Civil Engineering Report

Parramatta Leagues Club Hotel

Prepared for APP / 09 / 07 / 2019

181128

Structural
Civil
Traffic
Facade
Consulting
Engineers

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1.0 INTRODUCTION

The existing Parramatta Leagues Club on grade car park which is being redeveloped has been divided into two separate stages and two separate DA's. Stage 1 and DA 1 of the re-development involved a new multi-storey car park over the existing car park at the Parramatta Leagues Club, on O'Connell Street in Parramatta. Stage 2 and DA 2 of the re-development involves a new multi-storey Leisure Centre over the existing carpark. See Figure 1 below.

This Stormwater report focuses on the Stage 2 DA 2, the proposed Leisure Centre. The stormwater design that was undertaken for Stage 2 ties into the stormwater and On- Site Detention design completed for Stage 1 (See previously submitted report for Stage 1 dated 08.10.2015 by Taylor Thomson Whitting – Appendix A). This entire report references the previously submitted report as the stormwater design calculations undertaken for Stage 1 works included the entire site (Stage 1 and Stage 2).

Figure 1: Staged Works

2.0 EXISTING SITE

The existing site is Parramatta Leagues Club and the attached on-grade car park. The site discharges via a pipe network to the Parramatta River.

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3.0 BACKGROUND

As indicated in the Stormwater Report Dated 08.10.2015 for Stage 1 works, the Stormwater calculations for the surface drainage including the On-Site Detention (OSD) volume accounted for the entire catchment which included Stage 2. As seen in Figure 2 below, the surface drainage system for Stage 1 works connects to the proposed OSD however it allowed for the future Stage 2 Stormwater to be connected.

As part of Stage 1, DA 1 works additional information was provided to Council which covered the Water Sensitive Urban Design (WSUD) requirements for both stages of works and specific OSD location and arrangements in accordance with Parramatta City Council. After undertaking the WSUD analysis on MUSIC the treatment train specified to treat both stages of works included the SPEL Ecoceptor and SPEL Hydrosystem.

No further comments have been received or raised from Council after the above additional information was submitted for Stage 1 works.

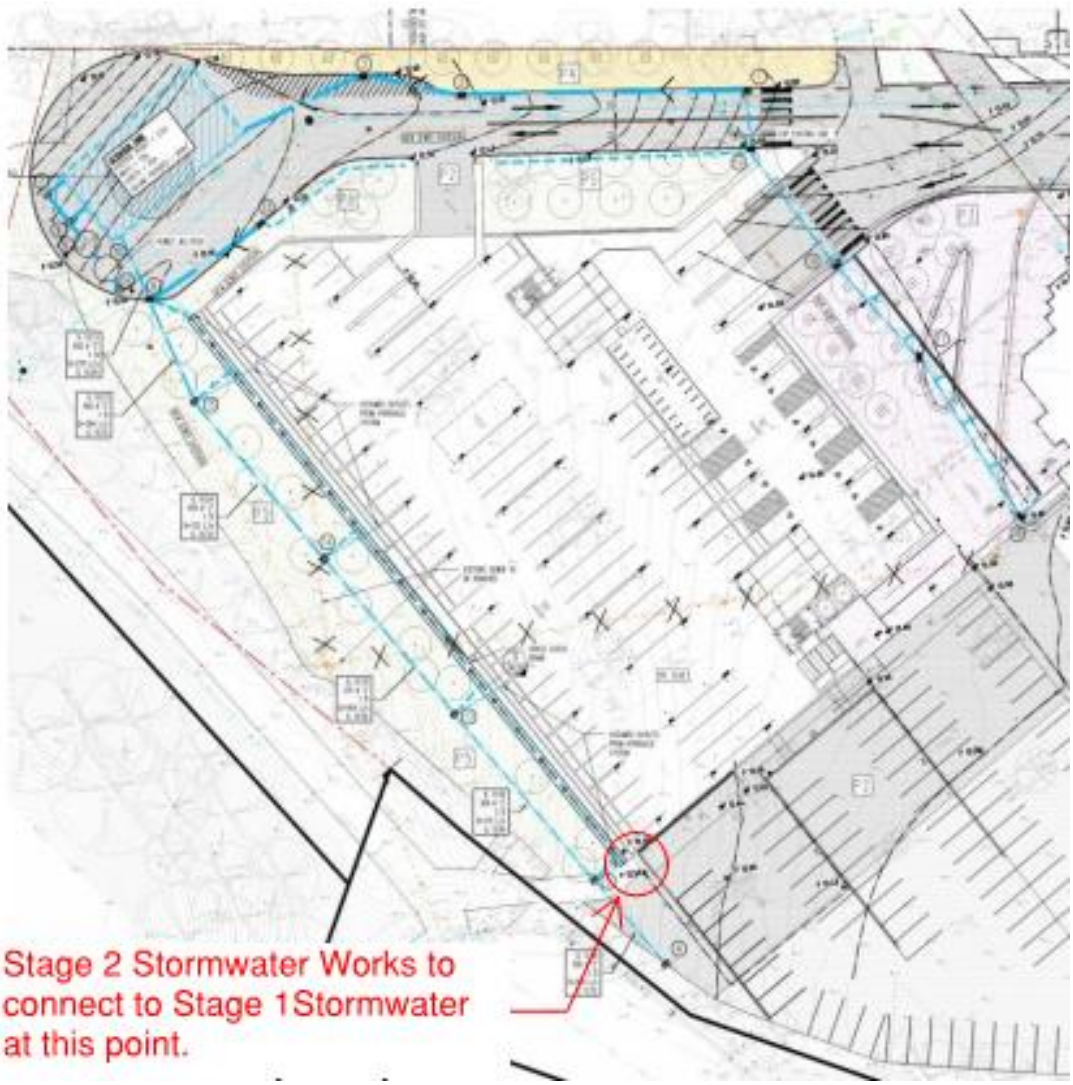

Figure 2: Stage 1 Multi-storey car park Stormwater System

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4.0 PROPOSED WORKS

The existing on grade car park as indicated in Figure 1 above will be redeveloped into a Leisure Centre as part of Stage 2 works. The corresponding stormwater works for the proposed Leisure Centre will connect to the proposed Stage 1 system as indicated in Figure 3 below. The proposed levels provided in Figure 3 below to be confirmed by Architect.

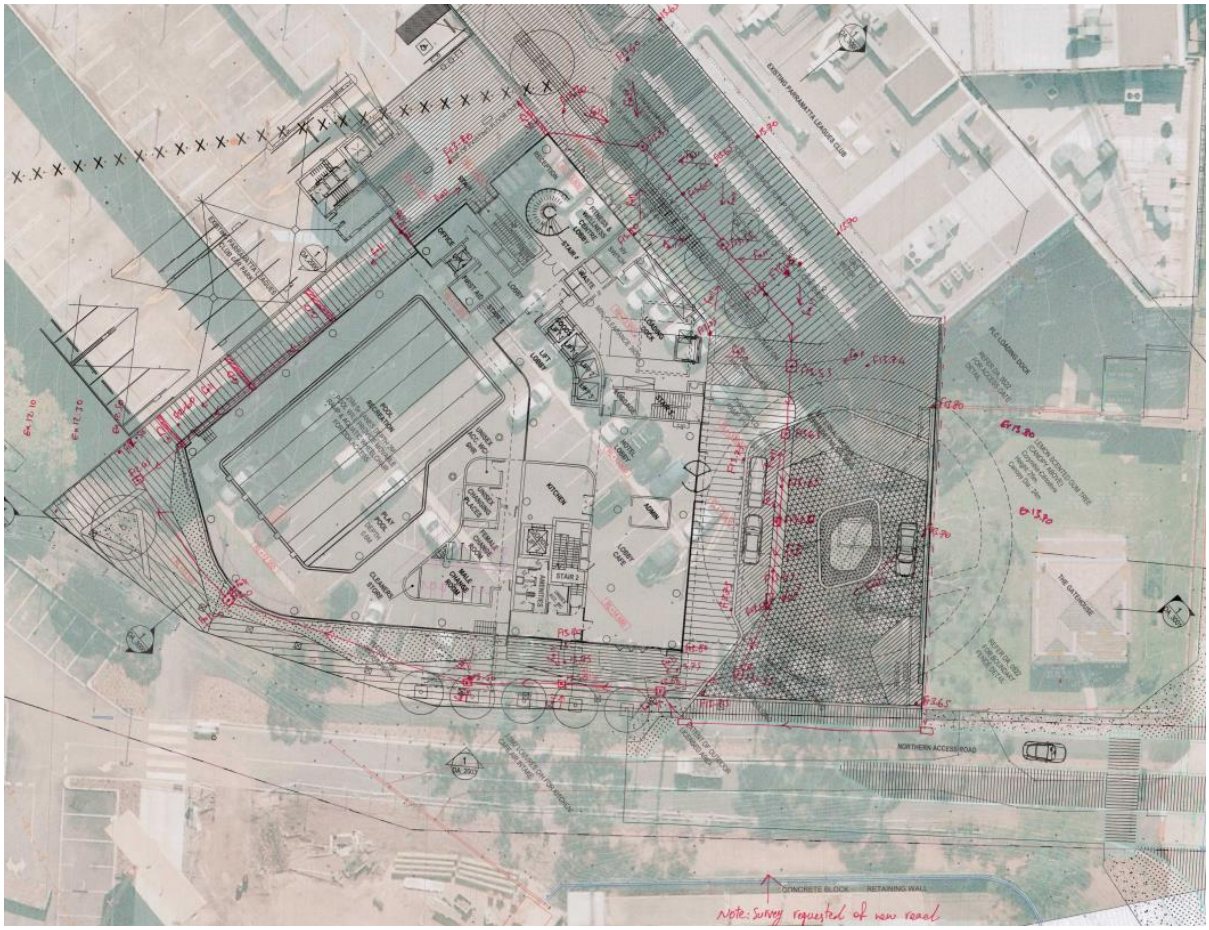

Figure 3: Stage 2 Leisure Centre Stormwater System

4.1 Surface Drainage

Surface water surrounding the proposed development will be captured by a series of pits, grated trench drains and dish drains as indicated on mark up SKC106- P1. Similar to Stage 1 works, the pipes have been sized to contain the 20 Year ARI storm. This system as indicated in on mark up SKC106- P1, will connect to the Stage 1 system which has previously been sized to capture the Stage 2 impervious area.

The existing outlet to Parramatta River, west of the club, will be the ultimate discharge point. The proposed upgrades will discharge to the existing system. No impact is expected on the existing outlet. (See previously submitted report for Stage 1 dated 08.10.2015 by Taylor Thomson Whitting, Included in Appendix A)

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4.2 Stormwater Detention

An On-Site Detention (OSD) system has been designed to meet the requirements of the Upper Parramatta River Catchment Trust (UPRCT) and Parramatta Council requirements. Based on a catchment area of 1.06 ha (Inclusive of Stage 1 and Stage 2 works), the detention volume required is 485m^3. The UPRCT calculation sheet is attached as an appendix of Stage 1 Report Dated 08.10.2015

All stormwater collected on site will be directed to the OSD system.

4.3 Stormwater Quality

Stormwater quality analysis was undertaken during Stage 1 works and is inclusive of stage 2 works. Stage 1 works will be required to be completed prior to any stage 2 stormwater system is installed. The MUSIC model from Stage 1 may be resubmitted at Council request for Stage 2 works.

Before discharging to the OSD tank, stormwater will pass through a GPT (Spel Ecoceptor) and a Spel Hydrosystem to remove gross pollutants, sediments and nutrients from the stormwater. The two devices also target hydrocarbons expected to be present in the car park runoff.

The entire site has been modelled in MUSIC to demonstrate that the proposed stormwater treatment devices achieve the stormwater treatment targets outlined in the Parramatta Development Control Plan 2011:

- 85% removal of total suspended solids;
- 60% removal of total phosphorus; and
- 45% removal of total nitrogen.

Pollutant	Load	Residual Load	Load reduction
Gross Pollutants (kg/yr)	209	1.06	99.5%
Total Suspended Solids (kg/yr)	1570	117	92.6%
Total Phosphorus (kg/yr)	3.26	1.08	66.9%
Total Nitrogen (kg/yr)	22.4	10.7	52.1%

5.0 FLOOD RISK

The lowest point on the site is approximately 12.00 mAHD, with the majority of the site above 11.60 mAHD. Based on flood maps provided by Council, the 100-year flood level is 8.36 mAHD, while the Probable Maximum Flood (PMF) level is 13.80 mAHD.

Flooding controls are outlined in the City of Parramatta Local Floodplain Risk Management Policy and DCP section 2.4.2 .The site is classified as commercial and Industrial and is within the Low Flood Risk Precinct.

In accordance with the DCP policy and Floodplan Matrix, 'Habitable floor levels to be equal to or greater than the 100 year ARI flood level plus freeboard'. The recreational centre FFL is set at 13.80, which is equal to the PMF and 5.44 m above the 100-year flood level, and therefore complies with the above clause.

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6.0 CONSTRUCTION PHASE STORMWATER MANAGEMENT

Construction works to be carried out in accordance with the “Blue Book” erosion and sediment control requirements. The exact controls will vary depending on construction methodology and timing, but typically consist of:

- Sediment fences;
- A sediment basin;
- Vehicle shaker grid and wash down; and
- Sand bags surrounding existing pits.

A conceptual erosion and sediment control plan has been included in mark up SKC102-P1.

7.0 CONCLUSION

The proposed Leisure Centre at Parramatta Leagues Club has been designed cognisant of the potential impact on Parramatta River and the surrounding area. Stormwater infrastructure has been designed to provide stormwater quantity and quality outcomes to meet the stormwater quality targets outlined in the DCP.

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Roxy Hadian
Engineer

Authorised by:
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DIRECTOR NAME
Technical Director

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Appendix A

Stage 1 Stormwater Report

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Civil

TaylorThomsonWhitting

Flooding and Stormwater Drainage
Parramatta Leagues Club

for Parramatta Leagues Club

08/10/2015

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1.0 INTRODUCTION

A new multi-storey car park is proposed over the existing car park at the Parramatta Leagues Club, on O'Connell Street in Parramatta.

This report has been prepared to address the flooding and stormwater design issues for the proposed upgrade to Parramatta Leagues Club. The report supports the development application for the project.

2.0 EXISTING SITE

The existing site is Parramatta Leagues Club and the attached on-grade car park. The site discharges via a pipe network to the Parramatta River.

2.1 Surface Drainage

All surface water from the site ultimately discharges to Parramatta River. The car park area grades to an overland flow path to the west of the site.

Eels Place and the roof drainage discharge to Council's pipe network which runs along the northern boundary of the site.

Council's stormwater drainage diagram is included as Figure 1.

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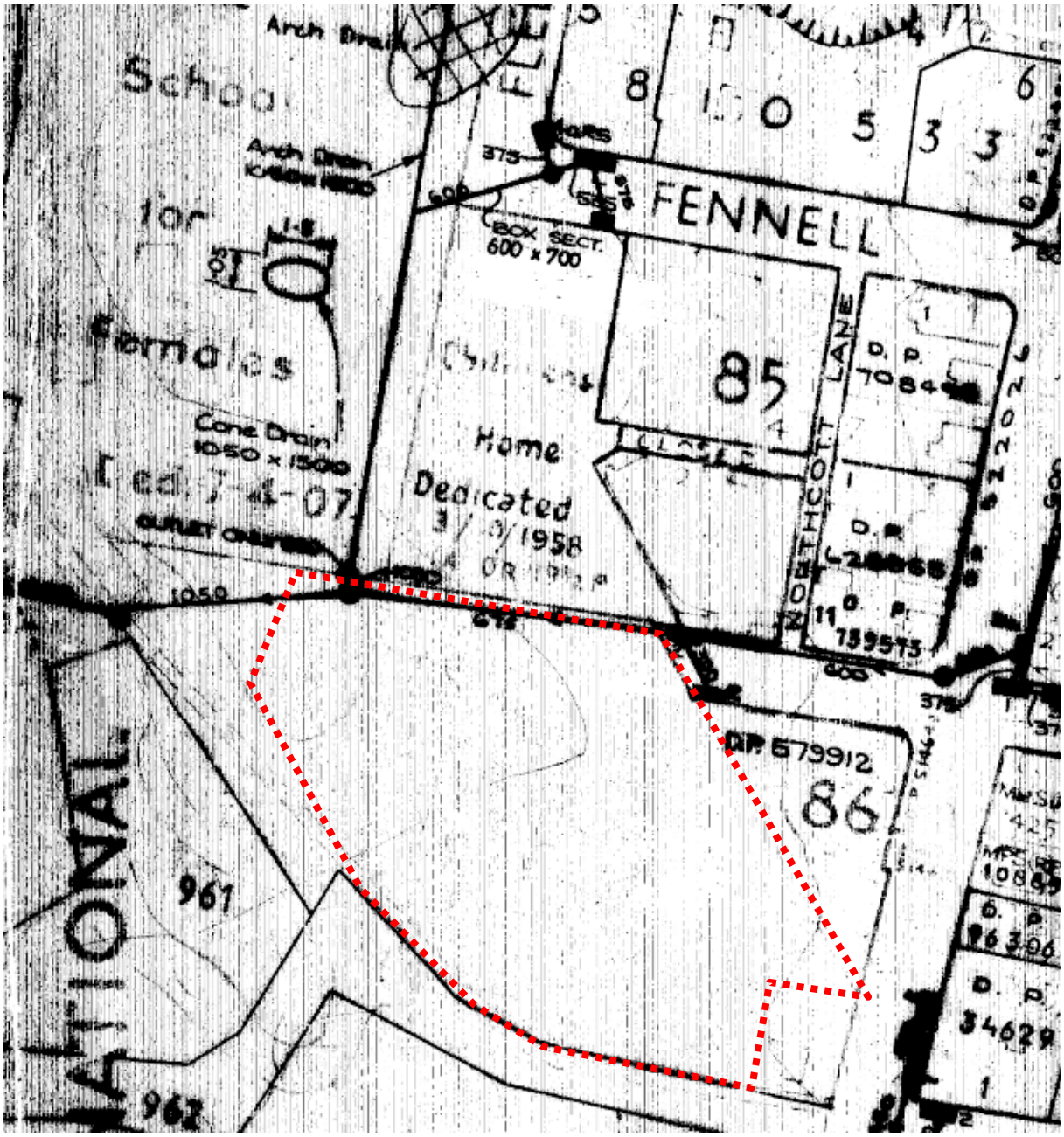

Figure 1 Council Stormwater Plan

2.2 Site Survey

Survey of the site has been undertaken by Brunskill McClenahan and Associates. The survey shows that the site grades from O'Connell Street and Eels Place in the north east corner (15.0 mAHD) towards the Parramatta River west of the site. Grades vary between approximately 5% and 0.5%.

There is a low point on the south west boundary at about 11 mAHD. The adjacent overland flow path, a bitumen path, has an invert of 10.85 mAHD.

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Figure 2 Site Survey Extract

The survey includes information on the existing stormwater pipe along the northern boundary, including pipe sizes and inverts.

3.0 PROPOSED WORKS

The existing at grade car park is proposed to be upgraded to a multi-storey above ground car park.

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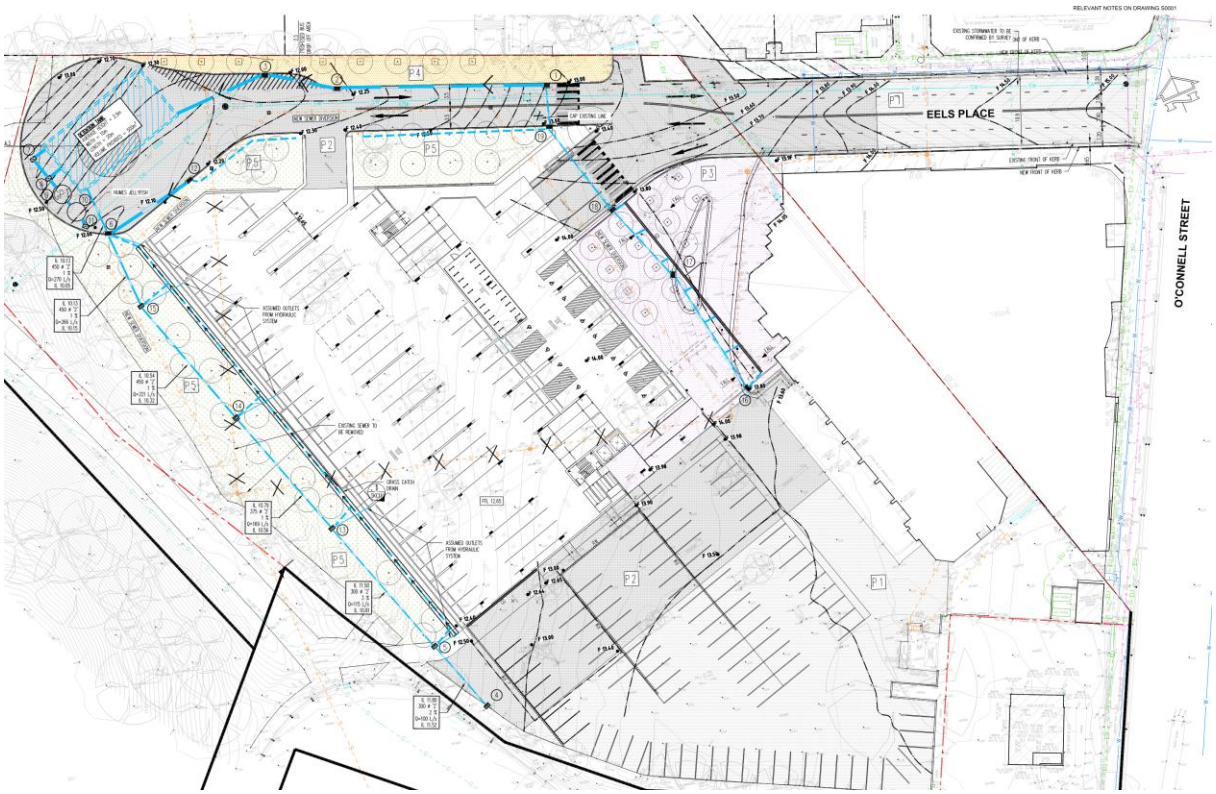

Figure 3 Site Plan

3.1 Surface Drainage

Surface water from the proposed car park and surrounding areas will be collected by a combination of grated trench drains and pits. This will discharge to the existing stormwater system via new pipes.

The existing outlet to Parramatta River, west of the club, will be the ultimate discharge point. The proposed upgrades will discharge to the existing system. No impact is expected on the existing outlet.

3.2 Stormwater Detention

An on-site detention system has been designed to meet the requirements of the Upper Parramatta River Catchment Trust. Based on a catchment area of 1.06 ha, the detention volume required is 485m^3. The UPRCT calculation sheet is attached as an appendix to this document.

All stormwater collected on site will be directed to the OSD system.

3.3 Stormwater Quality

Before discharging to the OSD tank, stormwater will pass through a GPT (Spel Ecoceptor) and a Spel Hydrosystem to remove gross pollutants, sediments and nutrients from the stormwater. The two devices also target hydrocarbons expected to be present in the car park runoff.

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The site has been modelled in MUSIC to demonstrate that the proposed stormwater treatment devices achieve the stormwater treatment targets outlined in the Parramatta Development Control Plan 2011:

- 85% removal of total suspended solids;
- 60% removal of total phosphorus; and
- 45% removal of total nitrogen.

Pollutant	Load	Residual Load	Load reduction
Gross Pollutants (kg/yr)	209	1.06	99.5%
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4.0 CONSTRUCTION PHASE STORMWATER MANAGEMENT

Construction works to be carried out in accordance with the “Blue Book” erosion and sediment control requirements. The exact controls will vary depending on construction methodology and timing, but typically consist of:

- Sediment fences;
- A sediment basin;
- Vehicle shaker grid and wash down; and
- Sand bags surrounding existing pits.

A conceptual erosion and sediment control plan has been included in the civil drawing set (drawing number SKC03).

5.0 FLOOD RISK

The lowest point on the site is approximately 11.00 mAHD, with the majority of the site above 11.60 mAHD. Based on flood maps provided by Council, the 100-year flood level is 8.36 mAHD, while the Probable Maximum Flood (PMF) level is 13.80 mAHD.

Flooding controls are outlined in the City of Parramatta Local Floodplain Risk Management Policy. The site is classified as Commercial and Industrial and is within the Low Flood Risk Precinct. The policy states that “Garages capable of accommodating more than 3 motor vehicles on land zones for urban purposes, or enclosed car parking, must be protected from inundation by floods equal to or greater than the 100 year ARI flood. Ramp levels to be no lower than 0.5m above the 100 year ARI flood level.”

The carpark entrance level is 12.65mAHD, which is more than 4.2m above the 100-year flood level, and therefore complies with the above clause.

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5.1 Flood evacuation

The recommended flood evacuation route during PMF conditions is to have a marshalling area on Eels Place which sits above the PMF level, with final evacuation north along O'Connell Street. This is consistent with Parramatta Local Disaster Plan (2010).

Note that the existing club facility has a floor level of 14.0 mHD, which is 200mm above the PMF level from Parramatta River. Patrons can seek refuge in the club during an extreme rainfall event.

6.0 CONCLUSION

The proposed multi storey car park at Parramatta Leagues Club has been designed cognisant of the potential impact on Parramatta River and the surrounding area. Stormwater infrastructure has been designed to provide stormwater quantity and quality outcomes to meet the stormwater quality targets outlined in the DCP. The car park entrance level is 4.2m above the 100-year flood level which complies with the DCP freeboard requirements.

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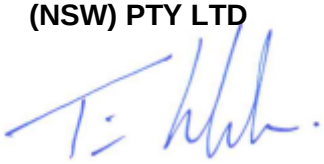

Tim Henderson
Engineer

Authorised by:
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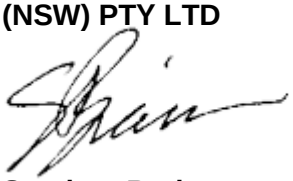

Stephen Brain
Technical Director

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Appendix C

Flood Response Plan

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On-Site Detention Calculation Sheet for Upper Parramatta River Catchment
HED Secondary Outlet

Project:	**Parrmatta Leagues Club**
Site Address	**Grose Street, Parramatta**
Job No:	**141716**
Designer:	**TH**
Telephone:	**(02) 9439 7288**

Site Data

OSD Area:	**Upper Parramatta River Catchment**					
L.G.A	**Parramatta City Council**					
Site Area	**1.061**	ha	**10,610**	m^2		
Total Roof Area	**0.6575**	ha	**6,575**	m^2		
Area of Site draining to OSD Storage	**1.061**	ha	**10,610**	m^2	**Satisfactory**	
Residual Site Area (Lot Area - Roof Area)	**0.404**	ha				
Area Bypassing Storage	**0**	ha				
Area Bypassing / Residual Site Area	**0.0%**				**Satisfactory**	**30% Max**
No. of Dwellings on Site	**1**				**Satisfactory**	
Site Area per Dwelling	**1.061**	ha				
Roof Area per Dwelling	**0.658**	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	**100%**				
Adjusted SRDs	**40**	L/s/ha		**150**	L/s/ha

OSD Calculations

		Extended Detention			Detention	
Basic SSR Volume	Ext Detention Storage	**318.30**	m^3	Total Storage	**482.76**	m^3
Total Rainwater Tank Credits		**0.00**	m^3		**0.00**	m^3
Storage Volume				Total	**482.75**	m^3
Storage Volume	Ext Detention Storage	**318.30**	m^3	Flood Detention Storage	**164.46**	m^3
OSD Discharges	Primary Outlet	**42.44**	L/s	Secondary Outlet	**159.15**	L/s
RL of Top Water Level of Storage		**12.300**	m		**12.300**	m
RL of Orifice Centre-line		**9.800**	m		**10.200**	m
Number of Orifices		**1**			**1**	
Estimated Downstream Flood Level		**9.00**	1.5 yr ARI		**10.20**	100 yr ARI
Downstream FL - RL of Orifice Cente-line		**-0.80**	**Satisfactory**	**Satisfactory**	**0.00**	m
Design Head to Orifice Centre		**2.500**	m	TWL Ext Detn Storage - RL Orifice	**2.100**	m
Calculated Orifice Diameter		**113**	mm	**Satisfactory**	**Satisfactory**	**229**	mm

Overflow Weir & Freeboard Calculation

RL of Minimum Habitable Floor Level		**14.000**	m
RL of Minimum Garage Floor Level		**12.650**	m
Length of Overflow Weir		**2.40**	m
Site Runoff Coefficient	**Parramatta City Council**	**0.75**	
Storm Intensity (5 min 100 yr ARI)		**206**	mm/h
Peak Flow over Weir		**455.3**	L/s
Depth of Flow over Weir		**238**	mm
Freeboard to Habitable Floor	**Satisfactory**	**1462**	mm
Freeboard to Garage Floor	**Satisfactory**	**112**	mm

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Flood Response Plan

Prepared for Parramatta Leagues Club / 2 / 11 / 2017

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1.0 Introduction

This plan has been prepared for the Parramatta Leagues Club to respond to DA Consent (ref DA/210/2015) Condition 79:

> *An evacuation report and procedure shall be prepared by an appropriate consult engineer. This report is to demonstrate how the occupants of the development will egress he site in the early stages of a storm event, together with how they will seek refuge in a peak stormwater event (i.e first floor of the building etc.). The report shall be submitted to the Principal Certifying Authority prior to the issue of the Occupation Certificate. A copy of the report shall be attached to the Occupation Certificate when forwarded to Council.*

2.0 Flood Risk

The lowest point on the site is approximately 11.00 mAHD, with the majority of the site above 11.60 mAHD. Based on flood maps provided by Council, the 100-year flood level is 8.36 mAHD, while the Probable Maximum Flood (PMF) level is 13.80 mAHD.

The multi-storey car park entrance level is 12.50 mAHD, which is more than 4.0 m above the 100-year flood level, and has therefore has a low flood risk.

3.0 Flood evacuation

The recommended flood evacuation route during PMF conditions is to have a marshalling area on Eels Place which sits above the PMF level, with final evacuation north along O'Connell Street. This is consistent with Parramatta Local Disaster Plan (2010).

Note that the existing club facility has a floor level of 14.0 mHD, which is 200mm above the PMF level from Parramatta River. Patrons and staff can seek refuge in the club during an extreme rainfall event.

4.0 Conclusion

There is no flood risk on the site from the Parramatta River in a 100-year flood event. During a PMF event, patrons and staff can seek refuge in the club, or evacuate via Eels Place.

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Engineer

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