MEMORANDUM

Date: 05 June 2020 **Pages** **3**

To: **Willoughby City Council** **From:** Anıl Dilman

122058 – The Quadrangle – Castlecrag – Stormwater Management Memorandum

Dear Council Officer,

1. Introduction

We present this technical Stormwater Management memorandum, to address stormwater drainage concerns relating to the redevelopment of the Quadrangle Shopping Centre, located at 100 Edinburgh Road, Castlecrag.

2. Reference Documents

The following information has been used as the basis of the site stormwater drainage management:

- Dial Before You Dig information
- Authority information received to date
- Willoughby City Council – On-Site Stormwater Detention
- fjmt studio – Development Plans

Refer Appendix for Catchment Plans and On-Site Detention Report, as output by OSD4W software.

3. Catchment Analysis

The site has a total catchment area of approximately 5,170m^2. The site is within Zone 1 of the Willoughby City Council *Drainage Catchment Zone*.

Catchment areas, site perviousness, and catchment run-off coefficients are summarised in the Table below. There are two distinct catchments consisting of roof/podium and landscaping zones which includes hardstand areas.

Catchment ID	Catchment Area	% Impervious	Co-efficient, C
Existing Catchment			
Roof/Podium	5,170 m^2	100	1
Total	**5,170 m^2**		**1** *(C, Weighted)*
Proposed Catchment			
Roof/Podium	4,570 m^2	100	1
Landscape Zones	600 m^2	10	0.3
Total	**5,170 m^2**		**0.919** *(C, Weighted)*

Table 1. Proposed Development Catchment Analysis Summary

4. On-Site Detention

Based on the catchment analysis of existing conditions vs. proposed conditions, the proposed site conditions present an improved catchment characteristic with increased pervious zones.

Based on the general improvement it is not recommended to provide On-Site Detention infrastructure.

However, we note Willoughby City Council 'Specific Conditions' in their *On-Site Stormwater Detention* technical notes, identifying the following for Zone 1 of their Drainage Catchment:

TABLE 1 - Site Storage Required per impervious area.
See On-Site Detention Drainage Zone Map for your required zone.

Zone	*Volume of Storage Req'd m^3/Ha*	*Volume of Storage Req'd m^3/100m^2*
1	327	3.27
2	360	3.6
3	380	3.8
4	315	3.15

TABLE 2 – Permissible Site Discharge (PSD) per impervious area.
See On-Site Detention Drainage Zone Map for your required zone.

Zone	*Permissible Site Discharge L/s/Ha*	*Permissible Site Discharge L/s/100m^2*
1	225	2.25
2	170	1.7
3	180	1.8
4	136	1.36

Figure 1. Extract of OSD Characteristics from Willoughby City Council technical notes

4.1. Results

If on-site detention is required, it is recommended to use option a:

a. The site will require approximately 150m³ of total storage using **only** Site Storage requirements.
b. The site will require approximately 214m³ of total storage using **only** Permissible Site Discharge requirements, limited outlet flow to 102.83L/s to retard flow rates.

5. Legal Point of Discharge

It is envisaged that the site will have an unhindered gravity outlet to the sites Legal Point of Discharge.

6. Layout

Final arrangements, outlet design considerations and layout plans are subject to detailed design, spatial arrangements, and on-going authority liaison for compliance.

7. Conclusion

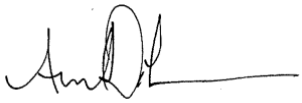
The proposed development presents a general improvement of site catchment characteristics, increasing pervious areas and reducing urbanisation.

As such, on-site detention is not recommended. However, if OSD is required, it is recommended to limit this to 150m³ using Council *Site Storage* requirements.

This memorandum has been provided to address town planning concerns relating to the redevelopment of 100 Edinburgh Road. This memorandum should be read in conjunction with relevant information by other consultants. Recommendations and conclusions are subject to further detailed design.

Should you have any questions or further queries with the above please do not hesitate to contact me.

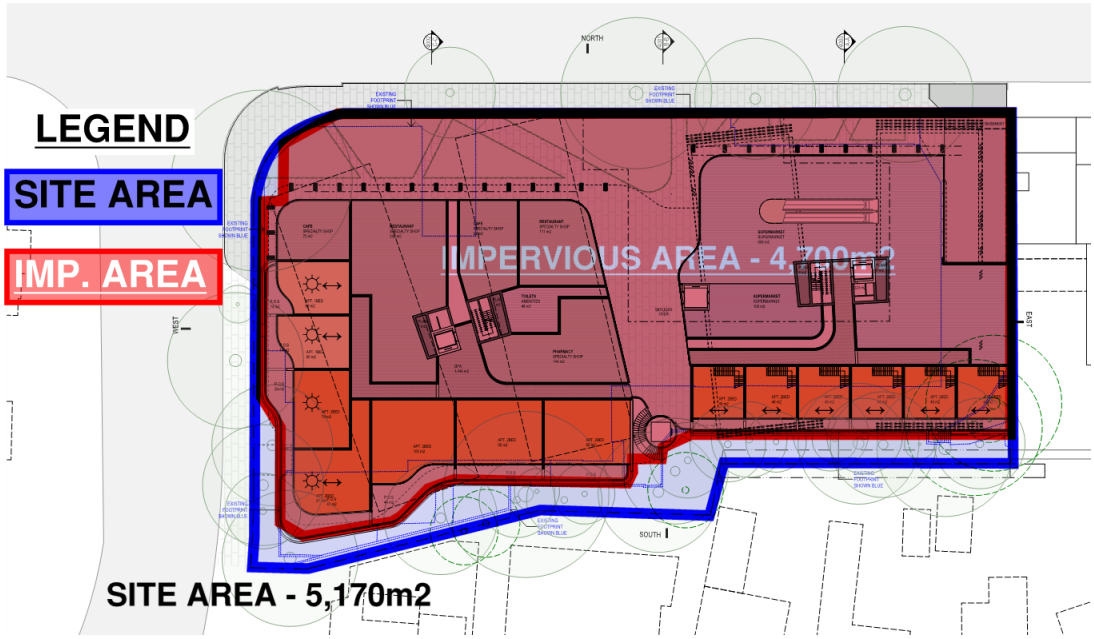
Sincerely,



Anıl Dilman
Associate – Infrastructure

8. Appendix A

Catchment Plan



9. Appendix B

OSD Report – OSD4W Software Output

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          ***   SUMMARY OSD DESIGN REPORT   ***
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Printed from  *OSD4W*  version 1.08.4     S/N #  X7-10261
Licensed to : Meinhardt Australia Pty. Ltd.
Prepared by : Urban Development
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1. CLIENT DETAILS
     Name            :
     Address line 1    :
     Address line 2    :
     Address line 3    :

2. JOB NAME AND REFERENCE
     Job Reference     :  122058
     Job Name          :  The Quadrangle - Castlecrag
     Job Detail   1    :  100 Edinburg Road
     Job Detail   2    :  Castlecrag
     Job Detail   3    :  NSW

3. AREAS (sq.m.)   &   RUN-OFF COEFFICIENTS
     Total Site area   :      5170

4. EXISTING SITE DETAILS
    Aes1   :  5170          Ces1     :  0.30
    Aes2   :  0             Ces2     :  0.30
    Aes3   :  0             Ces3     :  0.15
    Aes4   :  0             Ces4     :  0.12
    Weighted C - site       Cew      :  0.30

5. PROPOSED SITE DETAILS
    Aps1   :  4570          Cps1     :  1.00
    Aps2   :  600           Cps2     :  0.30
    Aps3   :  0             Cps3     :  0.15
    Aps4   :  0             Cps4     :  0.12
    Weighted C - site       Cpw      :  0.92
    Uncontrolled portion(s)  UPfrac   :  0.00

6. CATCHMENT TIMES (minutes)
    Time of concentration            : 10.00
    Travel time from discharge point
              to catchment outlet  :  5.00

7. OSD DESIGN
     Flow Control Device               :  MC2 Multi-Cell
     Storage type                      :  Pipe
     Rainfall zone                     :  WILLOUGHBY
     ARI for OUTFLOW          (years)    :  100
     ARI for STORAGE          (years)    :  100
     Qptot                    (L/s)      :   88.88
     Qu                       (L/s)      :    0.00
     Qp                       (L/s)      :    0.00
     Calculated PSD           (L/s)      :  111.87
     Nominated PSD            (L/s)      :  102.83
     Adopted PSD              (L/s)      :  102.83

8. STORAGE DETAILS
     Volume                   (cub.m.)   :  213.65
     Time to fill storage     (mins)     :   39.8
     Time to empty storage    (mins)     :   61.4
     Critical storm duration  (mins)     :   54.5

9. STORM DURATIONS & RAINFALL INTENSITIES
     PSD ..............  Duration :  10.0 min.     Intensity : 206.3 mm/hr
     MAX. STORAGE ......  Duration :  54.5 min.     Intensity :  96.4 mm/hr

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