

SITE DRAINAGE MANAGEMENT REPORT

Site Address	Killesta Secondary College 427-441 Springvale Rd Springvale
Job Number	21/09
Date:	13/06/2021
Client:	Killesta Secondary College
Report By:	Martin Masina
Checked By:	Brian Bird
Appendices:	A Killester College Senior Centre Functional Layout Plan B Kennedy Hall On-Site Stormwater Detention Computations C Kennedy Hall On-Site Stormwater Music Modelling D Ann Street Carpark On-Site Stormwater Detention Computations E Ann Street Carpark On-Site Stormwater Storm Modelling

Revision B 21.06.2021

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright



282 Canterbury Road
Surrey Hills, Victoria 3127
(03) 9836 7892
info@ipsumstructures.com.au
ABN 90 633 978 346

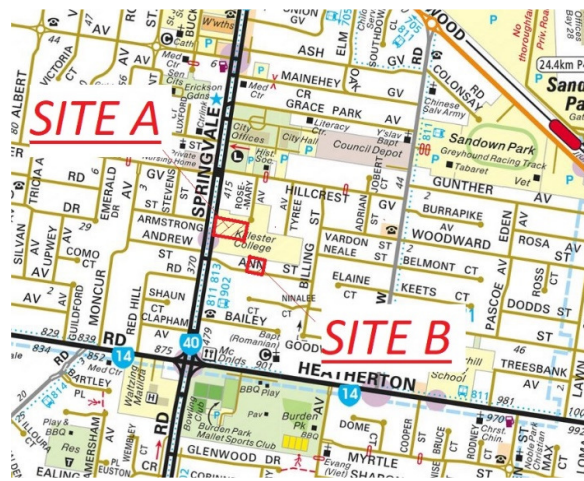
INTRODUCTION

This report will outline the drainage analysis for the development of the proposed extension to the Killesta Secondary Collage senior centre Kennedy Hall, and associated carpark and the construction of the additional Ann Street carpark. The report embraces a range of measures that are designed to mitigate the increase in stormwater runoff as well as to avoid the environmental impacts of the potential pollution threat to the runoff itself.

PROJECT OBJECTIVES

- 1) Minimise stormwater discharge off site from the increase in the impervious are of the proposed development.
- 2) Minimising potable water demand by harvesting and storing stormwater in rainwater tanks for sanitary flushing of toilets.
- 3) Treating stormwater on-site to improve the water quality and reduce the flow into the council's stormwater system.

SITE DESCRIPTION



The site lies on the east side of Springvale Road, Springvale and consists of an existing school hall, classrooms, amenities, and associated carpark. The site of the southern carpark is a collection of existing dwelling fronting the northern side of Ann Street Nos. 5 & 7 awaiting demolition.

SITE TOPOGRAPHY

The topography of both sites is fully developed sites with the natural fall of the land being in a south westerly direction away from the developments.

SITE STATISTICS.

Kennedy Hall – Site A

Site Area = 4170m²

Existing Impervious Area = 2870m²

Total Site Coverage 70%

Coefficient C=0.70

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

Proposed Impervious Area = 3962m²
Total Site Coverage = 95%
Coefficient C=0.95
Ann Street Carpark – Site B
Site Area = 1070m²
Existing Impervious Area = 792m²
Total Site Coverage = 74%
Coefficient C=0.74
Proposed Impervious Area = 1016m²
Total Site Coverage = 95%
Coefficient C=0.95

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

LEGAL POINTS OF DISCHARGE

Kennedy Hall

The discharging of stormwater from the existing Kennedy Hall redevelopment will be into an existing side entry pit located on the eastern side of Springvale Road north of the existing school entrance pending town planning approval. (TBC)



Ann Street Carpark

The discharging of stormwater from the southern carpark will be into an existing side entry pit located on the north frontage of No.3 Ann Street just west of the site. This will include a short length of outfall drain located behind the existing kerb and channel.



WSUD TREATMENT MEASURE OPTIONS OPEN TO THE COLLEGE

Stormwater management

Kennedy Hall – Site A

Rainwater tanks. All roof areas will be used to harvest stormwater and be discharged into 4 No. existing, and 7 No. proposed above ground 3000 Lt tanks for reconnection to garden and internal reuse and onsite detention. The proportion of reuse to temporary onsite detention will be 50%/50%. The balance of the onsite detention will be existing 675 dia and proposed 600 dia underground stormwater pipes, together with the existing 4.92m3 underground rectangular stormwater tank located south centrally to existing Kennedy Hall. With the impervious coverage of the site at 95% the ability for the installation of open swales and/or rain gardens is non-existent due to the sheer lack of required open landscaped area. The ability to treat discharged stormwater onsite can only be done via an installed proprietary WSUD produce SPEL "Ecoceptor" or approved equivalent. The site will then discharge into the EXISTING legal point of discharge in Springvale Road via an orifice control pit.

Ann Street Carpark – Site B

Rainwater pipes. All bituminous pavement area will collect into a proposed 675 dia underground pipe for on-site detention only.

Vegetated Sandy Loan Swale. Water runoff from the bitumen car parks and driveways will fall towards the surrounding vegetation onsite and soak into the landscaped area. Though the site is being calculated at an impervious factor of 95% there is designated landscaped area set aside with room for open swale systems. The site will then discharge into the existing legal point of discharge in Ann Street via an orifice control pit.

WSUD ASSESSMENT RATING RESULTS

The measure of the WSUD best practise objectives will be via the use of the Music Model and Melbourne Water STORM calculator software.

What is eMUSIC ?

The Music Modelling tool software (eMUSIC) calculator is a software program developed as a method of the analysis of stormwater treatment methods using various source, treatment, and other node tools. The eMUSIC is used when the measurement of stormwater treatment varies from a simplified method to achieve Melbourne Water best practise Targets.

Best Practise Targets are:

Reduction in Total Suspended Solids.	80%
Reduction in Total Nitrogens.	45%
Reduction in Total Phosphorous	45%
Reduction in Litter from Typical Urban Design	70%

What is STORM ?

The Stormwater Treatment Objective Relative Measure (STORM) calculator is a tool that was developed by Melbourne Water as a method of simplifying the analysis of stormwater treatment methods. The STORM calculator is designed for the public to easily assess WSUD measures on any given property.

A STORM rating of 100% means that the objectives outlined above have been met. A site that does not incorporate any treatment measures will result in a STORM rating of 0%.

INFORMATION PROVIDED

General.

Functional Layout plan.

Kennedy Hall redevelopment.

- Summary OSD design report.
- Music Model Treatment Train.

Ann Street carpark.

- Summary OSD design report.
- Melbourne Water STORM report.

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

DRAINAGE STRATEGY

- Both drainage designs will be a gravity system.
- Both drainage designs will drain to the LPD via onsite detention and WSUD.

DETENTION DESIGN

- The runoff from the development was modelled in OSD4 to provide appropriate detention volume.
- The onsite detention will be a Q10 stormwater event.
- The site discharge will be a Q5 stormwater event.
- Coefficient of runoff for existing condition = 0.70 for Kennedy Hall and 0.74 for Ann Street Carpark
- Coefficient of runoff for finished development = 0.95 for both sites.
- The Tc to site is 5 min.
- The time travelled from discharge point to catchment outlet is as calculated.
- Site permissible site discharge is as calculated.

CONCLUSION

Kennedy Hall – Site A

- The required Q10 stormwater event volume is calculated at 53.78m³. The actual Q10 stormwater volume is calculated at 57.50m³
- The Music Treatment Train

Best practise targets

Reduction in Total Suspended Solids.	83.3%	80%
Reduction in Total Nitrogens.	50.9%	45%
Reduction in Total Phosphorous	74.8%	45%
Reduction in Litter from Typical Urban Design	100%	70%

Ann Street – Site B

- The required Q10 stormwater event volume is calculated at 12.87m³. The actual Q10 stormwater volume is calculated at 12.92m³
- The Melbourne Storm Rating is calculated at 219% greater than the required 100%.

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

APPENDIX B

KENNEDY HALL ON-SITE STORMWATER DETENTION COMPUTATIONS

ON SITE STORMWATER DETENTION COMPUTATIONS

Project Name: Killesta SC Springvale Rd Springvale (a)
 Reference: 59 20 21 (Kennedy Hall Redevelopment)
 Authority: Greater Dandenong City Council
 Date: 15/06/2021
 Version No. 1

PERMISSIBLE SITE DISCHARGE CALCULATION

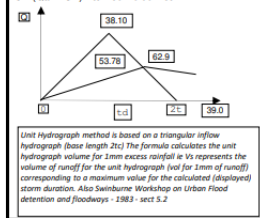
EXISTING SITE	
Location:	DANDENONG(GREATER)
ARI (yrs):	5
Site Area:	4100 m ²
Coefficient of runoff:	0.7 n
Time of Concentration:	5.7 min.
Rainfall Intensity:	78.36
PSD:	62.95 l/s

DEVELOPED SITE

Location:	DANDENONG(GREATER)
ARI (yrs):	10
Effective Area:	0.3895 ha
Weighted Coeff.:	0.95
Rainfall Intensity:	35.22
PSD:	15.17 l/s

ARR87 UNIT HYDROGRAPH METHOD

$V_s = (Q_a - PSD) \times t_c \times 60 \times 0.001$ cu.m.



MAXIMISED SOLUTION	
Critical Td =	39.09 storm duration
l =	35.22 mm/hr
Qa =	38.10 l/s peak flow
Vs (max) =	53.78 m ³

ORIFICE CALCULATIONS	
$(Q = cA (2gH)^{0.5})$	
Diameter	102 mm
Head	0.45 m

REQUIRED STORAGE VOLUME = 53.78 m³ @ Tc = 39.09 min.

AVAILABLE STORAGE WITHIN PIPES

Pipe Run	Dia. (mm)	Dia. (actual) (mm)	Length (m)	Number of	Volume (m ³)
1 - EX	675.0	685.8	18.0	1	5.91
1-2	450.0	457.2	56.0	2	18.39
1-3	375.0	381.0	33.0	3	11.29
0	0.0	0.0	0.0	0	0.00
0	0.0	0.0	0.0	0	0.00
0	0.0	0.0	0.0	0	0.00
0	0.0	0.0	0.0	0	0.00
0	0.0	0.0	0.0	0	0.00
0	0.0	0.0	0.0	0	0.00
0	0.0	0.0	0.0	0	0.00
0	0.0	0.0	0.0	0	0.00
0	0.0	0.0	0.0	0	0.00
Sub Total					35.60

AVAILABLE STORAGE WITHIN PITS

Pit No.	L (m)	W (m)	Design WL (m)	IL	V (m ³)
2	0.60	0.60	48.50	48.10	0.14
3	0.60	0.60	48.50	48.15	0.13
4	0.60	0.60	48.50	48.20	0.11
ex ulg tank	2.75	2.75	48.50	48.30	4.92
0	0.00	0.00	48.50	0.00	0.00
0	0.00	0.00	48.50	0.00	0.00
0	0.00	0.00	48.50	0.00	0.00
0	0.00	0.00	48.50	0.00	0.00
0	0.00	0.00	48.50	0.00	0.00
0	0.00	0.00	48.50	0.00	0.00
0	0.00	0.00	48.50	0.00	0.00
Sub Total					5.40

AVAILABLE STORAGE (OTHER)

Description	V (m ³)	
Water tanks 11x3000 L	16.50	
	0.00	
	0.00	
Sub Total		16.50

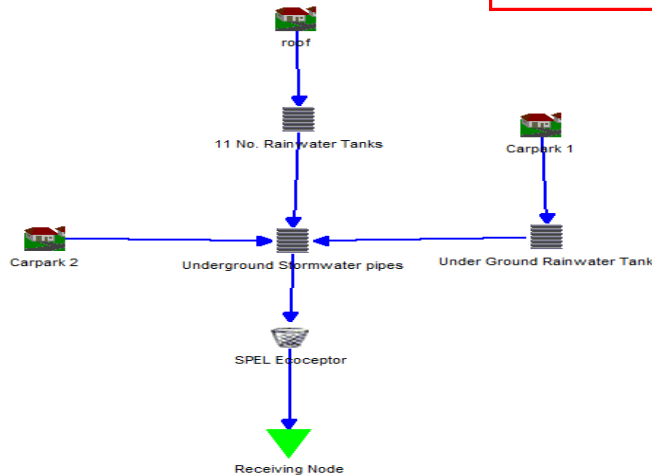
TOTAL STORAGE VOLUME = 57.50 m³

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

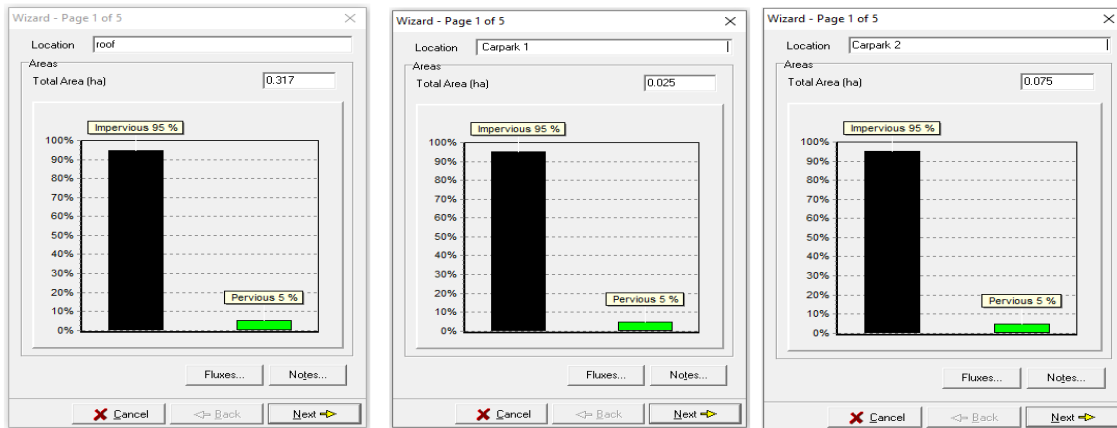
APPENDIX C

KENNEDY HALL ON-SITE STORMWATER MUSIC MODELLING

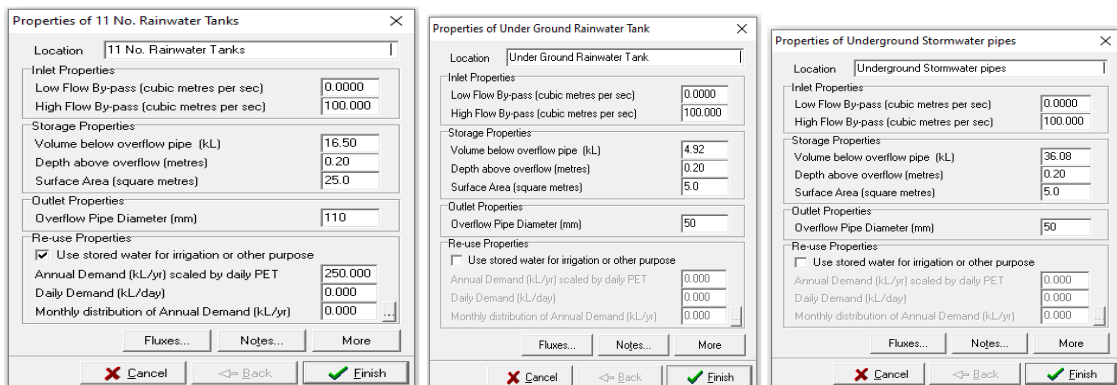
This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright



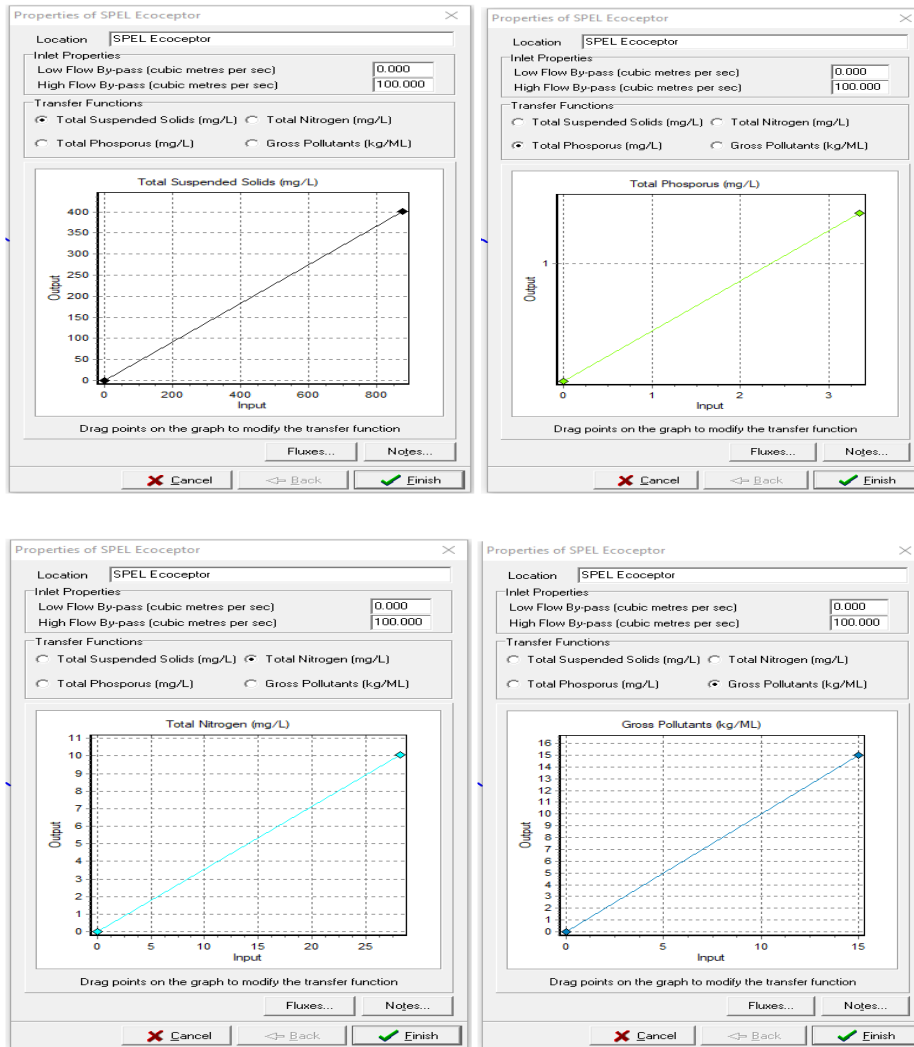
Music model treatment train



Source Node information



Rainwater Tanks node information.



SPEL Ecoceptor node Information

	Sources	Residual Load	% Reduction
Flow (ML/yr)	3.16	2.91	7.8
Total Suspended Solids (kg/yr)	640	107	83.3
Total Phosphorus (kg/yr)	1.32	0.646	50.9
Total Nitrogen (kg/yr)	9.25	2.34	74.8
Gross Pollutants (kg/yr)	109	0.00	100.0

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

Treatment Train Effectiveness Receiving node (Springvale Road.)

APPENDIX E

ANN STREET CARPARK ON-SITE STORMWATER STORM MODELLING



STORM Rating Report

TransactionID: 1172160
Municipality: GREATER DANDENONG
Rainfall Station: GREATER DANDENONG
Address: Killesta Secondary Colleg
Springvale Road
Springvale
VIC
Assessor: Martin Masina
Development Type: Commercial/Retail
Allotment Site (m2): 1,070.00
STORM Rating %: 219

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Carpark 1	510.00	Infiltration Sandy Loam	30.00	0	215.70	0.00
Carpark 2	510.00	Infiltration Sand	30.00	0	222.00	0.00

This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright

Date Generated: 15-Jun-2021

Program Version: 1.0.0

Note the Ann Street carpark has been divided into two half's (Carpark 1 and Carpark 2) so that the full area of landscaping can be maximised.