Parramatta Aquatic Centre

Stormwater Management Report

Prepared for: The City of Parramatta Council

Attention: Ben Chaplin

Date: 6 March 2020

Prepared by: Renata Tracey

Ref: 38574

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Revision

Site Address: Park Parade, Parramatta 2150
Proposed Development: Parramatta Aquatic Leisure Centre

Client: The Parramatta City Council
Local Authority Parramatta Council
Authority Reference #: N/A
Wood & Grieve Reference: 38574

R. Tracey

Renata Tracey

For and on behalf of

Wood & Grieve Engineers

Revision	Date	Comment	Prepared By	Approved By
A	06/03/2020	DRAFT SSDA	GYD	RET

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1. Introduction

Wood & Grieve Engineers have been commissioned by the City of Parramatta Council to prepare this Stormwater Management Plan (SMP) in support of the State Significant Development Application for the proposed works associated with the Parramatta Aquatic Centre development located at the corner of Park Parade and Pitt Street, Parramatta, NSW. The site's real address is LOT: 7055 DP: 1074336.

This SMP outlines the conceptual water management design for the proposed redevelopment of the site.

The purpose of this SMP is to evaluate the stormwater management methodology associated with the proposed development plan so as to demonstrate that the appropriate strategies have been adopted.

The SMP specifically addresses the following items for both the construction and operational phases of the development:

- Flood Impacts
- Stormwater runoff volumes and detention (Stormwater Quantity)
- Stormwater quality treatment measures (Stormwater Quality)
- Erosion and Sedimentation Control

2. Relevant Policies, Standards and Guidelines

The following listed policies, standards and guidelines were referred to in the preparation of this report:

- Parramatta Council Development Control Plan 2011
- AS3500
- Australian Rainfall & Runoff 2016;
- AS3500 parts 0-5: 2013 Plumbing and Drainage
- AS2890 parts 1-6: 2009 Parking Facilities
- AS1428 parts 1-5: 2010 Design for Access and Mobility
- Landcom Managing Urban Stormwater: Soils and Construction Volume 1 2004
- NSW Floodplain Development Manual 2005
- Guidelines for development adjoining land and water managed by DECCW (OEH, 2013)

3. Existing Site Characteristics

3.1 Property Detail

Address: **Park Parade, NSW 2150**

LOT: 7055 DP: 1074336

Total Site Area: 4.582Ha

The proposed development can be seen on the concept design drawings in Appendix A of this report.

The proposed development will consist of the earthworks associated with the Parramatta Aquatic Centre. The site location aerial photo below (Figure 1), the site is Bounded by Par Parade to the east, Parramatta High School to the south and residential properties to the west.

Figure 1 – Site Location Plan

3.2 Topography

The site currently falls from west to east at a grade of approximately 10%. At the southwest corner there is a maximum elevation of approximately 40m AHD and at the southeast corner of the site there is a minimum elevation of approximately 17m AHD. The image below (Figure 2) shows the topography of the site with contours at 1m spacing.

Figure 2 – Site Topography

3.3 Stormwater Catchments

3.3.1 External Catchments

The surrounding area has been investigated to determine the likely impact of existing external stormwater catchments on the proposed site. It is noted that there are no external catchments coming into the site. **Refer Figure 3 below.**

3.3.2 Internal Catchments

The internal site catchment sheet flows from west to east. Overland flow is ultimately captured by a series of kerb inlet pits within Park Parade.

Figure 3 – Existing Topography and Catchments

3.4 Existing Drainage Line and Stormwater Discharge

Internally, the site does not appear to have any existing stormwater infrastructure. The site discharges to the series of kerb inlet pits within Park Parade.

See below which shows the site survey with the existing kerb inlet pits highlighted. It is recommended that the existing condition, inverts and pipe sizes of this network be surveyed prior to detailed design.

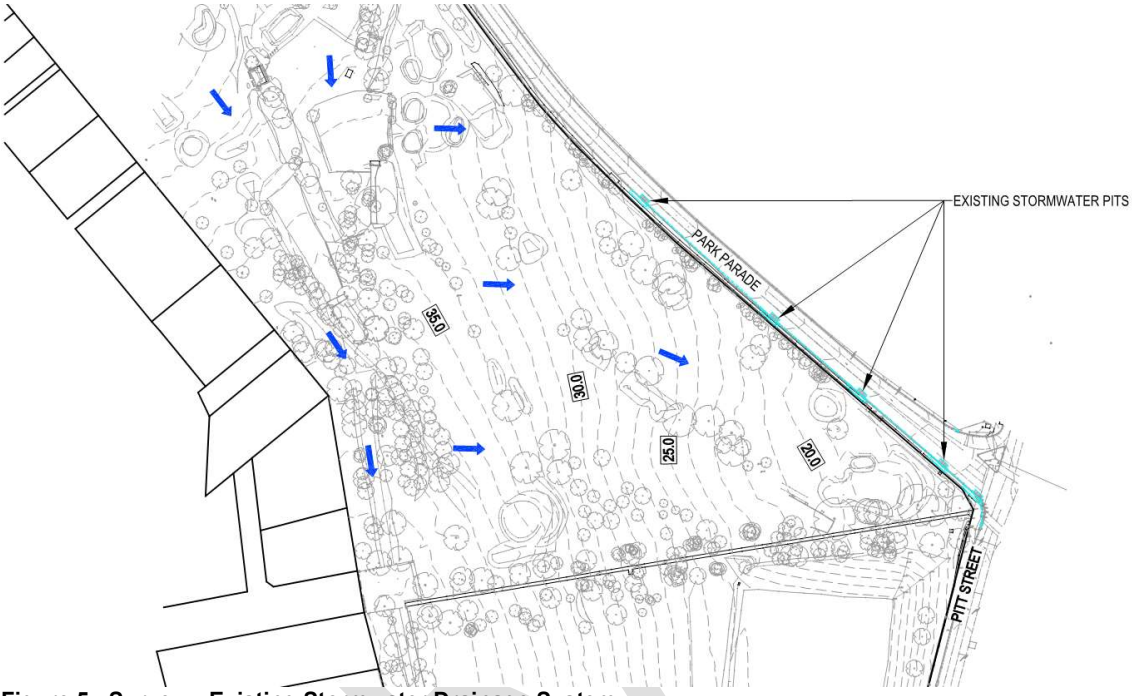

Figure 5 - Survey – Existing Stormwater Drainage System

4. Local Authority Requirements

4.1 Local Council

The site is located within the City of Parramatta LGA and stormwater management design is governed by the Parramatta LEP and DCP.

City of Parramatta specify stormwater management requirements for developments in their Development Engineering Guidelines (2018). This Guide confirms the requirements for stormwater conveyance through the site and stormwater discharge controls. The On-site Detention requirements for the site are outlined in the Upper Parramatta River Catchment Trust On-site Stormwater Detention Handbook 4th Edition December 2005.

The Council design standards will be discussed in the following sections.

4.1.1 Stormwater Conveyance Requirements

Council specify the following average recurrence intervals (ARI) shall be used for stormwater drainage design relating to development:

Component	Design ARI (Years)
Surface/piped drainage	5
Surface/piped drainage – critical facilities	100
Eaves gutters/downpipes	20
Eaves gutters/downpipes – charged line drainage systems or in association with an OSD system	100
Box gutters	100
Overland flow path	100
Outlet to natural watercourse	20
Inter-allotment drainage (where a flowpath for flow in excess of the pipe capacity has been provided)	20
Inter-allotment drainage (pipe only)	100
Street drainage	20

The overland flow paths must be capable of conveying the maximum discharge between the 100 year ARI catchment runoff and pipe system capacity, safely connecting to the closest existing overland flow path (road reserve). This may require improvements to the surface of easements where relied upon by the proposed development.

4.1.2 On Site Detention Requirements

City of Parramatta Development Engineering Guidelines (2018) state that On-site Detention systems (OSD) when required, are to be designed in accordance with the specific requirements of (as relevant) The Upper Parramatta River Catchment Trust On-site Detention Handbook.

The aims of the OSD policy is to achieve the following:

- Ensure that new developments and redevelopments do not increase peak stormwater flows in any downstream area during major storms up to and including 100 year ARI (1% AEP) events.
- Reduce post development peaks throughout the catchment in the 1.5 year ARI event to be as close to natural levels as practical and encourage the integration of OSD with other water quality measures.
- There should be no increase in the site discharge to the downstream drainage systems nor reduction in the volume of storage provided unless specifically allowed.

The Upper Parramatta River Catchment Trust On-site Detention Handbook states that the following properties must a have an On-Site Detention system:

- Subdivisions (including residential) approved after 1991;
- Single dwellings on lots created by a subdivision approved after 1991, unless communal OSD system was constructed as part of the subdivision;
- All commercial, industrial and special- use developments and buildings;
- Town houses, villas, home units, duplexes and dual occupancies;
- Semi-detached residential/commercial and residential/industrial properties;
- Buildings, car parks and other sealed areas of public sport and recreational facilities;
- Single dwellings, extensions and additions;
- Sites that include WSUD and water re-use;
- Tennis courts;
- Roads, car parks, paths and other sealed areas; and
- Public buildings;

Given that the site falls under the "Buildings, car parks and other sealed areas of public sport and recreational facilities" definition, on-site detention is required. As such, on-site detention will be required as per the following:

- The Site Reference Discharge (SRD) for the primary (lower) orifice outlet (SRD_L) is 40 L/s/ha. The SRD for the secondary orifice outlet (SRD_U) in the DCP is 150 L/s/ha.
- The overall (total) Site Storage Requirements (SSR_T) is 455 m^3/ha. The SSR for the OSD storage is partitioned into extended detention (lower) and flood detention (upper) storages. The maximum SSR for the extended detention storage is 300m^3/ha.
- The SSRs are only adjusted if a rainwater tank is included in the development/redevelopment and an airspace "credit" is claimed to partially offset the SSR.

The Upper Parramatta River Catchment Trust On-site Stormwater Detention Handbook states that portions of large lots which are unaffected by the development may be excluded from the area to be controlled by the OSD systems, provided flows from these areas can be diverted around the OSD system.

4.1.3 Legal Point of Discharge

Council requires that developments drain via a gravity fed drainage system. For developments up to 30l/s, discharge via a kerb outlet will be permitted and for development exceeding 30l/s, discharge from the site shall be connected to Council's underground piped drainage network. Where no Council pipe exists in the immediate vicinity, disposal will require a suitable designed and constructed pipeline to the nearest available Council drainage system (generally not exceeding 15m).

4.1.4 Stormwater Quality and Pollution Control

The City of Parramatta Engineer Design Guidelines specify that Water Sensitive Urban Design (WSUD) requirements set out by each former local council area are followed. Since the site falls in the Parramatta LGA the Parramatta DCP (2011) design standards discussed below.

The Parramatta DCP (2011) states that the on-site drainage systems shall be designed to include suitable means to ensure that the quality of stormwater leaving the site meets the specified reduction targets. Targets are set out below.

Pollutant	Performance Target reduction loads[1]
Gross Pollutants	90% reduction in the post development mean annual load of total gross pollutant load (greater than 5mm)
Total Suspended Solids	85% reduction in the post development mean annual load of Total Suspended Solids (TSS)
Total Phosphorus	60% reduction in the post development mean annual load of Total Phosphorus (TP)
Total Nitrogen	45% reduction in the post development mean annual load of Total Nitrogen (TN)
Hydrocarbons, motor oils, oil and grease	No visible oils for flows up to 50% of the one-year ARI peak flow specific for service stations, depots, vehicle body repair workshops, vehicle repair stations, vehicle sales or hire premises, car parks associated with retail premises, places of public worship, tourist and visitor accommodation, registered clubs and pubs

NOTE: Reductions in loads are relative to the pollution generation from the same development without treatment.

Table 1 – Water Sensitive Urban Design Reduction Targets (Parramatta DCP (2011))

All developments must consider WSUD measures listed in the table below in order to achieve water quality and quantity targets.

WSUD Measure	Allotment Scale	Subdivision Scale	Open Space or Regional Scale
Vegetated Swales	N/A	Yes	Yes
Vegetated Filter Strips	Yes	Yes	Yes
Sand Filters	Yes	Yes	Yes
Bioretention Systems • Off-line (planting beds) • On-line (conveyance)	 Yes Yes	 Yes Yes	 Yes Yes
Permeable Pavements	Yes	Yes	Yes
Infiltration Trenches	Yes	Yes	Yes
Infiltration Basins	N/A	Yes	Yes
Rainwater Tanks	Yes	N/A	N/A
Landscape Developments	Yes	Yes	Yes

Table 2 – Scale of WSUD Application in Urban Catchments (Parramatta DCP (2011))

Selection of treatment methods will be heavily dependent on the proposed design layout of the site.

5. Flood Impact Assessment

When considering a new development, it is important to assess the impact of existing flooding on the proposed development and also the impact of the proposed development on existing or potential flooding both upstream and downstream of the development.

5.1 Flooding

The site is not located in a flood affected area. Refer figure below.

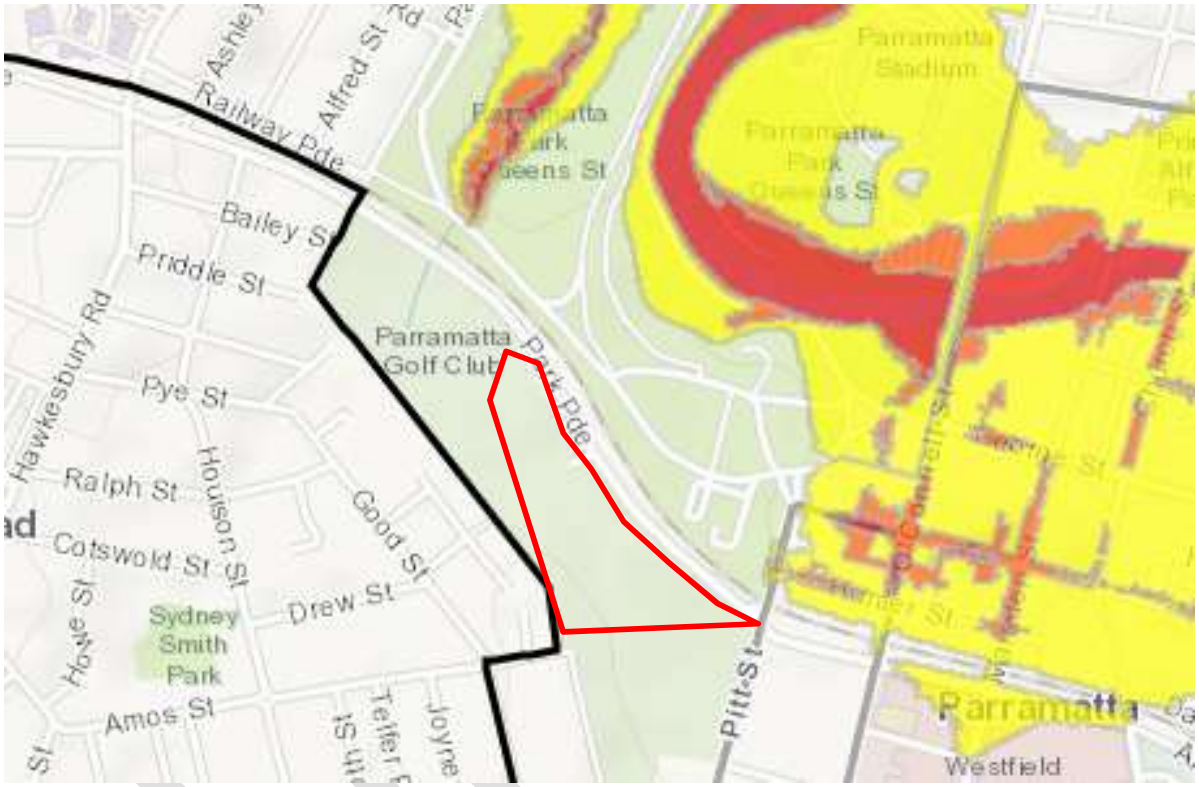

Figure 4 – Parramatta Council Floodsmart Flood Warning Areas

Table 1 – Parramatta Council Flood Risk Areas Explained (Source : Parramatta Council Website)

	Common Description	Technical Description
High Risk Area	• Frequent flooding is common • Near the main river and creeks where water flows during a flood, including overflow from drainage • This area will see the fastest flowing and deepest water and cause a significant risk to life	High hazard flood area within the 1% annual exceedance probability (AEP) (1:100)
Medium Risk Area	• Frequent flooding will be rare • Where the flood water goes once the creek/river areas overflow • In rare floods these areas have the potential for deep and fast flowing water	Medium and low hazard area in the 1% AEP (1:100)
Low Risk Area	• Flooding is extremely rare • Generally, away from the river or creek and higher up • If a flood affects these areas it will cover a large area with dangerous water in many places	Area from the 1% AEP (1:100) up to the Probable Maximum Flood
Everywhere Else	Not expected to flood but there still could be local incidents water running off the land and of street drainage not coping with rainfall amounts.	Area outside the Probable Maximum Flood. There may still be isolated impacts from local overland flow.

5.2 Development Flood Impacts

The proposed development will maintain existing overland flow paths and convey all overland flow away from habitable floor areas. Access to the site is not impeded by flooding.

Given that it can be confirmed that the development will not impact on any existing floodplain nor will flooding impact on the development there has been no further development specific flood modelling undertaken at this time.

6. Stormwater Conveyance

This section of the report discusses the systems proposed to allow for stormwater to be conveyed across the site to the legal point of discharge.

As discussed in Section 4 of this report The City of Parramatta Council requirements set the minimum design parameters for the design of stormwater conveyance infrastructure through the site.

6.1 Surface Drainage

The surface areas will be drained through a variety of methods, discussed below, in accordance with AS3500.3:2015 and Council's stormwater drainage guidelines.

6.1.1 In-Ground Drainage

The in-ground drainage has been designed to meet the following criteria:

- In the minor design storm event (5 year) there will be no surcharging of the in-ground drainage system and;
- In the major design storm event (100 year) there will be no uncontrolled discharge from the site.

Surface runoff from the development site will be directed to stormwater inlet structures. The inlet structures have been designed to adequately convey the surface runoff into the in-ground drainage network.

The runoff will then be conveyed underground across the site through a pit and pipe system to the on-site detention tank. From the on-site detention tank stormwater will be conveyed to the legal point of discharge in a controlled manner through an inground pipe system.

6.2 Legal Point of Discharge

The legal point of discharge for the development will be to the kerb inlet pits within Park Parade as per existing condition.

7. Stormwater Attenuation

As discussed in section 4.1.2 The Upper Parramatta River Catchment Trust On-site Stormwater Detention Handbook sets targets for site storage requirements and Site Reference Discharge.

The site catchment area has been calculated as having a total area of 4.582Ha. Given that the pervious area of 2.23Ha will bypass the stormwater system, the remaining area of 2.352Ha will be used to rationalise the on-site detention tank volume. Refer figure below for catchment areas.

Figure 5 – Proposed Catchment Areas

The On-Site Detention Calculation Sheet for UPRC HED Secondary Outlet has been used to determine the following site specific requirements. Refer table below.

Table 2 – Site Specific Requirements in accordance with the UPRCT On-Site Stormwater Detention Handbook

Area Ha	Required SRD_L L/s	Required SRD_U L/s	Required SSR (Total) m^3	Required SSR (Extended) m^3
2.352	67.62	176.40	1070	706

Refer Appendix B for Upper Parramatta River Catchment (UPRC) Calculation Sheet.

As can be seen in the table above, Parramatta Council standards require a significant on-site detention tank based on the rate applied to the developed area of the site. It is proposed that an alternative approach be adopted to maximise rainwater re-use while also controlling the site release rate.

An On-Site Detention system is proposed which will have storage for passive irrigation re-use and control the site release rate to that of the pre-development release rate. Refer in-principle representation of the proposed tank configuration below.

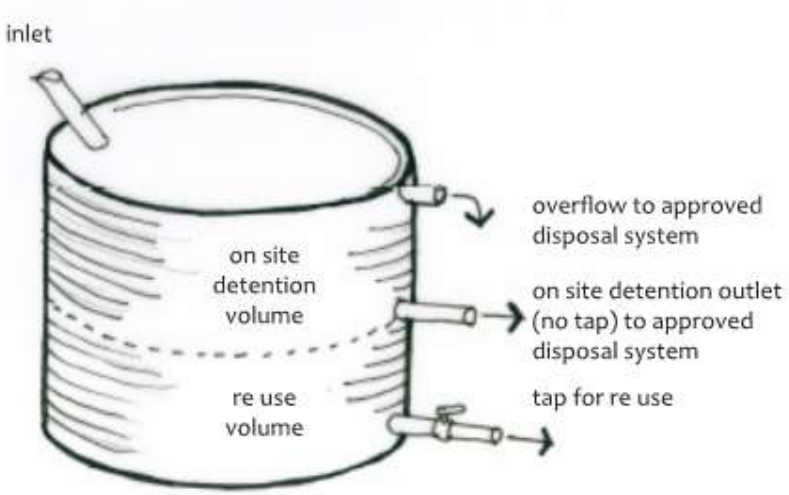

Figure 6 – Combined Re-Use and Detention Tank (Source : Blue Mountains Council DCP Part C6)

On-Site Detention Sizing

Hydraulic modelling of the catchment was undertaken using DRAINS stormwater modelling software to determine the required on-site detention volume to control the post developed flows to that of the pre-developed flows.

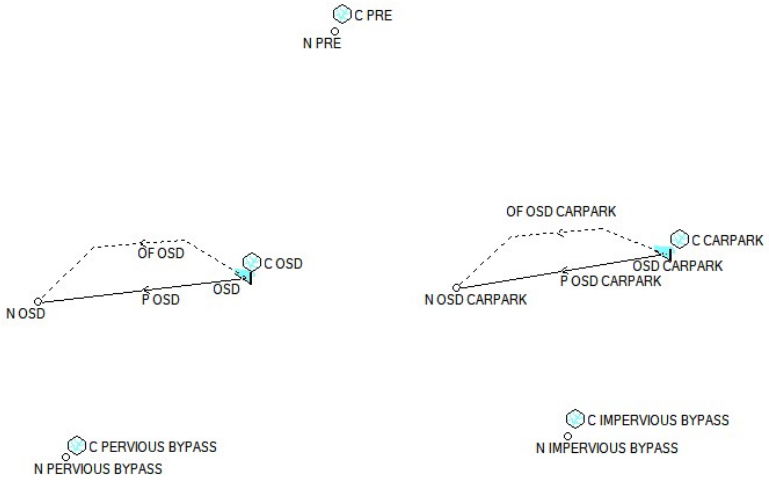

Figure 7 – DRAINS Model Layout

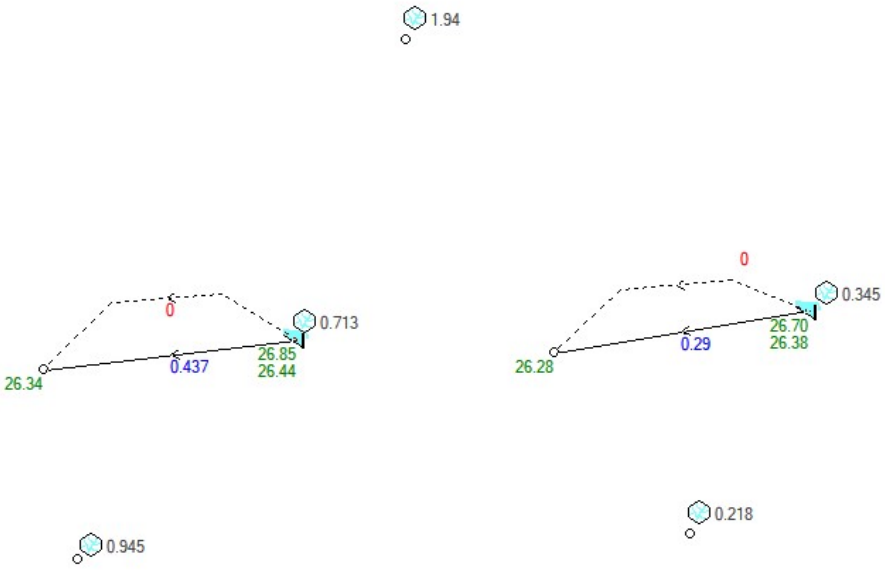

Figure 8 – DRAINS Model Results

Inputs and results are displayed in the tables below.

Table 3 – Hydraulic Modelling of the Pre Developed Scenario

	Area (Ha)	% Impervious	OSD Volume (m^3)	100yr Release Rate (L/s)
Catchment Area	4.582	0%	-	1940

Table 4 – Hydraulic Modelling of the Post Developed Scenario

	Area (Ha)	% Impervious	OSD Volume Provided (m^3)	100yr Release Rate (L/s)
Roof	1.296	100%	170	437
Carpark	0.66	100%	40	290
Impervious Bypass	0.396	100%	-	218
Pervious Bypass	2.23	0%	-	945
TOTAL	**4.582**	**-**	**210**	**1890**

As shown in the table above, the on-site detention storage of the tank will attenuate the post-developed flows back to that of the pre-developed flows. This is considered a reasonable approach given that the proposed system will not increase the flows from the existing case.

Refer Appendix C for DRAINS Results.

Rainwater Re-Use Sizing

Based on the proposed site levels and proposed landscaped areas, it is estimated that approximately 1Ha of the site can be passively irrigated via subsurface irrigation from proposed detention areas. A rate of 0.3kL/year/m^2 has been adopted in accordance with *Blacktown City Council's Developer Handbook For WSUD* Section 18.11 Rainwater and Stormwater Tanks.

Table 5 – Passive Subsurface Irrigation Re-Use

Proposed Landscaped Area (Ha)	Subsurface Irrigation Rate (m^3/year/m^2)	Annual Subsurface Irrigation Re-Use (m^3/year)	Daily Subsurface Irrigation Re-Use (m^3/day)
1.0	0.3	3,000	8.219

To determine the number of days where the re-use storage is empty or full, rainfall data has been taken from the Bureau of Meteorology Climate Data Rainfall Monitoring Station Number 66124 located in Parramatta North (Masons Drive) for a full calendar year from 1st March 2019 – 29th February 2020. Results are summarised below.

Table 6 – Proposed Rainwater Re-Use Data

Catchment Contributing to Re-Use (Ha)	Proposed Rainwater Re-Use Storage Volume (m^3)	Days Rainwater Storage is Exceeded per Year	Number of Days Storage is Empty per Year
1.296	125	53	114

As shown above, based on the rainfall data from 1st March 2019 – 29th February 2020, there would be 53 days of the year where rainwater re-use volume would over-top into the on-site detention storage. There is also 251 days of the year where the rainwater storage within the tank could passively irrigate the site using sub-surface irrigation.

Refer Appendix D for Rainwater Re-Use Calculations.

8. Stormwater Quality Treatment

As discussed in Section 4.1.4 the Parramatta DCP (2011) sets targets for the reduction of water borne pollution being conveyed from the site through the stormwater drainage system.

This section of the report demonstrates the Stormwater Quality Improvement Devices (SQID's) to be implemented and the Pollutant Export Modelling undertaken to demonstrate the effectiveness of the treatment system in achieving the reduction targets set by council.

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8.1 Potential Pollutants

There are a wide range of potential stormwater pollutant sources which occur from urbanised catchments, many which can be managed through appropriate stormwater quality treatment. Typical urban pollutants may include:

- Atmospheric deposition
- Erosion (including that from subdivision and building activities)
- Litter and debris
- Traffic emissions and vehicle wear
- Animal droppings
- Pesticides and fertilisers
- Application, storage and wash-off of car oil, detergents and other household and commercial solvents and chemicals
- Solids accumulation and growth in stormwater systems
- Weathering of buildings

These pollutants in urban stormwater can be placed into various categories as follows. The pollutants underlined below are able to be readily modelled:

- Suspended Solids
- Litter
- Nutrients such as Nitrogen and Phosphorous
- Biological oxygen demand (BOD) and chemical oxygen demand (COD) materials
- Micro-organisms
- Toxic organics
- Trace metals
- Oils and surfactants

While only the key pollutants underlined above will be examined within the modelling, the stormwater Quality Improvement Devices implemented are expected to assist in reducing a wide range of pollutants. For example, heavy metals are commonly associated with, and bound to fine sediments. Thus reducing the discharge of fine sediment during the construction and operational phases will also reduce the discharge of heavy metals to existing stormwater systems.

8.2 Pollutant Reduction System

In order to achieve the pollutant reduction targets specified in section 3.3 of this report a series of treatment devices are proposed which together form a treatment train.

The pollution reduction system for each site has been diagrammatically shown in the figure below. The treatment train varies for each discharge point.

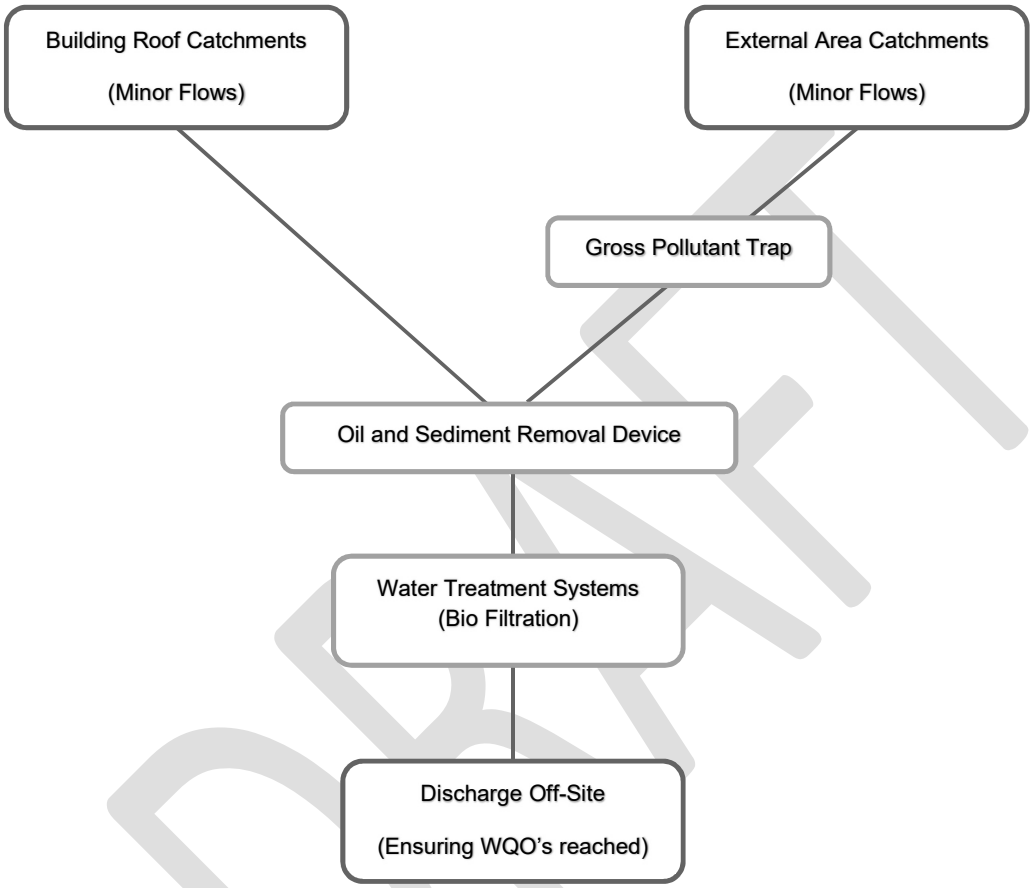


Figure 9 – Proposed Water Quality Treatment Train

Further discussion on each element of this treatment train is provided below.

8.2.1 SPEL Hydrosystem

The SPEL Hydrosystem filter unit used filtration cartridges to remove high levels of stormwater pollutants including:

- Total Suspended Solids (TSS), median removal efficiency of 84%,
- Total Nitrogen (TN), median removal efficiency of 47%
- Total Phosphorous (TP), median removal efficiency of 81%

One SPEL Hydrosystem is proposed within the carpark/paved area along the frontage of Park Parade.

The MUSIC modelling parameters for this device are set by the manufacturer, SPEL Stormwater.

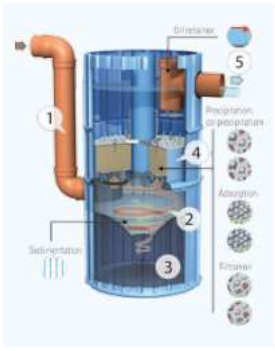


Figure 10 – SPEL Hydrosystem infiltration Unit (Source: SPEL Stormwater)

8.2.2 Stormsack Pit Inlet Trap (or approved equivalent)

Stormsacks (or other similar approved equivalents) provide effective removal of TSS and gross pollutants. Stormsacks are a filter cage system which are inserted into roadway gully pits to filter and remove pollutants before the water enters the piped drainage system. It is proposed to place Stormsacks filters within every proposed stormwater inlet pit.

The SPEL Stormwater sack remove high levels of stormwater pollutants including:

- Total Suspended Solids (TSS), median removal efficiency of 61%, including particles down to two microns
- Total Nitrogen (TN), median removal efficiency of 45%
- Total Phosphorous (TP), median removal efficiency of 28%

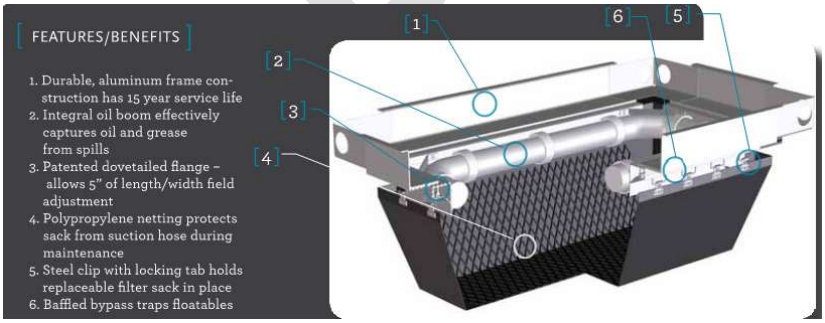


Figure 11 – Stormsack Pit Inlet Trap (Source: SPEL Stormwater)

The MUSIC modelling parameters for this device are set by the manufacturer, SPEL Stormwater.

8.2.3 SPEL Puraceptor

The SPEL Puraceptor unit used filtration cartridges to remove high levels of stormwater pollutants including:

- Total Suspended Solids (TSS), median removal efficiency of 87%,
- Total Nitrogen (TN), median removal efficiency of 23%
- Total Phosphorous (TP), median removal efficiency of 11%

The Puraceptor is an effective solution for High risk hydrocarbon zones as it is a full retention separator.

Compliant Standards:

- **BS EN 858.1:2002 – Separator System for Light Liquids (e.g. oil & petrol);**
  - **Stormwater discharge concentration of less than 5mg of oil per liter (5mg/L).**
- BS 4994:1987 FRP – Specification for the Design and Construction of Vessels and Storage Tanks in Reinforced Plastics;
- AS 2634:1983 – Chemical Plant Equipment made from Glass-Fibre Reinforced Plastics (GRP) Based on Thermosetting Resins and;
- Airports (Environmental Protection) Regulations 1997, Schedule 2 – Water pollution, Cl 1.03.

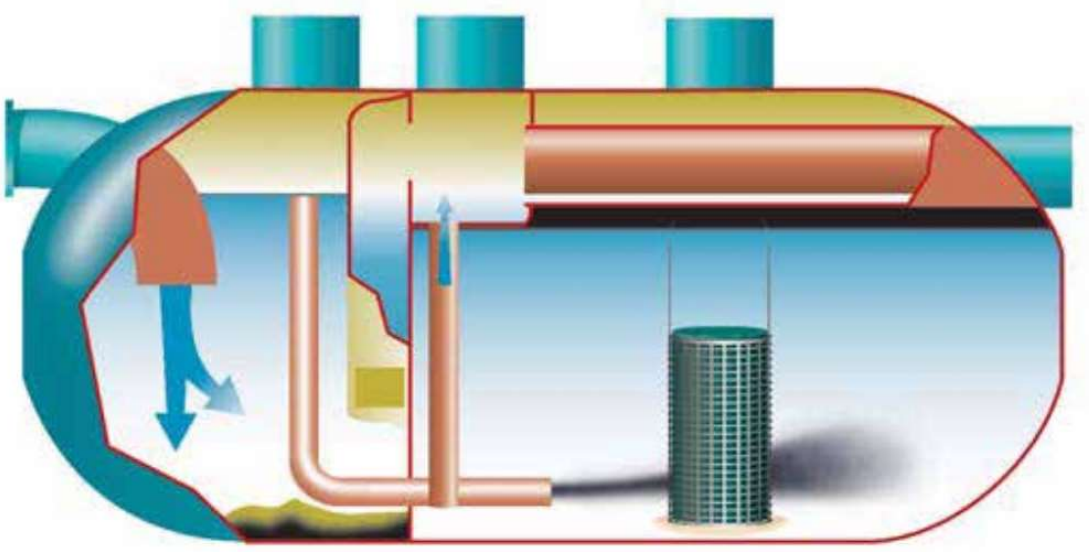


Figure 12 – Puraceptor Unit (Source: SPEL Stormwater)

One puraceptor unit has been proposed for the carpark area to treat hydrocarbons. The MUSIC modelling parameters for this device are set by the manufacturer, SPEL Stormwater.

8.2.4 Raingardens

Bio-Detention systems are vegetated areas where stormwater is passed through densely planted filter media (loamy sand) allowing the plants to absorb the collected and stored nutrients. Bio-retention basins utilise temporary ponding above the vegetated surface to increase the volume of stored water for treatment. Bio-Detention systems can take a number of forms but all have common features including the extended detention depth above the media surface, the filter media and a low level drainage media and subsoil system. These are shown in the figure below.

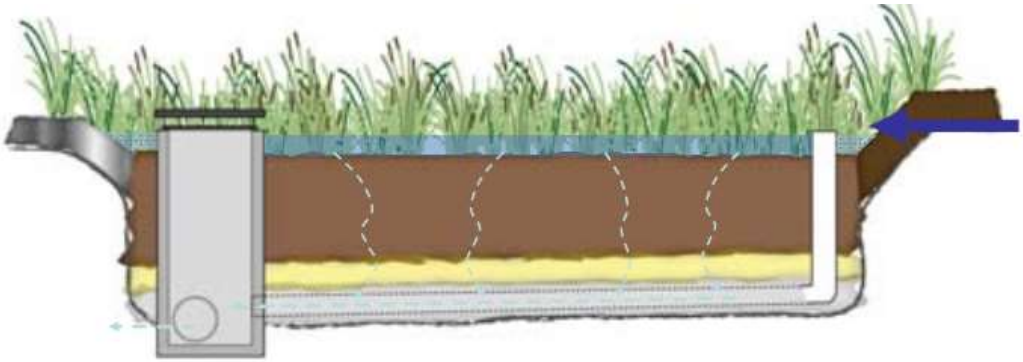


Figure 13: Typical Section of a generic Bio-Detention system (Source: Water by Design)

Raingardens have been proposed within the proposed carpark as well as the southeast corner of the site to treat overland flow from the pervious landscaped areas.

It is recommended that the extended detention depth be no greater than 0.2m to mitigate risk of drowning.

8.3 Pollutant Reduction Modelling

In order to demonstrate that the proposed treatment train meets the required reduction targets, pollutant reduction modelling is proposed using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Software program Version 6.3 by eWater CRC. Pollutant export rates are currently only available for Total Suspended Solids (TSS), Total Nitrogen (TN), Total Phosphorous (TP) and Gross Pollutants (GP). Therefore only quantitative modelling for TSS, TN, TP & GP has been undertaken using MUSIC.

Modelling has only been undertaken on the post-development proposal with SQID's installed so as to demonstrate the percentage reduction for each pollutant type.

8.3.1 MUSIC Program Setup

This section explains the setup of the MUSIC model with the detailed pollutant reduction calculations being included in the MUSIC results in Appendix C.

For Music Modelling (using MUSIC 6.3.0) the following parameters have been used:

Table 7 – MUSIC modelling parameters

Model Parameters	
Meteorological Data:	Sydney 1959
Evaporation Data:	Sydney 1959
Time Step:	6 minute

Table 8 – Catchment Information

Node Description	Catchment Parameters		
	Area (Ha)	% Impervious	Land Use Rainfall and Pollutant Parameters
Roof Catchment	0.0815	100	Urban Roof
External Areas	0.172	57	Urban Mixed

8.3.2 MUSIC Results & Parameters

MUSIC Runoff Generation Parameters

The following properties have been used in the MUSIC Modelling based on the Land Use Rainfall and Pollutant Parameters.

Table 9 –MUSIC Runoff Generation Parameters from *Blacktown City Council's Developer Handbook For WSUD*

Parameter	Urban Residential
Rainfall Threshold (mm)	1.4
Soil Capacity (mm)	170
Initial Storage (%)	30
Field Capacity	70
Infiltration Capacity Coefficient a	210
Infiltration Capacity Coefficient b	210
Initial Depth (mm)	10
Daily Recharge Rate (%)	50
Daily Baseflow Rate (%)	4
Daily Deep Seepage Rate (%)	0

Music Concentration Parameters

Table 10 –MUSIC Concentration Parameters from *Blacktown City Council's Developer Handbook For WSUD*

Land-use Type	Parameters	TSS Log10 mg/L		TP Log10 mg/L		TN Log10 mg/L	
		Base Flow	Storm Flow	Base Flow	Storm Flow	Base Flow	Storm Flow
Urban Residential	Mean	1.20	2.15	-0.85	-0.60	0.11	0.30
	STD Dev	0.17	0.32	0.19	0.25	0.12	0.19
Urban Roof	Mean	N/A	1.30	N/A	-0.89	N/A	0.30
	STD Dev	N/A	0.32	N/A	0.25	N/A	0.19
Sealed Roads	Mean	1.20	2.43	-0.85	-0.30	0.11	0.34
	STD Dev	0.17	0.32	0.19	0.25	0.12	0.19
Pervious Areas	Mean	1.10	2.15	-0.82	-0.60	0.32	0.30
	STD Dev	0.17	0.32	0.19	0.25	0.12	0.19

In order to achieve the pollutant reduction targets specified in section 4.1.4 of this report a series of treatment devices are proposed which together form a treatment train. The proposed treatment train includes the following:

- SPEL Stormsacks
- SPEL Hydrosystem
- Swales
- Raingardens
- SPEL Filter Cartridges
- SPEL Puraceptor

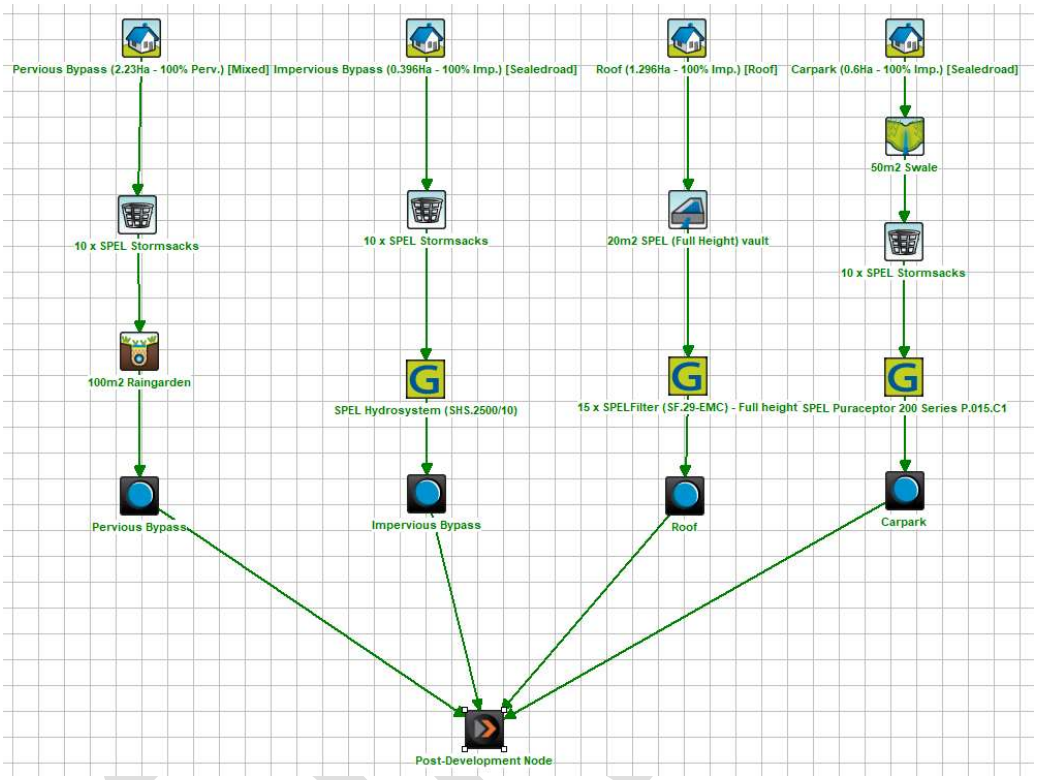
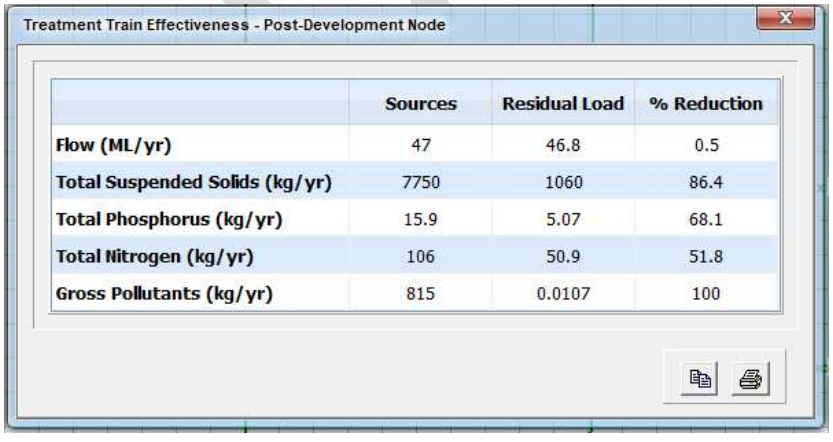


Figure 14 – MUSIC Model Setup

The following are the treatment rates as determined by the MUSIC model.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	47	46.8	0.5
Total Suspended Solids (kg/yr)	7750	1060	86.4
Total Phosphorus (kg/yr)	15.9	5.07	68.1
Total Nitrogen (kg/yr)	106	50.9	51.8
Gross Pollutants (kg/yr)	815	0.0107	100

Figure 15 – MUSIC Model Results

Table 11 – MUSIC Results vs. Site Targets.

Indicator	Total Site Reduction	Site Targets	Target Achieved
Gross Pollutants	100%	90%	Yes
Total Suspended Solids (TSS)	85%	85%	Yes
Total Phosphorus (TP)	69%	60%	Yes
Total Nitrogen (TN)	50%	45%	Yes

As can be seen in the table above, the MUSIC model shows that the stormwater treatment requirements are achieved.

Refer Appendix E for MUSIC Results.

9. Erosion & Sedimentation Control

Landcom have published a design guide entitled “Managing Urban Stormwater - Soils and Construction” which is regarded as the standard to which erosion and sedimentation control should be designed to within NSW.

The control of erosion and sedimentation describes the measures incorporated during and following construction of a new development to prevent the pollution and degradation of the downstream watercourse.

A Soil and Water Management Plan has prepared as part of the development application documentation and is included in Appendix A of this report.

Stormwater Drainage Infrastructure Inlets

Risk:

- Sediment from the construction site washing into the existing stormwater drainage inlet infrastructure.

Consequence:

- The sediment will then be conveyed into the downstream waterbody by stormwater runoff, contaminating the waterbody.
- The sediment will build up blocking the stormwater infrastructure and preventing stormwater conveyance to the downstream waterbody and impacting drainage upstream.

Mitigation:

- Sandbag protection will be installed surrounding all existing stormwater drainage infrastructure inlets to prevent sediment entering the system.

Maintenance:

- Frequent inspection of the sandbags to ensure they are arranged in a manner that prevents sediment from accessing the drainage system. If sediment is building up on the sandbags they should be cleared of sediment and re-established.

Construction Exit Protection

Risk:

- Spoil such as soil being conveyed from the site on the wheels of vehicles.

Consequence:

- Spoil being tracked onto the public road corridors where it is then washed into the existing stormwater drainage infrastructure and is then washed downstream polluting the downstream waterbody.
- Spoil being tracked onto the public road creating dangerous driving conditions for other road users.

Mitigation:

- A shaker grid and wash down facility will be installed at all exits from the construction site. All vehicles leaving the site will have their wheels washed down and pass over the shaker grid to remove any spoil collected on their wheels and retaining the spoil on site.

Maintenance:

- Frequent inspection of the shaker grid to ensure it is clean and still functioning.

Downstream Site Boundaries

Risk:

- Rainfall runoff falling on the site collecting sediment from the construction site and conveying it overland onto downstream properties and waterbodies.

Consequence:

- Sediment discharge polluting downstream properties and waterbodies.

Mitigation:

- Installation of sediment fences on all downstream boundaries of the site to collect sediment and prevent it discharging onto downstream properties or waterbodies.

Maintenance:

- Regular inspection of the sediment fences to ensure they are functioning correctly and are intact.
- If sediment build up is present it should be removed to ensure correct functionality of the fences.

It is noted that the site earthworks will have taken place at an earlier stage during which, a series of three sediment basins were proposed across the site to capture overland flow from three separate catchments and control the release of stormwater and sediment from the site during the proposed earthworks. The proposed basins have been sized in accordance with Landcom's "Managing Urban Stormwater - Soils and Construction". All overland flows will be conveyed to the sediment basins, which will subsequently be released to Park Parade and captured in the existing kerb inlet pits as per the existing condition. These sediment basins may only be decommissioned once the site finishes have been stabilised (ie. grassed or paved).

Appendix A Civil Drawings

CIVIL ENGINEERING WORKS

SHEET LIST TABLE	
SHEET NUMBER	SHEET TITLE
CI-000-001	COVER SHEET
CI-007-001	GENERAL NOTES
CI-000-011	KEY PLAN
CI-060-001	GENERAL ARRANGEMENT PLAN SITE WIDE
CI-060-011	GENERAL ARRANGEMENT PLAN SHEET 1
CI-060-012	GENERAL ARRANGEMENT PLAN SHEET 2
CI-060-013	GENERAL ARRANGEMENT PLAN SHEET 3
CI-060-014	GENERAL ARRANGEMENT PLAN SHEET 4
CI-060-015	GENERAL ARRANGEMENT PLAN SHEET 5
CI-070-001	EROSION AND SEDIMENT CONTROL PLAN SITE WIDE
CI-070-011	EROSION AND SEDIMENT CONTROL PLAN SHEET 1
CI-070-012	EROSION AND SEDIMENT CONTROL PLAN SHEET 2
CI-070-013	EROSION AND SEDIMENT CONTROL PLAN SHEET 3
CI-070-014	EROSION AND SEDIMENT CONTROL PLAN SHEET 4
CI-070-015	EROSION AND SEDIMENT CONTROL PLAN SHEET 5
CI-076-001	EROSION AND SEDIMENT CONTROL DETAILS
CI-406-001	ROADWORKS DETAILS
CI-520-001	STORMWATER DRAINAGE PLAN SITE WIDE
CI-520-011	STORMWATER DRAINAGE PLAN SHEET 1
CI-520-012	STORMWATER DRAINAGE PLAN SHEET 2
CI-520-013	STORMWATER DRAINAGE PLAN SHEET 3
CI-520-014	STORMWATER DRAINAGE PLAN SHEET 4
CI-520-015	STORMWATER DRAINAGE PLAN SHEET 5
CI-526-001	STORMWATER DRAINAGE DETAILS

CITY OF PARRAMATTA

CITY OF PARRAMATTA COUNCIL — CLIENT

AQUATIC LEISURE CENTRE, PARRAMATTA — PROJECT

WOOD & GRIEVE ENGINEERS
NOW PART OF
Stantec

38574	CI-000-001	A
PROJECT No	DRAWING No	REV

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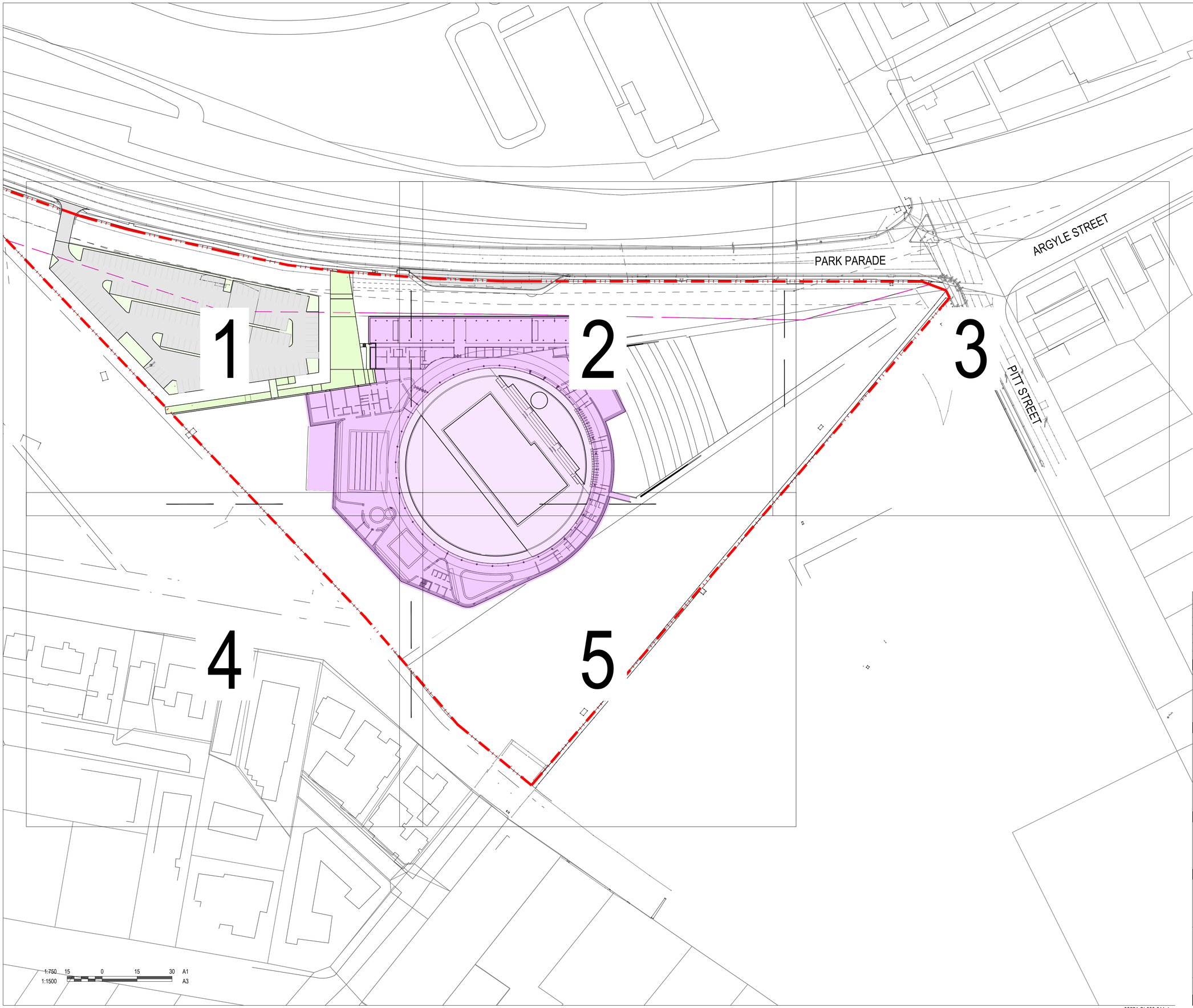

LEGEND

- PROPOSED SITE BOUNDARY
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- HARDSTAND OR LANDSCAPING TO LANDSCAPE ARCHITECT'S SPECIFICATIONS

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	ISSUED FOR DRAFT SSDA	LAM	RET	06.03.20

CITY OF PARRAMATTA

CONSULTANT: WOOD & GRIEVE ENGINEERS NOW PART OF Stantec

ARCHITECT/CLIENT

DRAWN:	LAM
DESIGNED:	LAM
VERIFIED:	-
APPROVED FOR TENDER:	-
APPROVED FOR CONSTRUCTION:	-

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

KEY PLAN

FOR APPROVAL

NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:750	38574	CI-000-011	A

38574-CI-000-011.dwg

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GENERAL NOTES

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
2. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH OTHER SUCH WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
3. ALL DIMENSIONS ARE IN MILLIMETRES & ALL LEVELS ARE IN METRES, UNO (UNLESS NOTED OTHERWISE).
4. NO DIMENSION SHALL BE OBTAINED BY SCALING THE DRAWINGS.
5. ALL LEVELS AND SETTING OUT DIMENSIONS SHOWN ON THE DRAWINGS SHALL BE CHECKED ON SITE PRIOR TO COMMENCEMENT OF WORKS.
6. EXISTING SERVICES WHERE SHOWN HAVE BEEN PLOTTED FROM SUPPLIED DATA AND SUCH THEIR ACCURACY CAN NOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF WORK.
7. CAD FILES / DTM FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES (UPON REQUEST).

SITEWORKS NOTES

1. ORIGIN OF LEVELS:- REFER SURVEY NOTES.
2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO WOOD AND GRIEVE ENGINEERS.
3. CONTRACTOR TO CONFIRM ALL CBR VALUES PRIOR TO COMMENCEMENT OF WORKS.
4. MAKE SMOOTH CONNECTION WITH EXISTING WORKS.
5. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
6. ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
7. PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
8. ASPHALTIC CONCRETE SHALL CONFORM TO RMS. SPECIFICATION R116.
9. ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS. FORM 3051 (UNBOUND), RMS. FORM 3052 (BOUND) COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1.
   FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m^3 BASECOURSE MATERIAL PLACED.
10. ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS. FORM 3051, 3051.1 AND COMPACTED TO MINIMUM 95% MODIFIED DENSITY IN ACCORDANCE WITH A.S 1289 5.2.1
    FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m^3 OF SUB-BASE COURSE MATERIAL PLACED.
11. AS AN ALTERNATIVE TO THE USE OF IGNEOUS ROCK AS A SUB-BASE MATERIAL IN (9) A CERTIFIED RECYCLED CONCRETE MATERIAL COMPLYING WITH RMS. FORM 3051 AND 3051.1 WILL BE CONSIDERED. SUBJECT TO MATERIAL SAMPLES AND APPROPRIATE CERTIFICATIONS BEING PROVIDED TO THE SATISFACTION OF WOOD AND GRIEVE ENGINEERS.
12. SHOULD THE CONTRACTOR WISH TO USE A RECYCLED PRODUCT THIS SHALL BE CLEARLY INDICATED IN THEIR TENDER AND THE PRICE DIFFERENCE BETWEEN AN IGNEOUS PRODUCT AND A RECYCLED PRODUCT SHALL BE CLEARLY INDICATED.
13. WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED BY OTHERS, (eg. ADJUSTMENT OF SERVICES), THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF THESE WORKS.

SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN SHOWN AS PER THE TOPOGRAPHIC SURVEY RECEIVED ON 09/12/2019 FILE PARRAMATTA AQUATIC CENTRE_SITE SURVEY-SH1, AS INVESTIGATED BY LAND DATA SURVEYORS. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. WOOD AND GRIEVE ENGINEERS DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS. SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT WOOD AND GRIEVE ENGINEERS.

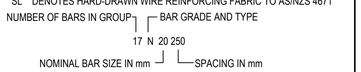
CONCRETE NOTES

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
2. CONCRETE QUALITY ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

ELEMENT	AS 3600 F'c MPa AT 28 DAYS	SPECIFIED SLUMP	NOMINAL AGG. SIZE
VEHICULAR BASE	32	60	20
KERBS, PATHS, AND PITS	25	80	20

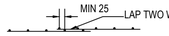
- CEMENT TYPE SHALL BE (ACSE SPECIFICATION) TYPE SL
- PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379.

3. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING BY WOOD AND GRIEVE ENGINEERS.
4. CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE 40mm TOP AND 70mm FOR EXTERNAL EDGES UNLESS NOTED OTHERWISE.
5. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1m CENTRES BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS.
6. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENEOUS MASS, COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS. ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED AND CURED IN ACCORDANCE WITH R.M.S. SPECIFICATION R83.
7. REINFORCEMENT SYMBOLS:
   N DENOTES GRADE 450 N BARS TO AS/NZS 4671 GRADE N
   R DENOTES 230 R HOT ROLLED PLAIN BARS TO AS/NZS 4671
   SL DENOTES HARD-DRAWN WIRE REINFORCING FABRIC TO AS/NZS 4671



THE FIGURE FOLLOWING THE FABRIC SYMBOL SL IS THE REFERENCE NUMBER FOR FABRIC TO AS/NZS 4671.

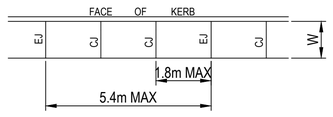
8. FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:



JOINTING NOTES

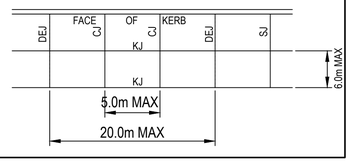
PEDESTRIAN PAVEMENT JOINTS

1. ALL PEDESTRIAN PAVEMENTS ARE TO BE JOINTED AS FOLLOWS. (U.N.O)
2. EXPANSION JOINTS ARE TO BE LOCATED WHERE POSSIBLE AT TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX. 5.4m CENTRES.
3. CONTRACTION JOINTS ARE TO BE LOCATED AT A MAX. SPACING OF 1.8m
4. WHERE POSSIBLE JOINTS SHOULD BE LOCATED TO MATCH KERBING AND OR ADJACENT PAVEMENT JOINTS.
5. PEDESTRIAN PAVEMENT JOINT DETAIL:



VEHICULAR PAVEMENT JOINTS

6. ALL VEHICULAR PAVEMENTS TO BE JOINTED AS FOLLOWS. (U.N.O)
7. CONTRACTION JOINTS SHOULD GENERALLY BE LOCATED AT A MAX OF 5.0m CENTRES WITH DOWELED EXPANSION JOINTS AT MAX 20.0m CENTRES
8. VEHICULAR PAVEMENT JOINT DETAIL.



KERBING NOTES

1. ALL CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 25 MPa U.N.O IN REINFORCED CONCRETE NOTES.
2. ALL KERBS, GUTTERS, DISH DRAINS AND CROSSINGS TO BE CONSTRUCTED ON 100mm GRANULAR BASECOURSE COMPACTED TO MINIMUM 95% MODIFIED DRY DENSITY (AS 1289 5.2.1).
3. EXPANSION JOINTS (E.J) TO BE FORMED FROM 10mm COMPRESSIBLE CORK FILLER BOARD FOR THE FULL DEPTH OF THE SECTION AND CUT TO PROFILE. EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, ON TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX 12m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE EXPANSION JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
4. WEAKENED PLANE JOINTS TO BE MIN 3mm WIDE AND LOCATED AT 3m CENTRES EXCEPT FOR INTEGRAL KERBS WHERE THE WEAKENED PLANE JOINTS ARE TO MATCH THE JOINT LOCATIONS IN THE SLABS.
5. BROOMED FINISH TO ALL RAMPED AND VEHICULAR CROSSINGS. ALL OTHER KERBING OR DISH DRAINS TO BE STEEL FLOAT FINISHED.
6. IN THE REPLACEMENT OF KERB AND GUTTER :- EXISTING ROAD PAVEMENT IS TO BE SAWCUT 900mm U.N.O FROM THE LIP OF GUTTER. UPON COMPLETION OF THE NEW KERB AND GUTTER NEW BASECOURSE AND SURFACE TO BE LAID 600mm WIDE U.N.O.
7. EXISTING ALLOTMENT DRAINAGE PIPES ARE TO BE BUILT INTO THE NEW KERB AND GUTTER WITH 100mm DIA HOLE.
8. EXISTING KERB AND GUTTER IS TO BE COMPLETELY REMOVED WHERE NEW KERB AND GUTTER IS SHOWN.

PROPOSED SERVICES NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH RELEVANT SERVICE AUTHORITY DOCUMENTATION AND CURRENT NSW STREETS OPENING CONFERENCE GUIDE TO CODES AND PRACTICES FOR STREETS OPENING LITERATURE.
2. THE CONTRACTOR SHALL ATTEND, MANAGE & SUPERVISE THE PROVISION OF PUBLIC UTILITY SERVICES TO THE WORKS GENERALLY AS INDICATED ON THE SERVICES PLANS, NOTING THAT PRIOR & DURING CONSTRUCTION THE PUBLIC UTILITY AUTHORITIES WILL FINALISE THEIR DOCUMENTATION TO CONSTRUCTION ISSUE STANDARD.
3. THE CIVIL CONTRACTOR (TRENCH PROVIDER) IS TO ARRANGE ON SITE MEETING WITH ALL SERVICE AUTHORITIES PRIOR TO THE INSTALLATION OF CONDUITS.
4. THE CIVIL CONTRACTOR TO CO-ORDINATE INSTALLATION OF ELECTRICITY, GAS,TELECOMMUNICATION, WATER AND SEWER SERVICES.
5. ELECTRICITY, GAS AND TELECOMMUNICATION SERVICES ARE TO BE LAID FOLLOWING THE INSTALLATION OF STORMWATER, SEWER AND WATER SERVICES AND KERB AND GUTTER.
6. ALL UTILITY AUTHORITY REPRESENTATIVES TO INSPECT ROAD CROSSINGS PRIOR TO SEALING.
7. ALL ELECTRICAL ROAD CROSSINGS TO BE CLASS 6 (ORANGE) uPVC CONDUITS.
8. ALL GAS ROAD CROSSINGS TO BE uPVC GREY SEWER GRADE CONDUITS.
9. ALL STREET POLES TO BE POSITIONED THE APPROPRIATE DISTANCE FROM FACE OF KERB TO FACE OF POLE ACCORDING TO THE CURRENT NSW STREETS OPENING CONFERENCE GUIDE TO CODES AND PRACTICES FOR STREETS OPENING LITERATURE. CONTRACTOR TO ALLOW TO EXCAVATE AND BACKFILL TRENCH GENERALLY IN ACCORDANCE WITH NOTE 2.
10. ALL SERVICE PIT COVERS AND MARKERS ARE TO BE LAID WHOLLY WITHIN THE CONCRETE FOOTPATH. CONTACT SUPERINTENDANT SHOULD DIFFICULTIES ARISE.

TELSTRA - DUTY OF CARE NOTE

TELSTRA'S PLANS SHOW ONLY THE PRESENCE OF CABLES AND PLANT. THEY ONLY SHOW THEIR POSITION RELATIVE TO ROAD BOUNDARIES, PROPERTY FENCES ETC. AT THE TIME OF INSTALLATION AND TELSTRA DOES NOT WARRANT OR HOLD OUT THAT SUCH PLANS ARE ACCURATE THEREAFTER DUE TO CHANGES THAT MAY OCCUR OVER TIME. DO NOT ASSUME DEPTH OR ALIGNMENT OF CABLES OR PLANT AS THESE VARY SIGNIFICANTLY.
THE CONTRACTOR HAS A DUTY OF CARE WHEN EXCAVATING NEAR TELSTRA CABLES AND PLANT. BEFORE USING MACHINE EXCAVATORS TELSTRA PLANT MUST FIRST BE PHYSICALLY EXPOSED BY SOFT DIG POTHOLING TO IDENTIFY IT'S LOCATION TELSTRA WILL SEEK COMPENSATION FOR DAMAGES CAUSED TO IT'S PROPERTY AND LOSSES CAUSED TO TELSTRA AND IT'S CUSTOMERS.

EROSION AND SEDIMENT CONTROL NOTES

GENERAL INSTRUCTIONS

1. THE SITE SUPERINTENDENT/ENGINEER WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS DOCUMENTED.
2. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH
   2.1. LOCAL AUTHORITY REQUIREMENTS
   2.2. EPA REQUIREMENTS
   2.3. NSW DEPARTMENT OF HOUSING MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4th EDITION, MARCH 2004.
3. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.
4. WHEN STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS SEDIMENT FENCES ARE ERECTED AROUND PITS.
5. CONTRACTOR IS TO ENSURE ALL EROSION & SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.

LAND DISTURBANCE

6. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
   6.1. INSTALL A SEDIMENT FENCE ALONG THE BOUNDARIES AS SHOWN ON PLAN. REFER DETAIL.
   6.2. CONSTRUCT STABILISED CONSTRUCTION ENTRANCE TO LOCATION AS DETERMINED BY SUPERINTENDENT/ENGINEER. REFER DETAIL.
   6.3. INSTALL SEDIMENT BASIN AS SHOWN ON PLAN
   6.4. INSTALL SEDIMENT TRAPS AS SHOWN ON PLAN.
7. 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.

EROSION CONTROL

8. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.
9. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.

SEDIMENT CONTROL

10. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS, INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
11. 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.
12. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
13. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.

OTHER MATTERS

13. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
14. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES BY:
    14.1. PROTECTING THEM WITH BARRIER FENCING OR SIMILAR MATERIALS INSTALLED OUTSIDE THE DRIP LINE
    14.2. ENSURING THAT NOTHING IS NAILED TO THEM
    14.3. PROHIBITING PAVING, GRADING, SEDIMENT WASH OR PLACING OF STOCKPILES WITHIN THE DRIP LINE EXCEPT UNDER THE FOLLOWING CONDITIONS.
    14.4. 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, WHICH EVER IS THE GREATER
    14.5. A DRAINAGE SYSTEM THAT ALLOWS AIR AND WATER TO CIRCULATE THROUGH THE ROOT ZONE (E.G. A GRAVEL BED) IS PLACED UNDER ALL FILL LAYERS OF MORE THAN 300 MILLIMETRES DEPTH
    14.6. CARE IS TAKEN NOT TO CUT ROOTS UNNECESSARILY NOR TO COMPACT THE SOIL AROUND THEM.

BULK EARTHWORKS NOTES

1. REFER SPECIFICATIONS NOTES FOR EARTHWORKS GENERAL REQUIREMENTS.
2. STRIP EXISTING TOPSOIL IN CONSULTATION WITH THE GEOTECHNICAL ENGINEER / REPORT. FOR THE PURPOSES OF EARTHWORKS CALCULATIONS A TOPSOIL STRIPPING DEPTH OF XXXXmm HAS BEEN ASSUMED. GROUND SLAB DEPTH OF XXXXmm HAS BEEN ASSUMED WHERE REQUIRED.
3. NO ALLOWANCE HAS BEEN MADE FOR BULKING FACTORS. NOTE ALL VOLUMES DEPICTED ARE SOLID VOLUMES ONLY AND MAY NOT REFLECT DETAILED EARTHWORKS.
4. NO ALLOWANCE HAS BEEN MADE FOR DETAILED EARTHWORKS; ie SERVICE TRENCHING, DETAILED EXCAVATION, FOOTINGS, RETAINING WALLS AND THE LIKE.
5. THE CONTRACTOR SHALL USE FINAL SURFACE LEVELS AND TYPICAL PAVEMENT DETAILS FOR ACTUAL EARTHWORKS LEVELS.
6. BULK EARTHWORKS ARE BASED ON THE SETDOWN TO UNDERSIDE OF PAVEMENT BUILDUPS AS SPECIFIED FROM FINISHED SURFACE LEVELS.
7. SITE STRIPPING VOLUMES HAVE NOT BEEN INCLUDED IN BULK EARTHWORKS CALCULATIONS.

STORMWATER DRAINAGE NOTES

1. ON COMPLETION OF STORMWATER INSTALLATION, ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL CONDITION, INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AND GRASSED AREAS AND ROAD PAVEMENTS, UNLESS DIRECTED OTHERWISE.
2. PIPES 300 DIA. AND LARGER TO BE REINFORCED CONCRETE CLASS '3' APPROVED SPIGOT AND SOCKET WITH RUBBER RING JOINTS. U.N.O.
3. PIPES UP TO 300 DIA SHALL BE SEWER GRADE uPVC WITH SOLVENT WELDED JOINTS.
4. EQUIVALENT STRENGTH VCP OR FRC PIPES MAY BE USED.
5. ALL STORMWATER DRAINAGE LINES UNDER PROPOSED BUILDING SLABS TO BE uPVC PRESSURE PIPE GRADE 6. ENSURE ALL VERTICALS AND DOWNPIPES ARE uPVC PRESSURE PIPE, GRADE 6 FOR A MIN OF 3.0m IN HEIGHT.
6. PIPES TO BE INSTALLED TO TYPE HS3 (ROAD) HS2 (LOTS) SUPPORT IN ACCORDANCE WITH AS 3725 (2007) IN ALL CASES BACKFILL TRENCH WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL COMPACTED IN 150mm LAYERS TO MINIMUM 98% STANDARD MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
7. ALL INTERNAL WORKS WITHIN PROPERTY BOUNDARIES ARE TO COMPLY WITH THE REQUIREMENTS OF AS 3500 3.1 (2006) AND AS/NZS 3500 3.2 (2010).
8. PRECAST PITS MAY BE USED EXTERNAL TO THE BUILDING SUBJECT TO APPROVAL BY WOOD AND GRIEVE ENGINEERS.
9. ENLARGERS, CONNECTIONS AND JUNCTIONS TO BE PREFABRICATED FITTINGS WHERE PIPES ARE LESS THAN 300 DIA.
10. WHERE SUBSOIL DRAINS PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS, UNSLOTTED uPVC SEWER GRADE PIPE IS TO BE USED.
11. CARE IS TO BE TAKEN WITH LEVELS OF STORMWATER LINES. GRADES SHOWN ARE NOT TO BE REDUCED WITHOUT APPROVAL.
12. GRATES AND COVERS SHALL CONFORM TO AS 3996.
13. ALL INTERNAL PIT DIMENSIONS TO CONFORM TO AS3500.3 TABLE 7.5.2.1
14. AT ALL TIMES DURING CONSTRUCTION OF STORMWATER PITS, ADEQUATE SAFETY PROCEDURES SHALL BE TAKEN TO ENSURE AGAINST THE POSSIBILITY OF PERSONNEL FALLING DOWN PITS.
15. ALL EXISTING STORMWATER DRAINAGE LINES AND PITS THAT ARE TO REMAIN ARE TO BE INSPECTED AND CLEANED. DURING THIS PROCESS ANY PART OF THE STORMWATER DRAINAGE SYSTEM THAT WARRANTS REPAIR SHALL BE REPORTED TO THE SUPERINTENDENT/ENGINEER FOR FURTHER DIRECTIONS.
16. THE CONTRACTOR IS TO ORGANISE AND STAGE CONSTRUCTION WORK AND UNDERTAKE ANY DIVERSION WORKS TO ENSURE THE EXISTING DRAINAGE IS ABLE TO CONVEY ALL STORMWATER FLOWS THAT MAY OCCUR DURING THE PERIOD OF THE CONSTRUCTION WORKS.
17. ANY DAMAGE TO THE WORKS DUE TO STORMWATER FLOWS OR FLOODING DURING THE CONSTRUCTION PERIOD IS AT THE CONTRACTOR'S RISK.
18. SETOUT POINTS FOR STORMWATER STRUCTURES ARE AS INDICATED IN THE DRAWINGS UNLESS OTHERWISE NOTED.
19. ALL PAVED SURFACE LEVELS AND GRADES TO BE COORDINATED WITH GULLY PIT LEVELS TO ENSURE NO UNDRAINED AREAS OCCUR.
20. THE SIDES OF ALL PIPE TRENCH EXCAVATIONS DEEPER THAN 1.0m SHALL BE FULLY SUPPORTED AT ALL TIMES AND HAVE APPROPRIATE EDGE PROTECTION.
21. ALL NEW PIPES TO BE LAID IN AN UPSTREAM DIRECTION. THE LINE, LEVEL AND LOCATION OF EXISTING SERVICES CROSSING THE LINE OF THE PROPOSED STORMWATER PIPE SHALL BE DETERMINED BY EXCAVATION PRIOR TO THE LAYING OF THE PIPE. IF CONFLICT IS APPARENT, THE ENGINEER SHALL BE NOTIFIED AND INSTRUCTIONS AS TO WHETHER THE EXISTING SERVICE IS TO BE ADJUSTED OR THE PROPOSED PIPE INVERT ALTERED WILL BE ISSUED.
22. PIPE BEDDING, HAUNCH AND BACKFILL TO BE AS SHOWN ON THE CIVIL DETAILS DRAWINGS AND THE CIVIL SPECIFICATION.
23. SUBSOIL DRAINAGE PIPES TO BE SLOTTED PIPE AND FILTER SOCK CLASS 1000 TO AS2439 PART 1 LAID AT PREFERABLE MINIMUM GRADE 1 IN 100 OR ABSOLUTE MINIMUM 1 IN 200 WHERE LIMITED BY OUTFALL LEVELS.
24. STORMWATER STRUCTURES ARE TO BE CONSTRUCTED PERPENDICULAR TO THE INCOMING PIPEWORK UNLESS OTHERWISE NOTED.
25. PRECAST COMPONENTS SHALL BE CONNECTED BY MEANS OF EPOXY OR CHEMICAL GROUTED BARS OF THE SAME DIAMETER AND SPACING AS THE SMALLER BARS IN THE RESPECTIVE COMPONENTS.
26. PRE-CAST PITS MUST HAVE LIFTING ANCHORS.
27. WORKING LOADS ARE THOSE DUE TO FILL MATERIAL AND STANDARD HIGHWAY VEHICLES AS PER AS3725. CONSTRUCTION LOADS HAVE NOT BEEN ALLOWED FOR.
28. ALL EXPOSED EDGES ON STORMWATER PITS TO BE ROUNDED TO 5mm RAD. UNO.

REV	DESCRIPTION	DRAWN	APP'D	DATE
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WOOD & GRIEVE ENGINEERS NOW PART OF Stantec	DRAWN:	LAM
	DESIGNED:	LAM
	VERIFIED:	.
	APPROVED FOR TENDER:	.
	APPROVED FOR CONSTRUCTION:	.

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

GENERAL NOTES

FOR APPROVAL

NOT FOR CONSTRUCTION

NTS	38574	CI-007-001	A
SCALE @ A1	PROJECT No	DRAWING No	REV

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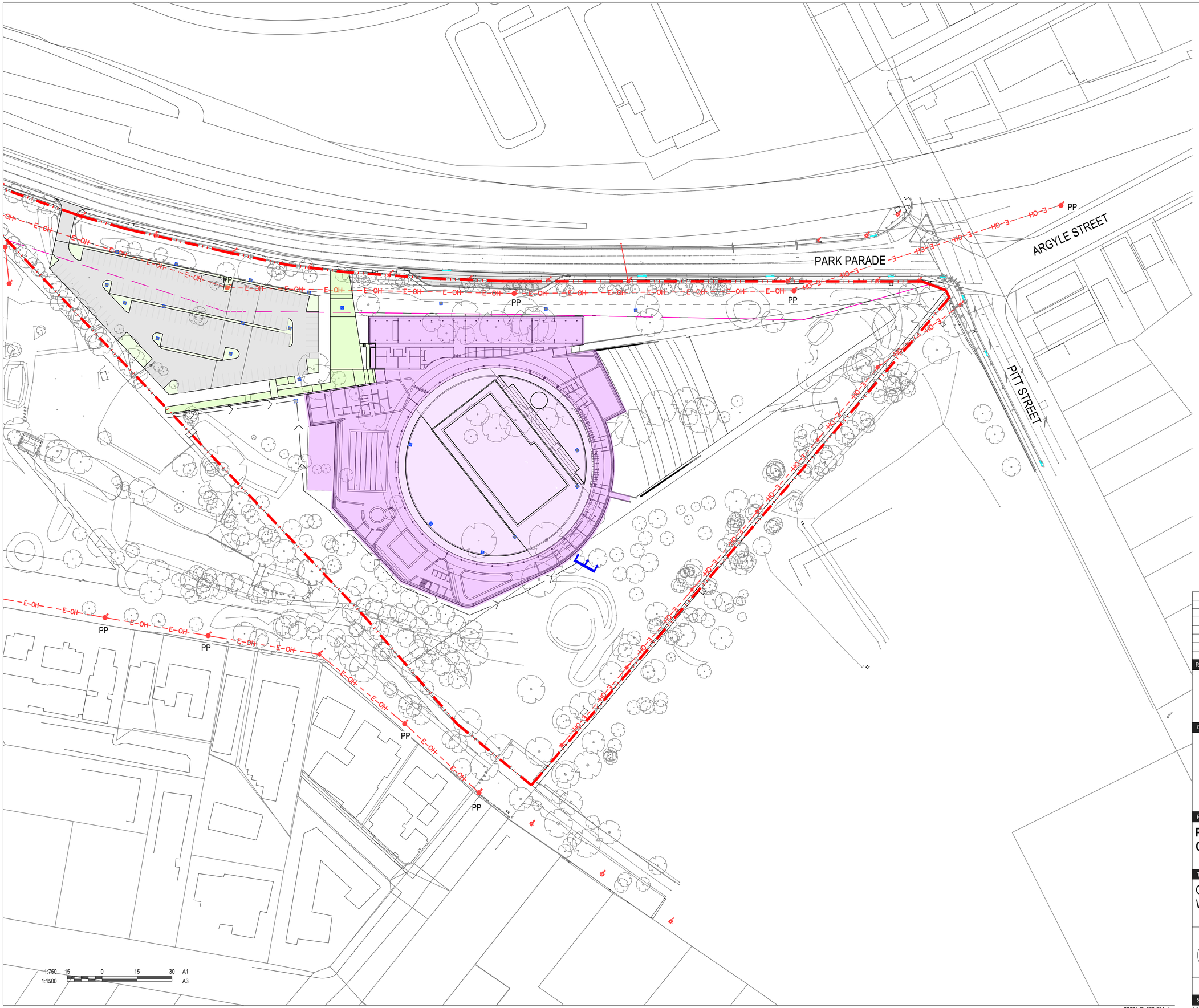

LEGEND

- PROPOSED SITE BOUNDARY
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- HARDSTAND OR LANDSCAPING TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING TREE
- E-OH EXISTING ELECTRICITY OVERHEAD
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT

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PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

GENERAL ARRANGEMENT PLAN SITE WIDE

FOR APPROVAL

NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
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PARK PARADE

MATCHLINE. REFER SHEET 2

MATCHLINE. REFER SHEET 4

LEGEND

- PROPOSED SITE BOUNDARY
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- HARDSTAND OR LANDSCAPING TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING TREE
- E-OH EXISTING ELECTRICITY OVERHEAD
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
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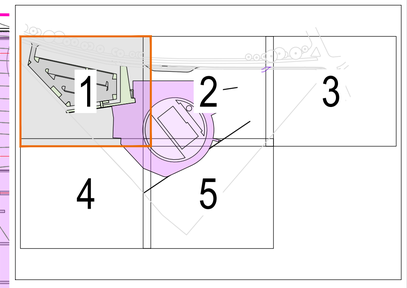

KEY PLAN

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PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

GENERAL ARRANGEMENT PLAN SHEET 1

FOR APPROVAL

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SCALE @ A1	PROJECT No	DRAWING No	REV
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1:250 1:500 5 0 5 10 A1 A3

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PARK PARADE

MATCHLINE. REFER SHEET 1

MATCHLINE. REFER SHEET 3

MATCHLINE. REFER SHEET 5

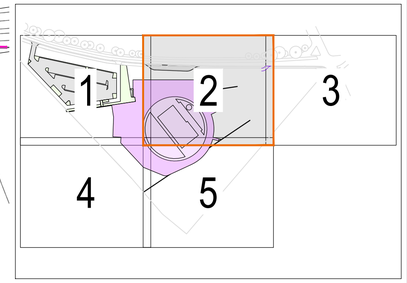
PP

PP

1:250 5 0 5 10 A1
1:500 A3

LEGEND

- PROPOSED SITE BOUNDARY
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- HARDSTAND OR LANDSCAPING TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING TREE
- E-OH EXISTING ELECTRICITY OVERHEAD
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN
NTS

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PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

GENERAL ARRANGEMENT PLAN SHEET 2

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:250	38574	CI-060-012	A

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PARK PARADE

ARGYLE STREET

PITT STREET

MATCHLINE. REFER SHEET 2

PP

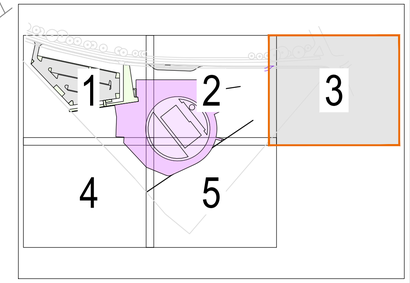
PP

E-OH

1:250 1:500 5 0 5 10 A1 A3

LEGEND

- PROPOSED SITE BOUNDARY
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- HARDSTAND OR LANDSCAPING TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING TREE
- E-OH EXISTING ELECTRICITY OVERHEAD
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN
NTS

REV	DESCRIPTION	DRAWN	APP'D	DATE
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PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

GENERAL ARRANGEMENT PLAN SHEET 3

FOR APPROVAL
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MATCHLINE. REFER SHEET 1

MATCHLINE. REFER SHEET 5

SP73484

LOT 1
DP523943

LOT 2
DP523943

SP85238

SP42467

LOT 1
SP59070

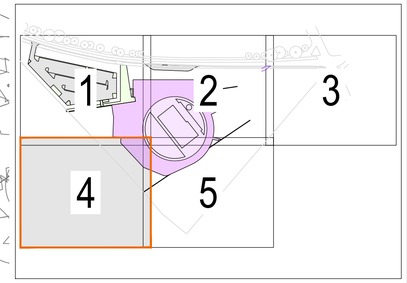
PP

E-OH

1:250 5 0 5 10 A1
1:500 A3

LEGEND

- PROPOSED SITE BOUNDARY
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- HARDSTAND OR LANDSCAPING TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING TREE
- E-OH EXISTING ELECTRICITY OVERHEAD
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN

NTS

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	ISSUED FOR DRAFT SSDA	LAM	RET	06.03.20

CITY OF PARRAMATTA

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APPROVED FOR CONSTRUCTION:	-

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

GENERAL ARRANGEMENT PLAN SHEET 4

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
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MATCHLINE. REFER SHEET 1

MATCHLINE. REFER SHEET 4

PP

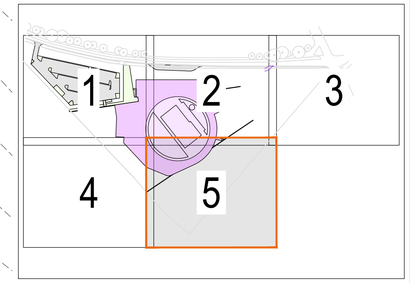
LOT 41
DP1164350

PP

1:250 5 0 5 10 A1
1:500 A3

LEGEND

- PROPOSED SITE BOUNDARY
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- HARDSTAND OR LANDSCAPING TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING TREE
- E-OH EXISTING ELECTRICITY OVERHEAD
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN
NTS

REV	DESCRIPTION	DRAWN	APP'D	DATE
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CITY OF PARRAMATTA

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PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

GENERAL ARRANGEMENT PLAN SHEET 5

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SCALE @ A1	PROJECT No	DRAWING No	REV
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NOTE:
FOR EROSION AND SEDIMENT CONTROL DETAILS REFER DRAWING CI-076-001

PARK PARADE

ARGYLE STREET

PITT STREET

PP

1:750 15 0 15 30 A1
1:1500 A3

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LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- VEHICLE SHAKEDOWN DEVICE
- PROPOSED SEDIMENT BASIN
- PROPOSED SILT FENCE
- PROPOSED BUND
- BARRIER FENCE
- OVERLAND FLOW PATH
- LEVEL SPREADER
- SANDBAG PIT PROTECTION
- EXISTING TREE
- EXISTING STORMWATER PIPE
- EXISTING SEWER
- EXISTING GAS
- EXISTING WATER
- EXISTING ELECTRICITY
- EXISTING ELECTRICITY OVERHEAD
- EXISTING TELECOMMUNICATIONS
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT

REV	DESCRIPTION	DRAWN	APP'D	DATE
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APPROVED FOR CONSTRUCTION:	.

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

EROSION AND SEDIMENT CONTROL PLAN
SITE WIDE

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
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SHAKER GRID TO BE LOCATED AT SITE ENTRANCE

PROPOSED SEDIMENT BASIN.
TOTAL VOLUME = 162m³
SETTLING ZONE = 77m³
SEDIMENT STORAGE ZONE = 40m³
DEPTH = 1.5m
DISPERSIBLE SOILS - FLOCCULATION REQUIRED.

PROPOSED 500mm HIGH BUND TO DIVERT UPSTREAM CATCHMENT

PARK PARADE

MATCHLINE. REFER SHEET 2

MATCHLINE. REFER SHEET 4

NOTE:

FOR EROSION AND SEDIMENT CONTROL DETAILS REFER DRAWING CI-076-001

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- VEHICLE SHAKEDOWN DEVICE
- PROPOSED SEDIMENT BASIN
- PROPOSED SILT FENCE
- PROPOSED BUND
- BARRIER FENCE
- OVERLAND FLOW PATH
- LEVEL SPREADER
- SANDBAG PIT PROTECTION
- EXISTING TREE
- EXISTING STORMWATER PIPE
- S EXISTING SEWER
- G EXISTING GAS
- W EXISTING WATER
- E-UG EXISTING ELECTRICITY
- E-OH EXISTING ELECTRICITY OVERHEAD
- COMS EXISTING TELECOMMUNICATIONS
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT

1:250 | 5 0 5 10 A1
1:500 | A3

KEY PLAN

NTS

REV	DESCRIPTION	DRAWN	APP'D	DATE
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ARCHITECT/CLIENT

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APPROVED FOR CONSTRUCTION:	-

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

EROSION AND SEDIMENT CONTROL PLAN SHEET 1

FOR APPROVAL
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SCALE @ A1	PROJECT No	DRAWING No	REV
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NOTE:

FOR EROSION AND SEDIMENT CONTROL DETAILS REFER DRAWING CI-076-001

PROPOSED SEDIMENT BASIN.
TOTAL VOLUME = 365m³
SETTLING ZONE = 199m³
SEDIMENT STORAGE ZONE = 108m³
DEPTH = 1.5m
DISPERSIBLE SOILS - FLOCCULATION REQUIRED.

PARK PARADE

MATCHLINE. REFER SHEET 1

MATCHLINE. REFER SHEET 2

MATCHLINE. REFER SHEET 1

MATCHLINE. REFER SHEET 5

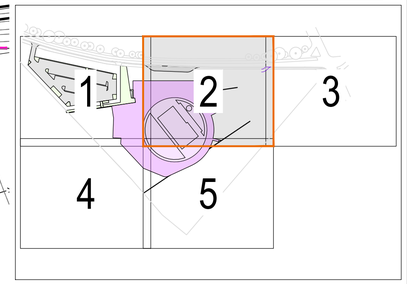
MATCHLINE. REFER SHEET 2

MATCHLINE. REFER SHEET 3

1:250 5 0 5 10 A1
1:500 A3

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- VEHICLE SHAKEDOWN DEVICE
- PROPOSED SEDIMENT BASIN
- PROPOSED SILT FENCE
- PROPOSED BUND
- BARRIER FENCE
- OVERLAND FLOW PATH
- LEVEL SPREADER
- SANDBAG PIT PROTECTION
- EXISTING TREE
- EXISTING STORMWATER PIPE
- EXISTING SEWER
- EXISTING GAS
- EXISTING WATER
- EXISTING ELECTRICITY
- EXISTING ELECTRICITY OVERHEAD
- EXISTING TELECOMMUNICATIONS
- EXISTING STORMWATER KERB INLET PIT
- EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN
NTS

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	ISSUED FOR DRAFT SSDA	LAM	RET	06.03.20

CITY OF PARRAMATTA

CONSULTANT: WOOD & GRIEVE ENGINEERS, NOW PART OF Stantec

ARCHITECT/CLIENT

DRAWN:	LAM
DESIGNED:	LAM
VERIFIED:	.
APPROVED FOR TENDER:	.
APPROVED FOR CONSTRUCTION:	.

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

EROSION AND SEDIMENT CONTROL PLAN SHEET 2

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:250	38574	CI-070-012	A

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PARK PARADE

ARGYLE STREET

PITT STREET

PROPOSED SEDIMENT BASIN.
TOTAL VOLUME = 162m³
SETTLING ZONE = 77m³
SEDIMENT STORAGE ZONE = 40m³
DEPTH = 1.5m
DISPERSIBLE SOILS - FLOCCULATION REQUIRED.

MATCHLINE. REFER SHEET 2

MATCHLINE. REFER SHEET 3

T1 T2 T3 T4 T5 T6 T7 T8 T150 T151 T152 T155 T156

G148(13) G149(5) G153(16) G154(4)

PP

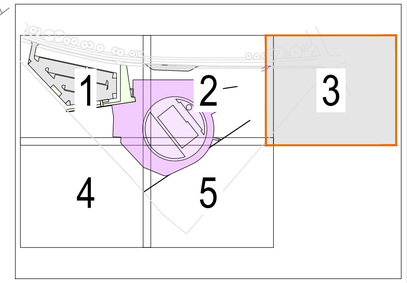
1:250 1:500 5 0 5 10 A1 A3

NOTE:

FOR EROSION AND SEDIMENT CONTROL DETAILS REFER DRAWING CI-076-001

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- VEHICLE SHAKEDOWN DEVICE
- PROPOSED SEDIMENT BASIN
- PROPOSED SILT FENCE
- PROPOSED BUND
- BARRIER FENCE
- OVERLAND FLOW PATH
- LEVEL SPREADER
- SANDBAG PIT PROTECTION
- EXISTING TREE
- EXISTING STORMWATER PIPE
- EXISTING SEWER
- EXISTING GAS
- EXISTING WATER
- EXISTING ELECTRICITY
- EXISTING ELECTRICITY OVERHEAD
- EXISTING TELECOMMUNICATIONS
- EXISTING STORMWATER KERB INLET PIT
- EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN

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CITY OF PARRAMATTA

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PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

EROSION AND SEDIMENT CONTROL PLAN SHEET 3

FOR APPROVAL

NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:250	38574	CI-070-013	A

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MATCHLINE. REFER SHEET 1

MATCHLINE. REFER SHEET 5

NOTE:
FOR EROSION AND SEDIMENT CONTROL DETAILS REFER DRAWING CI-076-001

PROPOSED 500mm HIGH BUND TO DIVERT UPSTREAM CATCHMENT

SP73484

LOT 1 DP523943

LOT 2 DP523943

SP85238

SP42467

LOT 1 SP59070

T73 T74 T75 T76 T78 T69 T70 T71 T82 T91 T92 T93 T94 T95 T96 T97 T98

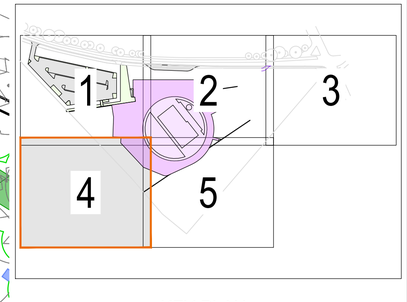
G72(3) G77(3) G68(62) G90(2) G99(3) G100(2) G101(2)

PP

A

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- VEHICLE SHAKEDOWN DEVICE
- PROPOSED SEDIMENT BASIN
- PROPOSED SILT FENCE
- PROPOSED BUND
- BARRIER FENCE
- OVERLAND FLOW PATH
- LEVEL SPREADER
- SANDBAG PIT PROTECTION
- EXISTING TREE
- EXISTING STORMWATER PIPE
- S EXISTING SEWER
- G EXISTING GAS
- W EXISTING WATER
- E-UG EXISTING ELECTRICITY
- E-OH EXISTING ELECTRICITY OVERHEAD
- COMMS EXISTING TELECOMMUNICATIONS
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN
NTS

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	ISSUED FOR DRAFT SSDA	LAM	RET	06.03.20

CITY OF PARRAMATTA

CONSULTANT: WOOD & GRIEVE ENGINEERS, NOW PART OF Stantec

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DESIGNED:	LAM
VERIFIED:	-
APPROVED FOR TENDER:	-
APPROVED FOR CONSTRUCTION:	-

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

EROSION AND SEDIMENT CONTROL PLAN SHEET 4

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:250	38574	CI-070-014	A

1:250 5 0 5 10 A1
1:500 A3

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6/03/2020 3:58:22 PM

MATCHLINE. REFER SHEET 1

MATCHLINE. REFER SHEET 4

NOTE:
FOR EROSION AND SEDIMENT CONTROL DETAILS REFER DRAWING CI-076-001

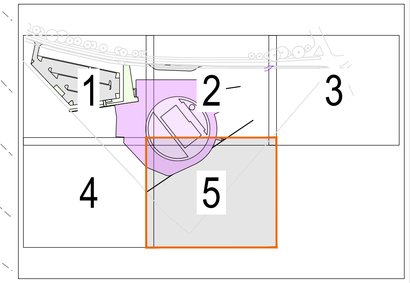
PROPOSED 500mm HIGH BUND TO DIVERT UPSTREAM CATCHMENT

LOT 41
DP1164350

1:250 5 0 5 10 A1
1:500 A3

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- VEHICLE SHAKEDOWN DEVICE
- PROPOSED SEDIMENT BASIN
- PROPOSED SILT FENCE
- PROPOSED BUND
- BARRIER FENCE
- OVERLAND FLOW PATH
- LEVEL SPREADER
- SANDBAG PIT PROTECTION
- EXISTING TREE
- EXISTING STORMWATER PIPE
- S EXISTING SEWER
- G EXISTING GAS
- W EXISTING WATER
- E-UG EXISTING ELECTRICITY
- E-OH EXISTING ELECTRICITY OVERHEAD
- COMS EXISTING TELECOMMUNICATIONS
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN
NTS

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	ISSUED FOR DRAFT SSDA	LAM	RET	06.03.20

CITY OF PARRAMATTA

CONSULTANT: WOOD & GRIEVE ENGINEERS, NOW PART OF Stantec

ARCHITECT/CLIENT

DRAWN:	LAM
DESIGNED:	LAM
VERIFIED:	.
APPROVED FOR TENDER:	.
APPROVED FOR CONSTRUCTION:	.

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

EROSION AND SEDIMENT CONTROL PLAN SHEET 5

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
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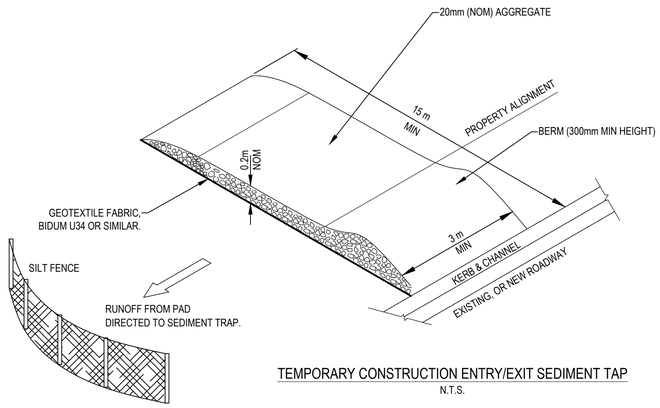
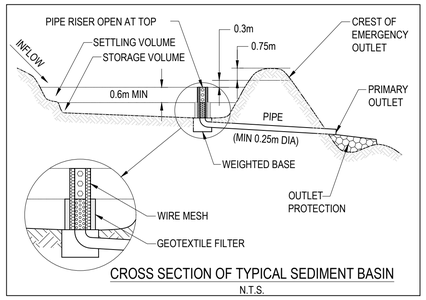
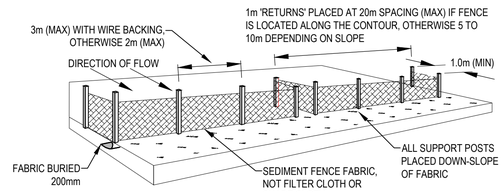


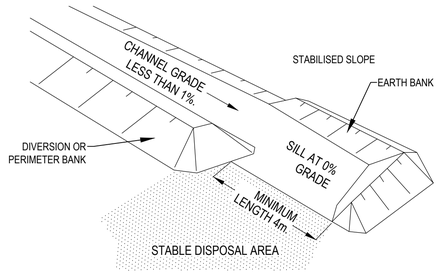
TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TAP
N.T.S.



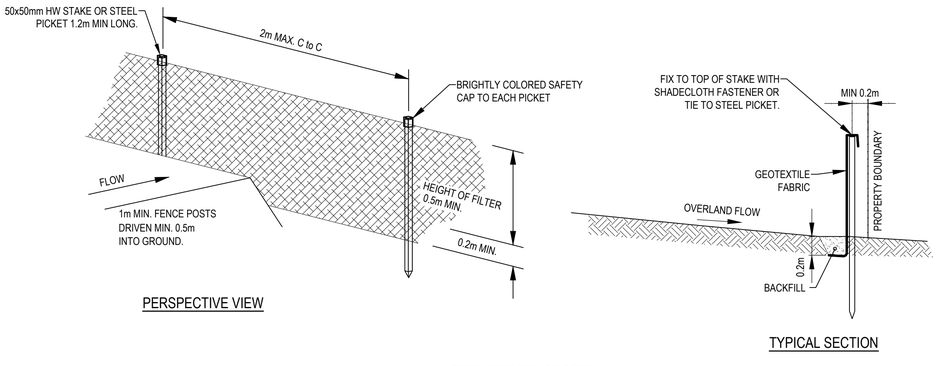
CROSS SECTION OF TYPICAL SEDIMENT BASIN
N.T.S.



INSTALLATION OF SEDIMENT FENCE
N.T.S



LEVEL SPREADER (OR SILL)
N.T.S.



SEDIMENT FENCE DETAIL
N.T.S.

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A	ISSUED FOR DRAFT SSDA	LAM	RET	06.03.20
REV	DESCRIPTION	DRAWN	APP'D	DATE

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CONSULTANT	ARCHITECT/CLIENT

WOOD & GRIEVE ENGINEERS
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Stantec

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APPROVED FOR TENDER:	.
APPROVED FOR CONSTRUCTION:	.

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

EROSION AND SEDIMENT CONTROL DETAILS

FOR APPROVAL
NOT FOR CONSTRUCTION

NTS	38574	CI-076-001	A
SCALE @ A1	PROJECT No	DRAWING No	REV

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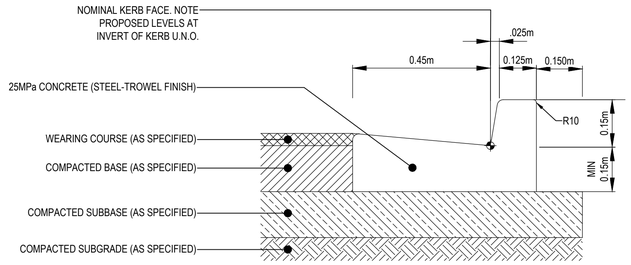
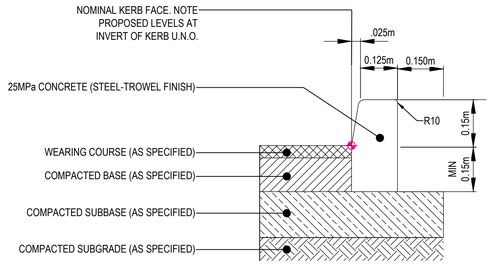


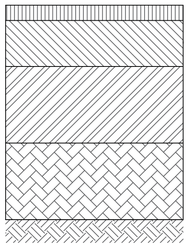
KERB AND GUTTER DETAIL

(SCALE 1:10)



KERB ONLY 'KO' DETAIL

(SCALE 1:10)



MIN 50mm AC SURFACING

150mm THICK BASE.
DGB20 (CBR 80).
98% MODIFIED COMPACTION.

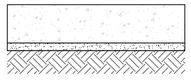
250mm THICK SUB-BASE.
DGS40 (CBR 45).
95% MODIFIED COMPACTION.

250mm SUBGRADE REPLACEMENT.
STABALISED WITH 3% BY WEIGHT
OF LIME TO MIN CBR 8%.

SUBGRADE COMPACTED TO 100%
STANDARD COMPACTION.

CAR PARK PAVEMENT DETAIL

(SCALE 1:10)



125mm CONCRETE 25MPa WITH
SL62 MESH CENTRALLY PLACED

25mm SAND BEDDING

SUBGRADE COMPACTED TO 100%
STANDARD COMPACTION.

CONCRETE FOOTPATH DETAIL

(SCALE 1:10)

1:10 0.1 0 0.1 0.2 0.3 0.4 0.5 A1
1:20 A3

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APPROVED FOR CONSTRUCTION:	.

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

ROADWORKS DETAILS

FOR APPROVAL

NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
AS SHOWN	38574	CI-406-001	A

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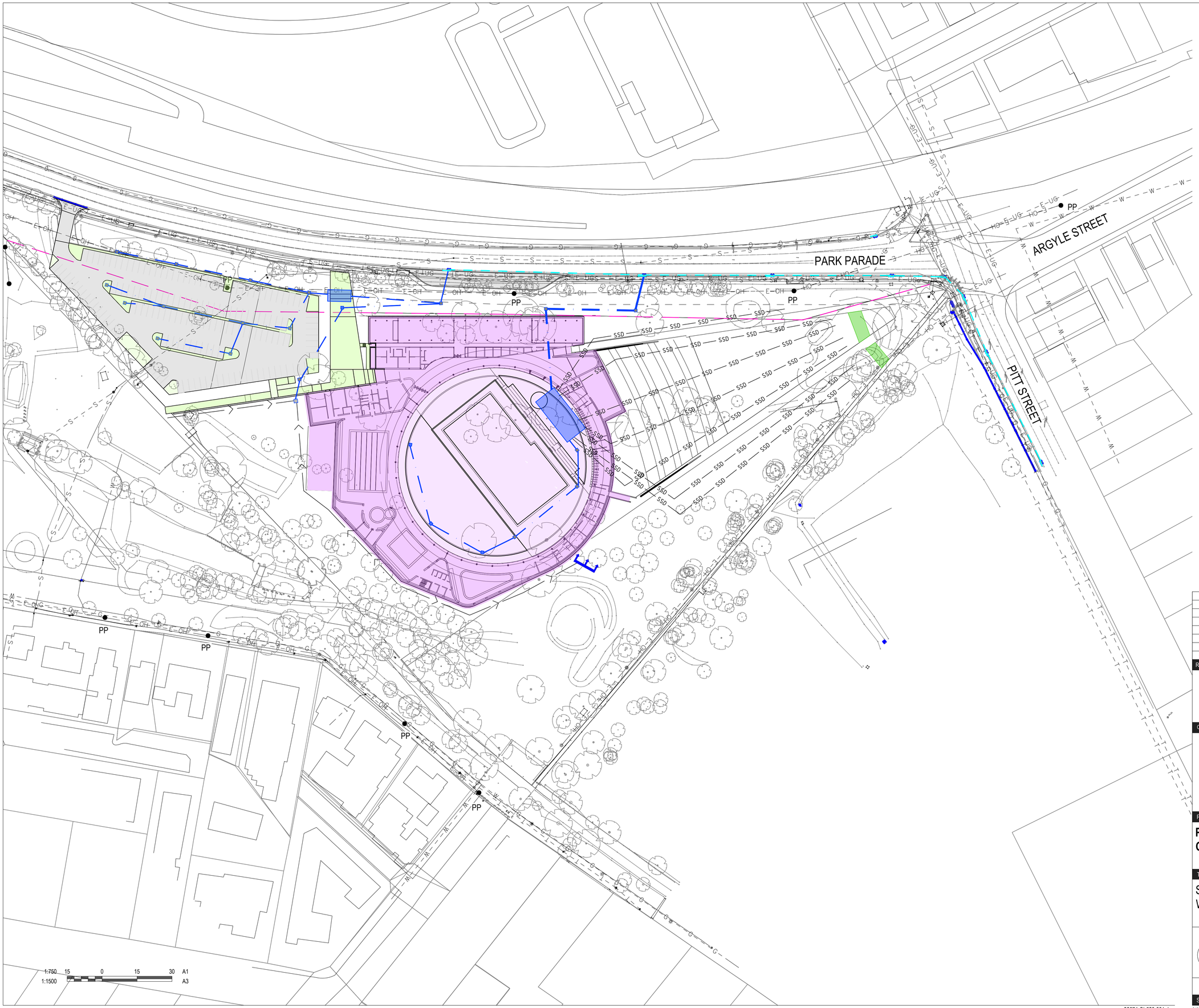

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- 31.40 PROPOSED SURFACE CONTOUR
- 31.40 EXISTING SURFACE CONTOUR
- EXISTING TREE
- PROPOSED STORMWATER PIPE
- PROPOSED GRATED DRAIN
- SSD PROPOSED SUBSURFACE DRAIN
- PROPOSED SWALE
- EXISTING STORMWATER PIPE
- S EXISTING SEWER
- G EXISTING GAS
- W EXISTING WATER
- E-UG EXISTING ELECTRICITY
- E-OH EXISTING ELECTRICITY OVERHEAD
- COMS EXISTING TELECOMMUNICATIONS
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING STORMWATER KERB INLET PIT
- PP EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT

REV	DESCRIPTION	DRAWN	APP'D	DATE
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PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

STORMWATER DRAINAGE PLAN SITE WIDE

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:750	38574	CI-520-001	A

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PARK PARADE

PROPOSED SWALES AND RAINGARDENS.

PROPOSED RAINWATER RE-USE AND ON-SITE DETENTION STORAGE.
RAINWATER RE-USE VOLUME 50m³
ON-SITE DETENTION VOLUME 80m³
MAX. RELEASE RATE 437m³/s

PROPOSED SWALE TO CAPTURE UPSTREAM CATCHMENTS AND DIVERT OVERLAND FLOWS AWAY FROM ROOF AREA.

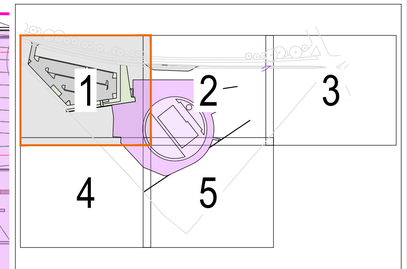
MATCHLINE. REFER SHEET 4

MATCHLINE. REFER SHEET 2

1:250 | 5 0 5 10 A1
1:500 A3

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- PROPOSED SURFACE CONTOUR (31.40)
- EXISTING SURFACE CONTOUR (31.40)
- EXISTING TREE
- PROPOSED STORMWATER PIPE
- PROPOSED GRATED DRAIN
- PROPOSED SUBSURFACE DRAIN (SSD)
- PROPOSED SWALE
- EXISTING STORMWATER PIPE
- EXISTING SEWER (S)
- EXISTING GAS (G)
- EXISTING WATER (W)
- EXISTING ELECTRICITY (E-UG)
- EXISTING ELECTRICITY OVERHEAD (E-OH)
- EXISTING TELECOMMUNICATIONS (COMS)
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING STORMWATER KERB INLET PIT
- EXISTING ELECTRICITY POLE (PP)
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN
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APPROVED FOR CONSTRUCTION:	-

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

STORMWATER DRAINAGE PLAN SHEET 1

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:250	38574	CI-520-011	A

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PARK PARADE

CONNECT INTO EXISTING KERB INLET PIT.

CONNECT INTO EXISTING KERB INLET PIT.

PROPOSED SUBSURFACE DRAINAGE LINES TO PASSIVELY IRRIGATE PROPOSED LANDSCAPE.

PROPOSED GRATED DRAIN TO PICK UP OVERLAND FLOW FROM POOL SURROUNDS.

PROPOSED RAINWATER RE-USE AND ON-SITE DETENTION STORAGE.
RAINWATER RE-USE VOLUME 100m³
ON-SITE DETENTION VOLUME 160m³
MAX. RELEASE RATE 437m³/s

POOL

MATCHLINE. REFER SHEET 1

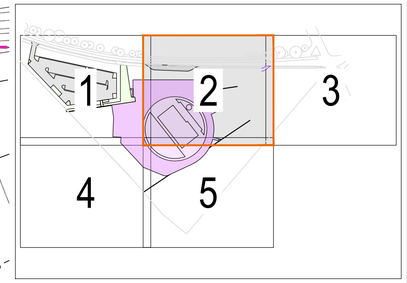
MATCHLINE. REFER SHEET 3

MATCHLINE. REFER SHEET 5

1:250 5 0 5 10 A1
1:500 A3

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- PROPOSED SURFACE CONTOUR (31.40)
- EXISTING SURFACE CONTOUR (31.40)
- EXISTING TREE
- PROPOSED STORMWATER PIPE
- PROPOSED GRATED DRAIN
- PROPOSED SUBSURFACE DRAIN (SSD)
- PROPOSED SWALE
- EXISTING STORMWATER PIPE
- EXISTING SEWER (S)
- EXISTING GAS (G)
- EXISTING WATER (W)
- EXISTING ELECTRICITY (E-UG)
- EXISTING ELECTRICITY OVERHEAD (E-OH)
- EXISTING TELECOMMUNICATIONS (COMS)
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING STORMWATER KERB INLET PIT
- EXISTING ELECTRICITY POLE (PP)
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN
NTS

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CITY OF PARRAMATTA

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APPROVED FOR CONSTRUCTION:	-

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

STORMWATER DRAINAGE PLAN SHEET 2

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:250	38574	CI-520-012	A

38574-CI-520-011.dwg
6/03/2020 4:00:15 PM

PARK PARADE

ARGYLE STREET

PITT STREET

PROPOSED 100m² RAINGARDEN

PROPOSED SUBSURFACE DRAINAGE LINES TO PASSIVELY IRRIGATE PROPOSED LANDSCAPE.

MATCHLINE. REFER SHEET 2

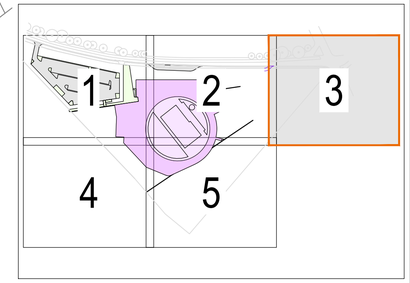
PP

1:250 5 0 5 10 A1
1:500 A3

38574-CI-520-011.dwg

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXISTING TREE
- PROPOSED STORMWATER PIPE
- PROPOSED GRATED DRAIN
- PROPOSED SUBSURFACE DRAIN
- PROPOSED SWALE
- EXISTING STORMWATER PIPE
- EXISTING SEWER
- EXISTING GAS
- EXISTING WATER
- EXISTING ELECTRICITY
- EXISTING ELECTRICITY OVERHEAD
- EXISTING TELECOMMUNICATIONS
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING STORMWATER KERB INLET PIT
- EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN

NTS

REV	DESCRIPTION	DRAWN	APP'D	DATE
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CITY OF PARRAMATTA

CONSULTANT	ARCHITECT/CLIENT
WOOD & GRIEVE ENGINEERS NOW PART OF Stantec	

DRAWN:	LAM
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APPROVED FOR CONSTRUCTION:	.

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

STORMWATER DRAINAGE PLAN SHEET 3

FOR APPROVAL

NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
1:250	38574	CI-520-013	A

6/03/2020 4:00:30 PM

MATCHLINE. REFER SHEET 1

PROPOSED SWALE TO CAPTURE UPSTREAM CATCHMENTS AND DIVERT OVERLAND FLOWS AWAY FROM ROOF AREA.

PROPOSED STORMWATER INFRASTRUCTURE TO PICK UP ROOF DOWNPIPES.

SP73484

LOT 1
DP523943

LOT 2
DP523943

SP85238

SP42467

LOT 1
SP59070

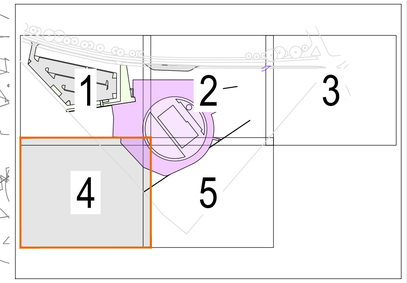
PP

MATCHLINE. REFER SHEET 5

1:250 5 0 5 10 A1
1:500 A3

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXISTING TREE
- PROPOSED STORMWATER PIPE
- PROPOSED GRATED DRAIN
- PROPOSED SUBSURFACE DRAIN
- PROPOSED SWALE
- EXISTING STORMWATER PIPE
- EXISTING SEWER
- EXISTING GAS
- EXISTING WATER
- EXISTING ELECTRICITY
- EXISTING ELECTRICITY OVERHEAD
- EXISTING TELECOMMUNICATIONS
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING STORMWATER KERB INLET PIT
- EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN
NTS

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	ISSUED FOR DRAFT SSDA	LAM	RET	06.03.20

CITY OF PARRAMATTA

CONSULTANT	ARCHITECT/CLIENT
WOOD & GRIEVE ENGINEERS NOW PART OF Stantec	DRAWN: LAM DESIGNED: LAM VERIFIED: APPROVED FOR TENDER: APPROVED FOR CONSTRUCTION:

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

STORMWATER DRAINAGE PLAN SHEET 4

FOR APPROVAL
NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
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38574-CI-520-011.dwg
6/03/2020 4:00:45 PM

MATCHLINE. REFER SHEET 1

MATCHLINE. REFER SHEET 4

PROPOSED SWALE TO CAPTURE UPSTREAM CATCHMENTS AND DIVERT OVERLAND FLOWS AWAY FROM ROOF AREA.

LOT 41
DP1164350

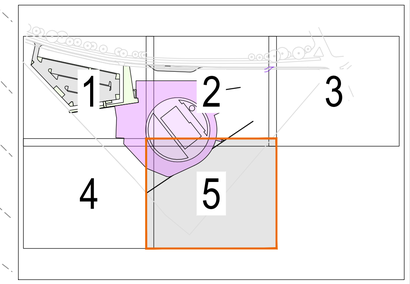
PP

PP

1:250 5 0 5 10 A1
1:500 A3

LEGEND

- PROPOSED SITE BOUNDARY
- EXTENT OF EARTHWORKS
- EASEMENT
- PROPOSED BUILDING
- PROPOSED CAR PARK PAVEMENT
- PROPOSED LANDSCAPE TO LANDSCAPE ARCHITECT'S SPECIFICATIONS
- PROPOSED SURFACE CONTOUR
- EXISTING SURFACE CONTOUR
- EXISTING TREE
- PROPOSED STORMWATER PIPE
- PROPOSED GRATED DRAIN
- PROPOSED SUBSURFACE DRAIN
- PROPOSED SWALE
- EXISTING STORMWATER PIPE
- EXISTING SEWER
- EXISTING GAS
- EXISTING WATER
- EXISTING ELECTRICITY
- EXISTING ELECTRICITY OVERHEAD
- EXISTING TELECOMMUNICATIONS
- PROPOSED GRATED INLET PIT
- PROPOSED JUNCTION PIT
- EXISTING STORMWATER KERB INLET PIT
- EXISTING ELECTRICITY POLE
- EXISTING ELECTRICITY POLE WITH LIGHT



KEY PLAN
NTS

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	ISSUED FOR DRAFT SSDA	LAM	RET	06.03.20

CITY OF PARRAMATTA

CONSULTANT: WOOD & GRIEVE ENGINEERS, NOW PART OF Stantec

ARCHITECT/CLIENT

DRAWN:	LAM
DESIGNED:	LAM
VERIFIED:	-
APPROVED FOR TENDER:	-
APPROVED FOR CONSTRUCTION:	-

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

STORMWATER DRAINAGE PLAN SHEET 5

FOR APPROVAL
NOT FOR CONSTRUCTION

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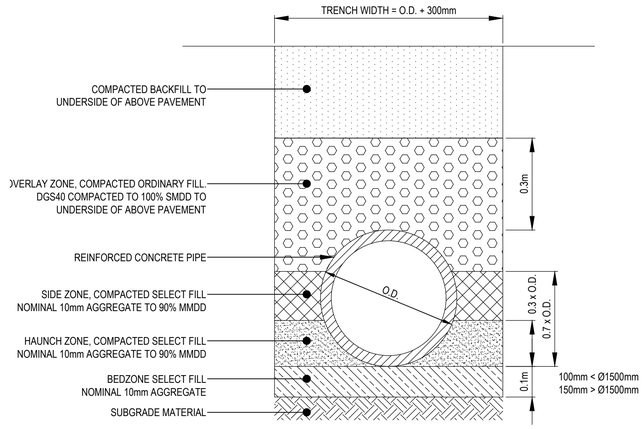
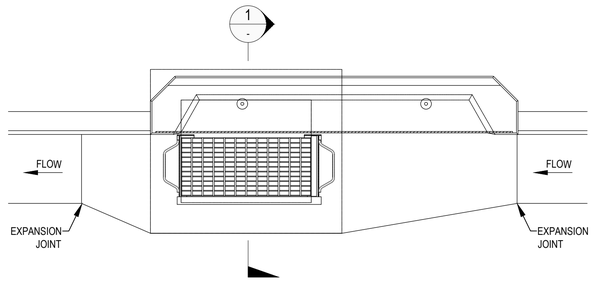
38574-CI-520-011.dwg

6/03/2020 4:01:02 PM

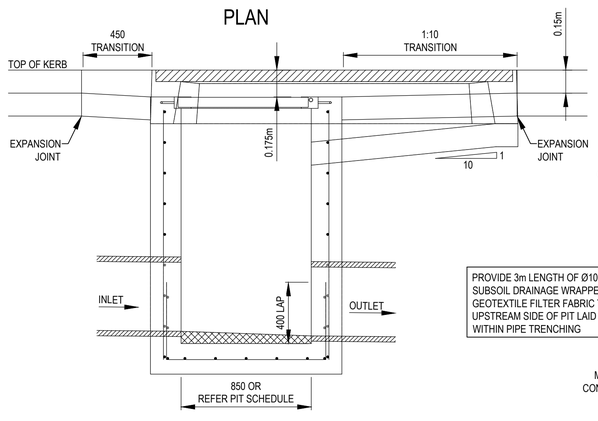


TYPICAL PIPE TRENCH DETAIL

SCALE 1:10



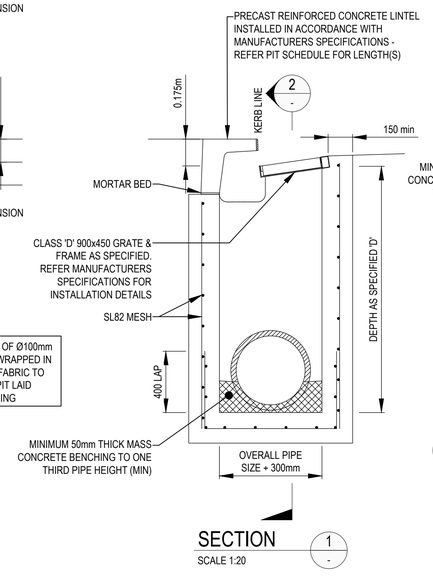
PLAN



SECTION 2

SCALE 1:20

PROVIDE 3m LENGTH OF Ø100mm SUBSOIL DRAINAGE WRAPPED IN GEOTEXTILE FILTER FABRIC TO UPSTREAM SIDE OF PIT LAID WITHIN PIPE TRENCHING

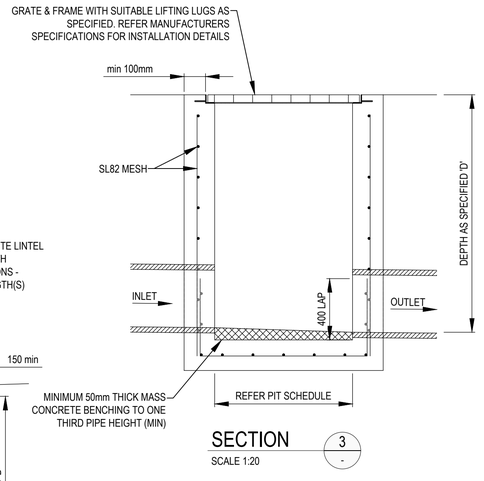


SECTION 1

SCALE 1:20

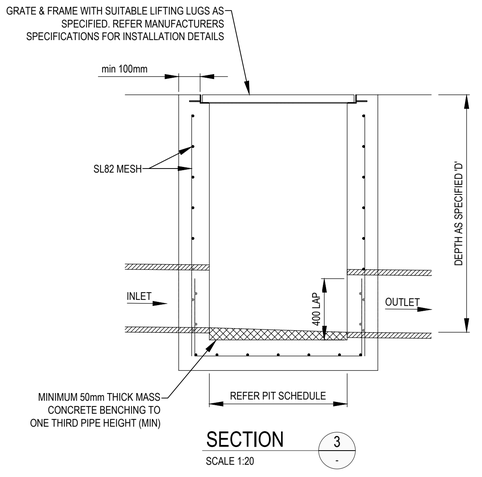
KERB INLET PIT

SCALE 1:20



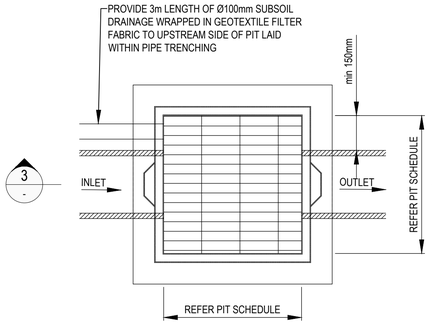
SECTION 3

SCALE 1:20



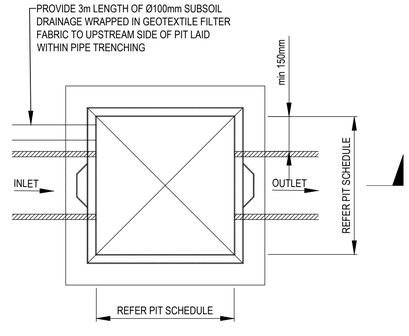
SECTION 3

SCALE 1:20



GRATED PIT PLAN

SCALE 1:20



JUNCTION PIT PLAN

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1:20 A3

1:20 0.2 0 0.2 0.4 0.6 0.8 1 A1
1:40 A3

REV	DESCRIPTION	DRAWN	APP'D	DATE
A	ISSUED FOR DRAFT SSDA	LAM	RET	06.03.20

CITY OF PARRAMATTA

CONSULTANT: WOOD & GRIEVE ENGINEERS — NOW PART OF Stantec

ARCHITECT/CLIENT

DRAWN:	LAM
DESIGNED:	LAM
VERIFIED:	-
APPROVED FOR TENDER:	-
APPROVED FOR CONSTRUCTION:	-

PROJECT

PARRAMATTA AQUATIC CENTRE

TITLE

STORMWATER DRAINAGE DETAILS

FOR APPROVAL

NOT FOR CONSTRUCTION

SCALE @ A1	PROJECT No	DRAWING No	REV
AS SHOWN	38574	CI-526-001	A

38574-CI-526-001.dwg

6/03/2020 4:09:12 PM

Appendix B UPRC Calculation Sheet

Project:	**PARRAMATTA AQUATIC CENTRE**
Site Address	
Job No:	**38574**
Designer:	**RET**
Telephone:	**(02) 8484 7000**

Site Data

OSD Area:	**Upper Parramatta River Catchment**					
L.G.A	**Parramatta City Council**					
Site Area	**2.352**	ha	**23,520**	m^2		
Total Roof Area	**1.296**	ha	**12,960**	m^2		
Area of Site draining to OSD Storage	**1.956**	ha	**19,560**	m^2	**Increase Area to Reduce Bypass**	
Residual Site Area (Lot Area - Roof Area)	**1.056**	ha				
Area Bypassing Storage	**0.396**	ha				
Area Bypassing / Residual Site Area	**37.5%**				**Unacceptable - Exceeds 30%**	**30% Max**
No. of Dwellings on Site	**1**				**Satisfactory**	
Site Area per Dwelling	**2.352**	ha				
Roof Area per Dwelling	**1.296**	ha				

Basic OSD Parameters

		Extended Detention			Detention	
Basic SSR Vols	Ext Detention Storage	**300**	m^3/ha	Total Storage	**455**	m^3/ha
Basic SRDs	Primary Outlet	**40**	L/s/ha	Secondary Outlet	**150**	L/s/ha

OSD Tank Bypass

Residual Lot Capture in OSD Tank	**63%**				
Adjusted SRDs	**29**	L/s/ha		**75**	L/s/ha

OSD Calculations

		Extended Detention				Detention	
Basic SSR Volume	Ext Detention Storage	**705.60**	m^3		Total Storage	**1070.16**	m^3
Total Rainwater Tank Credits		**0.00**	m^3			**0.00**	m^3
Storage Volume					Total	**1070.16**	m^3
Storage Volume	Ext Detention Storage	**705.60**	m^3		Flood Detention Storage	**364.56**	m^3
OSD Discharges	Primary Outlet	**67.62**	L/s		Secondary Outlet	**176.40**	L/s
RL of Top Water Level of Storage		**26.500**	m			**28.000**	m
RL of Orifice Centre-line		**25.000**	m			**25.000**	m
Number of Orifices		**1**				**1**	
Estimated Downstream Flood Level		**0.00**	1.5 yr ARI			**0.00**	100 yr ARI
Downstream FL - RL of Orifice Cente-line		**-25.00**	**Satisfactory**		**Satisfactory**	**-25.00**	m
Design Head to Orifice Centre		**1.500**	m		TWL Ext Detn Storage - RL Orifice	**1.500**	m
Calculated Orifice Diameter		**163**	mm	**Satisfactory**	**Satisfactory**	**263**	mm

Appendix C DRAINS Results

100yr ARI Storm Results

DRAINS results prepared from Version 2020.012

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surface Flow Arriving (cu.m/s)	Version 8 Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
N OSD	26.34		0.131				
N OSD CARPARK	26.28		0.041				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (cu.m/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
C PRE	1.941	0	1.941	5	2	10	1% AEP, 15 min burst, Storm 2
C PERVIOUS BYPASS	0.945	0	0.945	5	2	10	1% AEP, 15 min burst, Storm 2
C OSD	0.713	0.713	0	5	2	10	1% AEP, 5 min burst, Storm 1
C IMPERVIOUS BYPASS	0.218	0.218	0	5	2	10	1% AEP, 5 min burst, Storm 1
C CARPARK	0.345	0.319	0.026	5	2	10	1% AEP, 10 min burst, Storm 5

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
P OSD	0.437	2.24	26.594	26.343	1% AEP, 15 min burst, Storm 8
P OSD CARPARK	0.29	2.04	26.507	26.276	1% AEP, 10 min burst, Storm 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF OSD	0	0	1.479	0	0	0	0	
OF OSD CARPARK	0	0	1.479	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
OSD	26.85	169.4	0.437	0.437	0
OSD CARPARK	26.7	34.8	0.29	0.29	0

Run Log for Parramatta Aquatic Centre REV C.drn run at 15:28:10 on 6/3/2020 using version 2020.012

Flows were safe in all overflow routes.

Appendix D Rainwater Re-Use Calculations

Daily Rainfall Data Input (http://www.bom.gov.au/climate/data/)

2019	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	0	0	0	0	0		0	0	0	0	0	0
2nd	0	0	0	0	0		0	0	0	0	0	0
3rd	0	16	0	3.2	1	1	0	0	0	0	0	0
4th	0	1.2	0	0	11.8	20	5.8	0	0	0	16.6	0
5th	0	0	0	7	0	3.8	17.2	0	0	12	0	0
6th	0	1.6	0	3.4	0	1.4	1.4	0	0	0.4	0	0
7th	4.2	48	5.2	0	0	0	2	0	0	0	0	0
8th	0.4	51	0	0	0	1	0.4	0	0	0	0	0
9th	0	102	0	0	0	0	0.2	0	0	0	0	0
10th	0	158	0.6	0	0	0	0	0	1	0	0	0
11th	0.4	0	0	0	0.2	0	0	0	0	0	0	0
12th	0.2	0	0	0	0	0	0	0.4	0	21	0	0
13th	1.2	13.4	2.2	0	0	0	0	0	0	4	0	0
14th	0	10.2	0.4	0	0	0	0	0	0	0	0	0
15th	0	0	22	0	0	0	0	0	0	0	0	0
16th	3.4	15	37	0	0	7.6	0	0	0	0	0	0
17th	24	0.2	46	0	0	3	0	0	0	0	0	0
18th	14	0.8	40.4	0	0	10	0	0	0	0	0	0
19th	5.6	11.4	2	0	0	0	0	0	0	0	0	0
20th	0.4	0	18.6	0	0	0	0	0	0	0	0	0
21st	0.2	0	2.8	0		0	0	0	0	0	0	0
22nd	0	0	1	0		0	0	0	0	0	0	0
23rd	0	0.2	5.4	0		0	0	0	0	0	3.4	0
24th	2.2	0	2	0		25.4	0	0	0	0	2	0.6
25th	5.2	0	5.4	0		8	0	0	0	0	0	0.4
26th	0	0	1.2	0		8.6	0	0	0	0.8	1.4	0
27th	5.6	0.6	0	0		0	0	11.6	0	0	0.2	0
28th	0	0	0	0		0	0	0	0	0	0	0
29th	0	0	0	0		0	0	0	0	0	0	0
30th	0		33	0		0	3	28	0	0	0	0
31st	0		0.4				0	14		0		0

Number of Rainfall Days			**107**
			Station No.
Parramatta North (Masons Drive)	33.79S	151.02E	66124
Site Coordinates	33.815	150.995	
Rainwater Harvested Area	1.296	Ha	**roof area only

Irrigation

Area of Landscape	10,000	m2
Irrigation Rate	0.3	kL/year/m2
Yearly Usage	3,000	kL
Daily Usage	8,219	Litre

Toilet Flushing

No. of Toilets	0	
Daily Water Usage	35	Litre/toilet
Total Daily Usage	0	Litre

Laundry

No. of Laundries	0	
Daily Water Usage	45	Litre/toilet
Total Daily Usage	0	Litre

Total Water Usage	**8,219**	**Litre/day**	**8.22 m3/day**

Target Runoff Days	53.5		
Runoff Days	53	Total Site Area	12,960 m2
Potable Usage Days	114		
Rainwater Tank Volume	125 m3		
Initial Volume	125 m3		

	Rainwater Tank Volume (m3)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1st	116.78	92.12	28.52	113.75	0.00	0.00	75.68	14.22	116.78	0.00	0.00	8.53
2nd	108.56	83.90	20.30	105.53	0.00	0.00	67.47	6.00	108.56	0.00	0.00	0.31
3rd	100.34	125.00	12.08	125.00	4.74	4.74	59.25	0.00	100.34	0.00	0.00	0.00
4th	92.12	125.00	3.86	116.78	125.00	125.00	125.00	0.00	92.12	0.00	125.00	0.00
5th	83.90	116.78	0.00	125.00	116.78	125.00	125.00	0.00	83.90	125.00	116.78	0.00
6th	75.68	125.00	0.00	125.00	108.56	125.00	125.00	0.00	75.68	121.96	108.56	0.00
7th	67.47	125.00	59.17	116.78	100.34	116.78	125.00	0.00	67.47	113.75	100.34	0.00
8th	113.68	125.00	50.95	108.56	92.12	121.52	121.96	0.00	59.25	105.53	92.12	0.00
9th	110.64	125.00	42.73	100.34	83.90	113.30	116.34	0.00	51.03	97.31	83.90	0.00
10th	102.42	125.00	42.29	92.12	75.68	105.08	108.12	0.00	55.77	89.09	75.68	0.00
11th	94.21	116.78	34.07	83.90	70.06	96.86	99.90	0.00	47.55	80.87	67.47	0.00
12th	91.17	108.56	25.85	75.68	61.84	88.64	91.68	0.00	39.33	125.00	59.25	0.00
13th	85.54	125.00	46.15	67.47	53.62	80.43	83.46	0.00	31.11	125.00	51.03	0.00
14th	92.88	125.00	43.11	59.25	45.40	72.21	75.24	0.00	22.89	116.78	42.81	0.00
15th	84.66	116.78	125.00	51.03	37.18	63.99	67.02	0.00	14.67	108.56	34.59	0.00
16th	76.44	125.00	125.00	42.81	28.96	125.00	58.80	0.00	6.45	100.34	26.37	0.00
17th	112.28	119.37	125.00	34.59	20.74	125.00	50.58	0.00	0.00	92.12	18.15	0.00
18th	125.00	121.52	125.00	26.37	12.52	125.00	42.37	0.00	0.00	83.90	9.93	0.00
19th	125.00	125.00	125.00	18.15	4.30	116.78	34.15	0.00	0.00	75.68	1.71	0.00
20th	125.00	116.78	125.00	9.93	0.00	108.56	25.93	0.00	0.00	67.47	0.00	0.00
21st	121.96	108.56	125.00	1.71	0.00	100.34	17.71	0.00	0.00	59.25	0.00	0.00
22nd	116.34	100.34	125.00	0.00	0.00	92.12	9.49	0.00	0.00	51.03	0.00	0.00
23rd	108.12	94.72	125.00	0.00	0.00	83.90	1.27	0.00	0.00	42.81	35.84	0.00
24th	99.90	86.50	125.00	0.00	0.00	125.00	0.00	0.00	0.00	34.59	53.55	0.00
25th	120.19	78.28	125.00	0.00	0.00	125.00	0.00	0.00	0.00	26.37	45.33	0.00
26th	125.00	70.06	125.00	0.00	0.00	125.00	0.00	0.00	0.00	28.52	55.25	0.00
27th	116.78	69.61	116.78	0.00	0.00	116.78	0.00	125.00	0.00	20.30	49.62	0.00
28th	125.00	61.40	108.56	0.00	0.00	108.56	0.00	116.78	0.00	12.08	41.40	0.00
29th	116.78	53.18	100.34	0.00	0.00	100.34	0.00	108.56	0.00	3.86	33.19	0.00
30th	108.56	44.96	125.00	0.00	0.00	92.12	30.66	125.00	0.00	0.00	24.97	0.00
31st	100.34	36.74	121.96	0.00	0.00	83.90	22.44	125.00	0.00	0.00	16.75	0.00

Appendix E MUSIC Results

Source nodes
Location,Roof (1.296Ha - 100% Imp.),Carpark (0.6Ha - 100% Imp.),Pervious Bypass (2.23Ha - 100% Perv.),Impervious Bypass (0.396Ha - 100% Imp.)
ID,1,2,3,4
Node Type,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode,UrbanSourceNode
Zoning Surface Type,Roof,Sealedroad,Mixed,Sealedroad
Total Area (ha),1.296,0.66,2.23,0.66
Area Impervious (ha),1.296,0.66,0,0.66
Area Pervious (ha),0,0,2.23,0
Field Capacity (mm),70,70,70,70
Pervious Area Infiltration Capacity coefficient - a,210,210,210,210
Pervious Area Infiltration Capacity exponent - b,4.7,4.7,4.7,4.7
Impervious Area Rainfall Threshold (mm/day),1.4,1.4,1.4,1.4
Pervious Area Soil Storage Capacity (mm),170,170,170,170
Pervious Area Soil Initial Storage (% of Capacity),30,30,30,30
Groundwater Initial Depth (mm),10,10,10,10
Groundwater Daily Recharge Rate (%),50,50,50,50
Groundwater Daily Baseflow Rate (%),4,4,4,4
Groundwater Daily Deep Seepage Rate (%),0,0,0,0
Stormflow Total Suspended Solids Mean (log mg/L),1.3,2.43,2.15,2.43
Stormflow Total Suspended Solids Standard Deviation (log mg/L),0.32,0.32,0.32,0.32
Stormflow Total Suspended Solids Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Suspended Solids Serial Correlation,0,0,0,0
Stormflow Total Phosphorus Mean (log mg/L),-0.89,-0.3,-0.6,-0.3
Stormflow Total Phosphorus Standard Deviation (log mg/L),0.25,0.25,0.25,0.25
Stormflow Total Phosphorus Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Phosphorus Serial Correlation,0,0,0,0
Stormflow Total Nitrogen Mean (log mg/L),0.3,0.34,0.3,0.34
Stormflow Total Nitrogen Standard Deviation (log mg/L),0.19,0.19,0.19,0.19
Stormflow Total Nitrogen Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic
Stormflow Total Nitrogen Serial Correlation,0,0,0,0
Baseflow Total Suspended Solids Mean (log mg/L),1.1,1.2,1.1,1.2
Baseflow Total Suspended Solids Standard Deviation (log mg/L),0.17,0.17,0.17,0.17
Baseflow Total Suspended Solids Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Suspended Solids Serial Correlation,0,0,0,0
Baseflow Total Phosphorus Mean (log mg/L),-0.82,-0.85,-0.82,-0.85
Baseflow Total Phosphorus Standard Deviation (log mg/L),0.19,0.19,0.19,0.19
Baseflow Total Phosphorus Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Phosphorus Serial Correlation,0,0,0,0
Baseflow Total Nitrogen Mean (log mg/L),0.32,0.11,0.32,0.11
Baseflow Total Nitrogen Standard Deviation (log mg/L),0.12,0.12,0.12,0.12
Baseflow Total Nitrogen Estimation Method,Stochastic,Stochastic,Stochastic,Stochastic
Baseflow Total Nitrogen Serial Correlation,0,0,0,0
Flow based constituent generation - enabled,Off,Off,Off,Off
Flow based constituent generation - flow file, , , ,
Flow based constituent generation - base flow column, , , ,
Flow based constituent generation - pervious flow column, , , ,
Flow based constituent generation - impervious flow column, , , ,
Flow based constituent generation - unit, , , ,
OUT - Mean Annual Flow (ML/yr),16.9,8.60,12.9,8.60
OUT - TSS Mean Annual Load (kg/yr),438,2.96E3,1.34E3,3.01E3
OUT - TP Mean Annual Load (kg/yr),2.62,5.20,2.90,5.18
OUT - TN Mean Annual Load (kg/yr),37.1,20.5,27.5,20.5
OUT - Gross Pollutant Mean Annual Load (kg/yr),404,206,0.00,206
Rain In (ML/yr),19.3051,9.83132,33.2179,9.83132
ET Loss (ML/yr),2.42133,1.23308,20.3092,1.23308
Deep Seepage Loss (ML/yr),0,0,0,0
Baseflow Out (ML/yr),0,0,6.85242,0
Imp. Stormflow Out (ML/yr),16.8838,8.59824,0,8.59824
Perv. Stormflow Out (ML/yr),0,0,6.05654,0
Total Stormflow Out (ML/yr),16.8838,8.59824,6.05654,8.59824

Total Outflow (ML/yr),16.8838,8.59824,12.909,8.59824
Change in Soil Storage (ML/yr),0,0,-0.000158,0
TSS Baseflow Out (kg/yr),0,0,93.0631,0
TSS Total Stormflow Out (kg/yr),438.402,2957.31,1245.5,3013.16
TSS Total Outflow (kg/yr),438.402,2957.31,1338.57,3013.16
TP Baseflow Out (kg/yr),0,0,1.1412,0
TP Total Stormflow Out (kg/yr),2.61714,5.19816,1.7575,5.18321
TP Total Outflow (kg/yr),2.61714,5.19816,2.8987,5.18321
TN Baseflow Out (kg/yr),0,0,14.8659,0
TN Total Stormflow Out (kg/yr),37.0908,20.4932,12.6708,20.506
TN Total Outflow (kg/yr),37.0908,20.4932,27.5366,20.506
GP Total Outflow (kg/yr),403.96,205.721,0,205.721

No Imported Data Source nodes

USTM treatment nodes
Location,50m2 Swale,20m2 SPEL (Full Height) vault,100m2 Raingarden
ID,5,9,11
Node Type,SwaleNode,DetentionBasinNode,BioRetentionNodeV4
Lo-flow bypass rate (cum/sec),0,0,0
Hi-flow bypass rate (cum/sec), ,100,100
Inlet pond volume, ,0,
Area (sqm), ,20,100
Initial Volume (m^3), , ,
Extended detention depth (m),0.5,0.85,0.2
Number of Rainwater tanks, , ,
Permanent Pool Volume (cubic metres), ,0,
Proportion vegetated, ,0,
Equivalent Pipe Diameter (mm), ,38,
Overflow weir width (m),20,2,2
Notional Detention Time (hrs), ,1.52,
Orifice Discharge Coefficient, ,0.6,
Weir Coefficient, ,1.7,1.7
Number of CSTR Cells,10,1,3
Total Suspended Solids - k (m/yr),8000,8000,8000
Total Suspended Solids - C* (mg/L),20,20,20
Total Suspended Solids - C** (mg/L),14,20,
Total Phosphorus - k (m/yr),6000,6000,6000
Total Phosphorus - C* (mg/L),0.13,0.13,0.13
Total Phosphorus - C** (mg/L),0.13,0.13,
Total Nitrogen - k (m/yr),500,500,500
Total Nitrogen - C* (mg/L),1.4,1.4,1.4
Total Nitrogen - C** (mg/L),1.4,1.4,
Threshold Hydraulic Loading for C** (m/yr),3500,3500,
Horizontal Flow Coefficient, , ,3
Reuse Enabled,Off,Off,Off
Max drawdown height (m), , ,
Annual Demand Enabled,Off,Off,Off
Annual Demand Value (ML/year), , ,
Annual Demand Distribution, , ,
Annual Demand Monthly Distribution: Jan, , ,
Annual Demand Monthly Distribution: Feb, , ,
Annual Demand Monthly Distribution: Mar, , ,
Annual Demand Monthly Distribution: Apr, , ,
Annual Demand Monthly Distribution: May, , ,
Annual Demand Monthly Distribution: Jun, , ,
Annual Demand Monthly Distribution: Jul, , ,
Annual Demand Monthly Distribution: Aug, , ,
Annual Demand Monthly Distribution: Sep, , ,
Annual Demand Monthly Distribution: Oct, , ,
Annual Demand Monthly Distribution: Nov, , ,
Annual Demand Monthly Distribution: Dec, , ,
Daily Demand Enabled,Off,Off,Off
Daily Demand Value (ML/day), , ,

Custom Demand Enabled,Off,Off,Off
Custom Demand Time Series File, , ,
Custom Demand Time Series Units, , ,
Filter area (sqm), , ,80
Filter perimeter (m), , ,0.1
Filter depth (m), , ,0.5
Filter Median Particle Diameter (mm), , ,
Saturated Hydraulic Conductivity (mm/hr), , ,100
Infiltration Media Porosity, , ,0.35
Length (m),50, ,
Bed slope,0.03, ,
Base Width (m),1, ,
Top width (m),2, ,
Vegetation height (m),0.15, ,
Vegetation Type, , ,Vegetated with Effective Nutrient Removal Plants
Total Nitrogen Content in Filter (mg/kg), , ,800
Orthophosphate Content in Filter (mg/kg), , ,40
Is Base Lined?, , ,Yes
Is Underdrain Present?, , ,Yes
Is Submerged Zone Present?, , ,No
Submerged Zone Depth (m), , ,
B for Media Soil Texture,-9999,-9999,13
Proportion of upstream impervious area treated, , ,
Exfiltration Rate (mm/hr),0,0,0
Evaporative Loss as % of PET, ,0,100
Depth in metres below the drain pipe, , ,0
TSS A Coefficient, , ,
TSS B Coefficient, , ,
TP A Coefficient, , ,
TP B Coefficient, , ,
TN A Coefficient, , ,
TN B Coefficient, , ,
Sfc, , ,0.61
S*, , ,0.37
Sw, , ,0.11
Sh, , ,0.05
Emax (m/day), , ,0.008
Ew (m/day), , ,0.001
IN - Mean Annual Flow (ML/yr),8.60,16.9,12.9
IN - TSS Mean Annual Load (kg/yr),2.96E3,438,688
IN - TP Mean Annual Load (kg/yr),5.20,2.62,2.17
IN - TN Mean Annual Load (kg/yr),20.5,37.1,16.2
IN - Gross Pollutant Mean Annual Load (kg/yr),206,404,0.00
OUT - Mean Annual Flow (ML/yr),8.60,16.9,12.7
OUT - TSS Mean Annual Load (kg/yr),909,402,450
OUT - TP Mean Annual Load (kg/yr),2.47,2.49,1.34
OUT - TN Mean Annual Load (kg/yr),18.7,36.3,11.4
OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00,0.00,0.00
Flow In (ML/yr),8.59821,16.8839,12.9082
ET Loss (ML/yr),0,0,0.211774
Infiltration Loss (ML/yr),0,0,0
Low Flow Bypass Out (ML/yr),0,0,0
High Flow Bypass Out (ML/yr),0,0,0
Orifice / Filter Out (ML/yr),8.59827,5.4115,7.54467
Weir Out (ML/yr),0,11.4748,5.14431
Transfer Function Out (ML/yr),0,0,0
Reuse Supplied (ML/yr),0,0,0
Reuse Requested (ML/yr),0,0,0
% Reuse Demand Met,0,0,0
% Load Reduction,-0.00069782,-0.0142147,1.69824
TSS Flow In (kg/yr),2957.31,438.402,687.708
TSS ET Loss (kg/yr),0,0,0
TSS Infiltration Loss (kg/yr),0,0,0
TSS Low Flow Bypass Out (kg/yr),0,0,0

TSS High Flow Bypass Out (kg/yr),0,0,0
TSS Orifice / Filter Out (kg/yr),908.684,119.956,12.2586
TSS Weir Out (kg/yr),0,282.483,437.388
TSS Transfer Function Out (kg/yr),0,0,0
TSS Reuse Supplied (kg/yr),0,0,0
TSS Reuse Requested (kg/yr),0,0,0
TSS % Reuse Demand Met,0,0,0
TSS % Load Reduction,69.2733,8.2032,34.6167
TP Flow In (kg/yr),5.19816,2.61714,2.17079
TP ET Loss (kg/yr),0,0,0
TP Infiltration Loss (kg/yr),0,0,0
TP Low Flow Bypass Out (kg/yr),0,0,0
TP High Flow Bypass Out (kg/yr),0,0,0
TP Orifice / Filter Out (kg/yr),2.46668,0.759423,0.368802
TP Weir Out (kg/yr),0,1.72811,0.967783
TP Transfer Function Out (kg/yr),0,0,0
TP Reuse Supplied (kg/yr),0,0,0
TP Reuse Requested (kg/yr),0,0,0
TP % Reuse Demand Met,0,0,0
TP % Load Reduction,52.5471,4.95224,38.4287
TN Flow In (kg/yr),20.4932,37.0908,16.1633
TN ET Loss (kg/yr),0,0,0
TN Infiltration Loss (kg/yr),0,0,0
TN Low Flow Bypass Out (kg/yr),0,0,0
TN High Flow Bypass Out (kg/yr),0,0,0
TN Orifice / Filter Out (kg/yr),18.7096,11.0706,4.52726
TN Weir Out (kg/yr),0,25.1928,6.83132
TN Transfer Function Out (kg/yr),0,0,0
TN Reuse Supplied (kg/yr),0,0,0
TN Reuse Requested (kg/yr),0,0,0
TN % Reuse Demand Met,0,0,0
TN % Load Reduction,8.70337,2.23074,29.726
GP Flow In (kg/yr),205.721,403.96,0
GP ET Loss (kg/yr),0,0,0
GP Infiltration Loss (kg/yr),0,0,0
GP Low Flow Bypass Out (kg/yr),0,0,0
GP High Flow Bypass Out (kg/yr),0,0,0
GP Orifice / Filter Out (kg/yr),0,0,0
GP Weir Out (kg/yr),0,0,0
GP Transfer Function Out (kg/yr),0,0,0
GP Reuse Supplied (kg/yr),0,0,0
GP Reuse Requested (kg/yr),0,0,0
GP % Reuse Demand Met,0,0,0
GP % Load Reduction,100,100,100
PET Scaling Factor, , ,2.1

Generic treatment nodes
Location,10 x SPEL Stormsacks,15 x SPELFilter (SF.29-EMC) - Full height,SPEL Hydrosystem (SHS.2500/10),10 x SPEL Stormsacks,10 x SPEL Stormsacks,SPEL Puraceptor 200 Series P.015.C1
ID,6,8,12,16,17,18
Node Type,GPTNode,GenericNode,GenericNode,GPTNode,GPTNode,GenericNode
Lo-flow bypass rate (cum/sec),0,0,0,0,0,0
Hi-flow bypass rate (cum/sec),0.15,0.0424,0.04,0.15,0.15,0.015
Flow Transfer Function
Input (cum/sec),0,0,0,0,0,0
Output (cum/sec),0,0,0,0,0,0
Input (cum/sec),10,10,10,10,10,10
Output (cum/sec),10,10,10,10,10,10
Input (cum/sec), , , , , ,
Output (cum/sec), , , , , ,
Input (cum/sec), , , , , ,
Output (cum/sec), , , , , ,
Input (cum/sec), , , , , ,
Output (cum/sec), , , , , ,

Input (cum/sec), , , , , ,
Output (cum/sec), , , , , ,
Input (cum/sec), , , , , ,
Output (cum/sec), , , , , ,
Input (cum/sec), , , , , ,
Output (cum/sec), , , , , ,
Input (cum/sec), , , , , ,
Output (cum/sec), , , , , ,
Input (cum/sec), , , , , ,
Output (cum/sec), , , , , ,
Gross Pollutant Transfer Function
Enabled,True,True,True,True,True,True
Input (kg/ML),0,0,0,0,0,0
Output (kg/ML),0,0,0,0,0,0
Input (kg/ML),15,15,15,15,15,15
Output (kg/ML),0,0,0,0,0,0
Input (kg/ML), , , , , ,
Output (kg/ML), , , , , ,
Input (kg/ML), , , , , ,
Output (kg/ML), , , , , ,
Input (kg/ML), , , , , ,
Output (kg/ML), , , , , ,
Input (kg/ML), , , , , ,
Output (kg/ML), , , , , ,
Input (kg/ML), , , , , ,
Output (kg/ML), , , , , ,
Input (kg/ML), , , , , ,
Output (kg/ML), , , , , ,
Input (kg/ML), , , , , ,
Output (kg/ML), , , , , ,
Total Nitrogen Transfer Function
Enabled,True,True,True,True,True,True
Input (mg/L),0,0,0,0,0,0
Output (mg/L),0,0,0,0,0,0
Input (mg/L),50,50,50,50,50,50
Output (mg/L),27.5,29,26.5,27.5,27.5,38.5
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Total Phosphorus Transfer Function
Enabled,True,True,True,True,True,True
Input (mg/L),0,0,0,0,0,0
Output (mg/L),0,0,0,0,0,0
Input (mg/L),5,5,5,5,5,5
Output (mg/L),3.6,1.23,0.95,3.6,3.6,4.45
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,

Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Total Suspended Solids Transfer Function
Enabled,True,True,True,True,True,True
Input (mg/L),0,0,0,0,0,0
Output (mg/L),0,0,0,0,0,0
Input (mg/L),1000,1000,1000,1000,1000,1000
Output (mg/L),390,65,160,390,390,130
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
Input (mg/L), , , , , ,
Output (mg/L), , , , , ,
TSS Flow based Efficiency Enabled,Off,Off,Off,Off,Off,Off
TSS Flow based Efficiency, , , , , ,
TP Flow based Efficiency Enabled,Off,Off,Off,Off,Off,Off
TP Flow based Efficiency, , , , , ,
TN Flow based Efficiency Enabled,Off,Off,Off,Off,Off,Off
TN Flow based Efficiency, , , , , ,
GP Flow based Efficiency Enabled,Off,Off,Off,Off,Off,Off
GP Flow based Efficiency, , , , , ,
IN - Mean Annual Flow (ML/yr),8.60,16.9,8.60,8.60,12.9,8.60
IN - TSS Mean Annual Load (kg/yr),909,402,1.18E3,3.01E3,1.34E3,357
IN - TP Mean Annual Load (kg/yr),2.47,2.49,3.74,5.18,2.90,1.78
IN - TN Mean Annual Load (kg/yr),18.7,36.3,11.3,20.5,27.5,10.3
IN - Gross Pollutant Mean Annual Load (kg/yr),0.00,0.00,17.9E-3,206,0.00,0.00
OUT - Mean Annual Flow (ML/yr),8.60,16.9,8.60,8.60,12.9,8.60
OUT - TSS Mean Annual Load (kg/yr),357,110,292,1.18E3,688,204
OUT - TP Mean Annual Load (kg/yr),1.78,1.02,1.05,3.74,2.17,1.66
OUT - TN Mean Annual Load (kg/yr),10.3,24.5,6.54,11.3,16.2,8.58
OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00,0.00,10.7E-3,17.9E-3,0.00,0.00
Flow In (ML/yr),8.59827,16.8863,8.59821,8.59821,12.9082,8.59827
ET Loss (ML/yr),0,0,0,0,0,0
Infiltration Loss (ML/yr),0,0,0,0,0,0
Low Flow Bypass Out (ML/yr),0,0,0,0,0,0
High Flow Bypass Out (ML/yr),0.011856,3.62378,0.947778,0.012372,1.21199,2.25832
Orifice / Filter Out (ML/yr),0,0,0,0,0,0
Weir Out (ML/yr),0,0,0,0,0,0
Transfer Function Out (ML/yr),8.58641,13.2625,7.65043,8.58584,11.6966,6.33999
Reuse Supplied (ML/yr),0,0,0,0,0,0
Reuse Requested (ML/yr),0,0,0,0,0,0
% Reuse Demand Met,0,0,0,0,0,0
% Load Reduction,1.16302E-5,2.36879E-5,3.4891E-5,-1.16303E-5,-0.00338545,-0.000500101

TSS Flow In (kg/yr),908.673,402.438,1177.68,3013.16,1338.59,356.79
TSS ET Loss (kg/yr),0,0,0,0,0,0
TSS Infiltration Loss (kg/yr),0,0,0,0,0,0
TSS Low Flow Bypass Out (kg/yr),0,0,0,0,0,0
TSS High Flow Bypass Out (kg/yr),3.94824,89.6336,123.355,4.18424,271.574,180.916
TSS Orifice / Filter Out (kg/yr),0,0,0,0,0,0
TSS Weir Out (kg/yr),0,0,0,0,0,0
TSS Transfer Function Out (kg/yr),352.842,20.3324,168.693,1173.5,416.136,22.864
TSS Reuse Supplied (kg/yr),0,0,0,0,0,0
TSS Reuse Requested (kg/yr),0,0,0,0,0,0
TSS % Reuse Demand Met,0,0,0,0,0,0
TSS % Load Reduction,60.735,72.675,75.2015,60.9153,48.6243,42.8851
TP Flow In (kg/yr),2.46665,2.48751,3.73588,5.18321,2.89872,1.7773
TP ET Loss (kg/yr),0,0,0,0,0,0
TP Infiltration Loss (kg/yr),0,0,0,0,0,0
TP Low Flow Bypass Out (kg/yr),0,0,0,0,0,0
TP High Flow Bypass Out (kg/yr),0.004673,0.54701,0.419511,0.014183,0.299008,0.716852
TP Orifice / Filter Out (kg/yr),0,0,0,0,0,0
TP Weir Out (kg/yr),0,0,0,0,0,0
TP Transfer Function Out (kg/yr),1.77262,0.477367,0.630109,3.7217,1.87179,0.943803
TP Reuse Supplied (kg/yr),0,0,0,0,0,0
TP Reuse Requested (kg/yr),0,0,0,0,0,0
TP % Reuse Demand Met,0,0,0,0,0,0
TP % Load Reduction,27.947,58.8192,71.9044,27.9234,25.1118,6.56278
TN Flow In (kg/yr),18.7094,36.2635,11.2922,20.506,27.5368,10.303
TN ET Loss (kg/yr),0,0,0,0,0,0
TN Infiltration Loss (kg/yr),0,0,0,0,0,0
TN Low Flow Bypass Out (kg/yr),0,0,0,0,0,0
TN High Flow Bypass Out (kg/yr),0.028451,8.16573,1.18286,0.030751,2.26207,2.82734
TN Orifice / Filter Out (kg/yr),0,0,0,0,0,0
TN Weir Out (kg/yr),0,0,0,0,0,0
TN Transfer Function Out (kg/yr),10.2745,16.2966,5.35793,11.2614,13.9011,5.75624
TN Reuse Supplied (kg/yr),0,0,0,0,0,0
TN Reuse Requested (kg/yr),0,0,0,0,0,0
TN % Reuse Demand Met,0,0,0,0,0,0
TN % Load Reduction,44.9317,32.5427,42.0768,44.9325,41.3035,16.6883
GP Flow In (kg/yr),0,0,0.017942,205.722,0,0
GP ET Loss (kg/yr),0,0,0,0,0,0
GP Infiltration Loss (kg/yr),0,0,0,0,0,0
GP Low Flow Bypass Out (kg/yr),0,0,0,0,0,0
GP High Flow Bypass Out (kg/yr),0,0,0.010733,0.017942,0,0
GP Orifice / Filter Out (kg/yr),0,0,0,0,0,0
GP Weir Out (kg/yr),0,0,0,0,0,0
GP Transfer Function Out (kg/yr),0,0,0,0,0,0
GP Reuse Supplied (kg/yr),0,0,0,0,0,0
GP Reuse Requested (kg/yr),0,0,0,0,0,0
GP % Reuse Demand Met,0,0,0,0,0,0
GP % Load Reduction,100,100,40.1795,99.9913,100,100

Other nodes
Location,Carpark ,Roof,Post-Development Node,Impervious Bypass,Pervious Bypass
ID,7,10,13,14,15
Node Type,JunctionNode,JunctionNode,PostDevelopmentNode,JunctionNode,JunctionNode
IN - Mean Annual Flow (ML/yr),8.60,16.9,46.8,8.60,12.7
IN - TSS Mean Annual Load (kg/yr),204,110,1.06E3,292,450
IN - TP Mean Annual Load (kg/yr),1.66,1.02,5.07,1.05,1.34
IN - TN Mean Annual Load (kg/yr),8.58,24.5,50.9,6.54,11.4
IN - Gross Pollutant Mean Annual Load (kg/yr),0.00,0.00,10.7E-3,10.7E-3,0.00
OUT - Mean Annual Flow (ML/yr),8.60,16.9,46.8,8.60,12.7
OUT - TSS Mean Annual Load (kg/yr),204,110,1.06E3,292,450
OUT - TP Mean Annual Load (kg/yr),1.66,1.02,5.07,1.05,1.34
OUT - TN Mean Annual Load (kg/yr),8.58,24.5,50.9,6.54,11.4
OUT - Gross Pollutant Mean Annual Load (kg/yr),0.00,0.00,10.7E-3,10.7E-3,0.00
% Load Reduction,-1.50E-3,-14.7E-3,0.462,-425E-9,1.70

TSS % Load Reduction,93.1,74.9,86.4,90.3,66.4
TN % Load Reduction,58.1,34.0,51.8,68.1,58.8
TP % Load Reduction,68.1,60.9,68.1,79.7,53.9
GP % Load Reduction,100,100,100,100,0.00

Links
Location,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link,Drainage Link
Source node ID,2,5,1,9,8,11,12,15,14,10,7,4,16,3,17,6,18
Target node ID,5,6,9,8,10,15,14,13,13,13,13,16,12,17,11,18,7
Muskingum-Cunge Routing,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed,Not Routed
Muskingum K, , , , , , , , , , , , , , , , , , ,
Muskingum theta, , , , , , , , , , , , , , , , , , ,
IN - Mean Annual Flow (ML/yr),8.60,8.60,16.9,16.9,16.9,12.7,8.60,12.7,8.60,16.9,8.60,8.60,8.60,12.9,12.9,8.60,8.60
IN - TSS Mean Annual Load
(kg/yr),2.96E3,909,438,402,110,450,292,450,292,110,204,3.01E3,1.18E3,1.34E3,688,357,204
IN - TP Mean Annual Load (kg/yr),5.20,2.47,2.62,2.49,1.02,1.34,1.05,1.34,1.05,1.02,1.66,5.18,3.74,2.90,2.17,1.78,1.66
IN - TN Mean Annual Load (kg/yr),20.5,18.7,37.1,36.3,24.5,11.4,6.54,11.4,6.54,24.5,8.58,20.5,11.3,27.5,16.2,10.3,8.58
IN - Gross Pollutant Mean Annual Load (kg/yr),206,0.00,404,0.00,0.00,0.00,10.7E-3,0.00,10.7E-3,0.00,0.00,206,17.9E-3,0.00,0.00,0.00,0.00
OUT - Mean Annual Flow (ML/yr),8.60,8.60,16.9,16.9,16.9,12.7,8.60,12.7,8.60,16.9,8.60,8.60,8.60,12.9,12.9,8.60,8.60
OUT - TSS Mean Annual Load
(kg/yr),2.96E3,909,438,402,110,450,292,450,292,110,204,3.01E3,1.18E3,1.34E3,688,357,204
OUT - TP Mean Annual Load (kg/yr),5.20,2.47,2.62,2.49,1.02,1.34,1.05,1.34,1.05,1.02,1.66,5.18,3.74,2.90,2.17,1.78,1.66
OUT - TN Mean Annual Load (kg/yr),20.5,18.7,37.1,36.3,24.5,11.4,6.54,11.4,6.54,24.5,8.58,20.5,11.3,27.5,16.2,10.3,8.58
OUT - Gross Pollutant Mean Annual Load (kg/yr),206,0.00,404,0.00,0.00,0.00,10.7E-3,0.00,10.7E-3,0.00,0.00,206,17.9E-3,0.00,0.00,0.00,0.00

Catchment Details
Catchment Name,Parramatta Aquatic Centre_RevC
Timestep,6 Minutes
Start Date,1/01/1959
End Date,31/12/1959 11:54:00 PM
Rainfall Station, 66062 SYDNEY
ET Station,Monthly User Defined
Mean Annual Rainfall (mm), 1490
Mean Annual ET (mm), 1260

Design with
community in mind

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