ENGINEERING

Stormwater Management Plan

Baptcare Social Housing
50s Gilwell Road, Lalor
Superlot Subdivision

JOB NUMBER:	S54643 - 277075
CLIENT:	ClarkeHopkinsClarke Architects Pty Ltd
SITE:	Baptcare Wattle Grove, LALOR, VIC 3075
DATE:	17 September 2021
REVISION:	1

Table of contents

1 Introduction

FMG Engineering have been engaged by ClarkeHopkinsClarke Architects to prepare a stormwater management plan (SWMP) for the proposed 48-unit development at 50s Gillwell Road, Lalor. The application to subdivide the development site from the larger existing Baptcare owned site is to be submitted in September 2021.

This SWMP outlines the conceptual stormwater design for the proposed development and has been prepared to accompany a town planning application for the site being lodged with DELWP.

This plan should ensure that the stormwater and drainage discharge from the development site meets current best practice performance objectives for stormwater, demonstrates the application of Water Sensitive Urban Design (WSUD) and complies with the intent of City of Whittlesea requirements.

1.1 Purpose

The purpose of this SWMP is to evaluate the quantity and quality of stormwater associated with the proposed development plan to demonstrate to Whittlesea City Council and DELWP that an appropriate stormwater management strategy has been adopted.

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

- Stormwater runoff volumes and detention (Stormwater Quantity); and
- Stormwater quality treatment measures (Stormwater Quality);

The following will be achieved with the correct application of this SWMP report:

- Appropriate standards to be maintained on all aspects of stormwater within the site,
- Pollution control to be maintained,
- Examination of the surrounding area and properties to ensure they will not be adversely affected nor unduly disrupted by stormwater, and
- Establishment of a unified, clear and concise stormwater management strategy.

1.2 Existing Site Conditions

1.2.1 Property Details

Address:	50s Gilwell Road, Lalor, VIC 3075
Lot and Plan Number:	Part of Lot RR PS646643
Zoning:	General Residential Zone 1 (GRZ1)
Site Area:	0.86ha

As shown in in Figure 1, the site has street frontages to Gillwell Road and Pine Tree Crescent. The east boundary will be shared with an existing Baptcare Residential Aged Care Facility.

Figure 1 – Site Location Plan (indicative boundaries)

1.3 Development Summary

The site at 50s Gillwell Road, Lalor is to be developed with 48 affordable housing units. Dwelling types vary between 1, 2 and 3 bedroom homes with a mix of single and double storey configurations. For any planning permit applications made, this report will focus solely on the stormwater management strategy and management of the proposed development. A summary of the site is shown in Table 1.

Figure 2 – Proposed Development

1.4 Flooding

Reference to the VicPlan Planning Overlay mapping indicates that the development site is not subject to any Special Building Overlays (SBO) or Land Subject to Inundation (LSIO), Flood Overlay (FO). This indicates that the site should not be prone to storm water overflow (originating external to the site) during a 1 in 100 year storm. Appropriate measures should still be put in place to ensure the development does not flood in storm events.

Figure 3 shows the planning – land management overlays relative to the proposed site

Figure 3 – Land Management overlays

1.5 Overland Flow Path

There is gentle fall across the site from east to west. Overland flow from will be possible to Pinetree Crescent for part of the site. The southern half of the site will drain to the south west unless the finished surface levels and road grading raises this area to induce fall to the north.

The site survey is provided in Appendix A.

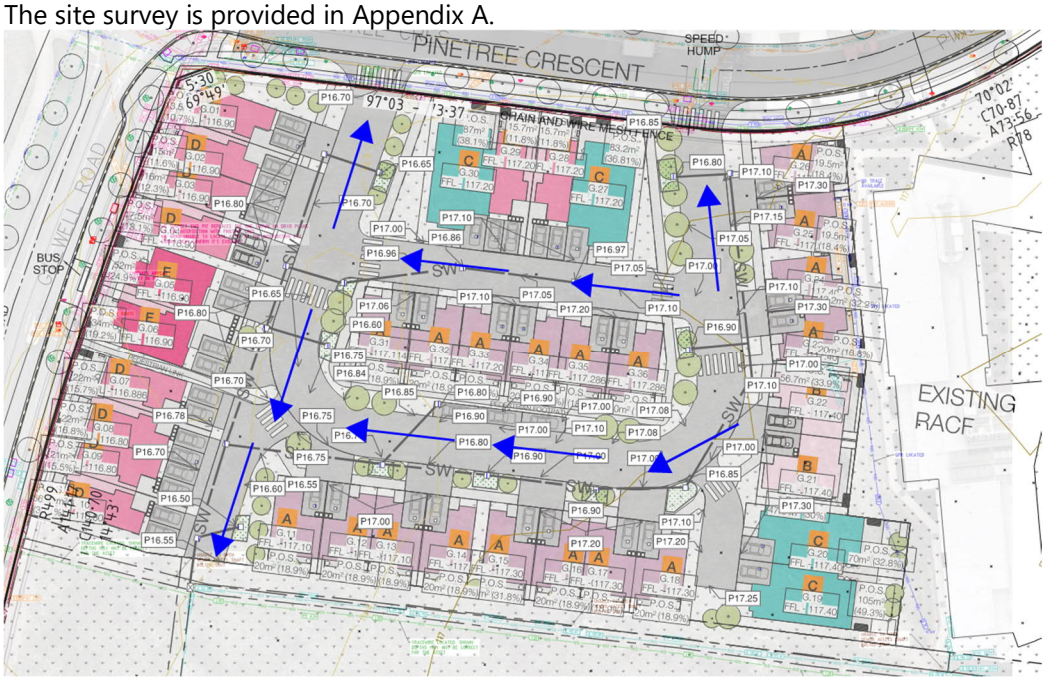


Figure 4 – Overland Flow Paths

2 Stormwater Management

The stormwater management for the development will be based on water sensitive urban design (WSUD) principles and will be consistent with Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO 2006). The following key items will be considered:

- Adequate drainage to ensure a free draining development.
- Pavement, road and drainage levels designed to ensure surrounding properties are not adversely affected.
- The discharge volumes of the development are stored to pre-development levels.
- The pollutant discharge from the site is minimised to meet Best Practice.

The proposed development has a total catchment area of approximately 8,640m^2. For the purpose of water quality, the site is separated into 4 catchment types which are summarised in Table 1

Table 1: Stormwater Treatment

Area Description	Catchment Area	Discharge
Dwellings	2,596m^2	To rainwater tanks with overflows directed to the road stormwater drainage system discharge to the LPD
Road Pavement	2,286m^2	Raingarden / bioswale within nature strip + minor catchments to stormwater trip with litter basket
Driveways	967m^2	Stormwater pit with litter basket
Landscape	2,791m^2	Bioswale terminating in raingarden within nature strip
		Tertiary Treatment - SPEL filter in downstream pit structure. Low flow treatment with high flow bypass.
Total	**8640m^2**	

Runoff from the surrounding areas have not been considered in this analysis as the drainage systems for these areas will not be modified as part of the proposed development works. Catchment areas are shown in Appendix A.

3 Stormwater System On-site Water Quality Treatment

3.1 Music Model

The MUSIC model has been set up based on Melbourne Water guidelines.

Rainfall parameters are based on Melbourne with 6-minute steps.
The best practice water quality objectives based on the CSIRO (and Victorian Stormwater Committee) guidelines are:

- 80% retention of the typical urban annual load for Total Suspended Solids (TSS).
- 45% retention of the typical urban annual load for Total Phosphorus (TP).
- 45% retention of the typical urban annual load for Total Nitrogen (TN).

- 70% retention of the typical urban annual load for gross pollutants (litter).

The assumed discharge point to the existing drainage is shown in Appendix A. The results of the model are shown in Table 2

Table 2: MUSIC Model results

Standard	Pollution Reduction Target	Reduction Required	Results Achieved
Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO) 2006	Gross Pollutants	70%	100%
	TSS	80%	86.6%
	TP	45%	75.1%
	TN	45%	60.8%

The models for the above set of results are shown in Appendix A

4 On-site Detention System

The whole site has been considered as a single catchment discharging to the existing stormwater drainage alignment immediately to the south of the development site boundary. Appendix A shows the catchment area plan discharging to the LPD.

4.1 Detention System

On-site detention has been proposed on site to restrict the flow to pre-development conditions for the LPD.

The permissible site discharge was modelled using an OSD4W model for a 5-year ARI design standard permissible site discharge and the on-site storage standard of 20-year ARI. Time of concentration for the catchment outlet is assumed to be 12 minutes with a time from site to outlet of 7 minutes (to be confirmed with council).

To calculate the on-site detention volume for the catchment discharging to the existing council drain, City of Whittlesea may nominate a permissible site discharge (PSD) but this will only be given when the LPD is received. Until then, it is assumed that the PSD will be calculated using OSD4W with the allowable discharge used to create the required storage volume. Table 3 shows the preliminary OSD4W results with Appendix B showing the model print out.

Table3: OSD4W Model results

Catchment	**PSD**	**Storage**
Council Drainage	70.75 L/s	65.59m^3.

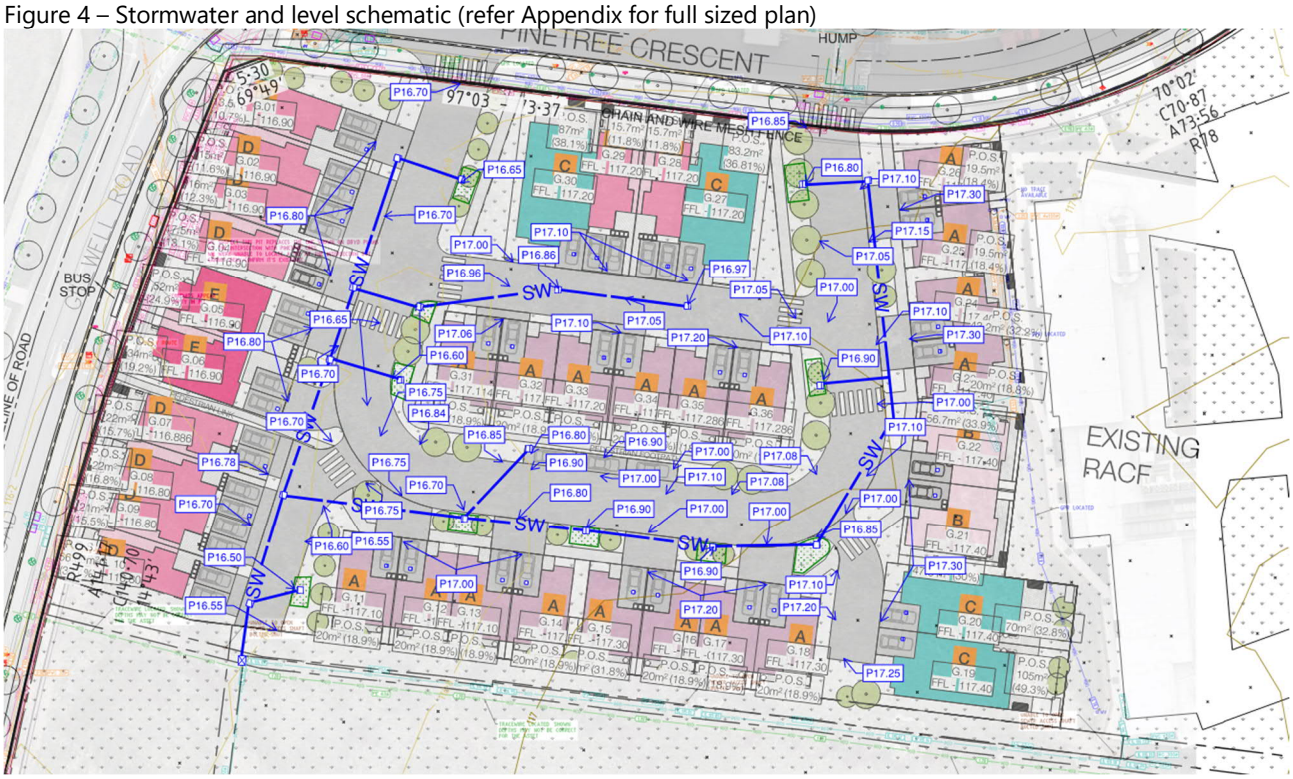
Stormwater pits and pipes within the road drainage system and tanks for each proposed lot are proposed to store the required volume of water. An orifice pit with the calculated orifice diameter is proposed to restrict the flow to permissible site discharge.

5 Stormwater Drainage Strategy and LPD nomination

The stormwater drainage strategy is comprised of the following key elements:

- Overland flow to Pinetree Crescent and existing route to the south west
- Dwelling levels at approximately 300mm above existing surface levels
- Connection to existing large diameter stormwater drainage assets to the south
- Utilise large diameter stormwater pipe to provide detention storage for council roads
- Provide detention storage within dwelling water tanks for roof catchments (1,000L each dwelling)
- Stormwater treatment will be primarily be at source treatment with a tertiary treatment pit and filter at the downstream end of the stormwater system within the site.
- Shallow filter depth raingardens to receive road and landscape flows with conventional stormwater drainage providing redundancy and drainage capacity for 1:10 year storm events

Figure 4 – Stormwater and level schematic (refer Appendix for full sized plan)



6 Limitations

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Appendix A

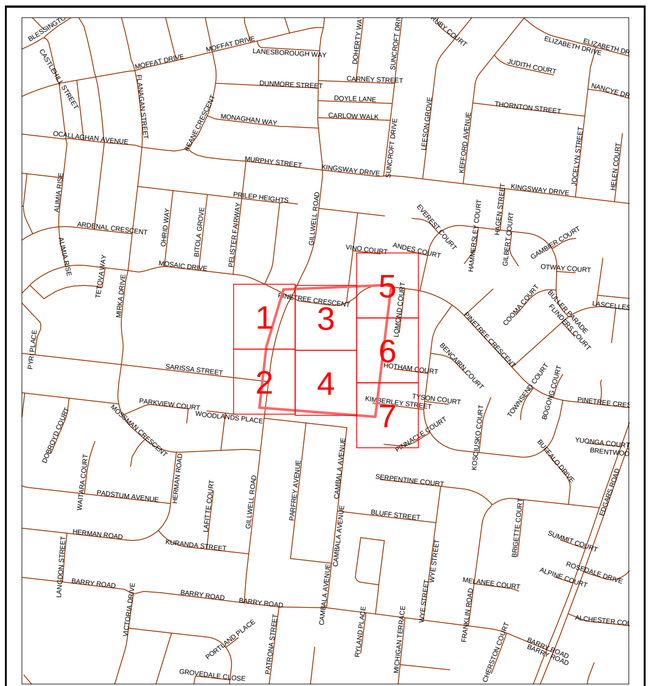
Catchment Areas / Council DBYD plan / site survey / services plan

Date: 14/12/2020

Overview Map

Sequence No: 104862312

50s Gillwell Road Lalor



The information provided is supplied at your request and is to be considered indicative only. Council provides no guarantee as to the accuracy and location of services and accepts no responsibility for inaccuracy shown on plans. Persons conducting the works are to verify all levels and locations on site by manual pot holing (hand digging) prior to commencing works.

Vicmap N 0 0.05km

LEGEND:

1 Detail Map

Affected DBYD Work Area
Property
Suburb
Easement
Gas Pipeline
Drainage Pipe
Drainage Pit
Fibre Optic Conduit
City of Whittlesea

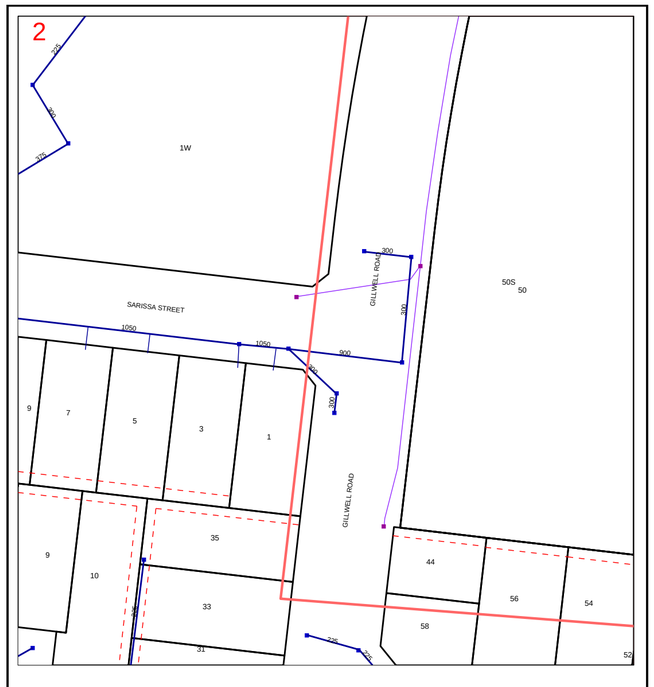
Powered by dbyd

Date: 14/12/2020

Map 2

Sequence No: 104862312

50s Gillwell Road Lalor



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Fibre Optic Conduit
City of Whittlesea

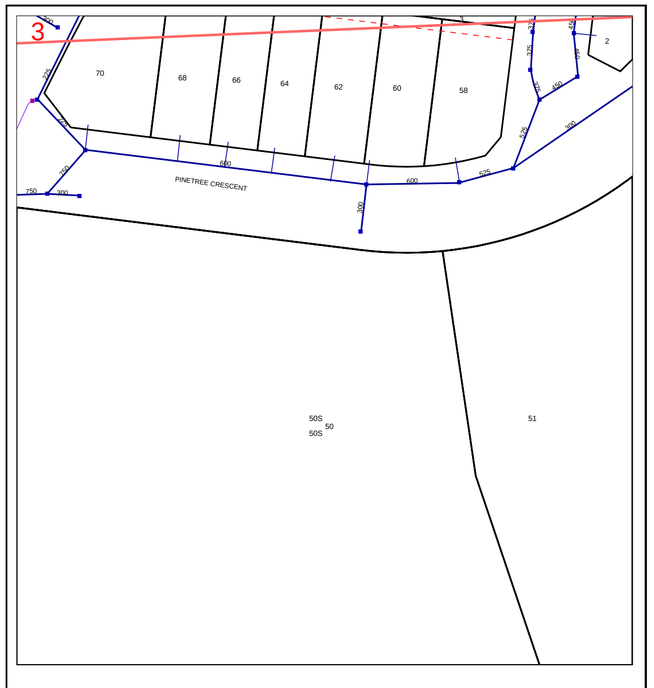
Powered by dbyd

Date: 14/12/2020

Map 3

Sequence No: 104862312

50s Gillwell Road Lalor



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City of Whittlesea

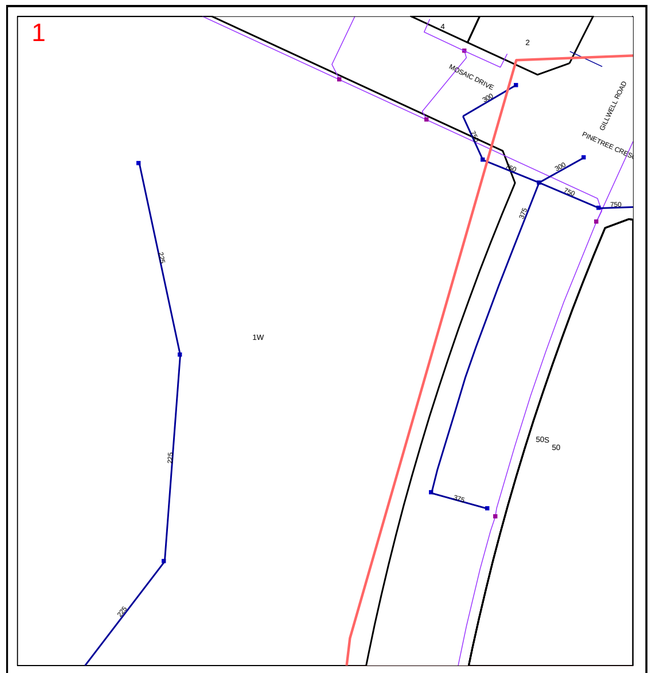
Powered by dbyd

Date: 14/12/2020

Map 1

Sequence No: 104862312

50s Gillwell Road Lalor



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City of Whittlesea

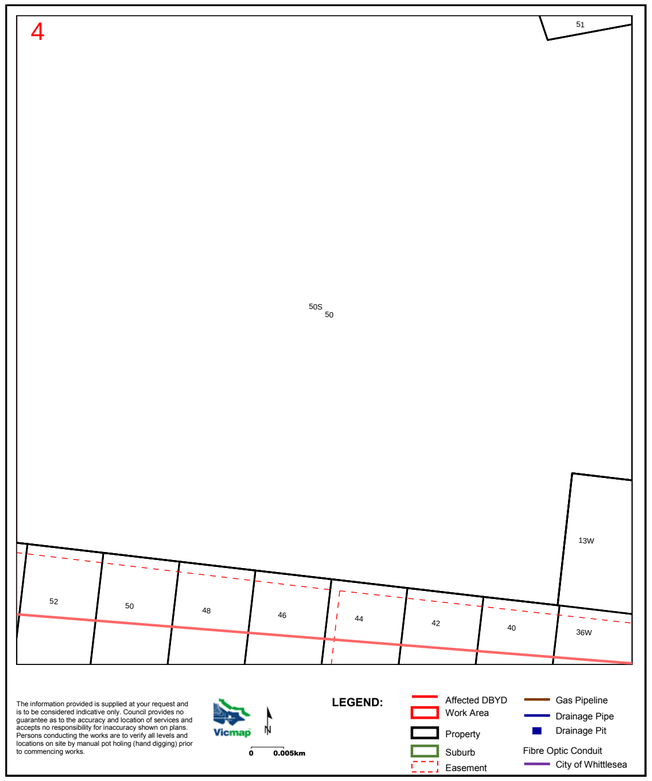
Powered by dbyd

Date: 14/12/2020

Map 4

Sequence No: 104862312

50s Gillwell Road Lalor



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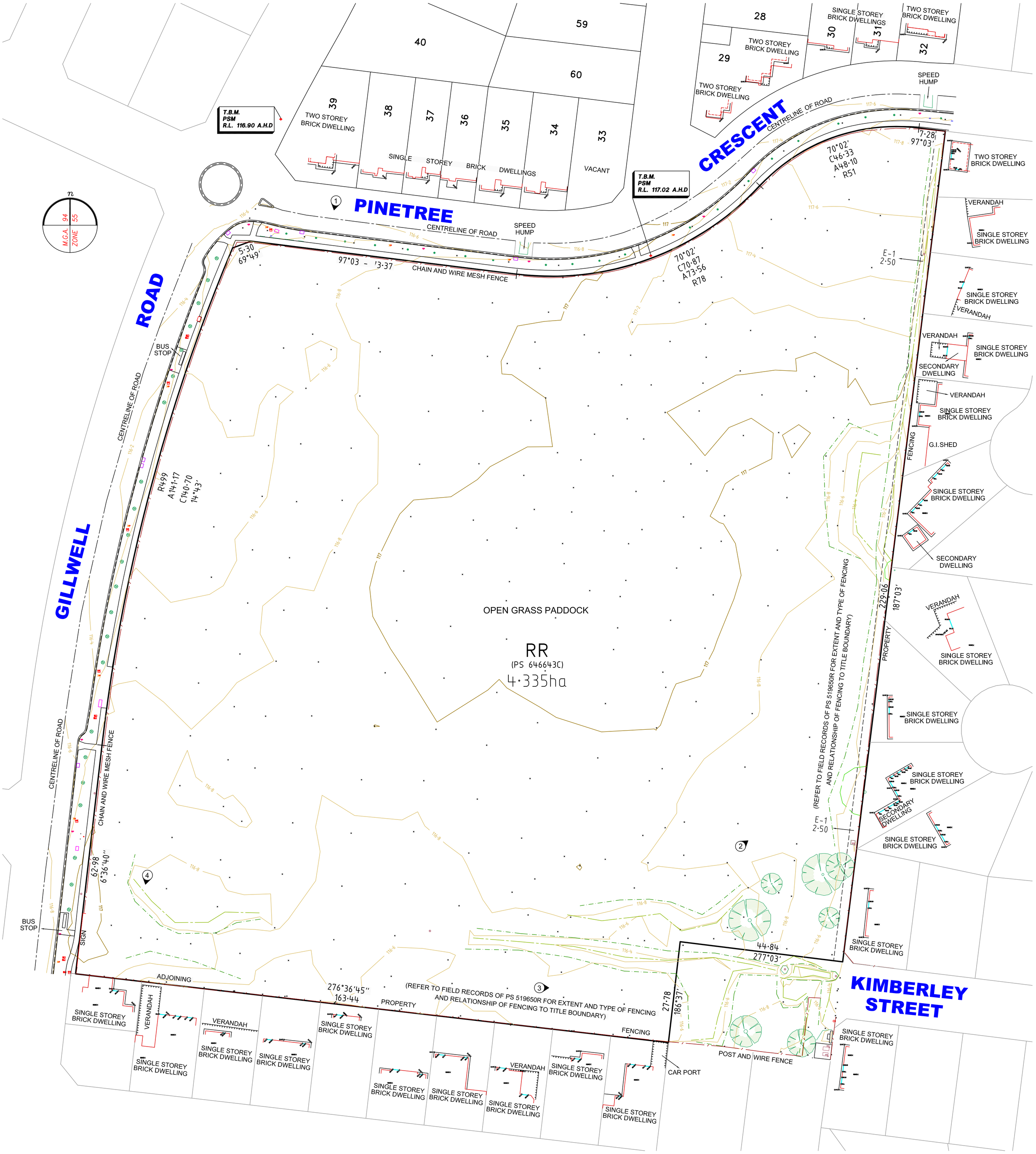
Powered by dbyd



Services

Services that were not visible at the time of survey may not be shown on this plan. Reference should be made to service authority plans prior to commencement of works.

Notations

Date of Survey OCT 2011 & DEC 2014

Land Subject to Easement
E-1 Drainage and Sewerage

Location of buildings beyond site boundaries have been located by remote means

Information relating to abutting properties has only been shown where visible or access is available

DCMB linework is indicative only and should not be used for design purposes

Direction of photographs shown thus (1)

All dimensions and survey marks shown on this plan should be verified/confirmed by all contractors & consultants prior to use for any future construction & site works

Levels shown thus 116·58 are to Australian Height Datum vide PM108 with a stated value of RL119.79

Refer to frozen layers with a suffix of _L for levels.
Refer to frozen layers with a suffix of _C for crosses
Refer to frozen layer "TRIANGLE" for 3D Triangles

Contour Interval 0.2 metres

Scale	1:500 (0 5 10 15 20)
Certified	AJR Licensed Surveyor
Drawn	MT
Date	11/12/2014
Survey Data	826876.see
CAD drawing number	644100EC
Original sheet size	A1
Client	**BAPTCARE LALOR COMMUNITY c/- CONNECT PM P/L**
Project	**50S GILLWELL ROAD LALOR**
Details	**FEATURE & LEVEL SURVEY UPDATE + SITE ANALYSIS**
Sheet	1 of 1
Job Number	30267

Bosco Jonson Pty Ltd
A.B.N 15 169 138 827
P.O. Box 5075, South Melbourne, Vic 3205
16 Eastern Road, South Melbourne
Vic 3205 Australia
Tel 03) 9699 1400 Fax 03) 9699 5992

Legend

1	TBM		712	Electricity Pole Only	
102	Top Of Bank		715	Electricity Unclassified	
103	Toe Of Bank		716	Electricity Pit	ELEC
104	Existing Surface	×	721	Telco Pit (Point)	
110	Breakline String		729	Telco Pit (String)	
201	Single Tree		741	Sewerage Pit (Point)	
203	Tree Dripline		748	Sewerage Pit Lid (String)	SEW
308	Side Entry Pit		751	Stop Valve	SV
401	Centre Of Bitumen		753	Fire Hydrant	FH
406	Lip Of Kerb/Channel		762	Unclassified Pit	
407	Invert Of Kerb/Channel		764	Unclassified Utility	
408	Back Of Kerb/Channel		810	Bus Stop	
410	Pedestrian Path		903	Fence	
419	Edge Of Concrete		904	Gate	
423	Speed Hump		910	"Top of Fence"	×
503	Signs	SIGN	950	Title	
518	Multi Mounted Sign		S13	Stage 13	
521	Bollard	•			
601	Building Level One				
602	Secondary Dwelling/Shed				
603	Major Building				
604	Verandah/Roof Over				
605	Window				
632	Eaves	EAVE×			
634	Ridge Line	RIDGE×			
635	Spouting	SPOUTING×			
636	Window Head	HEAD×			
637	Window Sill	SILL×			
711	Light Pole				

Utility Linetype Legend

	QL-B	QL-C	QL-D
Telecommunications			
Optic fibre			
Electricity			
Electricity HV			
Gas			
Gas with pressure			
Water			
Recycled Water			
Fire Service			
Sewerage			
Drainage			
Petroleum Products			
Unidentified			
GPR Scan			
Scope			

Symbol Legend

Survey Mark		Gas or Fuel Valve	GV
Stormwater Pit		Gas Meter	
Traffic Signal Pole		Gas or Fuel Pit	
Electricity Supply Box		Sewerage Pit	
Light Pole		Sewerage Inspection Shaft	
Electricity Pole		Sewerage Vent Pipe	S
Electric Pole and Light		Stop Valve	WV
Electricity Pit		Fire Plug	FP
Electricity Pit 300mm		Fire Hydrant	FH
Comms Pit		Water Meter	
Comms Pit small rounded		Water Tap	
Comms Pillar		Irrigation or Sprinkler	
Comms Pole		Unclassified pit	

Utility Quality Level Description

Quality Level	Description	Tolerances	
		Vertical	Horizontal
A (QL-A)	Positive conformation of location, depth and attributes of subsurface utilities by exposing and/or directly surveying	±50mm	±50mm
B (QL-B)	Relative three dimensional location of subsurface utilities by electromagnetic detection or ground penetrating radar	±500mm	±300mm
C (QL-C)	Improved indication of the alignment of subsurface utilities based on surface features	N/A	±300mm (Surface features)
D (QL-D)	Indication of potential presence of subsurface utilities based on utility plans/information	N/A	N/A

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Client CLARKE HOPKINS CLARKE

Project BAPTCARE WATTLE GLEN
LALOR
VIC 3075

Type ASSET SURVEY

Scale 1:750m @ A3
0 5 10 15

Survey Date 19/08/2021 **Surveyor** JH

System MGA 94 Z55

Method TOTAL STATION WITH GNSS

Control WOLLERT PM 108 **R.L.** 119.79

Located 19/08/2021 **Locator** MT

REF. DWGS. 644100EC

DBYD No. 30329693

Revision

Rev.	Date	Drn	Chk	Description
0	26/08/2021	SO	ES/RP	ISSUED FOR USE

Drawing Number 304149 **Revision** 0

Sheet 008 OF 8 GENERAL ARRANGEMENT

Baptcare

Level 3, 1 Southbank Boulevard
Southbank, Victoria 3006
(03) 7019 8400
www.veris.com.au

DEVELOP WITH CONFIDENCE™

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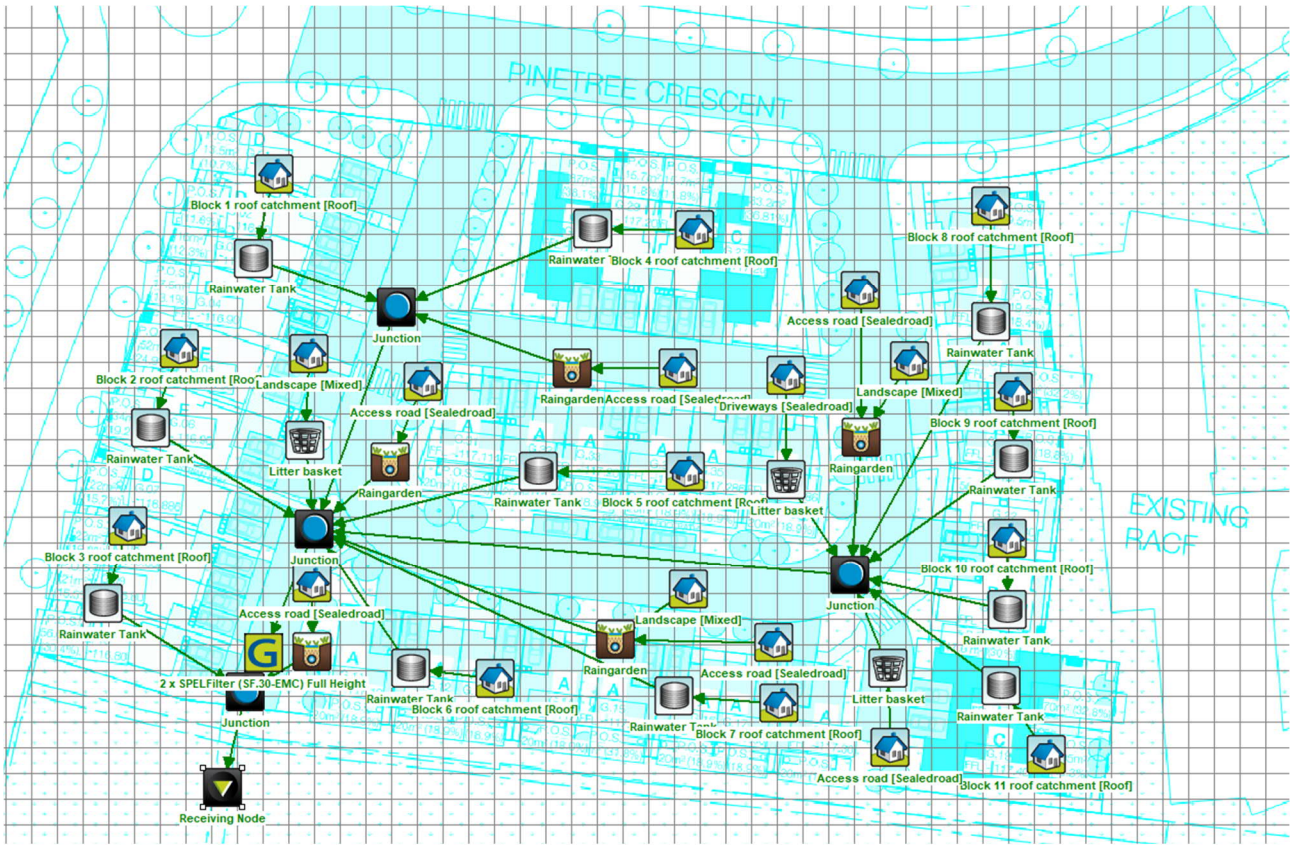
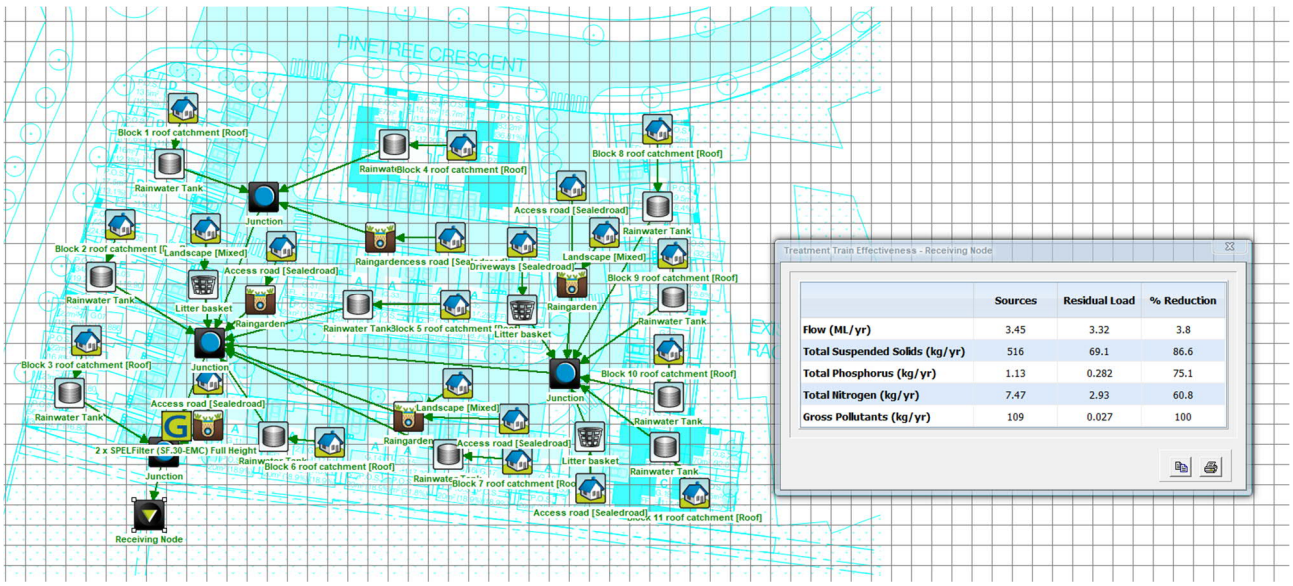
Appendix B

MUSIC Model Results / OSD4W Detention Storage Calculation





OSD4W Detention Storage Calculation

3. AREAS (sq.m.) & RUN-OFF COEFFICIENTS
   Total Site area : 8640

4. EXISTING SITE DETAILS
   Aes1 : 8640 Ces1 : 0.35
   Aes2 : 0 Ces2 : 0.30
   Aes3 : 0 Ces3 : 0.15
   Aes4 : 0 Ces4 : 0.12
   Weighted C - site Cew : 0.35

5. PROPOSED SITE DETAILS
   Aps1 : 2596 Cps1 : 1.00
   Aps2 : 1825 Cps2 : 0.90
   Aps3 : 967 Cps3 : 0.90
   Aps4 : 3252 Cps4 : 0.30
   Weighted C - site Cpw : 0.70
   Uncontrolled portion(s) UPfrac : 0.00

6. CATCHMENT TIMES (minutes)
   Time of concentration : 12.00
   Travel time from discharge point
   to catchment outlet : 7.00

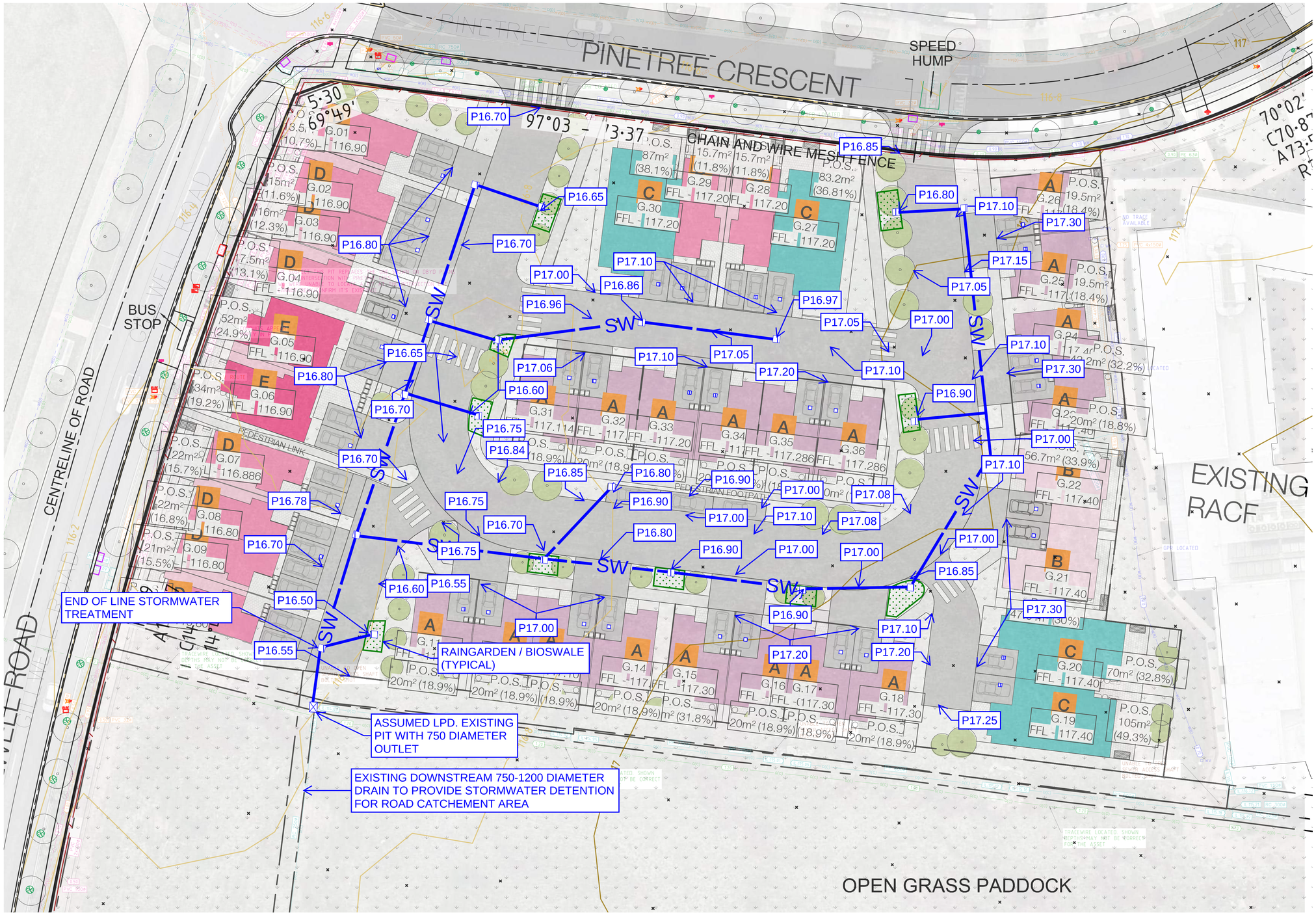
7. OSD DESIGN
   Flow Control Device : Orifice
   Storage type : Tank
   Rainfall zone : BROADMEADOWS
   ARI for OUTFLOW (years) : 5
   ARI for STORAGE (years) : 10
   Qptot (L/s) : 51.08
   Qu (L/s) : 0.00
   Qp (L/s) : 0.00
   Calculated PSD (L/s) : 70.75
   Nominated PSD (L/s) : -----
   Adopted PSD (L/s) : 70.75

8. STORAGE DETAILS
   Volume (cub.m.) : 65.59
   Time to fill storage (mins) : 17.2
   Time to empty storage (mins) : 49.8
   Critical storm duration (mins) : 23.8

9. STORM DURATIONS & RAINFALL INTENSITIES
   PSD ..... Duration : 12.0 min. Intensity : 60.8 mm/hr
   MAX. STORAGE ..... Duration : 23.8 min. Intensity : 50.3 mm/hr

Appendix C

Stormwater drainage schematic to demonstrate design intent and LPD nomination



REV	DESCRIPTION	DATE	INIT	APP
B	LEVEL SCHEMATIC PLAN FOR REVIEW	17.09.2021	RMS	
A	LEVEL SCHEMATIC PLAN FOR REVIEW	14.09.2021	RMS	

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P 1300 975 878 | **E** forensic@fmgengineering.com.au

ABN 58 083 071 185
Quality Management Systems ISO 9001 Certified

FMG ENGINEERING

CLIENT
BAPTCARE

PROJECT TITLE
BAPTCARE HOUSING DEVELOPMENT LALOR

SITE ADDRESS
50s GILWELL ROAD, LALOR VIC 3075

DRAWING TITLE
STORMWATER DRAINAGE SCHEMATIC

DESIGNED	RMS
DRAWN	RMS
CHECKED	EA
No. OF SHEETS	-
SCALE	1:250 AT A1
DATE STARTED	AUG 2021
SITE ID & JOB No.	S54643 - 277075
REV.	B
DRAWING No.	SKC01

FMG ENGINEERING

ADELAIDE
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Wayville SA 5034
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SYDNEY
Suite 28, 38 Ricketty St
Mascot NSW 2020
Ph: 1300 975 878

ABN: 58 083 071 185