

SSDA Civil Engineering Report

NEXTDC S5 Data Centre

Prepared for NEXTDC / 9 October 2025

221661 CAAC

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1.0 Executive Summary

This civil engineering report has been prepared by TTW (NSW) Pty Ltd on behalf of NEXTDC Limited to accompany a detailed State Significant Development Application (SSDA) for the data centre development at 269 Lane Cove Road. The legal description of the site is Lot 3 in Deposited Plan (DP) 1129811.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-63168959). This report concludes that the proposed data centre development is suitable and warrants approval subject to the implementation of the following mitigation measures.

- On-site stormwater detention tanks of approximately 530 m³ to reduce the discharge from the site to below the permissible site discharge allowed in the City of Ryde Development Control Plan 2014.
- A site wide stormwater network.
- Water treatment measures including 38 x Ocean Protect Oceaguards (or equivalent), 40 x 690mm Ocean Protect PSorb StormFilters (or equivalent) and an Ocean Protect Jellyfish JF-1200 (or equivalent) to meet pollutant reduction targets set out in the City of Ryde Development Control Plan 2014.
- 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 acceptable.

2.0 Introduction

2.1 Project Introduction

- Site preparation works including demolition and removal of existing structures, tree removal and bulk earthworks.
- Staged construction and operation of two connected data centre buildings (Building A and Building B) with a maximum height of 65 metres and a combined total gross floor area (GFA) of 47,285m² comprising 33,142m² of technical data hall floor space and 14,143m² of office, retail and innovation hub floor space.
 - Building A will be delivered in Stage 1 and will comprise the following:
 - Basement parking for 51 car spaces including two accessible spaces and 10 EV spaces
 - Seven storeys of technical data floor space accommodating seven data houses: 16,571m²
 - Utilities including diesel generators (3MWe), above-ground water tanks for industrial water (600kL each), above-ground diesel storage tanks (100kL each) and an aboveground water tank for fire water (400kL each).
 - Business identification signage facing Waterloo Road and Lane Cove Road.
 - Integrated 'Building O' component within Building A, comprising:
 - Two retail tenancies at ground level: 326m²
 - Lobby and innovation hub including auditorium and training rooms: 3,186m²
 - NEXTDC and ancillary office floor space on upper levels: 10,631m²
 - Building B will be delivered in Stage 2 and will comprise the following:
 - Seven storeys of technical data floor space accommodating seven data halls: 16,571m²
 - Utilities including diesel generators (3MWe), above-ground water tanks for industrial water (600kL each), above-ground diesel storage tanks (100kL each) and an aboveground water tank for fire water (400kL each).
 - Business identification signage on the western and southern building facades.
- Landscaping across the site in accordance with the project staging, delivering a mix of native and endemic plant species, shrubs and grasses, including 139 additional trees within a total area of 4,959m² deep soil and a resultant tree canopy cover of 5,707m²
- Staged delivery of public domain works including:
 - Stage 1: construction of Road 13 within the subject site and public plaza.
 - Stage 2: construction of Road 6 (half-width) within the subject site, including provision for a future pedestrian/cycle overbridge (to be delivered by others), and works along Lane Cove Road.
- Delivery of 90 megawatts of power with a 33kV switching station to be accommodated on site, as well as other site services, including stormwater infrastructure.

The following table provides a comparative analysis of the original proposal and revised proposal based on the key development features.

Table 1: Project Details

Element	Original Proposal	Revised Proposal	Change
Land Use Activity	Data centre with 14 data halls, ancillary office and innovation space plus two retail premises	Data centre with 14 data halls, ancillary space office and innovation plus two retail premises	Nil change
Total Site Area	22,381m ²	22,381m ²	Nil change
Total GFA	46,935m ²	47,285m ²	+350m ²
Data Hall	33,643m ²	33,142m ²	-501m ²
Lobby/Innovation Hub	3,192m ²	3,186m ²	-6m ²
Ancillary Office	9,765m ²	10,631m ²	+866m ²
Total Retail GFA	335m ²	326m ²	-9m ²
Floor Space Ratio	2.1:1	2.11:1	+0.01:1
Car Parking	105 spaces	51 spaces	-54 spaces
Bicycle Parking	12 spaces	20 spaces	+8 spaces
Motorbike Parking	11 spaces	17 spaces	+6 spaces
Maximum Building Height	Building O: office and innovation hub – 49 metres over 10-storeys Building A: data centre – 65 metres over nine-storeys Building B: data centre – 65 metres over nine-storeys	Building O: office and innovation hub – 49 metres over 10-storeys Building A: data centre – 65 metres over nine-storeys Building B: data centre – 60 metres over nine-storeys	Nil change to Building O Nil change to Building A -5 metres for Building B
Deep Soil and Landscaped Area	Deep soil zone: 1,825m ² (8.1% total site area, 13.1% future site area) Soft landscape: 5,251m ² (23.5% site area)	Deep soil zone: 4,959m ² (22.16% total site area, 35.6% future site area) Soft landscape: 6,570m ² (29.4% site area)	+3,134m ² deep soil (+14.06% site area, +22.5% future site area) +1,319m ² soft landscape (+5.9% site area)
Tree Removal	Tree removal = 146 Retained trees = 70 Proposed trees = 81 Total trees = 151	Tree removal = 126 Retained trees = 90 Proposed trees = 139 Total trees = 229	-20 trees removed +20 trees retained +58 trees proposed +78 additional trees
Tree Canopy Cover	5,688m ² (25.4%)	5,707m ² (28.7%)	+19m ² (+0.1%)
Cut and Fill Volume	Net cut 46,530m ³	Net cut of 75,650m ³	-29,120m ³
Power Consumption	90 megawatts	90 megawatts	Nil
Operating Hours	24-hours, 7 days a week	24-hours, 7 days a week	Nil

Element	Original Proposal	Revised Proposal	Change
Jobs - full-time equivalent (FTE) employees	Construction: 942 Operation: 490	Construction: 942 Operation: 490	Nil
Utilities and services	60 x diesel generators (@2Mwe = 120Mwe) 12 x above-ground diesel storage tanks (@110kL = 1,320kL) 8 x above-ground water tanks for industrial water (@460kL= 3,680kL) 2 x above-ground water tanks for fire water (@350kL = 700kL) 1 x 33kV switching station	48 x diesel generators (@3Mwe = 144MWe) 16 x above ground diesel storage tanks (@100kL = 1600kL) 8 x above ground water tanks for industrial water (@600kL = 4,800kL) 1 x above-ground water tank for fire water (@400kL total) 1 x 33kV switching station	-12 x diesel generators (+24MWe) +4 x above-ground diesel storage tanks(+280kL) Nil change to number of tanks (+1,120kL) -1 above-ground water tank (-300kL) Nil
Public domain works	2 x roads (Road 5 and Road 13) and road widening: 4,945m ² Public plaza: 3,522m ²	2 x roads (Road 13 and part Road 6) and roadwidening: 4,734m ² Public plaza: 3,762m ²	-211m ² roads (Road 5 deleted and Road 6 introduced) +240m ² public plaza

2.2 SEARs Response

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (SEARs) dated 8 November 2023 issued for the SSDA (SSD-63168959). Specifically, this report has been prepared to respond to the SEARS requirements issued under Table 2 below.

Table 2: SEARS Requirement

Item	Description of Requirement	Section Reference (this Report)
Water Management	<p>Provide an integrated water management strategy, including the following.</p> <ul style="list-style-type: none"> ▪ A surface and groundwater water discharge assessment in accordance with relevant EPA guidelines, including an assessment of potential impacts on watercourses, riparian areas, key fish habitat and recreational fishing, groundwater, and groundwater-dependent communities nearby. ▪ A detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements. ▪ Details of the proposed stormwater/wastewater drainage design including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse or dispose of water. ▪ An assessment of potential surface and groundwater impacts associated with the development, including potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities nearby. ▪ Description of the measures to minimise water use. ▪ Characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria using a MUSIC water quality model. ▪ Details of any surface or groundwater mitigation, management and monitoring activities and methodologies. 	<p>Section 4.0</p> <p>Groundwater has been covered within the separate Geotechnical Report.</p> <p>Site water balance and wastewater drainage is covered within the Services Infrastructure Report prepared by Arup.</p> <p>Details of the proposed stormwater drainage design including the characterisation of water quality are outlined in Section 7.0.</p>
Flooding	<p>A flood risk assessment, that includes a detailed flooding assessment that satisfies the objectives and any relevant provisions of the NSW Floodplain Development Manual (2023).</p>	<p>Flooding has been covered in the Flood Impact Assessment report issued by TTW.</p>

3.0 The Site

The site is located at 269 Lane Cove Road, Macquarie Park and is legally described at Lot 3 in Deposited Plan (DP) 1129811. It is located on the corner of Lane Cove Road and Waterloo Road and is made up of a single rectangular lot and is approximately 22,381 m² in size. An aerial photograph of the site is provided at Figure 3-1.

The site is located in the City of Ryde Local Government Area (LGA) within the Macquarie Park corridor, an established employment precinct with a particular focus on innovation. Macquarie Park is a nationally significant research and employment centre and includes the head offices for some of Australia's leading companies including Foxtel, Optus and Siemens. The site is approximately 2km southeast of Macquarie University, and 1.5km southeast of Macquarie Shopping Centre.

Existing development includes a two-storey office furniture store (Work Arena) at the northern end of the site and offices and studios associated with Foxtel in the southern portion of the site. Scattered trees exist along the site boundaries, particularly within the western setback to Lane Cove Road, along the southern boundary and the eastern boundary.

Vehicle access to the site is currently provided from Waterloo Road with an internal driveway providing access to several at-grade parking areas. A further vehicle crossover has been constructed along the Lane Cove Road frontage; however, it is not currently in use and barriers have been installed prohibiting access.

The site is well serviced by public transport with several bus routes operating along Lane Cove Road and Waterloo Road. The entrance to Macquarie Park Metro Station is immediately to the north of the site. The site includes a lengthy frontage to Lane Cove Road which provides access to the M2 Hills Motorway and Epping Road.

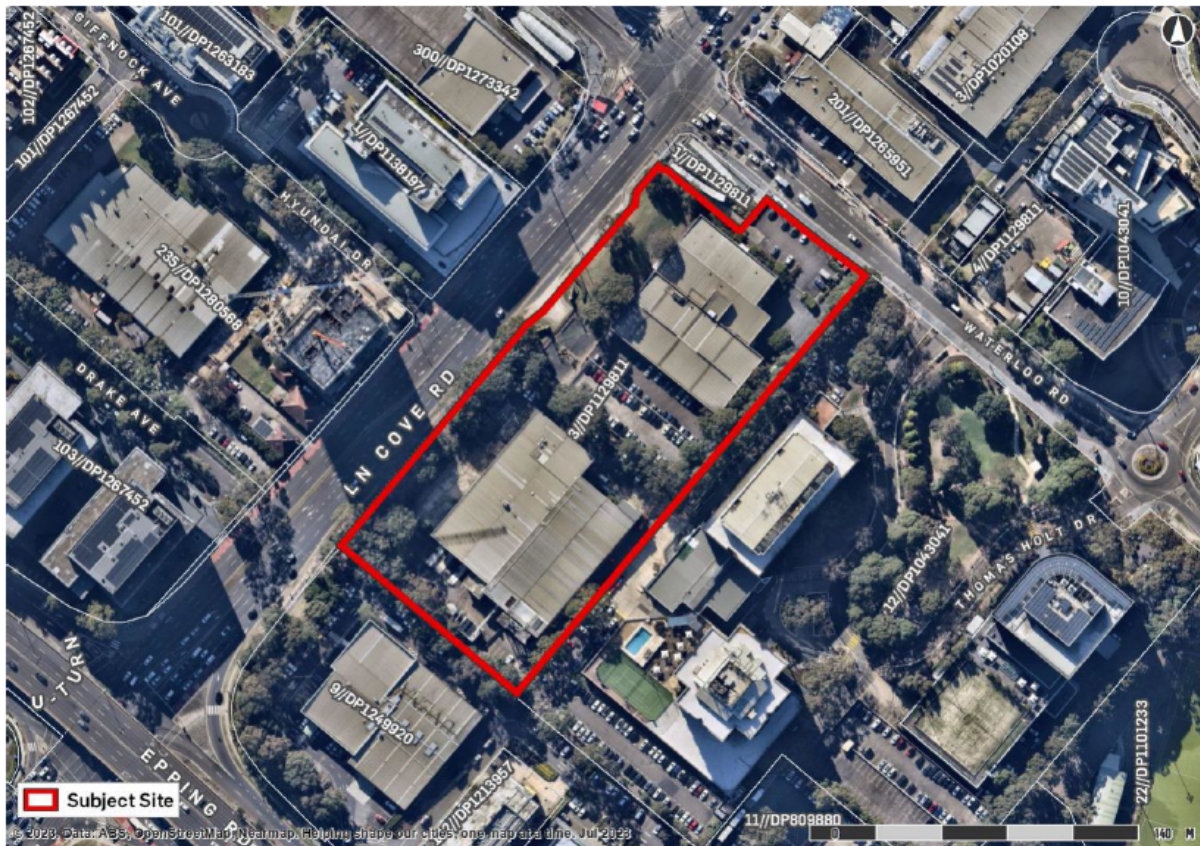


Figure 3-1: Aerial Photograph of Site (Source: Urbis GIS 2023)

4.0 Stakeholder Engagement

Refer to Table 3 for summary of stakeholder engagement to date relevant to the civil engineering design.

Table 3: Stakeholder Engagement

Relevant Stakeholder	Date	Items Discussed	Resolution
City of Ryde Council	Email correspondence from December 2023 to January 2024	Email correspondence regarding OSD parameters, stormwater connection points, road layouts and the adjacent site's road connection.	Civil design adjusted accordingly to suit the guidance from Council in relation to OSD parameters and road layouts. Refer to Appendix B for Council correspondence.
City of Ryde Council	RTS Comment	Provide long sections of the two new roads: Road 5 and Road 13 detailing compliant road geometry and proposed connections to existing roads. It's noted that Road 5 is not proposed in the draft RTS scheme and further justification is required to be provided with any application to support its removal. <ul style="list-style-type: none"> From the design contours on the submitted civil plans it appears that the proposed road elevations for Road 13 are undulating and may not be for compliant road assets. The long sections of the two roads will also be of paramount importance when confirming levels / retaining structures to facilitate access to the new buildings 	Refer to civil drawings 01041 and 01042 for road long sections and civil drawings 01051, 01052, 01053 and 01054 road cross sections for Road 13 and Road 6. Road 5 has since been removed to achieve additional public plaza to Lane Cove Road.
City of Ryde Council	RTS Comment	Ensure that future roads and intersections (e.g. Road 13, Road 5, etc.) are designed in accordance with the relevant Australian Standards, Austroads Guidelines and other relevant technical documentation.	Road 13 and its intersection with Waterloo Road and Road 6 and its intersection with Lane Cove Road have been designed in accordance with relevant Australian Standards, Austroads Guide to Road Design and Council Public Domain guidelines.
City of Ryde Council	RTS Comment	<ul style="list-style-type: none"> New road lots will warrant 2.5m by 2.5m splays on the corner of new intersections created. 	<ul style="list-style-type: none"> It is suggested that this form part of a condition of consent.
		<ul style="list-style-type: none"> The southern end of Road 13 terminates in a dead end and will require a temporary turning head to enable vehicles to safely turn around. Details must be provided. 	Temporary turning head provided at end of Road 13. Refer to civil drawing 03012.
		<ul style="list-style-type: none"> The civil plans lack sufficient detail with respect to road longitudinal grades, cross-sections to assess the relation of the public domain to surrounding sites. 	Refer to civil drawings 01041 and 01042 for road long sections and civil drawings 01051, 01052, 01053 and 01054 for cross sections for road 13 and 6.

Relevant Stakeholder	Date	Items Discussed	Resolution
		<ul style="list-style-type: none"> The level of excavation proposed for the new Road 13 is presented as some 1 - 2m. This imposes on the neighbouring property requiring that property to excavate to such a level for readily available access to this infrastructure. It would appear the proposal may require a retaining wall to support neighbouring land. This is a strongly undesirable asset for Council given the maintenance and risk implications, as well as being a barrier for the development of the neighbouring site who will have frontage to it for which it will impose on access. 	<p>Refer to the civil drawing 01051, 01052, 01053 and 01054 for sections that indicate the required retaining walls to the neighbouring property. These walls are required to maintain compliant access gradients to Lane Cove Road and to allow the retention of a number of trees along the eastern boundary.</p>
City of Ryde Council	RTS Comment	<p>As stated in Council's EIS advise Council is concerned with the development installing high volumes of subsurface utilities and its impact on the public domain due to its experience in similar data centres in the surrounding locality.</p> <p>The Applicant is advised to consider Council's EIS submission as to the requirements of the required public domain works. These requirements will not be repeated in this advice.</p> <p>The Applicant is to refer to page 19-21 of its EIS advise for Councils requirements.</p> <p>d) Additional Public Domain Comments:</p> <ul style="list-style-type: none"> Provide an extended plan view detailing the end of Road 13 and the interface with the neighbouring property. Road 13 must extend to the boundary line to facilitate future connection. Proposed levels must facilitate future connection without imposing undue burden on the neighbouring site through significant excavation requirements. A report detailing the existing subsurface features and infrastructure within the vicinity of the proposed development. The report should provide conceptual details of the expected volume of subsurface infrastructure that will be installed as part of the development works and how this new infrastructure will interact with existing subsurface infrastructure and conditions, new public domain infrastructure along the site frontages and future public domain infrastructure in the broader vicinity of the development site, including required clearances, and regulations of authorities such as TfNSW, Sydney Metro and utility authorities. 	<p>Refer below.</p> <p>The existing level at south boundary (end of Road 13) has been maintained to facilitate future connection and excavation issues.</p> <p>The utilities in the future public domain road reserve are to be addressed by relevant utility authorities. This can be addressed at detailed design stage.</p>

Relevant Stakeholder	Date	Items Discussed	Resolution
		<ul style="list-style-type: none"> A report detailing how installation of the required subsurface infrastructure – not only prior to occupation, but also during expansion of infrastructure post occupation - will be installed at compliant depths and allocated alignments within the verge area to prevent future obstruction to public infrastructure upgrades. The report should also provide conceptual details of how subsurface installation will be managed to minimise the ongoing impact of trenching of public infrastructure and disruption to the community. 	Refer to the Services Infrastructure Report prepared by Arup.
		<ul style="list-style-type: none"> The submitted plans show a proposal for land dedication. The strip of land along Lane Cove Road is to be dedicated to TfNSW. Please show the width of this strip in plan submissions. 	This width has been indicated on architectural plans following consultation with TfNSW.
		<p>No specific stormwater management plans have been provided. Based on the architectural plans, it is understood that Road 13 is proposed and is assumed to include stormwater drainage infrastructure. The ownership of Road 13 and its drainage infrastructure must be clearly detailed in the stormwater management or civil plans.</p> <p>On RtS submission Civil plans are to be provided that clearly indicate the future ownership of the Road 13. Should the roads be proposed for dedication to Council, Council will require strict compliance with Council's standards. Roads dedicated to Council, must reflect below requirements ensure below requirements are met.</p> <ul style="list-style-type: none"> A longitudinal section of the proposed new pit/pipe adjustment to be provided and indicate all the following details: 	<p>Refer to drawing 04011 for the Stormwater Management Plan.</p> <p>It is suggested provision of these long sections be included as a condition of consent as they will be required for the Section 138 approval.</p>
		1. Design to be in accordance with Council DCP 2014 8.2 stormwater management technical manual, table 5.4. DCP specifies any new Council Pipe shall be, at least, 375mm diameter.	Noted.
		2. New Pipe proposed in Council Land, including the connection from the boundary pit to the proposed pit shall be (steel reinforced Class IV), of minimum diameter \geq 375mm.	Noted.
		3. Please indicate the cover of the proposed pipe within Council land on the long section.	Cover to be in accordance with AS3500.
		4. Existing Council drainage infrastructure details including, diameter, etc. shall be shown on the plans. Note: Please use Council asset numbers.	Noted, to be addressed at S138.
		5. Minimum 1% slope to be proposed for new drainage lines in Council land.	Noted.

Relevant Stakeholder	Date	Items Discussed	Resolution
		6. Existing Council drainage infrastructure details including, diameter, etc. shall be shown on the plans, including details of the connection with the proposed stormwater system..	Noted. Refer to civil drawing 04011 for proposed connections to Council's drainage network.
		7. Council Details shall be incorporated, from Council Standard Drawings	Noted, to be addressed at S138.
		8. New proposed Council pipes to include Rubber ring joints.	Noted.
		9. Any proposed junction pit to be constructed with concrete lid.	Noted.
		10. Details of the connection to Council pipe/pit shall be included in the Stormwater Management Plan. Details of all new proposed Council pits must be included in the plans.	Noted, refer to Section 6 of this report.

5.0 Development Staging

The development is proposed to be undertaken in two stages.

Stage 1 will include:

- Demolition of existing structures;
- Bulk earthworks for the whole site;
- Construction of Building A and surrounds within the Stage 1 boundary;
- Construction of Road 13 with construction of a temporary turnaround where Road 13 connects with the stage 1 boundary; and
- Construction of the Public Plaza.

Stage 2 will include:

- Construction of Road 6 with provision for a future pedestrian/cycle overbridge
- Construction works along Lane Cove Road

Proposed site plan and Site staging plan are provided in Figure 5-1 and 5-2.

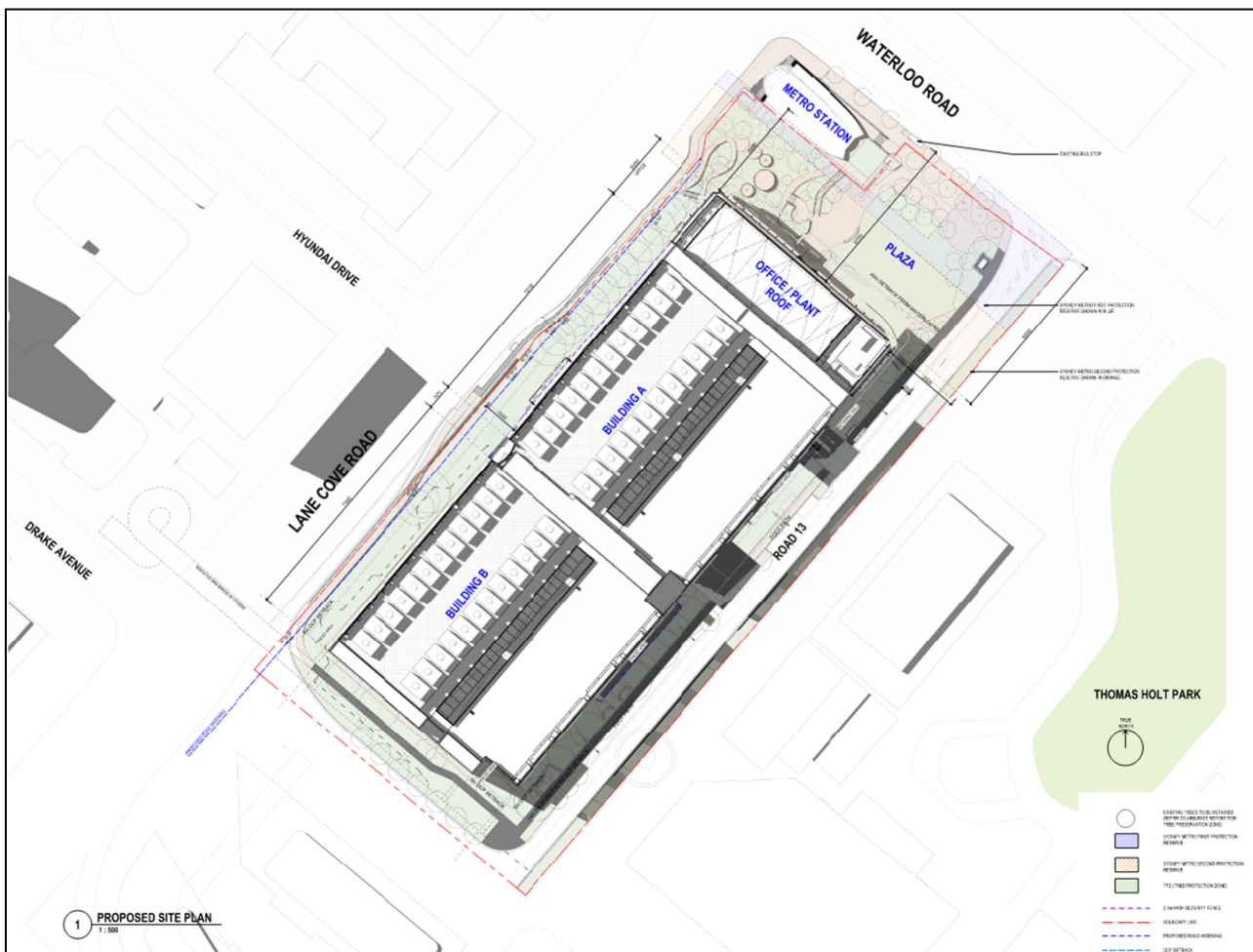


Figure 5-1: Proposed Site Plan (Source: HDR Architecture dated:26/08/2025)

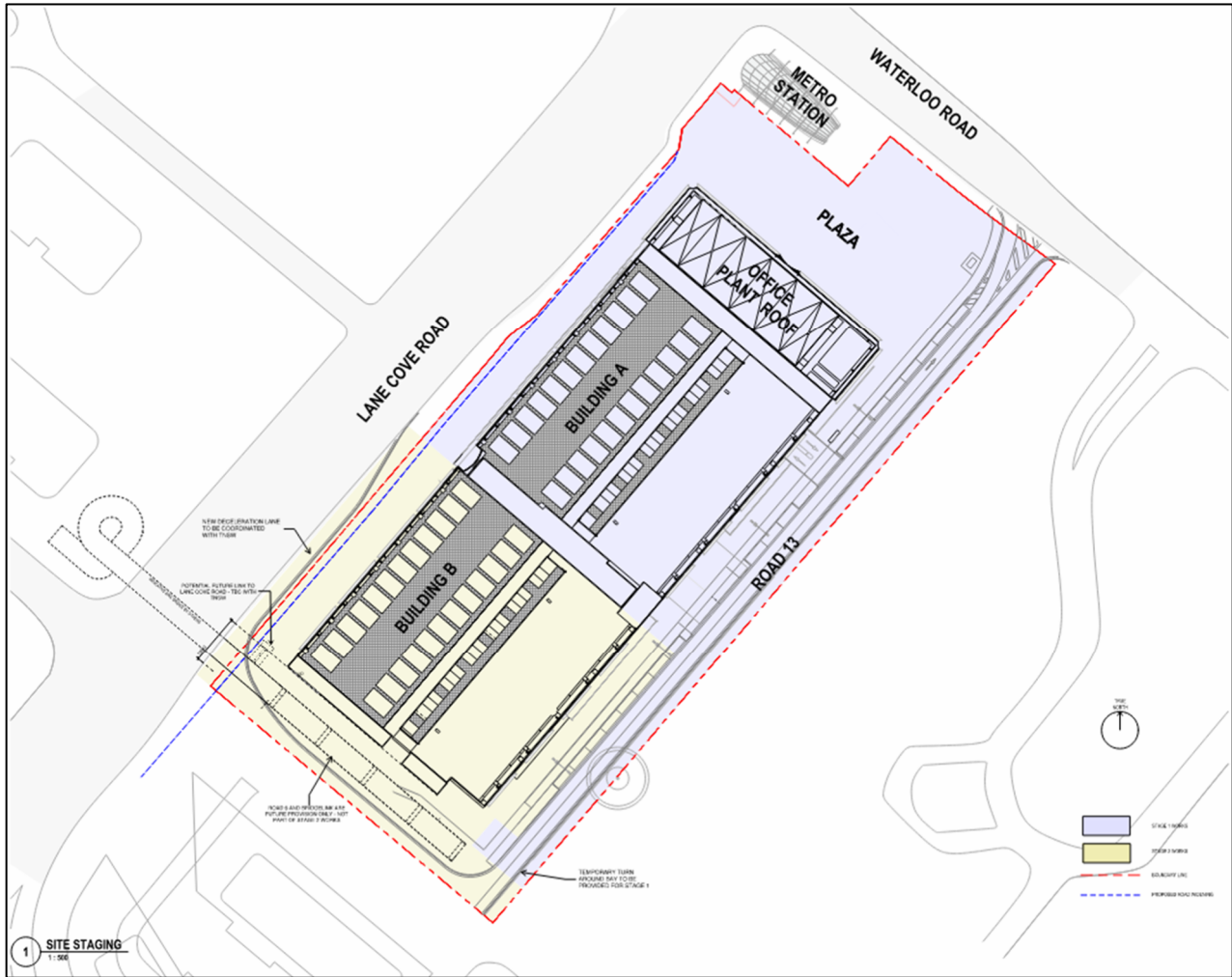


Figure 5-2: Site Staging Plan (Source: HDR Architecture dated: 16/09/2025)

6.0 Stormwater Methodology

6.1 Stormwater Quantity

6.1.1 Existing Stormwater

The existing site is approximately 22,381 m² and 70% impervious, comprising of two buildings, hardstand and landscaped areas. The site generally falls from the southwest to the northeast. An existing council pit is located on Waterloo Road around the northeastern site corner which connects the existing site drainage to Council's stormwater network which conveys site stormwater downstream to the north. An existing stormwater line also runs along the kerb on Lane Cove Road along the northwestern site frontage.

It is intent of the proposed stormwater design is to connect into Council's network by retaining the existing connection on Waterloo Road and a new connection to the existing stormwater on Lane Cove Road. Refer to Council's stormwater BYDA in Figure 6-1 below for indicative proposed site discharge locations.



Figure 6-1: Existing connection pit location (Source: City of Ryde Council drawings, Before You Dig Australia)

6.1.2 Proposed Stormwater Design

Stormwater has been designed in accordance with the City of Ryde Development Control Plan 2014 and the Stormwater Management Technical Manual 2014. All new stormwater is required to be conveyed by gravity as discharge from the site via Council's existing drainage system and existing catchment conditions should be maintained where practical. As outlined in Section 1.4.4 of the City of Ryde Stormwater Management Technical Manual (Figure 6-2), outflows from the site for all design storms are required to be less than the maximum outflow for the uncontrolled post-development site in the 5-year ARI storm. For the purpose of this analysis the 0.2 Exceedance Year (EY) is assumed to be equivalent to the 5-year ARI.

1.4.4 OSD Design - Detailed Method

The detailed method must be used in the following circumstances;

- Where the development does not satisfy the requirements for the simplified method above.
- Where Council considers the nature of the receiving system is too sensitive to warrant the simplified approach.
- Where the site conditions vary from those given in the simplified method.

The OSD must be designed to ensure the level of stormwater runoff discharged from the area of development must not to exceed the peak stormwater discharge arising from the post-developed works, during a 5 year ARI storm event.

To restrict post development flows to pre-development levels a detention basin for the design storms will be required to be modelled. Computational methods based on the approximate triangular method or the rational methods are not acceptable. It is recommended that a program in accordance with Section 3.1 is used.

In cases where the site proposes discharge to the kerb and gutter, the point of discharge is to be limited to 30L/s in accordance with Section 1.3.1.

If the rate of discharge from the outlet of the OSD system is affected by tail water conditions from the receiving system, for example where the invert level of the orifice is lower than the surface level at the point of connection into the existing drainage system, then full hydraulic calculations will be required in accordance with Section 5 of this Manual.

Figure 6-2: Stormwater Management Technical Manual (City of Ryde DCP, 2014)

Roof catchments are collected in roof gutters and conveyed via downpipes to the in-ground pipe system. Surface stormwater is directed by site grading and collected in Surface Inlet Pits (SIPs) and Kerb Inlet Pits (KIPs). The in-ground stormwater network conveys flows to the on-site stormwater detention (OSD) and water quality treatment devices.

The preliminary DRAINS model, illustrated in the figures below, presents the flow characteristics for both the uncontrolled post-development catchment and the post-development scenario incorporating OSD systems. The OSD has been configured to manage runoff from all roof areas, as well as the eastern and western hardstand and landscaped surfaces. Road 13, located on the eastern extent of the site will be serviced by a network of SIPs and KIPs, discharging independently of the proposed OSD. Similarly, the hardstand and landscaped areas south of the building fall towards the half-road and drain to proposed KIPs, ultimately discharging to the existing network at Lane Cove Road.

According to the DRAINS model, the 0.2 EY outflow for the uncontrolled post-development catchment is 832 L/s. This value represents the permissible site discharge and is depicted in Figure 6-4. For the OSD systems, during the 1% AEP storm, a total peak flow of 568 L/s discharging to the existing network at Waterloo Road and 119 L/s discharging to the existing network at Lane Cove Road, as shown in Figure 6-5. The combined site peak outflows in the 1% AEP storm is 687 L/s. As this is below the permissible site discharge, the system is considered acceptable. The required OSD tank specifications for the captured site area are approximately 530 m³ storage volume with a 300 mm orifice diameter set at the base of the tank.

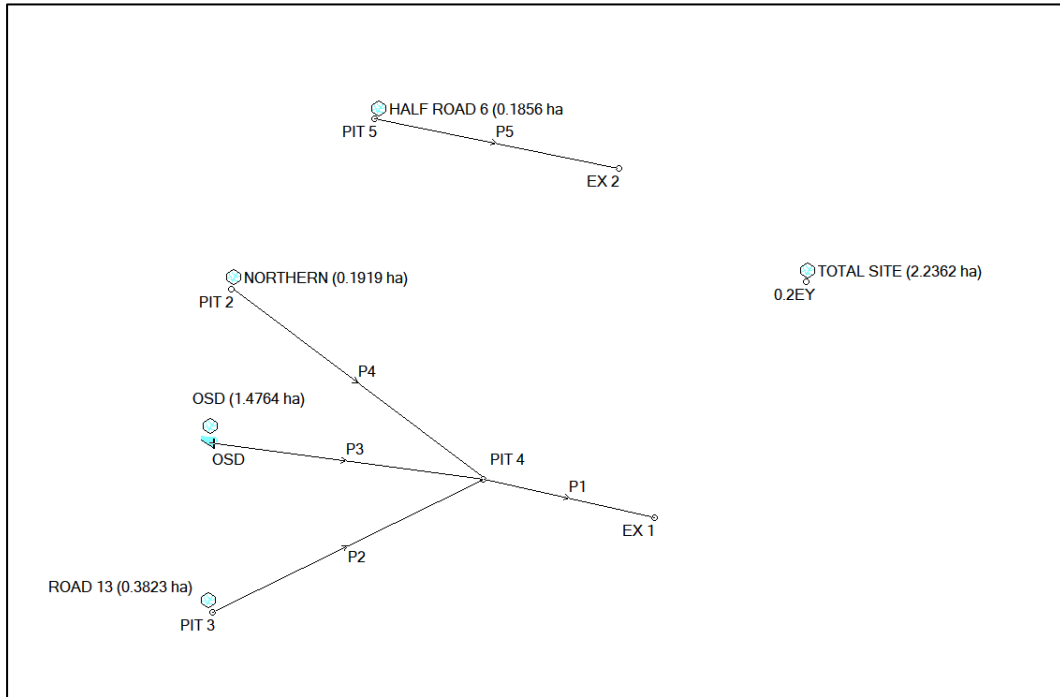


Figure 6-3: DRAINS Model Layout

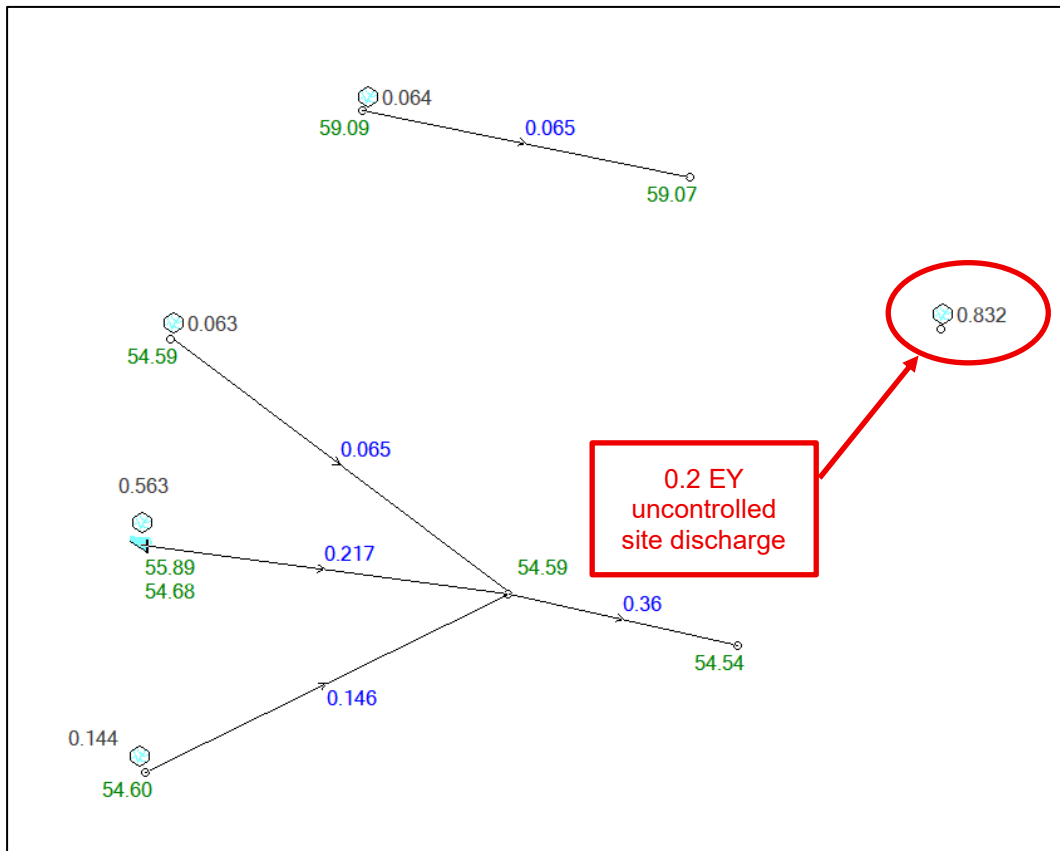


Figure 6-4: Results – 0.2 EY Storm

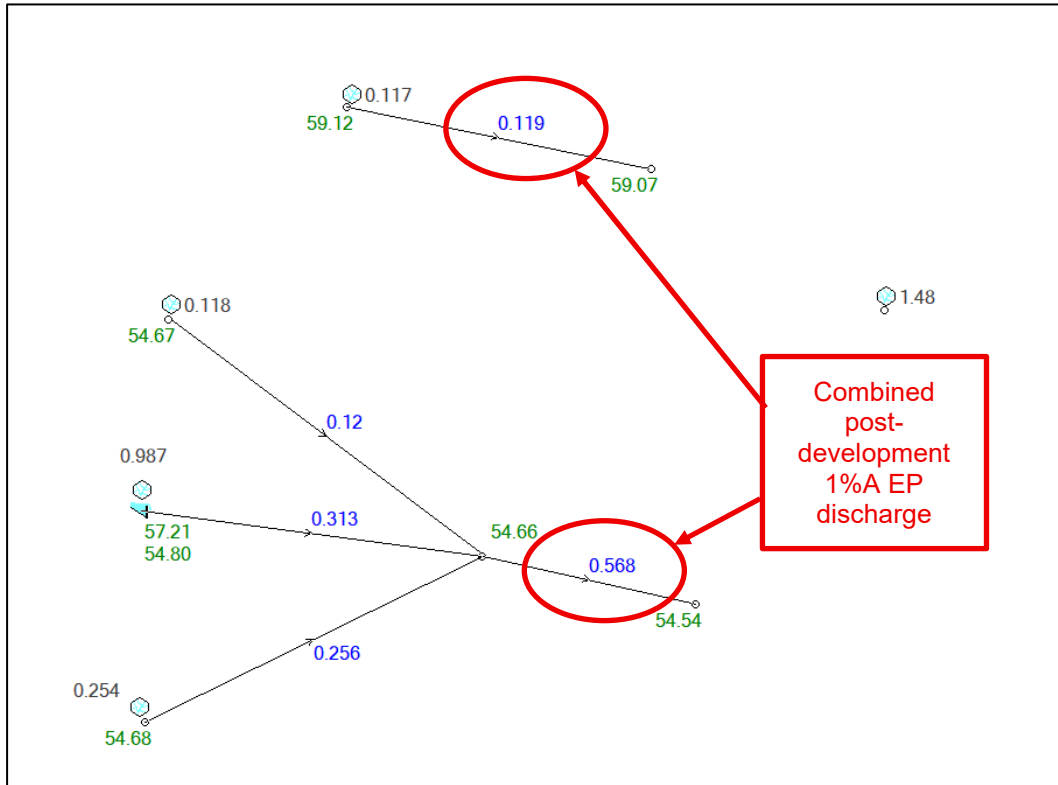


Figure 6-5: DRAINS Results - 1% AEP Storm

6.1.3 Stormwater Quality

Stormwater quality treatment is required to comply with the requirements outlined in the City of Ryde Development Control Plan 2014 Part 8.2 - Stormwater and Floodplain Management Section 3.3 (WSUD Controls). Within this, water quality treatment devices on site must achieve the water quality targets outlined in Section 3.3.1.b of the Stormwater and Floodplain Management guide which are shown in Figure 6-6.

b. WSUD measures incorporated into the development must satisfy the following pollutant target controls;

WSUD Stormwater Quality Performance Targets

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

Figure 6-6: Water Quality Targets (Source: City of Ryde Stormwater and Floodplain Management guide, 2014)

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)
- Ocean Protect Jellyrish (or equivalent)
- Rainwater Tanks

A preliminary MUSIC model below outlines the required stormwater treatment devices required to meet council targets (See Figure 6-7). The total catchment for the treated area is 17,650m² whereas the total site area is 22,381m². A 150,000L rainwater tank will be implemented for the re-use of rainwater for cooling, flushing, irrigation and other purposes (refer to Arup’s Services Infrastructure Report for further details). Rainwater reuse reduces the pollutants flowing into the stormwater treatment chambers. In addition to the rainwater tank, the reduction target is met through the use of 38 x Ocean Protect Oceanguards (or equivalent), 40 x 690mm Ocean Protect PSorb StormFilters (or equivalent) and an Ocean Protect JellyFish JF-1200 (or equivalent).

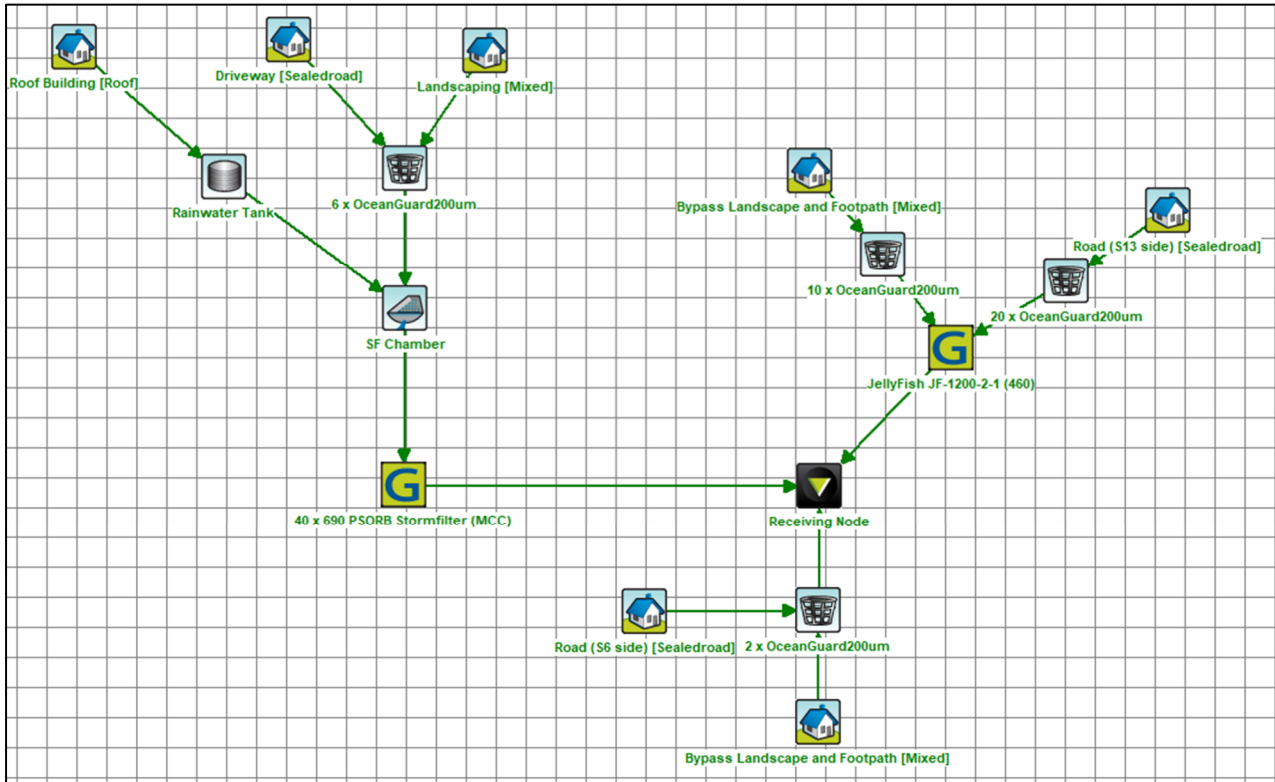


Figure 6-7: MUSIC Model Layout

Treatment Train Effectiveness - Receiving Node			
	Sources	Residual Load	% Reduction
Flow (ML/yr)	26.3	20.6	21.4
Total Suspended Solids (kg/yr)	2830	363	87.2
Total Phosphorus (kg/yr)	6.48	2.45	62.2
Total Nitrogen (kg/yr)	58.3	27	53.6
Gross Pollutants (kg/yr)	638	0.788	99.9

Figure 6-8: MUSIC Model Results

6.2 Staging of Stormwater Design

Stormwater within the Stage 1 boundary is to be completed in Stage 1. A temporary sedimentation basin is proposed to be located within the Stage 2 area for temporary stormwater detention purposes. The remaining stormwater infrastructure will be completed as part of the Stage 2 after which the temporary sedimentation basin will be removed.

6.3 Erosion and Sediment Control

During the construction stages of the project, an erosion and sediment control plan is to be implemented to prevent sediment laden stormwater from flowing into adjoining properties, bushland, roadways or receiving water bodies. Stormwater controls onsite are detailed in erosion and sediment control plans which is in accordance with relevant regulatory authority guidelines including Landcom NSW's Managing Urban Stormwater, Soils and Construction ("Blue Book"). The proposed Erosion and Sediment Control Plan for Stage 1 is included in Appendix A.

6.4 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 City of Ryde DCP. Discharge from the site has been designed to not exceed the current stormwater flows from site 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.

6.5 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 to an acceptable level 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 surrounding roads and landscapes. The earthworks will be undertaken to provide five building pads at finished floor levels of 53.65, 54.45, 55.90, 56.80, 57.00, and 58.00. Batter and shoring advice provided by JK Geotechnics in the geotechnical investigation (dated 17 February 2025) highlights the following points:

- Where temporary batters are feasible and of less than 3m height, they should be no steeper than 1 Vertical (V) to 1 Horizontal (H).
- Surcharge loads, including construction loads, are to be kept at a distance of at least twice the batter height from the batter crests.
- Where shoring is required, specific shoring wall analysis is to be undertaken with the assistance of JK Geotechnics.
- Following stripping and excavation, the subgrade will be proof rolled with a minimum of 6 passes of a smooth drum non-vibratory roller of no less than 12 tonnes static weight.

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 a net cut of 75,650 m³.

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, allowable building height, and drainage conditions.

7.2 Pavement Design

Pavement design of external surfaces within the site will be undertaken by TTW to ensure sufficient strength and safety of pavements for pedestrian and vehicular movement. Preliminary pavement design parameters set out by JK Geotechnics (Geotechnical Investigation, 17 February 2025) will be adhered to in order to design adequate pavements. Due to expected relatively poor subgrade values in certain site areas, one of the following parameters will be met:

- Pavements are to be designed for a preliminary CBR value of 3% or an estimated subgrade reaction modulus of 20kPa/mm.
- An appropriate fill layer will be selected as part of the overall pavement thickness. The selected fill should be well graded crushed sandstone or good quality shale with a minimum soaked CBR value of 10%.
- The subgrade will be stabilised to a depth of 200-300mm by the addition of lime.

7.3 Public Domain

Road 13 and Road 6 are to be constructed as part of the development and will function as public roads for the City of Ryde Council. Drawing CI-01011 shows the geometry alignment control and grading plan for the site, including the new roads. Public Domain works will begin in Stage 1 and be completed in Stage 2. Staged delivery of public domain works including:

- Stage 1: construction of Road 13 within the subject site, including the entry driveway, and parallel parking bays, retaining walls, footpaths, and stormwater pits and pipes along Road 13, as well as the public plaza.
- Stage 2: construction of Road 6 (half-width) within the subject site, including provision for a future pedestrian/cycle overbridge (to be delivered by others), and works along Lane Cove Road.

Figure 7-1 and 7-2 show typical cross section sketches of the proposed profiles of Road 13 and Road 6 half-road respectively.

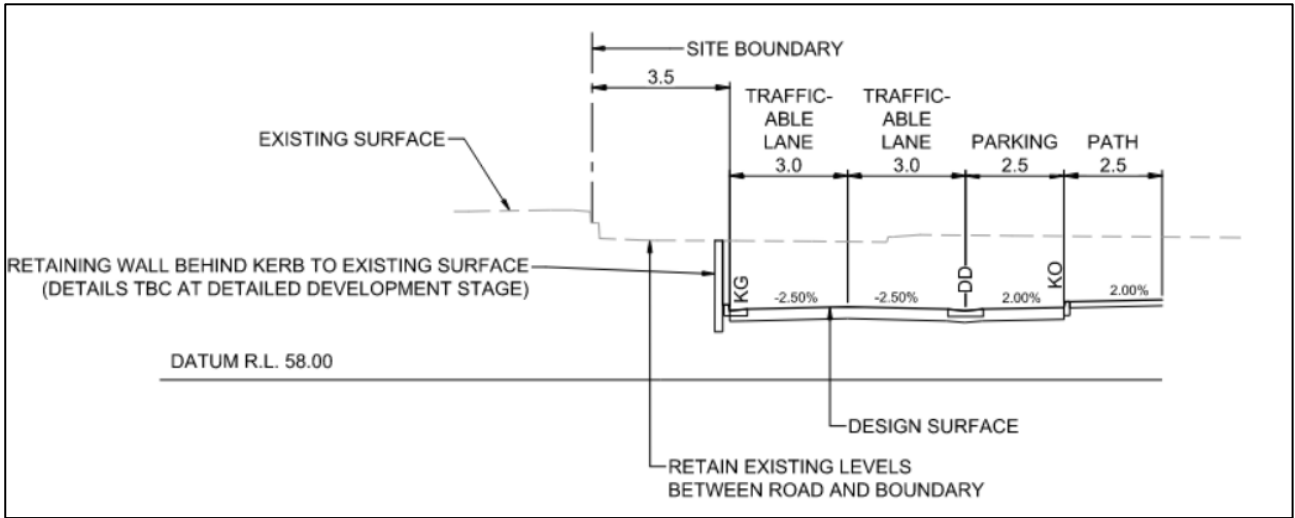


Figure 7-1: Road 13 Cross Sectional Sketch

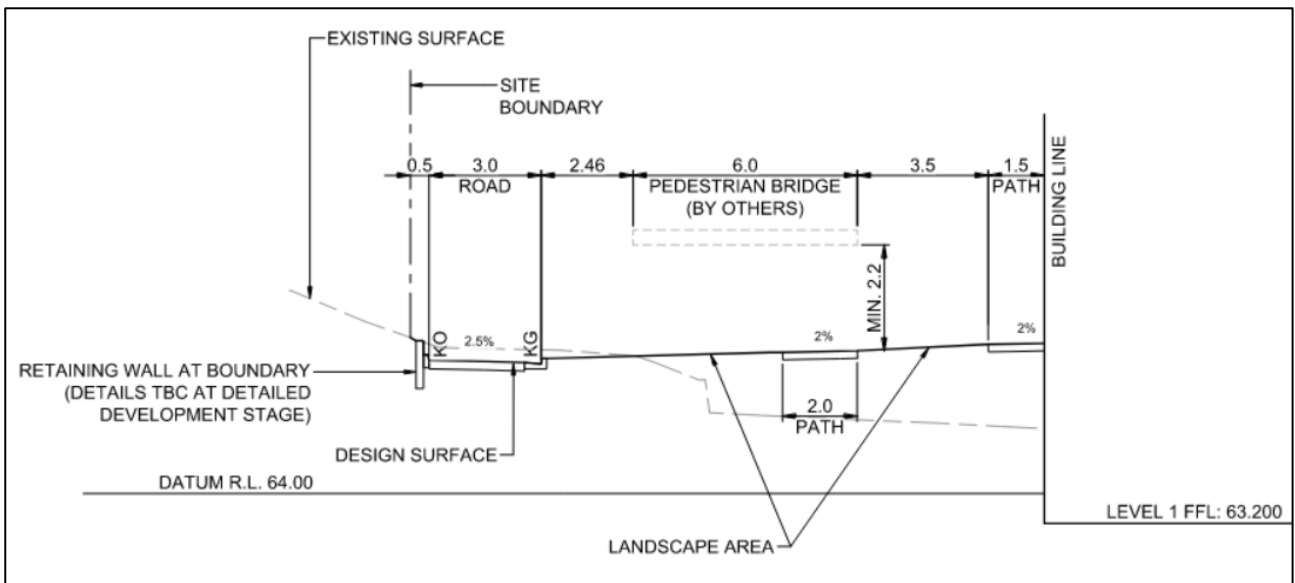


Figure 7-2: Road 13 Cross Sectional Sketch

Figure 7-3 shows the typical cross section sketch of the proposed deceleration lane on Lane Cove Road for approach to proposed Road 6 intersection.

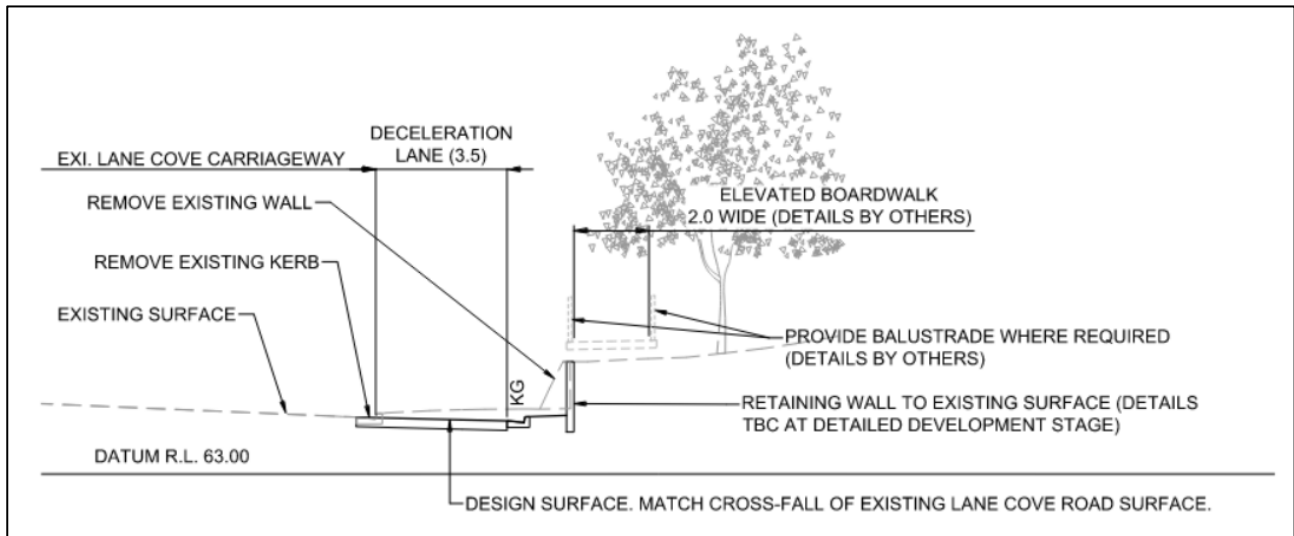


Figure 7-3: Road 13 Cross Sectional Sketch

7.4 Cumulative Impacts

Siteworks impacts are managed through the implementation of parameters set out by JK Geotechnics in the geotechnical investigation (dated 17 February 2025). These parameters will be implemented in the design stage of site works. The impact of weak 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. The introduction of new public domain roads aims to improve traffic conditions and ease of transport. As a result, from a site works perspective, cumulative impacts from the site on surrounding developments are negligible.

7.5 Mitigation Measures

The proposed siteworks design includes the following mitigation measures as recommended by JK Geotechnics:

- Adequate batter slopes and shoring analysis for bulk excavations.
- Proof rolling of subgrades after excavation to achieve adequately compacted soil.
- Design of pavements accounting for strengthened subgrade CBR values via the implementation of the parameters set out by JK Geotechnics.

8.0 Conclusion

The following provides a summary of the proposed concept civil engineering and stormwater management for the NEXTDC S5 Data Centre in Macquarie Park.

- For all design storms, stormwater on-site detention has been designed in order to discharge less than the maximum outflow for the pre-development site in the 5-year ARI (0.2 EY) storm. The 1% AEP storm discharge with OSD is below the pre-development 0.2 EY discharge for both OSDs and the total site overall and therefore adheres to the DCP guidelines.
- A preliminary stormwater treatment design has been developed which includes 38 x Ocean Protect Oceaguards (or equivalent), 40 x 690mm Ocean Protect PSorb StormFilters (or equivalent) and an Ocean Protect Jellyfish JF-1200 (or equivalent).
- A high-level cut and fill estimate has been completed for the site with an overall balance totalling a net cut of 75,650m³.
- The development is to be undertaken in two stages. The civil siteworks and stormwater design has been developed to allow for compliance with City of Ryde Council requirements throughout the staged development.

Prepared by
TTW (NSW) PTY LTD



CHRISTOPHER GENTILE
Senior Engineer

Authorised By
TTW (NSW) PTY LTD



GRACE CARPP
Associate

P:\2022\2216\221661\Reports\TTW\250929 Civil Engineering Report_Rev 13.docx

Appendix A

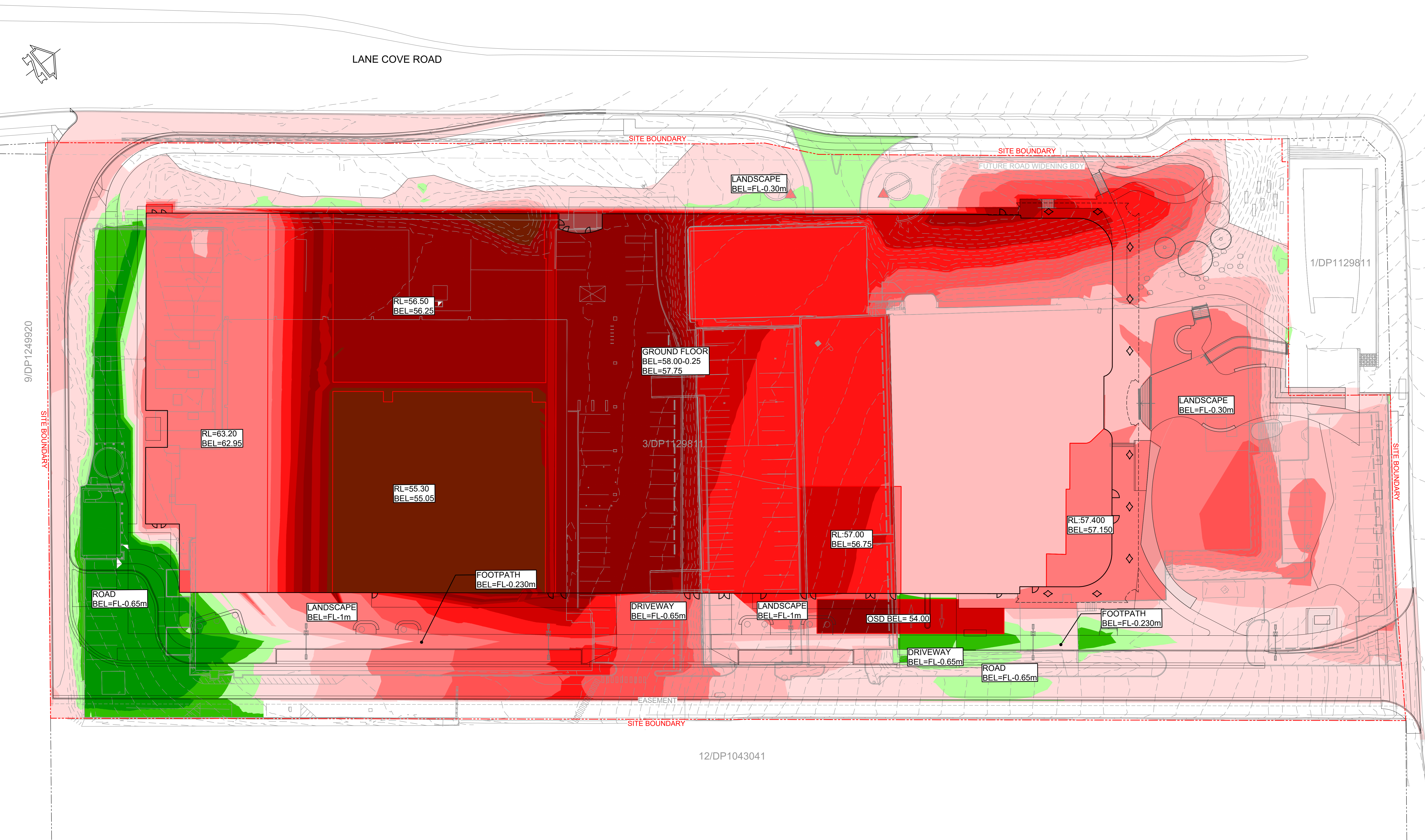
Civil Engineering General Arrangement Plan, Earthworks Plan and Erosion Control Plan

EARTHWORKS NOTES

- BULK EARTHWORKS DEPTHS SHOWN FROM AVAILABLE SURVEY LEVEL INFORMATION TO BULK DESIGN SURFACE LEVELS.
- BULK EARTHWORKS DEPTHS AND VOLUMES ARE PRELIMINARY ONLY AND SUBJECT TO CHANGE AT DETAILED DESIGN STAGE. NOT TO BE USED FOR TENDER OR DETAILED EXCAVATION. CONTRACTOR TO UNDERTAKE THEIR OWN VARIATION OF CUT FILL VOLUMES.
- DEPTHS AND VOLUME CALCULATION ASSUMED VARIABLE SETDOWN FOR PROPOSED SLAB, PAVEMENTS AND LANDSCAPE (REFER TO PLAN THIS PAGE FOR SETDOWNS). SETDOWN DEPTHS SUBJECT TO CHANGE AT DETAILED DESIGN STAGE. OSD EXCAVATION DEPTH SUBJECT TO CHANGE AT DETAILED DESIGN STAGE.
- DETAILED EARTHWORKS SUCH AS PILING, PILE CAPS, GROUND BEAMS, LIFT PITS, SERVICE TRENCHING, LANDSCAPE MOUNDING, FOOTINGS, ETC. ARE EXCLUDED. DEMOLITION OR REMOVAL OF EXISTING ELEMENTS (E.G. TOPSOIL, PAVEMENT, SLABS, BASEMENTS) NOT INCLUDED IN ANALYSIS.
- EXISTING BUILDING FINISHED FLOOR LEVELS INCORPORATED AS PER SURVEY. EARTHWORK CALCULATIONS DO NOT INCLUDE ANY EXISTING BUILDING FLOOR LEVEL THAT ARE NOT SURVEYED OR BELOW SURROUNDING LEVELS.
- PLAN TO BE READ IN CONJUNCTION WITH GEOTECHNICAL REPORT (REFER TO GENERAL NOTES ON DRAWING NO. 00002).
- CONTRACTOR TO PLACE SAFETY BARRIERS AROUND EXCAVATIONS IN ACCORDANCE WITH RELEVANT SAFETY REGULATIONS.

No.	FROM (m)	TO (m)	COLOUR
1	-11.00	-10.00	Dark Red
2	-10.00	-9.00	Red
3	-9.00	-8.00	Light Red
4	-8.00	-7.00	Lighter Red
5	-7.00	-6.00	Lightest Red
6	-6.00	-5.00	Lightest Red
7	-5.00	-4.00	Lightest Red
8	-4.00	-3.00	Lightest Red
9	-3.00	-2.00	Lightest Red
10	-2.00	-1.00	Lightest Red
11	-1.00	0.00	Lightest Red
12	0.00	0.50	Light Green
13	0.50	1.00	Light Green
14	1.00	3.00	Light Green

LOCATION	CUT (m³)	FILL (m³)	NET (m³)
3/DP1129811 289 LANE COVE ROAD MACQUARIE PARK, NSW 2113	77300	1650	75650 EXCESS CUT



Comments:

DATE	NO.	REVISION HISTORY (BY/CHK)	ISSUED BY	STATUS
03.10.2025	P	SSDA ISSUE	ES	OC
05.09.2025	O	DRMT SSDA ISSUE	ES	OC
19.09.2025	N	DRMT SSDA ISSUE	ES	OC
19.09.2025	M	SSDA ISSUE	SH	SH
27.03.2025	L	SSDA ISSUE	SH	SH
02.03.2025	G	SSDA ISSUE	ARW/OC	ARW/OC
21.02.2025	K	SSDA ISSUE	ARW/OC	ARW/OC
14.02.2025	I	SSDA ISSUE	ARW/OC	ARW/OC
08.08.2024	H	DRMT TENDER	BS	OC
12.07.2024	G	DRMT FOR TENDER	SH	OC
17.05.2024	F	ISSUE FOR LOD 300	BS	OC
16.04.2024	E	DRMT	BS	OC
10.04.2024	D	SSDA	BS	OC
02.04.2024	C	SSDA	BS	OC
15.03.2024	B	PRELIMINARY ISSUE	BS	OC
09.03.2024	A	PRELIMINARY ISSUE	BS	OC

NOTE:

- ALL DRAWINGS TO BE READ IN CONJUNCTION WITH ASSOCIATED SPECIFICATION
- DO NOT SCALE FROM DRAWINGS
- CONFIRM ALL MEASUREMENTS ON SITE
- CHECK ON SITE PRIOR TO ANY CONSTRUCTION AND REPORT ANY DISCREPANCIES
- ENSURE COORDINATION WITH OTHER TRADES ON SITE
- ASL = ABOVE SLAB LEVEL

PRINCIPAL CONSULTANTS:
 ARCHITECT: HDR
 SERVICES: AURECON
 STRUCTURAL: TTW

PRINCIPAL CONTRACTOR:
 MULTIPLEX

CLIENT:

 NEXTDC
 GPO Box 3219
 Brisbane QLD 4001
 T: +61 7 3177 4777

Contractor / Consultant / Document Author:

 www.thewgroup.com

Document Author Project Number:
 221661

Key Plan:

Site: SS
Stage: NEXTDC Project Number: 55.0003

Project Address:
 289 LANE COVE ROAD
 MACQUARIE PARK, NSW 2113

Project Name:
 NEXTDC SS

Drawing Title:
 EARTHWORKS
 CUT AND FILL
 VOLUMES PLAN

Drawing Status:
 SSDA

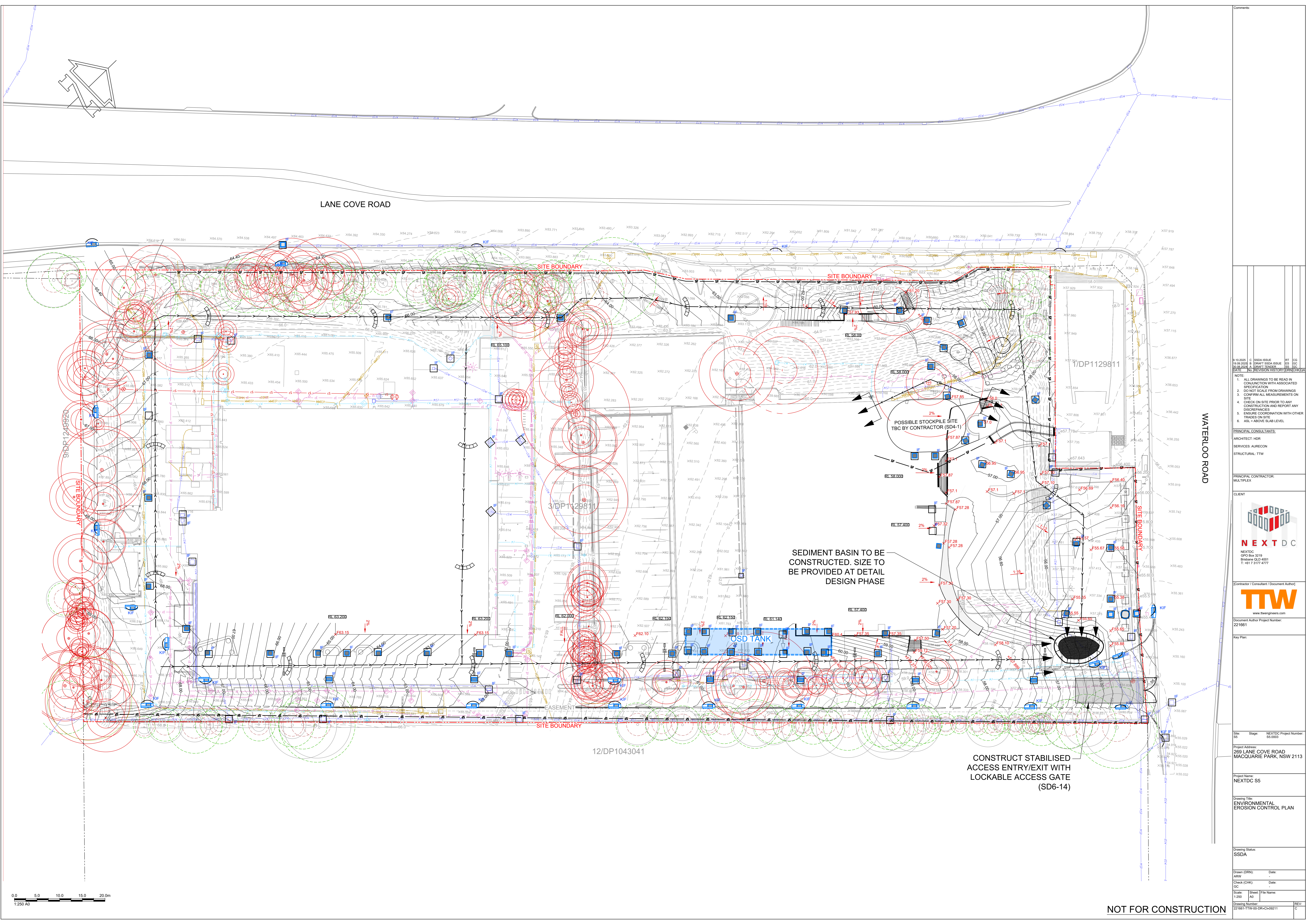
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Check (CHK): OC

Scale: 1:250
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Drawing Number: 221661-TTW-05-DR-C4-02011

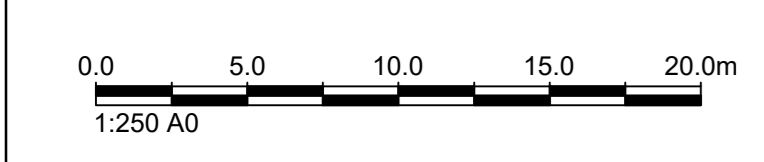
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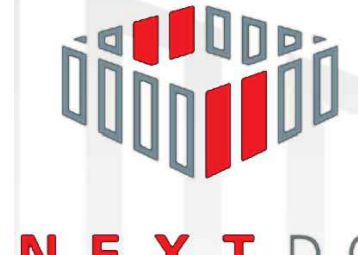

NOT FOR CONSTRUCTION



LANE COVE ROAD

WATERLOO ROAD



Comments:	
<p>9/10/2025 C SSDA ISSUE RT CG 10/09/2025 B DRAFT SSDA ISSUE ES CC 10/09/2025 A PROJECT ISSUES SS CC DATE NO REVISION HISTORY (R/N/C)</p>	
<p>NOTE:</p> <ol style="list-style-type: none"> 1. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH ASSOCIATED SPECIFICATION 2. DO NOT SCALE FROM DRAWINGS 3. CONFIRM ALL MEASUREMENTS ON SITE 4. CHECK ON SITE PRIOR TO ANY CONSTRUCTION AND REPORT ANY DISCREPANCIES 5. ENSURE COORDINATION WITH OTHER TRADES ON SITE 6. ASL = ABOVE SLAB LEVEL 	
<p>PRINCIPAL CONSULTANTS: ARCHITECT: HDR SERVICES: AURECON STRUCTURAL: TTW</p>	
<p>PRINCIPAL CONTRACTOR: MULTIPLEX</p>	
<p>CLIENT</p>  <p>NEXTDC NEXTDC GPO Box 3219 Brisbane QLD 4001 T: +61 7 3177 4177</p>	
<p>(Contractor / Consultant / Document Author)</p>  <p>TTW www.thewrightgroup.com</p>	
<p>Document Author Project Number: 221661</p>	
<p>Key Plan:</p>	
Site:	Stage: NEXTDC Project Number: SS.0003
<p>Project Address: 265 LANE COVE ROAD MACQUARIE PARK, NSW 2113</p>	
<p>Project Name: NEXTDC SS</p>	
<p>Drawing Title: ENVIRONMENTAL EROSION CONTROL PLAN</p>	
<p>Drawing Status: SSDA</p>	
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ARW	-
Check (CHK):	Date:
OC	-
Scale:	Sheet: File Name:
1:250	AD
Drawing Number:	REV:
221661-TTW-05-DR-CD-09211	C

NOT FOR CONSTRUCTION

Appendix B

Council Consultation

Grace Carpp

From: Daniel Pearse <DanielP@ryde.nsw.gov.au>
Sent: Monday, 15 January 2024 9:14 AM
To: Grace Carpp
Cc: Dominic Tate; Saffa Haroon
Subject: RE: SSD-63168959 Next DC Data Centre - Civil Design Queries

Some people who received this message don't often get email from danielp@ryde.nsw.gov.au. [Learn why this is important](#)

[External Email]: Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Grace,

On the query;

- *Based on the Macquarie Park precinct plan, we are providing 14.5m road corridor widths for both roads 5 and 13. Does Council have a particular design vehicle we need to allow for at the intersection of roads 5 and 13 or is this only subject to the requirements of our site?*

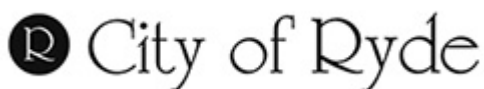
Our Traffic section advised;

12.5m long HRV or the largest vehicle (which is proposed to access the site), whichever is longer, is to be considered as design vehicle for this case. In particular, the applicant is to provide turn path plans at all intersections of Road 5 and Road 13 showing that longest vehicle can pass a B99 vehicle.

Unfortunately I'm still awaiting on a response from our Public Domain team. There is a key member on leave that would normally respond to these matters. Hopefully I can tease a response from them today. I did have a look at our records for the Goodmans site (75 Epping Road) and there is hardly any correspondence post-consent (mid 2022) so I take it things aren't moving anywhere soon. I'm not sure if our City Works team have had any further liaison with them.

Regards,

Daniel Pearse
Senior Coordinator Engineering & Landscaping Services
DEVELOPMENT ASSESSMENT
M +61434568041
E DanielP@ryde.nsw.gov.au
W www.ryde.nsw.gov.au



Customer Service Centre 1 Pope Street, Ryde (Within Top Ryde City shopping centre)
North Ryde Office Riverview Business Park, Building 0, Level 1, 3 Richardson Place, North Ryde

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The City of Ryde wishes to acknowledge the Traditional Custodians of the Land on which we work and pay our respect to the Elders both past, present and emerging, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

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From: Daniel Pearse <DanielP@ryde.nsw.gov.au>

Sent: Tuesday, 9 January 2024 11:34 AM

To: Grace Carpp <grace.carpp@ttw.com.au>

Cc: Dominic Tate <dominic.tate@ttw.com.au>; Saffa Haroon <Saffa.Haroon@ttw.com.au>

Subject: RE: SSD-63168959 Next DC Data Centre - Civil Design Queries

Hi Grace,

For the first point (OSD), that is correct. The PSD is set as the 20%AEP uncontrolled (ie no OSD) discharge rate from *post-developed* conditions. The DCP control refers to post-developed conditions as we typically experience a reduction in hardstand areas with extensive parking areas being gradually removed through development.

In regards to point 2, attached is the output from our drainage mapping layer. Unfortunately I do not have the pit levels, etc at hand. Our asset team may have this in a separate database however I will repeat their standard disclaimer that the information is very indicative only and should not be relied upon for the purpose of any design. Such matters would need to be confirmed via survey / inspection. This also applies to the location of services noted on the attached plan.

I have passed on the last two queries to our City Works and Traffic sections and should have a response hopefully by today.

Apologies for the delayed response. I lost your email in the Christmas rush.

Regards,
Daniel Pearse

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Senior Coordinator Engineering & Landscaping Services
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W www.ryde.nsw.gov.au



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From: Grace Carpp <grace.carpp@ttw.com.au>
Sent: Tuesday, 9 January 2024 10:43 AM
To: Daniel Pearse <DanielP@ryde.nsw.gov.au>
Cc: Dominic Tate <dominic.tate@ttw.com.au>; Saffa Haroon <Saffa.Haroon@ttw.com.au>
Subject: RE: SSD-63168959 Next DC Data Centre - Civil Design Queries

Hi Daniel,

Hope you had a good break. Do you have any update on the below?

Kind Regards,
Grace



Grace Carpp | Associate (Civil)

+61 2 9439 7288 | +61 2 8437 7278 | grace.carpp@ttw.com.au

TTW Engineers | Sydney

Read our latest news [here](#)

From: Grace Carpp
Sent: Wednesday, December 13, 2023 11:56 AM
To: DanielP@ryde.nsw.gov.au
Cc: Dominic Tate <dominic.tate@ttw.com.au>; Saffa Haroon <Saffa.Haroon@ttw.com.au>
Subject: SSD-63168959 Next DC Data Centre - Civil Design Queries

Hi Daniel,

We are the civil engineers working on the Next DC data centre project in Macquarie Park (reference number: SSD-63168959). I received your details from our project planner who held a meeting with yourself and other council officers last week.

As we are developing the internal road layout and stormwater design there are a few items we would like confirmation on:

- Our interpretation of the Detailed Method for OSD design within the DCP (screenshot below) is that the runoff discharged from the post development site with OSD in the 1% AEP must not exceed the runoff discharged from the post development site without OSD from the 20% AEP. Please let us know if this is incorrect.
- Does Council have any asset information available on the existing stormwater drainage within Waterloo Road?
- Based on the Macquarie Park precinct plan, we are providing 14.5m road corridor widths for both roads 5 and 13. Does Council have a particular design vehicle we need to allow for at the intersection of roads 5 and 13 or is this only subject to the requirements of our site?
- For road 13 we have obtained DA drawings for the proposed City Views Goodman Site on the corner of Epping Road and Lane Cove Road where we would be providing a future road connection. Are Council aware of any indicative timings for this roadwork to be undertaken or are there any further developed plans for this site? In the event that this site is not constructed in the near future is Council's preference that a turning head be provided at the completion of Road 13 within our site? We also note that upon overlaying these plans against our site survey, road 13 will have a dog-leg intersection from our site to the Goodman site.

Happy to have a quick meeting to discuss any of the above if you'd like.

Thanks,
Grace

1.4.4 OSD Design - Detailed Method

The detailed method must be used in the following circumstances;

- Where the development does not satisfy the requirements for the simplified method above.
- Where Council considers the nature of the receiving system is too sensitive to warrant the simplified approach.
- Where the site conditions vary from those given in the simplified method.

The OSD must be designed to ensure the level of stormwater runoff discharged from the area of development must not to exceed the peak stormwater discharge arising from the post-developed works, during a 5 year ARI storm event.

To restrict post development flows to pre-development levels a detention basin for the design storms will be required to be modelled. Computational methods based on the approximate triangular method or the rational methods are not acceptable. It is recommended that a program in accordance with Section 3.1 is used.

In cases where the site proposes discharge to the kerb and gutter, the point of discharge is to be limited to 30L/s in accordance with Section 1.3.1.

If the rate of discharge from the outlet of the OSD system is affected by tail water conditions from the receiving system, for example where the invert level of the orifice is lower than the surface level at the point of connection into the existing drainage system, then full hydraulic calculations will be required in accordance with Section 5 of this Manual.