CONSULTANTS

Suite 2, Level 1
33 Herbert Street
ST LEONARDS NSW 2065

PO Box 292
ST LEONARDS NSW 1590

T 02 9438 5098
F 02 9438 5398

ENGINEERS

MANAGERS

INFRASTRUCTURE
PLANNERS

DEVELOPMENT
CONSULTANTS

Stormwater Management Report / Integrated Water Management Report

SYD08 Data Centre, 57 Station Road Seven Hills

Prepared for: LCI Consultants

Document no: NSW202013

Issue no: Revision 03

Disclaimer

This Report has been prepared in accordance with the scope of services described in the agreement between ACOR Consultants Pty Ltd and the Client. The Report relies upon data, surveys, measurements and results based on instructions from, and in consultation with, the Client. Except as otherwise stated, ACOR Consultants Pty Ltd has not attempted to verify the accuracy or completeness of any information provided by the Client. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that changes may be required to the Report. Changes in circumstances or facts, the passage of time, manifestation of latent conditions or impacts of future events may also impact on the accuracy, completeness or currency of the information or material set out in this Report. This Report has been prepared solely for use by the Client, ACOR Consultants Pty Ltd accepts no responsibility for its use by any third parties without the specific authorisation of ACOR Consultants Pty Ltd]. ACOR Consultants Pty Ltd reserves the right to alter, amend, discontinue, vary or otherwise change any information, material or service at any time without subsequent notification. All access to, or use of, the information or material is at the user's risk and ACOR Consultants Pty Ltd accepts no responsibility for the results of any actions taken on the basis of information or material provided, nor for its accuracy, completeness or currency. For the reasons outlined above, however, no other warranty or guarantee, whether expressed or implied, is made as to the data, observations and findings expressed in this Report, to the extent permitted by law.

REVISIONS

Revision	Date	Purpose	Prepared By	Approved By
01	11.03.2022	Draft Issue for SSDA	J. Kafes	M. Buttarelli
02	18.03.2022	Final Issue	M. Buttarelli	M. Buttarelli
03	30.03.2022	Updated Site Image	M. Buttarelli	M. Buttarelli

Review Panel	
Division/Office	**Name**
St Leonards Office	M. Buttarelli

Table of Contents

Appendices

1 Introduction

This Stormwater Management Report has been prepared on behalf of Lehr Consultants International (Australia) Pty Ltd (LCI) in support of a State Significant Development Application (SSDA) submitted to the Department of Planning and Environment (DPE) under Part 4 of the *Environmental Planning and Assessment Act 1979 (EP&A Act 1979)*.

1.1 Purpose and Scope of Report

LCI is seeking to secure approval for the construction of a new data storage centre development on the site known as 57 Station Road, Seven Hills, located within the Blacktown City Council local government area (LGA). The proposed development will comprise the erection of a new two-storey data centre at the rear of the site, associated plant and equipment, car parking areas, landscaping, and civil works.

This report provides a stormwater management assessment and responds to the Industry Specific Secretary's Environmental Assessment Requirements (SEARs) issued by DPE on 23 December 2021. An outline of the SEARs relevant to this stormwater management assessment, and how they have been responded to, is summarised in the table below.

Issue and Assessment Requirements	Documentation	Response
13. Ground and Water Conditions • *Identify predicted water discharge points to surface/groundwater and consider discharge quality against relevant water quality criteria.* • *Provide a detailed site water balance including identification of water requirements for the life of the development, and measures to ensure an adequate and secure water supply.*	• *Integrated Water Management Plan*	• *Refer to Section 3.1 and Section 3.2.7 of this report* • *Refer to Section 5 of this report.*

14. Stormwater and Wastewater
• *Provide an Integrated Water Management Plan for the development that:*
  ○ *is prepared in consultation with the local council and any other relevant drainage or water authority.*
  ○ *details the proposed drainage design for the site including any on-site detention facilities, water quality management measures and the nominated discharge points, on-site sewage management, and measures to treat, reuse or dispose of water.*
  ○ *demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse impacts on any downstream properties.*
• *Where drainage infrastructure works are required that would be handed over to the local council, or other drainage or water*
	• *Integrated Water Management Plan*	Site stormwater management plan has been prepared in accordance with Blacktown Council's standards. The below report will outline how the proposed site meets these requirements
		
		No drainage infrastructure is to be handed over to the local authority

authority, provide full hydraulic details and detailed plans and specification of proposed works that have been prepared in consultation with, and comply with the relevant standards of, the local council or other drainage or water authority.		

1.2 Reference Documents

The stormwater system has been designed to comply with the following standards and local authority requirements:

a) Bureau of Meteorology IFD data – sourced from http://www.bom.gov.au

b) Australian Rainfall and Runoff (2019)

c) Landcom Managing Urban Stormwater: Soils and Construction Volume 1 (2004)

d) Blacktown City Council Engineering Guide for Development 2005

e) Blacktown City Council WSUD developer handbook 2020

f) Small Scale Stormwater Quality Model (S^3QM) available online at https://www.s3qm.com.au/_/#/dtc/Blacktown

g) Blacktown Development Control Plan DCP 2015 – General Provisions, being the following:

   i) Part E Development in Industrial Zone

   ii) Part J Water Sensitive Urban Design and Integrated Water Cycle Management

h) Upper Parramatta River Catchment Trust – On-Site Stormwater Detention Handbook, Fourth Edition (December 2005)

i) AS/NZS 3500.3-2018

This report must be read in conjunction with the following documentation:

- ACOR Concept Civil design drawings;
- ACOR CC Civil Design drawings for the single-storey data centre development under DA-21-01058
- ACOR Flood Impact Assessment Report which documents the flood behaviour during the existing pre-development and post-development scenarios;
- Architectural plans prepared by DEM architects; and
- Site topographic survey prepared by Hill & Blume Consulting Surveyors

2 Site Description

2.1 Site Location

The site is within the Blacktown local government area (LGA), however is on the boundary of the Parramatta LGA also. The site is in the Seven Hills Industrial Area, approximately 3.8km east of the Blacktown CBD and 6.8km west of the Parramatta CBD, and approximately halfway between Toongabbie and Seven Hills railway stations.

Figure 1: Data Centre Site – Aerial Image and Locality Summary

2.2 Site Description

The site is located on land known as 57 Station Road, Seven Hills, described legally as Lot B / DP 404669. The site is rectangular in shape with an area of 2.57ha and a northeast-southwest orientation. It is a corner lot with a frontage of around 111m to Station Road to the southwest, and 242m to McCoy Street road reserve to the southeast. The majority of the McCoy Street road reserve is unformed, with a formed 80m long driveway providing access to the adjoining McCoy Park.

The site is currently occupied by a range of buildings and structures associated with the previous industrial uses. An HV transmission tower is also located on the Site in the south, at the corner of Station Road and McCoy Street. Vehicular access is provided via three separate crossings along Station Road.

2.3 Overview of Approved Development

The Site is subject to an existing development approval, issued by Blacktown City Council under DA-21-01058 on 10 January 2022. The development consent permits:

> *Removal of trees, bulk earthworks, stormwater drainage works and construction of a single storey data centre to operate 24 hours a day 7 days a week with ancillary offices, on-site parking and associated landscaping.*

The existing approval permits tree removal, bulk earthworks, and drainage works across the entirety of the site, with the construction of a data centre on approximately the front third as depicted in the figure below. The balance of the site is the location of the proposed SSDA, excluding bulk earthworks.

Figure 2: Data Centre Site – Aerial Image and Locality Summary

The approved civil works under the Blacktown City Council DA-21-01058 will generally involve construction of the following:

- Hardstand and roadways to the single storey data centre footprint located on the southern half of the site adjacent to the Station Road boundary
- Secure main entry (primary) and emergency (secondary) vehicle entrances and driveway connections to Station Road
- Minor earthworks cut and fill to the single storey data centre footprint and surrounding roadways, hardstands and landscaping
- Earthworks filling and retaining walls to the northern half of the site to bench the area for construction of a two-storey data centre, being the subject of this SSDA submission
- Re-grading of the northern setback adjacent to Blacktown Creek to provide “compensatory flood storage” due to earthworks filling and retaining wall construction within a portion of the Blacktown Creek low- and medium-risk flood precinct.

- Stormwater drainage network including an in-ground and overland drainage network, on-site detention system, stormwater harvesting system and a gross pollutant trap to cater for the ultimate site re-development (i.e. both the approved works under the Blacktown City Council DA-21-01058 and this SSDA scope).

As part of the DA-21-01058 Development Approval issued by Blacktown City Council, extensive consultations have occurred with Council's engineers to demonstrate the proposed filling and retaining works for the site will have no negative impact to surrounding areas, and that flood storage volume is substantially retained compared to the pre-development scenario.

Two-dimensional flood modelling of the post-development scenario was undertaken to support the Stage 1 single storey data centre development proposal which includes the proposed earthworks filling and retaining works to the site. A copy of the DA-21-01058 approved flood impact assessment report has been included as Appendix D to this report.

2.4 Overview of Proposed Development

The SSDA seeks approval for the construction and use of a new data storage premises at the rear of the site.

The development footprint for the two-storey data centre, including the data centre building and surrounding roadways and hardstand areas, is calculated as 1.30 hectares.

The particulars of the Proposal are as follows:

- Construction of a new two-storey 19.2MW data centre at the rear of the Site including ancillary office space
- A gross floor area of 8,076 sqm
- Provision of external plant in plant yards to the west, north and south of the proposed data hall, as well as rooftop plant, which will be screened
- Provision of 9 new generators, for a site total of 12 generators
- Capacity for up to 289,000L of diesel fuel storage
- Operation to take place 24 hours a day, 7 days a week
- New vehicular circulation to provide access to Station Road, connecting into new driveways already approved under DA-21-01058
- Parking for 31 vehicles
- Landscaping works.

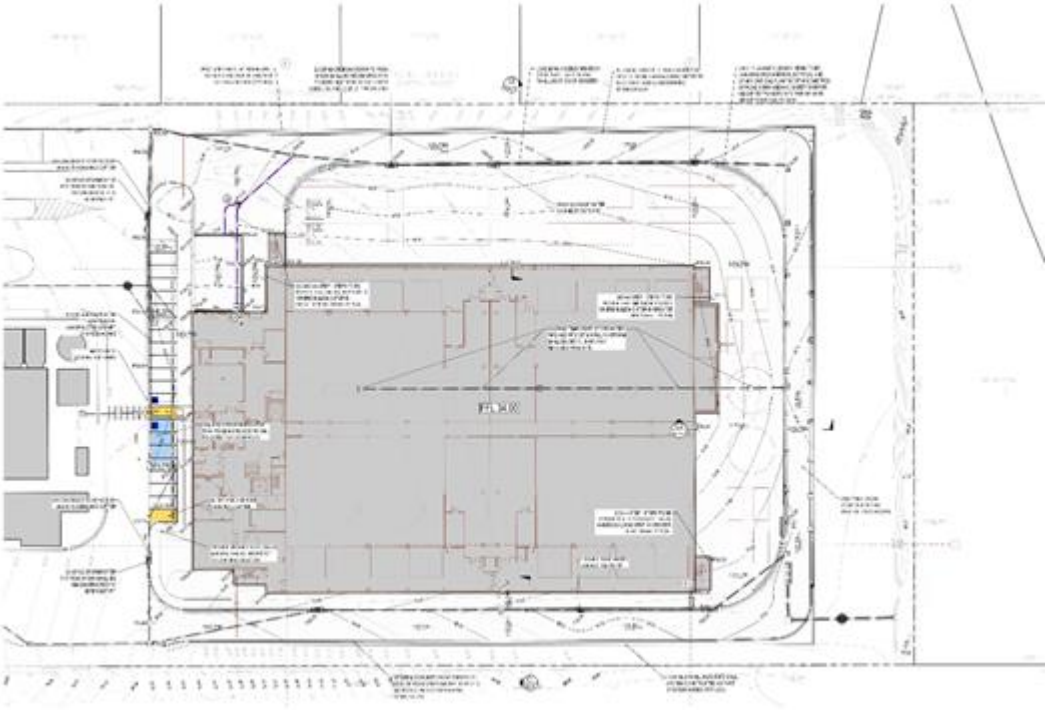


Figure 3: Proposed Two-Storey Data Centre Development

3 Stormwater Management

3.1 Approved Stormwater Drainage under DA-21-01058

The proposed single storey data centre development approved under the Blacktown City Council Development Consent DA-21-01058 has incorporated the following “future-proofing” stormwater drainage works for the two-storey data centre development which is part of this SSDA submission

- A 1,400 m^3 On Site detention tank at the rear of the site.
  - The tank has been sized to cater for the entire development footprint
- A combined 90kL Secondary Re-use tank and 10kL Roof Rainwater tank
  - The secondary re-use section of the tank collects surface run-off for landscaping irrigation.
  - The roof rainwater tank to be used for toilet flushing and general washdown taps.
- In ground pit and pipe system catering for the single storey data centre, as well as the trunk drainage network through the fill platform that will be utilised to drain the two-storey data centre development.
- A HS18 VortSentry GPT downstream of the OSD to treat stormwater discharge prior to entering the existing swale drain which eventually drains into Blacktown Creek

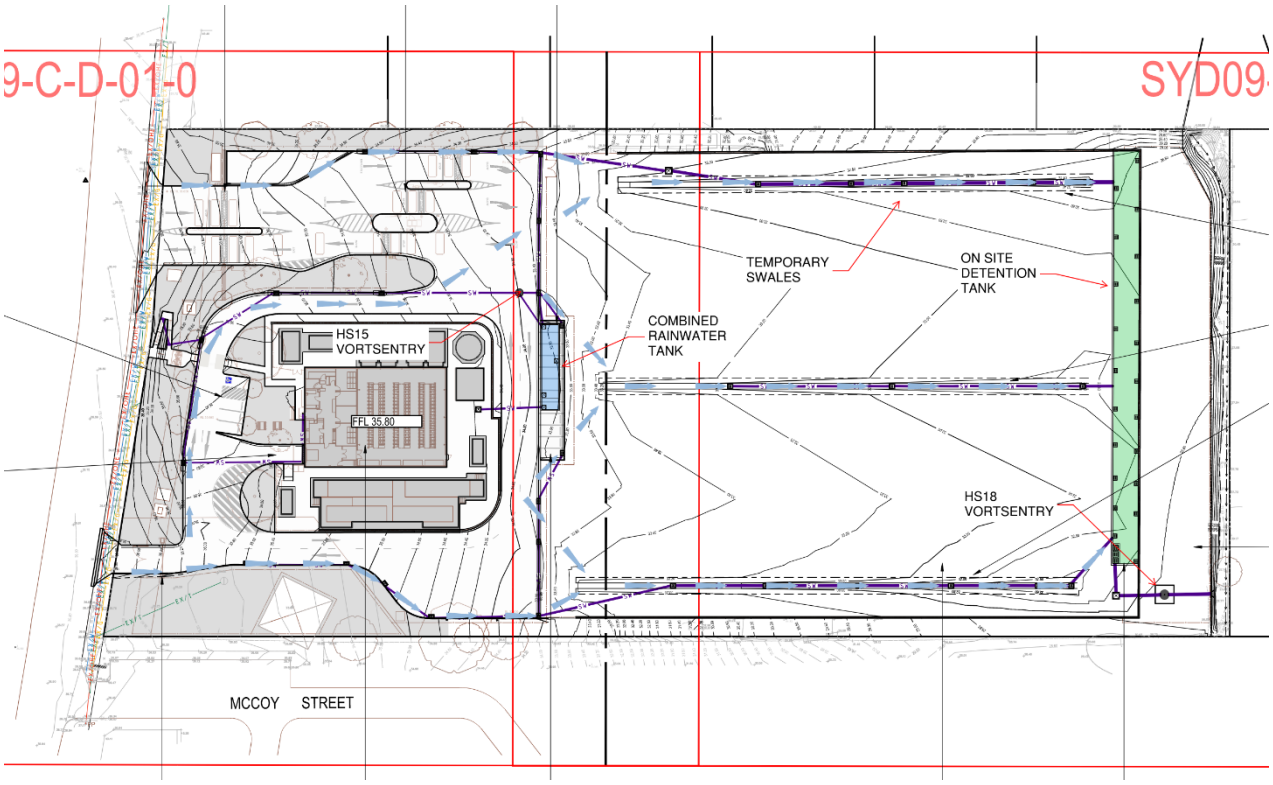


Figure 4: Stormwater Management Plan Approved under DA-21-01058

3.2 Proposed Stormwater Drainage

3.2.1 Blacktown City Council Stormwater Controls and Requirements

The stormwater drainage infrastructure for the Data Centre development is designed to comply with the following Council Policies:

- Blacktown City Council DCP 2015 – Part E Development in the Industrial Areas
- Blacktown City Council DCP 2015 – Part J Water Sensitive Urban Design and Integrated Water Cycle Management
- Upper Parramatta River Catchment Trust (UPRCT) – On-Site Stormwater Detention Handbook Version 4
- S3QM Deemed to Comply Tool

An industrial land use (IN1 – General Industrial) has been selected as per Blacktown LEP 2015, with the corresponding Stormwater Controls applied in accordance with *Blacktown City Council DCP Part E – Development in the industrial Areas section 5.4.3.*

3.2.2 On-Site Detention Requirements

An on-site detention (OSD) tank has been included as part of the Blacktown City Council DA-2-01058. The OSD system has been sized to service the entire development footprint and is in accordance with Council's Deemed to Comply tool, S3QM. A catchment plan for the site is shown in Figure 5 below.

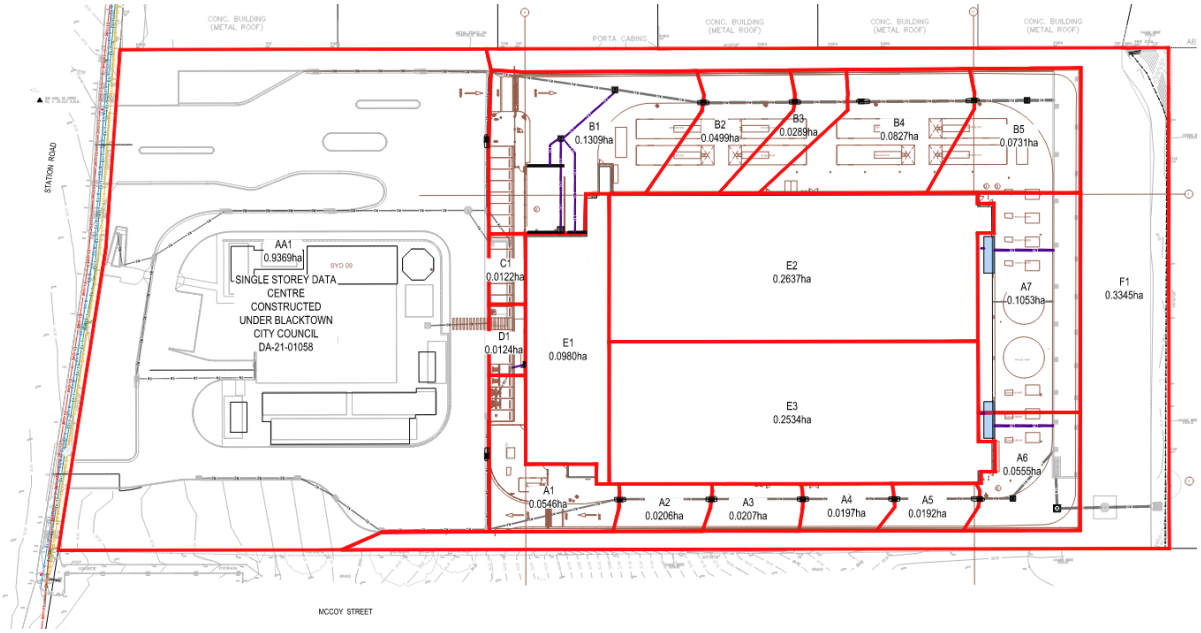


Figure 5: On-Site Detention (OSD) Catchment Plan for S3QM

Table 1: On-Site Detention (OSD) Catchment Plan Area Summary for S3QM

NAME	AREA (Ha)	BYPASS OR OSD	REMARKS
AA1	0.9369	OSD	DATA CENTRE CONSTRUCTED UNDER BLACKTOWN CITY COUNCIL DA-21-01058
A1	0.0531	OSD	
A2	0.0206	OSD	
A3	0.0207	OSD	
A4	0.0197	OSD	
A5	0.0192	OSD	
A6	0.0555	OSD	
A7	0.1053	OSD	
B1	0.1309	OSD	
B2	0.0499	OSD	
B3	0.0289	OSD	
B4	0.0827	OSD	
B5	0.0731	OSD	
C1	0.0122	OSD	
D1	0.0124	OSD	
E1	0.098	OSD	
E2	0.2637	OSD	ROOF TO RAINWATER TANK
E3	0.2534	OSD	ROOF TO RAINWATER TANK
F1	0.3338	BYPASS	
TOTAL TO OSD	2.2362		TOTAL CATCHMENT TO OSD
EXTERNAL	0.3338	BYPASS	EXTERNAL AREA TO RETAINING WALL
TOTAL	2.57		TOTAL SITE CATCHMENT INCLUDING BYPASS

A summary of the site storage and permissible site discharge as per S3QM, Deemed to Comply Tool prepared for the Blacktown City Council DA-21-01058, is shown in Table 2 Below.

Table 2: Site Storage and Permissible Site Discharge Requirements

Storm Event	Volume of Storage Required below Overflow Weir (m^3)	Permissible Site Discharge (L/s)	Orifice Diameter (mm)
50% AEP	925 m^3	83 L/s	156 mm
1% AEP	1400 m^3	307 L/s	275 mm

A copy of the S3QM certificate is attached as Appendix C to this report.

3.2.3 Hydrology

The following hydrological inputs and parameters have been used in the stormwater drainage design for the proposed development:

- Rainfall patterns have been derived from Intensity-Frequency-Duration (IFD) data sourced from the Bureau of Meteorology (BoM) for the Summer Hill locality, in accordance with AR&R (2019) guidelines
- Aerial temporal and temporal patterns for the Data Centre site have been sourced directly from the AR&R data hub for use in ILSAX hydrological modelling (DRAINS)
- Time of concentrations have been adopted as follows:
  - Impervious areas = 5 minutes
  - Pervious areas = 8 minutes.

IFD information has been sourced from the Bureau of Meteorology (BoM) website using the coordinates provided below.

- Site Coordinates: -33.7795, 150.9475

ARR2019 within DRAINS software analyses storm events against multiple temporal patterns to ensure the worst-case storm event is considered in designs. Temporal patterns have been provided from the ARR Data Hub website.

Table 3: Rainfall Depth (mm)

DURATION	20% AEP	10% AEP	5% AEP	2% AEP	1% AEP
5 mins	10.5	12.3	14.0	16.4	18.2
10 mins	17.1	20.1	23.1	27.0	30.0
15 mins	21.4	25.2	28.8	33.7	37.4
20 mins	24.4	28.7	32.9	38.4	42.6
25 mins	26.7	31.4	35.9	41.9	46.5
30 mins	28.6	33.5	38.3	44.7	49.6
45 mins	32.7	38.1	43.6	50.8	56.5
60 mins	35.6	41.5	47.4	55.3	61.6
90 mins	40.3	46.8	53.4	62.5	69.8

Source: Bureau of Meteorology (BoM) 2021

3.2.4 Hydraulic Design Parameters

The following hydraulic design parameters have been used in the stormwater drainage design for the Site:

- Minor drainage system comprising of the in-ground pit and pipe network is designed to safely collect and convey stormwater flows generated during the minor storm events.
    - Blacktown Council's *Engineering Guide for Development Appendix D Section 1.1* requires that the minor system be designed for the 20 Year ARI (5% AEP) Storm Event for industrial sites
- Additionally, the in-ground stormwater system has been designed with additional capacity to cater for a 4% AEP (25-year ARI) storm event, which is a client requirement;
    - Rainfall data in Australia is supplied by the Bureau of Meteorology, which follows the ARR2019 standard design rainfall events. As the 4% AEP storm event is not a standard Australian event, the Bureau of Meteorology does not provide rainfall data for this event. As such, 25% increase in rainfall intensities has been added to the 5% AEP storm event to provide a conservative estimate of the 4% AEP storm intensities.

- Safe overland flow paths are designed to convey 1% AEP storm event. The overland flow paths areas are also designed to convey flows in an event of in-ground system failure.
- A blockage factor of 30% is applied to on-grade inlet pits and 50% to sag-inlet pits as per Council's *Engineering Guide for Development Appendix D Section 10.2*.
- A minimum pipe grade of 0.5% has been adopted for all drainage pipelines greater than 225mm diameter.
- Pit loss coefficients have been considered in the design, in accordance with the relevant Missouri Charts.
- A 10% increase in rainfall intensities has been adopted to design rainfall intensities to account for climate change. This is aligned with the recommendations of the NSW Dept Environment & Climate Change
- The percentage of the overall site bypassing the proposed OSD shall be less than 15% of the developable site footprint as per Blacktown City Council requirements.

3.2.5 Loss Parameters

The loss parameters utilised in the DRAINS model have been derived from Blacktown City Council's *Engineering Guide for Development Appendix D Section 10.2* and are identified in Table 4:

Table 4: DRAINS Model Loss Parameters

PARAMETER	VALUE
Impervious (Paved) Depression Storage	1mm
Pervious (Grassed) Depression Storage	5mm
Soil Type	3

Source: Blacktown City Council's *Engineering Guide (2005)*

3.2.6 Stormwater Network Design

Further to the hydrology and hydraulic design philosophy described above, a post-development DRAINS model has been developed to calculate peak flows for a range of storm events for sizing of the pit and pipe drainage system.

The model incorporates the approved design for the single storey data centre development within the portion of the site adjacent to Station Road, including the OSD configuration and water levels. This ensures that the site stormwater system has been sized to accommodate tailwater levels within the OSD tank.

A summary of the DRAINS modelling results is attached as Appendix A to this report.

3.2.7 Stormwater Discharge

There is no formal Council stormwater network (pit and pipe system) available downstream of the property for connection of the proposed drainage outfall pipe. An existing drainage swale exists along the northern boundary of the property, which drains into the Blacktown Creek riparian corridor and into the watercourse.

As part of the single-storey data centre development approved by Blacktown Council under DA-21-01058, the existing (pre-development) discharge point, being a headwall outlet which discharges

stormwater from the subject site into the drainage swale along the northern boundary, will be reconstructed .

The OSD discharge is controlled by primary and secondary orifices to ensure permissible site discharge is achieved. This arrangement will reduce peak flow rates draining to the existing swale in comparison to the pre-developed site discharge.

Additional scour protection has been incorporated to the headwall outlet connection to the swale, to ensure acceptable water velocities are maintained and swale bed and riparian corridor erosion does not occur.

As such, the existing point of discharge into the swale has been maintained, as the drainage conditions (primarily peak flow rate and velocities) will be reduced.

Additionally, there will be net benefits associated with the stormwater discharge from the site compared to the pre-development scenario (existing site condition), as there is currently no on-site detention to attenuate flows, nor is there any water quality treatment system or GPT to treat flows prior to discharge into the drainage swale.

4 Water Sensitive Urban Design (WSUD)

4.1 Stormwater Quality

4.1.1 DA-21-01058 Approved WSUD Design

A HS18 VortSentry Gross Pollutant Trap (GPT) by Ocean Protect has been included as part of the Blacktown City Council DA-21-01058 approval for the single storey data centre development.

Water quality pollutant targets are not applicable for the site as the development site is subject to a water quality Section 7.11 Contribution Plan, as detailed in the S3QM Certificate attached as Appendix C to this report.

Notwithstanding, site discharge requires treatment through a gross pollutant trap (GPT) in accordance with Blacktown City Council's Engineering Guide for Development.

No additional water quality treatment devices have been included as part of the proposed two-storey data centre development and this SSDA approval, as there will be no modifications to the site discharge methodology approved within the DA-21-01058 Development Consent.

The storage of diesel fuel on-site will be through individual belly tanks under each backup generator structure. The diesel storage will be containerised, self-bunded with an integrated spill-containment system. Thus, no proposed fuel intercepting system is considered necessary to the stormwater drainage system.

5 Water Conservation

5.1 DA-21-01058 Approved Site Water Balance

Blacktown City Council - Part J Water Sensitive Urban Design and Integrated Water Cycle Management requires that industrial and business developments meet a minimum of 80% non-potable water demand through rainwater reuse.

A water balance model has been developed using MUSIC software to determine the required rainwater tank and secondary stormwater tank size to satisfy a minimum of 80% non-potable demand for the data centre development.

The DA-21-01058 Development Consent required the following rainwater and surface water harvesting parameters:

- 100kL total capacity stormwater harvesting tank collecting surface flows from the roadway for re-use for subsurface irrigation of landscaping areas
- 11kL total capacity roof water harvesting tank collecting roof runoff from the single storey data centre for re-use for toilet flushing.

A summary of the single storey data centre water demands approved under DA-21-01058 is shown in Table 5 below.

Table 5: Water Demand Allowances

Description	Unit Demand	Total Number of Fixtures or Area	Total Water Demand
Toilets and Urinals	0.1kL/day per toilet	2 toilets	0.20 kL/day
Irrigation (excluding turf area)	0.4kL/year/m^2	1960 m^2	784 kL/year
General Washdown (1 tap per 50 m building perimeter)	0.005 kL/day per tap	2 taps	0.01 kL/day

5.2 Proposed Two-Storey Data Centre Site Water Balance

The two-storey data centre development proposed within this SSDA submission considers the additional non-potable water demand due to additional toilets, general washdown areas and landscape irrigation.

A MUSIC water balance model has been created to satisfy 80% of non-potable water demand serviced through rainwater reuse, in accordance with Blacktown City Council - Part J Water Sensitive Urban Design and Integrated Water Cycle Management.

5.2.1 Site Water Usage and Demand

The following water demand profile has been incorporated into the water balance model, in accordance with the allowances listed in Blacktown City Council WSUD developer handbook.

Table 6: Water Demand Allowances – Two Storey Data Centre Development

Description	Unit Demand		Total Number of Fixtures or Area	Total Water Demand
Toilets and Urinals	0.1kL/day per toilet		14 toilets	1.40 kL/day
Irrigation (excluding turf area)	0.4kL/year/m^2		1,305 m^2	522 kL/year
General Washdown (1 tap per 50 m building perimeter)	0.005 kL/day per tap		7 taps	0.035 kL/day

5.2.2 Water Balance Catchment Area

The proposed rainwater storage tank will harvest roof water runoff from the proposed two-storey data centre building.

A nominal roof area of 5,100m^2 will drain into two proposed rainwater tanks located within the plant yard to the north of the data centre building.

A water balance catchment plan showing the roof areas draining to rainwater tanks and landscape areas requiring irrigation is shown in Figure 6 below.

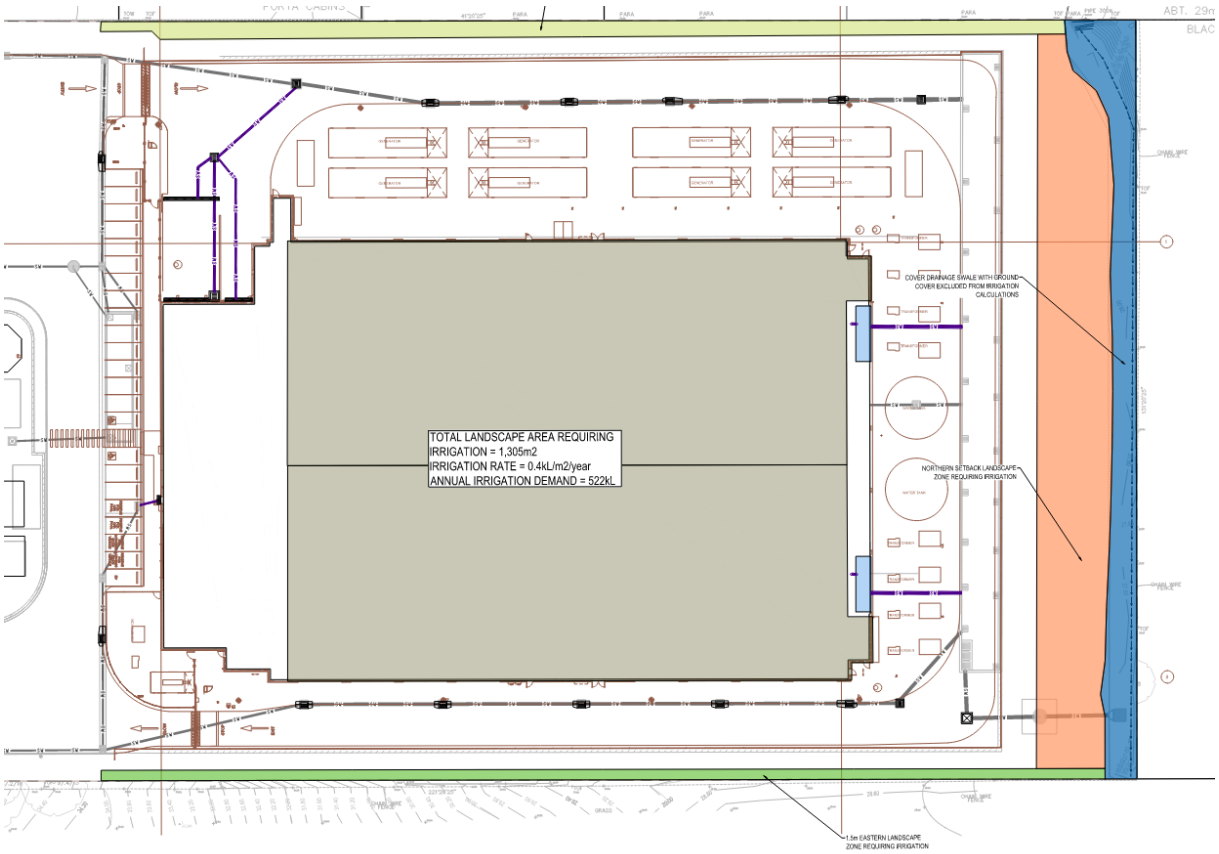


Figure 6: Water Balance Catchment Plan

We note that the existing drainage swale along the northern boundary shown in blue in Figure 6 has not been included as landscaping which requires irrigation.

5.3 Water Balancing Model and Rainwater Tank Sizing

A MUSIC water balance model has been created to determine the required rainwater tank size and roof area to be collected to achieve 80% of non-potable demand serviced through rainwater reuse. Based on this MUSIC model, the following key elements will be required:

- Two 40kL total capacity (35kL effective capacity) rainwater storage tanks (80kL total capacity accounting for 10% additional volume for an anaerobic zone). The rainwater tanks will be located within the plant yard to the north of the data centre building, which is in close proximity to the water treatment plant for the site.
- A nominal roof area of 5,100m2 draining into the rainwater storage tanks, with approximately 2,550m2 roof area draining into each rainwater tank.

The MUSIC water balance model summary is shown in Figure 7 below and demonstrates that a minimum of 80% of non-potable water demand is met from rainwater re-use.

Node Water Balance - 2x35kL RWT

	Flow (ML/yr)	TSS (kg/yr)	TP (kg/yr)	TN (kg/yr)	GP (kg/yr)
Flow In	3.73	96.31	0.57	8.22	97.18
ET Loss	0.00	0.00	0.00	0.00	0.00
Infiltration Loss	0.00	0.00	0.00	0.00	0.00
Low Flow Bypass Out	0.00	0.00	0.00	0.00	0.00
High Flow Bypass Out	0.00	0.00	0.00	0.00	0.00
Pipe Out	2.81	63.05	0.41	6.07	0.00
Weir Out	0.00	0.01	0.00	0.00	0.00
Transfer Function Out	0.00	0.00	0.00	0.00	0.00
Reuse Supplied	0.92	13.14	0.12	1.77	0.00
Reuse Requested	1.12	0.00	0.00	0.00	0.00
% Reuse Demand Met	82.05	0.00	0.00	0.00	0.00
% Load Reduction	24.55	34.52	27.05	26.07	100.00

Decimal Places 2

Figure 7: MUSIC Water Balance Model Results

6 Flooding

In accordance with Blacktown City Council Maps, the subject site at 57 Station Road Seven Hills has been identified as being within the low and medium flood risk precincts.

Construction of the engineered fill platform and retaining walls have been approved within the flood risk precincts as part of the single storey data centre Development Approval DA-21-01058 issued by Blacktown City Council. The approved design includes for compensatory flood storage by lowering the northern boundary setback levels to account for flood storage lost due to the retaining walls and fill platform.

No changes to the compensatory flood storage levels or flood storage volumes are proposed as part of this SSDA submission.

Planting proposed within the flood storage zone will need to comply with the nominated roughness coefficients within the flood impact assessment report, n* = 0.032.

Refer to the flood impact assessment report prepared for the full site development, enclosed as Appendix E to this report.

Figure 8: Flood Risk Precinct Map – Blacktown City Council Online Mapping

7 Soil Erosion and Sedimentation Control

7.1 General Principles

A Soil and Water Management Plan (SWMP) has been prepared for the Data Centre site works, in accordance with the Landcom Managing Urban Stormwater: Soils and Construction Volume 1 (2004).

The following general principles of soil and water management have been applied to the SWMP:

- Conserve topsoil for later site rehabilitation/revegetation
- Control water flow from the top of, and through the development area
- Rehabilitate disturbed lands quickly
- Maintain soil and water management measures appropriately during the construction phase

7.2 Sources of Pollution

Based on the proposed development activities, the following sources of pollution during construction that could lead to earthworks erosion, sediment and silt transportation and contamination of downstream stormwater systems have been considered:

- Earthworks undertaken prior to rainfall events without sufficient auxiliary measures to manage drainage
- Earthworks areas that have not been stabilised or are exposed prior to temporary or permanent ground cover
- Establishment time for rehabilitation / revegetation of exposed earthworks
- Construction works to existing stormwater pipelines and overland flow paths
- Vehicle entry and exit to the construction site and associated tracking of debris out of the site
- Clearing and grubbing of vegetation / organic matter and stripping of topsoil
- Stockpiling of excavated materials or construction materials (e.g. road base, ordinary and select fill, etc)
- Re-fuelling and general maintenance of construction plant and equipment

- Storage of chemicals, fuel and other hazardous materials
- Ineffective / incorrect installation or maintenance of soil erosion and sedimentation control measures

7.3 Soil and Water Management Strategy

The following construction management methodology has been developed for the Data Centre site works and included in the SWMP:

- Establish sediment fencing to the downstream perimeter of the zone of disturbed works to protect sediment laden water entering Blacktown Creek and other properties
- Installation of stabilised construction entry and exit grids to prevent construction vehicles tracking debris into adjacent Authority roadways and stormwater systems
- Construction of catch drains with rock check dams to divert sediment-laden and silt-laden water
- Protection of materials stockpiles by suitable wind protection fencing and / or temporary covering of stockpiles
- Protection of existing and recently constructed surface inlet pits with temporary sediment traps using geotextile filter fabric and sandbags
- Protection of existing and recently constructed overland flow paths with vegetated ground cover
- General expedited revegetation and stabilisation of exposed earthworks to prevent sedimentation of stormwater runoff

8 Conclusion

The proposed development incorporates measures to address both stormwater quantity and stormwater quantity requirements set out by Blacktown City Council DCP (2015).

The on-site detention tank constructed as part of the single-storey data centre development (DA-21-01058) caters for the full development footprint, including the two-storey data centre development subject to this SSDA submission.

The stormwater discharge outlet headwall and gross pollutant trap will be constructed as part of the single-storey data centre development (DA-21-01058). The proposed two-storey data centre development will involve connection to the site trunk stormwater drainage network and will discharge through this approved outlet. No modifications to the stormwater discharge location or outflows are proposed as part of this SSDA submission.

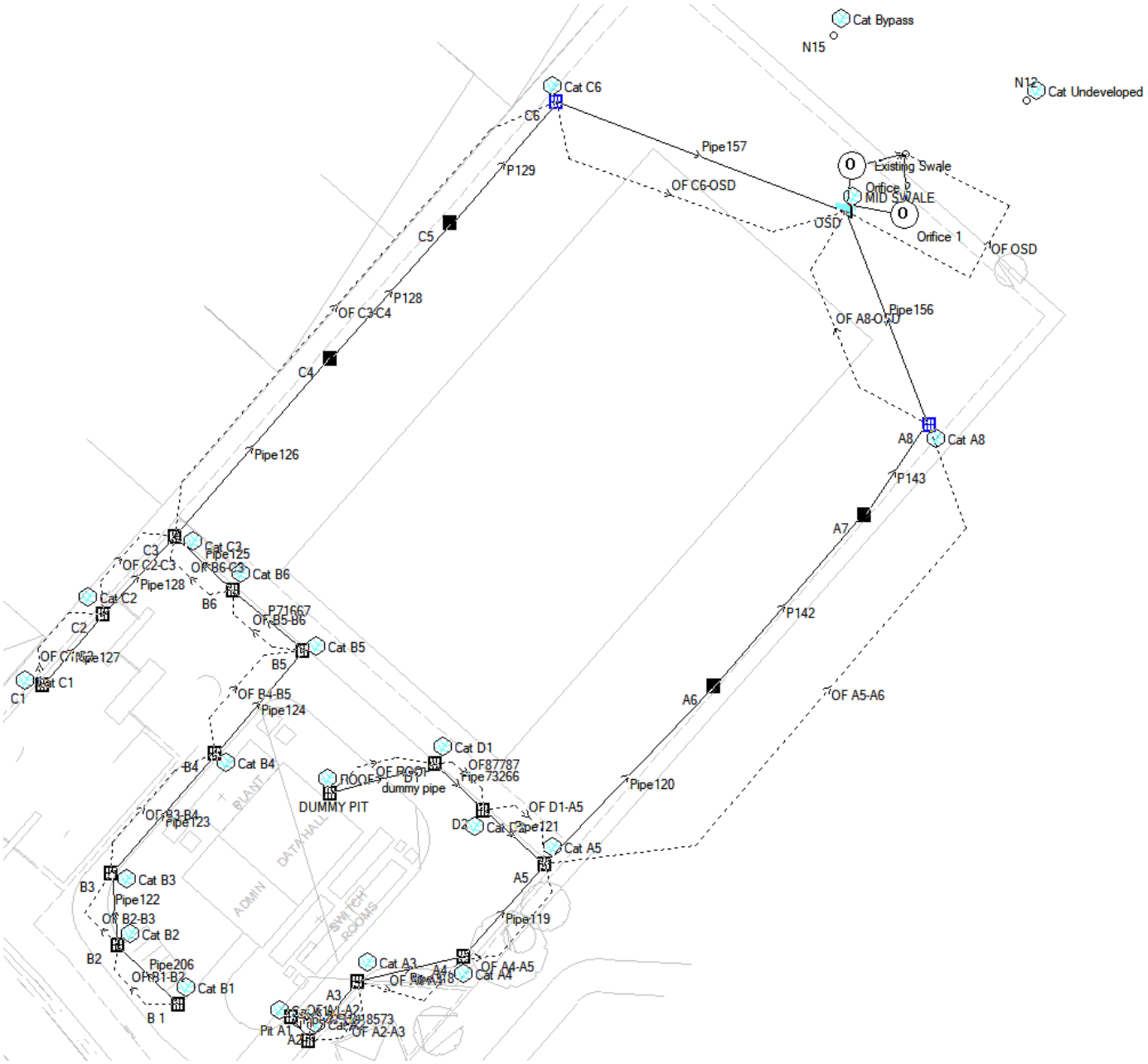
Water quality pollutant reduction targets will not be applicable for the subject site, as the development is subject to a water quality Section 7.11 Contributions Plan.

The 80% non-potable water demand target is achieved by incorporating an additional 2x 35kL effective capacity (2x 40kL total capacity) rainwater tanks.

Soil erosion and sediment control measures have been included in a detailed Soil and Water Management Plan (SWMP) for the proposed development. This SWMP has been prepared in accordance with industry best practices and consideration of the anticipated pollution sources to occur during construction.

9 APPENDICES

Appendix A - DRAINS Model



Appendix B - MUSIC Water Balance Model

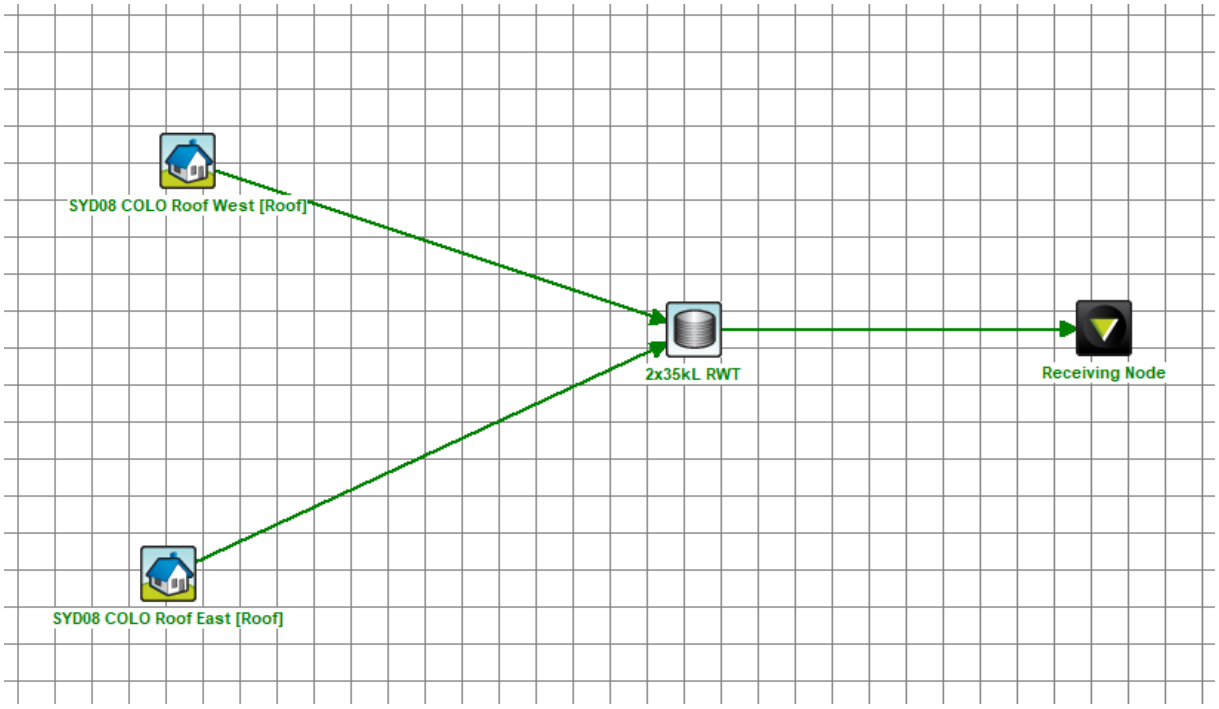


Figure B1 –MUSIC Water Balance Model Layout

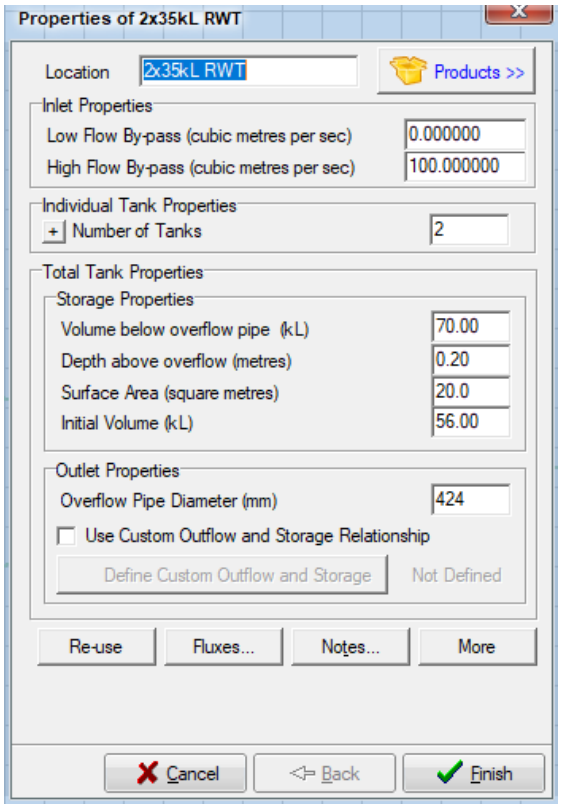


Figure B2 –Rainwater Tank Configuration

Node Water Balance - 2x35kL RWT

	Flow (ML/yr)	TSS (kg/yr)	TP (kg/yr)	TN (kg/yr)	GP (kg/yr)
Flow In	3.73	96.31	0.57	8.22	97.18
ET Loss	0.00	0.00	0.00	0.00	0.00
Infiltration Loss	0.00	0.00	0.00	0.00	0.00
Low Flow Bypass Out	0.00	0.00	0.00	0.00	0.00
High Flow Bypass Out	0.00	0.00	0.00	0.00	0.00
Pipe Out	2.81	63.05	0.41	6.07	0.00
Weir Out	0.00	0.01	0.00	0.00	0.00
Transfer Function Out	0.00	0.00	0.00	0.00	0.00
Reuse Supplied	0.92	13.14	0.12	1.77	0.00
Reuse Requested	1.12	0.00	0.00	0.00	0.00
% Reuse Demand Met	82.05	0.00	0.00	0.00	0.00
% Load Reduction	24.55	34.52	27.05	26.07	100.00

Decimal Places 2

Figure B3 –MUSIC Water Balance Model Results

Appendix C - S3QM Deemed to Comply Certificate

S3QM Deemed to Comply Certificate

Certificate Number: **5561**

This certificate confirms that the proposed development will meet Blacktown City Council's requirements for water sensitive urban design described in Blacktown Development Control Plan (Part J) 2015.
Terms used in this certificate or in the commitments have the meaning given by Blacktown Development Control Plan (Part J) 2015.

General Manager

Blacktown City Council

Date of Issue: **Fri May 07 2021**

To be valid this certificate must be lodged within 3 months of the date of issue:

Project Summary

Author	skhan@acor.com.au
Project Name	SYD09 DC DATA CENTRE
Site Address	57 Station Road Seven Hills NSW 2147
Lot/DP Number	-
Project Number	NSW202013
Land use	Industrial
Note	-

Compliance

Does the project comply with all relevant criteria?	**No**
OSD Compliant (as required)	Yes
Water Quality Compliant (as required)	Yes
Water Conservation Compliant (as required)	No
Models Required % Impervious Area (as required)	Yes

Site Details

Site Area (m^2)	25710
Roof Area (m^2)	630
Road Area (m^2)	4980
Other Impervious Area (m^2)	1140
Pervious Area (m^2)	18960

Applicable Development Controls

Water Conservation	Yes
On-site water quality	No
On-site works, Section 7.11 or VPA	Section 7.11 mandatory contribution required and the construction of a Gross Pollutant Trap and a Hydrocarbon Trap.
On-site detention	Yes
Groundwater (more than 1.5m of cut or fill or more than 1m of cut or fill if development is on waterfront land)	No
Waterfront Land (within 40m of a waterway)	Yes

Statement of Commitments

OSD Commitments

Site	
Site Area (m²)	25710
Site Area NOT draining to OSD (m²)	3300
Bypass (%)	12.84

Reduced Levels (mAHD)	
(2) RL of soffit (top) of tank	32.55
(1) Average RL of the base of the OSD Tank	29.04
(3) RL of Emergency Overflow Weir	32.1
RL of 50% AEP Overflow Weir	31.06
(5) RL of 50% AEP Orifice Centre Line	28.315
(6) RL of 1% AEP Orifice Centre Line	28.245
(8) Known RL of the Water Surface Level	29.3
Minimum RL of Garage Floor	32.65
Minimum RL of Habitable Floor	32.75

OSD Volume	
Required Storage BELOW the 50% AEP Overflow Weir (m^3)	910.96
Required Storage BELOW Emergency Overflow Weir (m^3)	1381.622

Discharge Details	
Using Filter Cartridges to manage Water Quality	No
Discharge Location	Channel or Swale With Known WSL
Length of Emergency Overflow Weir (m)	2.9
Maximum 50% AEP Site Discharge (l/s)	83.04
Maximum 50% AEP Orifice Discharge (l/s)	83.04
Maximum 1% AEP Site Discharge (l/s)	303.69
Maximum 1% AEP Orifice Discharge (l/s)	303.69

Orifice Details	
Number of 50% AEP Orifices	1
Number of 1% AEP Orifices	1
50% AEP Orifice Diameter (mm)	154
1% AEP Orifice Diameter (mm)	270.5

Due to the 1% AEP orifice being drowned by 27.37%, 18.11% of storage volume has been added.

Access grates to be provided such that the maximum reach from any point in the tank to the nearest grate is 6m.

Water Conservation Commitments

Catchment 1	
Roof area connect to tank	100 %
Total Tank Capacity	100.0 kl
Irrigated Area	1960 m^2
Number of High Use Toilets and Urinals	2
Number of Low Use Toilets and Urinals	0
Non Potable Demand	0.015 kl/day

Water Quality Commitments

Water Quality Commitments	**Not required**

Appendix D - Flood Impact Assessment Report – 57 Station Road, Seven Hills