Civil Stormwater and Flooding

Parramatta Leagues Club Hotel

Prepared for APP / 4 December 2018

171558

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Structural
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Contents

1.0 Introduction

This report has been prepared to support the development application for the Parramatta Leagues Club Hotel and ancillary fitness, wellness, function and bar uses (PLC Hotel) on the Parramatta Leagues Club site, O'Connell Street Parramatta.

TTW prepared the design for the recently completed multi-storey car park on the site, immediately north-west of the proposed PLC Hotel.

1.1 The Site

Figure 1 *Constructed plan for the existing at grade car park*

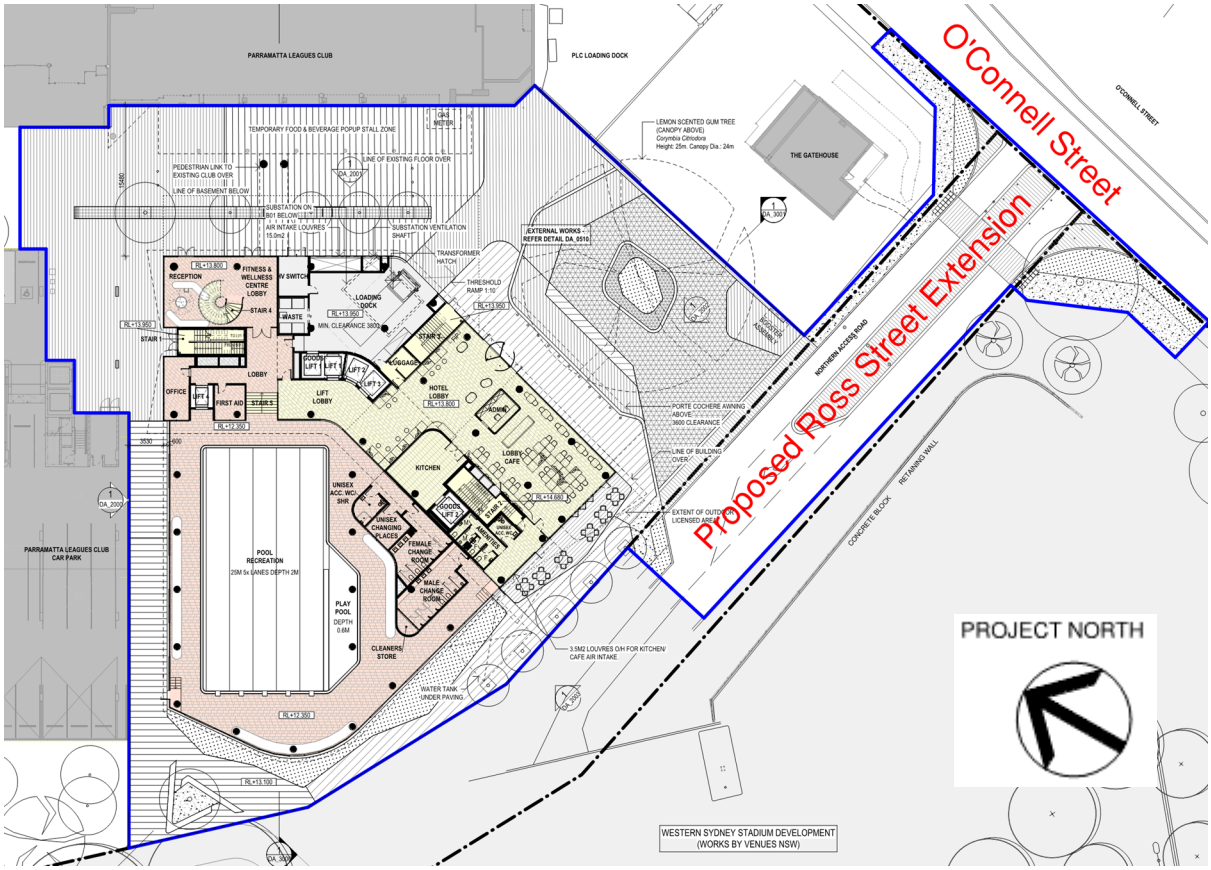

Figure 2 Proposed ground floor plan

1.2 Relevant Documents

- Parramatta DCP 2011
- Draft SEARS comments provided by Parramatta Council (NCA\8\2017 dated 6/11/2017)
- Parramatta Leagues Club Car Park design drawings (TTW)
- Flooding and Stormwater Drainage Report, Parramatta Leagues Club (TTW, October 2015).
- Proposed Parramatta Leagues Club Hotel Development drawings prepared by Hassell.
- Site survey prepared by BMA.

2.0 Background

TTW prepared the civil/stormwater design for the multi-storey car park, immediately north-west of the proposed PLC Hotel. The Flooding and Stormwater Drainage Report is attached as an appendix to this document.

As indicated in the abovementioned report, the stormwater calculations for the surface drainage including the On-Site Detention (OSD) volume accounted for both the car park and the PLC Hotel site. Shown in Figure 3 below, the surface drainage system for the car park connects to the proposed OSD. This system has allowed for the future hotel site stormwater to be connected.

As part of car park 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.

With no concerns being raised by Council, the works were installed and completed, and are operational.

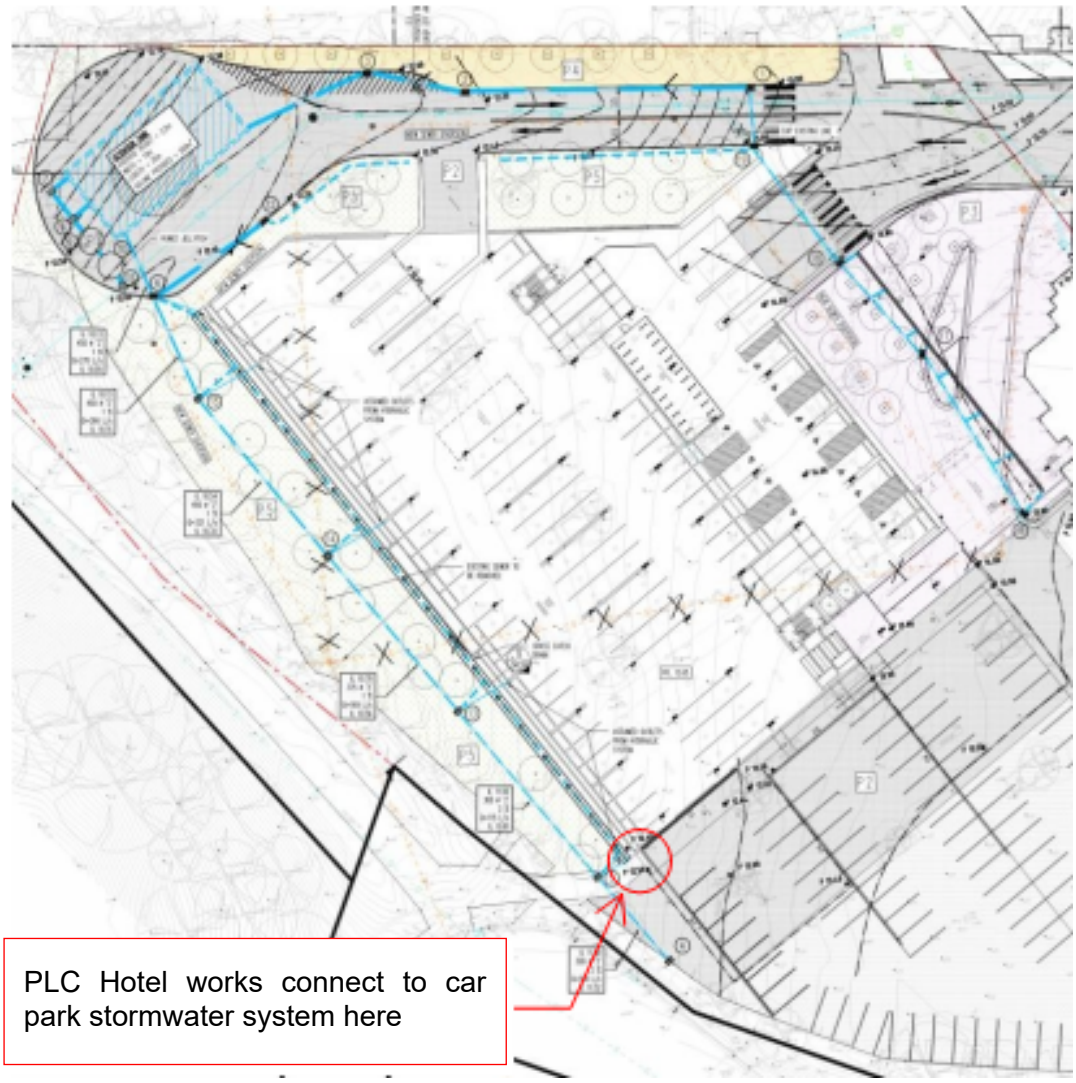

Figure 3 Multi-storey car park Stormwater System

3.0 Proposed Works

The existing on grade car park as indicated in Figure 1 will be redeveloped into a hotel and leisure centre as part of the proposal. The corresponding stormwater works for the proposed hotel will connect to the car park system as indicated in Figure 3.

3.1 Ross Street Extension

The Ross Street Extension design is subject to agreement with the Venues NSW. Western Sydney Stadium is under construction on the adjacent site.

3.2 Surface Drainage

Surface water surrounding the proposed hotel development will be captured by a series of pits, grated trench drains and dish drains. The drainage design is dependent on the Ross Street Extension design and will be developed once an agreed design for the road is in place.

In general, overland flow will be directed towards the road extension and the western corner of the site. Pipes will be sized to contain the 20 Year ARI storm. The system built as part of the car park works has capacity to convey the proposed hotel stormwater.

The existing outlet to Parramatta River, west of the club, will be the ultimate discharge point. The proposed works will discharge to the existing system. No impact is expected on the existing outlet. (Refer to the Flooding and Stormwater Drainage Report by TTW, Included in Appendix A)

3.3 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 the car park and proposed hotel). The UPRCT calculation sheet is attached as an appendix.

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

3.4 Stormwater Quality

Stormwater quality analysis was undertaken during car park works and is inclusive of hotel site.

Before discharging to the OSD tank, stormwater passes 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%

3.5 Rainwater Re-use

Rainwater Re-use can be accommodated if required by Parramatta Park Trust (PPT) and would form part of the arrangements and agreements between PLC and PPT. There is an allowance for an underground rainwater tank on the current site plans.

Overflows from the rainwater tank would be directed to the site stormwater system.

4.0 Flood Risk

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.

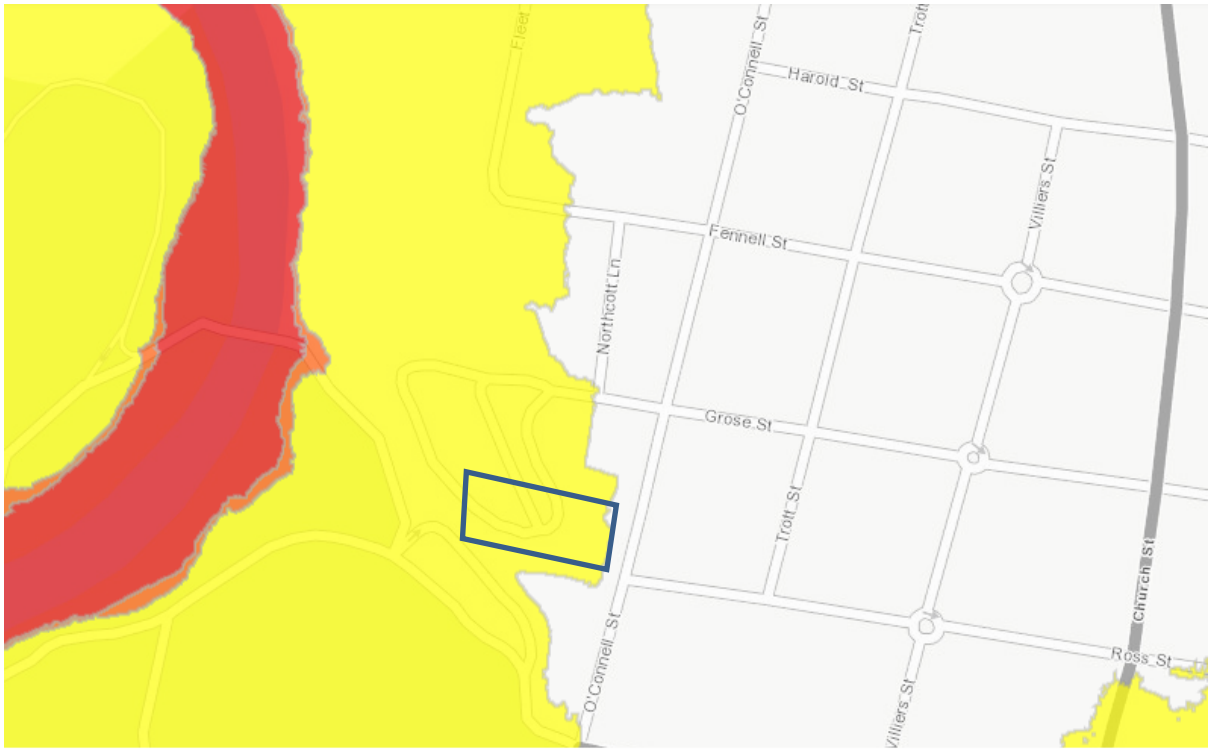

Figure 4 Flood map (Parramatta City Council). The yellow shading represents land above the 100-year flood and below the PMF - referred to as a "Low Flood Risk" precinct in the DCP

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 hotel FFL is set at 13.80 mAHD, which is 5.44 m above the 100-year flood level, and therefore complies with the above clause.

The proposed hotel includes a basement for plant and back of house with no public access. Basement entries have been designed to have a minimum level of 13.80 mAHD so are not affected by the PMF.

5.0 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 will be included in the civil drawing set.

6.0 Conclusion

The proposed PLC Hotel 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.

Good planning has allowed the use of the OSD for the adjoining carpark (completed early 2018) to accommodate the stormwater from the PLC Hotel site, without any further significant impact on the public domain

The site meets the Parramatta DCP flood protection requirements. The is protected from flooding for all events up to the PMF.

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STEPHEN BRAIN
Technical Director

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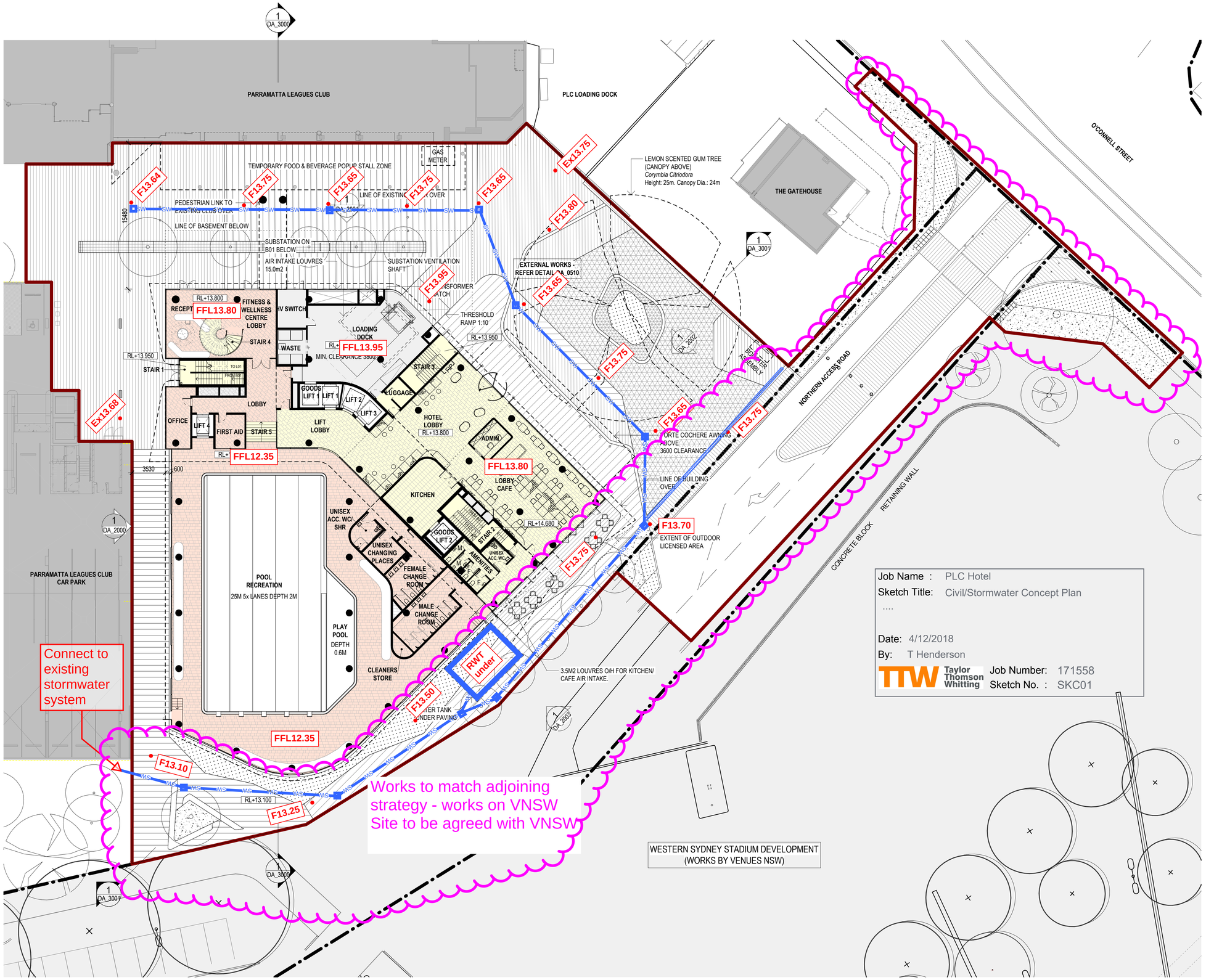
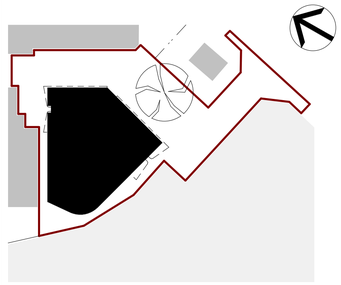
Appendix A

Stormwater Concept Design Sketch



1 GA FLOOR PLAN - GROUND
1 : 200

REFERENCE MAP (NTS) PROJECT NORTH



SCALE BAR
0 4 8 16m
1:200

Job Name : PLC Hotel
Sketch Title: Civil/Stormwater Concept Plan
....
Date: 4/12/2018
By: T Henderson
Taylor Thomson Whitting
Job Number: 171558
Sketch No. : SKC01

REV	DESCRIPTION	DATE
R	SSD ISSUE DRAFT	23.11.2018
Q	FOR INFORMATION	21.11.2018
P	FOR INFORMATION	19.11.2018
N	FOR INFORMATION	13.11.2018
M	FOR COORDINATION	06.11.2018
L	SSD ISSUE DRAFT	02.11.2018
K	FOR COORDINATION	31.10.2018
J	SSD ISSUE DRAFT	26.10.2018
H	GA PLANS, ELEV. & SEC. - ISSUED FOR COORDINATION	24.10.2018
G	GA PLANS - ISSUED FOR COORDINATION	23.10.2018
F	ISSUED FOR INFORMATION	19.10.2018
E	ISSUED FOR INFORMATION	05.10.2018
D	ISSUE FOR INFORMATION	28.09.2018
C	ISSUE FOR INFORMATION	18.09.2018
B	ISSUE FOR INFORMATION	14.09.2018
A	GA PLANS - ISSUE FOR INFORMATION	05.09.2018

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CLIENT
PARRAMATTA LEAGUES CLUB

PROJECT
PROPOSED PARRAMATTA LEAGUES CLUB HOTEL DEVELOPMENT
1 EELS PLACE, PARRAMATTA, NSW 2150

DRAWING TITLE
GA FLOOR PLAN - LEVEL 00 (GROUND) - LOBBIES, CAFE & 25M POOL

STATUS
DEVELOPMENT APPLICATION

SCALE @ A1	DRAWN	REVIEWED	APPROVED
1 : 200	HASSELL	LV	GS
PROJECT NUMBER	DRAWING NUMBER	REV	
012981	DA_1101	R	

Original Sheet Size A1 - 841 x 594mm

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Appendix B

Flooding and Stormwater Drainage Report

Civil

TaylorThomsonWhitting

Flooding and Stormwater Drainage
Parramatta Leagues Club

for Parramatta Leagues Club

08/10/2015

141716 P

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TABLE OF CONTENTS

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.

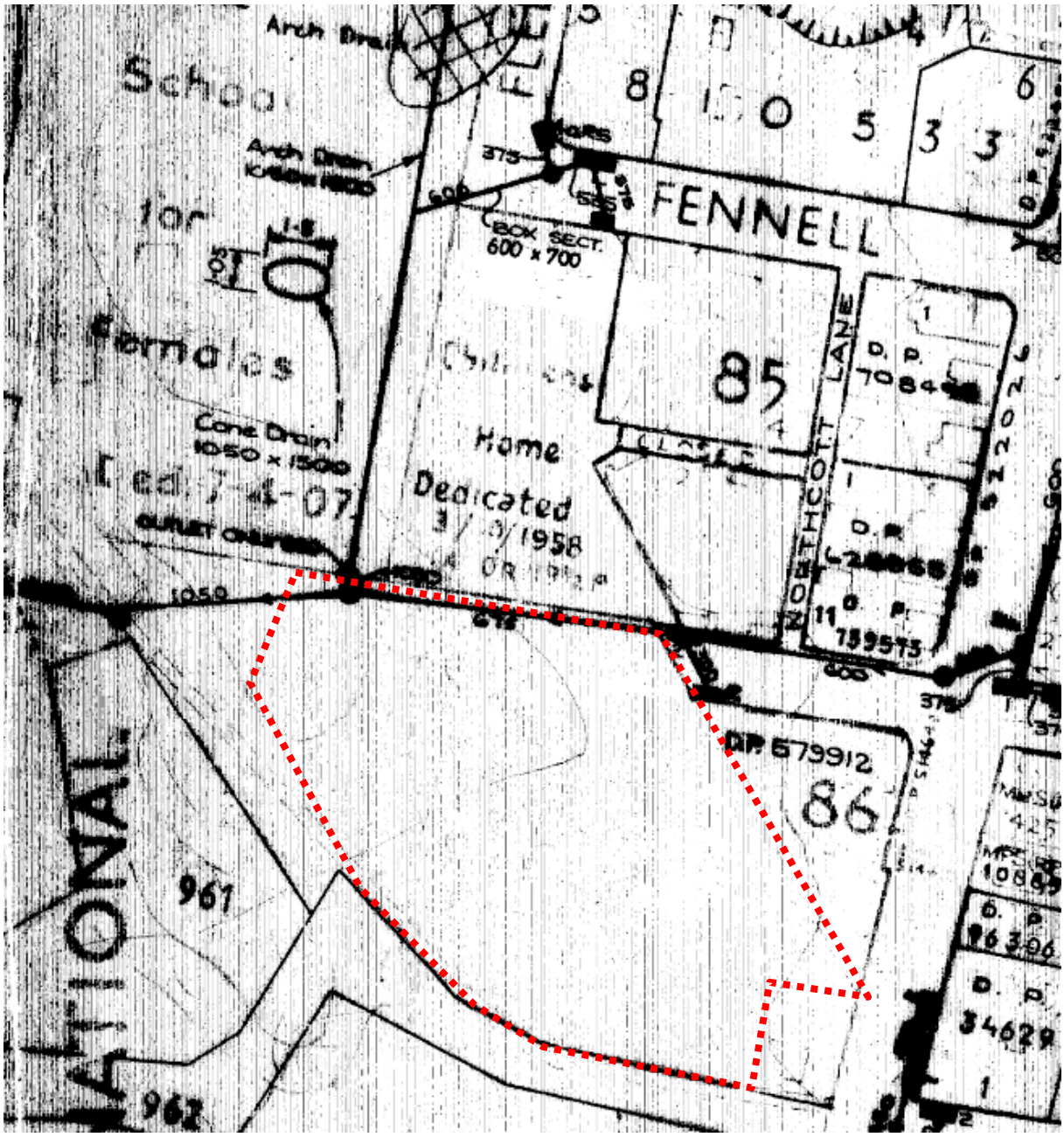

Figure 1 Council Stormwater Plan

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.

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.

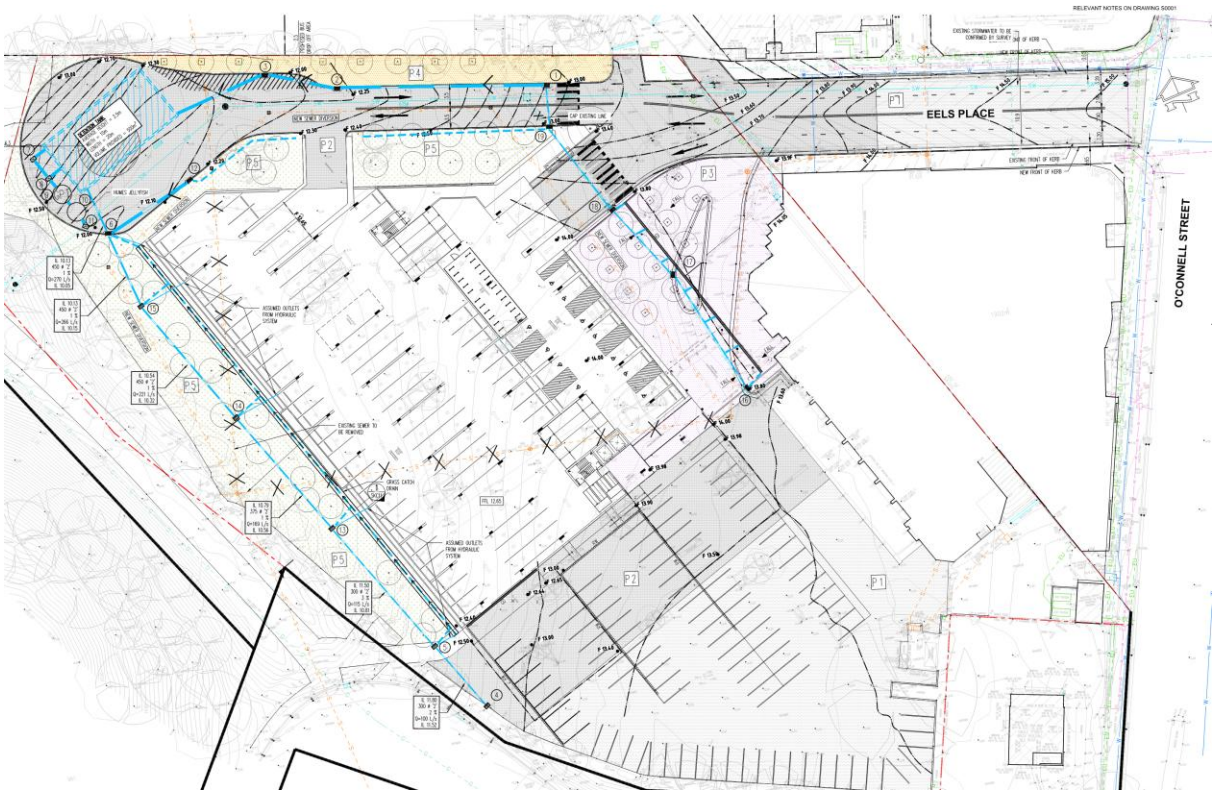

Figure 3 Site Plan

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.

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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Total Phosphorus (kg/yr)	3.26	1.08	66.9%
Total Nitrogen (kg/yr)	22.4	10.7	52.1%

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.

5.1 Flood evacuation

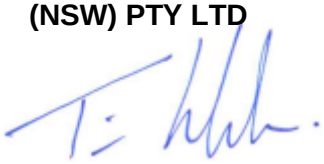
The recommended flood evacuation route during PMF conditions is to have a marshalling area on Eels Place which sits above the PMF level, with final evacuation north along O'Connell Street. This is consistent with Parramatta Local Disaster Plan (2010).

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.

Prepared by:
TAYLOR THOMSON WHITTING (NSW) PTY LTD



Tim Henderson
Engineer

Authorised by:
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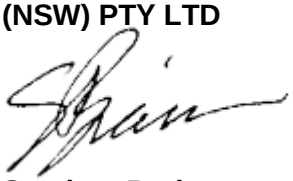

Stephen Brain
Technical Director

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APPENDIX A

CIVIL DESIGN DRAWINGS

APPENDIX B

UPRCT CALCULATION SHEET

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