



3 Andalusian Way, Castle Hill

Stormwater Management Plan

May 2024

The background is a solid teal color. It is decorated with several white dotted circular patterns, resembling traditional Indigenous Australian art. These patterns consist of concentric circles with dots inside, connected by dotted lines. They are located in the top-left, bottom-left, bottom-right, and right-center areas of the page.

Acknowledgment of Country

On behalf of Mott MacDonald, we would like to begin by acknowledging the Traditional Custodians of the land on which we meet today, and pay our respects to their Elders past and present.

We recognise and respect their cultural heritage, beliefs, continued connection to the land and water and commit to building a brighter future together.

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3 Andalusian Way, Castle Hill

Stormwater Management Plan

May 2024

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Executive summary

Mott MacDonald has been engaged by Deicorp Projects (Showground) Pty Ltd to develop a Stormwater Management Plan for the staged development of The Hills Showground Precinct East which is located to the east of Hills Showground Station at 3 Andalusian Way, adjacent to the Hills Showground Sydney Metro Station, Castle Hill. This plan will support the delivery of the site as it will identify opportunities, constraints, and risks related to civil design. The scope of this report summarises the existing and proposed stormwater drainage design as well as the design approach, key assumptions, relevant references, and standards that will be applied to the development of concept civil design documentation for the proposed development. The report is to be read in conjunction with the civil engineering plans in Appendix A.

1 Introduction

1.1 Purpose of Report

The purpose of this management plan is to communicate the proposed site stormwater strategy for the development and demonstrate compliance with the stormwater management quantity and quality requirements under, but not limited to, the Hills Shire Council Development Control Plan, Hills Showground Station Concept Plan, Integrated Water Cycle Management Strategy for Hills Showground Precinct and relevant Australian and industrial standards.

1.2 Scope of Work

This management plan details the stormwater assessment undertaken, including modelling results, and presents the proposed strategy for both stormwater quantity and quality management for the development.

The assessment includes the following components:

- Understanding the existing stormwater conditions for the site including flood risk, overland flow paths, permeability, existing infrastructure, and current points of discharge.
- Assessing the post-development flows for the proposed development by DRAINS to determine any increase in runoff and implement mitigation measures as required under the design criteria.
- Assessing the use of various stormwater quality treatment measures, including Water Sensitive Urban Design (WSUD) initiatives, to meet the stormwater quality objectives under the design criteria.
- Designing a stormwater system to convey the minor flows from the development to nominated points of discharge from the site and incorporating quantity and quality measures from the above.
- Considering major flows and overland flow paths through the developed site for each Lot safety and conveyance of flows and implementing above ground drainage measures as required.
- Implementing erosion and sediment control measures to minimise sediment runoff during the construction phase.

1.3 Limitations of this Report

- The proposed stormwater plan to be read in conjunction with relevant consultants including but not limited to, Architectural Plans, Landscape Plans, Traffic Engineering Report and relevant approval documents.
- This assessment and management plan has been undertaken as a desktop study only. Considerable effort has been undertaken to obtain available site data and project information and conducted preliminary consultation with The Hills Shire Council to understand the site conditions and constraints.

2 Design Guidelines and Methodologies

2.1 Consultation

Mott MacDonald is in consultation with the project team throughout the design phase to obtain a feasible design solution for the proposed development site. Iterations of the design were prepared in conjunction with the flood engineers input to flood levels, hydraulic engineers, landscape architects and architects. The proposed stormwater drainage design was conducted in accordance with Hill Shire Council Plan (DCP) and other relevant guidelines.

2.2 Codes and Guidelines

The design has been undertaken in compliance with the relevant Australian Standards, local government guidelines. Key documents used as guidance for the design are summarised in Table 2-1.

Table 2-1: Design Criteria and Guidelines

Reference	Title	Version or Date	Originator
DRAINS	DRAINS User Manual		DRAINS
eWater	MUSIC User Manual	V5	eWater
Blue Book	Managing Urban Stormwater – Soils and Construction, Volume 1, 4 th edition, March 2004, Landcom	March 2004	Landcom
NCC	National Code Australia	2022	Australian Building Codes Board
The Hills Shire Council	Design Guidelines Subdivisions/Developments	2011	Hills Shire Council
The Hills Shire Council DCP 2012	Part D Section 19 Showground Station Precinct	2012	Hills Shire Council
The Hills Shire Council Standard Drawings	Standard Drawings	Oct 2022	Hills Shire Council
State Significant Development Assessment SSD 9653	Hills Showground Station Concept Plan	January 2021	NSW Department of Planning, Industry and Environment
AS/NZS 3500.3	Plumbing and Drainage – Stormwater Drainage	2021	-

2.3 Other Consultant Inputs

The proposed stormwater design is also based on the following source of information received:

- Architectural design layouts for Lot 3 and Lot 4 (Buildings A, B and C) by Group GSA, Ref. A231481, Revision D, dated 24.11.2023.
- Architectural design layouts for Lot 5 (Buildings D and E) by Turner Studio, Ref. 23003, Revision J, dated 01.12.2023.
- Landscape design layouts by Land and Form, Ref. 2023062, Revision 1, dated 10.11.2023.
- Hills Showground Park Landscape, date 17.10.2023.
- Existing survey by Daw & Walton Consulting Surveyors, Ref. 5999-23, Revision 04, dated 22.11.2023.
- Integrated Water Cycle Management Strategy by WSP, Ref. PS109693-WSP-REP-01 Revision 07, dated 09/06/2020.
- Amended subdivision works plan by Maker Eng Pty Ltd, Ref. MKR00157 Revision 07, dated 12.07.2022.
- Water Cycle Report by Maker Eng Pty Ltd, Ref. MKR00157 Revision 03, dated 08.11.2021.

2.4 Methodologies

- DRAINS
 - DRAINS software package has been utilised to size the proposed below ground pit and pipe network to convey the major/minor storm events flows.
 - This software has also been used to undertake iterations to determine suitably sized stormwater detention tanks under the stormwater management quantity requirements.
 - The DRAINS model has been undertaken the online rainfall data from ARR Data Hub.
- MUSIC
 - Modelling of the proposed development was undertaken using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6.3 software. The software was utilised to simulate urban stormwater systems operating at a range of temporal and spatial scales. MUSIC models the total amounts of gross pollutants, phosphorus, nitrogen, and total suspended solids produced within various types of catchments. It allows the user to simulate the removal rates expected when implementing water quality treatment devices to reduce the increase gross pollutant and nutrient levels created by the proposed development.
 - The water quality modelling has been undertaken in accordance with the current NSW Music Modelling Guidelines 2015.

2.5 Stormwater Management Design Criteria

2.5.1 Design Storm Events

The proposed site stormwater drainage design has been sized to accommodate the 10% AEP storm events, while the proposed on-site detention has been sized to accommodate the 1% AEP storm events.

2.5.2 Design Requirements

The listed The Hills Shire Council guidelines, Australian Standards and designated tools manual in Table 2-2.

Table 2-2: Relevant Design Guidelines and Standards

Reference	Title	Version or Date	Originator
DRAINS	DRAINS User Manual		DRAINS
eWater	MUSIC User Manual	V5	eWater
Blue Book	Managing Urban Stormwater – Soils and Construction, Volume 1, 4 th edition, March 2004, Landcom	March 2004	Landcom
NCC	National Code Australia	2022	Australian Building Codes Board
The Hills Shire Council	Design Guidelines Subdivisions/Developments	2011	Hills Shire Council
The Hills Shire Council DCP 2012	Part D Section 19 Showground Station Precinct	2012	Hills Shire Council
The Hills Shire Council Standard Drawings	Standard Drawings	Oct 2022	Hills Shire Council
State Significant Development Assessment SSD 9653	Hills Showground Station Concept Plan	January 2021	NSW Department of Planning, Industry and Environment
AS/NZS 3500.3	Plumbing and Drainage – Stormwater Drainage	2021	-

Above provides the synopsis of the design requirements for the subject site. Design criteria has been developed to ensure the proposed design adheres to the requirements denote in The Hills Shire Council DCP and relevant authorities' guidelines. Table 2-3 below summarised the design criteria for hydrology and hydraulic analysis.

Table 2-3: Hydraulic and Hydrology Design Criteria

Item	Standard	Adopted
Hydrology & Hydraulics		
Hydrological Model	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.7	DRAINS (ILSAX)
Design Rainfall Data	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.10	AR&R Online Data
Urban Rainfall Losses	AR&R 2016 Table 9.6.6 Rainfall Loss Parameters (or AR&R 1987)	Paved (impervious) area depressions storage (mmm)=1 Supplementary area depression storage (mm) = 1 Grassed (previous) area depression storage (mm) = 5
Soil Type	AR&R 2016 Table 9.6.6 Rainfall Loss Parameters (or AR&R 1987)	AMC = 3
Major Design Storm	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.8	100YR Average Recurrence Interval (1% AEP)
Minor Design Storm	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.8	General – 10YR Average Recurrence Interval Sag – 20YR Average Recurrence Interval
Pipe Size	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.18	Minimum pipe culvert size in council property of 300mm diameter
Manning's Roughness Coefficient	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.16	Concrete – 0.013 Asphaltic Concrete – 0.015 Sprayed Seal – 0.018
Pipes and Culvert Colebrook-White (K value) formular	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.18	uPVC – 0.03 VCP – 0.04 RHS – 0.046 FRC – 0.06 RCP – 0.3
Pit Losses	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.19	QUDM
Pit Blockage Factors	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.17	Kerb inlet 10% Kerb sag pit 20% Surface inlet pit 50% Surface inlet pit cover with legs 20%
Tail water level/sea water level	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.13	10% AEP tail water conditions is based on the WAE DRAINS model 1% AEP tail water conditions is based on top of grate
Overland Flow Safety Criteria	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.15	Max Depth x Velocity in kerb and gutter = 0.6m ² /s Maxi Depth x Velocity in pedestrian access = 0.4m ² /s

Item	Standard	Adopted																		
On-Site Stormwater Detention	The Hill Shire Council, Design Guidelines Subdivision Developments, Section 4.22	Hawkesbury River Catchments - Using the same principles as above, where a proposed development drains to the Hawkesbury River Catchment OSD will be required. The Permissible Site Discharge (PSD) and Site Storage Volume (SSV) requirements shall be derived from Table 4.14 for that portion of the Hawkesbury River Catchment area that falls within the Shire. <table> <tr> <th>Site Slope</th><th>PSD (l/s/ha)</th><th>SSV (m³/ha)</th></tr> <tr> <td>Greater than 15%</td><td>136</td><td>298</td></tr> <tr> <td>Between 10% to 15%</td><td>115</td><td>336</td></tr> <tr> <td>Between 6% to 10%</td><td>104</td><td>362</td></tr> <tr> <td>Between 3% to 6%</td><td>92</td><td>396</td></tr> <tr> <td>Between 0% to 3%</td><td>87</td><td>412</td></tr> </table>	Site Slope	PSD (l/s/ha)	SSV (m³/ha)	Greater than 15%	136	298	Between 10% to 15%	115	336	Between 6% to 10%	104	362	Between 3% to 6%	92	396	Between 0% to 3%	87	412
Site Slope	PSD (l/s/ha)	SSV (m³/ha)																		
Greater than 15%	136	298																		
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Between 6% to 10%	104	362																		
Between 3% to 6%	92	396																		
Between 0% to 3%	87	412																		
Pollution reduction targets	The Hills Development Control Plan (DCP) 2012, Part D Section 19 Showground Station Precinct, Table 3	Gross Pollutants 90% TSS 85% TP 65% TN 45%																		
Stream Erosion Metrics	The Hills Development Control Plan (DCP) 2012, Part D Section 19 Showground Station Precinct, Table 3	Maximum 3.5 -5.0																		

3 Existing Site and Stormwater Conditions

3.1 General Description

The subject site is located adjacent to the Hills Showground Metro Station, approximately 25km northwest of Sydney CBD, within The Hill Shire Council LGA. The site Figure 3-1 is identified as lot 56, DP 1253217 and has an area of 2.82ha. The site is bounded by Showground Road to the northeast, Carrington Road to the south and southeast, Andalusian Way to the southwest and De Clambe Drive to the northwest. The area surrounding the site is generally described by low-scale residential development with commercial and light industrial development to the west of Cattai Creek as described in the Hills Showground Station Concept Plan (SDD 9653) by NSW Department of Planning, Industry and Environment dated January 2021.

Based on the current site condition on Nearmap and the report undertaken by Maker Eng Pty Ltd (Maker), Hills Showground Precinct East, Project No: MKR00157, Version 02, dated 8th November 2021, and Hills Showground Station Concept plan by NSW Department of Planning, Industry and Environment dated January 2021, it is understood the site was occupied by a former council administration building and associated parking, which was been demolished under a separate development consent (403/2020/LA). The site is currently vacant with remaining of slabs from the former building structure.



Figure 3-1: Site Locality (Nearmap)

3.2 Existing Stormwater Drainage Characteristics

There is a natural high point within the site of approximately 101.0m AHD and the site has been cut by the existing batter to three catchments, as such stormwater runoff on the site flows towards the northern, eastern, and western site boundaries and discharges from the site as overland sheet flow. The runoff from the site ultimately drains into existing roadways including Showground Road, Carrington Road and De Clambe Drive. The three roadways converge to the west of the site and upper tributaries of Cattai Creek which flows into the Hawkesbury River.

Figure 3-2 below shows the existing site terrain contours in relation to the nearby roadway corridors. The arrow line shows the approximate catchment flow split with the northern portion of the site essentially out falling to De Clambe Drive, western portion of the site out falling to Carrington Road and eastern portion to Showground Road.



Figure 3-2: Existing Survey (Ref. 5999-23 by Daw & Walton Pty Ltd)

The internal new roads and drainage infrastructure shall be read in conjunction with Hills Showground Station Precinct Integrated Water Cycle Management Strategy undertaken by WSP, dated 28.05.2020 and amended subdivision civil works prepared by Maker Eng Rev. 07 date 12.07.2022 (Ref. MRK00157). These documents have been referenced for the public domain stormwater layout design and used as a point of connection for the proposed development of the Hills Showground Precinct East as discussed further in this report.

An expected ground water of 2.44ML/yr has been noticed by the geo-technical engineer during the investigation and this shall be further clarified and managed on site at construction.

4 Proposed Development

The development site is recognised as Precinct East with a total area of 28,226m² inclusive of high-density buildings from 3-16 stories with basements and a mix of townhouses and units. The Hills Showground Station Precinct Integrated Water Cycle Management Strategy report undertaken by WSP, Reference no: PS109693-WSP-REP-01, Rev:7, dated 28th May 2020, noted as part of the recent update on the existing drainage system an on-site detention basin has been designed in accordance with The Hills Shire Council Design Guidelines (NRT,2016) to cater for a large portion of the Hill Showground precinct, and discharge to the Cattai Creek. Figure 4-1 below provides an overview of the catchments draining to the site on-site detention basin. The proposed development consists of 5 buildings identified as: Building A, Building B, Building C, Building D and Building E, following by the architectural design by Group GSA and Turner respectively.

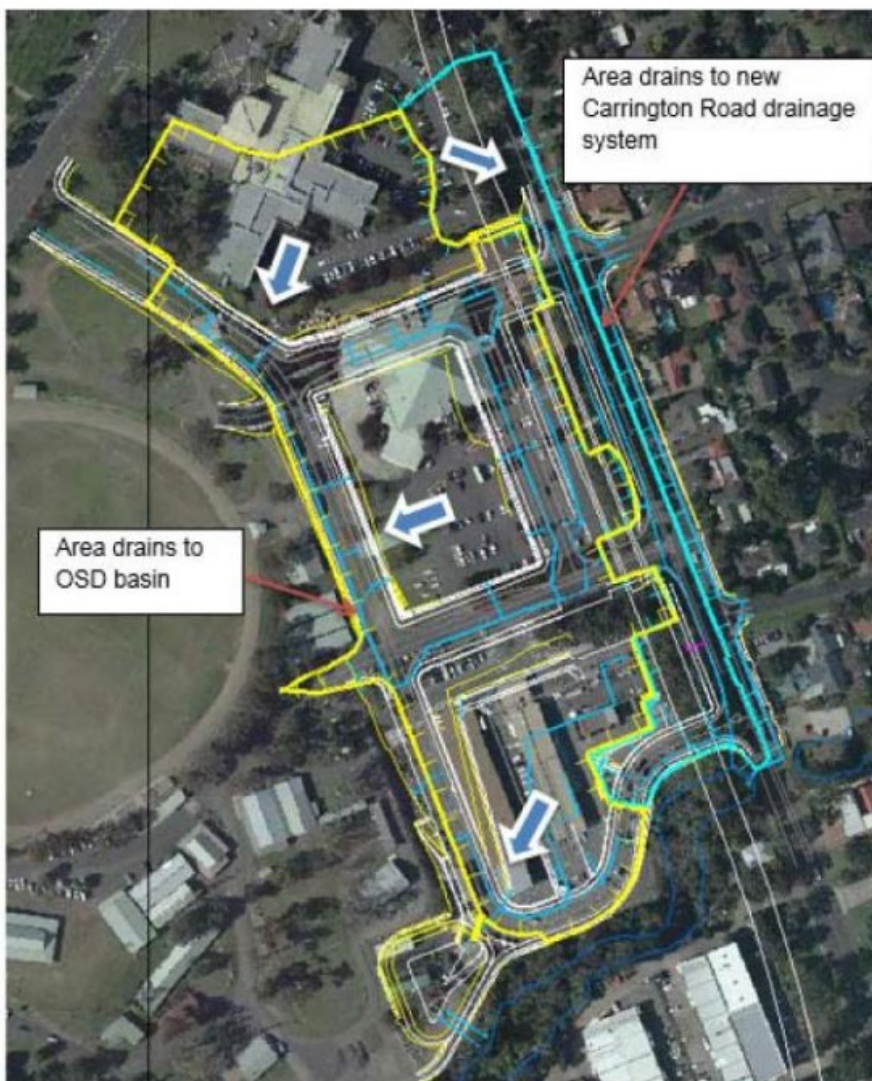


Figure 4-1: Existing Catchment Plan (Ref. Integrated Water Cycle Management Strategy by WSP)

The scope of work for the subject site is outlined in Figure 4-2, which clarifies that the section highlighted in blue is not included in the application approval process. This section was included to demonstrate the tie-in and coordination of the Development Application design.



Figure 4-2: Scope of Works

5 Stormwater Management

5.1 Water Quantity Management

The purpose of the stormwater quantity management is to limit the stormwater runoff from the site and ensure there is no surcharge to existing street drainage and approved subdivision works prepared by Marker Eng (Ref. MKR00157). Based on Integrated Water Cycle Management Strategy by WSP (Ref. PSD109693-WSP-REP-01), proposed lot building A and B are falling within Showground Precinct catchment which has been designed to have a basin as part of discharge control method. Considering street drainage capacity, only building A can be exempted from on-site detention control, the rest of the buildings need to be applied with appropriate storage and orifice control to reduce the impact of increase of impervious area.

This section will further discuss on the stormwater drainage design approach to be undertaken for the site to ensure adherence with the design guidelines.

5.1.1 Legal Discharge Point

As noted in the Subdivision Works Plan prepared by Marker Eng (Ref. MKR00157), there is an existing stub connection located cross existing De Clambe Drive know as node A03/A in DRAINS model and stormwater layout plan by Marker Eng. This will be point of discharge for building A in the proposed design.

The site of Building B is following proposed road levels and falling from north to south in general. Point of discharge for building B will be pit 3/A as noted in stormwater layout plan by Marker Eng which will drain across the intersection between Mandala Parade and Andalusian Way. As the existing Andalusian Way has 2-way crossfall with approximately 2.5% each way at intersection, this will potentially cause local flooding issue at kerb return location. Flood study is required by Council and been discussed in the flood report.

Building C and D (OSD_A catchment) is following the concept of subdivision works (proposed road) package by Marker Eng and to be drained to pit 2/C and 1/E respectively.

To minimise the impact to existing street drainage, second on-site detention is introduced, noted as OSD_D_B, to collect ground runoff along Showground Road and De Clambe Drive.

Building E is falling to the low point at intersection between Showground Road and Carrington Road. Therefore, connection to existing pit 4/B is reasonable and achievable.

5.1.2 Tailwater Assumption

The downstream tailwater level is typically utilised to assess and account for any potential backwater effects in the proposed outlet. The stormwater long sections documented by Marker Eng as part of the Hills Showground Precinct East, dated 12.07.22 provides long-section reflecting hydraulic grade line for public domain works for minor storm of 10 Year ARI storm events. To ensure the proposed on-site detention tank for each Lot B, Lot C, Lot D and Lot E operates in the major storm event of 100 years ARI, Mott Macdonald team has carried out a flood model to obtain existing kerb inlet pit tail water conditions for the catchment drains to downstream basin; wherever catchment not drains to the basin, the tail water condition to be assumed top of kerb at each designated discharge point to determine any backwater effect within the system. Table 5-1 below is summarizing the tail water condition to be adopted in DRAINS model.

Table 5-1: Tail Water Condition Summary

	Point of Discharge	Related Legal Discharge point	1% AEP Tail Water Condition (A.H.D)	10% AEP Tail Water Condition (A.H.D)
Building A	A03/A	A02/H	95.288	95.06
Building B	3/A	B01/G	93.811	92.84
Building C	2/C	B01/G	93.811	92.84
Building D_A	1/E	A02/H	95.288	95.06
Building D_B	Street Drainage on De Clambe Drive		98.45	N/A
Building E	4/B	4/B	97.03	N/A

(Note: Building D_B and Building E OSD are designed based on UPRCT spreadsheet and assumed 1% AEP at top of kerb as tail water condition.)

5.1.3 Water Quantity Catchment

The DRAINS model was set up to represent the post-developed scenario and existing street drainage. The site was divided into sub-catchments based on the layout and topography. The proposed DRAINS catchment breakdown is shown in Figure 5-1. Details of water quantity catchment deliniation shall be read in conjunction with stormwater maangemt plan prepared by Mott Macdonlad (Ref. 427623-009).



Figure 5-1: Proposed Stormwater Quantity Catchment

5.1.4 On-site Detention System

Based on the Hills Showground Station Precinct Integrated Water Cycle Management Strategy report undertaken by WSP, Reference no: PS109693-WSP-REP-01, Rev:7, dated 28.05.2020, Mott MacDonald understands there is an existing on-site detention basin located downstream to cater for a portion of the Hills Showground Precinct as shown in Figure 4-1, however to further ensure that the portion of the catchment is being detained in the downstream basin and will have no impact on the stormwater network, Mott MacDonald has undertaken a DRAINS assessment to investigate the water level and conclude that on-site detention is not required for building A. The existing basin and stormwater network has enough capacity and based on drains modelling there will be no surcharges during major and minor storm events on the network.

All proposed on-site detentions have been sized in accordance with the Hills Showground Council Guidelines Section 4.22, where the site slope between 0% to 3% has been adopted for all lots to detain the 1% AEP storm events post-development flow to site permissible to 85L/s/ha and a site storage volume of 412m³/ha. In addition, Mott MacDonald has prepared a catchment plan and a DRAINS model to undertake the hydraulic and hydrological assessment for the site. The total permissible site discharge (PSD) is inclusive of the area bypassing the OSD and controlled flow.

The proposed design adopted for the site have been broken down into respective buildings for discussion below.

Building A does not require an on-site detention as this portion for the development is forming part of the existing regional basin catchment, as depicted in Figure 5-2. Furthermore, it has been determined through a DRAINS analysis that the development of Building A will not have adverse impact on the Council's road drainage network and can be appropriately accommodated within the downstream regional basin.

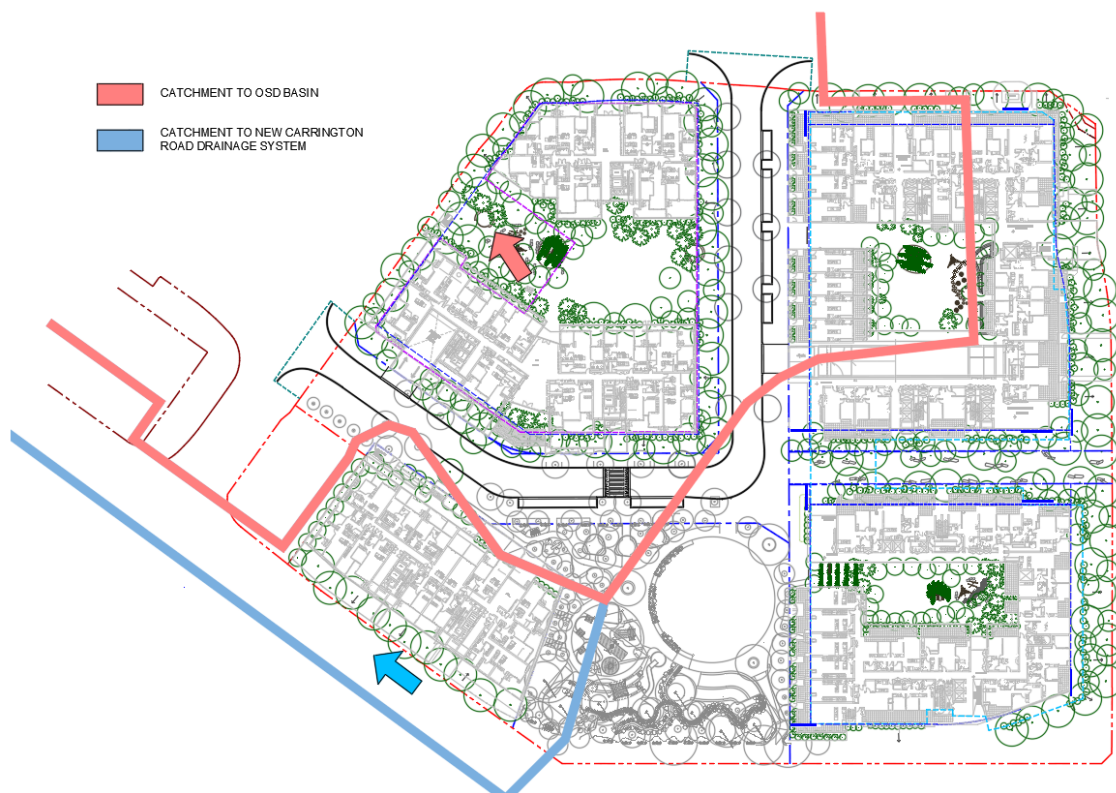


Figure 5-2: Proposed Development with Existing Stormwater Catchment Overlayed

Building B1 and B2 have been provided with an on-site detention to capture open space between building A and building B, building B roof area and building B surrounding ground area, where ground runoff cannot be drained to OSD, this to be considered as bypass. The OSD is located next to the western entry of building B at open space area.

Building C has an on-site detention and collect roof and surface runoff from proposed site. The OSD is located outside the building footprint and next to the approved Showground Park.

Building D and E has on-site detentions to collect roof and any roof-top cover areas and ground open space to OSD, the 2x OSDs are located at the high side of the building adjacent to the approved New Road and to Showground Road.

Building D_A and E OSDs have been located partially below terraces adjacent to the approved New Road to avoid placing them under habitable areas and instead utilise the available floorspace. Building D_B has been located outside the building footprint, below ground, and adjacent to Showground Road. This location ensures that it remains clear of any future road widening plans in the SP2 Zone.

The summary of each building OSD design competency is listed in Table 5-2 below:

Table 5-2: On-site Detention Design Competency Summary

	Total Site Area	Permissible Discharge	Site	OSD Rate	Flow	Bypass Rate	Flow	Site Provided	Storage
	m ²	L/s			L/s		L/s		m ³
Building A	1449	N/A			N/A		N/A		N/A
Building B	4723	N/A			N/A		N/A		135
Building C	2210	19			6		12		180
Building D_A	6477	56			45		-		275
Building D_B	Included above	Included above			10		-		95
Building E	4876	42			8		36		575

All roof and podium drainage are to be reticulated to the proposed rainwater tank and overflow to the Water Quality Chamber (WQC) incorporated with the in on-site detention. Refer to Hydraulic design documentation for internal building pipe reticulation.

5.2 Water Quality Management

To ensure that the development improves the quality of stormwater leaving the development site Mott MacDonald has reviewed the site, formulated a Water Sensitive Urban Design concept modelled the treatment train effectiveness and summarised the results in this section of the report. MUSIC software was utilised to simulate urban stormwater systems operating at a range of temporal and spatial scales. MUSIC models the total amounts of gross pollutants, phosphorus, nitrogen and total suspended solids produced within various types of catchments. It allows the user to simulate the removal rates expected when implementing water quality treatment devices to reduce the increased gross pollutant and nutrient levels created by the proposed development.

5.2.1 MUSIC Modelling Pluviograph Data Input

The water quality analysis requires historical rainfall data recorded by a pluviograph station. As such, pluviograph data from rainfall station noted as Baulkham Hills Eucalyptus Ct was utilised for the site. This station was considered appropriate as it is situated relatively close to the site and contains periods of both dry and wet weather. The pluviograph is shown in Table 5.2.1.

Table 5-3: The Hills Shire Council Pluviograph Data

Station No.	Location	Records	Data Interval
67109	Baulkham Hills	1992-2023	6-minute

Source: Australian Government Bureau of Meteorology Online Data

5.2.2 Water Quality Catchment

The MUSIC model was set up to represent the post-developed scenario. The site was divided into sub-catchments based on the layout and topography. The proposed MUSIC catchment breakdown is shown in Figure 5-3. Details of water quality catchment delineation shall be read in conjunction with stormwater maangemt plan prepared by Mott Macdonlad (Ref. 427623-009).



Figure 5-3: Proposed Stormwater Quality Catchment

The proposed catchments are separated into the following land use types:

- **Roof** - The roof area of all proposed buildings.
- **Landscape** – Both landscape and natural areas that are within the development.
- **Mixed Area** - All paved area outside roof and landscape area

MUSIC soil and groundwater parameters are set as per Table 5-4 and MUSIC node rainfall runoff parameters are set as per Table 5-5 respectively.

Table 5-4: Soil/groundwater parameters recommended for adoption in MUSIC modelling, (Showground Precinct Development Control Plan, 2012)

	Units	Urban	Non-urban
Impervious area parameters			
Rainfall threshold	mm/day	1.4	1.4
Pervious area parameters			
Soil storage capacity	mm	170	210
Initial storage	% of capacity	30	30
Field capacity	mm	70	80
Infiltration capacity coefficient - a		210	175
Infiltration capacity coefficient - b		4.7	3.1
Groundwater properties			
Initial depth	mm	10	10
Daily recharge rate	%	50	35
Daily baseflow rate	%	4	20
Daily deep seepage rate	%	0	0

Table 5-5: Recommended Stormwater Quality Parameters for MUSIC modelling, (Showground Precinct Development Control Plan, 2012)

Land Use	Storm Flow						Base Flow					
	TSS		TP		TN		TSS		TP		TN	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
(All values expressed as log ₁₀ mg/l)												
General Urban												
Residential	2.15	0.32	-0.60	0.25	0.30	0.19	1.20	0.17	-0.85	0.19	0.11	0.12
Industrial												
Commercial												
Roads	2.43	0.32	-0.30	0.25	0.34	0.19	-	-	-	-	-	-
Roofs	1.30	0.32	-0.89	0.25	0.30	0.19	-	-	-	-	-	-
Forest/Natural	1.60	0.32	-1.10	0.25	-0.05	0.19	0.78	0.17	-1.52	0.19	-0.52	0.12

(Note: SD = Standard Deviation, TSS = Total Suspended Solids, TP = Total Phosphorus and TN = Total Nitrogen)

5.2.3 Water Quality Treatment Train

The following treatment train has been proposed for the site:

- 30kL Rainwater Tanks are to be provided for each new building for re-use purpose as per hydraulic engineer's specifications.
- Stormwater capture within the development area is directed into the civil stormwater network consisting of pit and pipe networks and to be treated by StormFilters from Ocean Protect or equivalent.
- Stormwater runoff not draining to water quality chamber shall be installed with OceanGuard basket within the pit to treat suspended solids as best practice.

The treatment train that has been modelled is limited to new building drainage network that drains into the combined water quality / detention tank. Figure 5-4 below shows the proposed treatment train, as set out in the MUSIC model.

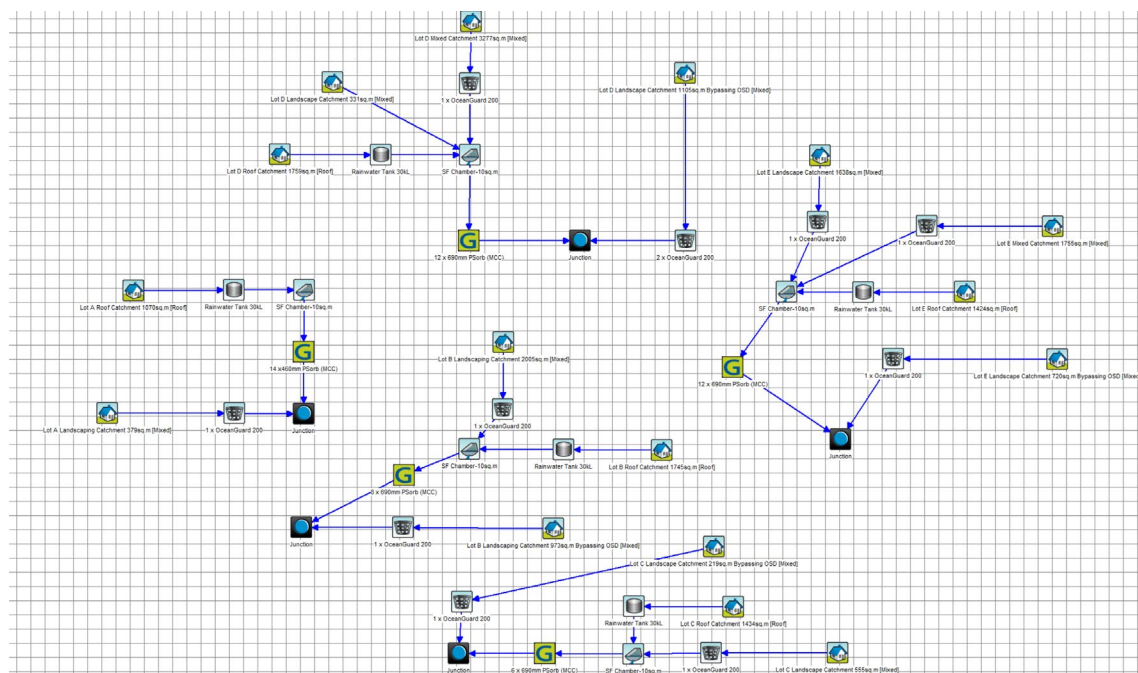


Figure 5-4: MUSIC Modelling Assessment

Table 5-6 below summarises the overall stormwater quality treatment for each building.

Table 5-6: Water Quality Treatment Measures Summary

Building	Water Quality Treatment Measures
A	1 x OceanGuard 14 x 460mm Psorb StormFilter Cartridges
B	2 x OceanGuard 8 x 690mm Psorb StormFilter Cartridges
C	2 x OceanGuard 6 x 690mm Psorb StormFilter Cartridges
D	2 x OceanGuard 12 x 690mm Psorb StormFilter Cartridges
E	3 x OceanGuard 12 x 690mm Psorb StormFilter Cartridges

5.2.4 MUSIC Modelling Results

Based on the results of this assessment, the proposed water quality treatment train will provide adequate improvements in Total Suspended Solids, Total Phosphorus, Total Nitrogen and Gross Pollutants for the proposed development. Similarly, Table 5.2.5 below indicate the minimum works required to meet the water quality targets. Further options could be explored during the detailed design phase of the project to further refine the stormwater network and treatment train and/or achieve higher standards where feasible.

Table 5-7: MUSIC Modelling Assessment Results

Pollutant Reduction Targets Required and Results						
Pollutants	Hill Shire Council DCP 2011 Section 4.5	Building A Results	Building B Results	Building C Results	Building D Results	Building E Results
Gross Pollutants (GP)	90%	100%	100%	100%	100%	100%
Total Suspended Solids (TSS)	85%	87.8%	90.2%	88.1%	89.9%	92.8%
Total Phosphorus (TP)	65%	75%	72.1%	75.4%	74.1%	77.4%
Total Nitrogen (TN)	45%	58.3%	52%	55.7%	53.3%	56%

6 Maintenance and Access and Safety

6.1 Maintenance Requirements

Throughout the operational life of the development, the stormwater system will require regular simple maintenance to ensure effective functionality, minimise lifecycle costs and maintain safety.

It is proposed maintenance activities are the responsibility of the strata facilities department and should generally include:

- Removal of gross pollutants such as litter and debris from open areas to prevent from entering the stormwater network.
- Periodic inspection of the stormwater network including pit/pipe network, StormFilters, detention tanks and outlets at street pits.
- Periodic inspection of rainwater tanks (requirements to be set out by building hydraulic design).
- Unblocking of inlets and outlets (system flushing) as required, including flushing of subsoil drainage systems.
- Removal of sediment build-up as required.
- Landscaping maintenance to grass swales and bio-retention basins.
- Regular inspection of safety elements (such as proposed fencing/gates around bio-retention basins).

6.2 Access and Safety

The following items for access and safety should be considered by the project architect and civil engineering team for the detailed design stage of the project:

- Covers and grates to stormwater network to be lockable to prevent unauthorized access or displacement.
- Appropriate fencing / barriers with lockable gates to detention tanks and pipe headwall outlets to prevent access from children.

7 Erosion and Sediment Control

The erosion and sediment control measures will be undertaken for each lot with reference to Landcom Blue Book; Managing Urban Stormwater Soil for best practice through the construction phase to limit any sediments generated from the site from entering the external stormwater network and creek. As such the following measures are to be undertaken as part of the proposed construction works:

- Sediment fence to be installed around the site perimeter to trap any sediment.
- Shaker grid/wash down facility to be installed at the site egress to limit any sediments from being carried outside of the constructions site.
- Stockpile location to be confirmed by contractor on-site during the construction phase, preferably to be located at the highest point of the site.

7.1 Construction Phase Pollutants of Concern

Pollutants that are typically generated during the construction phase of a development have been identified by reviewing the Managing Urban Stormwater: Soils and construction by Landcom. The various pollutants and their priority ratings are listed in the Table 7.1.1 below.

Table 7-1: Construction Phase Pollutant Loads

Pollutant	Source	Priority
Litter	Paper, construction packaging, food packaging, cement bags, off-cuts	High
Sediment	Unprotected exposed soils and stockpiles during earthworks and building	High
Hydrocarbons	Fuel and oil spill, leaks from construction equipment and temporary carpark areas	High
Toxic materials	Cement slurry, asphalt prime, solvents, cleaning agents, wash waters (e.g., from tile works)	High
pH altering substances	Acid sulfate soils, cement slurry and wash waters	High

7.2 Construction phase performance criteria

The construction phase performance criteria are limited to those parameters that are directly linked to construction site management practices are listed in Table 7-2.

Table 7-2: Construction Phase Performance Criteria

Issue	Construction Phase Stormwater Design Objectives	
Erosion Control	Erosion Control Measures	• Minimise exposure of disturbed soils at any time • Divert water run-off from undisturbed areas around disturbed areas. • Determine the erosion risk rating using local rainfall erosivity, rainfall depth, soil-loss rate or other acceptable methods. • Implement erosion control methods corresponding to identified erosion risk rating

Issue		Construction Phase Stormwater Design Objectives
Sediment Control	Sediment control measures	Determine appropriate sediment control measures using: - Potential soil loss rate, or - Monthly erosivity, or - Average monthly rainfall
	Design storm for sediment control basins	
	Sediment basin dewatering	Collect and drain stormwater from disturbed soils to sediment basin for design storm event: - Design storm for sediment basin sizing is 80th % five-day event or similar. Site discharge during sediment basin dewatering: - TSS < 50mg/l TSS, and - Turbidity not > 10% receiving water turbidity, and - pH between 6.5 and 8.5
Water Quality	Litter and other waste, hydrocarbons and other contaminants	Avoid wind-blown litter; remove gross pollutants. Ensure there is no visible oil or grease sheen on released waters. Dispose of waste containing contaminants at authorised facilities
Water stability and flood flow Management	Changes to the natural waterway hydraulics and hydrology	For peak flow for the 1-year and 100-year ARI event, use constructed sediment basins to attenuate the discharge rate of stormwater from the site

8 Conclusion

The objective of this stormwater management report is to provide a comprehensive and detailed overview of the proposed stormwater drainage system for each building within the development site. It also outlines the approach taken to ensure compliance with various regulations and guidelines, including those set forth by the Hills Shire Council DCP and relevant council guidelines.

For a comprehensive understanding of the stormwater management plan, this report should be read in conjunction with the civil drawing sets prepared by Mott MacDonald.

This stormwater management plan has been developed in accordance with the guidelines and standards listed outlined in Section 2.5, to manage the impacts of the proposed development on the existing site and downstream stormwater conditions. The plan has the following components:

- Stormwater quantity management includes implementing detention tanks to mitigate the peak flows from the site to retain existing conditions.
- Stormwater quality management implementing treatment trains with StormFilter cartridges, OceanGuard baskets and rainwater tank to achieve the water quality objectives.
- Recommended maintenance and safety and access considerations.
- Construction phase erosion and sediment control measures to minimise soil erosion and control sediment discharge from site.

The implementation of the measures outlined in this plan in the development of this site will result in no worsening stormwater and environmental conditions and will provide improvement to quality of the runoff discharged from the site.

For a comprehensive understanding of the stormwater management plan, this report should be read in conjunction with the civil drawing sets prepared by Mott MacDonald.

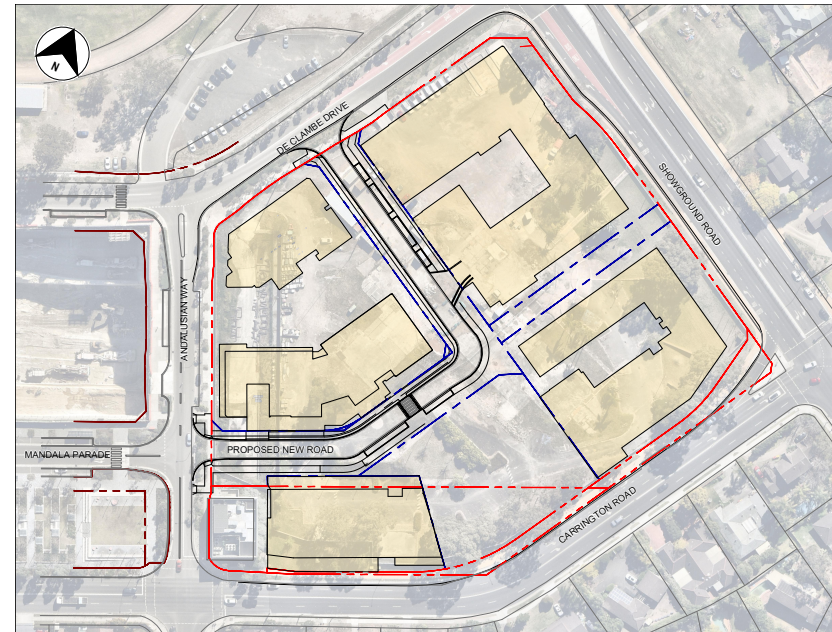
9 Appendix A: Stormwater Drawings

HILLS SHOWGROUND PRECINCT EAST

3 Andalusian Way, Castle Hill NSW 2154
Stormwater Management
Cover Sheet

Issue for Development Application
Revision Date: 24/05/2024
Revision: B

DRAWING NUMBER	DRAWING TITLE
427623-009-MMD-DA-01-DRG-C-0001	Cover Sheet
427623-009-MMD-DA-01-DRG-C-0002	General Notes and Legends
427623-009-MMD-DA-01-DRG-C-0020	Erosion and Sediment Control Plan
427623-009-MMD-DA-01-DRG-C-0021	Erosion and Sediment Control Details
427623-009-MMD-DA-01-DRG-C-0035	General Arrangement Plan
427623-009-MMD-DA-01-DRG-C-0050	Stormwater Drainage Layout plan
427623-009-MMD-DA-01-DRG-C-0051	Stormwater Drainage Plan - Sheet 1
427623-009-MMD-DA-01-DRG-C-0052	Stormwater Drainage Plan - Sheet 2
427623-009-MMD-DA-01-DRG-C-0053	Stormwater Drainage Plan - Sheet 3
427623-009-MMD-DA-01-DRG-C-0054	Stormwater Drainage Plan - Sheet 4
427623-009-MMD-DA-01-DRG-C-0060	Water Quality Catchment Plan
427623-009-MMD-DA-01-DRG-C-0061	Water Quantity Catchment Plan
427623-009-MMD-DA-01-DRG-C-0070	On-Site Detention Plan and Section - Sheet 1
427623-009-MMD-DA-01-DRG-C-0071	On-Site Detention Plan and Section - Sheet 2
427623-009-MMD-DA-01-DRG-C-0072	On-Site Detention Plan and Section - Sheet 3
427623-009-MMD-DA-01-DRG-C-0073	On-Site Detention Plan and Section - Sheet 4
427623-009-MMD-DA-01-DRG-C-0074	On-Site Detention Plan and Section - Sheet 5
427623-009-MMD-DA-01-DRG-C-0075	On-Site Detention Plan and Section - Sheet 6
427623-009-MMD-DA-01-DRG-C-0080	Stormwater Details



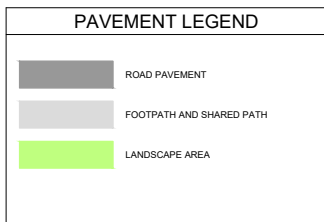
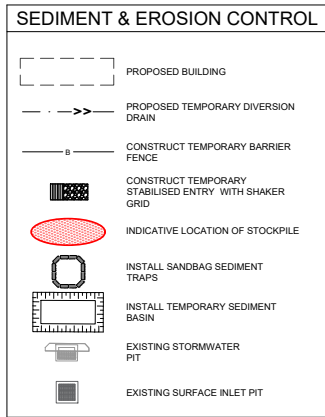
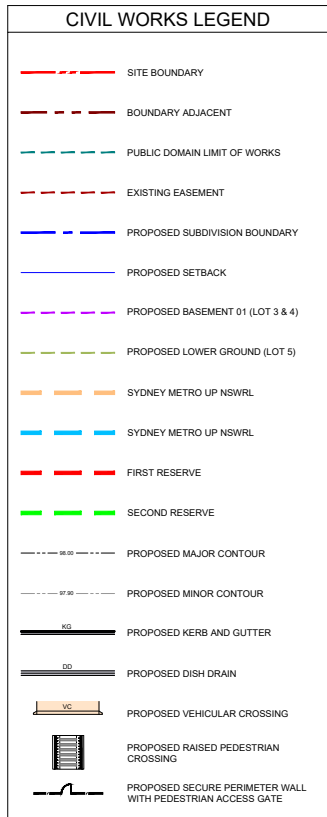
LOCALITY PLAN
N.T.S

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Level 10, 383 Kent Street Sydney, NSW 2000 Australia NSW 1230, Australia PO Box Q1678, QVB Sydney T +61 (0)2 9098 6800 www.mottmac.com				DEICORP				Hills Showground Precinct East Castle Hill, NSW 2154 Cover Sheet			
Rev Date Description				SCALE				Drawn: J Garbo Designed: Z.Wu Checked: A.Tarshan Approved: D.Fettell			
P1 24/11/23 DRAFT ISSUE FOR DEVELOPMENT APPLICATION				AT DF				Revision: B Status: FOR APPROVAL Security: STD			
P2 13/12/23 DRAFT ISSUE FOR DEVELOPMENT APPLICATION				AT DF				DRAWING NUMBER			
P3 10/01/24 DRAFT ISSUE FOR DEVELOPMENT APPLICATION				AT DF				427623-009-MMD-DA-01-DRG-C-0001			
P4 24/05/24 ISSUE FOR DEVELOPMENT APPLICATION				AT DF							

FILE LOCATION: C:\Users\Wu107468\Mott MacDonald\Desktop Civil Engineering - 9_3 Andalusian Way, Castle Hill\DA Workings\01 Drafting\Civil Drawings\Precinct East Drawings\STORMWATER MANAGEMENT\427623-009-MMD-DA-01-DRG-C-0001.dwg May 27, 2024 - 6:27PM WU107448



SITEWORKS NOTES

SN1 DATUM : Australian Height Datum (AHD)
ORIGIN OF LEVELS : SSIM 62673 RL: 102.368
ORIGIN OF CO-ORDINATES : Mapping Grid Of Australia (MGA)
SURVEY PREPARED BY : DavidWatson Consulting Surveyors
Plot No 222, Redfern NSW 2016
W: www.david-watson.com.au

SN2 THE CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK, AND REPORT ANY DISCREPANCIES TO THE SUPERINTENDENT.

SN3 ALL EXISTING SERVICES (INCLUDING ANY NOT SHOWN ON THE PLANS) MUST BE ACCURATELY LOCATED IN POSITION AND LEVEL. PRIOR TO ANY EXCAVATION, ANY DISCREPANCIES MUST BE REPORTED TO THE SUPERINTENDENT. MINIMUM SERVICE CLEARANCES SHALL BE MAINTAINED FROM THE RELEVANT SERVICE AUTHORITY.

SN4 THE CONTRACTOR SHALL ARRANGE FOR ALL SETTING OUT BY A REGISTERED SURVEYOR.

SN5 IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE NSW LAND REGISTRY SERVICES, IF ANY SURVEY MARKS THAT MUST BE DESTROYED IN THE CONSTRUCTION OF WORKS.
CONTACT HEAD OFFICE ON 02 878 3075. www.nswls.com.au

SN6 THE CONTRACTOR SHALL OBTAIN ALL REGULATORY AUTHORITY APPROVALS AT THEIR OWN EXPENSE

SN7 WHERE NEW WORKS ABUT EXISTING, THE CONTRACTOR MUST ENSURE THAT A SMOOTH AND EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED.

SN8 ALL DISTURBED AREAS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION, UNLESS SPECIFIED OTHERWISE.

SN9 EXCAVATED TRENCHES SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT NATURAL MATERIAL, ANY SUBSIDENCES DURING THE PERIOD TO BE RECTIFIED AS DIRECTED BY THE SUPERINTENDENT.

SN10 ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH THE LANDSCAPE ARCHITECT'S DETAILS AND / OR BY -

PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE, ENSURING THAT NOTHING IS NAILED TO THEM.
PROTECTING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPOLES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS:

ENCROACHMENT ONLY OCCURS ON ONE SIDE AND NO CLOSER TO THE TRUNK THAN EITHER 1.5m OR HALF THE DIAMETER BETWEEN THE OUTER EDGE OF THE DRIP LINE AND THE TRUNK, WHICH EVER IS THE GREATER.

A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (eg a GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300mm CARC IS TAKEN NOT TO CAUSE ANY UNNECESSARILY HIGH TO COMPACT THE SOIL AROUND THEM.

SN11 RECEPTORS FOR CONCRETE AND MORTAR, SLAGGERS, PAINTS, AC WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER ARE TO BE EMPTIED AS NECESSARY. DISPOSAL OF WASTE SHALL BE IN A MANNER APPROVED BY THE SUPERINTENDENT OR AS SPECIFIED IN THE WORKS CONTRACT.

EXISTING SERVICES NOTES

E81 EXISTING SERVICES HAVE BEEN PLOTTED FROM SUPPLIED DATA AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT.

E82 THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION AND REMOVAL, IF REQUIRED OF ALL REDUNDANT EXISTING SERVICES IN AREAS AFFECTED BY WORKS WITHIN THE CONTRACT AREA AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT.

E83 THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED.

E84 IF REQUIRED, THE CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN EXISTING SUPPLY TO BUILDINGS REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT AND THE RELEVANT SERVICE AUTHORITY.

E85 INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE TO THE PRINCIPAL. THE CONTRACTOR IS TO GAIN APPROVAL FROM THE SUPERINTENDENT FOR TIME OF INTERRUPTION - THE CONTRACTOR IS RESPONSIBLE FOR ALL LIAISON.

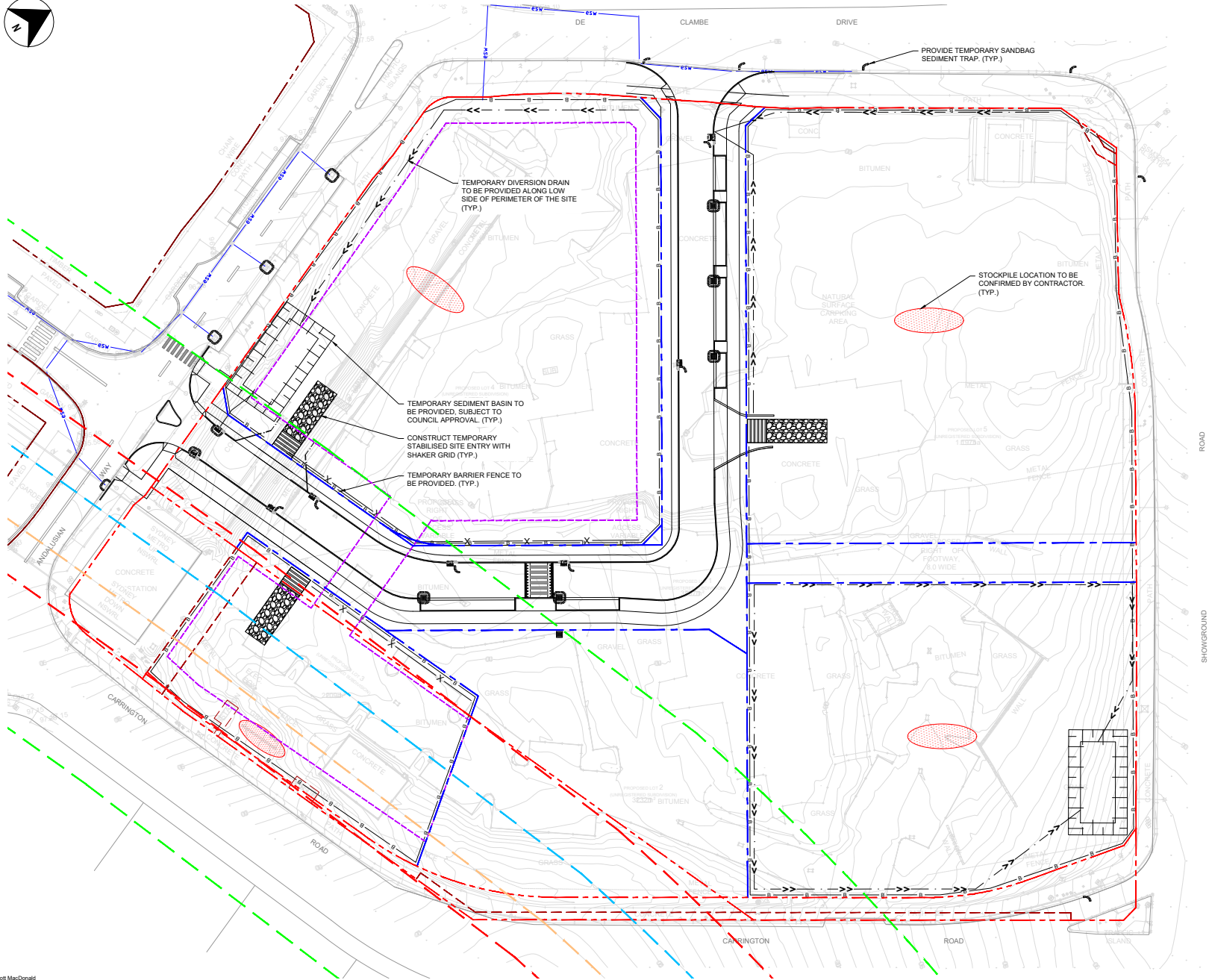
E86 ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVING SHALL BE LOCATED IN 900mm x 150mm PEW SCAVER GRADE COVERS EXTENDING A MINIMUM OF 500mm BEYOND THE EDGE OF PAVING.

E87 CLEARANCE AND COVER REQUIREMENTS SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY BEFORE COMMENCEMENT OF WORKS AND SHALL BE ADHERED TO AT ALL TIMES.

E88 CARE IS TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS ARE TO BE UNDERTAKEN OVER TELECOM OR ELECTRICAL SERVICES. HAND EXCAVATION IN THESE AREAS ONLY.

STORMWATER NOTES

SW1	FOR RESIDENTIAL SUBDIVISIONS AND PUBLIC ROADS - ALL 03375mm TO 06030mm DRAINAGE PIPES SHALL BE CLASS 4 APPROVED SPOOT AND SOCKET REINFORCED CONCRETE PIPES WITH RUBBER RING JOINTS (UNO). ALL 06375mm OR LARGER DRAINAGE PIPES SHALL BE CLASS 3 APPROVED SPOOT AND SOCKET REINFORCED CONCRETE PIPES WITH RUBBER RING JOINTS (UNO). ALL PVC-U DRAINAGE PIPES IN FOOTPATHS OR ACCESS WAYS SHALL BE DRY GRADE CLASS SDR IN ACCORDANCE WITH AS/NZS 1260:2009 - PVC-U PIPES AND FITTINGS FOR DRAIN, WASTE AND VENT APPLICATION. HEAVY DUTY PVC-U PIPES TO BE IN ACCORDANCE WITH AS/NZS 1254 - 2010. ALL FITTINGS FOR DRAIN, WASTE AND VENT SURFACE WATER APPLICATIONS MAY BE USED WITHIN ALL LOCATIONS.
SW2	FOR COMMERCIAL OR INDUSTRIAL SITES: ALL 03030mm TO 06030mm DRAINAGE PIPES SHALL BE CLASS 4 APPROVED SPOOT AND SOCKET REINFORCED CONCRETE PIPES WITH RUBBER RING JOINTS (UNO). ALL 06375mm OR LARGER DRAINAGE PIPES SHALL BE CLASS 3 APPROVED SPOOT AND SOCKET REINFORCED CONCRETE PIPES WITH RUBBER RING JOINTS (UNO). ALL DRAINAGE PIPES LESS THAN OR EQUAL TO 0225mm SHALL BE PVC-U DRY GRADE CLASS SDR IN ACCORDANCE WITH AS/NZS 1260 : 2009 - PVC-U PIPES AND FITTINGS FOR DRAIN, WASTE AND VENT APPLICATION WITH SOLVENT WELDED JOINTS.
SW3	EQUIVALENT STRENGTH FIBROUS REINFORCED CONCRETE (IF P.C.I. AND/OR HIGH DENSITY POLYESTER FIBRE REINFORCED CONCRETE) BE SUBJECT TO APPROVAL BY THE SUPERINTENDENT.
SW4	ALL PIPE JUNCTIONS UP TO AND INCLUDING Ø450mm AND TAPERS, SHALL BE VIA PURPOSE MADE FITTINGS (UNO).
SW5	MINIMUM GRADE TO STORMWATER LINES TO BE 1% (UNO).
SW6	CONTRACTOR TO SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.
SW7	ALL CONNECTIONS TO EXISTING DRAINAGE PIPES SHALL BE MADE IN TRADEMAN LIKE MANNER. ALL FITTINGS SHALL BE INSTALLED AT THE POINT OF ENTRY SHALL BE CEMENT RENDERED TO ENSURE A SMOOTH FINISH WITH NO PROTRUSIONS.
SW8	ALL IN-SITU CONCRETE PITS TO BE 323mm MINIMUM AT 28 DAYS.
SW9	PITS AND PIPES IN AREAS OF SALINITY HAZARD SHALL HAVE INCREASED COVER TO ANY REINFORCEMENT.
SW10	PRECAST CONCRETE PITS MAY BE INSTALLED IN LIEU OF CAST IN-SITU PITS, WHEN PIPE JUNCTIONS ARE ACCOMMODATED WITHIN THE OVERALL DIMENSIONS OF THE PIT, AND APPROVED BY THE SUPERINTENDENT.
SW11	PITS DEEPER THAN 1000mm SHALL BE SET PIPES INSTALLED IN ACCORDANCE WITH THE LOCAL OR STATUTORY AUTHORITY REQUIREMENTS.
SW12	BEDDING SHALL BE TYPE H2Z (UNO) FOR PIPES NOT INSTALLED IN PAVEMENTS, AND TYPE H2S FOR PIPES INSTALLED IN PAVEMENTS IN ACCORDANCE WITH AS/NZS 3725 - 2007 - DESIGN FOR INSTALLATION OF BURIED CONCRETE PIPES.
SW13	BACKFILL TRENCH WITH SAND OR APPROVED GRANULAR BACKFILL TO 300mm (MIN) ABOVE THE PIPE. WHERE THE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO PAVEMENT SURFACE WITH SAND OR APPROVED GRAVEL. SUB-GRADE COMPACTED IN 150mm LAYERS TO 98% STANDARD MAXIMUM DRY DENSITY. THE CONTRACTOR IS TO ENSURE COMPACTION EQUIPMENT IS APPROPRIATE FOR THE PIPE CLASS USED.
SW14	WHERE STORMWATER LINES PASS UNDER FLOOR SLABS DRY GRADE PVC-U RUBBER RING JOINTS ARE TO BE USED (UNO).
SW15	WHERE SUBSOL DRAINAGE LINES PASS UNDER FLOOR SLABS AND UNDER PAVEMENTS, ISOLATED PVC-U DRY GRADE CLASS SDR PIPES SHALL BE USED (UNO).
SW16	PROVIDE 3m LENGTH OF Ø100mm SUBSOL DRAINAGE LINE OR 200 NYLON STRIP DRAIN SURROUNDED WITH 150mm OF 20mm BLUE METAL OR GRVEL AND WRAPPED IN 500µm X2 GEOTEXTILE FABRIC OR APPROVED EQUIVALENT. AT INVERT OF INCOMING UPSTREAM PIPE ON EACH PIT.



NOTES

1. CONTRACTORS TO CONFIRM PUMP-OUT FROM DEEP BASEMENT EXCAVATION
2. UPON INSTALLATION OF NEW STORMWATER PITS, SAND BAGS ARE TO BE PLACED AROUND THE PROPOSED PITS TO PREVENT ANY SEDIMENT RUNOFF TO THE PITS.
3. EROSION AND SEDIMENT CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH THE PUBLICATION 'URBAN STORMWATER SOILS AND CONSTRUCTION' 'THE BLUE BOOK' 2004 (4TH EDITION) PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION, EXCAVATION OR CONSTRUCTION WORKS UPON THE SITE.
4. BUILDERS SHALL PROVIDE SEDIMENT FENCING MATERIAL DURING CONSTRUCTION TO THE LOW SIDE BOUNDARIES. SEDIMENT CONTROL FABRIC SHALL BE AN APPROVED MATERIAL (eg. PROFAB SILT FENCE, OR SIMILAR) STANDING MINIMUM 600mm ABOVE GROUND AND EXTENDING 200mm BELOW GROUND.
5. GRASS VERGES AND VEGETATION SHALL BE MAINTAINED AS MUCH AS PRACTICAL AND SHALL NOT BE CLEARED FROM NEIGHBORING SITES TO PROVIDE A BUFFER ZONE TO THE CONSTRUCTION SITE.
6. NO PARKING OR STOCK PILING OF MATERIALS IS PERMITTED ON THE LOWER SIDE OF THE SEDIMENT FENCE.
7. VEHICLE ACCESS SHALL BE RESTRICTED TO ONE DESIGNATED POINT AS SHOWN, AND VEHICLE CROSSINGS ARE TO BE ADEQUATELY COVERED AT ALL TIMES WITH BLUE METAL OR THE LIKE.
8. TEMPORARY CONSTRUCTION ENTRY/EXIT SHALL BE AS PER DRAWING ON DRAWING 0021. BUILDER TO ENSURE ALL DROPPABLE SOIL AND SEDIMENT IS REMOVED PRIOR TO CONSTRUCTION TRAFFIC EXITING SITE USING VEHICLE WHEEL WASH, CATTLE GRID, WHEEL SHAKER OR OTHER APPROPRIATE DEVICE. BUILDER SHALL ENSURE ALL CONSTRUCTION TRAFFIC ENTERING AND LEAVING THE SITE, DO SO, IN A FORWARD DIRECTION.
9. ALL STORMWATER INCIDENT ON THE CONSTRUCTION SITE MUST BE COLLECTED AND APPROPRIATELY DISPOSED OF IN A MANNER THAT DOES NOT INCREASE THE FLOOD RISK FOR THE CATCHMENT AREA OR DEGRADE THE QUALITY OF WATER BEING DISPOSED OF TO COUNCIL STORMWATER INFRASTRUCTURE.
10. MEASURES OUTLINED IN THE EROSION AND SEDIMENT CONTROL PLAN MUST BE IMPLEMENTED PRIOR TO AND MAINTAINED DURING AND AFTER THE CONSTRUCTION WORKS.
11. ALL DISTURBED AREAS AND STOCKPILES TO BE STABILISED WITHIN 5 DAYS.
12. TOPSOIL TO BE STRIPPED STOCKPILED AND RE-SPREAD ON COMPLETION OF EARTHWORKS. NONE TO BE REMOVED.
13. NO DISTURBANCE OF THE SITE OTHER THAN IMMEDIATE AREA OF WORKS.

REFERENCES:

- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0002 FOR GENERAL NOTES AND LEGENDS
- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0021 FOR SEDIMENT AND EROSION CONTROL DETAILS

THIS PLAN IS A CONCEPT ONLY. IT IS CREATED TO HIGHLIGHT SOME OF THE SEDIMENT AND EROSION CONTROL MEASURES WHICH MAY APPEAR. THE CONTRACTOR IS RESPONSIBLE FOR THE FINAL DESIGN AND ENSURING ALL MEASURES ARE TAKEN TO PROTECT THE ENVIRONMENT.

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M M MOTT MACDONALD	Level 10, 383 Kent Street Sydney, NSW 2000 Australia NSW 1230, Australia PO Box Q1678, QVB Sydney T +61 (0)2 9098 6800 www.mottmac.com		B	24/05/24	ISSUE FOR DEVELOPMENT APPLICATION	AT	DF	SCALE 0 20m 40m 1:400	CLIENT  DEICORP	TITLE Hills Showground Precinct East Castle Hill, NSW 2154 Erosion and Sediment Control Plan	DRAWING INFORMATION			
					Drawn: J Garbo		Revision: B							
					Designed: Z Wu		Status: FOR APPROVAL							
					Checked: A Tanshan		Security: STD							
					Approved: D Fettel									
Rev Date Description Chk'd App'd								DRAWING NUMBER 427623-009-MMD-DA-01-DRG-C-0020						

FILE LOCATION: C:\Users\Wu107446\Mott MacDonald\Desktop Civil Engineering - 0_3 Andelkovic Way, Castle Hill\04 Working\01 Drafting\Civil Drawings\Precinct East Drawings\STORMWATER MANAGEMENT\427623-009-MMD-DA-01-DRG-C-0020.dwg May 27, 2024 - 6:28PM WU107446

ISO A1 420 x 594mm

SOIL AND WATER MANAGEMENT NOTES

GENERAL INSTRUCTIONS

SWM01 THESE PLANS PRESENT A CONCEPTUAL SOIL AND WATER MANAGEMENT PLAN (SWMP) ONLY AND SHOWS A POSSIBLE WAY OF MANAGING SOIL AND EROSION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ESTABLISHMENT AND MANAGEMENT OF THE SITE AND PREPARING A DETAILED PLAN AND OBTAINING APPROVAL FROM THE RELEVANT AUTHORITY PRIOR TO THE COMMENCEMENT OF ANY WORKS.

SWM02 THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING PLANS AND ANY OTHER PLANS, WRITTEN INSTRUCTIONS, SPECIFICATION OR DOCUMENTATION THAT MAY BE ISSUED AND RELATING TO DEVELOPMENT OF THE SUBJECT SITE.

SWM03 THE CONTRACTOR WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE CONSISTENT WITH 'MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION' - ALSO KNOWN AS 'THE BLUE BOOK'.

SWM04 ALL BUILDERS AND SUB-CONTRACTORS SHALL BE INFORMED OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.

EROSION CONTROL

SWM05 WATER SHALL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNTIL SEDIMENT CONCENTRATION IS LESS THAN OR EQUAL TO 50MG/L. IE THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND / OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.

SWM06 ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.

SWM07 ACCEPTABLE RECEPTORS WILL BE CONSTRUCTED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.

SWM08 'SEDIMENT FENCING' WILL BE INSTALLED AS INDICATED ON THE PLANS AND AT THE DIRECTION OF SITE SUPERINTENDENT TO ENSURE CONTAINMENT OF SEDIMENT. THE SEDIMENT FENCING WILL OUTLET OR OVERFLOW UNDER STABILISED CONDITIONS INTO THE SEDIMENT BASIN, TO SAFELY CONVEY WATER INTO A SUITABLE FILTERING SYSTEM SHOULD THE PORES IN THE FABRIC BLOCK.

SWM09 STOCKPILES SHOULD NOT BE LOCATED WITHIN 5M OF TREES AND HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS, DRAINAGE LINES, PAVED AREAS AND DRIVEWAYS, WHERE THEY ARE WITHIN 5M FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE AREAS. MEASURES SHOULD ALSO BE APPLIED TO PREVENT THE EROSION OF THE STOCKPILE.

SWM10 ALL CUT AND FILL BATTERS ARE TO BE SEEDED AND MULCHED WITHIN 14 DAYS OF COMPLETION OF FORMATION.

SWM11 ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY:

- PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE.
- ENSURING THAT NOTHING IS NAILED TO THEM.
- PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS:
 - ENCROACHMENT ONLY OCCURS ON ONE SIDE AND NO CLOSER TO THE TRUNK THAN EITHER 1.5 METRES OR HALF THE DISTANCE BETWEEN THE OUTER EDGE OF THE DRIP LINE AND THE TRUNK, WHICHEVER IS THE GREATER.

(II) A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (IE. A GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300 MILLIMETRES DEPTH

(III) CARE IS TAKEN.

SWM12 DURING WINDY WEATHER, LARGE DISTURBED UNPROTECTED AREAS SHOULD BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.

SWM13 TEMPORARY PROTECTION FROM EROSION FORCES WILL BE UNDERTAKEN ON LANDS WHERE FINAL SHAPING HAS NOT BEEN COMPLETED BUT WORKS ARE UNLIKELY TO PROCEED FOR PERIODS OF TWO MONTHS OR MORE (EG. ON TOPSOIL STOCKPILES). THIS MAY BE ACHIEVED WITH A VEGETATIVE COVER, A RECOMMENDED LISTING OF PLANT SPECIES FOR TEMPORARY COVER IS -

- AUTUMN/WINTER SOWING
 - OATS/RYE/CORN AT 20 KG/HA
 - JAPANESE MILLET AT 10 KG/HA
- SPRING/SUMMER SOWING
 - JAPANESE MILLET AT 20 KG/HA
 - OATS/RYE/CORN AT 10 KG/HA

SWM14 DIVERSION BANKS / CHANNELS WILL BE REHABILITATED AS SOON AS POSSIBLE AND WITHIN 5 WORKING DAYS FROM THEIR FINAL SHAPING. OTHER THAN IN THE WINTER MONTHS, SUITABLE MATERIALS INCLUDE TURF GRASSES SUCH AS COUCH OR KIKUYU DURING WINTER, OR AT OTHER TIMES WHEN TEMPORARY REHABILITATION (MORE THAN 3 MONTHS) IS REQUIRED, IT IS SUGGESTED THAT HESSIAN CLOTH IS USED BUT ONLY IF TACKED WITH APPROPRIATE PEGS AND AN ANIONIC BITUMEN EMULSION. FOOT AND VEHICULAR TRAFFIC SHOULD BE KEPT AWAY FROM THESE AREAS.

SWM15 UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.

CONSTRUCTION SEQUENCE

SWM16 WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE SHOULD BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE -

- INSTALL INLET SEDIMENT TRAPS TO ALL GULLY PITS FRONTING THE SITE.
- INSTALL A 1.8M CHAIN WIRE FENCE AROUND THE BOUNDARIES AND ATTACH HESSIAN CLOTH OR SIMILAR TO IT ON THE WINDWARD SIDE (TIES AT THE TOP, CENTRE AND BOTTOM) AND AT 1M INTERVALS OR AS INSTRUCTED BY THE SUPERINTENDENT).
- INSTALL GEOFABRIC SEDIMENT FENCE AND SEDIMENT TRAPS AROUND ALL PERMANENT STORMWATER RETICULATION STRUCTURES AS SHOWN ON THE PLAN.
- CONSTRUCT STABILISED CONSTRUCTION ENTRANCE AS SHOWN ON THE PLAN OR TO LOCATION AS DETERMINED BY SUPERINTENDENT.
- INSTALL DIVERSION BANKS ALONG THE BOUNDARY WHERE REQUIRED, REHABILITATE DISTURBED LANDS DOWNSLOPE FROM THE BASINS WITHIN 20 WORKING DAYS.
- ENSURE THAT THE SEDIMENT BASIN IS DIRECTED ONTO A TURFED AREA AND DRAINS TO A SUITABLE LOCATION. A TEMPORARY STORMWATER LINE MAY BE NECESSARY TO CONVEY THE FLOWS TO THIS LOCATION. CONSTRUCT DIVERSION CHANNELS AT THE BOUNDARY TO DRAIN INTO THE SEDIMENT BASIN AS SHOWN ON PLANS.
- AT COMPLETION STABILISE SITE AND DECOMMISSION SEDIMENT BASIN AND ALL EROSION CONTROL DEVICES.

SWM17 TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

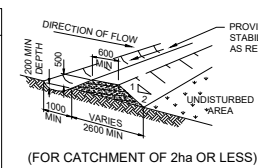
SWM18 FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.

SITE INSPECTION AND MAINTENANCE

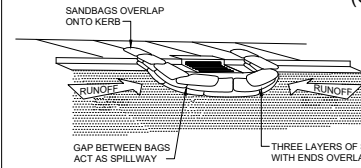
SWM19 AT LEAST WEEKLY AND AFTER EVERY RAIN FALL EVENT, THE CONTRACTOR WILL INSPECT THE SITE AND ENSURE THAT -

- DRAINS AND ALL SEDIMENT CONTROL DEVICES OPERATE EFFECTIVELY AND INITIATE REPAIR OR MAINTENANCE AS REQUIRED.
- RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER ARE TO BE EMPTIED AS NECESSARY. DISPOSAL OF WASTE SHALL BE IN A MANNER APPROVED BY THE SUPERINTENDENT.
- SPILLED SAND (OR OTHER MATERIALS) IS REMOVED FROM HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS, GUTTERS, PAVED AREAS AND DRIVEWAYS.
- SEDIMENT IS REMOVED FROM BASINS AND / OR TRAPS WHEN LESS THAN 20MP OF TRAPPING CAPACITY REMAIN PER 100MP OF DISTURBED LANDS, AND / OR LESS THAN 500MM DEPTH REMAINS IN THE SETTLING ZONE. ANY COLLECTED SEDIMENT WILL BE DISPOSED IN AREAS WHERE FURTHER POLLUTION TO DOWN SLOPE LANDS AND WATERWAYS IS UNLIKELY.
- REHABILITATED LANDS HAVE EFFECTIVELY REDUCED THE EROSION HAZARD AND INITIATE UPGRADING OR REPAIR AS APPROPRIATE.

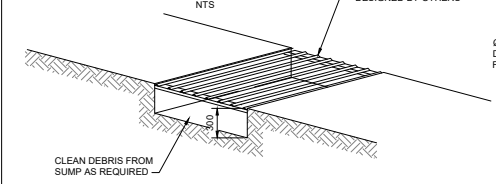
SWM20 THE CONTRACTOR SHALL PROVIDE ALL MONITORING CONTROL AND TESTING.



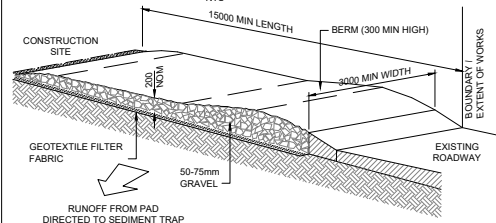
DIVERSION BANK (WITH CHANNEL)
NTS



SEDIMENT TRAP FOR KERB INLET (AT LOW POINT - SANDBAG)
NTS



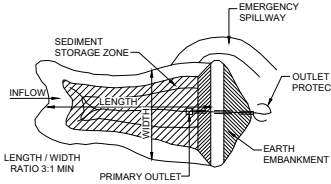
SHAKER PAD
NTS



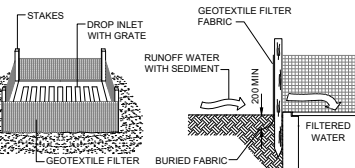
TEMPORARY SITE ENTRANCE
NTS

MAINTENANCE

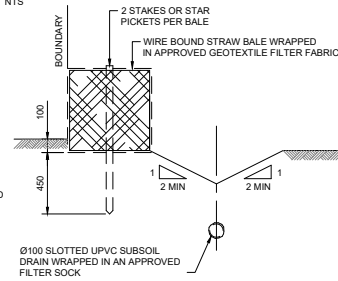
- THE TEMPORARY ACCESS SHALL BE MAINTAINED IN A CONDITION THAT PREVENTS TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS OF WAY.
- THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL GRAVEL AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
- ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS OF WAY MUST BE REMOVED IMMEDIATELY.



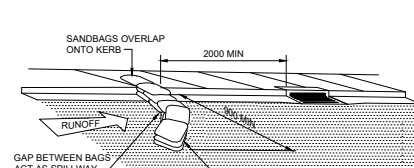
SEDIMENT BASIN (TYPICAL) PLAN - TYPE C SOILS
NTS



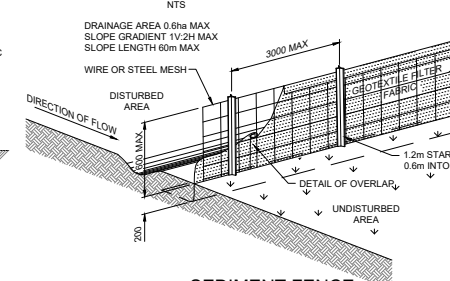
SEDIMENT TRAP FOR DROP INLET (GEOTEXTILE FILTER FABRIC)
NTS



SEDIMENT FENCE AT BOUNDARY (STRAW BALE)
NTS



SEDIMENT TRAP FOR KERB INLET (ON GRADE - SANDBAG)
NTS

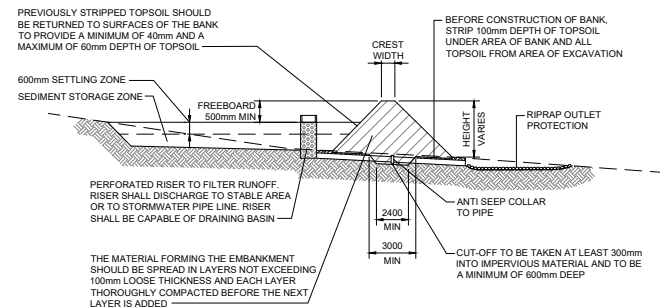


SEDIMENT FENCE (GEOTEXTILE FILTER FABRIC)
NTS

CONSTRUCTION NOTES

- PLACE STOCKPILES AS DIRECTED BY THE SUPERINTENDENT.
- CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
- WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
- WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED E.S.C.P. OR S.W.M.P. TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
- CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND INSTALL SEDIMENT FENCES 1m TO 2m DOWNSLOPE CONSISTENT WITH 'MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION', ALSO KNOWN AS 'THE BLUE BOOK'.

STOCKPILES
NTS



SEDIMENT BASIN (TYPICAL) CROSS SECTION - TYPE C SOILS
NTS

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SCALE	CLIENT	TITLE	DRAWING INFORMATION
	DEICORP	Hills Showground Precinct East Castle Hill, NSW 2154 Erosion and Sediment Control Details	Drawn: J Garbo Designed: Z Wu Checked: A Tarshan Approved: D Fattell DRAWING NUMBER 427623-009-MMD-DA-01-DRG-C-0021



DEICORP

Hills Showground Precinct East
Castle Hill, NSW 2154
Erosion and Sediment Control Details

Drawn: J Garbo Designed: Z Wu Checked: A Tarshan Approved: D Fattell DRAWING NUMBER 427623-009-MMD-DA-01-DRG-C-0021	Revision: B Status: FOR APPROVAL Security: STD
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FILE LOCATION: C:\Users\WU107468\Mott MacDonald\Design\Civil Engineering\03_Anselton\Wey, Castle Hill\Hill Working\01_Drafting\Civil\Design\Process_East Drawings\STORMWATER MANAGEMENT\427623-009-MMD-DA-01-DRG-C-0021.dwg May 27, 2024 - 6:28PM WU107468

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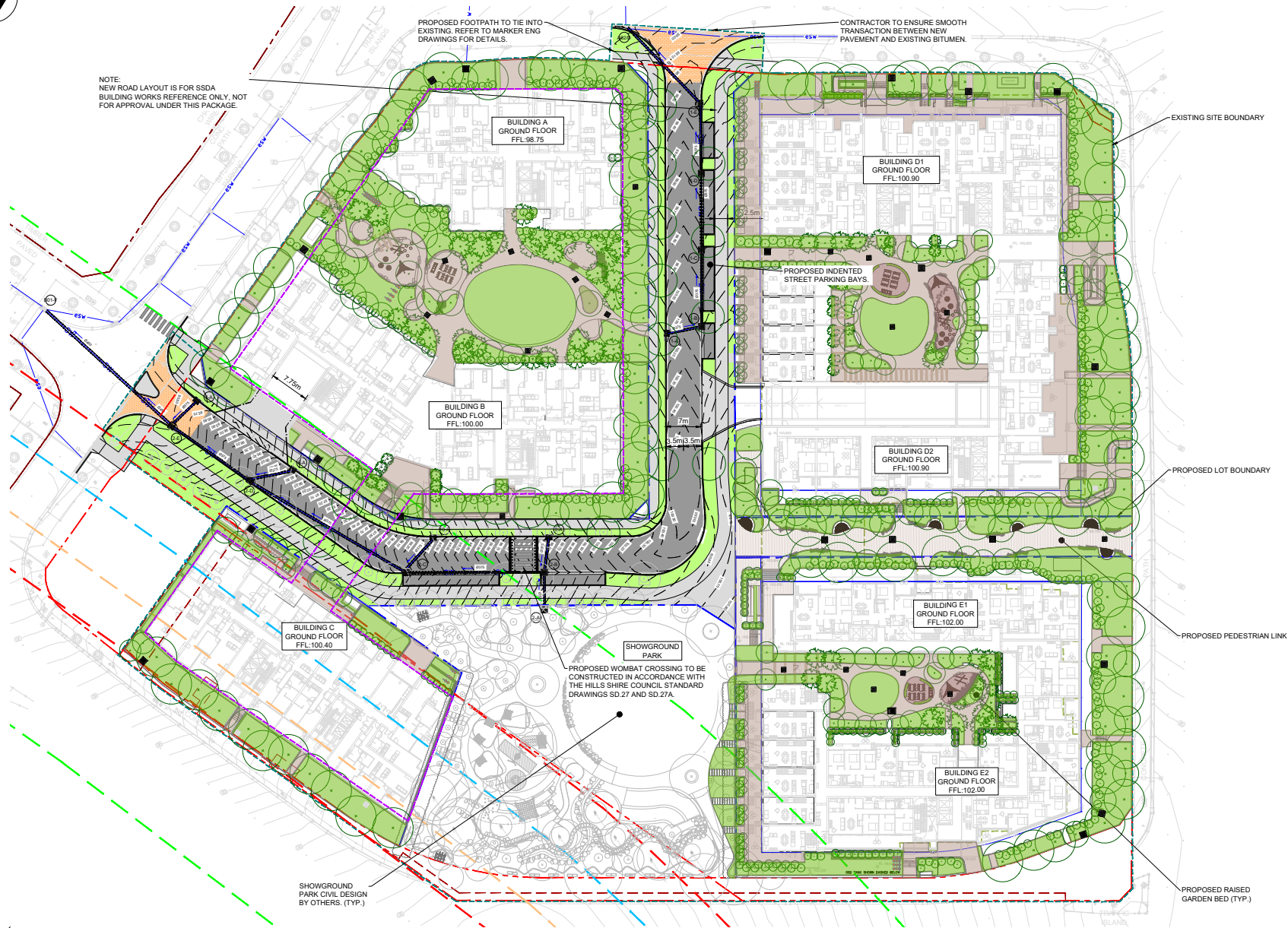
NOTE:
NEW ROAD LAYOUT IS FOR SSDA
BUILDING WORKS REFERENCE ONLY. NOT
FOR APPROVAL UNDER THIS PACKAGE

PROPOSED FOOTPATH TO TIE INTO
EXISTING. REFER TO MARKER ENG
DRAWINGS FOR DETAILS.

CONTRACTOR TO ENSURE SMOOTH
TRANSACTION BETWEEN NEW
PAVEMENT AND EXISTING BITUMEN.

REFERENCES:
- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0002
FOR GENERAL NOTES.

NOTES:
- ANY PROPOSED WORK ON COUNCIL'S LAND/ROAD DUE
TO THE PROPOSED DEVELOPMENT SHALL BE
SUBJECT/ REQUIRES SEPARATE APPROVAL FROM
COUNCIL BEFOREHAND VIA SECTION 138 OF THE
ROADS ACT 1993



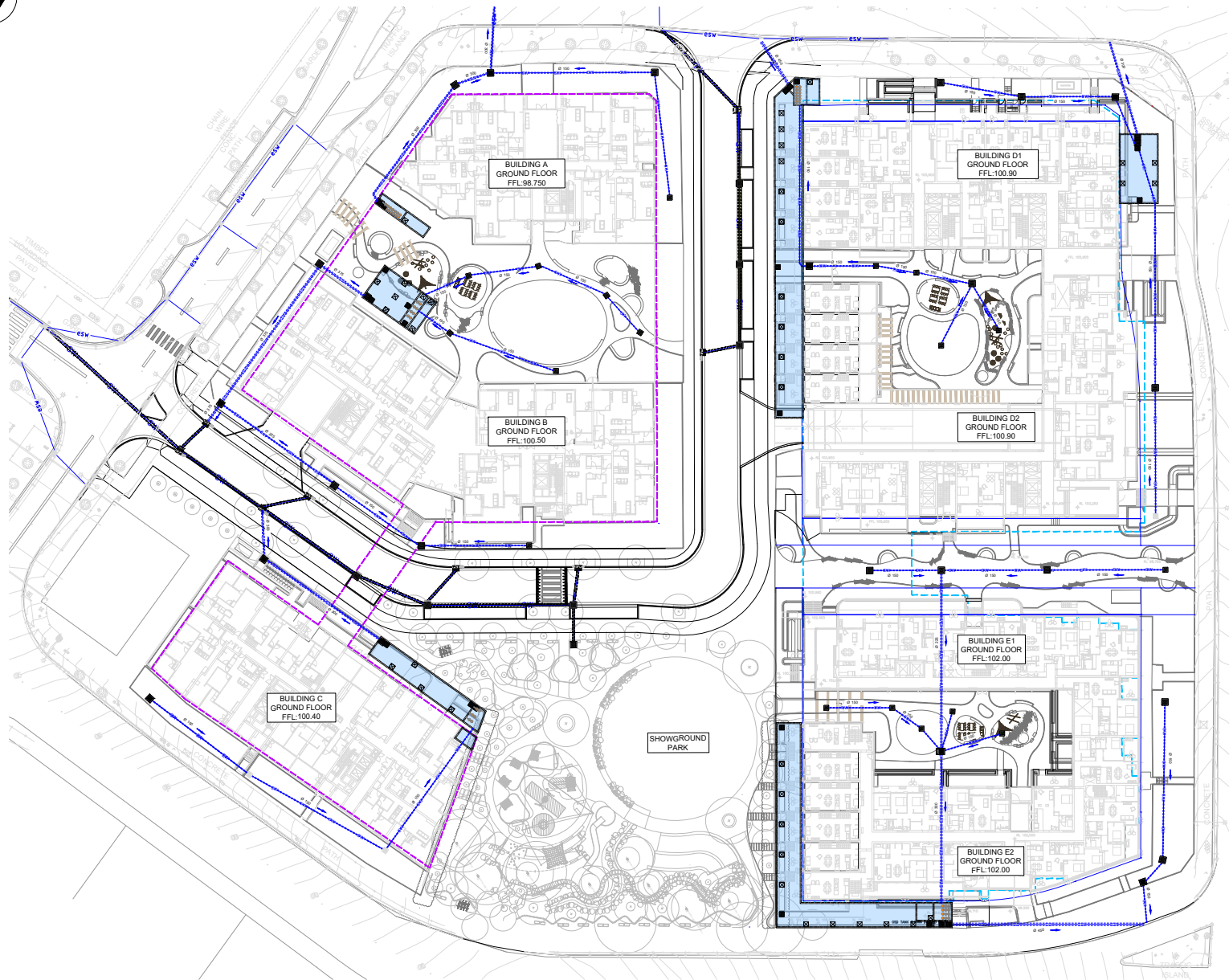
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ISO A1 594 x 841mm



REFERENCES:

- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0002 FOR GENERAL NOTES AND LEGENDS.
- REFER TO DRAWINGS 427623-009-MMD-DA-01-DRG-C-0070 TO 427623-009-MMD-DA-01-DRG-C-0075 FOR ON-SITE DETENTION DETAILS.
- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0080 FOR STORMWATER DRAINAGE DETAILS.

NOTES:

- ANY PROPOSED WORK ON COUNCIL'S LAND/ROAD DUE TO THE PROPOSED DEVELOPMENT SHALL BE SUBJECT TO SEPARATE APPROVAL FROM COUNCIL BEFOREHAND VIA SECTION 138 OF THE ROADS ACT 1993.
- ALL STORMWATER SYSTEM HAVE APPROPRIATE OVERLAND FLOW PATH TO CONVEY 1% AEP STORM RUNOFF TO OSD. FOR INTERNAL BUILDING DRAINAGE, ROOF DRAINAGE AND DOWNPIPE DESIGN, REFER TO HYDRAULIC ENGINEER DESIGN.
- POSITIVE COVENANT & RESTRICTIONS UNDER THE 88E PROVISIONS OF THE CONVEYANCING ACT 1919 ARE REQUIRED TO PROVIDE LEGAL PROTECTION FOR THE SYSTEMS REQUIRING OWNERS TO REPAIR AND MAINTAIN THE OSD SYSTEMS.

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										Drawn: J.Garbo Designed: Z.Wu Checked: A.Tarshan Approved: D.Fettell DRAWING NUMBER 427623-009-MMD-DA-01-DRG-C-0050	Revision: B Status: FOR APPROVAL Security: STD

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ISO A1 420 x 594mm



STORMFILTER TANK A
COLLECTING ROOF RUNOFF
ONLY.

OSD TANK B COLLECTING
STORMWATER RUNOFF.

EXISTING ROAD DRAINAGE PIT
AND PIPES. (TYP.)

BOUNDARY PIT WITH
OCEANASKET INSERT TO
REDUCE POLLUTANT OVER
STORM EVENTS. (TYP.)

ROAD DRAINAGE DESIGNED
BY MAKER AND, REF.
MKR0015 (TYP.)

ANDALUSIAN WAY

INSET 'A'

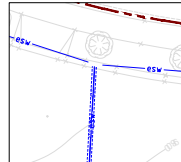
DE CLAMBE

BUILDING A
GROUND FLOOR
FFL:98.75

BUILDING B
GROUND FLOOR
FFL:100.50

GRATED SURFACE INLET PIT
COLLECTING SURFACE
RUNOFF AND SEEPAGE FROM
LANDSCAPE GARDEN. (TYP.)

PROPOSED ROAD

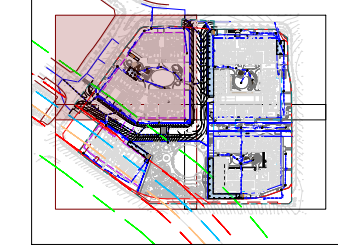


INSET 'A'

REFERENCES:
- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0002
FOR GENERAL NOTES AND LEGENDS.
- REFER TO DRAWINGS 427623-009-MMD-DA-01-DRG-C-0070
TO 427623-009-MMD-DA-01-DRG-C-0075 FOR ON-SITE
DETENTION DETAILS.
- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0080
FOR STORMWATER DRAINAGE DETAILS.

FOR CONTINUATION REFER TO DRG 427623-MMD-DA-01-DRG-0053

KEY PLAN



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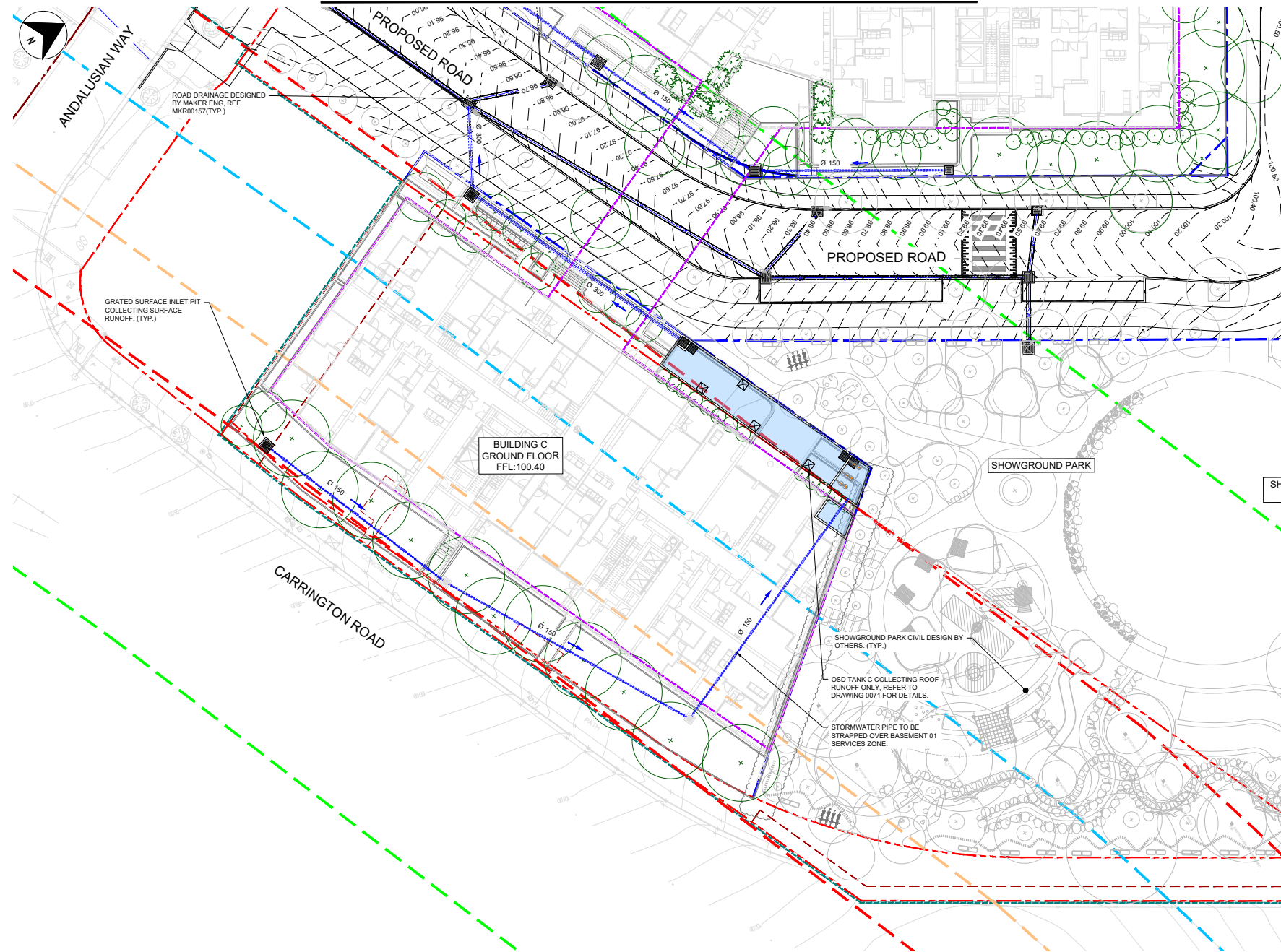
	Level 10, 383 Kent Street Sydney, NSW 2000 Australia NSW 1230, Australia PO Box Q1678, QVB Sydney T +61 (0)2 9098 6800 www.mottmac.com	B 24/05/24 A 19/01/24 P3 10/01/24 P2 13/12/23 P1 24/11/23	ISSUE FOR DEVELOPMENT APPLICATION ISSUE FOR DEVELOPMENT APPLICATION DRAFT ISSUE FOR DEVELOPMENT APPLICATION DRAFT ISSUE FOR DEVELOPMENT APPLICATION DRAFT ISSUE FOR DEVELOPMENT APPLICATION	AT AT AT AT AT	DF DF DF DF DF	SCALE 1:200 0 10m 20m		CLIENT DEICORP	TITLE Hills Showground Precinct East Castle Hill, NSW 2154 Stormwater Drainage Plan - Sheet 1	DRAWING INFORMATION	
										Drawn: J.Garbo Designed: Z.Wu Checked: A.Tarshan Approved: D.Fettell DRAWING NUMBER 427623-009-MMD-DA-01-DRG-C-0051	Revision: B Status: FOR APPROVAL Security: STD

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ISO A1 594 x 841mm

REFERENCES:

- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0002 FOR GENERAL NOTES AND LEGENDS.
- REFER TO DRAWINGS 427623-009-MMD-DA-01-DRG-C-0070 TO 427623-009-MMD-DA-01-DRG-C-0075 FOR ON-SITE DETENTION DETAILS.
- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0080 FOR STORMWATER DRAINAGE DETAILS.



FOR CONTINUATION REFER TO DRG 427623-MMD-DA-01-DRG-0054

KEY PLAN



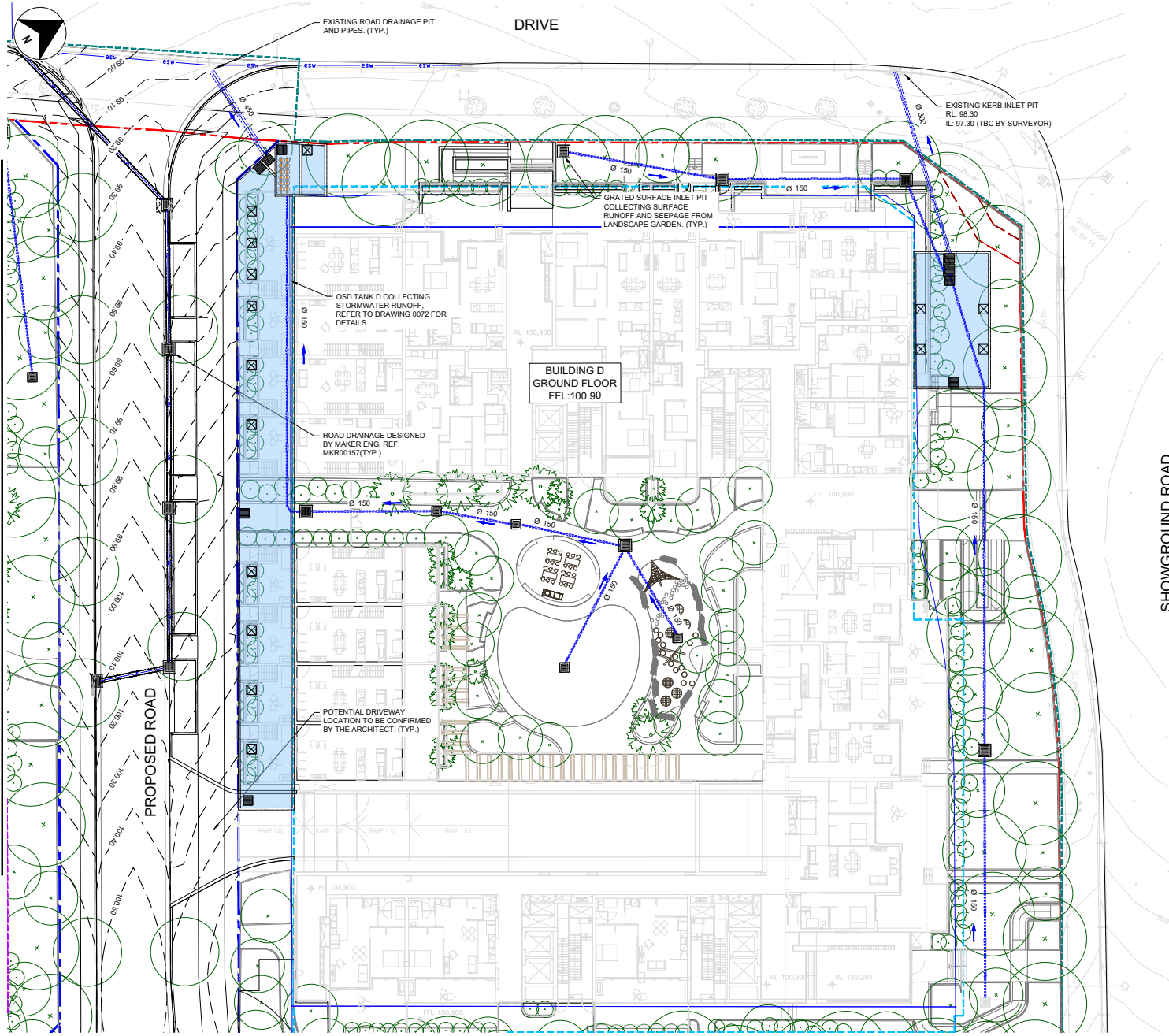
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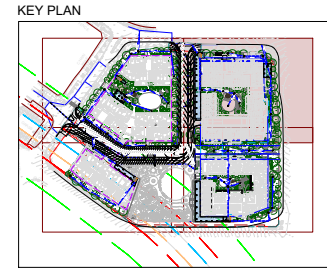
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									Drawn: J Garbo Designed: Z.Wu Checked: A.Tarshan Approved: D.Fettell DRAWING NUMBER 427623-009-MMD-DA-01-DRG-C-0052	Revision: B Status: FOR APPROVAL Security: STD

REFERENCES:
- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0002 FOR GENERAL NOTES AND LEGENDS.
- REFER TO DRAWINGS 427623-009-MMD-DA-01-DRG-C-0070 TO 427623-009-MMD-DA-01-DRG-C-0075 FOR ON-SITE DETENTION DETAILS.
- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0080 FOR STORMWATER DRAINAGE DETAILS.

FOR CONTINUATION REFER TO DRG 427623-MMD-DA-01-DRG-0051



SHOWGROUND ROAD



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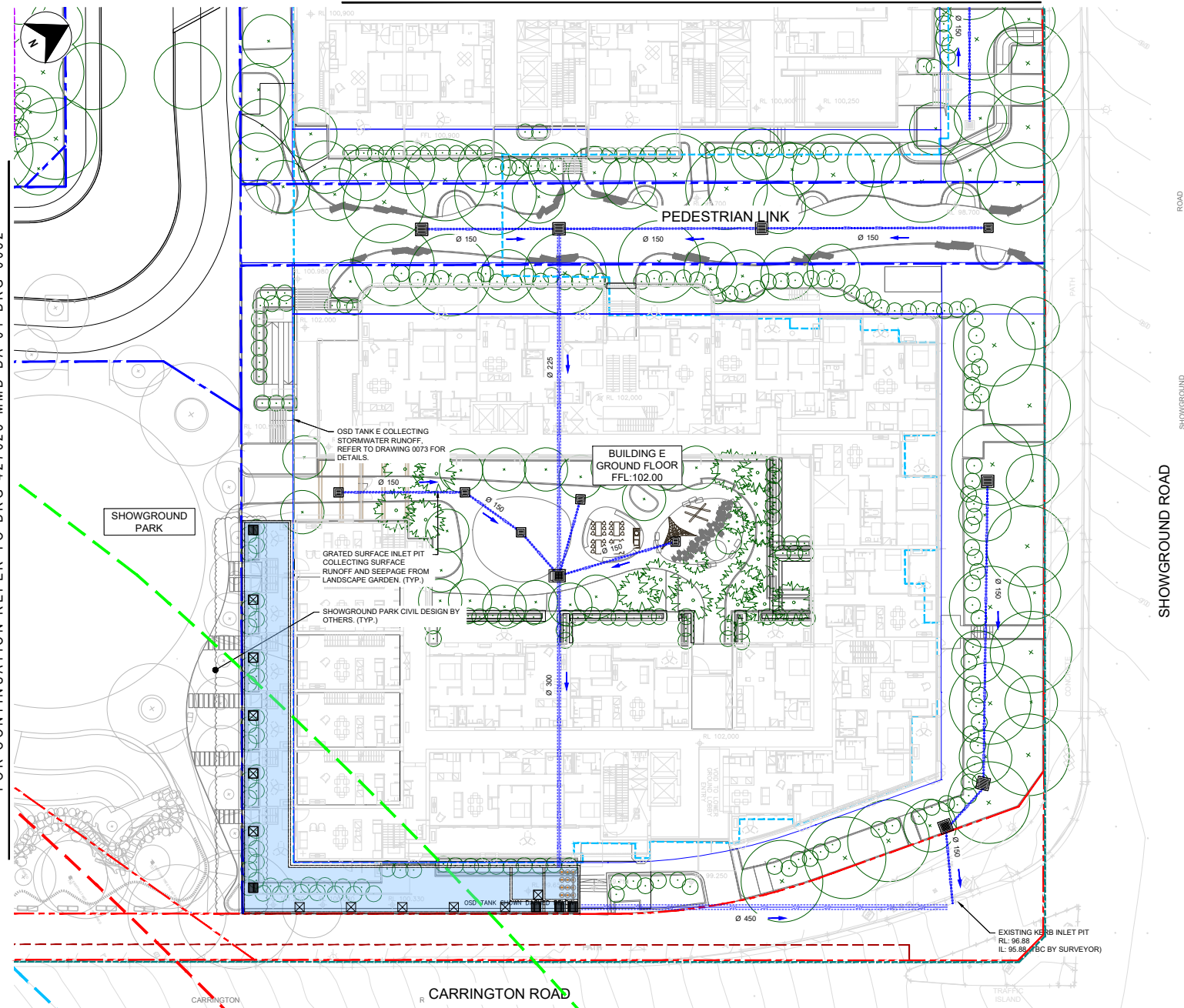
M M MOTT MACDONALD	Level 10, 383 Kent Street Sydney, NSW 2000 Australia NSW 1230, Australia PO Box Q1678, QVB Sydney T +61 (0)2 9098 6800 www.mottmac.com		B	24/05/24	ISSUE FOR DEVELOPMENT APPLICATION	AT	DF	SCALE 1:200 0 10m 20m	CLIENT DEICORP	TITLE Hills Showground Precinct East Castle Hill, NSW 2154 Stormwater Drainage Plan - Sheet 3	DRAWING INFORMATION			
	Drawn: J.Garbo				Revision: B									
	Designed: Z.Wu				Status: FOR APPROVAL									
	Checked: A.Tarshan				Security: STD									
	Approved: D.Fettell													
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Rev		Date		Description		Ch'k'd		App'd						

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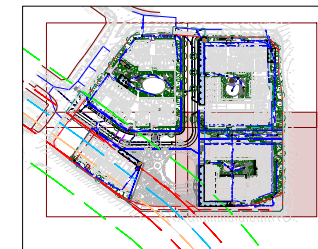
ISO A1 420 x 594 mm

REFERENCES:

- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0002 FOR GENERAL NOTES AND LEGENDS.
- REFER TO DRAWINGS 427623-009-MMD-DA-01-DRG-C-0070 TO 427623-009-MMD-DA-01-DRG-C-0075 FOR ON-SITE DETENTION DETAILS.
- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0080 FOR STORMWATER DRAINAGE DETAILS.



KEY PLAN



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ISO A1 420 x 594 mm



LEGEND

WATER QUALITY CATCHMENT

- SITE BOUNDARY
- BOUNDARY ADJACENT
- EXISTING EASEMENT
- PROPOSED SUBDIVISION BOUNDARY
- CATCHMENT - ROOF AREA
- CATCHMENT - LANDSCAPE
- CATCHMENT - MIXED AREA
- CATCHMENT - BYPASS
- CATCHMENT FLOW ARROW
- CATCHMENT BOUNDARY

REFERENCES:
- REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0002 FOR GENERAL NOTES.

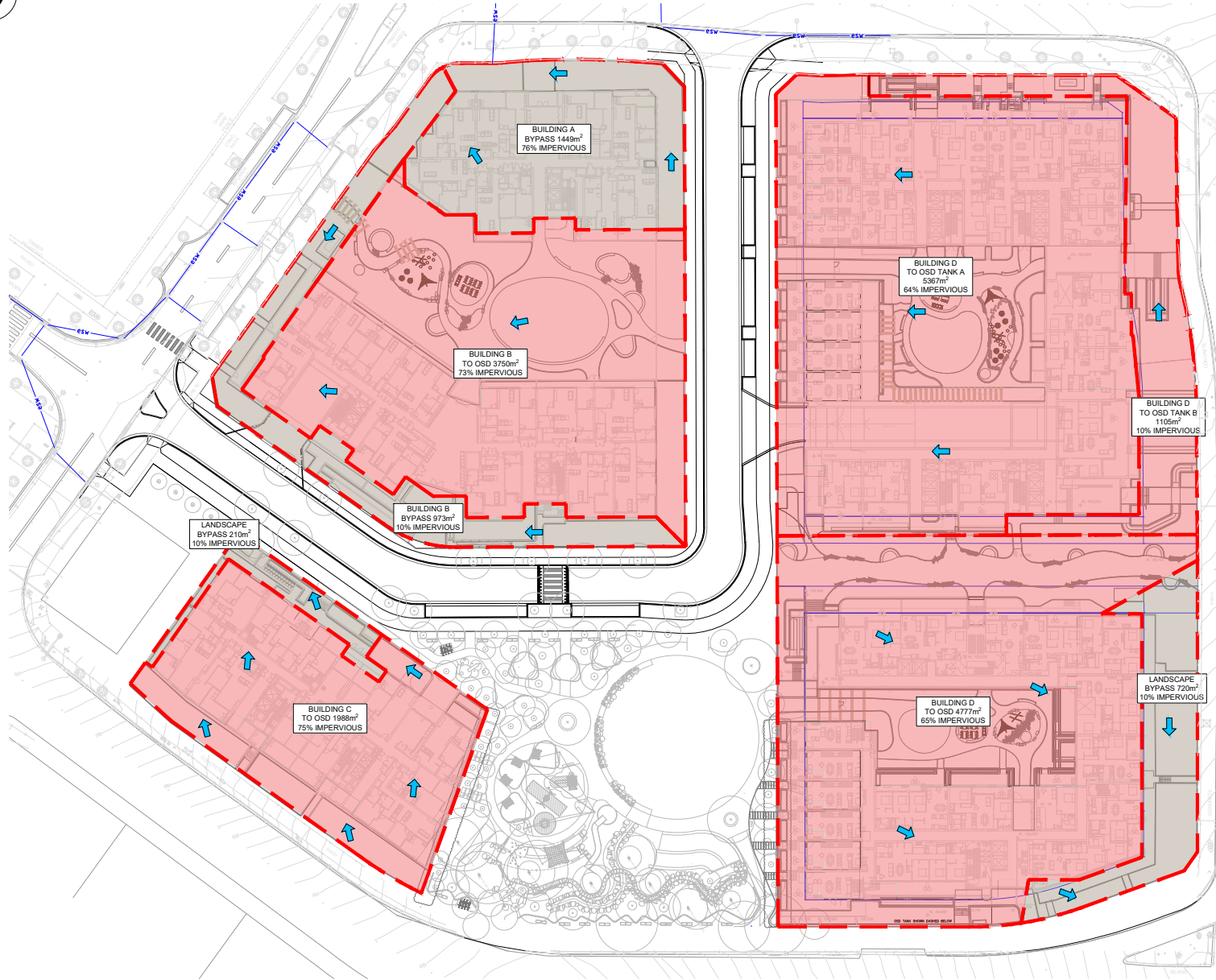
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	RevDateDescriptionChk'dApp'd										Drawn: J Garbo	Revision: B
											Designed: Z.Wu	Status: FOR APPROVAL
											Checked: A.Tarshan	Security: STD
											Approved: D.Fetell	
											DRAWING NUMBER 427623-009-MMD-DA-01-DRG-C-0060	

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ISO A1 420 x 594mm



LEGEND

WATER QUANTITY CATCHMENT

SITE BOUNDARY

BOUNDARY ADJACENT

EXISTING EASEMENT

PROPOSED SUBDIVISION BOUNDARY

CATCHMENT TO ON-SITE DETENTION

CTAHCMET BYPASS ON-SITE DETENTION

CATCHMENT FLOW ARROW

CATCHMENT BOUNDARY

REFERENCES:
REFER TO DRAWING 427623-009-MMD-DA-01-DRG-C-0002 FOR GENERAL NOTES.

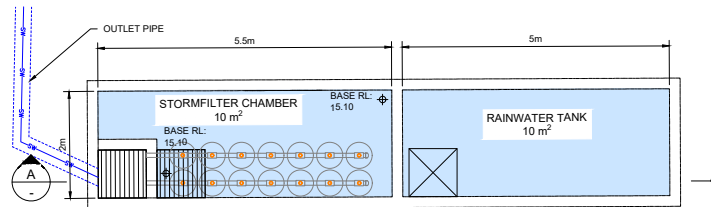
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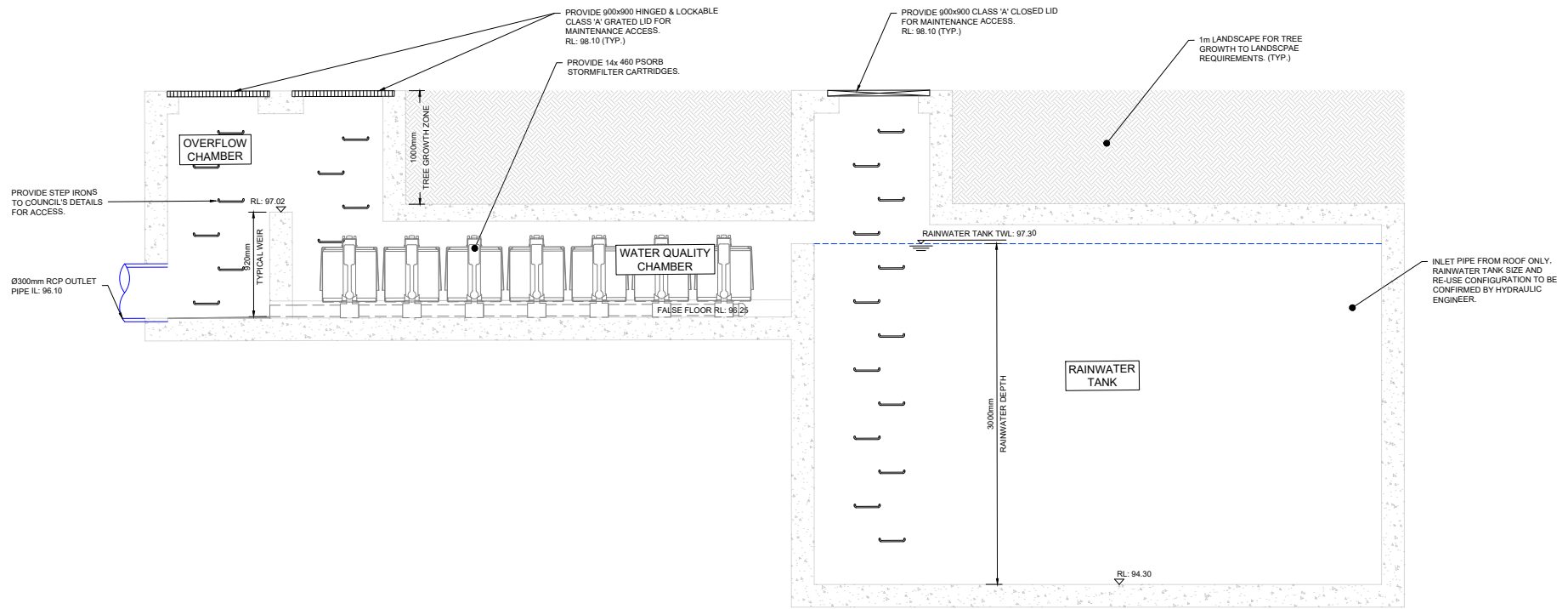
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	A	19/01/24	ISSUE FOR DEVELOPMENT APPLICATION	AT	DF	Drawn: J Garbo	Revision: B							
	P3	10/01/24	DRAFT ISSUE FOR DEVELOPMENT APPLICATION	AT	DF	Designed: Z.Wu	Status: FOR APPROVAL							
	P2	13/12/23	DRAFT ISSUE FOR DEVELOPMENT APPLICATION	AT	DF	Checked: A.Tarshan	Security: STD							
	P1	24/11/23	DRAFT ISSUE FOR DEVELOPMENT APPLICATION	AT	DF	Approved: D.Fettell								
	Rev Date Description		Chk'd	App'd	DRAWING NUMBER									
427623-009-MMD-DA-01-DRG-C-0061														

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ISO A1 420 x 594mm



STOMFILTER PLAN VIEW
SCALE 1:50



SECTION A
1:20

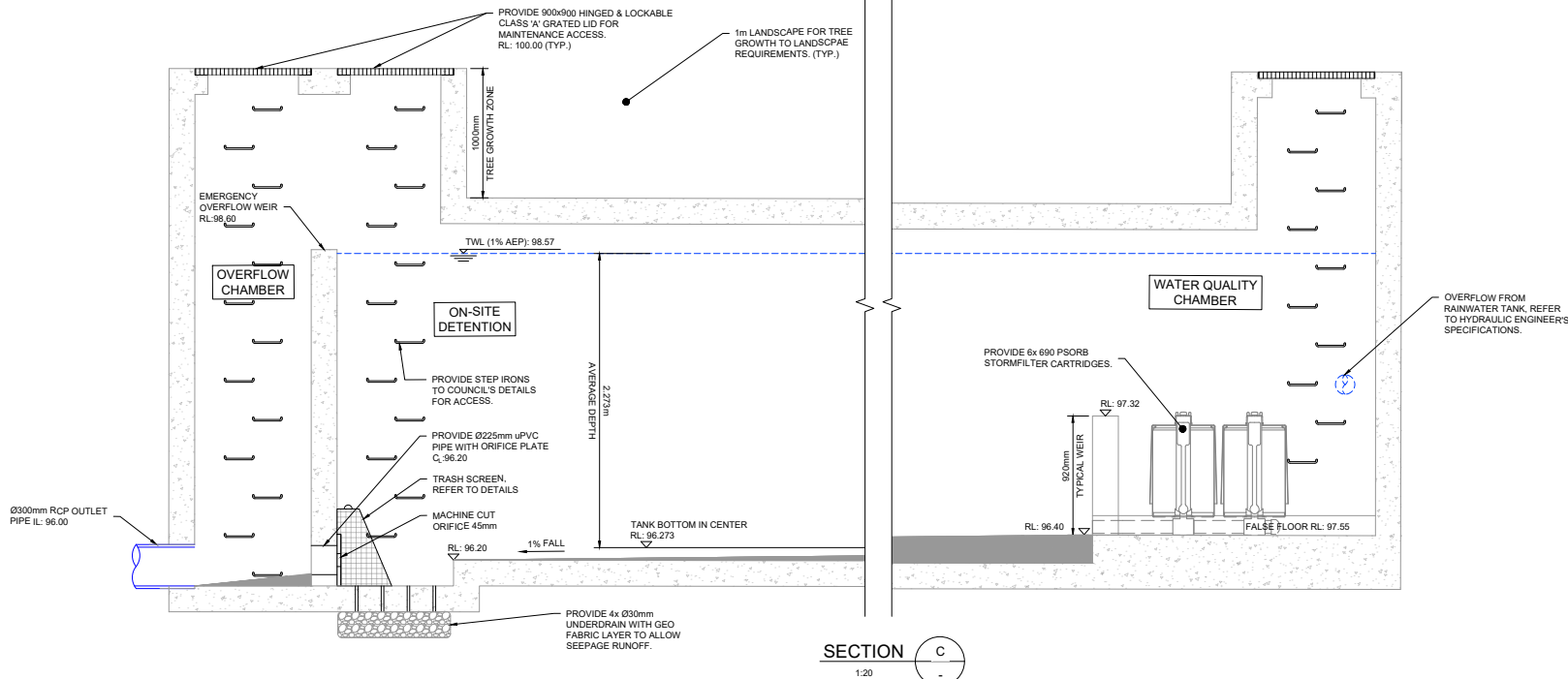
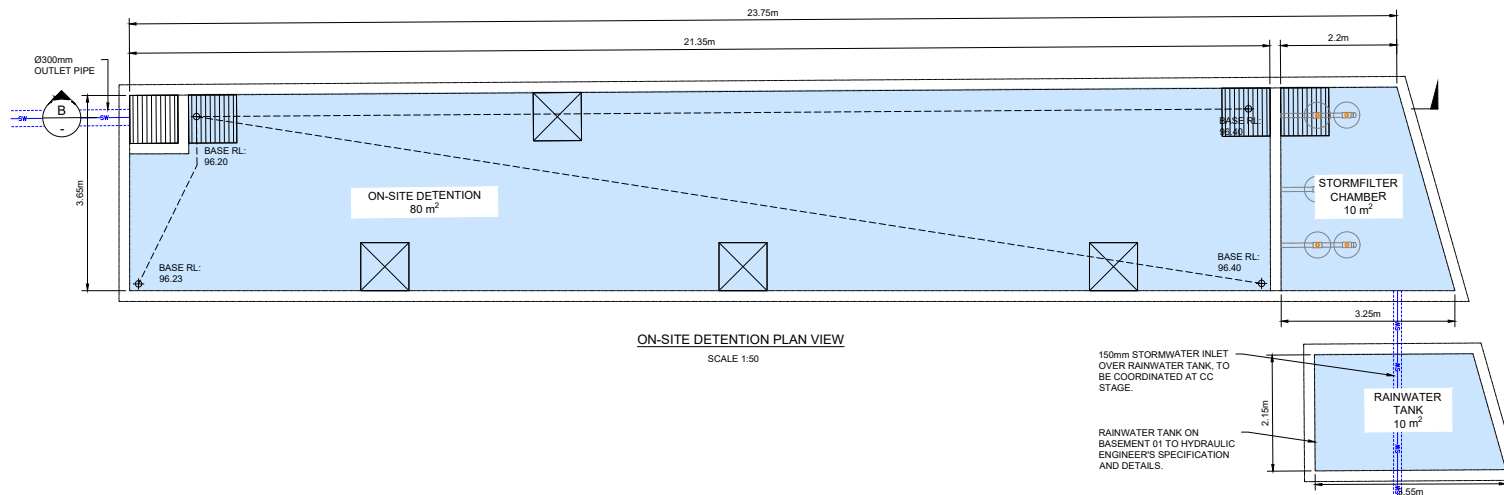
BUILDING 'A' WATER QUALITY CHAMBER

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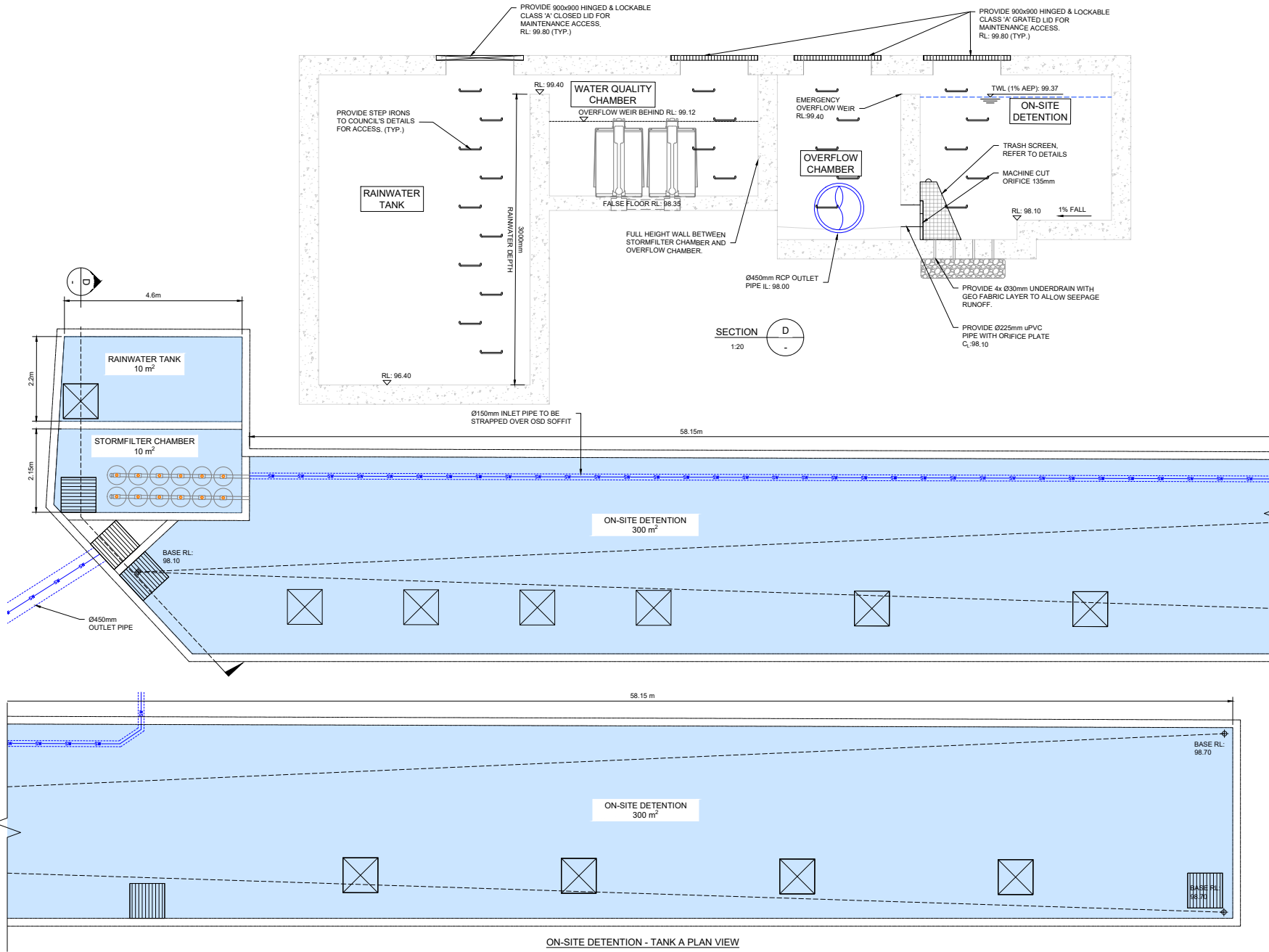
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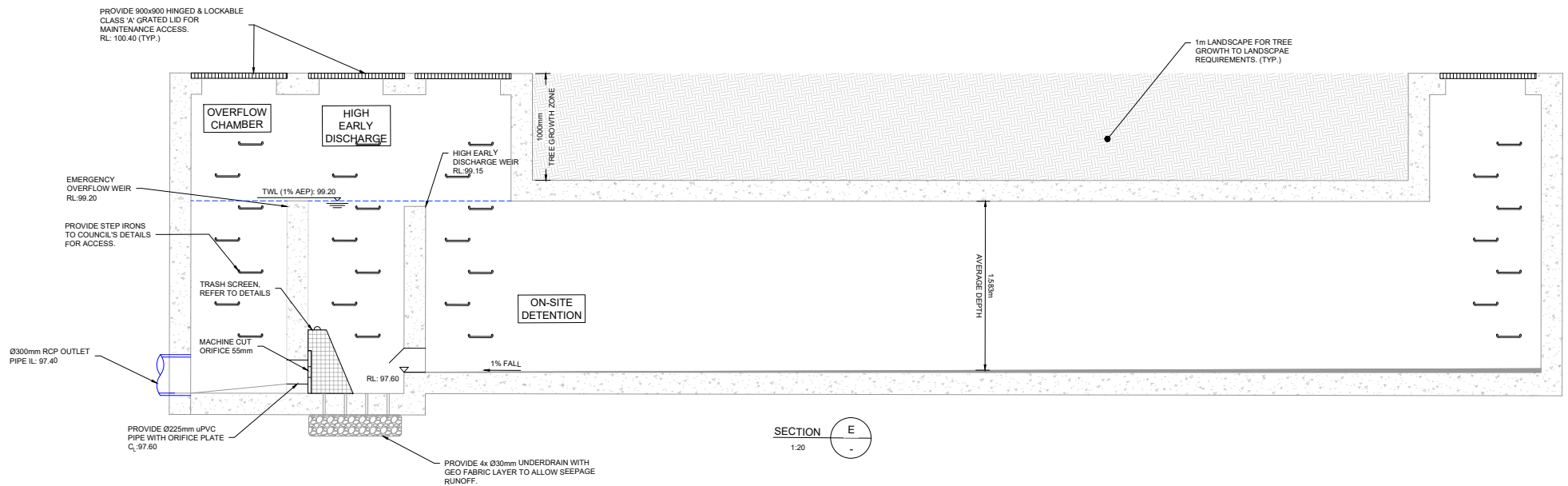
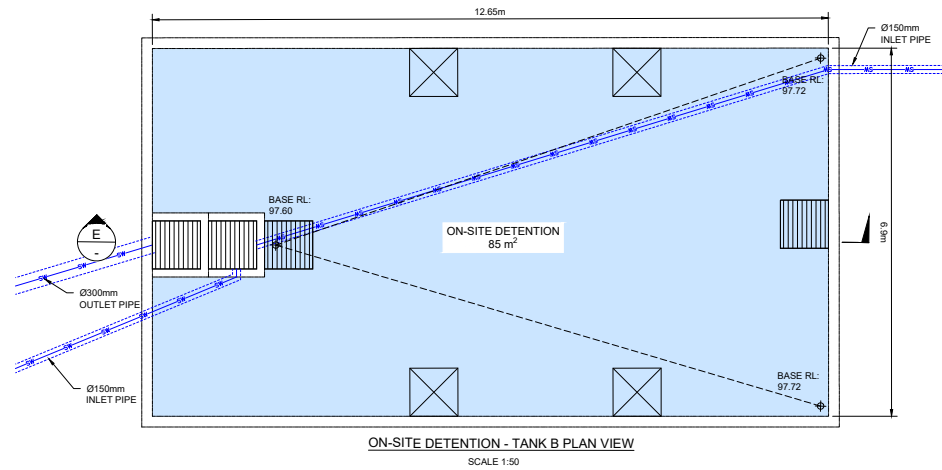
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		Rev	Date	Description	Ch'k'd	App'd				Drawn: J.Garbo Designed: Z.Wu Checked: A.Tarshan Approved: D.Fettell	Revision: B Status: FOR APPROVAL Security: STD
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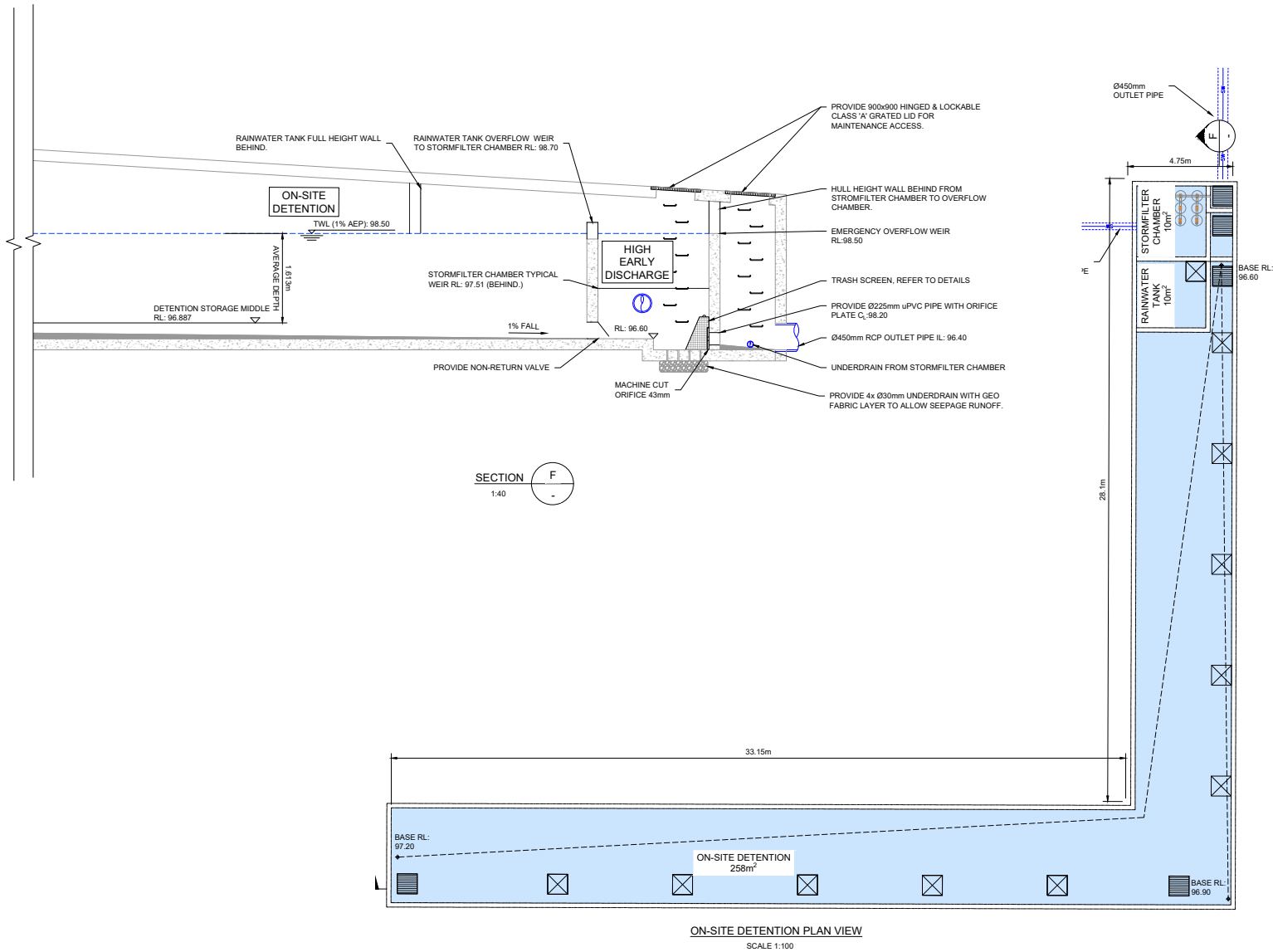


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P2	13/12/23	DRAFT ISSUE FOR DEVELOPMENT APPLICATION	AT	DF																											
P1	24/11/23	DRAFT ISSUE FOR DEVELOPMENT APPLICATION	AT	DF																											



ORIFICE CALCULATION:

MAXIMUM 1% AEP DISCHARGE RATE (Q_d) = 29.90L/s
(FROM UPRCT SPREADSHEET)

STORMFILTER CARTRIDGES FLOW RATE (Q_d) = 10.80L/s

DESIGNED FLOW RATE (Q_d) =
 $Q_d - Q_c = 29.90 - 10.80 = 19.10L/s$

DESIGNED WATER HEAD = 1.47m

$Q_{ORIFICE} = AC_d(2gh)^{0.5} = \pi x r^2 x 0.6 x (2 x 9.81 x 1.47)^{0.5} = Q_d$

THEREFORE, $r = 43mm$

- NOTES:**
- ALL INLETS ARE DIRECTED TO THE STORMFILTER CHAMBER WHICH WILL BE SIZED FOR THE 4EY STORM EVENT.
 - THE UNDERDRAIN FROM THE SF CHAMBER DRAINS PAST THE DCP AND THE ORIFICE HAS BEEN ADJUSTED TO ACCOUNT FOR THE FLOW
 - THE SFC OVERFLOWS INTO THE HED WHICH OVERFLOWS INTO THE MAIN STORAGE

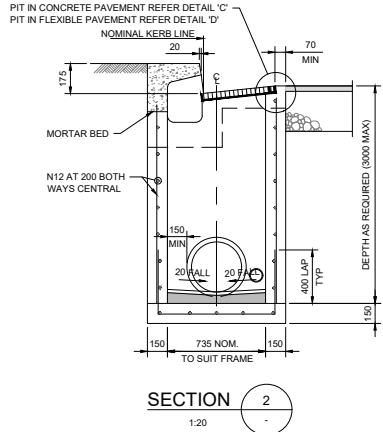
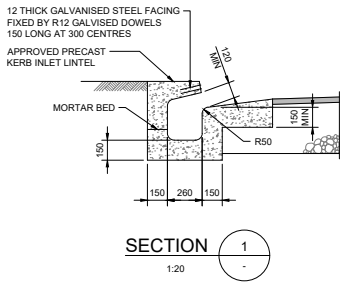
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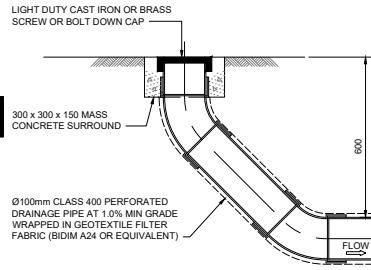
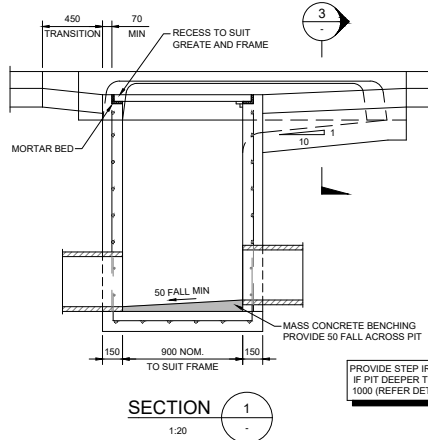
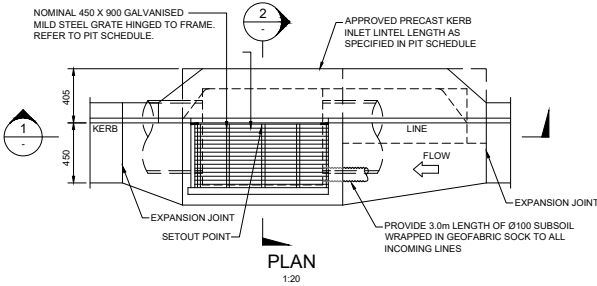
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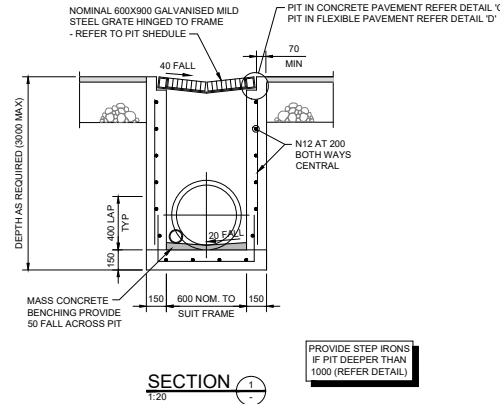


GRADED KERB INLET PIT
(PIPE SIZES $\leq \varnothing 375$)

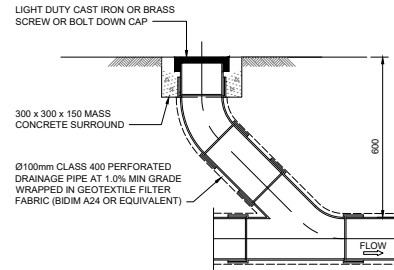


HIGH END RISER (HER)

1:10

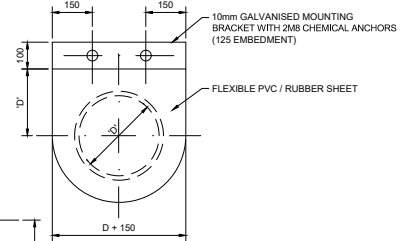
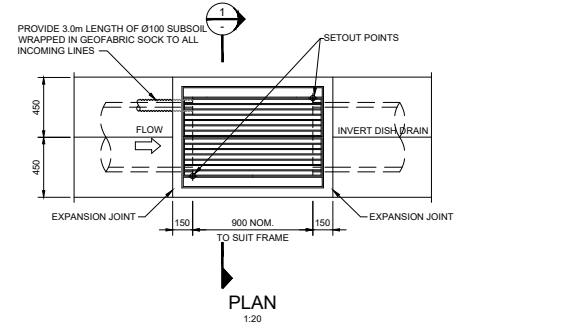


SURFACE INLET / JUNCTION PIT
IN DISH DRAIN
(PIPE SIZES $\leq \varnothing 450$)



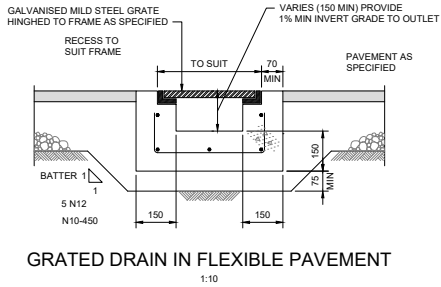
INTERMEDIATE RISER (IR)

1:10



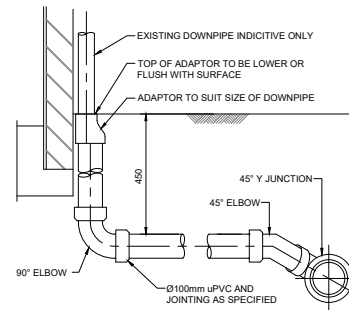
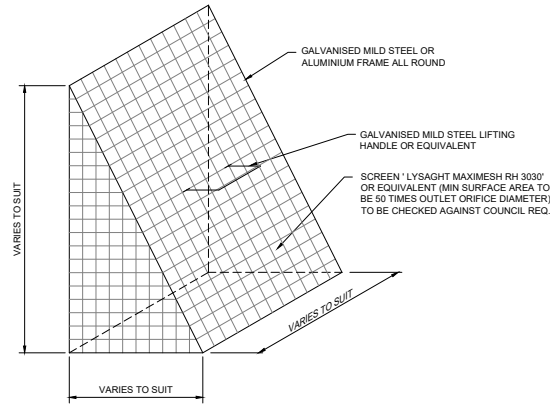
FLAP VALVE

1:10



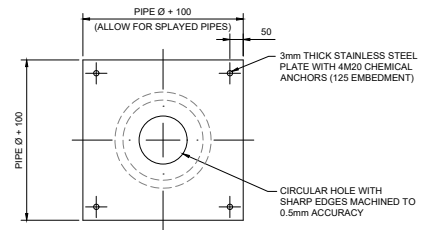
GRADED DRAIN IN FLEXIBLE PAVEMENT

1:10



uPVC DOWNPIPE CONNECTION

1:10



ORIFICE PLATE - TYPE A

1:10

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 Level 10, 383 Kent Street Sydney, NSW 2000 Australia NSW 1230, Australia PO Box Q1678, QVB Sydney T +61 (0)2 9098 6800 www.mottmac.com	B 24/05/24 ISSUE FOR DEVELOPMENT APPLICATION A 19/01/24 ISSUE FOR DEVELOPMENT APPLICATION P3 10/01/24 DRAFT ISSUE FOR DEVELOPMENT APPLICATION P2 13/12/23 DRAFT ISSUE FOR DEVELOPMENT APPLICATION P1 24/11/23 DRAFT ISSUE FOR DEVELOPMENT APPLICATION	AT DF 1:5 0 250mm 500mm AT DF 1:10 0 500mm 1000mm AT DF 1:20 0 1000mm 2000mm	CLIENT  DEICORP	TITLE Hills Showground Precinct East Castle Hill, NSW 2154 Stormwater Details	DRAWING INFORMATION Drawn: J Garbo Designed: Z Wu Checked: A Tarshan Approved: D Fattell DRAWING NUMBER 427623-009-MMD-DA-01-DRG-C-0080 Revision: B Status: FOR APPROVAL Security: STD
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