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SSDA Civil Engineering Report Incorporating Water Management Plan, 2 & 10-22 Kent Road, and 685 Gardeners Road, Mascot

Project Duke Data Centre

Prepared for Goodman / 16 May 2025

Client Ref: Rev B - SSDA Amendment

241336

Your Partner in Engineering

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Contents

Rev	Date	Prepared By	Approved By	Remarks
A	26/09/2024	SH	VC	SSDA Submission
B	16/05/2025	SH	GC	SSDA Amendment

1.0 Executive Summary

This civil engineering report has been prepared by TTW (NSW) Pty Ltd to accompany a State Significant Development Application (SSD-71368959) for the construction and 24/7 operation of a data centre with associated works at 2 & 10-22 Kent Road, and 685 Gardeners Road, Mascot.

This report concludes that the proposed data centre is suitable and warrants approval subject to the implementation of the following mitigation measures.

- A site wide stormwater network.
- On-site stormwater detention tanks of volume 293m^3 and 261m^3 and an above ground OSD basin of max depth 0.56m and approximate volume of 220m^3 to reduce the discharge from the site to be below the pre-development flows with the site defined as 100% pervious and to comply with the bypass area requirement as described in the Bayside Development Control Plan.
- Water treatment measures including 25 x 690mm Ocean Protect PSorb StormFilters or equivalent to meet pollutant reduction targets set out in the Bayside Technical Specification-Stormwater Management 2023.
- An erosion and sediment control plan to manage stormwater quality and quantity on site during the construction phase of the development.

Following the implementation of the above mitigation measures, the remaining impacts are appropriate.

2.0 Introduction

The proposed development (SSD-71368959) will seek approval for the construction of an 120MVA Data Centre. The proposal seeks to demolish existing structures on the site, construct, fit out and the 24/7 operation of a Data Centre, with associated works.

The works subject to SSD-71368959 include the following:

- Site preparation works including demolition, bulk excavation, and removal of existing structures on the site, tree and vegetation clearing, and bulk earthworks,

  Construction, fit out and 24/7 operation of a 120 MVA data centre with a maximum building height of 40m (from natural ground level) and total gross floor area of approximately 26,052m^2 comprising:

  - At-grade parking for thirty-four (34) car parking spaces and one (1) accessible car parking spaces,
  - Two (2) 12.5m loading dock spaces,
  - Four (4) levels of technical data hall floor space with one data hall on ground level, three (3) data halls on levels one and two (2) data halls on level three.
  - Secure entrance lobby on ground level and ancillary office space on each level and mezzanine level,
- Provision of required plant and utilities, including:
  - Six (6) 33kV switch rooms on ground level
  - 1,172,000L above ground diesel storage tanks,
  - 5,125kL above ground water storage tanks,
  - 72 diesel generators
- Acoustic screen parapet,
- Vehicle access provided via Gardeners Road and Ricketty Street,

This report has been prepared to address the Secretary's Environmental Assessment Requirements (**SEARs**) and accompanying cover letter issued for Project Duke Data Centre (SSD-71368959) dated 31 May 2024. Specifically, this report has been prepared to respond to the SEARs requirement issued below

Issue and Assessment Requirements	*Response*
13. Ground and Water Conditions	
Assess potential impact on soil resources and related infrastructure and riparian lands on and near the site, including soil erosion, salinity and acid sulfate soils. *Provide a Surface and Groundwater Impact Assessment that assesses potential impacts on:* ▪ *Surface water resources (quality and quantity) including related infrastructure, hydrology, dependent ecosystems, drainage lines, downstream assets and watercourses.* • *Groundwater resources in accordance with the Groundwater Guidelines.*	*Refer to Geotechnical Report by PSM for assessment on soil resources.* *Refer to **Sections 6.2 to 6.4** for the potential impact on water quality for the development site.* *Refer to **Section 6.3** and Flood Risk Assessment for further detail.* *Groundwater Impact Assessment is covered within the Geotechnical Report by PSM.*
14. Water Management	
Provide an Integrated Water Management Plan for the development that: ▪ *is prepared in consultation with the local council and any other relevant drainage or water authority.* ▪ *Outlines the water-related servicing infrastructure required by the development (informed by the anticipated annual and ultimate increase in servicing demand) and evaluates opportunities to reduce water demand (such as recycled water provision).* ▪ *Details the proposed drainage design (stormwater and wastewater) for the site including any on-site detention facilities, water quality management measures and nominated discharge points, on-site sewage management, and measures to treat, reuse or dispose of water.* ▪ *Demonstrates compliance with the local council or other drainage or water authority requirements and avoids adverse downstream impacts.* *Where water and drainage infrastructure works are required that would be handed over to the local council, or other drainage or water authority, provide full hydraulic details and detailed plans and 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.*	*Refer to **Section 6.0** for further details.* *Refer to Integrated Water Management Plan by Arup for Site water balance and wastewater drainage.* *Refer to **Section 6.0** for details of the proposed stormwater drainage design as well as the characterisation of water quality.* *Discharge from the site is noted to be made to an existing Council drainage system within Gardeners Road.*

15. Flood Risk	
▪ *Identify any flood risk on-site having regard to adopted flood studies, the potential effects of climate change, and any relevant provisions of the NSW Flood Risk Management Manual.* ▪ *Where the development could alter flood behaviour, affect flood risk to the existing community or expose its users to flood risk, provide a Flood Impact and Risk Assessment – Flood Risk Management Guide LU01.* *Detail design solutions and operational procedures to mitigate flood risk where required*	*Refer to Flood Risk Assessment report issued by TTW.*

3.0 The Site

The project is located on land known as 2 and 10-22 Kent Road, and 685 Gardeners Road, Mascot, legally referred to as Lot 1 DP529177, Lot 1 DP1009083 and Lot 2 DP529177. The site is located on Country of the Gadigal people within the local government area of Bayside Council.

It has a land area of approximately 23,470m^2 with frontages to Ricketty Street, Kent Road and Gardeners Road, all of which are classified roads.

The site forms part of the Mascot West Employment lands which comprises a mix of land zoned for industrial, commercial and business park uses. To the east of the site is Mascot Station Town Centre which comprises a mix of retail, commercial, residential and recreational open space land uses.

Surrounding land uses in the immediate vicinity of the include:

- **North**: Gardeners Road, which is the LGA boundary with the City of Sydney. Further to the north is existing industrial development with Alexandra Canal beyond.
-
- **South**: Ricketty Street is immediately south, with predominantly one (1) to four (4) storey commercial and industrial development beyond.

- **East**: Kent Road is immediately to the east, with four (4) to 14 storey high density residential development beyond.

- **West**: To the west is light industrial development typically one (1) to two (2) storey in height.

The site is zoned E3 Productivity Support under the Bayside Local Environmental Plan 2012 (**BLEP 2021**). The proposal is permissible with development consent in the E3 zone and meets the zone objectives.

In its existing state, the site itself contains two large warehouse buildings which are currently leased out to multiple tenants. Large extents of the site consist of hardstand for vehicle circulation and parking with a number of mature trees are located along the site's boundaries.

A summary of the site is provided in Table 1.

Table 1: Site Description summary

Item	Description
Site Area	23470m^2
Ownership	Goodman
Legal Description	Lot 1 in DP529177, Lot 1 in DP1009083 and Lot 2 DP529177

4.0 Stakeholder Engagement

Table 2 summarises stakeholder engagement to date that is relevant to the civil engineering design.

Table 2: Stakeholder Engagement

Relevant Stakeholder	Items Discussed	Response to submission
Bayside City Council	The DRAINS Model for the OSD sizing is to be provided to Council for assessment with a tailwater level adopted. The OSD design for the entire site must adhere to the requirements outlined in section 6 of Bayside Technical Specification for Stormwater Management.	Due to the significant flood affectation of the site in larger storm events, the in ground stormwater has been designed for two different scenarios major and minor. A DRAINS model has been prepared for Council's assessment. Refer to Section 6.1.2 in this report for details.
Bayside City Council	18. A WSUD catchment plan is to be provided to show the architectural plan in the background including the roof plan. The catchment areas in the catchment plan are to be accurately reflected in the MUSIC Model. The WSUD catchment plan must clearly show the non-trafficable roof areas draining into the rainwater tank. Council requests that the MUSIC Model be submitted to us for further assessment.	A WSUD Catchment plan 04010 in civil drawings has been prepared to reflect the MUSIC modelling. MUSIC model has been prepared in line with catchment summary to be submitted to the Council for assessment.
Bayside City Council	19. The MUSIC Model must be revised to add up to the total site area of 20,760m2 (2.076ha). The MUSIC Model to be revised to show the high flow bypass from the diversion chamber.	A MUSIC model has been revised to reflect the total catchment of the site area. A high flow bypass link has also been shown from the chamber to assess the targets.
Bayside City Council	20. An OSD base plan is to be provided for the OSDs, showing all base levels and minimum 1% fall towards the outlet pipe. The dimensions of the internal walls to be shown of the OSD including the weir levels.	OSD base plans have been included in the civil drawing package. Refer to drawings 4041, 4042 and 4043 for OSD details.
Bayside City Council	21. Sections are to be provided for the OSDs showing the surface level, top water level, orifice centreline, outlet pipe size and overflow weir.	OSD Sections have been included in the civil drawing package. Refer to drawings 4041, 4042 and 4043 for OSD details.
Bayside City Council	22. An OSD catchment plan is to be provided showing the impervious (roof and hardstand) and pervious area draining into the OSD system as well as the bypass area. The OSD bypass is not to exceed 15% of the total site area.	A catchment plan (04010 in civil drawings) has been prepared to show the pervious and impervious areas summary to confirm area draining to the OSDs. The OSD bypass is not exceeding 15% of total site area.
Bayside City Council	24. Exploring the use of natural WSUD elements that do not compromise the ability to plant canopy trees is encouraged.	A vegetated swale has been proposed at the boundary along both Ricketty St and Kent Rd as natural WSUD element.
Bayside City Council	25. A safe emergency overflow to be provided for both OSDs in the case of a blockage.	Emergency overflow weir has been shown for both OSDs as these are above ground OSDs.

Bayside City Council	1. Where available, please provide additional information regarding the proposed piling works and service trenching, such as number, location, and/or type of piles and services proposed, to assist in assessing the impact of the works to Kent Rd PAD1	The proposed piling will consist of CFA piles. Service trenching is expected to remain clear of the existing PAD1 easement. Shoring is to be implemented where new services are located in close proximity to the existing PAD1.

5.0 Proposed Development

The proposed development, referred to as Project Duke Data Centre, comprises the demolition of the existing warehouse buildings on the site and bulk excavation to facilitate the construction, fit out and operation of a data centre. The current proposed site layout by Grimshaw Architects is shown in Figure 1.

The civil works required for the development includes:

- New stormwater drainage collection of the site;
- Civil aspects of pavement works; and
- Stormwater detention and water quality treatment to meet compliance with the Development Control Plan (DCP).

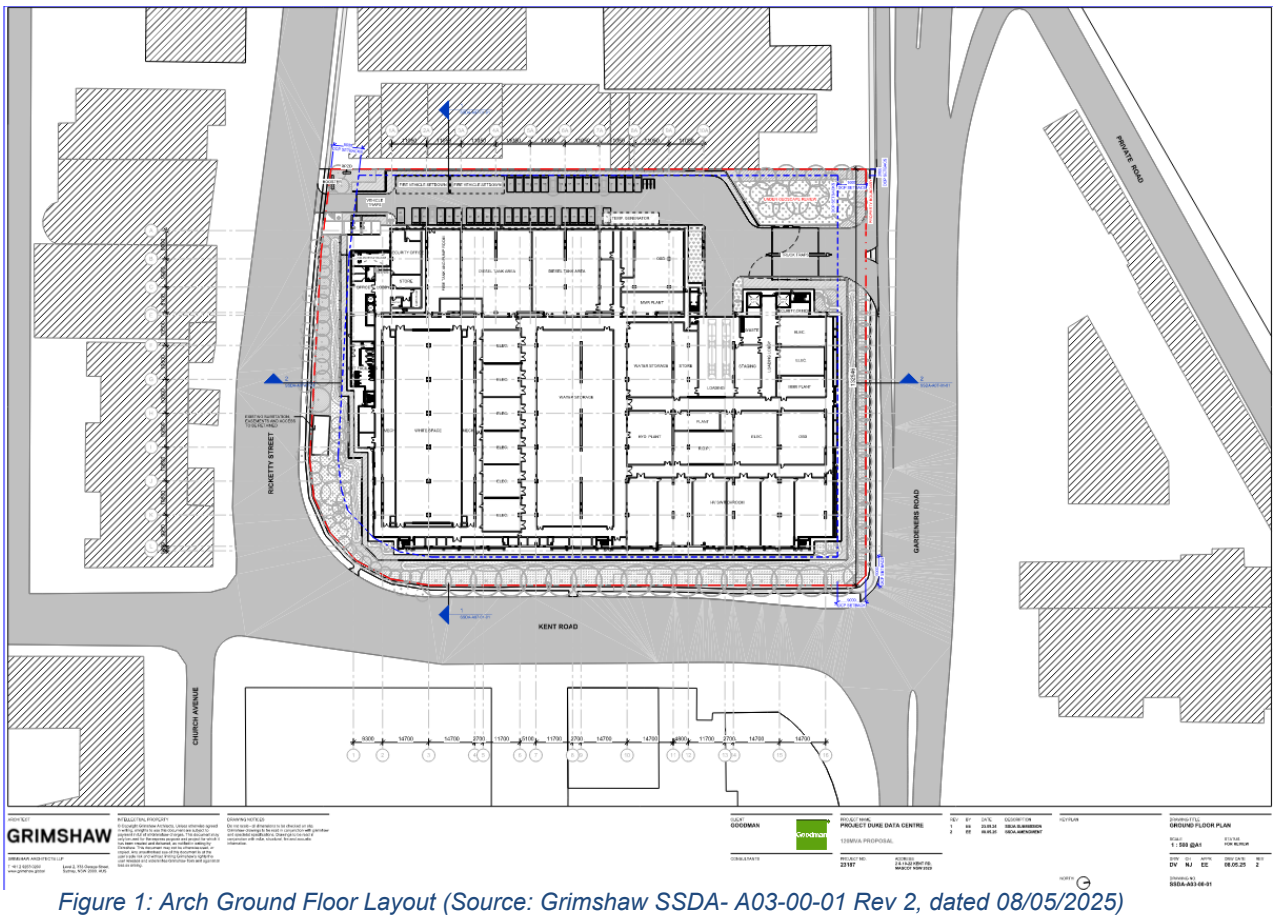


Figure 1: Arch Ground Floor Layout (Source: Grimshaw SSDA- A03-00-01 Rev 2, dated 08/05/2025)

6.0 Stormwater Methodology

6.1 Stormwater Quantity

6.1.1 Existing Stormwater

The site is located within a low-lying area with a mild grade, sloping from east to west towards Alexandra Canal. The local stormwater system is owned and operated by Bayside City Council. Figure 2 below shows the existing site is discharging to the council-owned stormwater pipe system that runs along the Gardeners Road..

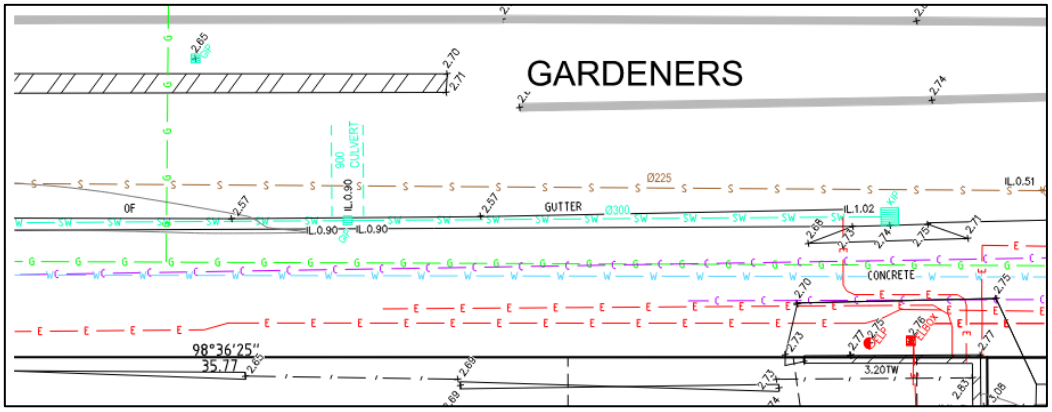


Figure 2: Existing Stormwater Gardener Road (Source: Survey LTS dated 02/04/2025)

There is a 300mm and 450mm diameter pipe extending along Gardeners Road and the existing site is serviced by discharging into multiple kerb inlet pits along the northern boundary. The existing site also appears to be discharging to kerb inlet pits on Kent Road on the east side, which then connects to the Gardener Road discharge system and is ultimately directed into the northwest towards Alexandra Canal.

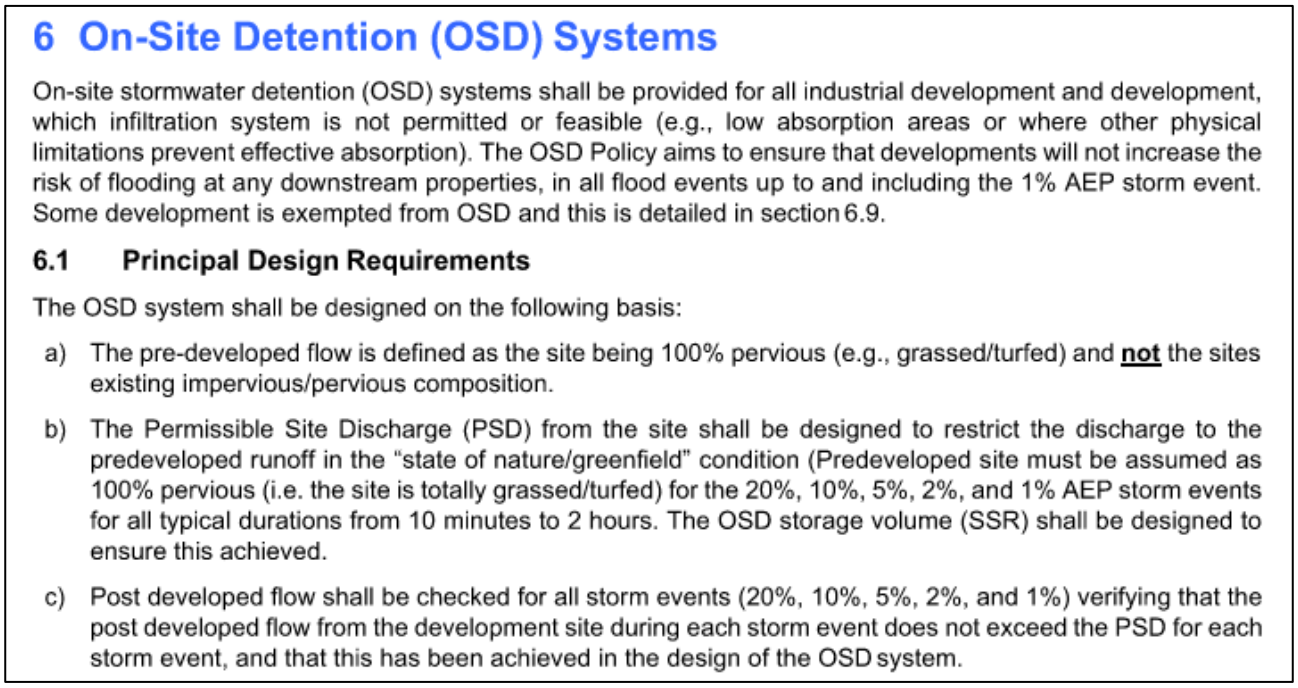
6.1.2 Proposed Stormwater Design

Stormwater has been designed in accordance with Bayside Technical Specifications Stormwater Management 2023. All new stormwater is required to be conveyed by gravity as discharge from the site to Council's existing drainage system.

The site is designed to have swales along the boundaries of Ricketty Street, Kent Road and Gardeners Road. The Ricketty Street site boundary is proposed to be protected by a flood barrier wall at 4.1m to prevent flood waters from entering the site, refer to the Flood Impact and Risk Assessment Report prepared by TTW.A flood barrier wall also extends along the corner of Ricketty Street and Kent Road to bund the flood levels in major flood events.

Roof catchments are collected in roof gutters and conveyed by downpipes to the two proposed OSDs. Surface stormwater flows have been conveyed by site grading and collected by Surface Inlet Pits (SIP). In-ground stormwater is further conveyed to the diversion pit to the stormfilter chamber for water quality treatment.

All major development would require an OSD as per the DCP requirements as shown in Figure 3.



6 On-Site Detention (OSD) Systems

On-site stormwater detention (OSD) systems shall be provided for all industrial development and development, which infiltration system is not permitted or feasible (e.g., low absorption areas or where other physical limitations prevent effective absorption). The OSD Policy aims to ensure that developments will not increase the risk of flooding at any downstream properties, in all flood events up to and including the 1% AEP storm event. Some development is exempted from OSD and this is detailed in section 6.9.

6.1 Principal Design Requirements

The OSD system shall be designed on the following basis:

a) The pre-developed flow is defined as the site being 100% pervious (e.g., grassed/turfed) and **not** the sites existing impervious/pervious composition.

b) The Permissible Site Discharge (PSD) from the site shall be designed to restrict the discharge to the predeveloped runoff in the "state of nature/greenfield" condition (Predeveloped site must be assumed as 100% pervious (i.e. the site is totally grassed/turfed) for the 20%, 10%, 5%, 2%, and 1% AEP storm events for all typical durations from 10 minutes to 2 hours. The OSD storage volume (SSR) shall be designed to ensure this achieved.

c) Post developed flow shall be checked for all storm events (20%, 10%, 5%, 2%, and 1%) verifying that the post developed flow from the development site during each storm event does not exceed the PSD for each storm event, and that this has been achieved in the design of the OSD system.

Figure 3: OSD Requirements (Source: Bayside Techanical Specification Stormwater Management 2023)

A preliminary DRAINS model is shown in Figure 4 which indicates the flows from the pre-development and post-development catchment with OSD. Based on the proposal that all existing buildings will be demolished, and site will be cleared before development, the pre-development catchment is assumed to be 100% pervious. Stormwater design of the proposed development will therefore be restricted to match the pre-development discharge through the site.

The proposed stormwater network of the site has been modelled using the program DRAINS. Two above ground OSDs have been designed to capture roof drainage of the proposed development. OSD 1 has a capacity of 293m^3 and OSD 2 has a capacity of 261m^3. The flows from these OSDs then pass through the diversion pit on to the stormfilter chamber for water quality treatment and flows through the above ground basin and ultimately discharge to the Gardeners Road inground pit system. Post development external areas are captured separately in above ground OSD storage basin of approximate depth of 0.55m and approx. volume of 220m^3.

Due to the significant flood affectation of the site in larger storm events, the in-ground stormwater has been designed for two different scenarios:

- During minor storm events the site discharges to an above ground detention basin prior to discharge to Gardeners Road to capture lower lying areas of the site and meet Council's bypass requirements for the site. These height of the surface levels of the carparking and loading dock connection points are limited by the requirement for compliant driveway gradients to Gardeners Road and Ricketty Street. Permissible site discharge rates are met through the combination of the above ground detention tanks within the building and this above ground basin.

- During major storm events this above ground basin and stormwater adjacent to Gardeners Road is inundated the due to the high flood level that extends into the site. Permissible site discharge is met through the above ground detention tanks within the building.

In frequent storm events, the top of kerb level has been assumed as the boundary tailwater level. This has been included within the DRAINS model submitted as part of this application. The results for the minor storm event of 20% AEP are shown in Figure 5.

The peak 1% AEP flood level has been identified as 3.278 m based on flood modelling. This level has been adopted as the downstream tailwater condition in the DRAINS model for the 1% AEP storm event to ensure

accurate hydraulic representation. Under these conditions, elevated downstream tailwater levels significantly impede the functionality of the DRAINS model, as conventional assumptions about free outflow are no longer valid. To accurately reflect the downstream hydraulic conditions and resultant flood levels, the model has been modified to incorporate the effects of backwater and surcharge caused by these high tailwater levels as shown in Figure 4 and these inundated downstream networks have been removed from the model as they will be fully inundated in this storm event.

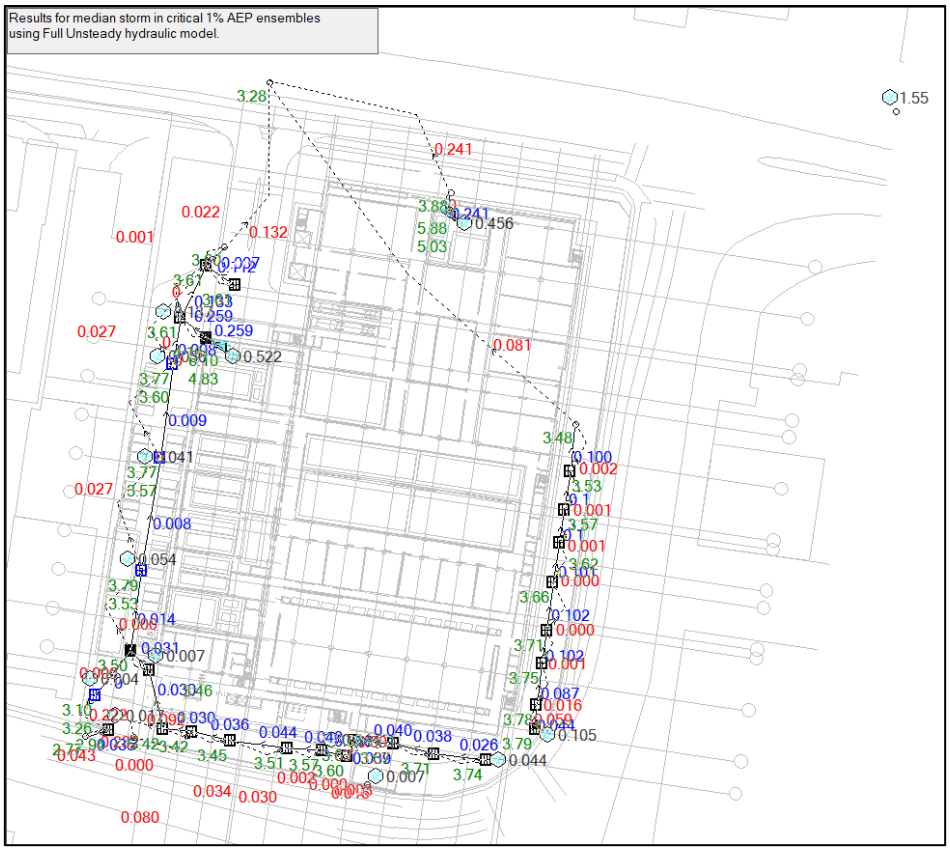


Figure 4: 1%AEP DRAINS Model

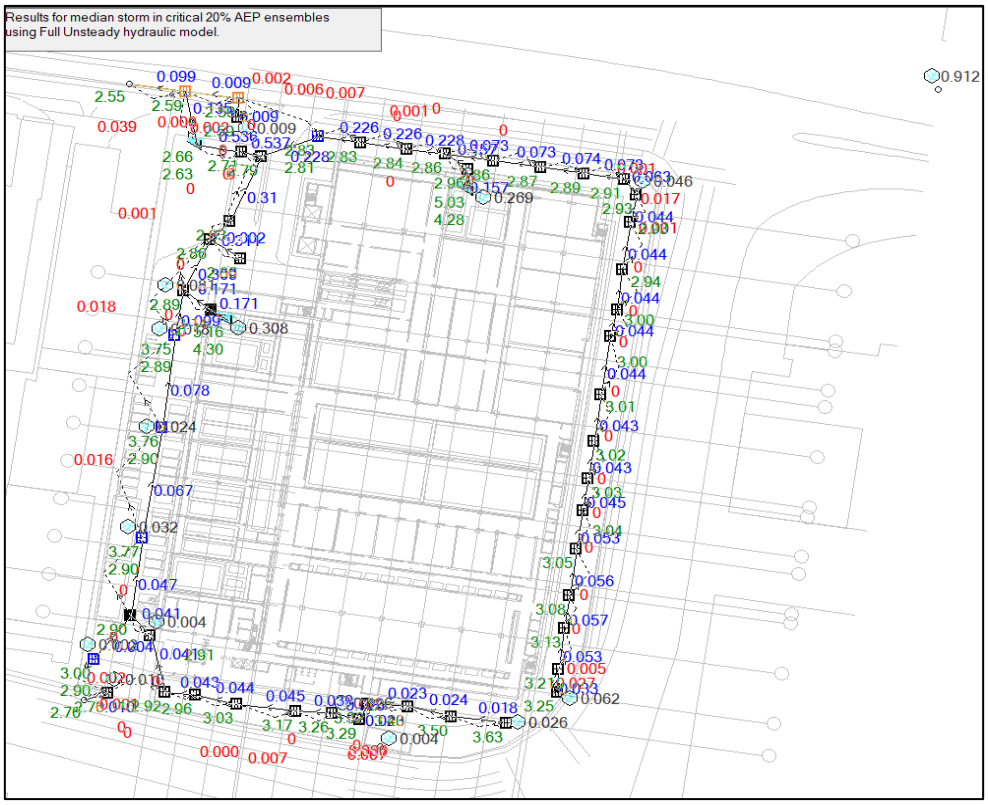


Figure 5: 20% AEP DRAINS model

Table 3: Summary of Pre and Post discharge through the site in various flood events

Storm Event	Pre-Development Discharge (L/sec)	Post-Development Discharge(L/Sec)
1% AEP	1550	900
2% AEP	1400	263
5% AEP	1200	209
10% AEP	1060	166
20% AEP	911	153

6.2 Stormwater Quality

Stormwater quality treatment is required to comply with the requirements outlined in Bayside Technical Specification Stormwater Management 2023. Within this, water quality treatment devices on site must achieve the water quality targets outlined in Section 7.1.1 of the Stormwater Management 2023 guide as shown in Figure 6.

Stormwater Pollutant	Pollutant Reduction
Gross pollutants	90%
Total suspended solids (TSS)	85%
Total phosphorous (TP)	60%
Total nitrogen (TN)	45%

Table 5 - Stormwater Pollution Reduction Targets

Figure 6:Stormwater Pollution Targets (Source: Bayside Technical Specification Stormwater Management 2023)

Stormwater quality reduction targets are to be met through the use of the following devices;

- Ocean Protect Storm Filter Cartridges (or equivalent)
- Ocean Protect Oceanguard Pit Inserts (or equivalent)

A preliminary MUSIC model shown in Figure 7 outlines the required stormwater treatment devices required to ensure pollutant reduction load requirements are being met by site. This currently consists of:

- 25 x Tall (690) PSorb StormFilter Cartridges or equivalent installed within a diversion chamber separate to the OSD tank;
- Ocean Protect Oceanguard or equivalent installed in all pits in the paved area and landscape area.

A summary of the treatment train system in addition to the annual pollution reduction load rates is provided in the Figure 8.

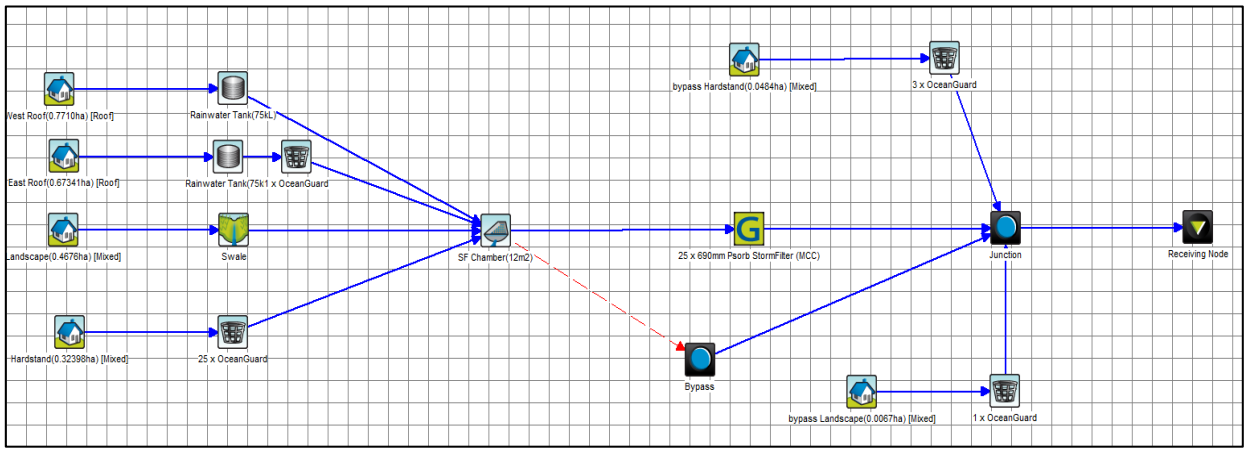
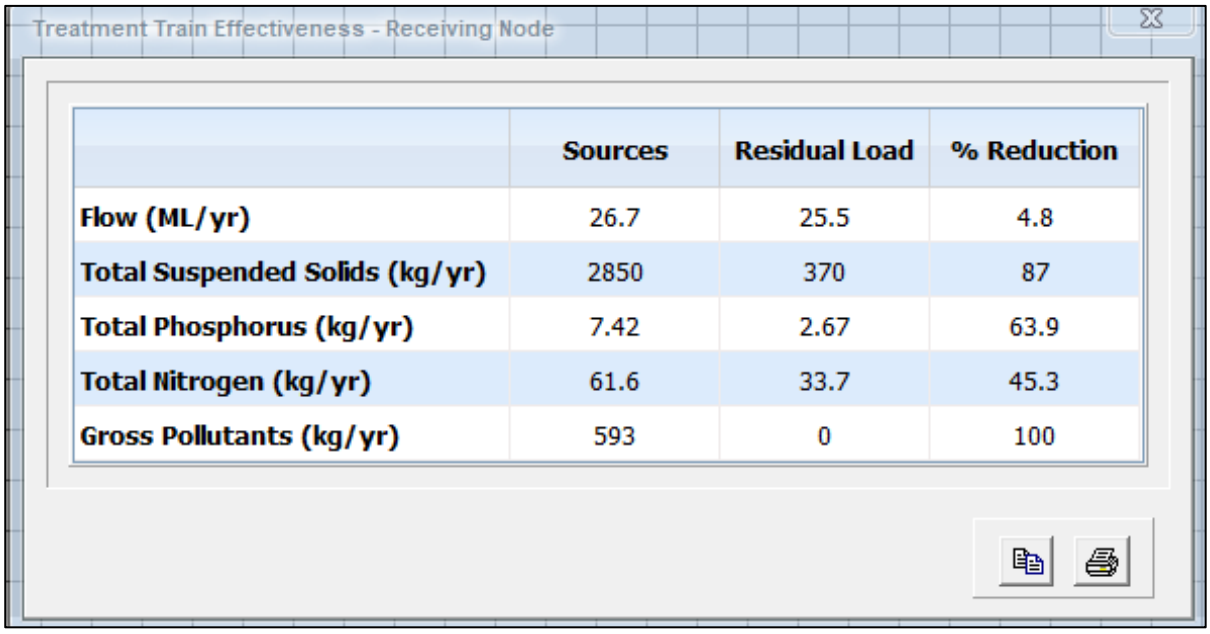


Figure 7: MUSIC Model



	Sources	Residual Load	% Reduction
Flow (ML/yr)	26.7	25.5	4.8
Total Suspended Solids (kg/yr)	2850	370	87
Total Phosphorus (kg/yr)	7.42	2.67	63.9
Total Nitrogen (kg/yr)	61.6	33.7	45.3
Gross Pollutants (kg/yr)	593	0	100

Figure 8: Treatment Train MUSIC Model Results

6.3 Cumulative Impacts

Stormwater impacts are managed through the implementation of stormwater controls throughout the site to mimic existing conditions and adhere to guidelines set out by the Bayside Technical Specification Stormwater Management 2023. Discharge from the site has been designed to not exceed the pre-development stormwater flows from site as defined as 100% pervious and to connect to the existing council network with no cumulative impacts. As a result, from a stormwater perspective, cumulative impacts from the site on surrounding developments are negligible and will not impact hydrology, drainage lines, downstream asset or watercourses.

6.4 Mitigation Measures

The proposed stormwater design includes the following mitigation measures:

- On site stormwater detention to reduce the rate of discharge of stormwater from the site post development to a pre development flows with all the site defined as 100% pervious in accordance with the DCP.
- On site stormwater quality treatment to mitigate the impact of the site on downstream water quality.
- Erosion and sediment control measures during construction to mitigate downstream impacts on water quantity and quality.

7.0 Site Works Methodology

7.1 Bulk Earthworks

Bulk earthworks on the site will be required to facilitate the development of the site for the proposed multi-storey data centres and proposed carpark and landscapes. The earthworks will be undertaken to provide a building pad at finished floor level (FFL) 4.15m. The batter slope for the design batters of up to 2m are recommended by PSM in the geotechnical investigation (dated 12 July 2024) as shown in Figure 9 subject to following recommendations:

- The batters shall be protected from erosion.
- Permanent batters shall be drained.
- Temporary batter should not be left unsupported for more than 1m without further advice, and inspection should be by geotechnical engineer following significant rain events.
- Where loads are imposed or structures/ services are located within on batter height of the crest of batter, further advise should be sought from geotechnical engineer.
-

Table 10 – Batter Slope Angles

Unit	Temporary	Permanent
ENGINEERED FILL / SAND	2.0H : 1V	2.5H : 1V

Steeper batters may be possible subject to further advice, probably including inspection during construction.

Figure 9: Slope Batters (Source: Geotechnical Report PSM5378-005R dated 12 July 2024)

A high-level cut and fill estimate has been completed for the site and is shown in Appendix A on drawing sheet 02011. Overall, the balance totals an approximate net cut of 4,700m^3.

Note, the bulk earthworks plan excludes detailed excavation. It is a preliminary estimate which is subject to adjustment to allow for variances in geotechnical conditions, final building layout and drainage conditions.

7.2 Pavement Design

Pavement design of external surfaces within the site has been proposed by TTW to ensure sufficient strength and safety of pavements for pedestrian and vehicular movement. Preliminary test conducted for CBR for pavement design by PSM (Geotechnical Investigation, 12 July 2024) were adhered to design adequate pavements. Figure 10 shows the results of CBR test from geotechnical report. TTW has adopted 2% CBR for preliminary pavement design in accordance with advice from geotechnical report (Refer to Figure 10). Further investigation and testing will be required to confirm the pavement design during the detail design stage.

8.6 Pavements

A total of three (3) CBR tests were undertaken in the geotechnical investigations. The test results indicate a soaked CBR value of between 1.5% and 25%. A design subgrade CBR of 2% can be adopted for pavement founded on the existing FILL unit.

Figure 10:CBR Percentage (Source: Geotechnical Report PSM5378-005R dated 12 July 2024)

7.3 Cumulative Impacts

Site works impacts are managed through the implementation of parameters set out by PSM in the geotechnical investigation (dated 12 July 2024). These parameters will be implemented in the design stage of site works. The impact of subgrades and soils will be addressed in bulk earthwork and pavement design to ensure no danger is posed to surrounding sites during the construction and operation stage of the development. As a result, from a site works perspective, cumulative impacts from the site on surrounding developments are negligible.

7.4 Mitigation Measures

The proposed site works design includes the following mitigation measures as recommended by PSM:

- Adequate batter slopes and shoring analysis for bulk excavations.
- Proof rolling of final subgrades after excavation to confirm adequately soil properties.
- CBR testing undertaken at subgrade level for pavement layouts.

8.0 Conclusions

The following provides a summary of the proposed concept civil engineering and stormwater management for the Project Duke Data Centre in Mascot.

- Stormwater on-site detention for 1% AEP design storms and all minor storms, has been designed in order to satisfy the design requirement for post discharge and therefore adheres to the DCP guidelines.
- A preliminary stormwater treatment design has been developed which includes Ocean Protect Oceanguards or equivalent and 25 x 690mm Ocean Protect PSorb StormFilters or equivalent to reduce the pollutant target through the site.
- A preliminary pavement design is proposed based on 2% CBR subject to revise based on further investigation in detail design stage.
- A high-level cut and fill estimate has been completed for the site with an overall balance totalling a net cut of approximately 4,700m3.

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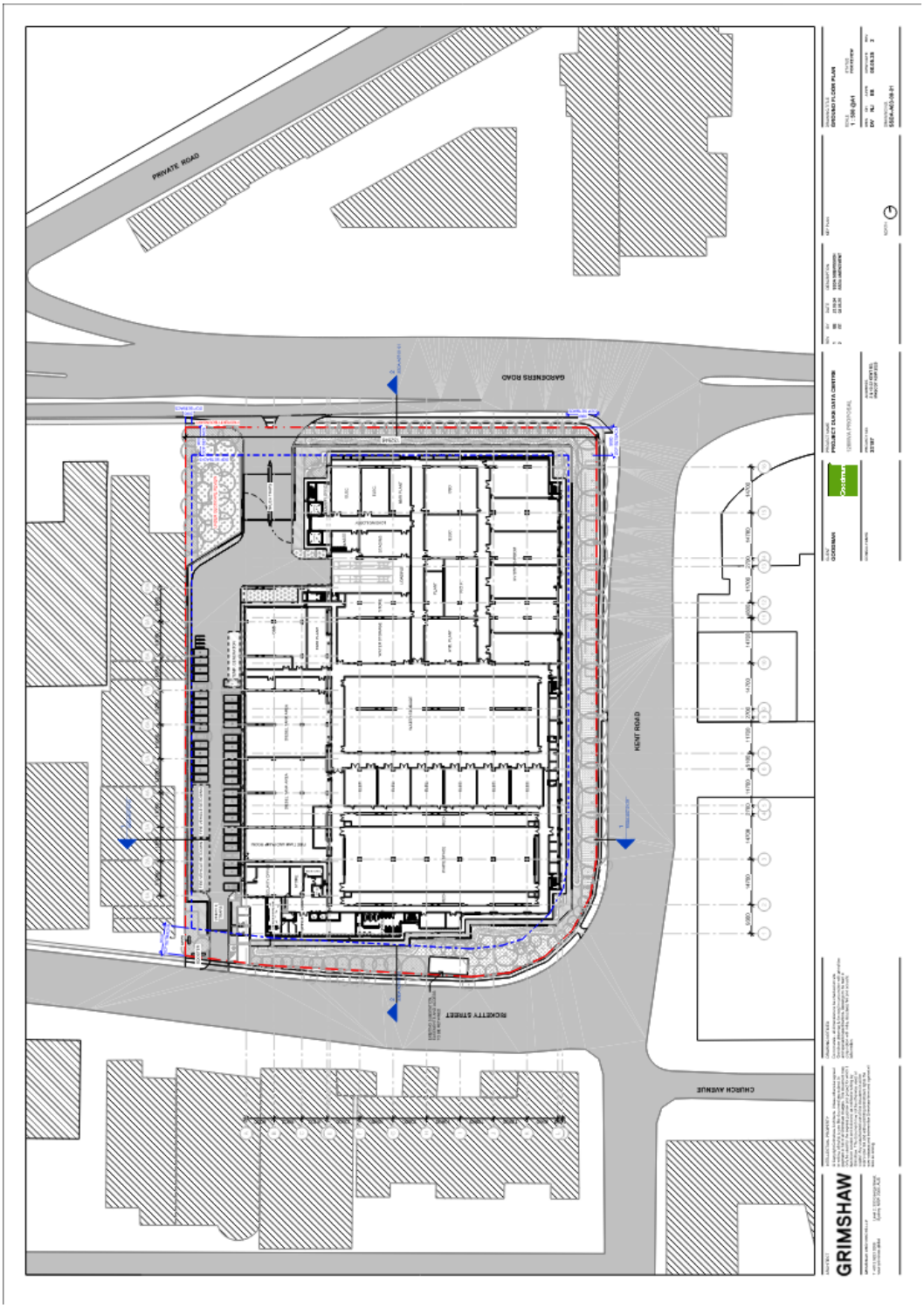
Appendix A

SSDA Arch Plan



Appendix A 1: Arch Ground Floor Layout (Source: Grimshaw SSDA- A03-00-01 Rev 2, dated 08/05/2025)

Appendix B

Civil SSDA Drawings