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Sustainable Built Environments Pty Ltd

Sustainable Management Plan (SMP)

for the

New Senior Centre

at

Killester College

427-442 Springvale Road, Springvale

For

McIldowie Architects

CONTENTS

Quality Assurance
Document: Sustainable Management Plan (SMP)
Date: 21/06/2021
Prepared by SMc

Revision	Revision Date	Details	Authorised
V1	21st June 2021	Issue for Town Planning	RP

1. EXECUTIVE SUMMARY

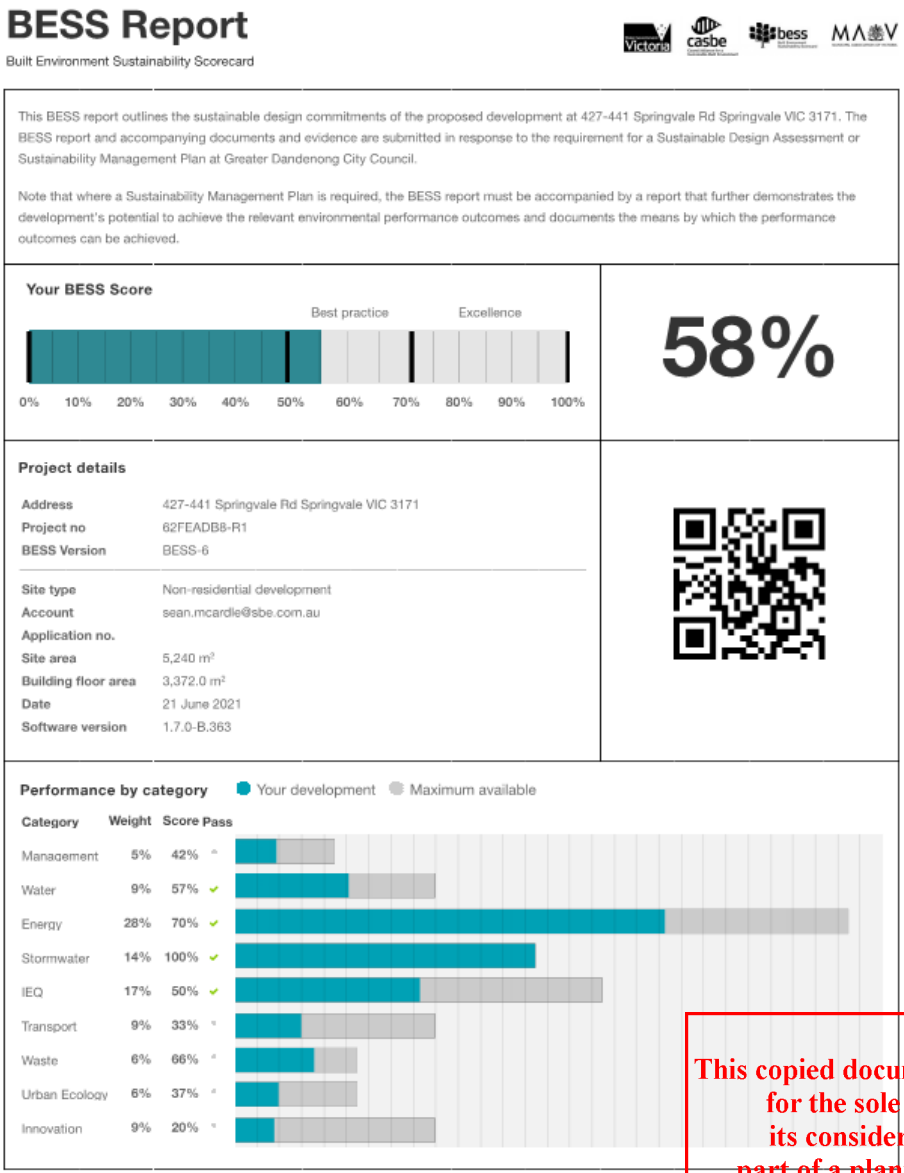
Sustainable Built Environments (SBE) has been commissioned to provide an Environmentally Sustainable Design (ESD) report for the proposed new Senior Centre development at 427-442 Springvale Road, Springvale.

The project involves the adaptive reuse of an existing sports hall and e two storey extension that will house the new Senior Centre. As some car parking will be lost in the process a new carpark is to be created on the south side of the campus.

The aim of this ESD report is to identify and convey the key sustainability opportunities embraced in the design, and provide the Responsible Planning Authority with a clear indication of how the development achieves the City of Greater Dandenong ESD policy aims and objectives. In particular, this report addresses the requirements outlined in the Greater Dandenong Planning Scheme Clause 22.06.

SBE has used the Built Environment Sustainability Scorecard (BESS) to benchmark the design's potential ESD performance under each key ESD criteria including: management, water and energy efficiency, stormwater, indoor environment quality (IEQ), sustainable transport, waste, urban ecology, and innovation. Relevant standards included in the Sustainable Design Factsheets published by IMAP have been used to assess ESD criteria not covered by BESS (e.g. Building Materials) but encouraged to be addressed by Council.

The proposed development currently targets 58 points out of 100 in BESS (see extract below), which equates to Best Practice. We understand this will satisfy Council's desired performance of development within its boundaries.



BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 427-441 Springvale Rd Springvale VIC 3171. The BESS report and accompanying documents and evidence are submitted in response to the requirement for a Sustainable Design Assessment or Sustainability Management Plan at Greater Dandenong City Council.

Note that where a Sustainability Management Plan is required, the BESS report must be accompanied by a report that further demonstrates the development's potential to achieve the relevant environmental performance outcomes and documents the means by which the performance outcomes can be achieved.

Your BESS Score

Best practice Excellence

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

58%

Project details

Address	427-441 Springvale Rd Springvale VIC 3171
Project no	62FEADB8-R1
BESS Version	BESS-6
Site type	Non-residential development
Account	sean.mcardle@sbe.com.au
Application no.	
Site area	5,240 m²
Building floor area	3,372.0 m²
Date	21 June 2021
Software version	1.7.0-B.363

Performance by category Your development Maximum available

Category	Weight	Score	Pass
Management	5%	42%	-
Water	9%	57%	✓
Energy	28%	70%	✓
Stormwater	14%	100%	✓
IEQ	17%	50%	✓
Transport	9%	33%	-
Waste	6%	66%	-
Urban Ecology	6%	37%	-
Innovation	9%	20%	-

2. INTRODUCTION

Sustainable Built Environments (SBE) has been commissioned to provide an Environmentally Sustainable Design (ESD) report for the proposed new Senior Centre development at 427-442 Springvale Road, Springvale.

This Sustainable Management Plan (SMP) developed for Town Planning provides an overview of the key sustainable design initiatives and predicted environmental performance of the proposed development. The report addresses the City of Greater Dandenong's commitment to promoting good ESD outcomes in the built environment and demonstrates how this is being achieved within the project.

2.1 The Project

The project involves the adaptive reuse of an existing sports hall and e two storey extension that will house the new Senior Centre. As some car parking will be lost in the process a new carpark is to be created on the south side of the campus. A net gain of five carparks is achieved. It should be noted this development does not bring any new students or staff to campus.

2.2 Documents

This report has been informed by the Architectural drawings produced by McIldowie Architects, Job No 3078, dated 31.05.21.

2.3 City of Greater Dandenong Planning Requirements

2.3.1. 22.06 Environmentally Sustainable Development

Clause 22.06 of the Greater Dandenong Planning Scheme set out a number of policy objectives under key sustainability categories. The overarching objective is that developments should achieve best practice in environmentally sustainable development from the design stage through to construction and operation.

In the context of this policy best practice is defined as a combination of commercially proven techniques, methodologies and systems, appropriate to the scale of development and site specific opportunities and constraints, which are demonstrated and locally available and have already led to optimum ESD outcomes. Best practice in the built environment encompasses the full life of the build.

SBE has used the Built Environment Sustainability Scorecard (BESS) to benchmark the design's potential ESD performance under each key ESD criteria including: management, water and energy efficiency, stormwater, indoor environment quality (IEQ), sustainable transport, waste, urban ecology, and innovation. Relevant standards included in the Sustainable Design Factsheets published by IMAP have been used to assess ESD criteria not covered by BESS (e.g. Building Materials) but encouraged to be addressed by Council.

3. MANAGEMENT

It is important to encourage an environmental focus in the management of design, construction and operational phases of the development. The Management category aims to highlight the importance of a holistic and thoroughly integrated approach to constructing and operating a building with good environmental performance.

Management			
Section Number	**Reference Credit**	**Credit Aim**	**Design Response/ Project Compliance**
3.1	*BESS 3.3 Metering*	To provide building users with information that allows monitoring of energy and water consumption	All major building services (i.e. lighting, HVAC equipment, lift, etc.) shall be individually sub-metered.
3.2	*BESS 4.1 Building Users Guide*	To encourage and recognise initiatives that will help building users to use the building efficiently	A simple Building Users' Guide using a non-technical language shall be developed and issued to all building occupants and/or site manager(s). The Building Users' Guide may be a simple booklet and/or a combination of interpretative signage throughout the building with the purpose to facilitate more sustainable behaviour by building occupants.
3.3	*BESS 2.3 Thermal Performance Modelling - Non-Residential*	To encourage and recognise developments that have used modelling to inform passive design at the early design stage	A Section J facade assessment has been carried out using the NCC 2019 DTS facade calculator. Refer to Appendix A.

4. WATER

In Australia, water has long been considered a precious and high-demand resource. Fresh water supplies are increasingly affected by a range of factors including catchment locations, contaminated sources, drought and rising demand. In addition to reducing the demand for water, efficient use of water in buildings can reduce building owners' operational costs. This category aims to minimise the impacts on the environment from extensive water use in the built environment.

Water			
Section Number	**Reference Credit**	**Credit Aim**	**Design Response/ Project Compliance**
4.1	*BESS 1.1 Potable Water Use Reduction*	To encourage building design that minimises potable water consumption in operations.	All sanitary fixtures and water appliances shall have the WELS rating stated below: • Taps – 5 Stars • Toilets – 4 Stars, supplied by rainwater • 5 star dishwasher in kitchen Total of 33,000 litre rainwater storage shall be installed to collect rainwater from all clean roof areas. 50% of this storage is to be dedicated to detention, as per the MUSIC modelling, leaving 16,500 dedicated to reuse for WC flushing and irrigation of up to 200m2 of landscaping.
4.2	*BESS 3.1 Water Efficient Landscaping*		Low water use plants shall be specified for the landscaped areas in the new carpark.

5. ENERGY

Production of Australia's energy is largely from the incineration of non-renewable fossil fuels and is the country's greatest contributor to greenhouse gas emissions. The credits within the Energy Category target an overall reduction of energy consumption. Such reduction has an impact upon greenhouse gas emissions and energy production capacity as well as other emissions associated with energy generation.

Energy			
Section Number	**Reference Credit**	**Credit Aim**	**Design Response/ Project Compliance**
5.1	*BESS 1.1 Thermal Performance Rating – Non-Residential*	To reduce reliance on mechanical systems to achieve thermal comfort in summer and winter, as well as to reduce greenhouse gas emissions, energy demand, and maintenance and operational costs.	A preliminary Section J1-J3 assessment has been conducted. DTS compliance is confirmed – with a min 10% increase in floor and roof performance. For more information on the preliminary assessment refer to Appendix A.
5.2	*BESS 2.1 Greenhouse Gas Emissions* *BESS 2.2 Peak Demand* *BESS 2.3 Electricity Consumption* *BESS 2.4 Gas Consumption*		All air-conditioning systems provided for the development shall have a COP and EER 85% or better than the most efficient equivalent capacity unit available. The 5-6 centre to be supplied with reverse cycle heat pump type VRF units connected to local fan coil units. The Hall shall be supplied with Heating, Cooling Ventilation (HCV) units - A combination of evaporative cooling and ducted gas heating. They also have a free running mode to supply ventilation only.
5.3	*BESS 3.2 Hot Water*		The domestic hot water systems provided for the development shall be 6 star gas fired storage unit, with a recirculating pump..
5.4	*IMAP Energy Efficiency Factsheet*		All external lighting shall be LED and controlled by either (or a combination of) motion detectors, timers and Photo electric (PE) sensors.
5.5	*BESS 3.5 Internal Lighting – Non Residential*		The maximum illumination power density (W/m2) in at least 90% of each of the areas of the relevant building class will meet the requirements in Table J6.2a of the NCC 2019 Vol 1. LED luminaires throughout.
5.6	*BESS Energy 4.2 Renewable Energy Systems - Solar*		A 50,000 kWh PV array shall be installed on the roof and a 100kW battery array within the building.

6. STORMWATER

Continued urbanisation and expansion has resulted in a dramatic increase in areas of hard and impervious surfaces, such as buildings, roads and car parks. This has various negative impacts on waterways and their water quality, as well as on people, fauna and flora.

Best practice stormwater management means incorporating water sensitive urban design strategies such as rainwater tanks, raingardens, porous paving and landscaping to reduce the volume of run-off and the pollutant load on local waterways.

Stormwater			
Section Number	**Reference Credit**	**Credit Aim**	**Design Response/ Project Compliance**
6.1	*BESS 1.1 Stormwater Treatment*	To minimise negative environmental impacts of stormwater runoff and maximise onsite re-use of stormwater	A total of 33,000 litre rainwater storage shall be installed to collect rainwater from all clean roof areas. 50% of this storage is to be dedicated to detention, as per the MUSIC modelling, leaving 16,500 dedicated to reuse for WC flushing and irrigation of up to 200m2 of landscaping. Runoff from the remainder of the designated site for the Senior Centre (including western carpark) known as Site A shall be treated by a SPEL Ecoceptor prior to discharge. Site A was analysed using MUSIC. See below. Runoff from the new southern (Anne St) carpark known as Site B shall be treated by infiltration swales. Site B was analysed using STORM – a score of 219 was achieved – see below. WSUD Modelling report included in Appendix F.

Site A

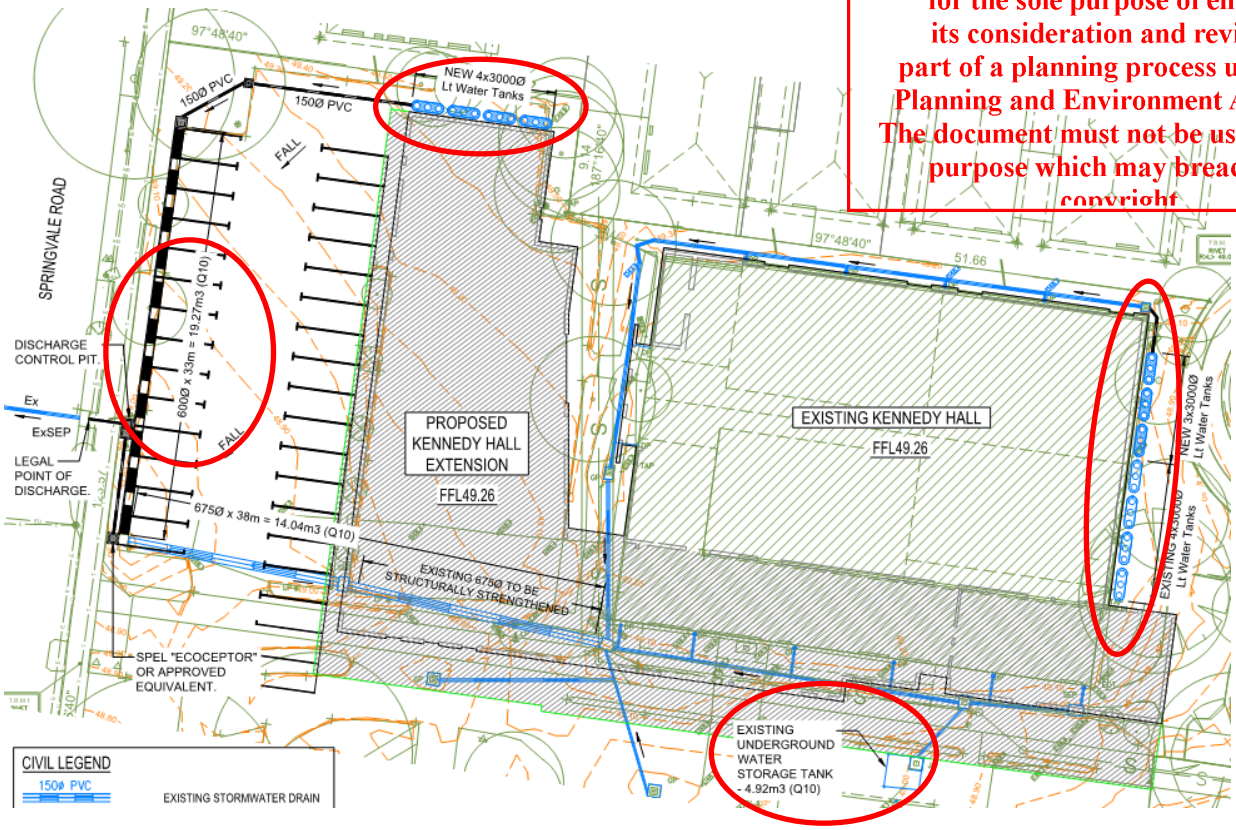


Figure 1 Site plan shows 11x3,000 Rainwater tanks, 4.92m3 detention tank underground and 19.27m3 pipe capacity for detention.

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%

Hi Sean,

In regards to the flow rate, we will meet pre-existing flows with no reduction.ie 0% Flow reduction.

…We have divided the rainwater tanks into three categories;

1. *Above ground tanks (11x3,000) for 50% reuse and 50% detention*
2. *Below ground tanks (4.93m3) for detention*
3. *Below ground pipes (19.27m3) for detention*

….All the tanks sit between the roof and carpark and the SPEL ecoceptor on the treatment train line.

Regards,

Ross McEwan

M.Eng (StructForen), B.Eng (Hons), B.Arts, MIEAust, RBP, RPEQ

Managing Director

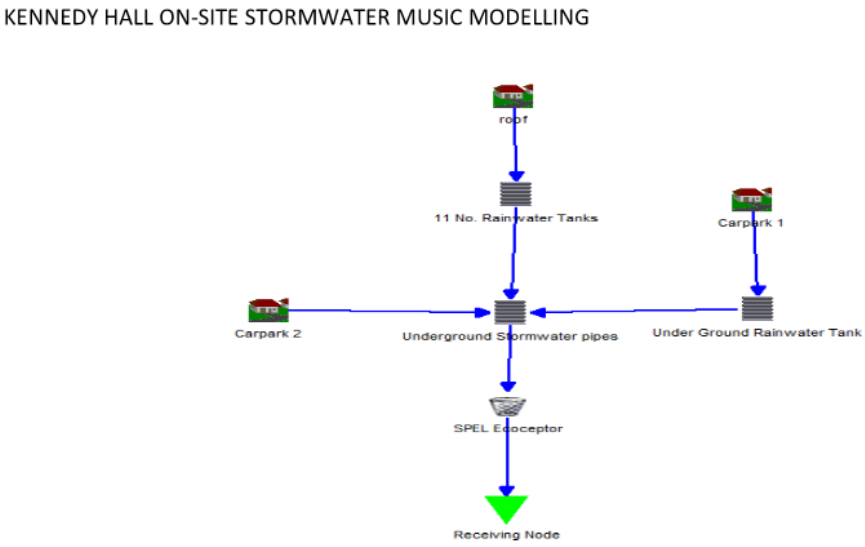
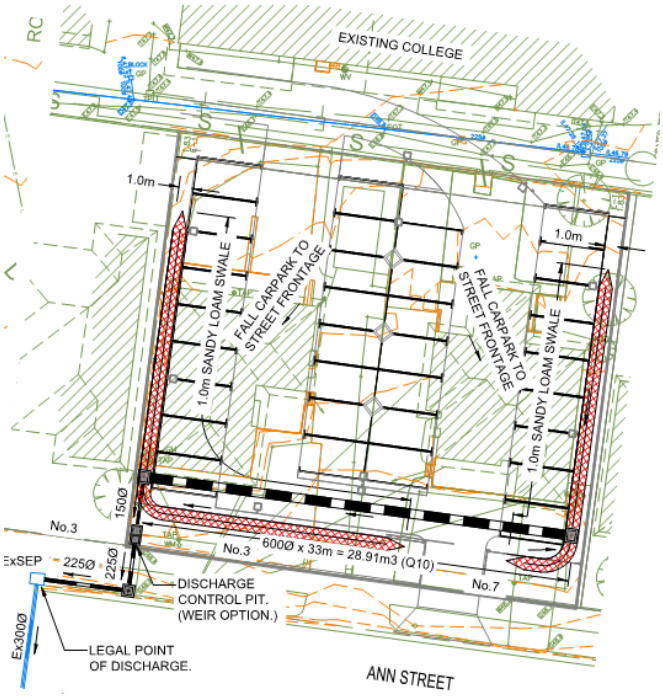


Figure 2 MUSIC Modelled treatment train for Site A.

Site B



ANN STREET CARPARK ON-SITE STORMWATER STORM MODELLING

Melbourne Water

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

7. INDOOR ENVIRONMENT QUALITY

Indoor Environment Quality (IEQ) is a key ESD objective in the provision of a healthy and safe internal building environment for residents. The IEQ category aims to balance other categories, in the sense that reductions in energy consumption could easily be achieved at the expense of occupants' comfort. Yet, occupant comfort is vital and as such the IEQ category encourages healthy and good indoor environmental quality.

Indoor Environment Quality			
Section Number	**Reference Credit**	**Credit Aim**	**Design Response/ Project Compliance**
7.1	*BESS 1.4 Daylight Access – Non-Residential*	To provide a high level of amenity and energy efficiency through design for natural light.	33.2% of the nominated floor area achieves daylight factor greater than 2%. Refer to Appendix B for more information on the daylight assessment.
7.2	*BESS 2.3 Effective Natural Ventilation*	To provide fresh air and passive cooling opportunities.	The sports hall has a hybrid climate control, system consisting of openable louvres/windows, fan forced ventilation as well as heating and tempering evaporative cooling. The Senior Centre has a ducted ventilation system supplying up to a 50% increase over AS 1668:2012 minimums and with a CO2 monitoring and control system that will ensure occupied spaces are kept at a CO2 concentration of no more than 500ppm.
7.3	*BESS 4.1 Air Quality - Non-Residential*	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	All paints, adhesives, sealants and carpets applied on-site shall meet the maximum Total Volatile Organic Compound (TVOC) limits outlined in Appendix C. All engineered wood products including particleboard, plywood, Medium Density Fibreboard (MDF), Laminated Veneer Lumber (LVL), High-Pressure Laminate (HPL), Compact Laminate and decorative overlaid wood panels shall meet the Formaldehyde emission limits outlined in Appendix D.

8. TRANSPORT

The automobile accounts for 54% of Australia's total domestic transport emissions and approximately 80% of adults use a private car to commute to and from work. There is a need to maximise alternative transport options if the environmental impact of car commuting is to be reduced. Options available may include trains, buses and, light rail trams. Walking and cycling are the most environmentally friendly alternatives, with no associated fuel use or pollutants. All credits within the Transport category have the same underlying principle; to reward the reduction in automotive movement by simultaneously discouraging it and encouraging use of alternative transportation.

Transport			
Section Number	**Reference Credit**	**Credit Aim**	**Design Response/ Project Compliance**
8.1	BESS 1.4 Bicycle Parking - Non-Residential	To encourage and recognise initiatives that facilitate cycling	This facility does not bring additional students to campus. School has adequate bike parking on campus already.
8.2	BESS 1.5 Bicycle Parking - Non-Residential Visitor		This facility does not bring additional visitors to campus. School has adequate bike parking on campus already.

9. WASTE

Up to 40% of the waste going to Australia's landfills is related to the construction and demolition of buildings. Simple design decisions can influence the amount of construction waste being produced and operational waste streams being separated.

Even more waste is produced during the occupancy phase of buildings. Poor waste practices and treatment of the environment in the past have not only lead to a degradation of our water, air and land resources but also represent a big financial burden to current and future generations.

Waste			
Section Number	**Reference Credit**	**Credit Aim**	**Design Response/ Project Compliance**
9.1	*BESS Waste 1.1 - Construction Waste - Building Re-Use*	If the development is on a site that has been previously developed, has at least 30% of the existing building been re-used?	75% of the floor plate, half of the roof, wall and structure of the existing sports hall is retained and adapted for reuse in the new Senior college.
9.2	*BESS 2.2 Operational Waste – Convenience of Recycling*	To minimise recyclable material going to landfill	Wherever a general waste bin is provided, a clearly labelled recycling bin shall also be provided.

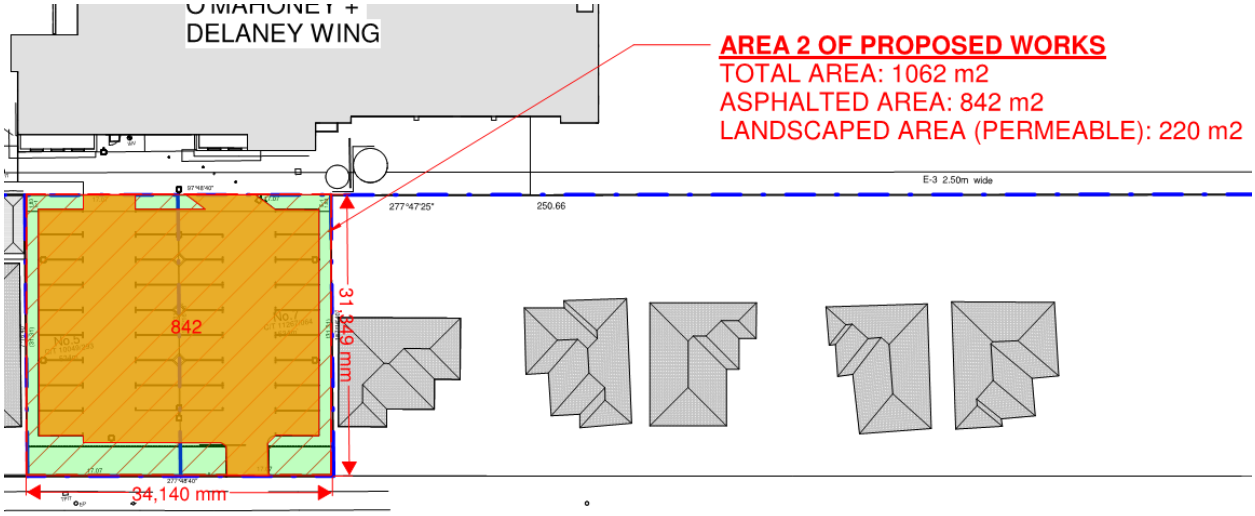
10. URBAN ECOLOGY

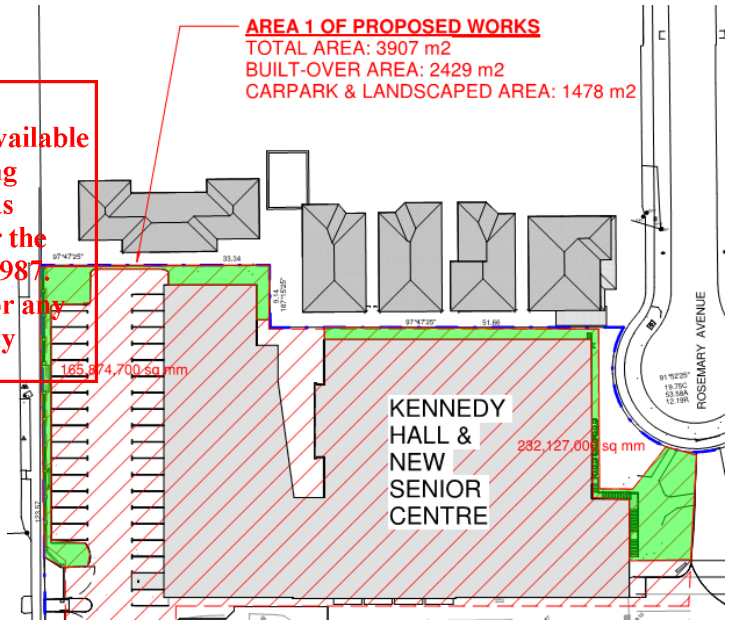
The credits within the Land Use and Ecology category promote initiatives to improve or reduce impacts on ecological systems and biodiversity. The term 'Biodiversity' is used to describe the variation of life forms in a particular ecosystem and is often used as a measure of the health status of the environment.

Many credits in other categories have an indirect impact on the land use and ecology of the Australian environment, for example, the 'Stormwater' category addresses the rainwater run-off from buildings and hard surfaces in an attempt to prevent pollution from reaching nearby natural watercourses. This category, however, addresses the direct impact of a project on the ecological value of the site.

Urban Ecology			
Section Number	**Reference Credit**	**Credit Aim**	**Design Response/ Project Compliance**
10.2	*BESS 2.1 Vegetation*	To encourage and recognise the use of vegetation and landscaping within and around developments.	Approximately 220+165+232m2=617m2. 617/(1062+3907) = 617/4969 = 12% of the site area shall be covered in vegetation.

Mark-ups for vegetated area on site:





11. MATERIALS

The 'Innovation' criteria aims to recognise the implementation of innovative practices, processes and strategies that

The production and use of building materials can have serious impacts on the environment. Energy is used to extract, produce and transport building materials; natural resources are exploited to be used in building materials; the industrial production of the materials causes pollution, and if poorly selected and used the material ends up as waste, to become landfill or incinerated.

Within the Materials category the credits target the consumption of resources through selection and re-use of materials, and efficient management practices. The basic concepts of the category are to reduce the amount of natural resources used, re-use whatever materials can be re-used, and recycle whenever possible.

Materials			
Section Number	**Reference Credit**	**Credit Aim**	**Design Response/ Project Compliance**
11.1	*IMAP Building Materials*	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	All timber used in the building and construction works shall either be: • Certified by a forest certification scheme and be accompanied by a relevant Chain of Custody (CoC) certificate; or • Be from a reused source.
11.2	*IMAP Building Materials*		All permanent formwork, pipes, flooring, blinds and cables in a project shall either: • Not contain PVC and have an Environmental Product Declaration (EPD); or • Meet Best Practice Guidelines for PVC.
11.3	*Green Star 21 Product Transparency and Sustainability*	To encourage sustainability and transparency in product specification.	Products and manufacturers complying with the following standards and certifications shall be chosen in preference to non-compliance choices, where they are equally suitable for use and selection does not impact the project budget: • Products with a product-specific, third-party verified EPD; • Products with a industry-wide, third-party verified EPD; • Carpet Institute of Australia Environmental Certification Scheme (ECS); • Ecospecifier Green Tag GreenRate; • Australasian Furnishing Research and Development Institute Green Tick; • Good Environmental Choice Australia; • The institute for Market Transformation to Sustainability Sustainable Materials Rating Technology; • Manufacturer Environmental Management System (ISO14001); • Manufacturer certified to SA8000 social accountability standard or GeSI management standards; and • Products certified to Fairtrade Mark.
11.4	*IMAP Construction and Building Management*	To reward projects that reduce construction waste going to landfill by reusing or recycling building materials.	At least 70% of the waste generated during construction and demolition shall be diverted from landfill. This commitment shall be included in the contractual documentation.

12. INNOVATION

The 'Innovation' criteria aims to recognise the implementation of innovative practices, processes and strategies that promote sustainability in the built environment.

The 'Innovation' criteria also rewards projects that can demonstrate that sustainability principles have been incorporated not at a project level, but also in a broader sense. This may include, for instance, collaboration between building owners and tenants, disclosure of the financial impacts of sustainability or delivering sustainable education content to site workers.

Innovation			
Section Number	**Reference Credit**	**Credit Aim**	**Design Response/ Project Compliance**
12.1	*Inn-1*	To encourage design features and technologies that are not recognised elsewhere within BESS because they are new to Victoria, or because they go well beyond the best practice standard in BESS.	100kW battery array and a 50kW PV array are proposed in order to avoid having to upgrade the power supply to the site (new substation) and the main switchboard. Thus operational greenhouse gas emissions are reduced, as are those embodied in the creation of the substantial electrical infrastructure. 2 points claimed.

13. CONCLUSION

This report outlines the range of ESD initiatives that have been included in the design of the proposed new Senior Centre, Killester College, 427-442 Springvale Road, Springvale.

The development proposal demonstrates a holistic approach to sustainable urban development that addresses the ESD objectives of the City of Greater Dandenong.

A copy of the BESS scorecard used to complete this assessment in accordance to the City of Greater Dandenong Planning Scheme is attached in Appendix E.

APPENDIX A – PRELIMINARY ENERGY EFFICIENCY ASSESSMENT

Table 1 outlines the assumptions that have been included in the preliminary Section J1 assessment and the results obtained.

General Building Parameters	
Address	427-442 Springvale Road, Springvale
Climate Zone	6
Building Class	9b
Total Floor Area	8,624m^2 of which 397m^2 are conditioned

Building Fabric Parameters			
Element	**DTS Description**	**Compliance**	**Comments**
J1.3 Roof and ceiling	External roof and ceiling part of the thermal envelope. R3.2+10% required.	Min R_T 3.55 (downwards) including renewed roof to hall. See performance calculations below.	These requirements apply to the existing and well as new structure.
J1.4 Roof lights	Roof lights part of the envelope	N/A	
J1.5 Walls	External walls part of the envelope must achieve at least R1.4	R_T 1.95 for new. Existing brick walls of sports hall to be insulated and newly lined. See performance calculations below.	
	Internal walls part of the envelope must achieve at least R1.4	R_T 1.95	
J1.5Glazing	Glazing – Combined façade (glazing and wall) must achieve U<2.0 and AC energy<205 (method 2).	Achieved using U3.0 SHGC 0.5 new and U5.8 SHGC 0.65 for existing glazing to north wall of hall. See façade calculator below.	
J1.6 Floors	Slab on Ground R2.0+10% required	R 2.6+ achieved. See slab on ground calculation below.	Ratio of floor area to floor perimeter = 12, giving equivalent slab on ground R2.6+
	Suspended Slab (between a conditioned and an unconditioned space)	R_T2.4	To exposed soffits of upper level overhangs and undercroft.

Table 1: Preliminary DTS assessment construction details

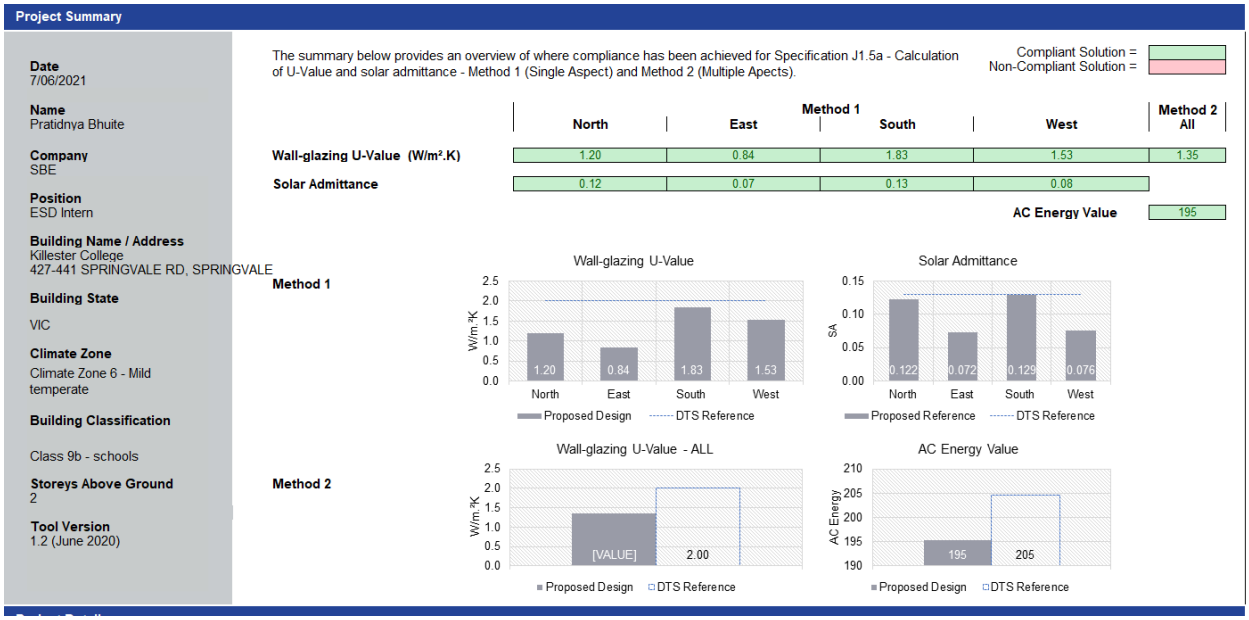


Figure 3 Project Summary - Facade Calculator - showing compliance with DTS methods 1 and 2.

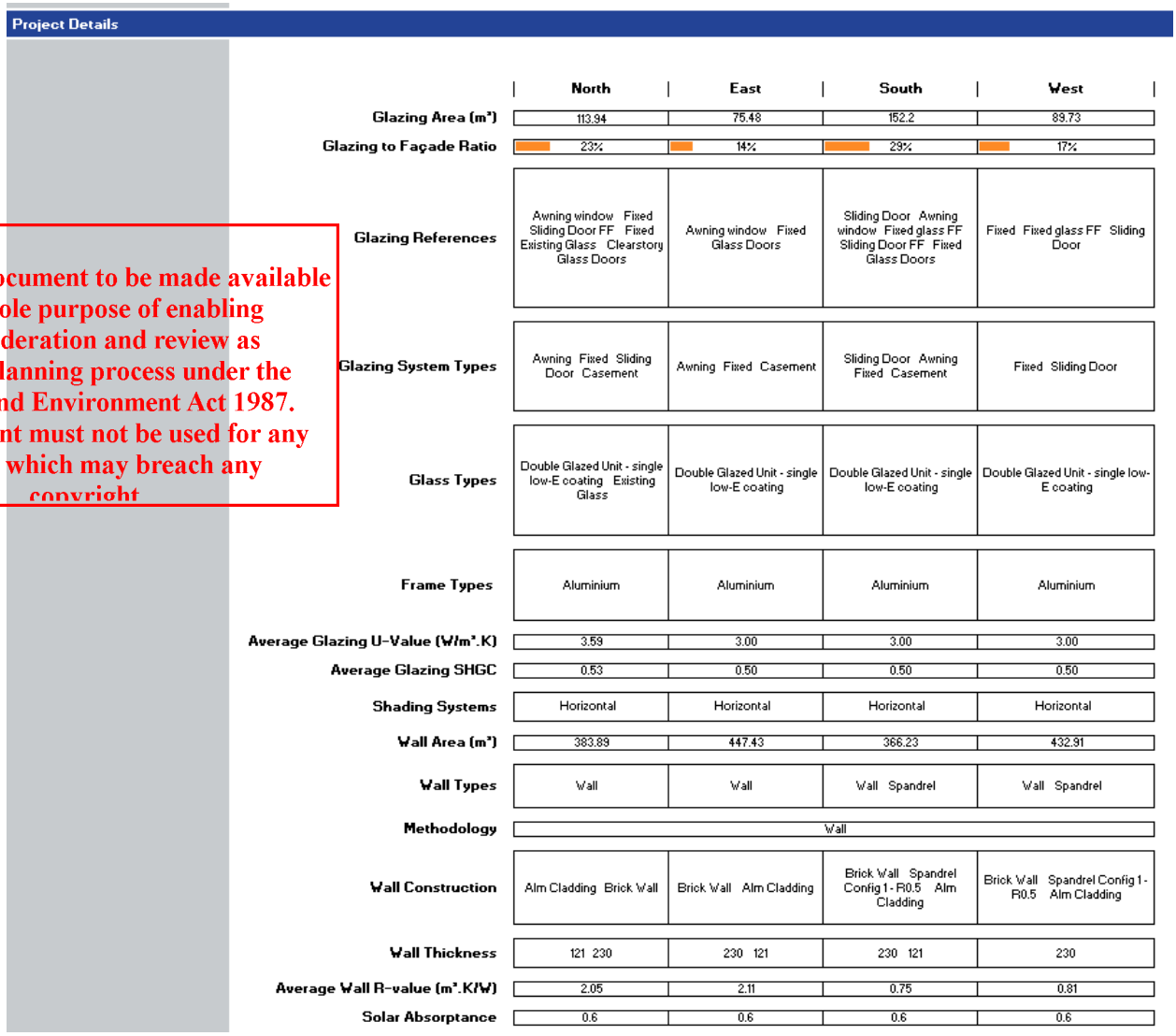
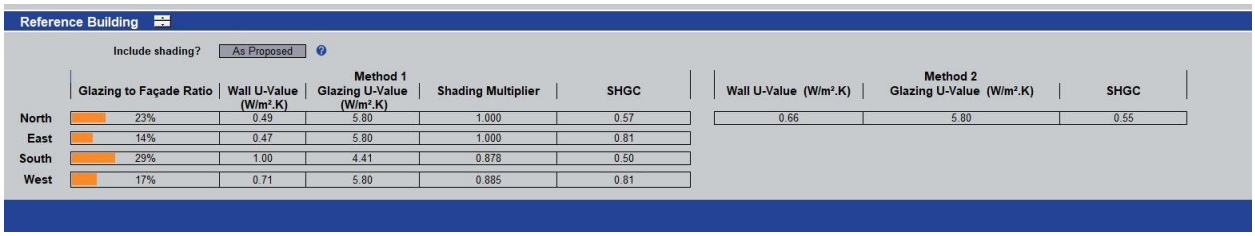


Figure 4 Project Details for each facade

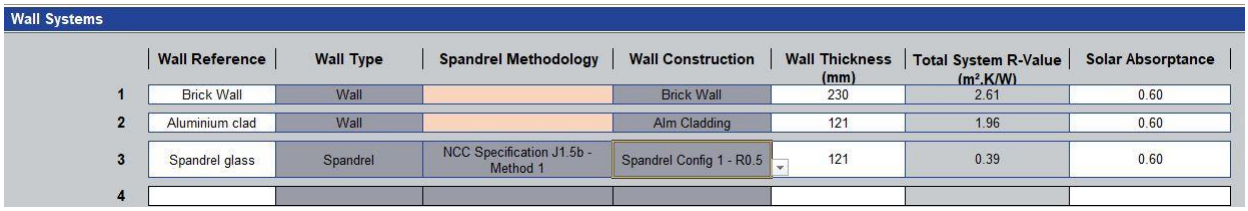


Reference Building

Include shading? As Proposed

	Glazing to Façade Ratio	Method 1 Wall U-Value (W/m².K)	Method 1 Glazing U-Value (W/m².K)	Method 1 Shading Multiplier	Method 1 SHGC	Method 2 Wall U-Value (W/m².K)	Method 2 Glazing U-Value (W/m².K)	Method 2 SHGC
North	23%	0.49	5.80	1.000	0.57	0.66	5.80	0.55
East	14%	0.47	5.80	1.000	0.81			
South	29%	1.00	4.41	0.878	0.50			
West	17%	0.71	5.80	0.885	0.81			

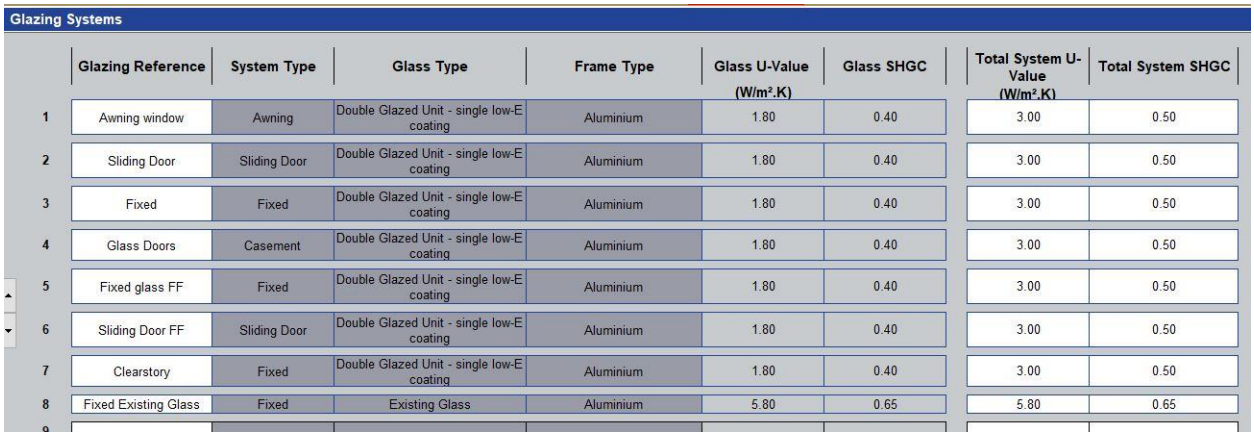
Figure 5 Reference Building



Wall Systems

	Wall Reference	Wall Type	Spandrel Methodology	Wall Construction	Wall Thickness (mm)	Total System R-Value (m².K/W)	Solar Absorptance
1	Brick Wall	Wall		Brick Wall	230	2.61	0.60
2	Aluminium clad	Wall		Alm Cladding	121	1.96	0.60
3	Spandrel glass	Spandrel	NCC Specification J1.5b - Method 1	Spandrel Config 1 - R0.5	121	0.39	0.60
4							

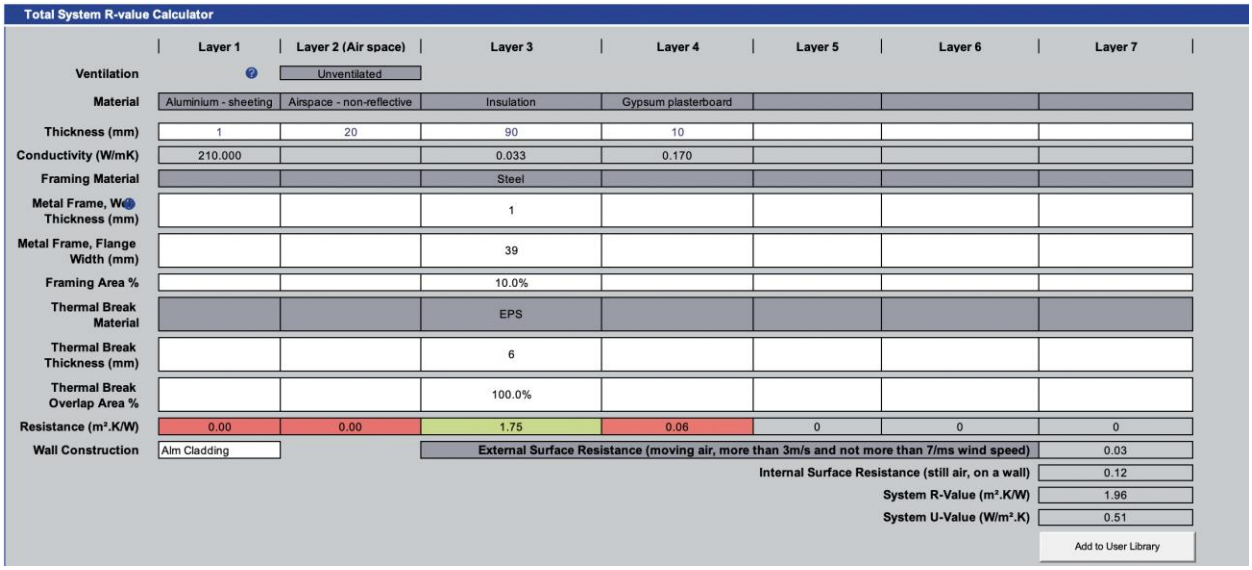
Figure 6 Wall type entries



Glazing Systems

	Glazing Reference	System Type	Glass Type	Frame Type	Glass U-Value (W/m².K)	Glass SHGC	Total System U-Value (W/m².K)	Total System SHGC
1	Awning window	Awning	Double Glazed Unit - single low-E coating	Aluminium	1.80	0.40	3.00	0.50
2	Sliding Door	Sliding Door	Double Glazed Unit - single low-E coating	Aluminium	1.80	0.40	3.00	0.50
3	Fixed	Fixed	Double Glazed Unit - single low-E coating	Aluminium	1.80	0.40	3.00	0.50
4	Glass Doors	Casement	Double Glazed Unit - single low-E coating	Aluminium	1.80	0.40	3.00	0.50
5	Fixed glass FF	Fixed	Double Glazed Unit - single low-E coating	Aluminium	1.80	0.40	3.00	0.50
6	Sliding Door FF	Sliding Door	Double Glazed Unit - single low-E coating	Aluminium	1.80	0.40	3.00	0.50
7	Clearstory	Fixed	Double Glazed Unit - single low-E coating	Aluminium	1.80	0.40	3.00	0.50
8	Fixed Existing Glass	Fixed	Existing Glass	Aluminium	5.80	0.65	5.80	0.65

Figure 7 New and existing glazing entries.



Total System R-value Calculator

	Layer 1	Layer 2 (Air space)	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7
Ventilation		Unventilated					
Material	Aluminium - sheeting	Airspace - non-reflective	Insulation	Gypsum plasterboard			
Thickness (mm)	1	20	90	10			
Conductivity (W/mK)	210.000		0.033	0.170			
Framing Material			Steel				
Metal Frame, Web Thickness (mm)			1				
Metal Frame, Flange Width (mm)			39				
Framing Area %			10.0%				
Thermal Break Material			EPS				
Thermal Break Thickness (mm)			6				
Thermal Break Overlap Area %			100.0%				
Resistance (m².K/W)	0.00	0.00	1.75	0.06	0	0	0
Wall Construction	Alm Cladding		External Surface Resistance (moving air, more than 3m/s and not more than 7/ms wind speed)				0.03
						Internal Surface Resistance (still air, on a wall)	0.12
						System R-Value (m².K/W)	1.96
						System U-Value (W/m².K)	0.51
							Add to User Library

Figure 8 New wall construction assumptions

Total System R-value Calculator

	Layer 1	Layer 2 (Air space)	Layer 3	Layer 4	Layer 5	Layer 6	Layer 7
Ventilation		Unventilated					
Material	Clay brick - 2.75kg	Airspace - 20mm, inner surface 0.05 emittance	R 2.7	Gypsum plasterboard			
Thickness (mm)	110	20	90	10			
Conductivity (W/mK)	0.550	n/a	0.033	0.170			
Framing Material			Steel				
Metal Frame, W Thickness (mm)			1				
Metal Frame, Flange Width (mm)			50				
Framing Area %			10.0%				
Thermal Break Material							
Thermal Break Thickness (mm)							
Thermal Break Overlap Area %							
Resistance (m².K/W)	0.20	0.00	2.20	0.06	0	0	0
Wall Construction	Brick wall		External Surface Resistance (moving air, more than 3m/s and not more than 7/ms wind speed)				0.03
						Internal Surface Resistance (still air, on a wall)	0.12
						System R-Value (m².K/W)	2.61
						System U-Value (W/m².K)	0.38
							Add to User Library

Figure 9 Brick wall construction assumptions

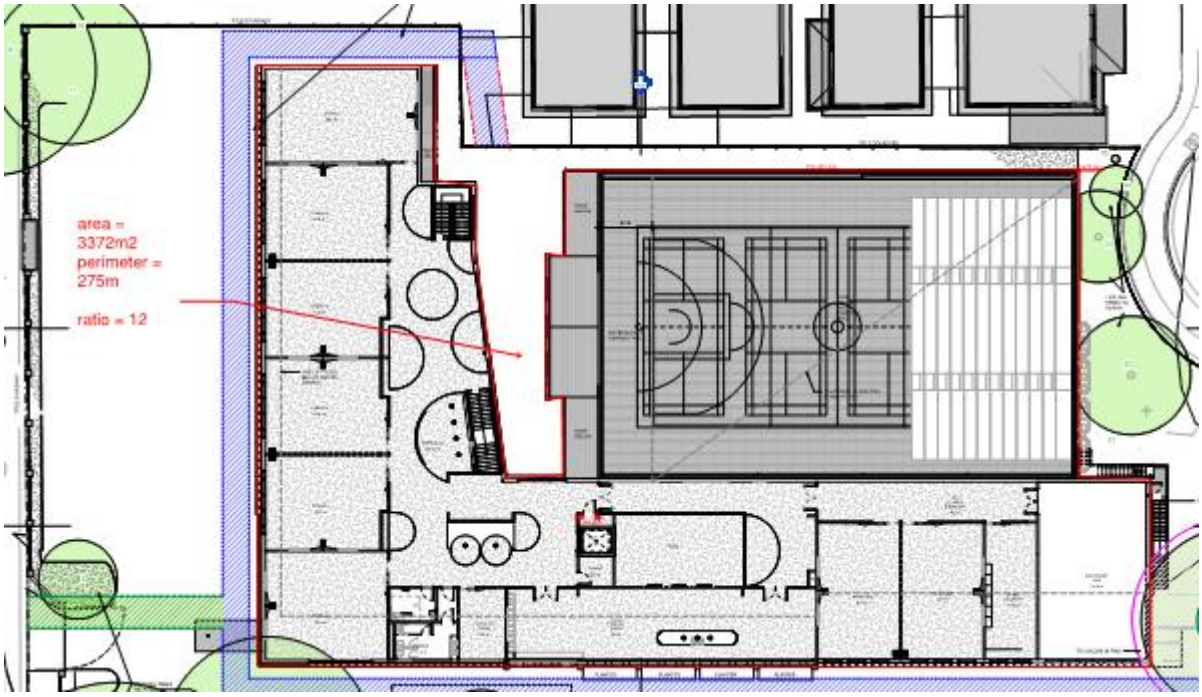


Figure 10 Floor area and perimeter ratio calculation

Table 2b R-Value of soil in contact with a floor

Ratio of *floor area* to floor perimeter (m)	Wall thickness of 50 mm	Wall thickness of 100 mm	Wall thickness of 150 mm	Wall thickness of 200 mm	Wall thickness of 250 mm	Wall thickness of 300 mm
1.0	0.4	0.5	0.5	0.6	0.7	0.8
1.5	0.6	0.7	0.7	0.8	0.9	1.0
2.0	0.7	0.8	0.9	1.0	1.1	1.3
2.5	0.9	1.0	1.1	1.2	1.3	1.5
3.0	1.0	1.2	1.3	1.4	1.5	1.7
3.5	1.2	1.3	1.5	1.6	1.7	1.9
4.0	1.3	1.5	1.6	1.7	1.9	2.2
4.5	1.5	1.7	1.8	1.9	2.1	2.4
5.0	1.6	1.8	2.0	2.1	2.3	2.6
5.5	1.8	2.0	2.1	2.2	2.4	2.8
6.0	1.9	2.1	2.3	2.4	2.6	2.9
6.5	2.0	2.3	2.4	2.6	2.8	3.1

Ratio of *floor area* to floor perimeter (m)	Wall thickness of 50 mm	Wall thickness of 100 mm	Wall thickness of 150 mm	Wall thickness of 200 mm	Wall thickness of 250 mm	Wall thickness of 300 mm
7.0	2.2	2.4	2.6	2.7	3.0	3.3

Note to Table 2b: Where a wall thickness or ratio of *floor area* to floor perimeter is between the values stated, interpolation may be used to determine the soil R-Value.

R>2.6+ achieved

Figure 11 Slab on ground R value equivalent calculation (based on ratio calculated above). Note table does not extend to a ratio of 12, so this is a conservative assessment.

Roof Type -	1	Flat Metal Roof with Suspended Ceiling	
Material	**Thickness (mm)**	**Thermal Conductivity (W/m.K)**	**Thermal Resistance (m^2.K/W)**
External Surface Resistance	-	-	0.03
Steel Roof Sheeting	0.42	47.50	0.00
Anticon 140	140	0.042	3.30
Unventilated Reflective Air Gap	Varies	-	0.17
Plaster board Ceiling Tiles	10	0.170	0.06
Internal Surface Resistance	-	-	0.16
		System R-Value	**3.56**
		System R-Value	**0.28**

Roof Type -	2	Flat Metal Roof with Raked Ceiling	
Material	**Thickness (mm)**	**Thermal Conductivity (W/m.K)**	**Thermal Resistance (m^2.K/W)**
External Surface Resistance	-	-	0.03
Steel Roof Sheeting	0.42	47.50	0.00
Anticon 140	140	0.042	3.30
Plaster board Ceiling Tiles	10	0.170	0.06
Internal Surface Resistance	-	-	0.16
		System R-Value	**3.55**
		System U-Value	**0.28**

Figure 12 Roof constructions

APPENDIX B – DAYLIGHT ASSESSMENT

Table 3 and 4 outline the assumptions that have been included in the daylight assessment and the results obtained.

General Building Simulation Parameters	
Address	427-442 Springvale Road, Springvale
Terrain Type	Open
Climate Zone	6
Building Class	9b
Sky	10,000 Lux CIE overcast sky
Working Plane	Floor level
Software	IES VE 2021.0.2.0
Application	FlucsDL
Assessed Areas	• Classrooms, break out spaces, exercise spaces, sports hall, offices • Amenities, circulation and back of house excluded.
Total Assessed Floor Area	2,891m2

Building Element Parameters	
Element	**Reflectance**
Floor	0.30
Wall	0.70
Ceiling	0.75
Roof	0.30
Ground	0.30
Glazing (VLT)	0.70
Skylight (VLT)	NA

Shading Elements	
Element	**Description**
Overshadowing	Neighbouring buildings are included in the model.
Local shading	All balconies, canopies, overhangs and reveals have been modelled as per the architectural drawings.

Table 2: Daylight simulation parameters

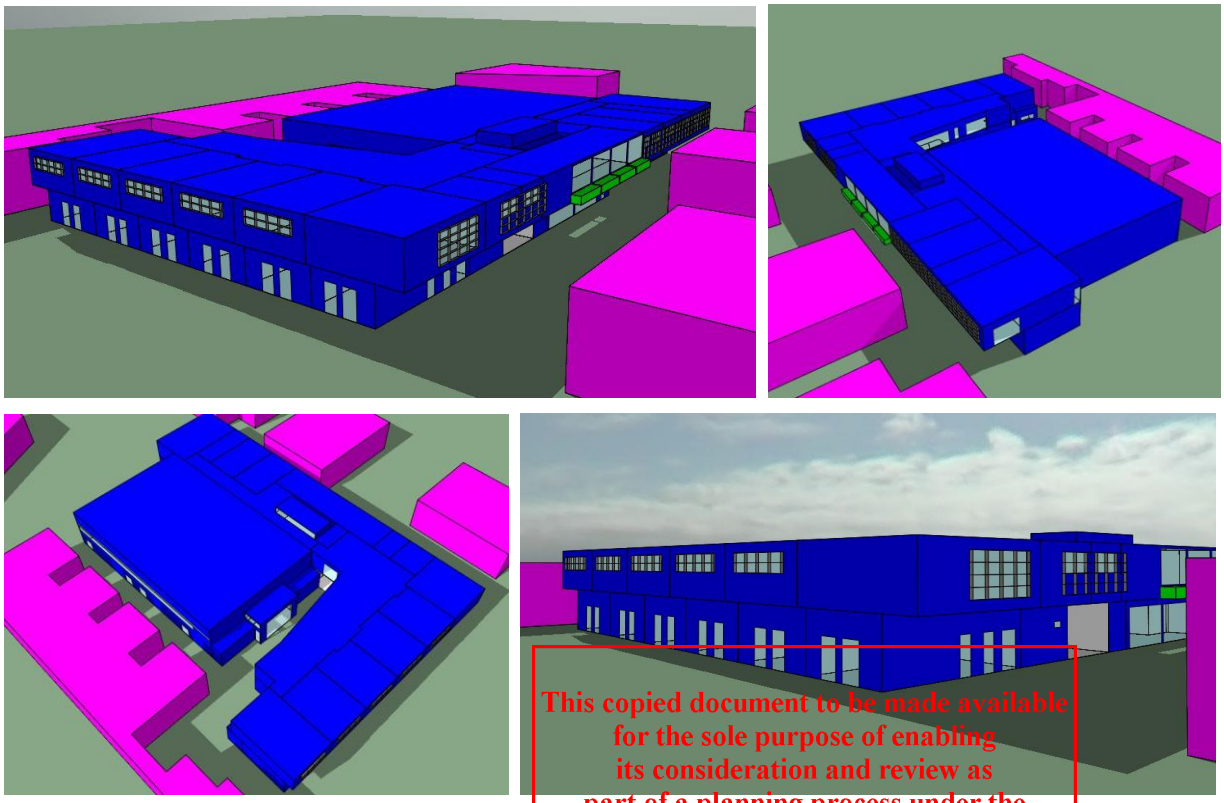


Figure 13 Daylight Model Images

Threshold Calculation

Building Results

Total floor area (m^2)	Total floor area above threshold (m^2)	Percentage floor area above threshold (%)	Area-weighted average daylight factor (%)	Area-weighted average illumination (lux)
2891.741	959.414	33.2	2.2	218.677

Table 3: Daylight assessment results

The following overlays show the extent of nominated floor area across which the desired daylight factor (2%) is achieved.

Figure 14: Ground Floor. Areas in green have a DF>2%.

Figure 15 First Floor. Areas in green have a DF>2%.

APPENDIX C – PAINTS, ADHESIVE, SEALANTS AND CARPETS

The following TVOC limits are applicable to all internal applications of all types of paints, adhesives or sealants applied on-site, including both exposed and concealed applications. If exterior grade products are used in an internal application then these must also meet the requirements.

The following items are excluded from this credit:

- Glazing film, tapes, and plumbing pipe cements;
- Products used in car park;
- Paints, adhesives and sealants used off-site, for example applied to furniture items in a manufacturing site and later installed in the fitout; and
- Adhesives and mastics used for temporary formwork and other temporary installations.

Product Type	Maximum TVOC Content (g/litre of ready to use product)
General purpose adhesive and sealants	50
Interior wall and ceiling paints, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealants, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100

Table 4: Maximum TVOC Limits for Paints, Adhesives and Sealants

Further, carpets used in the project must either be:

- Certified under a recognised Product Certification Scheme (listed on the GBCA website) or other recognised standards; or
- Compliant with the Total VOC (TVOC) limits specified in the table below.

Product Type	Maximum TVOC Content (g/litre of ready to use product)
ASTM D5116 – Total VOC limit	0.5mg/m2 per hour
ASTM D5116 – 4-PC (4 – Phenylcyclohexene)	0.05mg/m2 per hour
ISO 16000 / EN 13419 – TVOC at three days	0.5mg/m2 per hour
ISO 10580 / ISO/TC 219 (Document N238) – TVOC at 24 hours	0.5mg/m2 per hour

Table 5: Carpet Test Standards and TVOC Emissions Limits

APPENDIX D – ENGINEERED WOOD PRODUCTS

The term "engineered wood products" includes composite wood products and includes raw/ unfinished as well as finished products. Items not covered by these limits include products used in exterior applications, formwork, internal car park applications, re-used products, and raw timber. All emission levels must be established by a NATA or ISO/IEC 17025 registered laboratory as per the testing methodologies in the table above.

Test Protocol	Emission Limit / Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1.0 mg/L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.0 mg/L
AS/NZS 4357.4 – Laminated Veneer Lumber (LVL)	≤1.0 mg/L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1.0 mg/L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1.0 mg/L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1.0 mg/L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/ m²hr
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1mg/m²hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m²hr (at 3 days)
ASTM D6007	≤0.12mg/m³**
ASTM E1333	≤0.12mg/m³***
EN 717-1 (also known as DIN EN 717-1)	≤0.12 mg/m³
EN 717-2 (also known as DIN EN 717-2)	≤3.5 mg/m²hr
**The test report must confirm that the conditions of this table comply for the particular wood product type, the final results must be presented in EN 717-1 equivalent (as presented in the table) using the correlation ratio of 0.98.	
*** The final results must be presented in EN 717-1 equivalent (as presented in the table), using the correlation ratio of 0.98.	

Table 6: Formaldehyde emission limit values for engineered wood products

APPENDIX E – BESS SCORECARD

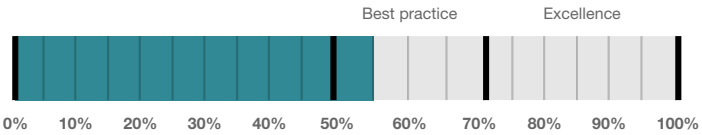
BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 427-441 Springvale Rd Springvale VIC 3171. The BESS report and accompanying documents and evidence are submitted in response to the requirement for a Sustainable Design Assessment or Sustainability Management Plan at Greater Dandenong City Council.

Note that where a Sustainability Management Plan is required, the BESS report must be accompanied by a report that further demonstrates the development's potential to achieve the relevant environmental performance outcomes and documents the means by which the performance outcomes can be achieved.

Your BESS Score



58%

Project details

Address	427-441 Springvale Rd Springvale VIC 3171
Project no	62FEADB8-R1
BESS Version	BESS-6
Site type	Non-residential development
Account	sean.mcardle@sbe.com.au
Application no.	
Site area	5,240 m²
Building floor area	3,372.0 m²
Date	21 June 2021
Software version	1.7.0-B.363

Performance by category

Buildings

Name	Height	Footprint	% of total footprint
Kennedy Hall and Senior Centre	2	3,372 m²	100%

Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	Building	% of total area
Public building				
Senior Centre	1	2,434 m²	Kennedy Hall and Senior Centre	72%
Hall	1	938 m²	Kennedy Hall and Senior Centre	27%
Total	**2**	**3,372 m²**	**100%**	

Credit summary

Management Overall contribution 4.5%

		42%
1.1 Pre-Application Meeting		0%
2.3 Thermal Performance Modelling - Non-Residential		50%
3.2 Metering	N/A	Scoped Out
	NA - all spaces owned and operated by school	
3.3 Metering		100%
4.1 Building Users Guide		100%

Water Overall contribution 9.0%

	Minimum required 50%	57%	✔ Pass
1.1 Potable water use reduction		60%	
3.1 Water Efficient Landscaping		100%	
4.1 Building Systems Water Use Reduction		0%	

Energy Overall contribution 27.5%

	Minimum required 50%	70%	✔ Pass
1.1 Thermal Performance Rating - Non-Residential		37%	
2.1 Greenhouse Gas Emissions		100%	
2.2 Peak Demand		100%	
2.3 Electricity Consumption		100%	
2.4 Gas Consumption		100%	
3.1 Carpark Ventilation	N/A		Scoped Out
	at grade		
3.2 Hot Water		100%	
3.7 Internal Lighting - Non-Residential		100%	
4.1 Combined Heat and Power (cogeneration / trigeneration)	N/A		Scoped Out
	No cogeneration or trigeneration system in use.		
4.2 Renewable Energy Systems - Solar		100%	
4.4 Renewable Energy Systems - Other	N/A		Disabled
	No other (non-solar PV) renewable energy is in use.		

Stormwater Overall contribution 13.5%

	Minimum required 100%	100%	✔ Pass
1.1 Stormwater Treatment		100%	

IEQ Overall contribution 16.5%

Minimum required 50%	50%	✔ Pass
1.4 Daylight Access - Non-Residential	33%	✔ Achieved
2.3 Ventilation - Non-Residential	83%	✔ Achieved
3.4 Thermal comfort - Shading - Non-residential	0%	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential	50%	
4.1 Air Quality - Non-Residential	100%	

Transport Overall contribution 9.0%

	33%	
1.4 Bicycle Parking - Non-Residential	100%	
1.5 Bicycle Parking - Non-Residential Visitor	100%	
1.6 End of Trip Facilities - Non-Residential	N/A	⊘ Disabled
	Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure	0%	
2.2 Car Share Scheme	0%	
2.3 Motorbikes / Mopeds	0%	

Waste Overall contribution 5.5%

	66%	
1.1 - Construction Waste - Building Re-Use	100%	
2.1 - Operational Waste - Food & Garden Waste	0%	
2.2 - Operational Waste - Convenience of Recycling	100%	

Urban Ecology Overall contribution 5.5%

	37%	
1.1 Communal Spaces	100%	
2.1 Vegetation	50%	
2.2 Green Roofs	0%	
2.3 Green Walls and Facades	0%	
3.2 Food Production - Non-Residential	0%	

Innovation Overall contribution 9.0%

	20%	
1.1 Innovation	20%	

Credit breakdown

Management Overall contribution 2%

1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 42.9% towards the category score.	
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?	
Question	Criteria Achieved ?	
Project	No	
2.3 Thermal Performance Modelling - Non-Residential		50%
Score Contribution	This credit contributes 28.6% towards the category score.	
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2019 Section J1.5?	
Question	Criteria Achieved ?	
Public building	Yes	
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2019 Section J (Energy Efficiency), NABERS or Green Star?	
Question	Criteria Achieved ?	
Public building	No	
3.2 Metering		N/A ◈ Scoped Out
This credit was scoped out	NA - all spaces owned and operated by school	
3.3 Metering		100%
Score Contribution	This credit contributes 14.3% towards the category score.	
Criteria	Have all major common area services been separately submetered?	
Question	Criteria Achieved ?	
Public building	Yes	
4.1 Building Users Guide		100%
Score Contribution	This credit contributes 14.3% towards the category score.	
Criteria	Will a building users guide be produced and issued to occupants?	
Question	Criteria Achieved ?	
Project	Yes	

Water

Overall contribution 5% Minimum required 50%

Water Approach		
What approach do you want to use for Water?		Use the built in calculation tools
Project Water Profile Question		
Do you have a reticulated third pipe or an on-site water recycling system?		No
Are you installing a swimming pool?		No
Are you installing a rainwater tank?		Yes
Water fixtures, fittings and connections		
Building	All	Kennedy Hall and Senior Centre
Showerhead	All	Scope out
Bath	All	Scope out
Kitchen Taps	All	>= 5 Star WELS rating
Bathroom Taps	All	>= 5 Star WELS rating
Dishwashers	Senior Centre	>= 5 Star WELS rating
	Hall	Scope out
WC	All	>= 4 Star WELS rating
Urinals	All	Scope out
Washing Machine Water Efficiency	All	Scope out
Which non-potable water source is the dwelling/space connected to?	Senior Centre	senior RWT
	Hall	Hall RWT
Non-potable water source connected to Toilets	All	Yes
Non-potable water source connected to Laundry (washing machine)	All	No
Non-potable water source connected to Hot Water System	All	No
Rainwater Tanks		
What is the total roof area connected to the rainwater tank?	senior RWT	1,355 m²
	Hall RWT	869 m²
Tank Size	senior RWT	10,500 Litres
	Hall RWT	6,000 Litres
Irrigation area connected to tank	senior RWT	100 m²
	Hall RWT	100 m²
Is connected irrigation area a water efficient garden?	senior RWT	No
	Hall RWT	No
Other external water demand connected to tank?	senior RWT	0.0 Litres/Day
	Hall RWT	0.0 Litres/Day

1.1 Potable water use reduction		60%
Score Contribution	This credit contributes 71.4% towards the category score.	
Criteria	What is the reduction in total potable water use due to efficient fixtures, appliances, rainwater use and recycled water use? To achieve points in this credit there must be >25% potable water reduction.	
Output	Reference	
Project	6164 kL	
Output	Proposed (excluding rainwater and recycled water use)	
Project	4542 kL	
Output	Proposed (including rainwater and recycled water use)	
Project	3679 kL	
Output	% Reduction in Potable Water Consumption	
Project	40 %	
Output	% of connected demand met by rainwater	
Project	40 %	
Output	How often does the tank overflow?	
Project	Very Often	
Output	Opportunity for additional rainwater connection	
Project	664 kL	
3.1 Water Efficient Landscaping		100%
Score Contribution	This credit contributes 14.3% towards the category score.	
Criteria	Will water efficient landscaping be installed?	
Question	Criteria Achieved ?	
Project	Yes	
4.1 Building Systems Water Use Reduction		0%
Score Contribution	This credit contributes 14.3% towards the category score.	
Criteria	Where applicable, have measures been taken to reduce potable water consumption by >80% in the buildings air-conditioning chillers and when testing fire safety systems?	
Question	Criteria Achieved ?	
Project	No	

Energy Overall contribution 19% Minimum required 50%

Use the BESS Deem to Satisfy (DtS) method for Energy?		Yes
Do all exposed floors and ceilings (forming part of the envelope) demonstrate a minimum 10% improvement in required NCC2019 insulation levels (total R-value upwards and downwards)?		Yes
Does all wall and glazing demonstrate meeting the required NCC2019 facade calculator (or better than the total allowance)?		Yes
Are heating and cooling systems within one Star of the most efficient equivalent capacity unit available, or Coefficient of Performance (CoP) & Energy Efficiency Ratios (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available?		Yes
Are water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit?		Yes
Are you installing a cogeneration or trigeneration system?		No
Non-Residential Building Energy Profile		
Heating, Cooling & Comfort Ventilation - Electricity - reference fabric and reference services		-
Heating, Cooling & Comfort Ventilation - Electricity - proposed fabric and reference services		-
Heating, Cooling & Comfort Ventilation - Electricity - proposed fabric and proposed services		-
Heating - Gas - reference fabric and reference services		-
Heating - Gas - proposed fabric and reference services		-
Heating - Gas - proposed fabric and proposed services		-
Heating - Wood - reference fabric and reference services		-
Heating - Wood - proposed fabric and reference services		-
Heating - Wood - proposed fabric and proposed services		-
Hot Water - Electricity - Baseline		-
Hot Water - Electricity - Proposed		-
Hot Water - Gas - Baseline		-
Hot Water - Gas - Proposed		-
Lighting - Baseline		-
Lighting - Proposed		-
Peak Thermal Cooling Load - Baseline		-
Peak Thermal Cooling Load - Proposed		-
Solar Photovoltaic system		
System Size (lesser of inverter and panel capacity)	Hall Array	50.0 kW peak
Orientation (which way is the system facing)?	Hall Array	North
Inclination (angle from horizontal)	Hall Array	30.0 Angle (degrees)
1.1 Thermal Performance Rating - Non-Residential		37%
Score Contribution	This credit contributes 40.0% towards the category score.	
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC 2019 Section J)?	

2.1 Greenhouse Gas Emissions		100%	
Score Contribution	This credit contributes 10.0% towards the category score.		
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?		
2.2 Peak Demand		100%	
Score Contribution	This credit contributes 5.0% towards the category score.		
Criteria	What is the % reduction in instantaneous (peak-hour) demand against the benchmark?		
2.3 Electricity Consumption		100%	
Score Contribution	This credit contributes 10.0% towards the category score.		
Criteria	What is the % reduction in annual electricity consumption against the benchmark?		
2.4 Gas Consumption		100%	
Score Contribution	This credit contributes 10.0% towards the category score.		
Criteria	What is the % reduction in annual gas consumption against the benchmark?		
3.1 Carpark Ventilation		N/A	Scoped Out
This credit was scoped out	at grade		
3.2 Hot Water		100%	
Score Contribution	This credit contributes 5.0% towards the category score.		
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?		
3.7 Internal Lighting - Non-Residential		100%	
Score Contribution	This credit contributes 10.0% towards the category score.		
Criteria	Does the maximum illumination power density (W/m2) in at least 90% of the area of the relevant building class meet the requirements in Table J6.2a of the NCC 2019 Vol 1?		
Question	Criteria Achieved ?		
Public building	Yes		
4.1 Combined Heat and Power (cogeneration / trigeneration)		N/A	Scoped Out
This credit was scoped out	No cogeneration or trigeneration system in use.		
4.2 Renewable Energy Systems - Solar		100%	
Score Contribution	This credit contributes 5.0% towards the category score.		
Criteria	What % of the estimated energy consumption of the building class it supplies does the solar power system provide?		
Output	Solar Power - Energy Generation per year		
Public building	65,152 kWh		
Output	% of Building's Energy		
Public building	52 %		
4.4 Renewable Energy Systems - Other		N/A	Disabled
This credit is disabled	No other (non-solar PV) renewable energy systems		

Stormwater

Overall contribution 14% Minimum required 100%

Which stormwater modelling are you using?		MUSIC or other modelling software
1.1 Stormwater Treatment		100%
Score Contribution	This credit contributes 100.0% towards the category score.	
Criteria	Has best practice stormwater management been demonstrated?	
Question	Flow (ML/year)	
Project	0.0 % Reduction	
Question	Total Suspended Solids (kg/year)	
Project	83.3 % Reduction	
Question	Total Phosphorus (kg/year)	
Project	74.8 % Reduction	
Question	Total Nitrogen (kg/year)	
Project	50.9 % Reduction	

IEQ Overall contribution 8% Minimum required 50%

1.4 Daylight Access - Non-Residential		33%	✔ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.		
Criteria	What % of the regular use floor areas have at least 2% daylight factor?		
Question	Percentage Achieved?		
Public building	33 %		
2.3 Ventilation - Non-Residential		83%	✔ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.		
Criteria	What % of the regular use areas are effectively naturally ventilated?		
Question	Percentage Achieved?		
Public building	0 %		
Criteria	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668.2:2012?		
Question	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668:2012?		
Public building	50 %		
Criteria	What CO_2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?		
Question	Value		
Public building	500 ppm		
3.4 Thermal comfort - Shading - Non-residential		0%	
Score Contribution	This credit contributes 17.6% towards the category score.		
Criteria	What percentage of east, north and west glazing to regular use areas is effectively shaded?		
Question	Percentage Achieved?		
Public building	0 %		
3.5 Thermal Comfort - Ceiling Fans - Non-Residential		50%	
Score Contribution	This credit contributes 5.9% towards the category score.		
Criteria	What percentage of regular use areas in tenancies have ceiling fans?		
Question	Percentage Achieved?		
Public building	50 %		
4.1 Air Quality - Non-Residential		100%	
Score Contribution	This credit contributes 5.9% towards the category score.		
Criteria	Do all paints, sealants and adhesives meet the maximum total indoor pollutant emission limits?		
Question	Criteria Achieved ?		
Project	Yes		
Criteria	Does all carpet meet the maximum total indoor pollutant emission limits?		
Question	Criteria Achieved ?		
Project	Yes		

Criteria	Does all engineered wood meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Project	Yes

Transport Overall contribution 3%

1.4 Bicycle Parking - Non-Residential		100%	
Score Contribution	This credit contributes 22.2% towards the category score.		
Criteria	Have the planning scheme requirements for employee bicycle parking been exceeded by at least 50% (or a minimum of 2 where there is no planning scheme requirement)?		
Annotation	This facility does not bring additional students to campus. School has adequate bike parking on campus already.		
Question	Criteria Achieved ?		
Public building	Yes		
Question	Bicycle Spaces Provided ?		
Public building	-		
1.5 Bicycle Parking - Non-Residential Visitor		100%	
Score Contribution	This credit contributes 11.1% towards the category score.		
Criteria	Have the planning scheme requirements for visitor bicycle parking been exceeded by at least 50% (or a minimum of 1 where there is no planning scheme requirement)?		
Annotation	This facility does not bring additional visitors to campus. School has adequate bike parking on campus already.		
Question	Criteria Achieved ?		
Public building	Yes		
Question	Bicycle Spaces Provided ?		
Public building	-		
1.6 End of Trip Facilities - Non-Residential		N/A	⊘ Disabled
This credit is disabled	Credit 1.4 must be complete first.		
2.1 Electric Vehicle Infrastructure		0%	
Score Contribution	This credit contributes 22.2% towards the category score.		
Criteria	Are facilities provided for the charging of electric vehicles?		
Question	Criteria Achieved ?		
Project	No		
2.2 Car Share Scheme		0%	
Score Contribution	This credit contributes 11.1% towards the category score.		
Criteria	Has a formal car sharing scheme been integrated into the development?		
Question	Criteria Achieved ?		
Project	No		
2.3 Motorbikes / Mopeds		0%	
Score Contribution	This credit contributes 22.2% towards the category score.		
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?		
Question	Criteria Achieved ?		
Project	No		

Waste Overall contribution 4%

1.1 - Construction Waste - Building Re-Use		100%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	If the development is on a site that has been previously developed, has at least 30% of the existing building been re-used?	
Question	Criteria Achieved ?	
Project	Yes	
2.1 - Operational Waste - Food & Garden Waste		0%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Are facilities provided for on-site management of food and garden waste?	
Question	Criteria Achieved ?	
Project	No	
2.2 - Operational Waste - Convenience of Recycling		100%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Are the recycling facilities at least as convenient for occupants as facilities for general waste?	
Question	Criteria Achieved ?	
Project	Yes	

Urban Ecology Overall contribution 2%

1.1 Communal Spaces		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Is there at least the following amount of common space measured in square meters : * 1m² for each of the first 50 occupants * Additional 0.5m² for each occupant between 51 and 250 * Additional 0.25m² for each occupant above 251?	
Annotation	break out space 193m2, first floor common room 137m2=330m2.	
Question	Common space provided	
Public building	330 m²	
Output	Minimum Common Space Required	
Public building	221 m²	
2.1 Vegetation		50%
Score Contribution	This credit contributes 50.0% towards the category score.	
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?	
Annotation	TBC - waiting on stormwater report from engineer/landscaping plan. 220+165+232m2=617m2. 617/(1062+3907) = 617/4969 = 12%	
Question	Percentage Achieved ?	
Project	12 %	
2.2 Green Roofs		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Does the development incorporate a green roof?	
Question	Criteria Achieved ?	
Project	No	
2.3 Green Walls and Facades		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Does the development incorporate a green wall or green façade?	
Question	Criteria Achieved ?	
Project	No	
3.2 Food Production - Non-Residential		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	What area of space per occupant is dedicated to food production?	
Question	Food Production Area	
Public building	0.0 m²	
Output	Min Food Production Area	
Public building	85 m²	

Innovation Overall contribution 2%

Innovation			
Description		100kW battery array	100kW battery array and a 50kW PV array are proposed in order to avoid having to upgrade the power supply to the site (new substation) and the main switchboard. Thus operational greenhouse gas emissions are reduced, as are those embodied in the creation of the substantial electrical infrastructure.
Points Targeted		100kW battery array	2
1.1 Innovation			20%
Score Contribution	This credit contributes 100.0% towards the category score.		
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?		

APPENDIX F– WSUD ASSESSMENT

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

IPSUM STRUCTURES

282 Canterbury Road
Surrey Hills, Victoria 3127
(03) 9836 7892
info@ipsumstructures.com.au

ABN 90 633 978 346

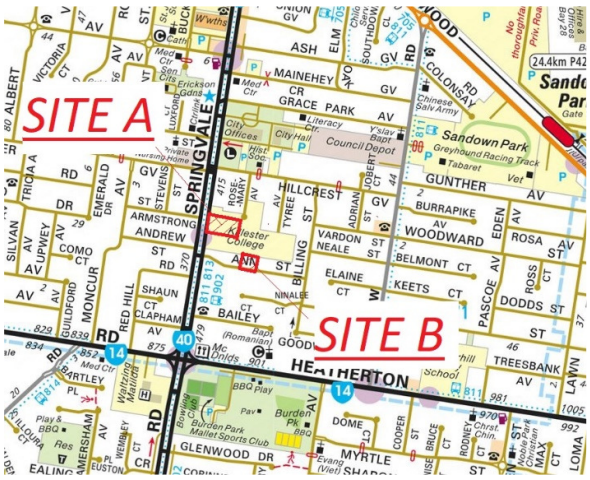
INTRODUCTION

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.

<u>Kennedy Hall – Site A</u>
Site Area = 4170m2
Existing Impervious Area = 2870m2
Total Site Coverage70%
Coefficient C=0.70

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

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 TREAMENT 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.

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

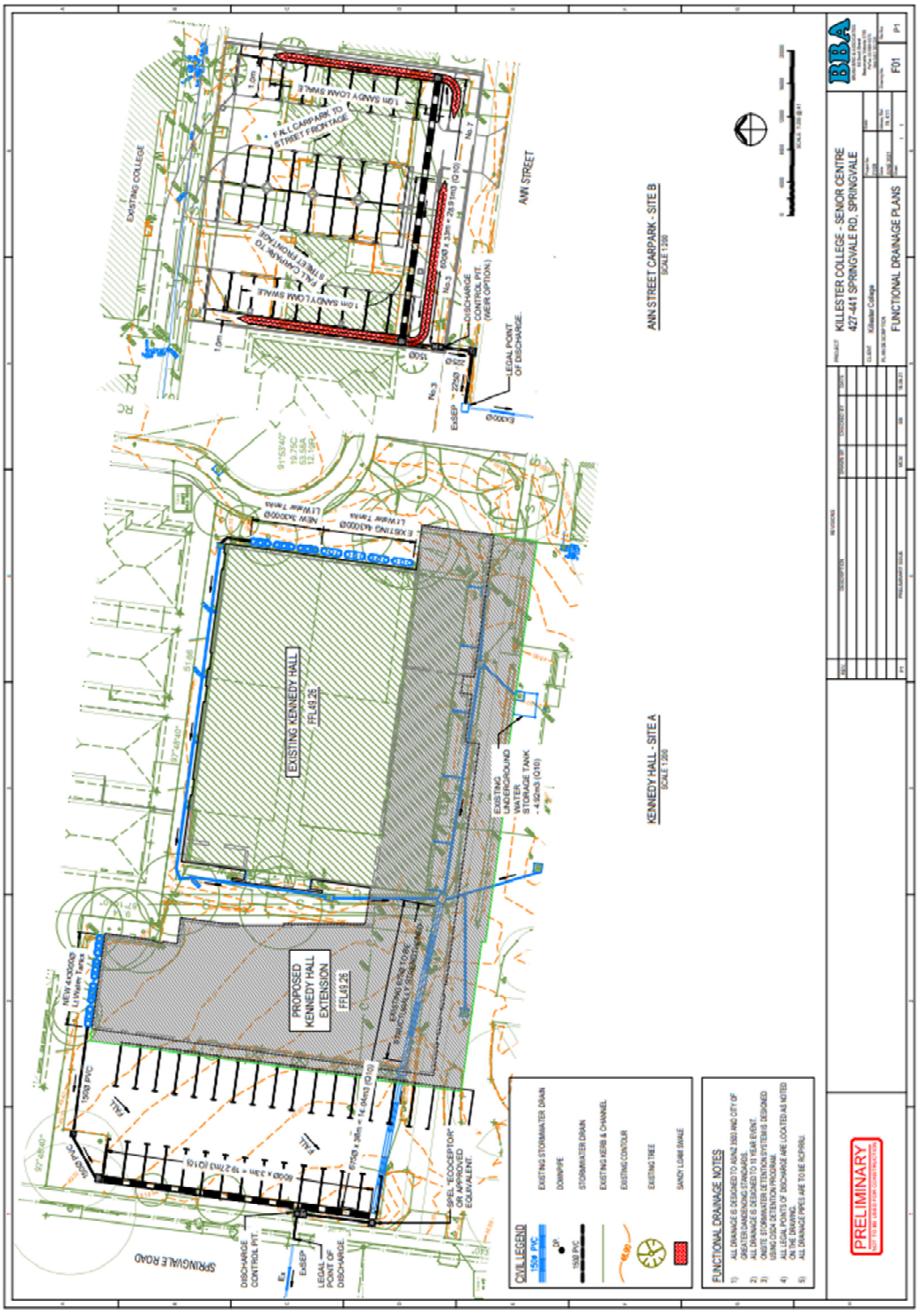
Best practise targets		
Reduction in Total Suspended Solids.	83.3%	80%
Reduction in Total Nitrogens.	50.9%	45%
Reduction in Total Phosphorous	74.8%	45%
Reduction in Litter from Typical Urban Design	100%	70%

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%.

APPENDIX A

KILLESTER COLLEGE – SENIOR CENTRE FUNCTIONAL LAYOUT PLAN.



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	m2
Coefficient of runoff:	0.7	n
Time of Concentration:	5.7	min.
Rainfall Intensity:	78.96	
PSD	62.95	l/s

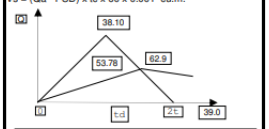
DEVELOPED SITE

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

Vs = (Qa - PSD) x tc x 60 x 0.001 cu.m.



Unit Hydrograph method is based on a triangular inflow hydrograph (base length 2tc) The formula calculates the unit hydrograph volume for 1mm excess rainfall ie Vs represents the volume of runoff for the unit hydrograph (vol for 1mm of runoff) corresponding to a maximum value for the calculated (displayed) storm duration. Also Swinburne Workshop on Urban Flood detention and floodways - 1983 - sect 5.2

MAXIMISED SOLUTION

Critical Td =	39.09	storm duration
I =	35.22	mm/hr
Qa =	38.10	l/s peak flow
Vs (max) =	53.78	m3

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.	Dia.	Length	Number of	Volume
(From pit to pit)	*(mm)*	*(actual)*	*(m)*		*(m3)*
1 - EX	675.0	685.8	16.0	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
				Sub Total	35.60

AVAILABLE STORAGE WITHIN PITS

Pit No.	L (m)	W (m)	Design WL (ma	IL	V (m3)
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 u/g 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 (m3)
Water tanks 11x3000 Lt	16.50
	0.00
	0.00
Sub Total	16.50

TOTAL STORAGE VOLUME = 57.50 m3

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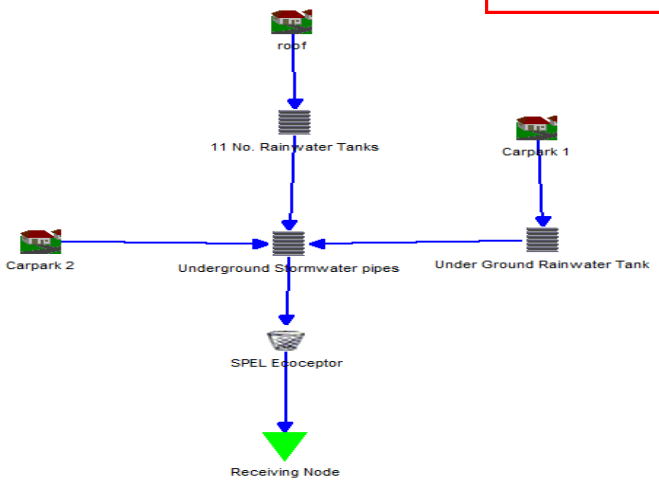
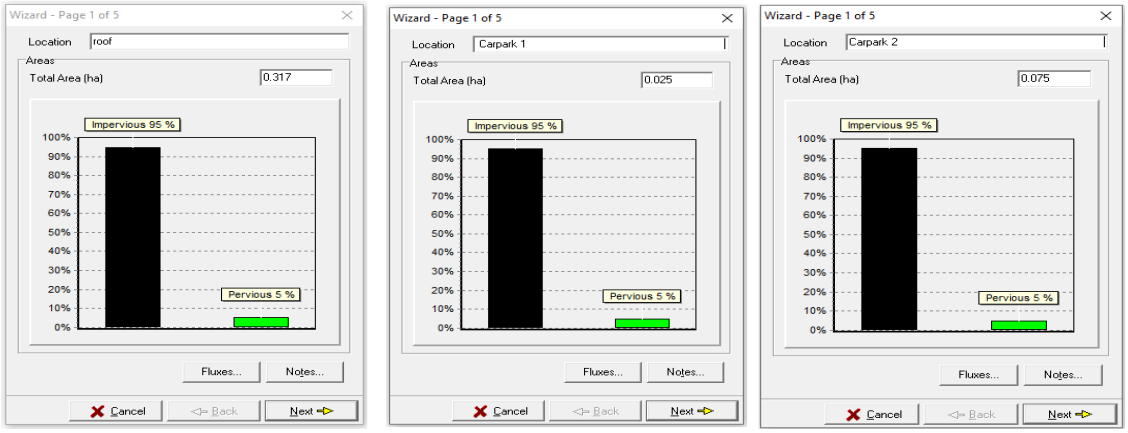
APPENDIX C

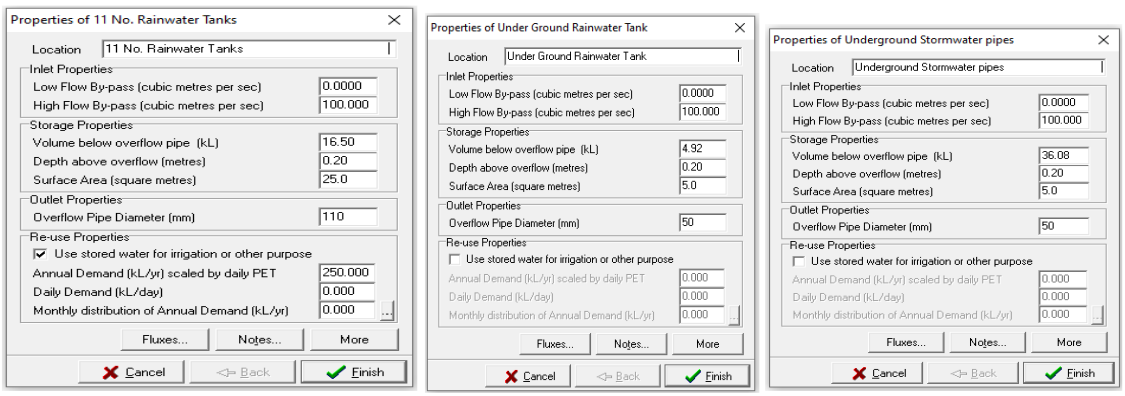
KENNEDY HALL ON-SITE STORMWATER MUSIC MODELLING



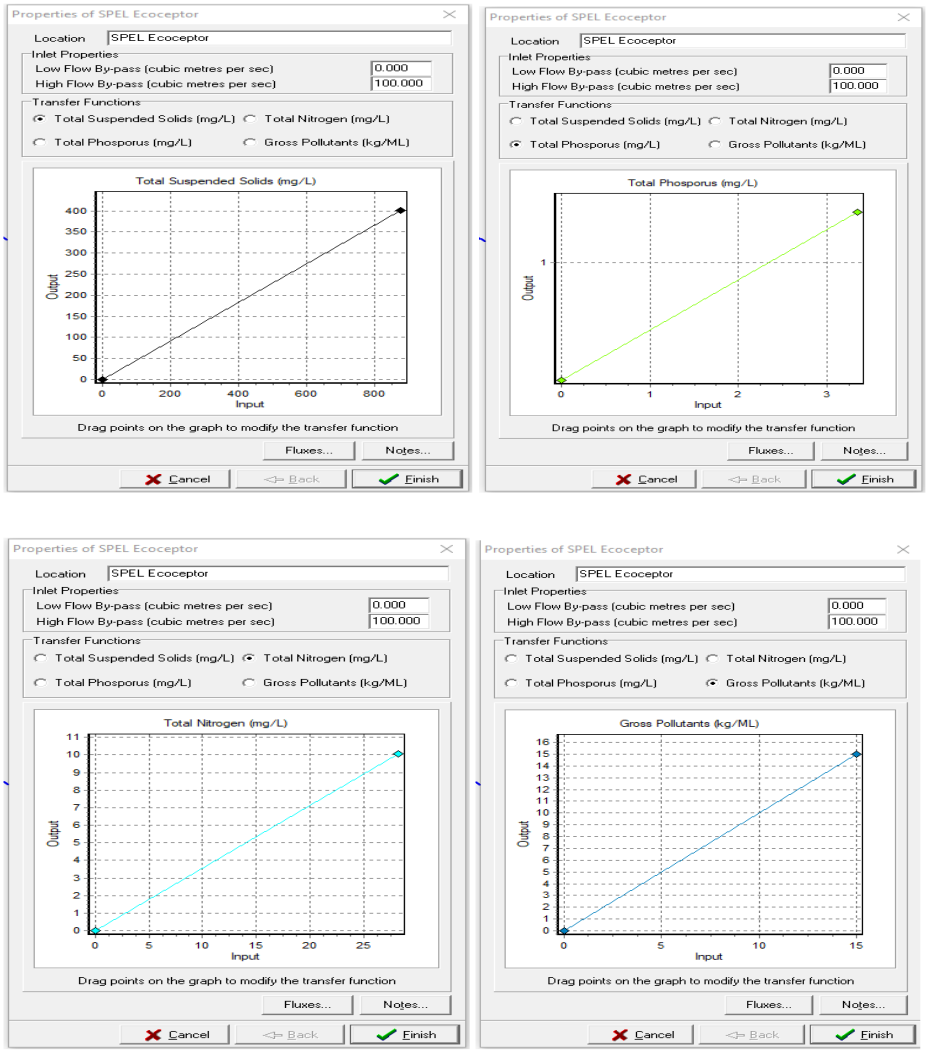
Music model treatment train



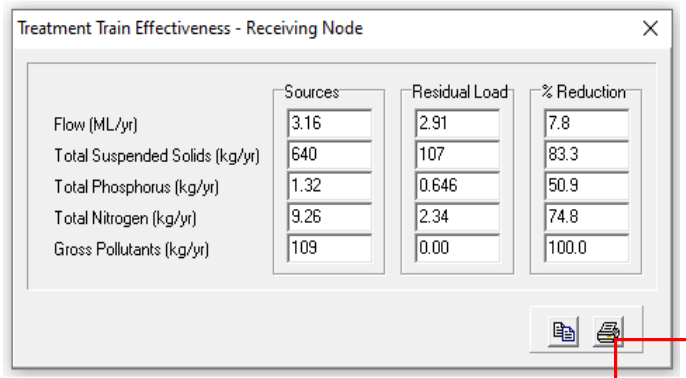
Source Node information



Rainwater Tanks node information.



SPEL Ecoceptor node Information



Treatment Train Effectiveness Receiving node (Springvale Road.)

APPENDIX D

ANN STREET CARPARK ON-SITE STORMWATER DETENTION COMPUTATIONS

ON SITE STORMWATER DETENTION COMPUTATIONS

Project Name: **Killesta SC Springvale Rd Springvale (b)**
Reference: **59 20 21 (Ann Street Carpark)**
Authority: Greater Dandenong City Council
Date: 15/06/2021
Version No. 1

PERMISSIBLE SITE DISCHARGE CALCULATION

EXISTING SITE
Location: *DANDENONG(GREATER)*
ARI (yrs) *5*

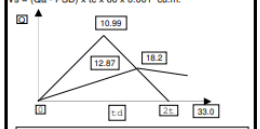
Site Area:	1070	m2
Coefficient of runoff:	0.74	n
Time of Concentration:	5	min.
Rainfall Intensity:	82.96	
PSD	18.25	l/s

DEVELOPED SITE
Location: *DANDENONG(GREATER)*
ARI (yrs) *10*

Effective Area:	0.10165	ha
Weighted Coeff.:	0.95	
Rainfall Intensity:	38.93	
PSD	4.50	l/s

ARR87 UNIT HYDROGRAPH METHOD

Vs = (Qa - PSD) x tc x 60 x 0.001 cu.m.



Unit Hydrograph method is based on a triangular inflow hydrograph (base length 2tc) The formula calculates the unit hydrograph volume for 1mm excess rainfall ie Vs represents the volume of runoff for the unit hydrograph (vol for 1mm of runoff) corresponding to a maximum value for the calculated (displayed) storm duration. Also Swinburne Workshop on Urban Flood detention and floodways - 1983 - sect 5.2

MAXIMISED SOLUTION

Critical Td =	33.04	storm duration
I =	38.93	mm/hr
Qa =	10.99	l/s peak flow
Vs (max) =	12.87	m3

ORIFICE CALCULATIONS
(Q = cA (2gH)^0.5)

Diameter	57	mm
Head	0.53	m

REQUIRED STORAGE VOLUME = 12.87 m3 @ Tc = 33.04 min.

AVAILABLE STORAGE WITHIN PIPES

Pipe Run (From pit to pit)	Dia. (mm)	Dia. (actual)	Length (m)	Number of	Volume (m3)
3 - 2	675.0	685.8	33.0	1	12.19
0.00	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	12.19

AVAILABLE STORAGE WITHIN PITS

Pit No.	L (m)	W (m)	Design WL (ma	IL	V (m3)
2	0.60	0.90	46.70	46.20	0.38
3	0.60	0.90	46.70	46.25	0.35
0	0.00	0.00	46.70	0.00	0.00
0	0.00	0.00	46.70	0.00	0.00
0	0.00	0.00	46.70	0.00	0.00
0	0.00	0.00	46.70	0.00	0.00
0	0.00	0.00	46.70	0.00	0.00
0	0.00	0.00	46.70	0.00	0.00
0	0.00	0.00	46.70	0.00	0.00
0	0.00	0.00	46.70	0.00	0.00
				Sub Total	0.73

AVAILABLE STORAGE (OTHER)

Description	V (m3)
	0.00
	0.00
	0.00
Sub Total	0.00

TOTAL STORAGE VOLUME = 12.92 m3

Prepared by MCM 15/06/2021 Page 1

APPENDIX E

ANN STREET CARPARK ON-SITE STORMWATER STORM MODELLING

Melbourne Water 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

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.