
Section 2.3.1 Waterway Health and Riparian Corridors		
PO1 ¹ – Development retains and restores native vegetation and riparian corridors. 1. Development maintains and protects waterways in accordance with the following guidelines: - Strahler Order 1 watercourses with a catchment area of less than 15 hectares can be re-constructed and /or piped, providing stormwater modelling demonstrates the pipe and street network is capable of accommodating flows up to and including the 100 year AEP storm event. - Naturalised trunk drainage paths are to be provided when the contributing catchment exceeds 15 hectares or when 1% AEP overland flows cannot be safely conveyed overland as described in <i>Australian Rainfall and Runoff – 2019</i>. - Waterways of Strahler Order 2 and higher will be maintained in a natural state, including the maintenance and restoration of riparian areas and habitat, such as fallen debris. - Where a development is associated with, or will affect, a waterway of Strahler Order 2 or higher, rehabilitation will occur to return that waterway to a natural state. 4. Retain areas of the Proteaceae shrubs for the Eastern Pygmy Possum <i>Cercartetus nanus</i> along or adjacent to riparian areas to improve and maintain habitat connectivity. 5. Weeds from creeks, streams and riparian areas are removed and replaced with appropriate native planting. 6. Locate stormwater infrastructure including pipelines and detention basins wholly on certified-urban capable land consistent with the Plan's biodiversity consistent with the Plan's biodiversity certification approvals. Stormwater infrastructure is not to be located within land identified as avoided or land managed as a reserve.	-	Noted – addressed by others.

Item	Report Section	Summary of Response
PO2 - Protect key aquatic habitat where it occurs.	Section 8.2	Badgerys Creek and Wianamatta-South Creek are mapped as key fish habitat as both watercourse are >3 Strahler stream order. An assessment of the Projects impacts to water quality and hydrological regimes indicated no significant impacts to the receiving waters. Further detail is provided in the referenced section of this SWIA.
PO3 - Development provides increased connectedness to high quality passive open space and the blue-green grid.	-	This performance objective is not applicable to the bulk earthworks SSDA 97711727.
PO4 - Riparian streets shown on the Aerotropolis Precinct Plan are delivered as part of subdivision and civil works and riparian corridors are integrated with the public domain and active transport connections.	-	This performance objective is not applicable to the bulk earthworks SSDA 97711727.
Section 2.3.2 Stormwater Management and Water Sensitive Urban Design		
PO1 - Development applications must demonstrate compliance with the stormwater quality targets at all times through interim stormwater management measures incorporated within the development, or by connection to the regional stormwater system once operational.	-	This performance objective is not applicable to the bulk earthworks SSDA 97711727.
PO2 - Development applications must demonstrate compliance with the stormwater flow targets at all times through interim stormwater management measures incorporated within the development, or by connection to the regional stormwater system once operational.	-	This performance objective is not applicable to the bulk earthworks SSDA 97711727.
PO3 – Development applications must include a Water Management Strategy (WMS)	Section 4.2	The water management strategy for the Project is provided in the referenced section of this SWIA. Proposed water management measures including the provision of sediment basins will be implemented and water reuse have been shown to achieve the construction phase stormwater management objectives contained in <i>Technical guidance for achieving Wianamatta-South Creek stormwater management targets</i> (NSW DPE, 2022).
PO4 - The regional stormwater system includes requirements for on lot as well as streetscape measures to ensure the Targets in PO1 and PO2 are met.	-	This performance objective is not applicable to the bulk earthworks SSDA 97711727.
PO6 ² - Development must not increase existing urban salinity or result in increased salt loads in waterways, wetlands, drainage line or soils 1. A salinity and or sodicity hazard assessment is required to ensure no impacts to be the waterways and built infrastructure. 2. All WSUD systems must incorporate an impervious liner, unless a detailed Salinity and Sodicity Assessment demonstrates infiltration of stormwater will not adversely impact the water table and soil salinity (or other soil conditions).	Section 8.1	Potential impacts to instream salinity are considered to be unlikely and are addressed in the referenced section of this SWIA.
PO7 - Drainage is designed to safely convey overland flows	-	Addressed in the Project <i>Flood Impact and Risk Assessment</i> (Colliers, 2026).
PO8 - Lots achieve minimum perviousness to meet stormwater drainage manager requirements and green and cooling objectives	-	This performance objective is not applicable to the bulk earthworks SSDA 97711727.
Section 2.3.3 Management and Access to Regional Stormwater Infrastructure and Waterways		
PO1 - Regional infrastructure Stormwater assets (including land and infrastructure) are managed and maintained by the stormwater drainage manager.	-	This performance objective is not applicable to the bulk earthworks SSDA 97711727.
PO2 - Development provides management access to the stormwater drainage manager.	-	This performance objective is not applicable to the bulk earthworks SSDA 97711727.
Section 2.5 Flooding and Environmental Resilience Management		
Section 2.5.1 Flood Management	-	Addressed in the Project <i>Flood Impact and Risk Assessment</i> (Colliers, 2026).

Item	Report Section	Summary of Response
Section 2.5.2 Mitigation Urban Heat Island Effect	-	Noted – addressed by others.
Section 2.5.3 Salinity	Section 8.1	Potential impacts to instream salinity are considered to be unlikely and are addressed in the Section 8.1 of this SWIA.
Section 2.5.4 Erosion and Sediment Control		
PO1 - Development is to ensure 80% of all flows leaving the construction site achieves total suspended solids of 50mg/L or less and a pH of 6.5-8.5 during the construction and building phases until the site is stabilised and landscaped	Section 4.2 and 5.2.2	Proposed water management measures including the provision of sediment basins will be implemented and water reuse have been shown to achieve the construction phase stormwater management objectives contained in <i>Technical guidance for achieving Wianamatta-South Creek stormwater management targets</i> (NSW DPE, 2022). This SWIA commits to the preparation of progressive erosion and sediment control drawings will be prepared in accordance with <i>Managing Urban Stormwater – Soils and Construction Volume 1</i> and <i>Volume 2</i> (hereafter collectively referred to as the Blue Book) that will detail temporary controls to be implemented as sediment basins are established.

Notes:

¹ PO = Performance Objective

² There is no PO5.

2.4 State Environment Planning Policy (Biodiversity and Conservation) 2021

Chapter 6 (Water catchments) of *State Environment Planning Policy (Biodiversity and Conservation) 2021* (the Biodiversity and Conservation SEPP) is applicable to this SWIA as well as other water related studies including the *Project Flood Impact and Risk Assessment* (Colliers, 2026) and the *Bulk Earthworks – Groundwater Assessment Report* (Arcadis, 2026). This SWIA addresses the relevant sections of Chapter 6 of the Biodiversity and Conservation SEPP relating to:

- Water quality and quantity.
- Factors that could impact aquatic ecology (e.g. hydrological regimes).
- Total catchment management.
- Land within 100 m of a natural water body and water dependent users.

3. SURFACE WATER CONTEXT

3.1 Climate

The Site has a temperate climate with warm to hot summers and cool winters. Rainfall and evaporation data for the Site was sourced from the Synthetic Information for Landholders (SILO) database. The SILO database interpolates raw rainfall and evaporation data from gauges managed by the Bureau of Meteorology (BoM) to provide spatially and temporarily complete datasets for site specific locations. Rainfall and evaporation (Morton's shallow lake evaporation) data was sourced for the SILO grid point closest to the Project (-30.60 latitude and 151.90 longitude), for the period between 01/01/1889 to 31/12/2024. There are only minor variations in average monthly rainfall between the nearby rainfall stations and the SILO data, indicating that the SILO dataset is suitable to be used to represent long-term rainfall data.

Annual rainfall and Mortons Lake evaporation statistics are provided in Table 3.1. Daily and monthly average rainfall and pan evaporation depth for are presented in Figure 3.1.

The average annual rainfall depth for the Site is 751 mm with the average annual Mortons Lake evaporation of 1,293 mm exceeding annual average rainfall. Average monthly rainfall totals indicate that the warmer months are the wettest months and evaporation exceeds rainfall in all months except for winter.

TABLE 3.1: ANNUAL RAINFALL AND EVAPORATION STATISTICS (SILO, 1889 – 2024)

Statistic	Annual Rainfall Depth (mm)	Annual Mortons Lake Evaporation Depth (mm)
10 th Percentile	469	1235
50 th Percentile	710	1288
90 th Percentile	1026	1351
Average	751	1293

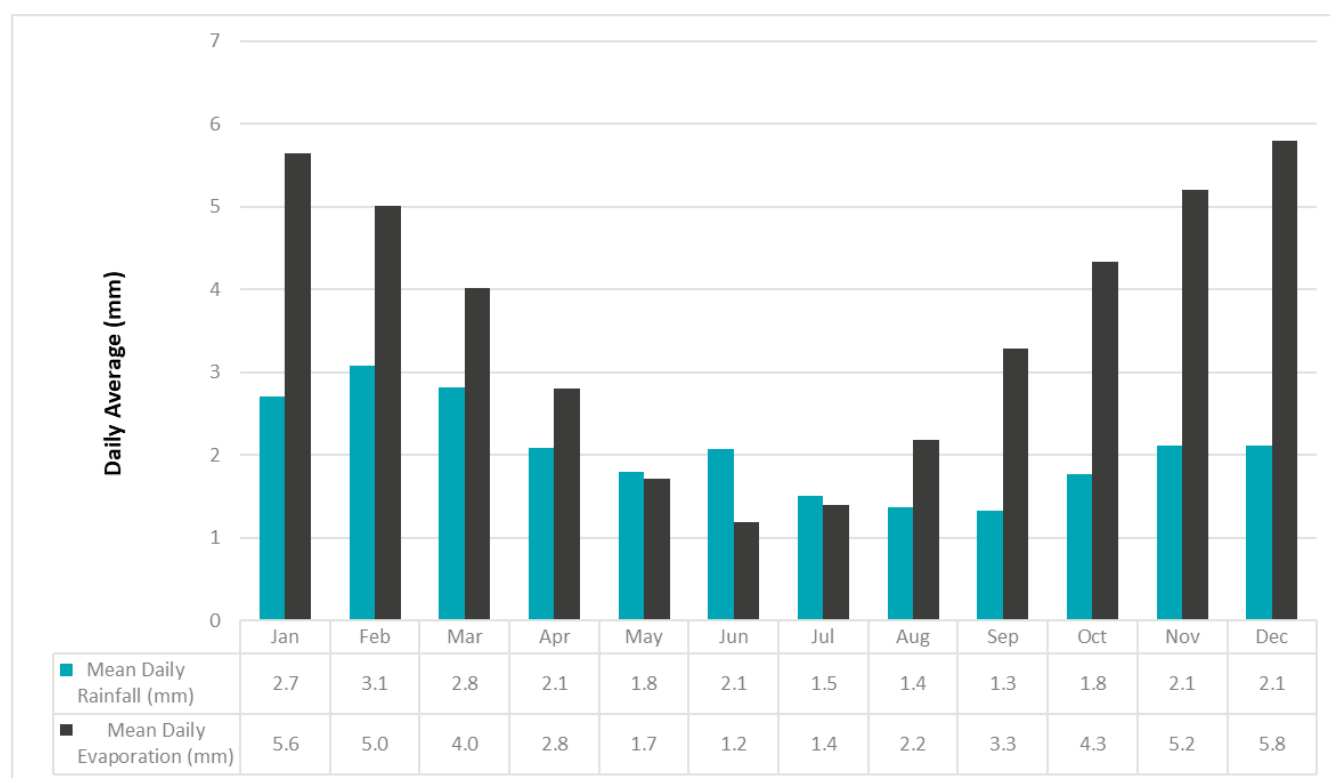


FIGURE 3.1: MONTHLY AVERAGE RAINFALL AND MORTONS LAKE EVAPORATION (SILO, 1889 – 2024)

3.2 Surface Hydrology and Catchments

On a regional scale, the Site is located within the Hawkesbury River catchment, a degraded tidal river (NSW Department of Climate Change, Energy, the Environment and Water, 2023). Locally, the Project is in the catchment areas of Badgerys Creek and Wianamatta-South Creek (also known as South Creek or Wianamatta Creek). Badgerys Creek is a tributary of Wianamatta-South Creek with their confluence approximately 6 km downstream of the Site. Wianamatta-South Creek flows into the Hawkesbury River downstream of Windsor, approximately 33 km north of the Site (refer to Figure 3.3). The Site is not located within the drinking water catchments of Sydney Water.

Wianamatta-South Creek has a catchment area of 784 square kilometres, rises to 120 metres north of Narellan and is primarily a degraded meandering deep and narrow channel (DCCEEW, 2023). The catchment area is characterised by a long south-to-north flowing channel, that is contributed to on the eastern and western sides by numerous relatively short creeks and streams. Daily discharges from St Marys and Quakers Hill sewage treatment plants make up the majority of flows into Lower Wianamatta-South Creek and Eastern Creek downstream of the Site (DCCEEW, 2023).

3.2.1 Flow Regimes

Figure 3.2 presents a flow duration curve for Wianamatta-South Creek developed using data sourced from the *WaterNSW Continuous monitoring network* for Gauge 212320. Gauge 21230 is located on Wianamatta-South Creek at Elizabeth Drive (station name “South Ck @ Elisab Dr”) approximately 4.7 km downstream of the Site and downstream of the confluence of Badgerys Creek with Wianamatta-South Creek. The catchment upstream of Gauge 212320 is 88 km² and the gauge has been collecting data since 1970

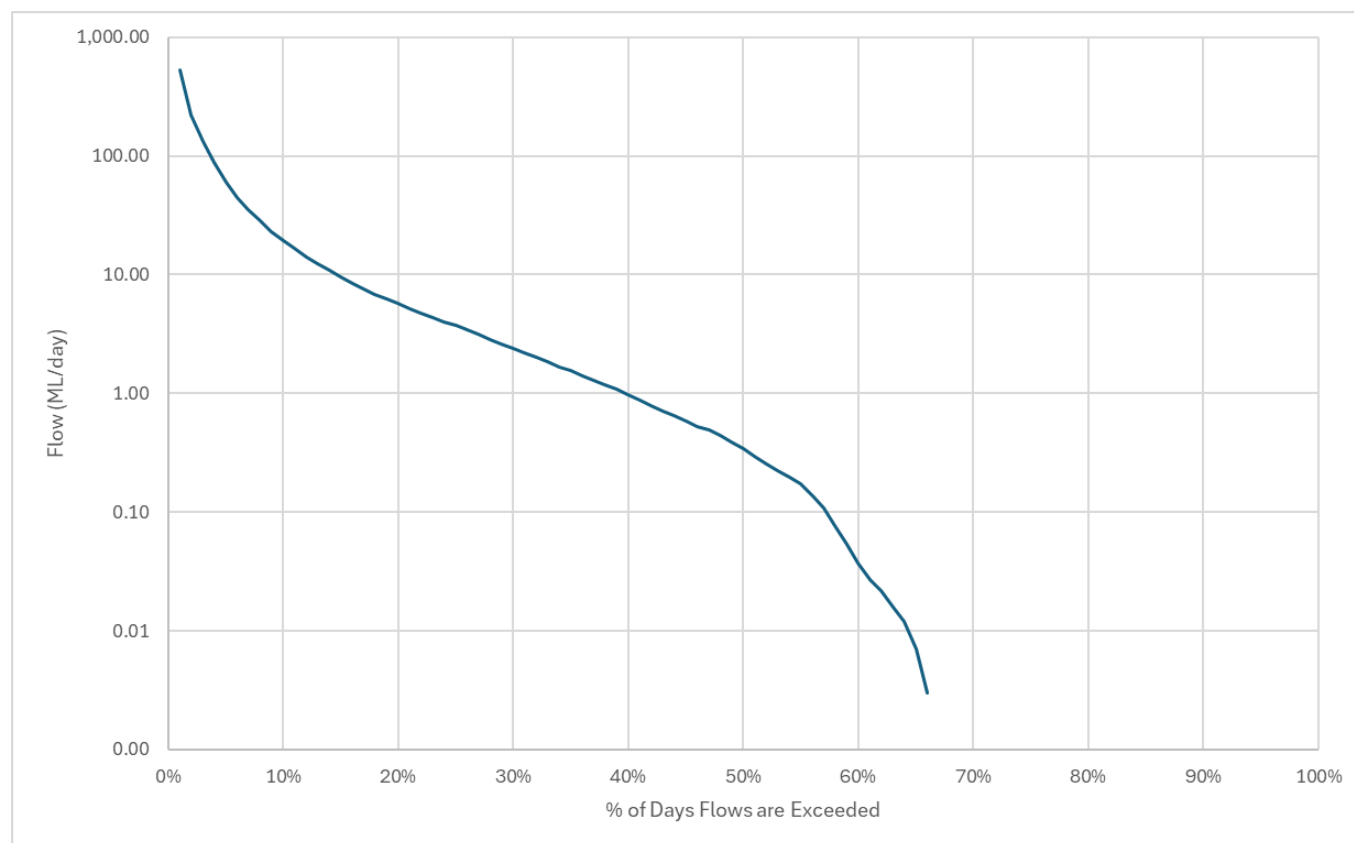


FIGURE 3.2: WIANAMATTA-SOUTH CREEK FLOW DURATION CURVE

(Source: WaterNSW Continuous monitoring network)



Legend

- Waterbodies
- Subject Site
- Watercourses
 - Major
 - Minor

Suite 2, Level 5, 45 Hunter Street
Newcastle NSW 2300

www.engeny.com.au

P: (02) 4926 1225

E: admin@engeny.com.au



0 1 2 km



Scale in metres (1:70,000 @ A3)

Map Projection: Transverse Mercator
Horizontal Datum: Australia Geodetic Datum
Vertical Datum: Australia Geodetic Datum
Grid: Australian Map Grid, Zone 56

Figure 3.3 **Catchment Context**

Goodman Group

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Job Number:
BNTL02053_0001
Revision: 0
Drawn: LS
Checked: CB
Date: 25/2/2026

3.3 Site Topography

The existing topography is relatively flat with grades less than 3% over much of the Site (Advisian, 2019). The Site slopes naturally away from the centre of the Site to the east towards Wianamatta-South Creek, and to the west and north-west towards Badgerys Creek. Historical quarrying activities on the Site have substantially altered the natural landform with two pit voids and elevated stockpiles present in the western and southern part of the Site. The most prominent of these landforms is a rehabilitated stockpile in the far west of the Site, known as the 'Western Stockpile' which has been revegetated with native grasses and trees.

3.4 Soils

The Site is mapped within the Blacktown and Wianamatta-South Creek soil landscapes with the on-site soils expected to consist of:

- Blacktown soil landscape:
 - Friable brownish black loam (A horizon).
 - Hardsetting brown clay loam (A2 horizon).
 - Strongly pedal, mottled brown light clay (B horizon).
 - Light grey plastic mottled clay (B3 or C horizon).
- South Creek soil landscape:
 - Brown apedal single-grained loam (A horizon).
 - Dull brown clay loam. (A horizon).
 - Bright brown clay (B horizon).

Blacktown topsoils are often hardsetting with moderate to high organic matter content with subsoils containing low organic matter and being highly dispersible and occasionally sodic. Wianamatta-South Creek topsoil is moderately dispersible and contains moderate amounts of organic matter with having high sand and silt fractions with low organic matter.

The modelled soil properties are tabulated in Table 3.2 and hydrogeological landscape data in Table 3.3 and indicate that the Site soils:

- Have high erodibility.
- Have fine textured topsoil and subsoil.
- Are acidic to slightly acidic.
- Have a very high overall salinity hazard, indicated by high instream EC and high land salinity.

TABLE 3.2: MODELLED SOIL PROPERTIES

Parameter	Soil Profile		
	0 - 30 cm Depth	30 - 60 cm Depth	60 - 100 cm Depth
Soil Erodibility, k factor (as used in the Revised Universal Soil Loss Equation (RUSLE))	0.06 - 0.07		
Clay Percentage (%)	>15 - 40	>25 - 50	>30 - 50
Silt Percentage (%)	>5 - 25	>5 - 25	>10 - 25
Sand Percentage (%)	>40 - 60	>30 - 60	>30 - 50
pH (CaCl ₂)	>5.0 - 6.5	>5.0 - 6.5	>5.0 - 6.5

TABLE 3.3: HYDROGEOLOGICAL LANDSCAPES

Overall Salinity Hazard	Land Salinity	Instream EC
Very High	High	High

3.5 Water Quality

3.5.1 Baseline Receiving Water Quality

Surface water quality monitoring is undertaken in Badgerys Creek and Wianamatta-South Creek (refer to Section 6) at the locations (upstream and downstream of the Site) shown on Figure 3.4. Table 3.4 and Table 3.5 present the water quality statistics for selected water quality parameters based on monthly monitoring completed from January 2024 to December 2025. Table 3.4 and Table 3.5 also include the relevant default trigger values for physical and chemical stressors presented in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Australian and New Zealand Environment and Conservation Council (ANZECC), 2000) (ANZECC) for slightly to moderately disturbed lowland river systems in south-east Australia (noting that there are no published NSW water quality and flow objectives for the Hawkesbury-Nepean catchment).

The statistics presented in Table 3.4 and Table 3.5 indicate:

- Receiving water (upstream and downstream) pH is consistent with ANZECC default trigger values.
- Receiving water (upstream and downstream) turbidity and electrical conductivity are on average within the ANZECC default trigger range but may at times exceed the upper trigger value.
- Nutrient concentrations (upstream and downstream) consistently exceed ANZECC default trigger values indicating the ecosystem could be classified as highly disturbed.

TABLE 3.4: BADGERYS CREEK WATER QUALITY

Analyte	Statistic	Upstream (RW1)	Downstream (RW2)	ANZECC Value	Default	Trigger
pH	Minimum	7.2	7.1	6.5 - 8.5		
	Average	7.4	7.3			
	Maximum	7.7	7.6			
Electrical Conductivity (µS/cm)	Minimum	1,230	1,250	125 - 2,200		
	Average	1,957	1,873			
	Maximum	3,740	3,640			
Turbidity (NTU)	Minimum	20	12	6 - 50		
	Average	62	36			
	Maximum	120	90			
Total Nitrogen (mg/L)	Minimum	0.6	0.5	0.5		
	Average	1.2	1.2			
	Maximum	3.6	2.2			
Oxides of Nitrogen (mg/L)	Minimum	0.01	0.01	0.04		
	Average	0.39	0.25			
	Maximum	2.40	1.50			
Ammonia (mg/L)	Minimum	0.02	0.02	0.02		
	Average	0.04	0.06			
	Maximum	0.07	0.22			
Total Phosphorus (mg/L)	Minimum	0.08	0.06	0.05		
	Average	0.17	0.20			
	Maximum	0.30	0.68			

TABLE 3.5: WIANAMATTA-SOUTH CREEK WATER QUALITY

Analyte	Statistic	Upstream (RW1)	Downstream (RW2)	ANZECC Value	Default	Trigger
pH	Minimum	7.2	7.3	6.5 - 8.5		
	Average	7.4	7.4			
	Maximum	7.6	7.6			
Electrical Conductivity (µS/cm)	Minimum	814	782	125 - 2,200		
	Average	1,311	1,390			
	Maximum	2,750	2,310			
Turbidity (NTU)	Minimum	8	7	6 - 50		
	Average	35	32			
	Maximum	100	100			
Total Nitrogen (mg/L)	Minimum	0.9	0.7	0.5		
	Average	2.4	1.6			
	Maximum	5.0	5.3			
Oxides of Nitrogen (mg/L)	Minimum	0.54	0.10	0.04		
	Average	1.76	1.03			
	Maximum	4.00	4.50			
Ammonia (mg/L)	Minimum	0.02	0.02	0.02		
	Average	0.09	0.06			
	Maximum	0.26	0.13			
Total Phosphorus (mg/L)	Minimum	0.20	0.10	0.05		
	Average	0.41	0.27			
	Maximum	0.76	1.00			

Further to the above, a detailed review of Badgerys Creek and Wianamatta-South Creek water quality was undertaken during the preparation of the *CSR Advanced Manufacturing Hub – Modification 4 Dewatering Strategy* (Advisian, 2019). One purpose of the review was to assess the potential impacts to Badgerys Creek and Wianamatta-South Creek water quality, should water that had accumulated in Pit 1, Pit 2 and former Pit 3 (now backfilled) be discharged to the creeks. The analytes considered by Advisian (2019) in the water review included:

- pH
- Electrical Conductivity
- Turbidity
- Total Suspended Solids
- Total Dissolved Solids
- Total Nitrogen
- Total Phosphorus
- Biochemical oxygen demand
- Chloride

- Sulphate
- Calcium
- Magnesium
- Sodium
- Potassium
- Total Alkalinity
- Arsenic
- Cadmium
- Chromium
- Copper
- Mercury
- Nickel
- Lead
- Zinc

Advisian (2019) concluded that, with the exception of pH, pit water quality aligned with the lower end of the reported concentrations in Badgerys Creek and that discharges of pit water to Badgerys Creek were *“not anticipated to impact on concentrations in the creek, as the concentration associated with the available pit samples is either less than or within the range of concentrations for water sampled from Badgerys Creek.”*. Receiving water quality performance criteria for Badgerys Creek downstream of the quarry were proposed (should the need to dispose of surplus pit water via licensed discharge arise) by Advisian based on water quality monitoring data collected over a three year period by WSIA at a location downstream of the quarry (refer to Section 3.5.2).

However, Advisian (2019) found that the concentration of some pit water analytes exceeded recorded concentrations in Wianamatta-South Creek (albeit from a limited monitoring data set) and as such, discharges of pit water would have the potential to degrade Wianamatta-South Creek water quality. The analytes identified by Advisian (2019) that exceeded to recorded Wianamatta-South Creek concentrations are listed below.

- pH
- Sulphate
- Total Alkalinity as CaCO₃
- Sodium
- Arsenic
- Copper.

3.5.2 Water Quality Performance Criteria

Table 3.6 presents the receiving water and discharge performance criteria applicable to the existing Site operations.

TABLE 3.6: SURFACE WATER PERFORMANCE CRITERIA

Analyte	Units	Receiving Water Performance Criteria	Discharge Performance Criteria
pH	-	6.5 - 8.0 ¹	6.5 - 8.5 ²
Electrical Conductivity	µS/cm 25°C	3,200 ¹	-
Dissolved Oxygen	mg/L	85 - 110% saturation ¹	-
Turbidity	NTU	-	50 ²
Ammonia	mg/L	0.48 ¹	-

Analyte	Units	Receiving Water Performance Criteria	Discharge Performance Criteria
Total Nitrogen	mg/L	8.7 ¹	-
Oxides of Nitrogen	mg/L	0.18 ¹	-
Total Phosphorus	mg/L	1 ¹	-
Filterable Reactive Phosphate	mg/L	0.35 ¹	-
Aluminium ⁴	mg/L	-	0.055 ³
Arsenic ⁴	mg/L	0.024 ³	0.024 ³
Cadmium ⁴	mg/L	0.002 ³	0.002 ³
Chromium ⁴	mg/L	0.001 ³	0.001 ³
Copper ⁴	mg/L	0.0014 ³	0.006 ³
Lead ⁴	mg/L	0.0034 ³	0.0034 ³
Mercury ⁴	mg/L	0.0006 ³	0.0006 ³
Nickel ⁴	mg/L	0.011 ³	0.011 ³
Zinc ⁴	mg/L	0.008 ³	0.0094 ³

¹ Performance criteria proposed in the recently updated Soil and Water Management Plan.

² Current discharge 100th percentile limit on EPL 684.

³ Receiving water and discharge criteria proposed should discharges of pit water be undertaken.

⁴ Values are for dissolved concentration.

3.5.3 Pit Water

As discussed in Section 3.5.1, a review of the potential impacts to Badgerys Creek and Wianamatta-South Creek water quality, should water that had accumulated in Pit 1, Pit 2 and former Pit 3 (now backfilled) be discharged to the creeks, was undertaken during the preparation of the *CSR Advanced Manufacturing Hub – Modification 4 Dewatering Strategy* (Advisian, 2019). At that time, over 1,000 ML of water (direct rainfall, surface runoff and groundwater seepage) had accumulated in the three pits. Since 2019:

- Pit 3 has been dewatered and backfilled.
- Pit 1 and Pit 2 have been dewatered and are now being backfilled.

The pit water quality data set used in the review undertaken by Advisian (2019) was limited and given the water contained in the pits had accumulated over several years, it is considered unlikely to be representative of the water that will be captured in Pit1 and Pit 2 as backfilling of the pits progresses. It is noted that all water that had accumulated in the pits has since been dewatered in accordance with a previous enforceable undertaking agreement with the NRAR. Any water within the pits is primarily associated with direct rainfall into the pits (runoff from catchments external to the pits have been redirected to a sediment basin).

Water samples were collected from the water storages in Pit 1 and Pit 2 on 27 January 2026, with testing undertaken for the analytes identified as requiring performance criteria by Advisian (2019) should the need to dispose of surplus pit water via licensed discharge arise (refer to Sections 3.5.1 and 3.5.2) as well as those undertaken during routine surface water monitoring with performance criteria (refer to Section 6). Table 3.7 presents the January 2026 pit water quality monitoring results. The results presented in Table 3.7 indicate that on 27 January 2026:

- Water stored in Pit 1 had a pH of 8.7 which marginally exceeds the EPL discharge upper limit of 8.5. It is noted that the Site presently has the capability to adjust pH to within EPL limits through chemical dosing (refer to Section 4.1).
- Water stored in Pit 2 had a dissolved Zinc concentration which marginally exceeds both the proposed discharge limit and receiving water performance criteria.
- No other analytes exceeded discharge or receiving water performance criteria.

TABLE 3.7: PIT WATER QUALITY RESULTS – JANUARY 2026

Analyte	Units	Limit Detection of	Pit 1	Pit 2	Receiving Water Performance Criteria	Discharge Performance Criteria
Temperature	°C	0.1	25.9	26.2	-	-
pH	pH Units	0.1	8.7	8.5	6.5 - 8.0 ¹	6.5 - 8.5 ²
Electrical Conductivity	µS/cm 25°C	50	2,670	1,210	3,200 ¹	-
Dissolved Oxygen	mg/L	0.1	8.2	8.3	85 - 110% saturation ¹ (6.9 - 8.9 mg/L at 26°C)	-
Turbidity	NTU	0.5	5.6	20	-	50 ²
Total Suspended Solids	mg/L	5	9	14	-	-
Total Dissolved Solids	mg/L	20	1,280	580	-	-
Ammonia	mg/L	0.02	<0.02	<0.02	0.48 ¹	-
Total Nitrogen	mg/L	0.1	0.7	0.9	8.7 ¹	-
Oxides of Nitrogen	mg/L	0.005	0.47	0.72	0.18 ¹	-
Total Phosphorus	mg/L	0.05	<0.05	<0.05	1 ¹	-
Phosphate	mg/L	0.005	0.008	0.01	0.35 ¹	-
Aluminium ⁴	mg/L	0.01	<0.01	<0.01	-	0.055 ³
Arsenic ⁴	mg/L	0.001	<0.001	<0.001	0.024 ³	0.024 ³
Cadmium ⁴	mg/L	0.0001	<0.0001	<0.0001	0.002 ³	0.002 ³
Chromium ⁴	mg/L	0.001	<0.001	<0.001	0.001 ³	0.001 ³
Copper ⁴	mg/L	0.001	0.001	<0.001	0.0014 ³	0.006 ³
Lead ⁴	mg/L	0.001	<0.001	<0.001	0.0034 ³	0.0034 ³
Mercury ⁴	mg/L	0.00005	<0.00005	<0.00005	0.0006 ³	0.0006 ³
Nickel ⁴	mg/L	0.001	<0.001	<0.001	0.011 ³	0.011 ³
Zinc ⁴	mg/L	0.001	0.008	0.012	0.008 ³	0.0094 ³

¹ Performance criteria proposed in the recently updated Soil and Water Management Plan.

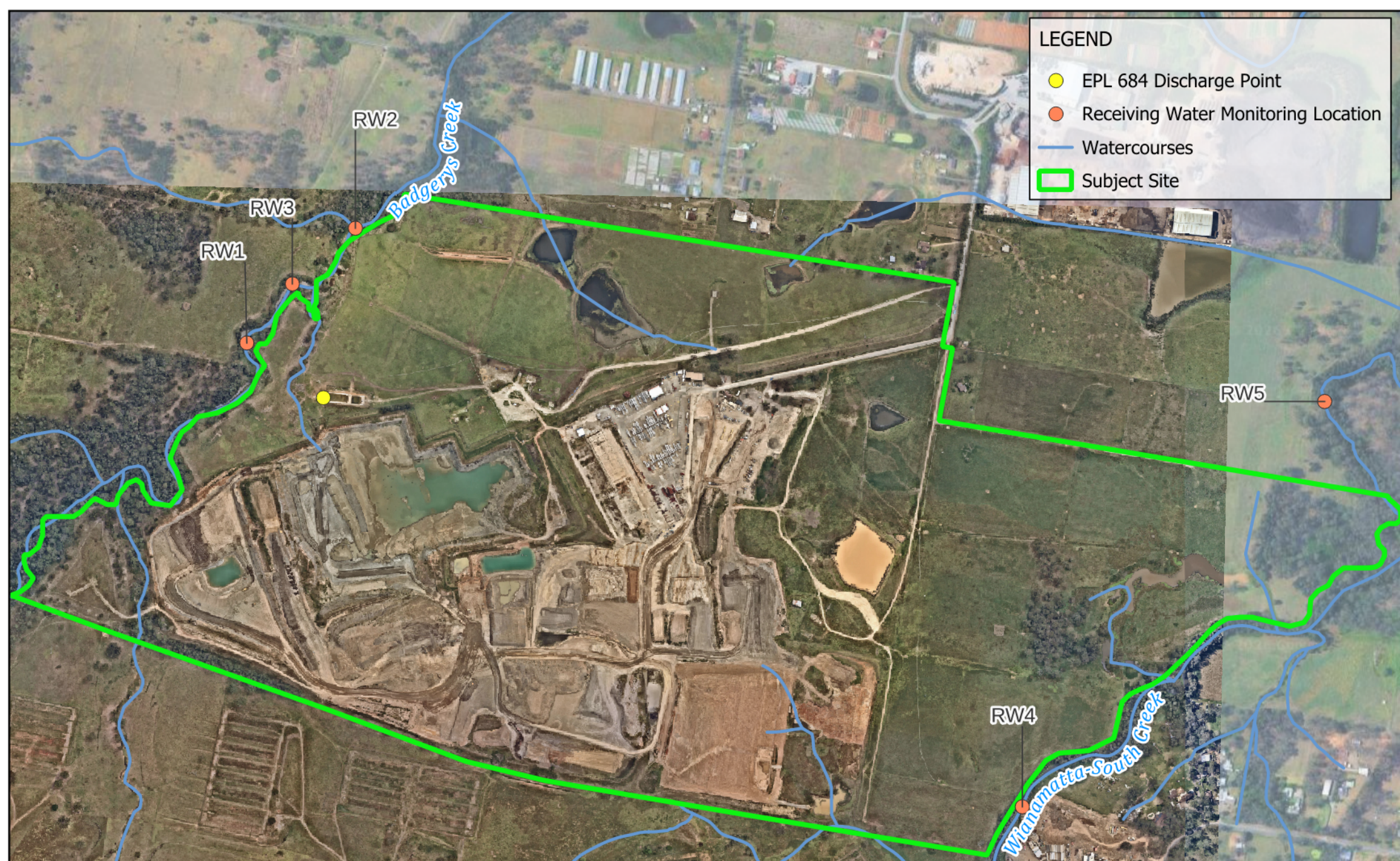
² Current discharge 100th percentile limit on EPL 684.

³ Receiving water and discharge criteria proposed should discharges of pit water be undertaken.

⁴ Values are for dissolved concentration.

LEGEND

- EPL 684 Discharge Point
- Receiving Water Monitoring Location
- Watercourses
- Subject Site



Suite 2, Level 5, 45 Hunter Street,
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0 100 200 m

Scale in metres (1:11,000 @ A4)

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Figure 3.4 Receiving Water Monitoring Locations Goodman Group

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Checked: CB
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3.6 Surface Water Extraction

3.6.1 Water Licensing

The NSW state government controls the use and flow of all water in rivers, lakes, and aquifers. Water take can occur lawfully without a licence under basic land holder rights provisions (refer to Section 3.6.3) or where an exemption applies (refer to Section 3.6.4). A WAL or a water supply work and/or water use approval may be required to take water from a river, lake or aquifer. The *Water Management Act 2000* applies to all regions where there is a Water Sharing Plan (WSP) (refer to Section 3.6.2) in operation.

Operational water requirements for the Project (fill conditioning and dust suppression) are proposed to be supplied via runoff captured within the Project water management system (WMS) (refer to Section 4). Water licensing requirements relevant to the Project are further detailed in Section 7.1.1, however, there are no current plans to extract water from any licensable surface water sources to supply Project water demands.

3.6.2 Water Sharing Plan

Water Sharing Plans (WSPs) have been developed under the *Water Management Act 2000* to protect the environmental health of water sources, whilst securing sustainable access to water for all users. The WSPs specify maximum water extractions and allocations and provide licensed and unlicensed water users with a clear picture of when and how water will be available for extraction. The Site is located within the *Greater Metropolitan Region Unregulated River WSP 2023* and specifically, within the Upper Wianamatta-South Creek Management Zone of the Wianamatta-South Creek Water Source.

3.6.3 Basic Landholder Rights

There are three types of basic landholder rights (BLR) in NSW (*Water Management Act 2000*):

- Domestic and stock rights – allows take and use of water for domestic consumption and non-intensive stock watering without the need for a water access licence (WAL) or water use approval. A water supply work approval (i.e. for a bore or dam, etc) is required.
- Harvestable rights – allows landholders to capture and store a proportion of the rainfall runoff from their landholding in one or more harvestable rights dams, without requiring a WAL, water use approval or water supply work approval.
- Native title rights – allows take and use of water in the exercise of native title rights (under the *Commonwealth Native Title Act 1993*), without requiring a WAL, water use approval or water supply work approval (unless the work is a dam or bore).

3.6.3.1 Harvestable Rights

Harvestable Rights provisions for the capture and reuse of surface water runoff generated within a property, is subject to the following rules:

- (1) Landholdings (owned and leased) must be contiguous (generally omits public roads and easements).
- (2) Harvestable rights cannot be transferred between water sources – i.e. water captured within a water source must be covered by a harvestable right (or licence) in that source.
- (3) Water captured (in dams, mining pits, etc) from higher order (3rd order and above) watercourses and above (or within 40 m (measured perpendicular), or on any floodplain, or on or within 3 km upstream of any Ramsar wetland, must be covered by a WAL, regardless of the Harvestable Right, unless exempt from licensing.

Harvestable rights dams do not require a WAL, water use approval or water supply work approval. However, if harvestable rights dam also stores and/or captures water taken under another right or licence this dam is known as a Mixed-rights dam. Mixed-rights dams may require a WAL and water supply work approval prior to construction.

3.6.3.2 Maximum Capacity of Harvestable Rights Dams – Method of Calculation

WaterNSW provides a tool to estimate harvestable rights, based on location and property area. This method uses a simple average annual unit runoff rate. The volume of water a landholder can capture and store under harvestable rights is expressed as a maximum harvestable right dam capacity for a landholding. The maximum harvestable right dam capacity for a landholding represents up to 10% of the average regional runoff for the region in which the landholding is located. The combined volume of all dams (or parts thereof) that capture and store harvestable rights water cannot exceed the maximum dam capacity.

There are three different harvestable rights orders applying to three different regions in NSW. These are:

- Coastal-draining catchments (September 2023).
- Central inland-draining catchments (September 2023).
- Western division order (March 2006).

The Project Area has a contiguous landholding area of approximately 189.2 ha and is in the central-inland draining catchment. Based on an average annual regional runoff of 0.8 ML/ha/year for the Project Site, the MHRDC allowance for the landholding is 15.1 ML (source: [Maximum Harvestable Rights Calculator - WaterNSW](#)). That is, the Applicant can use water from harvestable rights dams (that are not excluded works dams) up to a maximum aggregate capacity of 15.1 ML that do not require a surface water licence. The harvestable rights order for the central-inland draining catchments (September 2023) states that harvestable rights water captured or stored in that dam may be taken and used for any purpose, except that it must not be moved to an excluded work or to any other dam on the landholding that is not a harvestable rights dam.

3.6.4 Water Licensing Exemptions

The *Water Management Act 2000* exempts particular of water supply work types from requiring a WAL to take water from a water source. These work types are listed in the Part 7 of Schedule 4 of the *Water Management (General) Regulation 2025* and include the following that are applicable to the site:

- A work impounding water:
 - That impounds an amount of water exceeding the harvestable rights referred to in an order under the Act, section 54 for the landholding on which the work is located, and
 - That is constructed before 1 January 1999, and
 - That is used only for —
 - Domestic consumption or stock watering, or both, or
 - A purpose that does not require the extraction of water from the work, and
 - That is located on, or within a catchment of, a minor stream, and
 - From which water is being used only on the landholding on which the dam is located.
- A dam for drainage or effluent that is:
 - Constructed and used to capture, contain and recirculate drainage or effluent to prevent the contamination of a water source, and
 - Either, in relation to the use referred to in paragraph (a) —
 - Of a structural size that is the minimum necessary for the use, or
 - Required by a public authority for the use, and
- Located on, or within a catchment of, a minor stream.

Details of how and when these exclusions apply to the existing Site are provided in Section 4.1, with details for the Project provided in Section 7.1.1.

3.7 Surface Water Users

A search of the NSW Water Register for the 2025/2026 water year (July 2025 to June 2026) identified 87 WALs with a total entitlement of 2722.9 unit shares in the Upper Wianamatta-South Creek Management Zone of the Wianamatta-South Creek Water Source. There are also 101 WALs with a total entitlement of 4021.9 unit shares in the Upper Wianamatta-South Creek Management Zone of the Wianamatta-South Creek Water Source, however it is noted that the WSP rules do not allow transfer of entitlement between the upper and lower management zones.

A review of the water supply work approvals (WSWAs) associated with the 10 WALs with the largest entitlement indicates the predominant water use in the Upper Wianamatta-South Creek Management Zone of the Wianamatta-South Creek Water Source is for irrigation with other indicated uses being recreation and industrial.

It is noted that there are no current plans to extract water from any licensable surface water sources to supply Project water demands.

3.8 Environment Protection Licence

The Site operates under EPL 684 which identifies a one water discharge point, discharge limit conditions (water quality only) and requirements for monitoring of discharges. Table 3.8 provides a summary of the EPL 684 surface water discharge point conditions.

TABLE 3.8: EPL 684 DISCHARGE AND MONITORING POINTS

EPL Point Number	Type of Monitoring/ Discharge Point	Limit Condition Type	Description	Pollutant	Limit	Monitoring Frequency
3	Discharge to waters. Discharge quality monitoring.	Water quality.	Outlet from Sediment Dam B discharging to a minor tributary of Badgerys Creek.	pH	6.5 - 8.5	Continuous during discharge (In line instrumentation).
				Turbidity	50 NTU	
				Electrical Conductivity	-	
				Dissolved Aluminium	-	Monthly during discharge (grab sample).

4. WATER MANAGEMENT

4.1 Existing Water Management System

Approved activities currently being undertaken on the Site include the filling of former extraction Pit 1 and Pit 2 with previously stockpiled spoil materials, landform establishment outside of the former extraction pits within an approved disturbance boundary and management of surface water runoff from areas of disturbance to reduce the risk of negative impacts on the receiving environment.

Table 4.2 presents a functional description of the current Site WMS. Figure 4.1 and Figure 4.2 present WMS plan and schematic figures respectively. Further to the functional description presented in Table 4.2, it is noted that potable water is sourced from the Sydney Water mains supply to supplement Site water demands. Water is managed on site in accordance with the currently approved Soil and Water Management Plan (SWMP).

Given the Site will be dynamic as filling and landform establishment progresses, the catchments associated with individual water storages, and the location and number of water storages are likely to change over time with respect to the WMS details provided in Figure 4.1, Figure 4.2 and Table 4.2.

4.1.1 Existing water licensing

Two of the 4 clean water dams (referred to as FD 4 and FD 5) are harvestable rights dams with a total estimated capacity of 9 ML. Under Harvestable Rights regulations, a maximum harvestable rights dam capacity (MHRDC) of 15.1 ML was calculated for the Site (as detailed in in Section 3.6.3), based on the average annual regional runoff for the location. As the total capacity of FD 4 and FD 5 is less than the MHRDC they are permitted for this use, with water take permitted up to 15.1 ML/year.

The remaining 2 clean water dams (SD 1 and SD 2) are exempt from licensing as they were constructed prior to 1 January 1999, in accordance with Item 72 of Schedule 4, Part 7 of the *Water Management (General) Regulation 2025*. No water is transferred from these water storages for use in the Site WMS. The 5 dirty water dams and 2 in pit sumps are used to capture and store runoff from disturbed areas of the Site for reuse, treatment, and controlled discharges permissible under EPL 684. These storages are exempt from licensing requirements in accordance with Schedule 4, Part 7, Item 70 of the *Water Management (General) Regulation 2025* as they are used for the purpose of contamination prevention.

TABLE 4.1: EXISTING WMS STORAGES AND LICENSING

Water Storage	Water Type	Licensing and Exemptions
SD 1	Clean	Constructed before 1 January 1999 – exempt under Item 72.
SD 2	Clean	Constructed before 1 January 1999 – exempt under Item 72.
FD 4	Clean	Water may be extracted from FD 4 under harvestable rights provisions.
FD 5	Clean	Water may be extracted from FD 5 under harvestable rights provisions.
SD 3	Dirty	Receives and stores dirty water / runoff for treatment – exempt under Item 70.
SD A	Dirty	Receives and stores dirty water / runoff for treatment – exempt under Item 70.
SD B	Dirty	Receives and stores dirty water / runoff for treatment – exempt under Item 70.
Pit 3 SD	Dirty	Receives and stores dirty water / runoff for treatment – exempt under Item 70.
SE SD	Dirty	Receives and stores dirty water / runoff for treatment – exempt under Item 70.
Pit Sump 1	Dirty	Receives and stores dirty water / runoff for treatment – exempt under Item 70.
Pit Sump 2	Dirty	Receives and stores dirty water / runoff for treatment – exempt under Item 70.

* Sediment Dam (SD), Farm Dam (FD), SE (southeast)

TABLE 4.2: CURRENT WATER MANAGEMENT SYSTEM FUNCTIONAL DESCRIPTION

Water Storage	Water Type	Catchment Area (ha)	Capacity (ML)	Catchment Description	Overflows to	Water Usage, Transfers and Controlled Discharges
SD 1	Clean	11.1	16.8	Former brick product storage area and undisturbed area north of former brick product storage area.	SD 2	None
SD 2	Clean	5.6	14.7	Undisturbed area north and east of SD 1 catchment.	Badgerys Creek via a dam on adjacent property north of the Site.	None
SD 3	Dirty	17.0	19.7	Former brickworks and undisturbed catchment east of former brickworks. Planned areas of disturbance for landform establishment south and east of SD 3.	Ephemeral tributary of Wianamatta-South Creek.	Dewaters to restore settling zone volume (i.e. runoff from the 5 day 90 th percentile rainfall event) within 5 days of runoff generating rainfall: - Reuse to meet Site water demands as first priority. - Transfers to SD A to enable treatment and discharge to Badgerys Creek via SD B in accordance with EPL 684 conditions as second priority.
FD 4	Clean	2.6	4.0 (estimated)	Undisturbed catchment north of Site access road.	Wianamatta-South Creek via dams on adjacent properties north and northeast of the Site.	None at present. However, water may be extracted from FD 4 under harvestable rights provisions (refer to Section 3.6.3.1).
FD 5	Clean	2.3	5.0 (estimated)	Undisturbed catchment south of Site access road.	Ephemeral tributary of Wianamatta-South Creek.	None at present. However, water may be extracted from FD 4 under harvestable rights provisions (refer to Section 3.6.3.1).
SD A	Dirty	21.5	12.0	Stockpile Area.	Pit 1	Receives transfers from: SE SD. Pit Sump 1. Pit Sump 2. Dewaters to restore settling zone volume (i.e. runoff from the 5 day 90 th percentile rainfall event) within 5 days of runoff generating rainfall: - Reuse to meet Site water demands as first priority. - Is treated with Polyaluminium chloride (PAC) to reduce suspended solids concentration and hydrochloric acid (as required) to adjust pH prior to transfer to SD B in accordance with EPL 684 conditions as second priority.

Water Storage	Water Type	Catchment Area (ha)	Capacity (ML)	Catchment Description	Overflows to	Water Usage, Transfers and Controlled Discharges
SD B	Dirty	-	0.6	No external catchment drains to SD B.	Ephemeral tributary of Badgerys Creek.	Receives inflows from SD A. Automatic dosing of coagulant to inflows. Discharge to ephemeral tributary of Badgerys Creek via SD B in accordance with EPL 684 conditions. Real time monitoring of discharge rate and water quality: • Turbidity • pH • EC
Pit 3 SD	Dirty	5.2	1.1	Backfilled Pit 3.	Ephemeral tributary of Wianamatta-South Creek.	Dewaters to restore following runoff generating rainfall: • Reuse to meet Site water demands as first priority. • Transfers to SE SD to enable treatment and discharge to Badgerys Creek via SD B in accordance with EPL 684 conditions as second priority.
SE SD	Dirty	1.4	3.1	Backfilled Pit 3.	Ephemeral tributary of Wianamatta-South Creek.	Receives transfers from Pit 3 SD Dewaters to restore settling zone volume (i.e. combined runoff from the 5 day 90th percentile rainfall event to Pit 3 SD and SE SD) within 5 days of runoff generating rainfall: • Transfers to SD A for reuse or to enable treatment and discharge to Badgerys Creek via SD B in accordance with EPL 684 conditions as second priority. • Lay flat hose discharges to a sump to dissipate energy and enable coarse sediment to settle reducing sediment reporting to Sediment Dam A. • Surface drainage following discharge from lay flat hose passes through a pond with reeds that further reduces sediment loads delivered to Sediment Dam A.
Pit Sump 1	Dirty	17.9	Variable	Pit 1 areas being backfilled and immediate surrounds.	Pit 1	Dewatered to as far as practicable prevent surcharge into Pit 1: • Transfers to SD A for reuse or to enable treatment and discharge to Badgerys Creek via SD B in accordance with EPL 684 conditions as last priority.
Pit Sump 2	Dirty	6.0	Variable	Pit 2 areas being backfilled and immediate surrounds.	Pit 2	Dewatered to as far as practicable prevent surcharge into Pit 2: • Reuse for meet Site water demands as first priority. • Irrigation of farm areas for disposal of surplus water as second priority. • Transfers to SD A to enable treatment and discharge to Badgerys Creek via SD B in accordance with EPL 684 conditions as second priority. Filling of Pit 2 will be completed prior to filling of Pit 1 and the landform will be graded to drain to Pit 1.

LEGEND

EPL 684 Discharge Point

Water Cart Fill Point

Lay Flat hose

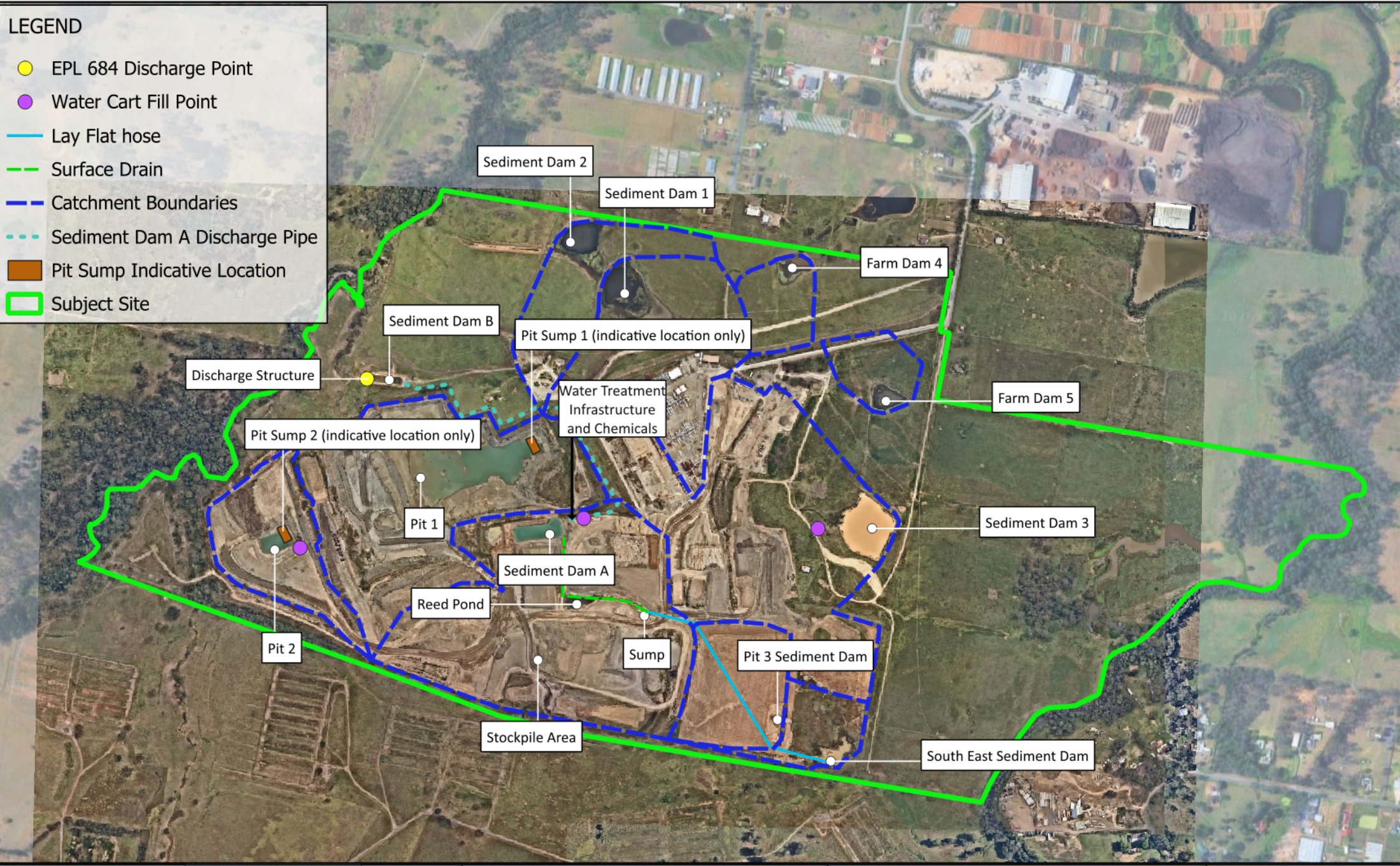
Surface Drain

Catchment Boundaries

Sediment Dam A Discharge Pipe

Pit Sump Indicative Location

Subject Site



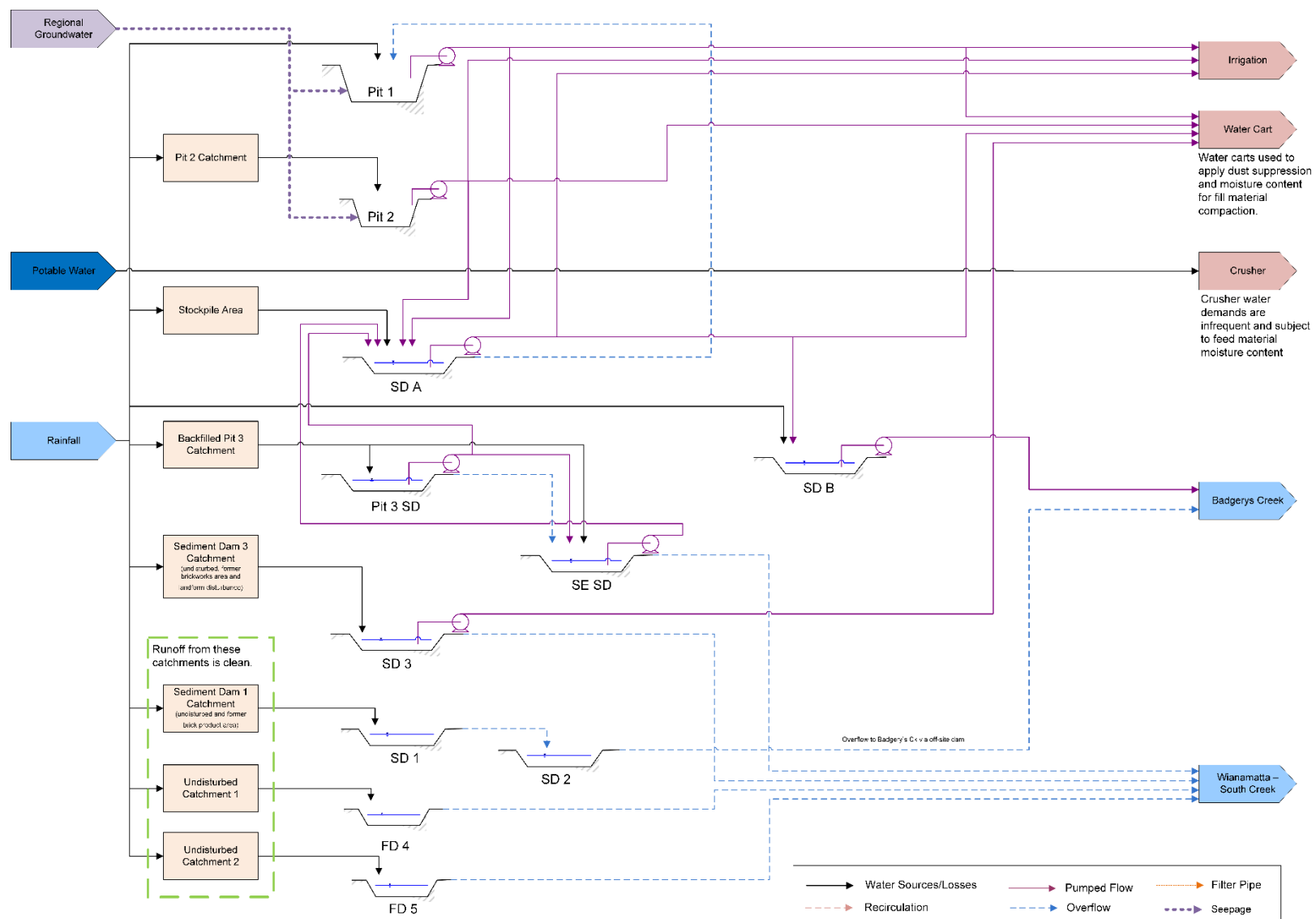


FIGURE 4.2: CURRENT WATER MANAGEMENT SYSTEM SCHEMATIC

4.2 Proposed Water Management System

The proposed WMS for the Project will include existing water management infrastructure, temporary erosion and sediment controls (ESCs) and a gradual transition as earthworks progress from the current WMS to the ultimate WMS that will exist at the conclusion of the bulk earthworks phase presented in Figure 4.3. No external stormwater runoff from upstream catchments running through the Site will be obstructed. The proposed WMS is comprised of 20 sediment dams. All the proposed dams will be exempt from water licensing requirements in accordance with Schedule 4, Part 7, Item 70 of the *Water Management (General) Regulation 2025*, as they will be used for the purpose of contamination prevention. Surface water take from these water sources is therefore exempt from water access licensing requirements and annual take limitations are not applicable.

As the Project is within the Wianamatta-South Creek catchment it is subject to the construction phase stormwater management target applying to developments with exposed areas greater than 2,500 m² contained in *Technical guidance for achieving Wianamatta-South Creek stormwater management targets* (NSW Department of Planning and Environment, 2022) and as presented in Table 4.3.

The sediment basins presented in Figure 4.3 have been sized to achieve the required 80% hydrological effectiveness indicated in Table 4.3 as demonstrated by water balance modelling (refer to Section 5). Sediment laden runoff captured in the sediment basins will be reused for fill material conditioning, dust suppression and irrigation of areas being vegetated (and any other non-potable water demands) or be treated discharged to Badgerys Creek (via NW and/or SW Basin) and possibly Wianamatta-South Creek (via NE and/or SE Basin) in accordance with EPL 684 (varied as required to accommodate re-located and/or additional discharge points and include a limit of 50 mg/L TSS).

Controlled discharges of surplus water to Badgerys Creek, including discharge of pit water via Sediment Dam B (SD B) drawn from Pit Sump 1 and Pit Sump 2, will continue in accordance with the Site EPL 684 conditions only when construction water demands cannot reuse the dirty stormwater within the required sediment basin dewatering period (i.e. five days to restore the design settling zone volume).

Controlled discharges to Wianamatta-South Creek may be required and, if undertaken, EPL 684 will be varied to allow licensed discharges to Wianamatta-South Creek with water quality limit conditions consistent with those currently approved for discharges to Badgerys Creek. Discharges will be made in a controlled manner to minimise the risk of erosion at the discharge point and in receiving creeks.

The chemical dosing systems to enable treatment of captured runoff to achieve EPL 684 limits will be determined during detailed design, however, based on current Site water management practices, it is anticipated that Alum (aluminium sulphate) will be the selected chemical coagulant to aid the settling of fine and dispersive solids.

Table 4.4 presents the maximum disturbed catchment and capacities of the sediment basins that will be progressively constructed as bulk earthworks progress to the landform that will later be developed with warehousing and other urban infrastructure that has permanent stormwater infrastructure designed to meet the operational phase stormwater management targets contained in *Technical guidance for achieving Wianamatta-South Creek stormwater management targets* (NSW Department of Planning and Environment, 2022). Sediment basins SW-NE, SW-SE, SW-NW and SW-SW will ultimately be retained and converted to bioretention basins (developed in line with the Sydney Water Integrated Stormwater Scheme) to service the operational phase of the development. It should be noted that only the construction phase stormwater targets presented in Table 4.3 apply to the bulk earthworks SSD (SSD- 97711727).

The current Site SWMP will be updated by a Certified Professional in Erosion and Sediment Control (CPESC) (or a qualified and experienced civil engineer with at least 5 years' experience in the development of site-specific soil and water management plans) to capture the soil and water management requirements of the Project. Temporary ESCs will be implemented to manage limited areas of disturbance as clearing of land and stripping occurs while sediment basins are established to enable treatment of disturbed area runoff with an 80% hydrologic effectiveness. Progressive erosion and sediment control drawings will be prepared in accordance with *Managing Urban Stormwater – Soils and Construction Volume 1 and Volume 2* (hereafter collectively referred to as the Blue Book) that will detail temporary controls to be implemented as sediment basins are established. The only disturbance within a given catchment that will occur prior to the required sediment basin being operational, is for the construction of the required sediment basin.

Earthworks will be staged to as far as practicable minimise the extent and duration of disturbance and progressive stabilisation of the completed landform will be undertaken where feasible. Given the finished landform will be subject to further disturbance as part of the internal works SSDA 97688711 (refer to Section 1.2), it is proposed to apply a polymer soil stabiliser for the purpose of achieving groundcover targets rather than establishing vegetation for the majority of the Site with an area of approximately 41.8 ha being vegetated. Temporary soil stabilisers are considered an appropriate stabilisation method given the short time frame between achieving the final landform and beginning warehouse works. If warehouse work does not start soon after final landform is achieved or it is found that the use of temporary soil stabilisers does not adequately stabilise the area, alternative approaches will be implemented.

During the period between stabilisation of the finished landform and commencement of works associated with SSDA 97688711, surface water runoff will continue to be managed in the sediment basins listed in Table 4.4 (or other equivalent sediment basins should the Project design change). The integrity of the polymer soil stabilising layer will be routinely inspected, with re-application as required to maintain appropriate groundcover. If temporary soil stabilisers are not effective, disturbed areas may be stabilised by sealing, revegetation or through use of alternative groundcovers to achieve ground cover requirements as specified in Table 4.5.

Stockpiles of erodible material and areas that will remain inactive for extended periods will be stabilised in accordance with Blue Book timing recommendations, where feasible. Recommended Blue Book stabilisation timing and groundcover requirements are provided in Table 4.5.

ESC measures will be maintained until full stabilisation of the site is achieved. Revegetation may include seeding with groundcover species containing sterile cover crop species (e.g. oats and Japanese millet as outlined in Table 9.4 of the 'Blue Book' to rapidly establish groundcover). Surfaces to be revegetated should have a minimum 100 mm layer of non-dispersive topsoil above dispersive subsoils (if present) in areas of sheet flow on gentle slopes (<1 in 4 (vertical to horizontal)). Lands recently established with grass species will be watered regularly until an effective cover has been properly established (>60 % cover) and plants are growing vigorously. Watering should be with low pressure sprays to avoid washing away any mulch cover that has been applied.

TABLE 4.3: WIANAMATTA-SOUTH CREEK CONSTRUCTION PHASE STORMWATER MANAGEMENT TARGETS

Parameter	Target
Total Suspended Solids (TSS)	All exposed areas greater than 2,500 m ² are to be provided with sediment controls that are designed, implemented and maintained to a standard that would achieve treatment of at least 80% of the average annual runoff volume of the contributing catchment (i.e. 80% hydrological effectiveness) to 50 mg/L TSS or less, and pH in the range (6.5 - 8.5). No release of coarse sediment is permitted for any construction or building site. Sites less than 2,500 m ² are required to comply with the requirements of the Blue Book.
Oil, Litter, and Waste Contaminants	No release of oil, litter or waste contaminants.
Stabilisation	Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces are to be effectively stabilised including all drainage systems An effectively stabilised surface is defined as one that does not or is not likely to result in visible evidence of soil loss caused by sheet, rill or gully erosion or lead to sedimentation and water contamination.

TABLE 4.4: PROPOSED SEDIMENT BASINS

Sediment Basin	Maximum Disturbed Catchment (ha)	Settling Zone Capacity (kL)	Sediment Zone Capacity (kL)	Total Capacity (kL)	Spills To
Lot 1 SB	3.2	1,593	797	2,390	Wianamatta-South Creek
Lot 2 SB	5.8	2,860	1,430	4,290	Wianamatta-South Creek
Lot 3 SB	4.5	2,231	1,115	3,346	Wianamatta-South Creek
Lot 4 SB	5.9	2,911	1,455	4,366	Wianamatta-South Creek
Lot 5 SB	6.2	3,029	1,515	4,544	Wianamatta-South Creek
Lot 6A SB	17.6	8,648	4,324	12,972	Wianamatta-South Creek
Lot 6B SB	6.9	3,394	1,697	5,091	Wianamatta-South Creek
Lot 7 SB	7.7	3,770	1,885	5,656	Badgerys Creek
Lot 8 SB	9.0	4,407	2,204	6,611	Badgerys Creek
Lot 9A SB	6.3	3,120	1,560	4,680	Badgerys Creek
Lot 9B SB	18.1	8,886	4,443	13,329	Badgerys Creek
Lot 10 SB	11.1	5,447	2,724	8,171	Badgerys Creek
Lot 11 SB	4.1	2,002	1,001	3,003	Badgerys Creek
Lot 12 SB	7.5	3,663	1,832	5,495	Badgerys Creek
SW-NE	13.7	6,741	3,371	10,112	Wianamatta-South Creek
SW-SE	3.1	1,500	750	2,251	Wianamatta-South Creek
SW-NW	5.3	2,580	1,290	3,870	Badgerys Creek
Trunk Channel South West	2.2	1,074	537	1,611	Badgerys Creek
SW-SW	1.5	749	375	1,124	Badgerys Creek
Active Open Space SB	2.6	1,275	638	1,913	Badgerys Creek

TABLE 4.5: STABILISATION TIMING AND COVER REQUIREMENTS

Item / Area	Stabilisation Timing	Maximum C-Factor ¹	Equivalent % Cover
Stockpile areas	Stockpiles are to be stabilised with an appropriate protective cover (e.g. synthetic, mulch, or vegetative) if they are to be in place and inactive for more than 14 days from completion of formation. Topsoil stockpiles that are to remain inactive for a long duration (i.e. more than 28 days (4 weeks)) will be protected with either a soil stabilising polymer or seeded with appropriate species to reduce the C-factor to 0.10 (~60% groundcover).	0.10	60%
Inactive areas	Applies after 28 days (4 weeks) of inactivity, even if works might continue later.	0.15	50%
Waterways and other areas subjected to concentrated flows	Applies after 14 days from completion of formation and before they are allowed to carry any concentrated flows (where possible).	0.05	>70%
Disturbed areas upon completion of works	Upon completion of works target a C-factor of less than 0.10 (equivalent to 60% cover) within 28 days (4 weeks) and a program is to be put in place to ensure the C-factor will drop permanently (by vegetation, paving, armouring, etc) to less than 0.05 within a further 84 days (12 weeks). Appropriate stabilisation for the site is achieved when the rehabilitated areas have a ground cover C-factor of less than 0.05 (greater than 70% ground cover).	0.05	>70%

4.2.1 Management of Chemicals

All chemicals, including hydrocarbons, will be stored in accordance with relevant standards and guidelines (e.g. *AS1940:2017 The storage and handling of flammable and combustible liquids*).

Mobile plant and equipment will be routinely inspected and maintained to reduce the likelihood of fuel and/or oil leaks that could contaminate surface water.

Spill kits will strategically located around the Site with spill response procedures and spill response training for personnel implemented in line with the current quarry operation.

4.2.2 Dewatering of Existing Water Storages

As earthworks progress, existing dams (refer to Section 4.1) will require dewatering to enable construction of the proposed landform (refer to Section 4.2). SLR (2026) completed a review of potential aquatic species that could be present in the water storages and concluded:

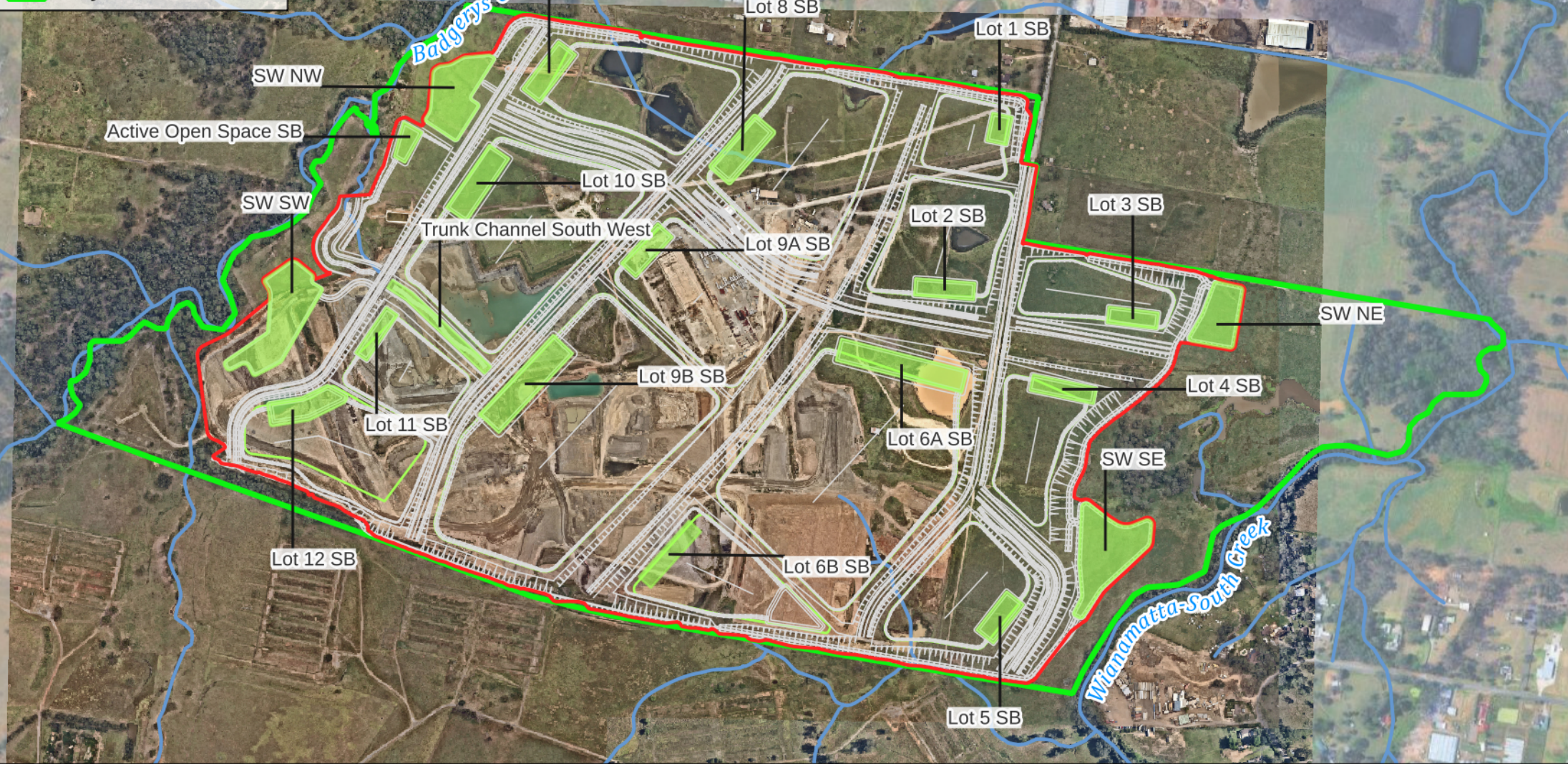
- No threatened aquatic species are considered likely to occur within the Project site.
- Aquatic fauna likely to be present in the water storages is limited to species common to the area, including eels, frogs and turtles.

A Dam Dewatering Plan (SLR, 2026) has been prepared that includes the following:

- Licensing (including a fauna translocation licence issued by the NSW Department of Primary Industries and Regional Development (DPIRD) – Fisheries and Forestry) requirements and qualifications of personnel managing the dewatering of water storages.
- Dewatering methodology.
- Fauna handling protocol relocation sites.
- Timing and staffing requirements for the dewatering activities.
- Reporting requirements.

LEGEND

- Finished Landform
- Watercourses
- Finished Landform Area
- Subject Site



Suite 2, Level 5, 45 Hunter Street,
Newcastle NSW 2300

PO Box 787 Newcastle NSW 2300

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0 100 200 m

Scale in metres (1:12,000 @ A4)

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Figure 4.3 Proposed Water Management System Plan Goodman Group

Engeny does not give any warranty nor accept any liability in relation to the completeness or accuracy of the maps, which may be inherently reliant upon the completeness and accuracy of the input data and the agreed scope of works.

Job Number:
BNTL02053_0001
Revision: 0
Drawn: LS
Checked: CB
Date: 11/3/2026

5. WATER BALANCE

A water balance model (WBM) has been developed in the GoldSim software package that reflects the proposed Project WMS presented in Section 4.2. The WBM is a daily timestep model using a historical climate data set and estimates:

- Gross water balance (i.e. deficit, neutral or surplus when excluding imports and controlled discharges).
- Water demands.
- Water import volumes and frequency (to supplement dirty water reuse).
- Controlled discharges (i.e. discharges in accordance with EPL 684 conditions) volumes and frequency.
- Uncontrolled discharges (i.e. sediment basin overflows) volumes and frequency.

5.1 WBM Development

5.1.1 Water Storages

Modelled water storage capacities are provided in Table 4.4. Given the Site does not extract water from dams that are considered excluded works (i.e. exempt from licensing as they were constructed prior to 1 January 1999, refer to Sections 3.6.4 and 7.1), these dams have not been included in the WBM.

It should be noted that modelled dirty water dam capacities do not include the sediment storage volume, i.e. the modelled capacities are inclusive of the settling zone capacities and any operational water storage allowances above the design settling zone capacities.

5.1.2 Catchment Area, Land Use and Runoff

Catchments draining to the sediment basins (including the basins that will transition to Sydney Water basins for the operational phase of SSDA 97688711 (i.e. separate SSDA for 14 warehouse buildings, active open space & amenities precinct (including a cafe) and internal site infrastructure works, refer to Section 1.2.1), were assumed to be 100% disturbed to provide for a conservative assessment of likely discharges to the receiving environment.

5.1.3 Rainfall and Evaporation

Climate data inputs to the water balance model include site specific daily rainfall, evapotranspiration (Mortons Potential) and lake evaporation (Mortons Shallow Lake) for a 134-year period sourced from the SILO database for grid point -33.90 latitude, 150.75 longitude. The SILO database interpolates raw rainfall and evaporation data from gauges managed by the BoM to provide spatially and temporarily complete datasets.

5.1.4 Runoff Estimation

The Australian Water Balance Model (AWBM) (an antecedent runoff model that accounts rainfall, evapotranspiration, soil storage and baseflow to estimate daily runoff) was used to simulate WMS catchment runoff. A schematic of the AWBM is presented in Figure 5.1 and the adopted AWBM parameters are presented in Table 5.1.

The AWBM parameters selected are representative of a disturbed surface and the model is intended to represent a fully pervious site. This is consistent with the largest catchment extents with the highest level of perviousness that will occur for the stage of the Project being assessed as part of the SWIA for SSD-97711727. Warehouse construction is proposed as part of a separate state significant development application (SSD-97688711).

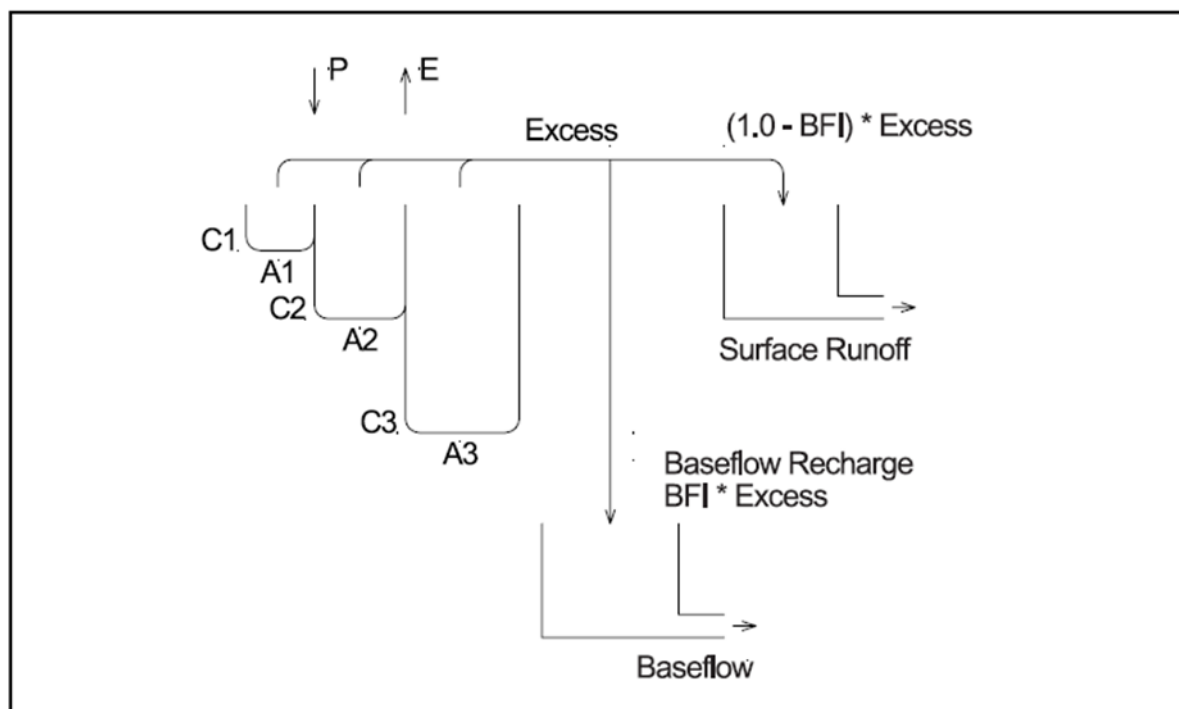


FIGURE 5.1: AUSTRALIAN WATER BALANCE MODEL SCHEMATIC

Source: *Calibrations of the AWBM for Use on Ungauged Catchments* (Boughton, W. and Chiew, F., 2003)

TABLE 5.1: AWBM RUNOFF PARAMETERS

Parameter	Description	Disturbed
Soil Store 1 (C1) (mm)	The water storage capacity of soils.	5
Soil Store 2 (C2) (mm)		30
Soil Store 3 (C3) (mm)		50
Partial Area 1 (A1)	The fraction of the total catchment area with the corresponding soil storage capacity, e.g. The fraction of the catchment A1 has a soil storage capacity of C1.	0.185
Partial Area 2 (A2)		0.43
Partial Area 3 (A3)		0.385
Base Flow Index (BFI)	Determines the amount of runoff that becomes baseflow.	0.05
Baseflow Recession Constant (Kb Day ⁻¹)	Determines the rate at which water is discharged from the baseflow store.	0.6
Surface Flow Recession Constant (Ks day ⁻¹)	Determines the rate at which water is discharged from the surface (soil) stores.	0

5.1.5 Groundwater Inflows

Groundwater inflows were sourced from Appendix H of the Groundwater Impact Assessment (GWIA) report for the Project (Arcadis, 2026). The 'characteristic' groundwater inflow rates have been adopted. Groundwater inflows to swales have been modelled as inflows to the storages in which the accumulated volumes would be dewatered to. Details of the modelled groundwater inflow rates and assumptions listed in Table 5.2.

TABLE 5.2: GROUNDWATER INFLOWS (ADAPTED FROM: ARCADIS, 2026)

Storage	Groundwater Inflow (ML/year)	Groundwater Sources
Lot 2 SB	0.035	Direct flows to the basin and 50% of the inflow to Swale 3 listed in Appendix H of the GWIA.
Lot 3 SB	0.066	50% of the inflow to Swale 4 listed in Appendix H of the GWIA.
Lot 4 SB	0.066	50% of the inflow to Swale 4 listed in Appendix H of the GWIA.
Lot 6A SB	0.563	Direct flows to the basin and 50% of the inflow to Swale 3 listed in Appendix H of the GWIA.
Lot 7 SB	0.152	Direct flows to the basin and 50% of the inflow to Swale 1 listed in Appendix H of the GWIA.
Lot 8 SB	0.111	50% of the inflow to Swale 2 listed in Appendix H of the GWIA.
Lot 9A SB	0.156	50% of the inflow to Swale 2 listed in Appendix H of the GWIA.
Lot 9B SB	0.018	Direct flows to the basin as listed in Appendix H of the GWIA.
Lot 10 SB	1.210	Direct flows to the basin and 50% of the inflow to Swale 1 listed in Appendix H of the GWIA.
Lot 11 SB	0.033	50% of the inflow to Swale 5 listed in Appendix H of the GWIA.
SW-NE	0.010	Direct flows to the basin as listed in Appendix H of the GWIA.
SW-SE	0.004	Direct flows to the basin as listed in Appendix H of the GWIA.
SW-NW	1.783	Direct flows to the basin as listed in Appendix H of the GWIA.
SW-SW	0.010	Direct flows to the basin as listed in Appendix H of the GWIA.

5.1.6 Water Sources and Demands

Table 5.3 and Table 5.4 present the modelled water sources and bulk earthworks phase water demands for the Project respectively. The following two scenarios were modelled:

- A high water demand scenario with ongoing material fill conditioning and dust suppression demands to provide an indication of peak water import demands.
- A low water demand scenario with the only demand being irrigation of a relatively small area (~4.2 ha) of the finished landform that is being revegetated (remainder of the finished landform stabilised using a polymer product, refer to Section 4.2) to provide an indication of peak discharges to the receiving environment when there is minimal water usage.

TABLE 5.3: WATER SOURCES

Water Source	Available Supply
Rainfall and runoff	Estimated using historical climate data set and AWBM.
Groundwater	4.2 ML/year
Mains reticulated potable water	100 mm Sydney Water connection.

TABLE 5.4: WATER DEMANDS

Water Demands	Value
Evaporation	Estimated using historical climate data set and variable water storage surface areas.
Fill material conditioning	50 L/m ³ with an average fill rate of 12,000 m ³ /day (with no water requirement for the low demand scenario).
Dust suppression	Up to 7 x 30 kL watercarts per day (with no water requirement for the low demand scenario).
Irrigation of areas being rehabilitated.	Apply 0.4 kL/m ² as the minimum irrigation rate for landscaped areas as indicated in <i>WSUD developer handbook MUSIC modelling and design guide 2020</i> (Blacktown City Council) (with irrigation demand rate based on rainfall minus evaporation rate for the low demand scenario).

5.1.7 WBM Assumptions

The following assumptions apply to the WBM:

- All sediment basins are operated with a target of dewatering the settling zone within 5 days of runoff generating rainfall:
 - Reuse on-site as first priority.
 - Discharge to receiving waters in accordance with EPL 684 conditions.
- Sediment basins can discharge simultaneously.

5.2 WBM Results

5.2.1 Median Rainfall Year Water Balance

Table 5.5 presents the approximate median net water balance results with a breakdown of water inflows and outflows for the high-water demand and low water demand scenarios.

The results below are based on the median rainfall year from the climate dataset (706.1 mm) as opposed to the median result for each of the individual inflow and outflow volumes.

TABLE 5.5: MEDIAN YEAR WATER BALANCE

Parameter	High Demand Result (ML)	Low Demand Result (ML)
Inflows		
Rainfall	15	15
Runoff	491	491
Groundwater	4	4
Water Import	223	13
Total Inflows	733	523
Outflows		
Evaporation	7	7
Demands (High Demand Scenario: Dust Suppression and Material Conditioning) (Low Demand Scenario: Irrigation only)	253	17
Controlled Discharge	248	271
Uncontrolled Discharge	225	228
Total Outflows	733	523
Inventory Change	0	0
Net Water Balance	0	0

5.2.2 Water Discharges

5.2.2.1 Controlled Discharges

Table 5.6 presents the predicted controlled discharge statistics for the high water demand and low water demand scenarios.

TABLE 5.6: CONTROLLED DISCHARGES

Result	High Demands Scenario Volume (ML/year)	Low Demand Scenario Volume (ML/year)
Minimum (dry conditions)	12	30
50 th Percentile	203	235
Maximum (wet conditions)	960	1,031

The results for the high water demand scenario indicate:

- Discharges are required in all climatic conditions to manage short term water surplus to and restore sediment basin settling zone design within the required 5 day dewatering period.
- Controlled discharges of up to approximately 12 ML/year may be required in very dry years.
- For median climatic conditions, discharges up to approximately 203 ML/year may be required.
- Controlled discharges of up to approximately 960 ML/year may be required in very wet years

The results for the low water demand scenario indicate higher controlled discharges compared to the high demand scenario as follows:

- Discharges are required in all climatic conditions to manage short term water surplus to and restore sediment basin settling zone design within the required 5 day dewatering period.
- Controlled discharges of up to approximately 30 ML/year may be required in very dry years.
- For median climatic conditions, discharges up to approximately 235 ML/year may be required.
- Controlled discharges of up to approximately 1,031 ML/year may be required in very wet years.

5.2.2.2 Uncontrolled Discharges

Table 5.7 presents the predicted uncontrolled discharge volume statistics (i.e. aggregated spill volumes from all sediment basins) for the high water demand and low water demand scenarios.

TABLE 5.7: UNCONTROLLED DISCHARGES

Result	High Demands Scenario Volume (ML/year)	Low Demand Scenario Volume (ML/year)
Minimum (dry conditions)	0	0
50 th Percentile	22	22
Maximum (wet conditions)	595	605

The results for the high water demand scenario indicate:

- No uncontrolled discharges are likely during dry climatic conditions.
- Only limited uncontrolled discharges from the sediment dams during median climatic conditions.
- Uncontrolled discharge volumes during the wettest climatic conditions are predicted to be high.

The predicted average annual uncontrolled discharge frequency for all sediment basins is below the indicative spill frequency of 1 to 2 spills/year for sediment basins sized to contain runoff from a 5 day 95th percentile rainfall event presented in Table 6.2 of Blue Book Volume 2E: Mines and quarries.

The results for the low water demand scenario indicate comparable uncontrolled discharges to the high demand scenario.

The predicted average annual uncontrolled discharge frequency for all sediment basins in both scenarios is below the indicative spill frequency of 1 to 2 spills/year for sediment basins sized to contain runoff from a 5 day 95th percentile rainfall event presented in Table 6.2 of Blue Book Volume 2E: Mines and quarries.

5.2.2.3 Hydrologic Effectiveness

The sediment basins in Project WMS have been designed to enable treatment of disturbed area runoff to achieve a target hydrologic effectiveness of 80% in accordance with construction phase stormwater management target applying to developments with exposed areas greater than 2,500 m² contained in *Technical guidance for achieving Wianamatta-South Creek stormwater management targets* (NSW Department of Planning and Environment, 2022) (refer to Section 4.2). That is, the WMS is required to treat 80% of average annual runoff to 50 mg/L TSS or less, and pH in the range (6.5 - 8.5).

The water balance model was used to assess the hydrologic effectiveness by determining the percentage of the average annual runoff volume that flows out of the WMS via uncontrolled discharges. The results indicate that the Project WMS achieves an average hydrologic effectiveness of 86% for the both the high water demand and low water demand scenarios respectively (i.e. 86% of average annual runoff is beneficially reused or released via controlled discharges with a 50 mg/L TSS or less, and pH in the range (6.5 - 8.5)), which is greater than the 80% target (refer to Figure 5.2).

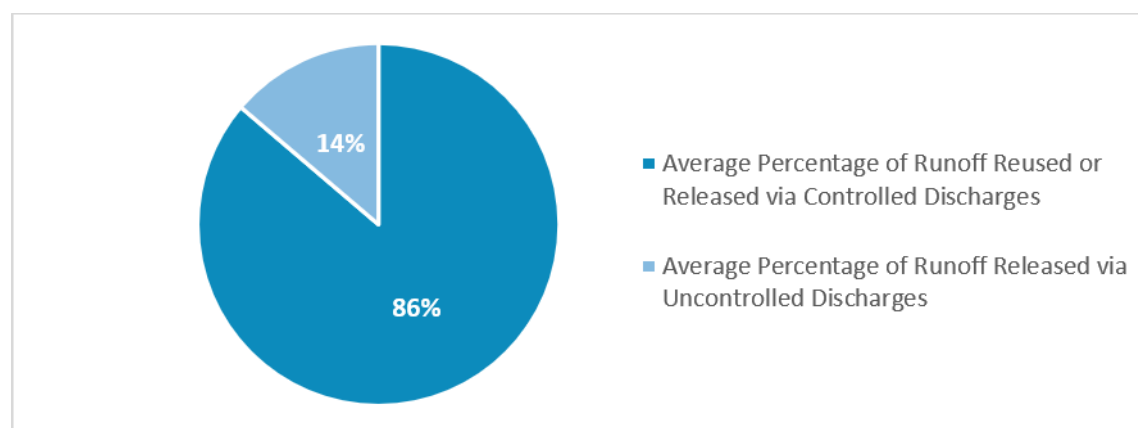


FIGURE 5.2: HYDROLOGIC EFFECTIVENESS – HIGH AND LOW WATER DEMAND SCENARIOS

5.2.3 Water Imports

Figure 5.3 and Figure 5.4 present the water import statistics for the high water demand and low water demand scenarios respectively.

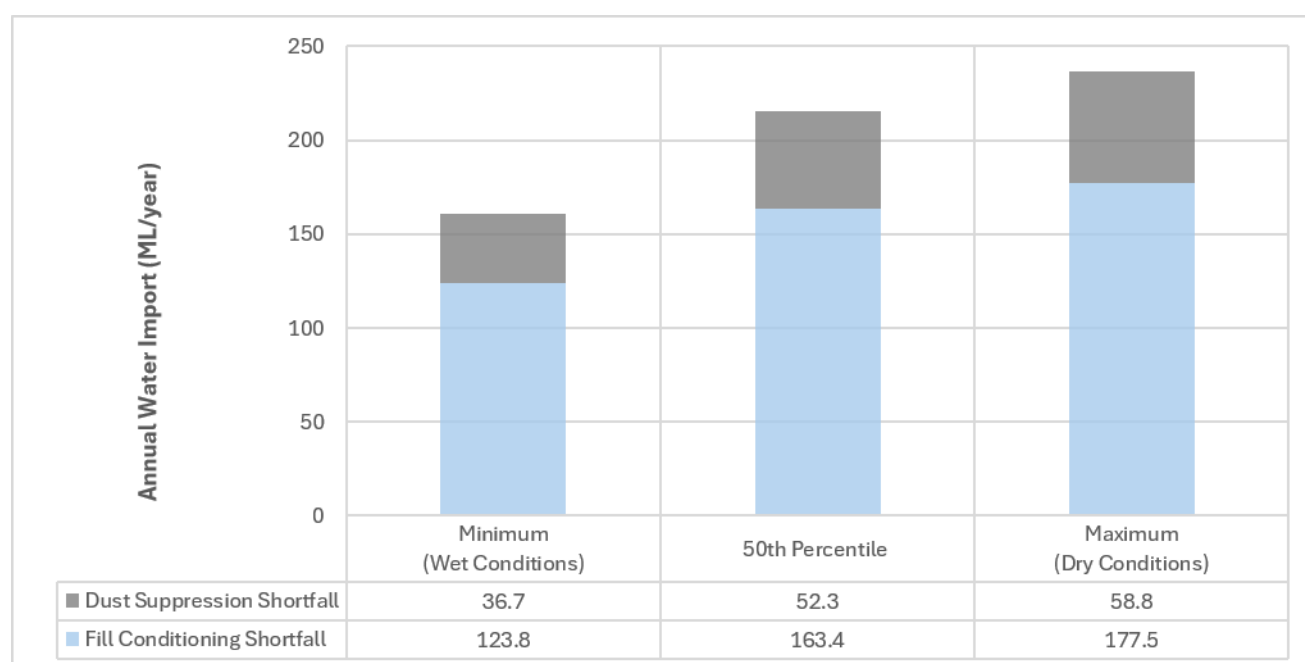


FIGURE 5.3: WATER IMPORTS – HIGH WATER DEMAND SCENARIO

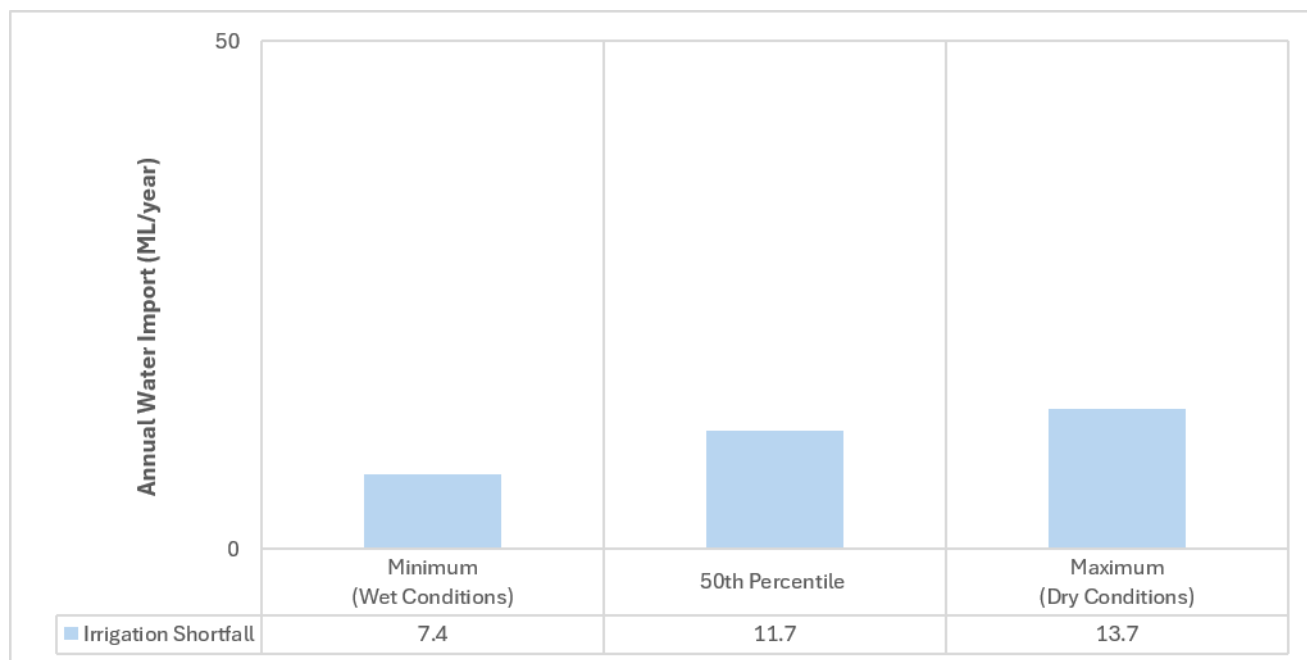


FIGURE 5.4: WATER IMPORTS – LOW WATER DEMAND SCENARIO

The results for the high water demand scenario indicate:

- A water import demand of up to approximately 236 ML during very dry climatic conditions.
- A water import demand of up to approximately 216 ML during median climatic conditions.
- A water import demand of up to approximately 161 ML during wetter climatic conditions to manage water deficits during short term dry periods throughout an overall wetter year, while maintaining the required settling volume in the sediment basins.

The results for the low water demand scenario indicates:

- A water import demand of up to approximately 14 ML during very dry climatic conditions.
- A water import demand of up to approximately 12 ML during median climatic conditions.
- A water import demand of up to approximately 7 ML during wetter climatic conditions to manage water deficits during short term dry periods throughout an overall wetter year, while maintaining the required settling volume in the sediment basins.

Water deficits will be sourced from either the Sydney Water potable supply and/or extraction of surface water (if required) after obtaining a WAL and sufficient entitlement in the Wianamatta-South Creek Water Source to cover the required water take.

6. SURFACE WATER MONITORING

Table 6.1 presents the proposed Project surface water quality monitoring program that is in addition to the existing approved water quality monitoring program in the Site SWMP. The existing will continue as required and subject to changes in water storage and discharge arrangements. All water quality monitoring will be undertaken in accordance with *Approved Methods for the Sampling and Analysis of Water Pollutants in NSW* (NSW EPA, 2022). Required water quality monitoring documentation will include:

- Sample collection date and time.
- Sample of chain of custody and analytical request forms.
- Field monitoring results.
- Field instrument calibration records.

All laboratory analysis will be undertaken at a laboratory with NATA accreditation to complete the requested analysis.

Table 6.2 presents the surface water monitoring program for water quantity that is in addition to the existing approved water quantity monitoring program in the Site SWMP. Stream condition monitoring program will continue in accordance with existing approved water stream condition monitoring program in the Site SWMP. Inspection and maintenance requirements for temporary erosion and sediment controls will be provided in an updated Site SWMP.

TABLE 6.1: PROPOSED SURFACE WATER QUALITY MONITORING

Monitoring Location ID	Description	Parameters	Limit of Reporting	Methodology	Frequency
Monitoring locations TBC subject to the location and number of discharge points for sediment basins (refer to Table 4.4).	Sediment Basin Discharges	pH	0.1	Field measurement with water meter and grab sample/laboratory analysis.	Prior to discharge.
		Turbidity (NTU)	5		
		Electrical Conductivity (µS/cm)	5		
		TSS (mg/L)	5	Grab sample/laboratory analysis.	Prior to discharge.
		Dissolved Aluminium (mg/L)	0.001		

TABLE 6.2: PROPOSED SURFACE WATER QUANTITY MONITORING

Monitoring Location ID	Description	Parameters	Methodology	Frequency
Refer to Figure 4.3	Sediment basin discharges.	Volume Discharged (ML)	Flow Meter or Pump Duty Flow Rate and Run Time.	Continuous during discharge.
Refer to Figure 4.3	Cumulative controlled discharge to either Badgerys Creek or Wianamatta-South Creek.	Controlled discharge occurrence (day)	Record each day that a discharge occurs and the watercourse receiving the discharge.	Daily.
Sediment Basins and Sydney Water Basins (refer to Table 4.4)	Sediment basin water and sediment inventory	Stored Water Volume (kL) Stored Sediment Volume (kL)	Fixed staff gauge (or surveyed water elevation) and dam stage storage relationship (elevation versus volume).	Monthly and following runoff generating rainfall.
-	Dust suppression.	Volume (ML)	Water cart capacity and number of fills.	Cumulative monthly.
-	Fill material conditioning.	Volume (ML)	Water cart capacity and number of fills.	Cumulative monthly.
-	Irrigation of areas being revegetated.	Volume (ML)	Water cart capacity and number of fills.	Cumulative monthly.

7. SURFACE WATER LICENSING AND APPROVALS

7.1.1 Surface Water Extraction

While the Project is expected to typically be self-sufficient with respect to operational water demands (i.e. using water captured in sediment basins which are in place to prevent contamination of downstream watercourses and as such exempt from licensing in accordance with Schedule 4, Part 7, Item 70 of the *Water Management (General) Regulation 2025* (refer to Section 4.2)), the water balance indicates the potential requirement to source additional water from water sources other than Site runoff to meet operational demands during dry periods (short term and long term). Minor water shortfalls will be supplemented from the Site Sydney Water mains supply, with consideration of other water sources (e.g. licensed surface water extraction) for more significant or ongoing shortfalls.

Should surface water extraction be required, Goodman will obtain a WAL, water supply work approval and sufficient entitlement in the Upper Wianamatta-South Creek Management Zone of the Wianamatta-South Creek Water Source in accordance with NSW legislation (i.e. *Water Management Act 2000*, *Water Management (General) Regulation 2025* and the *Greater Metropolitan Region Unregulated River WSP 2023*). Given the *Greater Metropolitan Region Unregulated River WSP 2023* limits the total take of surface water from each of the water sources covered by the WSP, any impacts associated with lawfully taking of water from the Upper Wianamatta-South Creek Management Zone of the Wianamatta-South Creek Water Source are considered acceptable.

7.1.2 Controlled Activities

The Project will impact waterfront land associated with minor streams within the area subject to bulk earthworks. Works will also be undertaken on waterfront land for the construction of Sydney Water Basin discharge structures. Given the Project is a SSD, a controlled activity approval (CAA) will not be required for the bulk earthworks, however, appropriate erosion and sediment controls will be implemented (refer to Section 4.2) to reduce the risk of impacts to the downstream watercourses and works will be undertaken generally in accordance with the relevant guidance documents for undertaking controlled activities on waterfront land (Department of Planning and Environment, 2022).

7.1.3 Environment Protection Licensing

The bulk earthworks will be completed under existing EPL 684, however, it is likely the EPL will require variation as follows:

- Provide for additional and or relocated discharge points.
- Revise limit conditions to include a 50 mg/L TSS limit given Wianamatta-South Ck construction stormwater management targets are based on TSS.

8. IMPACT ASSESSMENT

8.1 Water Quality

Controlled discharges of surplus water to Badgerys Creek, including discharge of pit water via SD B drawn from Pit Sump 1 and Pit Sump 2, will continue in accordance with EPL 684 conditions only when construction water demands cannot consume dirty stormwater within the required sediment basin dewatering period (i.e. five days to restore the design settling zone volume).

The electrical conductivity (an indication of water salinity) of water stored in Pit 1 and Pit 2 as of 27 January 2026 was 2,670 $\mu\text{S}/\text{cm}$ and 1,210 $\mu\text{S}/\text{cm}$ respectively which are both within the range of historically recorded electrical conductivity in Badgerys Creek and Wianamatta-South Creek as well as being below the electrical conductivity performance criteria presented in Table 3.6. Water captured in the proposed sediment basins is expected to have a lower electrical conductivity than that of the pit water.

Controlled discharges to Wianamatta-South Creek may be required and if undertaken, EPL 684 will be varied to allow licensed discharges to Wianamatta-South Creek with water quality limit conditions consistent with those currently approved for discharges to Badgerys Creek.

Sediment basins will be designed, constructed and managed to enable treatment of at least 80% of average annual Site runoff to achieve a TSS concentration of 50 mg/L and pH in the range of 6.5 - 8.5 in accordance with construction phase stormwater management targets applying to developments with exposed areas greater than 2,500 m² contained in *Technical guidance for achieving Wianamatta-South Creek stormwater management targets* (NSW Department of Planning and Environment, 2022) (refer to Table 4.3). Water balance modelling has demonstrated that the proposed sediment basins (refer to Section 5.2.2) will achieve the construction phase stormwater management targets.

Comparison of baseline water quality in Badgerys Creek and Wianamatta-South Creek with water stored on-site indicates that controlled discharges, following appropriate water treatment as required, can occur without degrading receiving water quality. As such, no significant impacts to either Badgerys Creek or Wianamatta-South Creek water quality, including salinity, are expected.

8.2 Geomorphological and Hydrological Values

8.2.1 Geomorphology

The maximum theoretical controlled discharge rate from the Project WMS is that required to simultaneously dewater the settling zone of all proposed sediment basins (69,880 kL) within five days of runoff generating rainfall is 0.162 m³/s (162 L/s). Table 8.1 presents the peak flow conditions in Badgerys Creek and Wianamatta-South Creek for the 4EY storm event (i.e. 4 exceedances per year or 3 month recurrence interval) as predicted by flood modelling undertaken by Colliers (2026) for the Project at the locations shown in Figure 8.1.

TABLE 8.1: BADGERYS CREEK AND WIANAMATTA-SOUTH CREEK 4EY FLOW CONDITIONS

Location	Flow (m ³ /s)	Velocity (m/s)
Badgerys Creek Mid	3.2	0.47
Badgerys Creek Downstream	3.0	0.29
Wianamatta-South Creek Mid	14.3	0.14
Wianamatta-South Creek Downstream	14.1	0.27

Further to the above, Advisian (2019) assessed the flow velocities in Badgerys Creek and Wianamatta-South Creek at two locations in each creek (refer to Figure 8.1) associated with a 0.1 m³/s (100 L/s) discharge as presented in Table 8.2. Advisian (2019) concluded that with the predicted velocities of less than 0.5 m/s (refer Table 8.2), discharges of 100 L/s would not pose an erosion hazard to either Badgerys Creek or Wianamatta-South Creek.

TABLE 8.2: BADGERYS CREEK AND WIANAMATTA-SOUTH CREEK 100 L/S SITE DISCHARGE FLOW CONDITIONS

Creek	Section 1 Velocity (m/s)	Section 2 Velocity (m/s)
Badgerys Creek	0.17	0.32
Wianamatta-South Creek	0.24	0.16

Assuming discharges are limited to eight hours per day, the instantaneous discharge rate from the entire Site would be up to approximately 0.5 m³/s is only approximately 17% of modelled Badgerys Creek 4EY flow and approximately 4% of modelled Wianamatta-South Creek 4EY flow, no impacts to stream geomorphology or stream stability are expected as a consequence of controlled discharges.

8.2.2 Hydrological

Badgerys Creek is ephemeral and therefore flows infrequently during periods of rainfall with pools of water present along the creek during times of no rain (Advisian, 2019). Wianamatta-South Creek is a perennial watercourse, however, the flow duration curve presented in Figure 3.2 indicates no flow in the creek for approximately 35% of the time. Discharges from the Site have the potential to alter the hydrological regimes in both Badgerys Creek and Wianamatta-South Creek by increasing the percentage of time flow is present and altering the natural wetting- drying cycle within the creeks.

Water balance modelling predicts discharges will occur for up between 9 and 157 days/year. As the minimum predicted discharge days will occur during dry years (i.e. when there will naturally be fewer natural flow in the creeks) and the maximum discharge days in wet years (i.e. when there will be more natural flow events in the creeks), the changes to hydrological regimes in both Badgerys Creek and Wianamatta-South Creek are expected to be inconsequential.

Notwithstanding the low likelihood of impacts, the cumulative number of controlled discharge days will be monitored (refer to Table 6.2) throughout the calendar year (for comparison with water balance predictions) and stream condition monitoring will be undertaken on a quarterly basis to collectively identify any potential impacts associated with changes to hydrological regimes.

LEGEND

Flow Condition Locations

● Advisian, 2019

● Colliers, 2026

— Finished Landform

— Watercourses

□ Subject Site

The figure is an aerial map showing the Badgerys Creek and Wianamatta-South Creek areas. The map includes the following labels and features:

- Badgerys Creek Section 1**: Located on the left side of the map.
- Badgerys Creek Mid**: Located on the left side of the map, below Section 1.
- Badgerys Creek Section 2**: Located at the top center of the map.
- Badgerys Creek Downstream**: Located below Section 2.
- South Creek Section 2**: Located at the top right of the map.
- Winamatta South Creek Downstream**: Located on the right side of the map.
- South Creek Section 1**: Located on the right side of the map, below the downstream section.
- Winamatta-South Creek**: Located at the bottom right of the map.
- Winamatta South Creek Mid**: Located at the bottom right of the map.
- Subject Site**: A large area outlined in green, representing the project site.
- Watercourses**: Blue lines representing the creeks.
- Finished Landform**: White lines representing the planned infrastructure.
- Flow Condition Locations**: Pink dots (Advisian, 2019) and green dots (Colliers, 2026) indicating specific locations along the creeks.

Suite 2, Level 5, 45 Hunter Street, Newcastle NSW 2300 PO Box 787 Newcastle NSW 2300 www.engeny.com.au P: 02 4926 1225		N	0 100 200 m Scale in metres (1:12,000 @ A4) Map Projection: Transverse Mercator Horizontal Datum: Geocentric Datum of Australia Vertical Datum: Australia Height Datum Grid: Map Grid of Australia, Zone 56	Figure 8.1 Badgerys Creek and Wianamatta-South Creek Flow Condition Locations Goodman Group Engeny does not give any warranty nor accept any liability in relation to the completeness or accuracy of the maps, which may be inherently reliant upon the completeness and accuracy of the input data and the agreed scope of works.	Job Number: BNTL02053_0001 Revision: 0 Drawn: LS Checked: CB Date: 11/3/2026
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8.3 Catchment Yield and Water Users

The water management system for the existing quarry operation contains runoff (up to a design storm event) from the disturbed areas of the Site to reduce the likelihood of pollution of receiving waters. Captured runoff is primarily used to supply operational water demands as a first priority, with surplus water disposed of via irrigation of farm areas in preference to controlled discharges to Badgerys Creek.

Given the extent of the disturbed areas associated with the Site will increase to up to approximately 154 ha from the current 75 ha (as of February 2026), the natural runoff to Badgerys Creek and Wianamatta-South Creek will be further reduced. If the flows returned to Badgerys Creek and Wianamatta-South Creek associated with controlled and uncontrolled discharges from the Site are not considered, the reduction in catchment yield for associated with the increased catchment from which runoff is contained is estimated to be approximately:

- 5% for Badgerys Creek based on creek catchment upslope of the Site (1,500 ha).
- 1% for Wianamatta-South Creek based on creek catchment upstream of the Site (8,200 ha).

The water balance indicates the potential requirement to source additional water from water sources other than Site runoff to meet operational demands during dry periods. Should surface water extraction be required, the Applicant will obtain a Water Access Licence (WAL), water supply work approval and sufficient entitlement in the Upper Wianamatta-South Creek Management Zone of the Wianamatta-South Creek Water Source in accordance with NSW legislation (i.e. *Water Management Act 2000*, *Water Management (General) Regulation 2025* and the *Greater Metropolitan Region Unregulated River Water Sharing Plan (WSP) 2023*). Given the *Greater Metropolitan Region Unregulated River WSP 2023* limits the total take of surface water from each of the water sources covered by the WSP, any impacts associated with lawfully taking of water from the Upper Wianamatta-South Creek Management Zone of the Wianamatta-South Creek Water Source are considered acceptable.

8.4 Cumulative Impacts

The Project is located within the Western Sydney Aerotropolis Precinct that is currently, and will be into the future, subject to extensive development including the WSIA which is now nearing construction phase completion. To achieve waterway health objectives for protecting and restoring the blue grid in the Wianamatta-South Creek catchment, DPE developed stormwater management targets for the catchment, including both construction and operational phase targets. These targets are published in *Technical guidance for achieving Wianamatta-South Creek stormwater management targets* (NSW Department of Planning and Environment (DPE), 2022).

It is considered that the Wianamatta-South Creek catchment stormwater management targets have been set with an understanding of the level of future development and therefore, if all developments collectively achieve the targets, the cumulative impacts to the catchment will be acceptable with waterway health objectives in the Wianamatta-South Creek catchment also achieved.

Water balance modelling has demonstrated that the proposed Site water management will achieve the construction phase stormwater management targets and therefore, the cumulative impacts associated with the Project are considered acceptable.

9. MITIGATION AND MANAGEMENT MEASURES

Table 9.1 provides a summary of the mitigation and management measures that will be implemented for the Project to reduce the risk of negative impacts to the receiving surface water environment and surface water users.

TABLE 9.1: MITIGATION AND MANAGEMENT MEASURES

ID	Description/Commitment
SW1	The current Site SWMP will be updated by a Certified Professional in Erosion and Sediment Control (CPESC) (or a qualified and experienced civil engineer with at least 5 years' experience in the development of site-specific soil and water management plans) to capture the soil and water management requirements of the Project.
SW2	Progressive erosion and sediment control drawings will be prepared in accordance with Managing Urban Stormwater – Soils and Construction Volume 1 and Volume 2 (hereafter collectively referred to as the Blue Book) that will detail temporary controls to be implemented as sediment basins are established.
SW3	Earthworks will be staged to as far as practicable minimise the extent and duration of disturbance and progressive stabilisation of the completed landform will be undertaken in accordance with Blue Book timing recommendations, where feasible.
SW4	Stockpiles of erodible material and areas that will remain inactive for extended periods will be stabilised in accordance with Blue Book timing recommendations, where feasible.
SW5	The only disturbance within a given catchment that will occur prior to the required sediment basin being operational, is for the construction of the required sediment basin.
SW6	During the period between stabilisation of the finished landform and commencement of works associated with SSDA 97688711, surface water runoff will continue to be managed in the sediment basins listed in Table 4.3 (or other equivalent sediment basins should the Project design change). The integrity of the polymer soil stabilising layer will be routinely inspected, with re-application as required to maintain appropriate groundcover.
SW7	The sediment basins will be designed, constructed and managed to enable treatment of at least 80% of average annual site runoff to achieve a TSS concentration of less than or equal to 50 mg/L and pH in the range of 6.5 - 8.5, in accordance with construction phase stormwater management targets applying to developments with exposed areas greater than 2,500 m ² contained in Technical guidance for achieving Wianamatta South Creek stormwater management targets (NSW Department of Planning and Environment, 2022).
SW8	Chemical coagulants and flocculants used will be selected based on guidance provided in the International Erosion Control Association (IECA) Chemical coagulants and flocculants fact sheet.
SW9	All chemicals, including hydrocarbons, will be stored in accordance with relevant standards and guidelines (e.g. AS1940:2017 The storage and handling of flammable and combustible liquids).
SW10	Mobile plant and equipment will be routinely inspected and maintained to reduce the likelihood of fuel and/or oil leaks that could contaminate surface water.
SW11	Spill kits will be strategically located around the Site with spill response procedures and spill response training for personnel implemented in line with the current quarry operation.
SW12	Controlled discharges to either Badgerys Creek or Wianamatta-South Creek will be limited to a maximum instantaneous flow rate of less than the peak flows from the 4EY storm event in Badgerys Creek and Wianamatta-South Creek.

10. CONCLUSIONS

An assessment of the potential impacts on surface water impacts associated with the Project was undertaken and the following conclusions have been drawn from the assessment outcomes:

- Water balance modelling indicates that the Project will have an adequate water source (i.e., captured rainfall runoff) for most climate conditions. While the Project is expected to typically be self-sufficient with respect to operational water demands (i.e. using water captured in sediment basins), the water balance indicates the potential requirement to source additional water from water sources other than Site runoff to meet operational demands during dry periods (short term and long term). Minor water shortfalls will be supplemented from the Site Sydney Water mains supply, with consideration of other water sources (e.g. licensed surface water extraction) for more significant or ongoing shortfalls.
- The proposed WMS is comprised of 20 sediment dams. All the proposed dams will be exempt from water licensing requirements in accordance with Schedule 4, Part 7, Item 70 of the *Water Management (General) Regulation 2025*, as they will be used for the purpose of contamination prevention. Surface water take from these water sources is therefore exempt from water access licensing requirements and annual take limitations are not applicable.
- Water balance model results indicate that the Project will be required to undertake controlled discharges of stormwater runoff captured in the WMS to ensure construction phase stormwater management targets contained in in *Technical guidance for achieving Wianamatta-South Creek stormwater management targets* (NSW Department of Planning and Environment, 2022) are achieved.
- An assessment of the potential impacts of controlled discharges to either Badgerys Creek or Wianamatta-South Creek indicates that measurable negative impacts to water quality, stream geomorphology and hydrological regimes are unlikely.
- Reductions in rainfall runoff volumes reporting to downstream users due to the Project WMS catchment area are considered negligible.

11. REFERENCES

Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2023 Background and changes, NSW DCCEEW, 2024.

Technical guidance for achieving Wianamatta-South Creek stormwater management targets, NSW Department of Planning and Environment, 2022.

225 – 245 Martin Street, Badgerys Creek, NSW, 2555, BEW SSDA No. 97711727 Flood Impact & Risk Assessment, Colliers, 2026.

Managing Urban Stormwater - Soils and Construction Volume 1, Landcom, 2004.

Managing Urban Stormwater - Soils and Construction Volume 2, Department of Environment and Climate Change, 2008.

WSUD developer handbook MUSIC modelling and design guide 2020, Blacktown City Council, 2020.

12. QUALIFICATIONS

- (a) In preparing this document, including all relevant calculation and modelling, Engeny Australia Pty Ltd (Engeny) has exercised the degree of skill, care and diligence normally exercised by members of the engineering profession and has acted in accordance with accepted practices of engineering principles.
- (b) Engeny has used reasonable endeavours to inform itself of the parameters and requirements of the project and has taken reasonable steps to ensure that the works and document is as accurate and comprehensive as possible given the information upon which it has been based including information that may have been provided or obtained by any third party or external sources which has not been independently verified.
- (c) Engeny reserves the right to review and amend any aspect of the works performed including any opinions and recommendations from the works included or referred to in the works if:
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