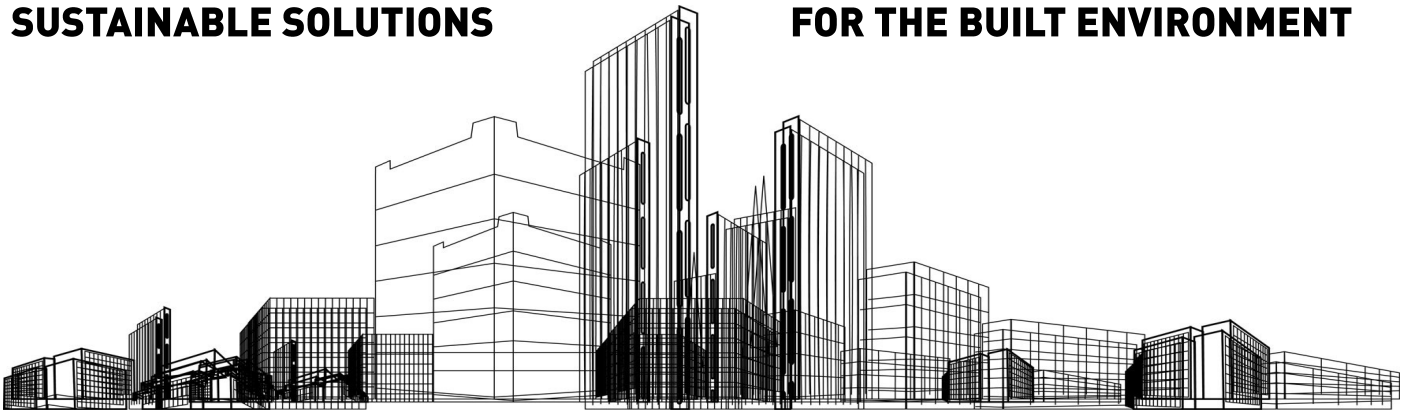
ENERGY
WATER
ENVIRONMENT

SAINT IGNATIUS COLLEGE - SENIOR SCHOOL

SUSTAINABILTY MANAGEMENT PLAN V3

16TH JULY, 2021

SUSTAINABLE SOLUTIONS FOR THE BUILT ENVIRONMENT



Date:	16/7/2021
Project Number:	PJ516
Project Title:	Saint Ignatius Senior School
To:	Georgina Campbell (Clarke Hopkins Clarke) Greater Geelong City Council
From:	Patrick Phelan

Document Title: Sustainability Management Plan Version 3

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1. Executive Summary

The purpose of this Sustainability Management Plan (SMP) is to show the sustainable design initiatives proposed for the Saint Ignatius Senior School at the planning stage. The school is located at 27 Peninsula Drive, Drysdale. It is subject to the ESD requirements of City of Greater Geelong. At the planning stage, the proposed development has been assessed against City of Greater Geelong Planning Scheme requirements and the National Construction Code energy efficiency regulations.

Table 1 below is a checklist showing compliance with the various environmentally sustainable design requirements.

Table 1 : SMP Checklist for Saint Ignatius Senior School

Item	In Documents / Will be achieved	Required / Recommended by	Reference if Applicable
JV3 Assessment for all conditioned components of the development	✓	National Construction Code and BESS	Refer to Section 3.2 and Appendix A
Water Sensitive Urban Design	✓	City of Greater Geelong planning scheme	Refer to Section 4.4 and Appendix B.2.
BESS sustainability tool assessment	✓	City of Greater Geelong planning scheme	Refer to Section 3.3 and Appendix B
An SMP describing sustainable initiatives for the development, targets and implementation	✓	City of Greater Geelong planning scheme.	Refer to Section 4

The implementation of the initiatives within the Sustainability Management Plan are the responsibility of the design team, the Saint Ignatius School and the lead and sub-contractors.

Where operational practices are required they will be carried out by the management of the Saint Ignatius Senior School.

2. Introduction

The purpose of this Sustainability Management Plan (SMP) is to show the sustainable design initiatives proposed for the Saint Ignatius Senior School at the planning stage. The school is located at 27 Peninsula Drive, Drysdale. It is subject to the ESD requirements of City of Greater Geelong. At the planning stage, the proposed development has been assessed against City of Greater Geelong Planning Scheme requirements and the National Construction Code energy efficiency regulations.

3. Performance Requirements

3.1 National Construction Code 2019 Part J – Class Type

This development is an education development and contains the following class types (to ultimately be confirmed by the building surveyor):

- Class 9b assembly building

As a part of further iterations of the ESD reports and submissions, JV3 modelling shall show compliance with the NCC Part J.

3.2 BESS Assessment

Built Environment Sustainability Scorecard (BESS) is an assessment tool created by CASBE council which is now widely used to benchmark proposed residential building developments. Based on the initiatives listed in Section 4 below, an initial BESS assessment has been undertaken for the Saint Ignatius Senior School design. The results of the BESS assessment are shown on the overleaf.

Table 2 : BESS Minimum Requirements and Calculated Scores for Saint Ignatius Senior School Design

Refer to Appendix B.1 and B.2 for the BESS and STORM calculations respectively.

4. ESD Initiatives

The following sections outline the ESD initiatives and management processes that are proposed for the Saint Ignatius Senior School development. These are based on consideration of the following categories:

- Indoor Environment Quality (IEQ)
- Energy Efficiency
- Water Efficiency
- Stormwater Management
- Building Materials
- Transport
- Waste Management
- Urban Ecology
- Innovation
- Construction and Building Management

Each of the above categories have been broken down into sub-categories and then into particular initiatives in the tables below.

The implementation of the initiatives within the Sustainability Management Plan are the responsibility of the design team, Saint Ignatius School and the lead and sub-contractors.

Where operational practices are required they will be carried out by the management of Saint Ignatius School.

4.1 Indoor Environment Quality (IEQ)

Table 3 : IEQ Sub-Categories and Initiatives

IEQ Sub-Categories	Proposed Saint Ignatius Senior School Initiatives	Performance Target	Schedule of Initiatives and Responsibility
Daylight	▪ Habitable spaces achieve 67.5% of area coverage over daylight factor of 2%	▪ BESS benchmarking Refer to Appendix C for daylight calculations	▪ Design phase: Architect ▪ Construction phase: Builder, window contractor
Hazardous Materials	▪ No hazardous waste shall be used in construction materials	▪ No hazardous waste shall be used in construction materials	▪ Implemented as part of construction of design drawings (mechanical contractor responsibility)
Acoustics	▪ All mechanical equipment shall meet the Australian Standards for noise levels	▪ To meet Australian Standards for noise levels	▪ Design phase: Architect ▪ Construction phase: Builder
Natural Ventilation	▪ Openable doors and windows.	▪ Achieve NCC requirements	▪ Design phase: Architect ▪ Construction phase: Builder

4.2 Energy Efficiency

Table 4 : Energy Efficiency Sub-Categories and Initiatives

Energy Efficiency Sub-Categories	Proposed Saint Ignatius Senior School Initiatives	Performance Target and Implementation	Schedule of Initiatives and Responsibility
Operating Energy and Building Fabric	▪ JV3 assessment shows an improvement of over 10% of NCC Part J benchmarks	▪ 10% improvement on NCC Part J	▪ Design phase: Architect ▪ Construction phase: Builder
Heating and Cooling	▪ Cooling shall be provided via VRV systems to all habitable spaces. The nominated COP for the systems is minimum 3.5	▪ COP of 3.5	▪ Design phase: Architect, mechanical designer ▪ Construction phase: Builder, mechanical contractor
Lighting Power Density	▪ Lighting power density shall be 20% lower than those stipulated by the National Construction Code in Part J6 for all NCC class types components. LED lighting will be implemented	▪ Lighting power densities to meet the 20% reduction target as follows - maximum: ▪ 3.6W/m2 for learning areas ▪ 4.0W/m2 for circulation and corridor areas ▪ 2.4W/m2 for toilets and bathrooms ▪ 3.2W/m2 for cleaners and plant rooms ▪ 3.2W/m2 for kitchen / food preparation ▪ National Construction Code requirements. ▪ BESS benchmarking (refer Appendix B.1)	▪ Design phase: Architect, Electrical Designer ▪ Construction phase: Electrical Contractor
Domestic Hot Water	▪ Domestic hot water shall be electric hot water	▪ BESS benchmarking (refer Appendix B.1)	▪ Design phase: Architect, hydraulic designer ▪ Construction phase: Hydraulic contractor
External Lighting	▪ External lighting will be controlled via a time switch and motion detection	▪ BESS benchmarking (refer Appendix B.1)	▪ Design phase: Architect, Electrical Designer ▪ Construction phase: Electrical Contractor
Solar PV	▪ A 95kW (total) solar PV system shall be installed on the Saint Ignatius Senior School roof	▪ 95kW solar PV system	▪ Design phase: Architect, Electrical / PV Designer ▪ Construction phase: Electrical / PV Contractor

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4.3 Water Efficiency

Table 5 : Water Efficiency Sub-Categories and Initiatives

Water Efficiency Sub-Categories	Proposed Saint Ignatius Senior School Initiatives	Performance Target	Schedule of Initiatives and Responsibility
Minimising Amenity Water Demand	▪ The fittings and fixtures proposed for the development will meet the following Star Ratings under the Water Efficiency Labeling Scheme: ▪ Toilets – 4 Star ▪ Tapware – 6 Star	▪ As per star rating targets specified. ▪ BESS benchmarking (refer Appendix B.1)	▪ Design phase: Architect / Hydraulic Designer ▪ Construction phase: Builder and hydraulic contractor
Rainwater Harvesting	▪ A 20,000 litre tank shall catch a minimum roof surface area of 1,835m^2 and shall be used to flush all new toilets as part of the scope of works	▪ BESS benchmarking (refer Appendix B.1)	▪ Design phase: Architect / Hydraulic Designer ▪ Construction phase: Builder and hydraulic contractor
Heat Rejection Water	▪ Air conditioning units shall use air-cooled condenser components.	▪ No water to be used in cooling.	▪ Design phase: Architect / Mechanical Designer ▪ Construction phase: Builder and Mechanical Contractor
Water Efficient Landscaping	▪ Water efficient garden	The landscape schedule is yet to be finalised however drought tolerant tree, shrub and grass species shall make up the majority of the landscaping	▪ Design phase: Architect / Landscape Designer ▪ Construction phase: Builder and Landscape Contractor

4.4 Stormwater Management

Table 6 : Stormwater Management Sub-Categories and Initiatives

Stormwater Management Sub-Categories	Proposed Saint Ignatius Senior School Initiatives	Performance Target	Schedule of Initiatives and Responsibility
STORM rating	▪ The calculated STORM rating is 103%. Refer to Appendix B.2 for the STORM report.	▪ A minimum of 100% in STORM.	▪ Design phase: Architect / ESD Consultant / Hydraulic Designer / Civil Designer / Landscape Consultant ▪ Construction phase: Builder, civil contractor, landscape contractor and hydraulic contractor

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Discharge to Sewer	▪ Low flow fittings and fixtures shall be used and shall reduce the discharge to sewer.	▪ The fittings and fixtures proposed for the development will meet the following Star Ratings under the Water Efficiency Labeling Scheme: ▪ Toilets – 4 Star ▪ Tapware – 6 Star	▪ Implemented as part of construction of design drawings (contractor responsibility)
Watercourse Pollution	▪ A 20kL rainwater harvesting system is proposed for the development to meet the watercourse pollution requirements of Council. Refer to Appendix B for the STORM report, rain garden cross-sections and maintenance plan.	▪ A minimum of 100% in STORM.	▪ Design phase: Architect / ESD Consultant / Hydraulic Designer / Civil Designer / Landscape Consultant ▪ Construction phase: Builder, civil contractor, landscape contractor and hydraulic contractor

4.5 Building Materials

Table 7 : Building Materials Sub-Categories and Initiatives

Building Materials Sub-Categories	Proposed Saint Ignatius Senior School Initiatives	Performance Target and Implementation	
Storage for Recycling Waste	▪ Appropriate bin storage space including space for recycling bins has been allocated.	▪ Refer to Waste Design Assessment for details.	▪ Design phase: Architect ▪ Construction phase: Builder
Environmental Toxicity	▪ Both refrigerants and insulation materials shall be specified to be non-ozone depleting in both composition and manufacture.	▪ Zero ozone depleting materials used in both composition and manufacture.	▪ Design phase: Architect ▪ Construction phase: Builder

4.6 Transport

Bicycle racks on other parts of the site to be used by staff and students and have been scoped out of this SMP.

4.7 Waste Management

Table 8 : Waste Management Sub-Categories and Initiatives

Waste Management Sub-Categories	Proposed Saint Ignatius Senior School Initiatives	Performance Target and Implementation	Schedule of Initiatives and Responsibility
Construction Environmental Management Plan	▪ A construction environmental Design Assessment will be	▪ Production and implementation of an EMP.	▪ Architectural preliminaries to require a CEMP

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	required to be implemented by the lead contractor.		▪ Lead contractor responsibility
Waste Management Plan	▪ Construction phase environmental Design Assessment to be implemented.	▪ Minimum 80% of construction waste to be reused or recycled. ▪ BESS benchmarking (refer Appendix B.1)	▪ Architectural preliminaries to require a WMP ▪ Lead contractor responsibility
Operational Waste	▪ Green and garden waste and recycling waste shall be separated from general waste and disposed / re-used accordingly	▪ Waste initiatives, requirements and instructions for both garden waste and recycling shall be incorporated into the building users guide.	▪ Architect in the design phase and schooling in the operation phase

4.8 Urban Ecology

Table 9 : Urban Ecology Sub-Categories and Initiatives

Urban Ecology Sub-Categories	Proposed Saint Ignatius Senior School Initiatives	Performance Target and Implementation	Schedule of Initiatives and Responsibility
Landscaped Areas	▪ Landscaping will be provided as shown in Landscape drawings.	▪ The landscape schedule is yet to be finalised however drought tolerant tree, shrub and grass species shall make up the majority of the landscaping	▪ Design phase: Architect / Landscape Architect ▪ Construction phase: Builder / Landscape Contractor

4.9 Innovation

There are no initiatives that cannot be categorised within the other 9 categories, therefore the innovation category is not applicable.

4.10 Construction and Building Management

Table 10 : Construction and Building Management Sub-Categories and Initiatives

Construction and Building Management Sub-Categories	Proposed Saint Ignatius Senior School Initiatives	Performance Target and Implementation	Schedule of Initiatives and Responsibility
Construction Environmental Design Assessment	▪ A construction environmental Design Assessment will be required to be implemented by the lead contractor.	▪ Production and implementation of an EMP.	▪ Architectural preliminaries to require a CEMP ▪ Lead contractor responsibility
Stormwater Construction Design Assessment	▪ A stormwater construction Design Assessment will be implemented as part of the construction environmental Design Assessment.	▪ Council requirements.	▪ Architectural preliminaries to require a SMP ▪ Lead contractor responsibility
Building User Guide	▪ A building user guide to be handed over to all owners after construction.	▪ Sustainability and maintenance information to be included in building user guide. ▪ The building user guide shall be based on City of Port Phillip's *Building*	▪ Lead contractor responsibility

		User's Guide – Expected Content. See Appendix E for attachment of this template document ▪ Waste initiatives, requirements and instructions for both garden waste and recycling shall be incorporated into the building users guide.	

5. Conclusion

The ESD components for the Saint Ignatius Senior School development have been proposed with reference to current construction code standards, the industry benchmarking tool BESS and City of Greater Geelong Planning Scheme ESD requirements. At the planning stage, the proposed design meets best practice as set out by these items.

Appendix A –NCC Part J Assessment

National Construction Code 2019 Part J – Non-Residential JV3 Report

Introduction – JV3 Report

The purpose of this component of the SMP is to show compliance of the proposed Saint Ignatius Senior School design with the energy efficiency requirements of the National Construction Code 2019. This report is for the information of the building surveyor and shows, based on the documentation used in the calculation and associated assumptions, the proposed Saint Ignatius Senior School design complies with the requirements and will meet a 14% improvement on heating and cooling based on the assumptions made in this section of the SMP. The overall JV3 assessment shows an improvement of 20%.

The proposed building fabric requirements (assumptions) are shown in the table below.
Table 11 : Proposed Building Fabric Requirements

Element of Model	Proposed Model – Design Requirements
Walls	**Metal stud walls (450mm spaces) with thickness of BMT1.15 (assumption) - insulation batts of R2.5 (standard insulation between metal studs). No further thermal break required**
Floor	**Concrete slab on ground with no additional insulation**
Roof	**Metal roof sheeting. Ceiling insulation of R3.5 (whole system R3.7)**
External Glazing	**U-values of a maximum of 4.65 (including the frame) and solar heat gain coefficient of 0.52 – single glazing**

Compliance has been shown using the verification method JV3. Computer simulation energy modeling has been undertaken using IES Virtual Environment Software Version 2019. Three models were created and each yielded an annual energy calculation for the purposes of comparison. The figure below shows the calculation requirements for the JV3 method with regards to the three models that are required to be produced.

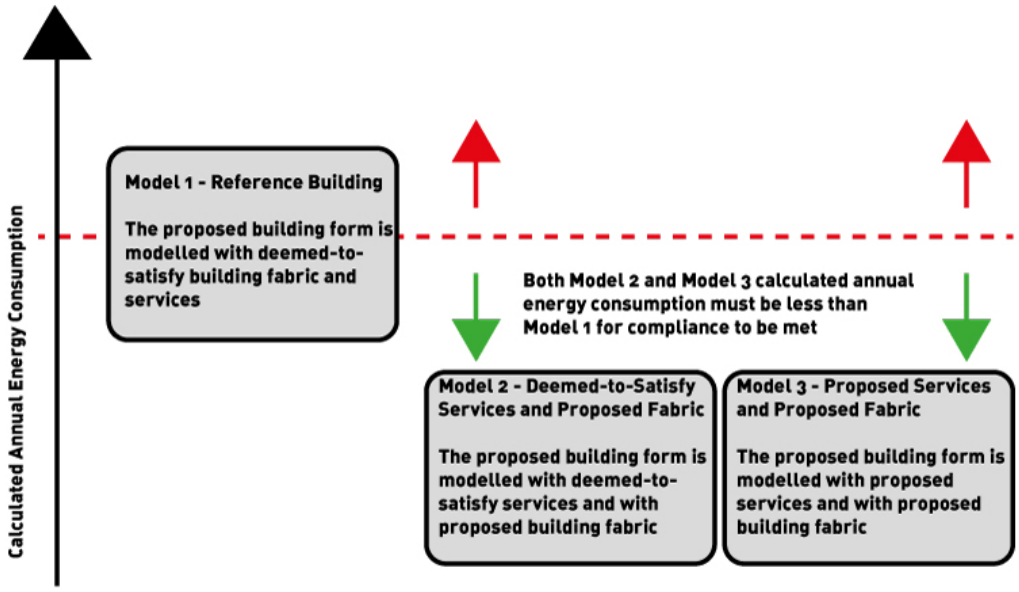

Figure 1 Illustration of the 3 Model Calculation System Required by JV3

Results JV3 Report

Table 1 below shows the calculated annual energy consumption of the Saint Ignatius Senior School for all three models.

Table 12 : Calculated Energy Consumption for 3 Models

Model	Calculated Annual Energy Consumption (MWh / annum)
Model 1 – Deemed-to-Satisfy Building Fabric and Services	311.13 (Reference)
Model 2 – Deemed-to-Satisfy Services and Proposed Building Fabric	307.94 (lower than reference)
Model 3 – Proposed Services and Proposed Building Fabric	233.85 (lower than reference)

As Model 2 and Model 3 have a lower energy consumption than Model 1, the design is compliant with the National Construction Code energy efficiency requirements. Note that these calculations do not include Solar PV as this is calculated separately in BESS.

The breakdown of the energy consumption for BESS is as follows:

Model End Use	Calculated Annual Energy Consumption (kWh / annum)
Heating, Cooling & Comfort Ventilation - Electricity Reference fabric & services	239,338
Heating, Cooling & Comfort Ventilation - Electricity Proposed fabric & reference services	236,147
Heating, Cooling & Comfort Ventilation - Electricity Proposed fabric & services	194,662
Hot Water - Electricity -Reference	11624
Hot Water - Electricity Proposed	11624
Lighting - Reference	71,802
Lighting - Proposed	57,441
Peak Thermal Cooling Load Reference fabric and services	286
Peak Thermal Cooling Load Proposed fabric and services	213

Note that these calculations do not include Solar PV as this is calculated separately in BESS.

Modelling Inputs – JV3 Report

Element of Model	Deemed to Satisfy Model (Not for Construction)	Proposed Model – Minimum Design Requirements
Walls	Lightweight cladding as detailed in Clarke Hopkins Clarke planning documentation. Insulation level of entire wall construction R2.8	Metal stud walls (450mm spaces) with thickness of BMT1.15 (assumption) - insulation batts of R2.5 (standard insulation between metal studs). No further thermal break required
Floor	Concrete slab on ground	Concrete slab on ground with no additional insulation

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Roof	Metal roof sheeting. Insulation of entire roof construction R3.2	Metal roof sheeting. Ceiling insulation of R3.5 (whole system R3.7)
External Glazing	Deemed-to-satisfy external glazing calculator	U-values of a maximum of 4.65 (including the frame) and solar heat gain coefficient of 0.52 – single glazing
Ceilings	Ceiling tiles	As per deemed-to-satisfy model
Internal Partitions	Plasterboard as detailed in Clarke Hopkins Clarke documentation	As per deemed-to-satisfy model
Artificial Lighting	Illumination power densities and usage profile as per deemed-to-satisfy requirements of Part J6 and Specification JV respectively	Design illumination power densities shall be at least 20% lower than NCC requirements
HVAC System	A VRV system for heating and cooling to nominated spaces. The COP for cooling is 2.8. Temperature setpoint is 18-26 degrees Celsius for heating and cooling respectively Air flow rate as required by Part F4	A VRV split system for heating and cooling to nominated spaces. The COP for cooling shall be minimum 3.5. Temperature setpoint is 18-26 degrees Celsius for heating and cooling respectively Air flow rate as required by Part F4
HVAC Operation	HVAC usage profile as per Specification JV	As per deemed-to-satisfy model
Location and Weather File	Melbourne 1971 TRY weather file	As per deemed-to-satisfy model
Domestic Hot Water	Not required for this calculation	
Lift Energy	Not applicable	
Infiltration Rate	Pressurised areas have an infiltration rate of 1 air change per hour, non-pressurised areas have an infiltration rate of 1.5 air changes per hour	As per deemed-to-satisfy model
Occupancy	Occupancy heat gains are 75W/person for sensible heat gain and 55W/person for latent heat gain	As per deemed-to-satisfy model
Appliances	Appliance heat gains and usage profile as per Specification JV	As per deemed-to-satisfy model
Information	Information is based on planning package supplied to Energy Water and Environment by Clarke Hopkins Clarke	As per deemed-to-satisfy model

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Appendix B – BESS and STORM Calculations

B.1 BESS Assessment

The full BESS assessment is shown on the overleaf.

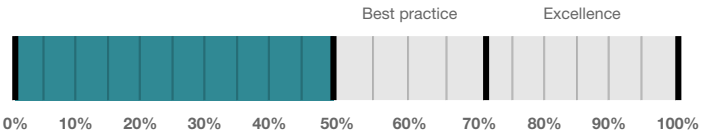
BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 27 Peninsula Dr, Drysdale VIC 3222, Australiar Drysdale VIC 3222. 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 Geelong 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

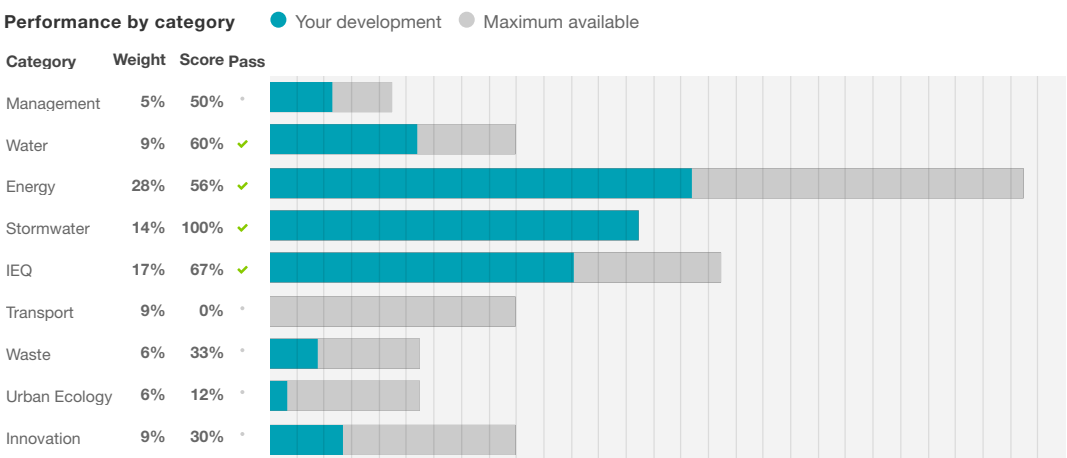


53%

Project details

Address	27 Peninsula Dr, Drysdale VIC 3222, Australiar Drysdale VIC 3222
Project no	EAFA8E7D-R4
BESS Version	BESS-5
Site type	Non-residential development
Account	patrick@ewenvironment.com.au
Application no.	
Site area	3,803 m²
Building floor area	5,088.0 m²
Date	16 July 2021
Software version	1.7.0-B.365

Performance by category



Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	% of total area
Office Building			
School Space	1	5,088 m²	100%
Total	**1**	**5,088 m²**	**100%**

Supporting information

Floorplans & elevation notes

Credit	Requirement	Response	Status
Energy 4.2	Floor plans showing location of photovoltaic panels as described.	To be printed Refer to architectural documentation (roof drawings) showing solar systems	✔
Stormwater 1.1	Location of any stormwater management systems used in STORM or MUSIC modelling (e.g. Rainwater tanks, raingarden, buffer strips)	To be printed Refer to architectural drawing	✔
Waste 2.2	Location of recycling facilities	To be printed Other recycling facilities on site shall be used	✔
Urban Ecology 1.1	Size and location of communal spaces	To be printed Refer to architectural drawings	✔

Supporting evidence

Credit	Requirement	Response	Status
Management 2.3	Preliminary modelling report	To be printed Refer SMP Refer SMP	✔
Management 2.4	Section J glazing assessment	To be printed Refer SMP Refer SMP	✔
Energy 1.1	Energy Report showing calculations of reference case and proposed buildings	To be printed Refer SMP Refer SMP	✔
Energy 3.7	Provide a written description of the average lighting power density to be installed in the development and specify the lighting type(s) to be used.	To be printed Refer SMP Refer SMP	✔
Energy 4.2	Specifications of the solar photovoltaic system(s).	To be printed Refer to architectural drawings for solar PV systems Refer to architectural drawings for solar PV systems	✔
Stormwater 1.1	STORM report or MUSIC model	To be printed Refer SMP Refer SMP	✔
IEQ 1.4	A short report detailing assumptions used and results achieved.	To be printed Refer SMP Refer SMP	✔

Credit summary

Management Overall contribution 4.5%

	50%	
1.1 Pre-Application Meeting	0%	
2.3 Thermal Performance Modelling - Non-Residential	100%	
2.4 Thermal Performance Modelling - Non-Residential	100%	
3.2 Metering	N/A	Scoped Out
		Not applicable to school
3.3 Metering	0%	
4.1 Building Users Guide	100%	

Water Overall contribution 9.0%

	Minimum required 50%	**60%**	**Pass**
1.1 Potable water use reduction	60%		
3.1 Water Efficient Landscaping	N/A	Scoped Out	
			Not applicable
4.1 Building Systems Water Use Reduction	N/A	Scoped Out	
			Air cooled chillers used

Energy Overall contribution 27.5%

	Minimum required 50%	56%	Pass
1.1 Thermal Performance Rating - Non-Residential		12%	
2.1 Greenhouse Gas Emissions		100%	
2.2 Peak Demand		100%	
2.3 Electricity Consumption		100%	
2.4 Gas Consumption		N/A	Scoped Out
No gas connection in use			
3.1 Carpark Ventilation		N/A	Scoped Out
No car park is proposed as part of these works			
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%	67%	Pass
1.4 Daylight Access - Non-Residential		67%	

Transport Overall contribution 9.0%

0%

1.4 Bicycle Parking - Non-Residential	0%	
1.5 Bicycle Parking - Non-Residential Visitor	0%	
1.6 End of Trip Facilities - Non-Residential	N/A	⊘ Disabled
	Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure	N/A	✣ Scoped Out
	No car parks are proposed as part of this work	
2.2 Car Share Scheme	N/A	✣ Scoped Out
	No car parks are proposed as part of this wo	
2.3 Motorbikes / Mopeds	N/A	✣ Scoped Out
	No car parks are proposed as part of this work	

Waste Overall contribution 5.5%

33%

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

Urban Ecology Overall contribution 5.5%

12%

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

Innovation Overall contribution 9.0%

30%

1.1 Innovation	30%	

Credit breakdown

Management Overall contribution 2%

1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 37.5% 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		100%
Score Contribution	This credit contributes 25.0% towards the category score.	
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2019 Section J (Energy Efficiency), NABERS or Green Star?	
Question	Criteria Achieved ?	
Office Building	Yes	

2.4 Thermal Performance Modelling - Non-Residential		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Has a preliminary Section J facade assessment been undertaken?	
Question	Criteria Achieved ?	
Office Building	Yes	

3.2 Metering		N/A ◈ Scoped Out
This credit was scoped out	Not applicable to school	

3.3 Metering		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have all major common area services been separately submetered?	
Question	Criteria Achieved ?	
Office Building	No	

4.1 Building Users Guide		100%
Score Contribution	This credit contributes 12.5% 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 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	
Showerhead:	Scope out
Bath:	Scope out
Kitchen Taps:	>= 6 Star WELS rating
Bathroom Taps:	>= 6 Star WELS rating
Dishwashers:	Scope out
WC:	>= 4 Star WELS rating
Urinals:	Scope out
Washing Machine Water Efficiency:	Scope out
Which non-potable water source is the dwelling/space connected to?:	Tank1
Non-potable water source connected to Toilets:	Yes
Non-potable water source connected to Laundry (washing machine):	No
Non-potable water source connected to Hot Water System:	No
Rainwater Tank	
What is the total roof area connected to the rainwater tank?: Tank1	1,863 m^2
Tank Size: Tank1	20,000 Litres
Irrigation area connected to tank: Tank1	0.0 m^2
Is connected irrigation area a water efficient garden?: Tank1	Yes
Other external water demand connected to tank?: Tank1	0.0 Litres/Day

1.1 Potable water use reduction		60%	
Score Contribution	This credit contributes 100.0% 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	6982 kL		
Output	Proposed (excluding rainwater and recycled water use)		
Project	4457 kL		
Output	Proposed (including rainwater and recycled water use)		
Project	3574 kL		
Output	% Reduction in Potable Water Consumption		
Project	48 %		
Output	% of connected demand met by rainwater		
Project	35 %		
Output	How often does the tank overflow?		
Project	Never / Rarely		
Output	Opportunity for additional rainwater connection		
Project	601 kL		
3.1 Water Efficient Landscaping		N/A	Scoped Out
This credit was scoped out	Not applicable		
4.1 Building Systems Water Use Reduction		N/A	Scoped Out
This credit was scoped out	Air cooled chillers used		

Energy Overall contribution 15% Minimum required 50%

Use the BESS Deem to Satisfy (DtS) method for Energy?:	No
Non-Residential Spaces Energy Profile	
Heating, Cooling & Comfort Ventilation - Electricity Reference fabric & services:	239,338 kWh
Heating, Cooling & Comfort Ventilation - Electricity Proposed fabric & reference services:	236,147 kWh
Heating, Cooling & Comfort Ventilation - Electricity Proposed fabric & services:	194,662 kWh
Heating - Wood Reference fabric & services:	-
Heating - Wood Proposed fabric & reference services:	-
Heating - Wood Proposed fabric & services:	-
Hot Water - Electricity Reference:	11,624 kWh
Hot Water - Electricity Proposed:	11,624 kWh
Lighting - Reference:	71,802 kWh
Lighting - Proposed:	57,441 kWh
Peak Thermal Cooling Load Reference fabric and services:	286 kW
Peak Thermal Cooling Load Proposed fabric and services:	213 kW
Solar Photovoltaic systems	
System Size (lesser of inverter and panel capacity):	
Solar PV System 1 West	33.8 kW peak
Solar PV System 2 North	18.5 kW peak
Solar PV System 3 West	24.3 kW peak
Solar PV System 4 East	18.5 kW peak
Orientation (which way is the system facing)?:	
Solar PV System 1 West	West
Solar PV System 2 North	North
Solar PV System 3 West	West
Solar PV System 4 East	East
Inclination (angle from horizontal):	
Solar PV System 1 West	7.0 Angle (degrees)
Solar PV System 2 North	6.0 Angle (degrees)
Solar PV System 3 West	5.0 Angle (degrees)
Solar PV System 4 East	5.0 Angle (degrees)

1.1 Thermal Performance Rating - Non-Residential	12%
Score Contribution	This credit contributes 44.4% towards the category score.
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC 2019 Section J)?
Output	Total Improvement
Office Building	1 %
2.1 Greenhouse Gas Emissions	100%
Score Contribution	This credit contributes 11.1% towards the category score.
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?
Output	Reference Building with Reference Services (BCA only)
Office Building	255,981 kg CO2
Output	Proposed Building with Proposed Services (Actual Building)
Office Building	210,412 kg CO2
Output	% Reduction in GHG Emissions
Office Building	17 %
2.2 Peak Demand	100%
Score Contribution	This credit contributes 5.6% towards the category score.
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?
Output	Peak Thermal Cooling Load - Baseline
Office Building	286 kW
Output	Peak Thermal Cooling Load - Proposed
Office Building	213 kW
Output	Peak Thermal Cooling Load - % Reduction
Office Building	25 %
2.3 Electricity Consumption	100%
Score Contribution	This credit contributes 11.1% towards the category score.
Criteria	What is the % reduction in annual electricity consumption against the benchmark?
Output	Reference
Office Building	250,962 kWh
Output	Proposed
Office Building	206,286 kWh
Output	Improvement
Office Building	17 %
2.4 Gas Consumption	N/A ◈ Scoped Out
This credit was scoped out	No gas connection in use
3.1 Carpark Ventilation	N/A ◈ Scoped Out
This credit was scoped out	No car park is proposed as part of these works

3.2 Hot Water		100%	
Score Contribution	This credit contributes 5.6% towards the category score.		
Criteria	What is the % reduction in annual hot water system energy use (gas and electricity) against the benchmark?		
Output	Reference		
Office Building	11,624 kWh		
Output	Proposed		
Office Building	11,624 kWh		
Output	Improvement		
Office Building	0 %		

3.7 Internal Lighting - Non-Residential		100%	
Score Contribution	This credit contributes 11.1% 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 ?		
Office 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 5.6% towards the category score.		
Criteria	Does the solar power system provide 5% of the estimated energy consumption of the building class it supplies?		
Output	Solar Power - Energy Generation per year		
Office Building	107,930 kWh		
Output	% of Building's Energy		
Office Building	40 %		

4.4 Renewable Energy Systems - Other		N/A	⊘ Disabled
This credit is disabled	No other (non-solar PV) renewable energy is in use.		

Stormwater

Overall contribution 14% Minimum required 100%

Which stormwater modelling are you using?:	Melbourne Water STORM tool	
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	STORM score achieved	
Project	103	
Output	Min STORM Score	
Project	100	

IEQ

Overall contribution 11% Minimum required 50%

1.4 Daylight Access - Non-Residential		67%
Score Contribution	This credit contributes 100.0% towards the category score.	
Criteria	What % of the nominated floor area has at least 2% daylight factor?	
Question	Percentage Achieved?	
Office Building	67 %	

Transport

Overall contribution 0%

1.4 Bicycle Parking - Non-Residential		0%
Score Contribution	This credit contributes 50.0% 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)?	
Question	Criteria Achieved ?	
Office Building	No	
Question	Bicycle Spaces Provided ?	
Office Building	-	

1.5 Bicycle Parking - Non-Residential Visitor		0%
Score Contribution	This credit contributes 25.0% 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)?	
Question	Criteria Achieved ?	
Office Building	No	
Question	Bicycle Spaces Provided ?	
Office 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	N/A	⌖ Scoped Out
This credit was scoped out	No car parks are proposed as part of this work	

2.2 Car Share Scheme	N/A	⌖ Scoped Out
This credit was scoped out	No car parks are proposed as part of this wo	

2.3 Motorbikes / Mopeds	N/A	⌖ Scoped Out
This credit was scoped out	No car parks are proposed as part of this work	

Waste Overall contribution 2%

1.1 - Construction Waste - Building Re-Use	0%
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	No

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 1%

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?	
Question	Common space provided	
Office Building	450 m²	
Output	Minimum Common Space Required	
Office Building	239 m²	
2.1 Vegetation		0%
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?	
Question	Percentage Achieved ?	
Project	0 %	
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 facade?	
Question	Criteria Achieved ?	
Project	No	
3.2 Food Production - Non-Residential		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Is there at least 0.25m² of space per occupant dedicated to food production?	
Question	Food Production Area	
Office Building	0.0 m²	
Output	Min Food Production Area	
Office Building	102 m²	

Innovation Overall contribution 3%

Innovations	
Description:	
Low VOC paints and Formaldehyde	Low VOC paints in accordance with Green Star Low VOC protocols and E1 or E0 joinery
Best Practice PVC	Use of best practice PVC in conduits, pipework, cabling, carpets and blinds
Points Targeted:	
Low VOC paints and Formaldehyde	2
Best Practice PVC	1

1.1 Innovation		30%
Score Contribution	This credit contributes 100.0% towards the category score.	
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?	

B.2 WSUD Report

The water sensitive urban design report (WSUD) is attached on the overleaf.

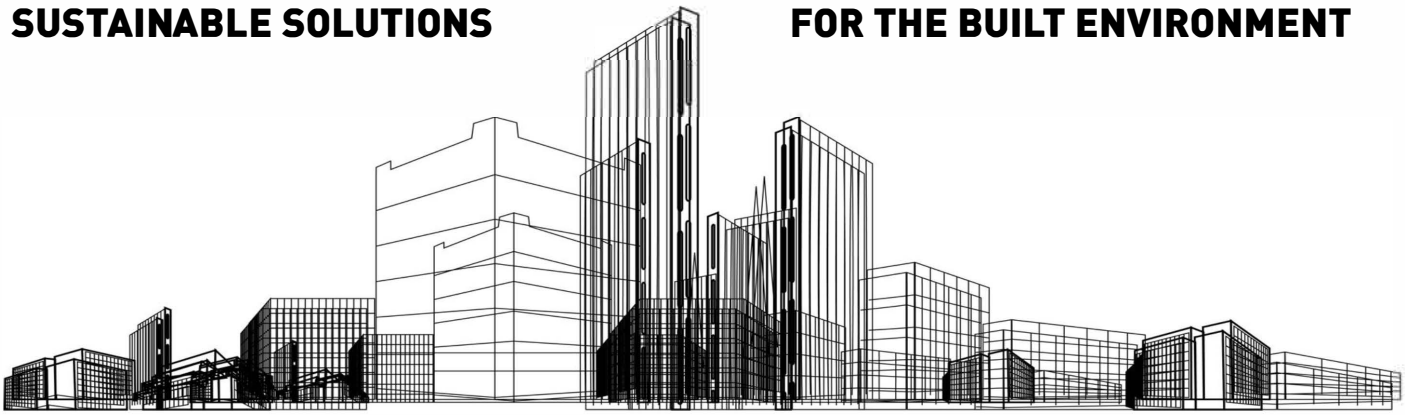
ENERGY
WATER
ENVIRONMENT

SAINT IGNATIUS COLLEGE - SENIOR SCHOOL

WATER SENSITIVE URBAN DESIGN REPORT V1

25TH MAY, 2021

SUSTAINABLE SOLUTIONS FOR THE BUILT ENVIRONMENT



Date:	25/5/2021
Project Number:	PJ516
Project Title:	Saint Ignatius Senior School
To:	Georgina Campbell (Clarke Hopkins Clarke) Greater Geelong City Council
From:	Patrick Phelan

Document Title: Water Sensitive Urban Design Report Version 1

Table of Contents

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ABN:50 800 554 305

1. Introduction

The purpose of this Water Sensitive Urban Design (WSUD) Report is to show the compliance of the Saint Ignatius Senior School development with Clause 53.18 Stormwater Management in Urban Development of the Geelong Planning Scheme. Clause 53.18 stipulates that water sensitive urban design must be integrated into the proposed design and measured with an accepted WSUD performance measurement tool. The tool used to undertake the calculation for the Saint Ignatius Senior School proposed design is Melbourne Water's STORM tool.

Geelong City Council recognizes the importance of stormwater management and the effects on the surrounding environment. Part of the SMP includes addressing how the proposed development responds to the principles and requirements of Water Sensitive Urban Design (WSUD). The main objectives for WSUD are:

- To achieve the best practice water quality performance objectives as set out in the Urban Stormwater Best Practice Environmental Management Guidelines, Victoria Stormwater Committee 1999 (as amended). Currently, these water quality performance objectives are:
  - Suspended Solids - 80% retention of typical urban annual load;
  - Total Nitrogen - 45% retention of typical urban annual load;
  - Total Phosphorus - 45% retention of typical urban annual load; and
  - Litter - 70% reduction of typical urban annual load.
- To promote the use of water sensitive urban design, including stormwater re-use.
- To mitigate the detrimental effect of development on downstream waterways, by the application of best practice stormwater management through water sensitive urban design for new developments.
- To minimise peak stormwater flows and stormwater pollutants to improve the health of water bodies, including creeks, rivers and bays.
- To reintegrate urban water into the landscape to facilitate a range of benefits including microclimate cooling, local habitat and provision of attractive spaces for community use and wellbeing.

2. Results

The minimum STORM rating for an effective WSUD is 100% using the STORM rating calculator. The STORM rating for the proposed Saint Ignatius Senior School development is 103%. Refer to Appendix A for the STORM Rating Report which shows all inputs and the STORM Rating Score.

The rating is achieved by the utilization of a 20kL rainwater harvesting system.

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Note that flow and detention requirements of Clause 53.18 are being undertaken by others. These are attached in Appendix C.

3. Conclusion

The proposed Saint Ignatius Senior School development complies with Clause 53.18 by meeting the minimum STORM rating requirement of 100%. It achieves a STORM rating of 103% via the implementation of 20kL rainwater harvesting system.

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Appendix A Stormwater Treatment Calculations and Requirements

A.1 STORM Rating Report

The Melbourne Water STORM Rating Tool report is shown below. Refer to architectural drawings for locations and sizes of raingardens.

Melbourne Water

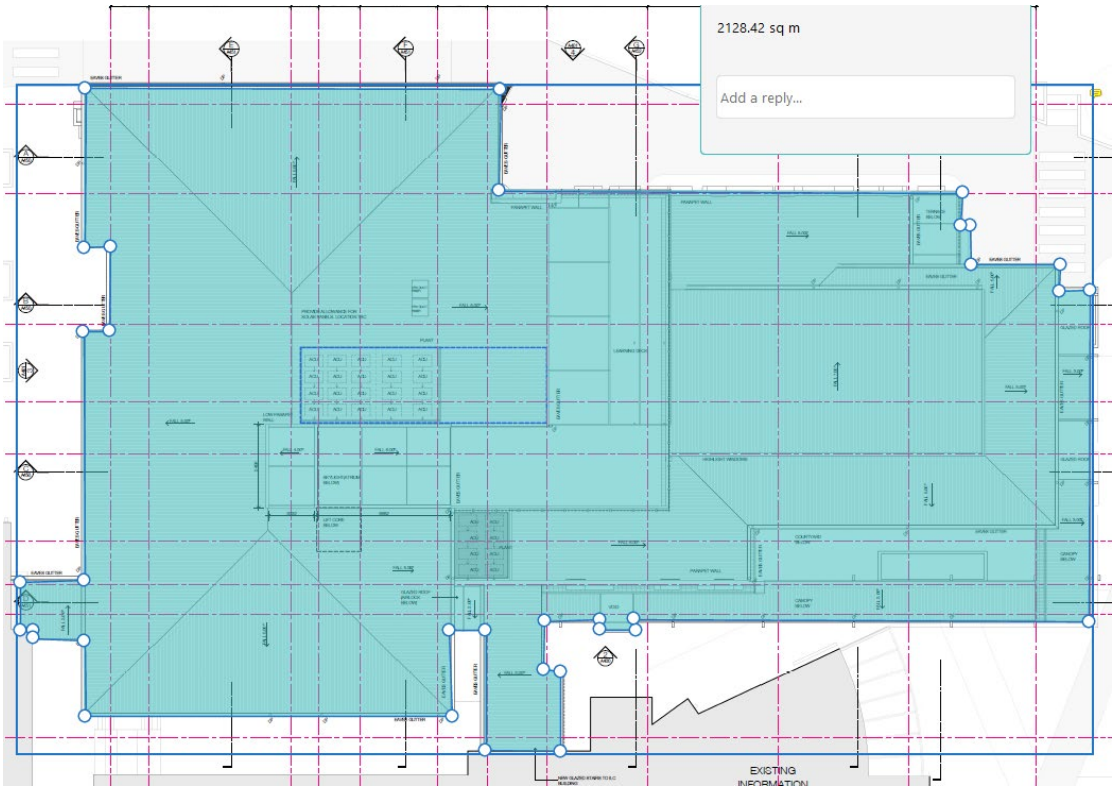
STORM Rating Report

TransactionID:	1103398
Municipality:	GREATER GEELONG
Rainfall Station:	GREATER GEELONG
Address:	27 Peninsula Drive
	Drysdale
	VIC 3222
Assessor:	Patrick Phelan
Development Type:	Other
Allotment Site (m2):	3,803.00
STORM Rating %:	103

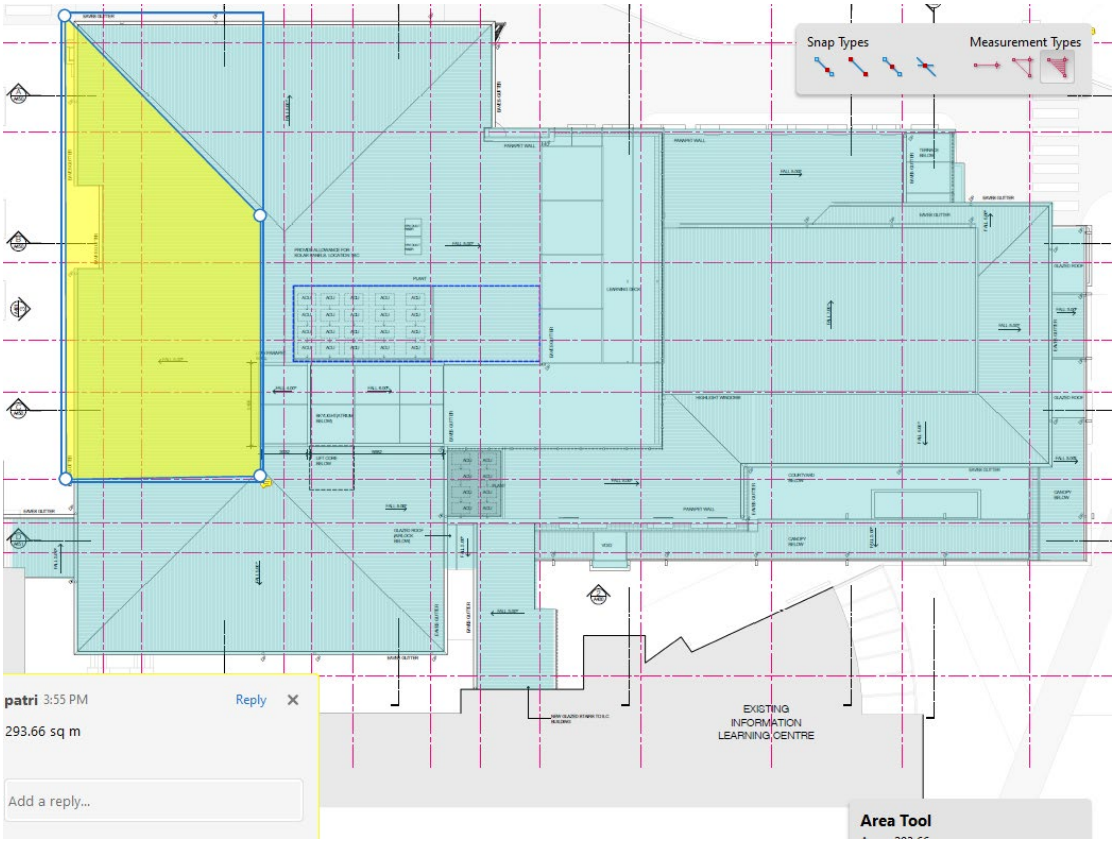
Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof - Rainwater Harvested	1,835.00	Rainwater Tank	20,000.00	100	120.00	54.00
Roof - No Rainwater	293.00	None	0.00	0	0.00	0.00

A.2 Details of Rainwater Harvesting System

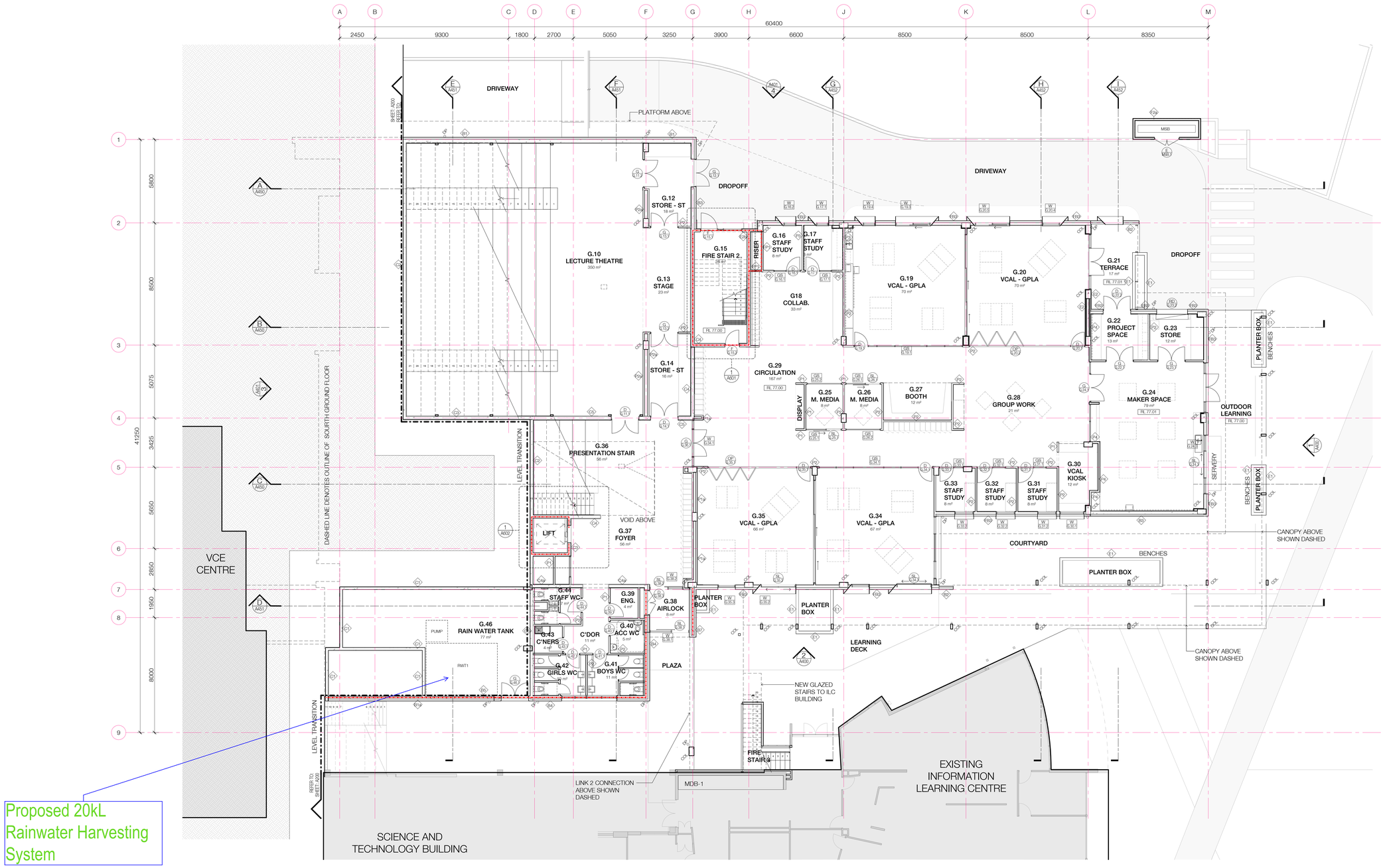
Total Catchment of roof.



Total catchment of roof minus the non-treated area.



Refer to the attached drawing showing rainwater harvesting system on the plans.



1 Floor Plan - North Ground
Scale 1 : 100

Revision/Issu		Date
-	Consultants Coordination Issue 01	29.03.2021
a	Consultants Coordination 02	13.04.2021

Use figured dimensions in preference to scale.
Verify dimensions at job before shop fabrication.
Read drawing in conjunction with specification.
© ClarkeHopkinsClarke

PRELIMINARY

Legend - General

- DOOR NUMBER
- OPERABLE WALL NUMBER
- ROLLER DOOR NUMBER
- ROLLER SHUTTER NUMBER
- WINDOW NUMBER
- GLAZED SCREEN
- RELATIVE LEVEL
- PROPOSED FINISHED FLOOR LEVEL
- DENOTES DEMOLISHED ITEMS

Legend - Wall Types

- CONCRETE
- STUD WALL
- BLOCK WALL
- BRICK VENEER WALL
- BLOCK VENEER WALL
- PRECAST CONCRETE WALL
- FIRE RATED WALL
- SMOKE WALL
- FULL HEIGHT WALL
- WALL TYPES REFER TO WALL TYPES DRAWING
- READ THIS DRAWING & WALL TYPES DRAWING IN CONJUNCTION WITH THE MATERIALS SCHEDULE
- FOR EXTENT OF WALL TYPES TO RESIDENT ROOM AREAS, REFER TO TYPICAL DRAWING

General Notes

1. REFER TO FIRE SAFETY ENGINEERING REPORT FOR EXTENT OF FIRE SEPARATION AND PERFORMANCE SOLUTIONS DESIGNED FOR THIS BUILDING.
2. ALL STUD WALLS ARE TO BE METAL STUDS.
3. UNLESS NOTED OTHERWISE, ALL FRAMES TO EXTEND TO THE UNDERSIDE OF THE SLAB/ROOF OVER. REFER TO WALL TYPE SCHEDULE AND ACOUSTIC REPORT FOR WALL LINING HEIGHTS AND ACOUSTIC INSULATION.
4. IMPACTCHEK TO BE INSTALLED FROM FLOOR TO 2400AFFL.
5. ALL INTERNAL PARTITION SETOUTS ARE DIMENSIONED TO THE FACE OF THE STRUCTURE ONLY, EG. STUD, BLOCK, CONCRETE, ALUMINIUM FRAME. IT DOES NOT INCLUDE THE THICKNESS OF FINISHES.
6. ALL OPENING DIMENSIONING SETOUTS ARE DIMENSIONED TO THE FACE OF FINISHES OF WALL CONSTRUCTION ONLY, EG. EXTERNAL CLADDING, INTERNAL PLASTERBOARD / PLYWOOD LINING. IT DOES NOT INCLUDE THE THICKNESS OF INTERNAL FITOUT ELEMENTS ON WALL SUCH AS PINBOARD, MDF / PLYWOOD PANELS AS PART OF JOINERY ASSEMBLY.
7. ALL EXTERNAL WALLS MUST BE OF NON-COMBUSTIBLE CONSTRUCTION AND PACKING TO BE FIBRE CEMENT SHEET OR APPROVED SIMILAR.
8. ALL WALL FRAMING TO BE IN ACCORDANCE WITH STRUCTURAL DRAWINGS
9. ALSO REFER TO ARCHITECTURAL DRAWINGS DETAILS **A700** SERIES FOR FURTHER DETAIL AND DIMENSIONS.
10. ALL EXTERNAL CORNERS OF FACE BRICK WALLS TO ACHIEVE FULL BRICK / HALF BRICK STRETCHERBOND PATTERN.
11. BUILDER TO ADVISE ANY DISCREPANCIES BETWEEN ALL DRAWINGS / SPECIFICATION TO ARCHITECT AND SEEK CLARIFICATIONS PRIOR TO CONSTRUCTION.

Keynote Legend

COL	COLUMN
DP	DOWNPIPE
MSB	MAIN SWITCHBOARD
PUMP	PUMP
RWT1	RAINWATER TANK - TYPE 1

ClarkeHopkinsClarke

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Collingwood Victoria 3066
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Sydney
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Scale	1: 100 @ A0
Date	18.01.2021
Drawn	AN
Architect	JC/NW

Project
Saint Ignatius College
27 Peninsula Drive,
Drysdale VIC 3222

Drawing
Floor Plan - North Ground Floor

Drawing No.
180159/A201 a

A0

Appendix B Construction Stormwater Management Plan

Stormwater management during the construction phase shall be undertaken by mitigation of the following pollutants generated by construction site during a rainfall event.

- Dust
- Silt
- Mud
- Gravel
- Stockpiled materials
- Spills/oils
- Debris/litter

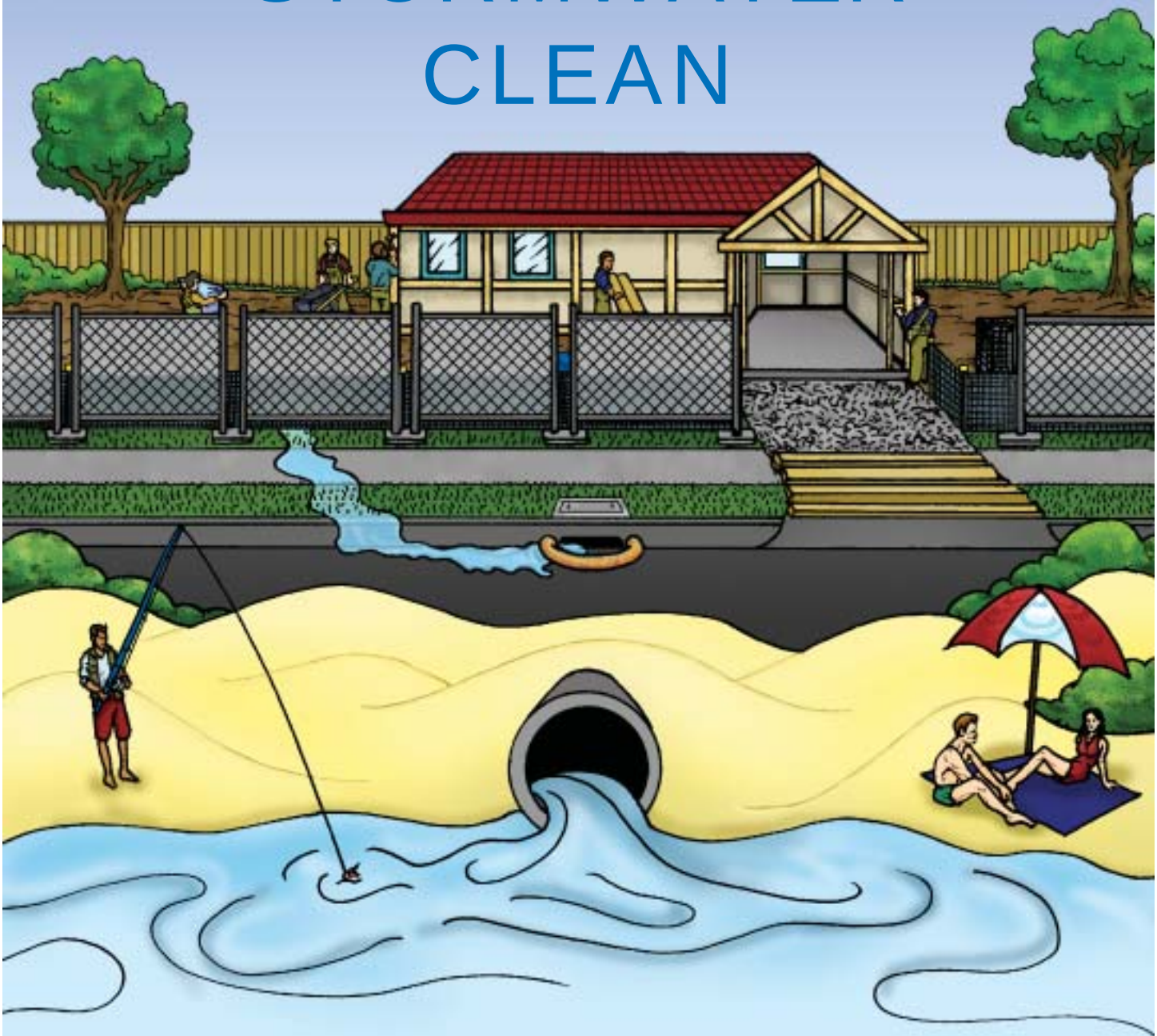
The treatment mechanisms suggested are as follows but not limited to:

- Construction rubbish strategy where site is kept clean from debris and litter
- Temporary grids to stop mud from the site being deposited on the roadway
- Silt filters under grates to prevent silt from entering the stormwater system
- Gravel filters

More information is available from “Keeping Our Stormwater Clean – A Builder’s Guide” by Melbourne Water which is attached. A comprehensive and site specific construction stormwater management plan shall be undertaken by the lead contractor prior to commencement of site works based on this document.

Attachment: Keeping Our Stormwater Clean – A Builder’s Guide

KEEPING OUR STORMWATER CLEAN



A BUILDER'S GUIDE

Information to help you control sediment and litter from your building site and comply with Council and State regulations

Melbourne Water

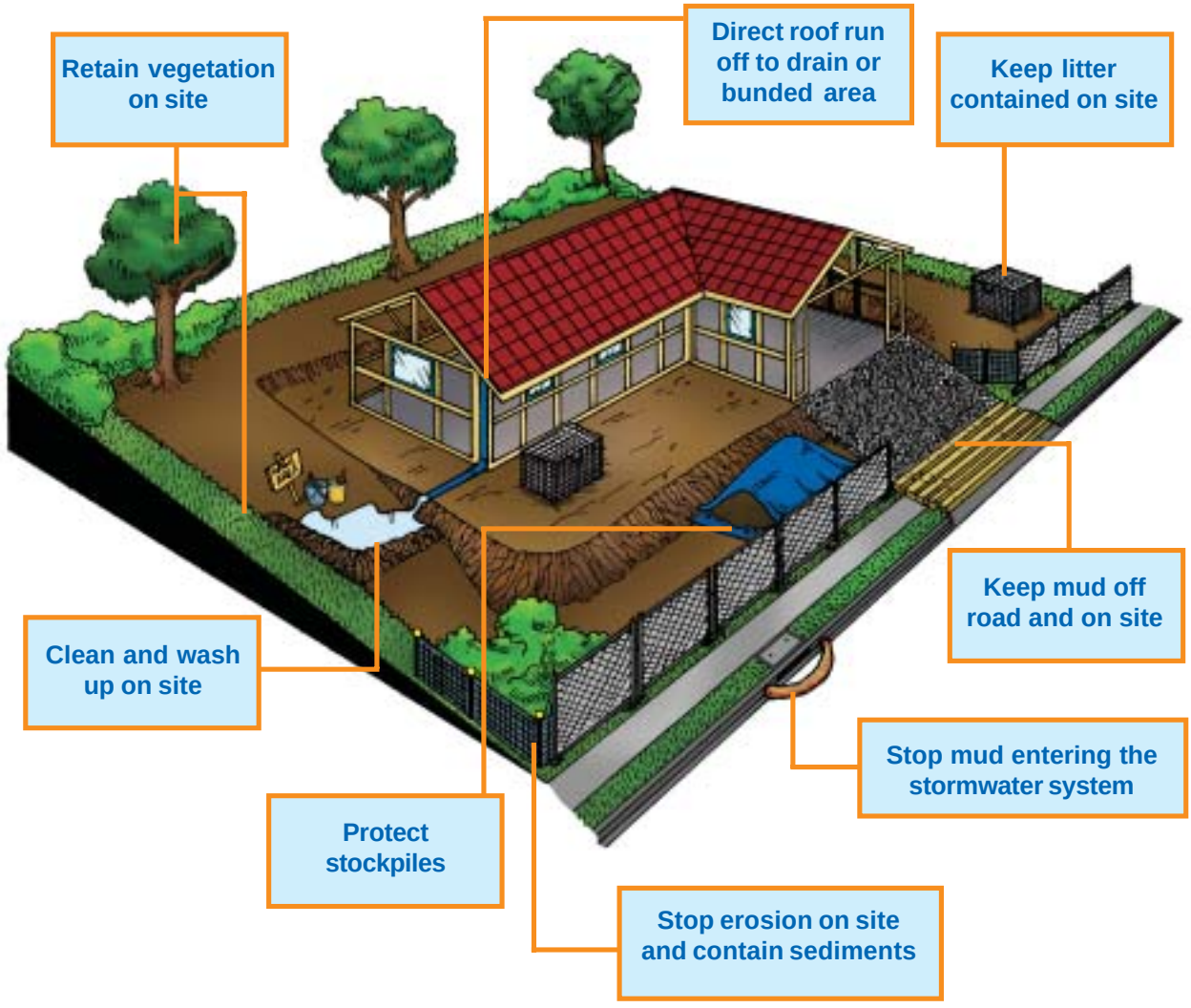
Victoria The Place To Be

EPA VICTORIA

ACKNOWLEDGEMENTS

This revised booklet was originally produced with the support of the Victorian EPA, Melbourne Water, Cities of Kingston, Casey, Hume, Melbourne, Moreland and Moonee Valley.

Check Council requirements and plan before you start work on site



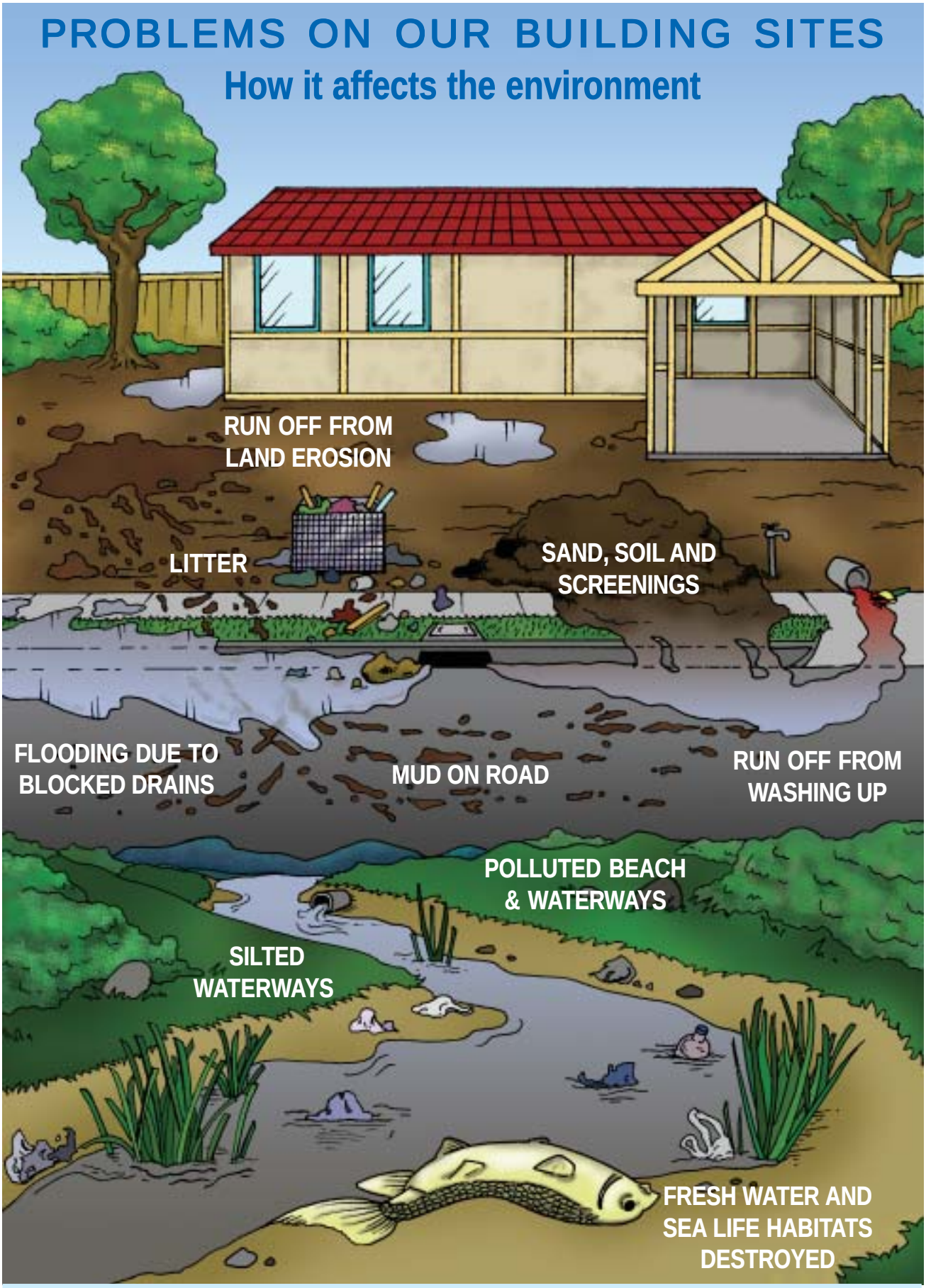
Supplier information for sediment & erosion control on page 3

CONTENTS

6 SITE RULES TO KEEP STORMWATER CLEAN

PROBLEMS ON OUR BUILDING SITES

How it affects the environment



WHY DO I NEED TO PROTECT OUR ENVIRONMENT?

It's the law!

Sediment from building sites can pollute stormwater. There are State and local council laws which make this an offence.

The developer or person managing the building site has the responsibility of making sure that the stormwater is not polluted.

Penalties apply for polluting stormwater.

To enjoy using our environment - now and in the future

Stormwater is not treated and carries pollution to local waterways and bays. Pollution in our stormwater can lead to short and long term damage to our environment.

To benefit builders

The site looks good (which is good for attracting new customers) **and you'll be helping to protect our environment**.

The site has fewer hazards. A well organised site has less loose material lying around causing a hazard. This reduces health and safety issues on a building site.

Downtime is reduced. A well managed and organised site is more efficient. This saves time and money.

USEFUL SUPPLIER INFORMATION

This information is provided for helpful contact details only. The companies are not listed in any particular order and are not necessarily recommended over others that may provide similar services.

SEDIMENT CONTROL

Approximate Price:
Geofabric fencing
100 m roll from $55 to $130
stakes $12 for 10
Filter socks unfilled: 2 m $4.50 filled $8 - $25

Geofabrics Australasia
03 8586 9111 www.geofabrics.com.au
Products: silt fencing

Southern Geosynthetics Supplies
0419 478 238 www.geosynthetics.com.au
Products: Silt fences, Silt Sausages

Statewide River & Stream Management
03 9702 9757 www.stateplanthire.com
Products: silt fence, stakes, silt logs
Installation service and site kits
Approx cost: $220 for 20 m frontage installed, $88 self installation

Treemax
03 98787 4111 www.treemax.com.au
Products:filter fence, silt worm, silt sock

Zerosion
0408 351 566 www.zerosion.com.au
Products: silt fence installation
Approx cost: $215 for up to 20 m frontage

STABILISED DRIVEWAYS

For aggregate look under sand, soil and gravel in the Yellow Pages
Recycled aggregate available from major suppliers.

TEMPORARY DOWNPIPE

Available from major plumbing suppliers

Art Plastic 25 m rolls of temporary plastic downpipe approx: $25

Temporary Flexible Downpipe
03 9786 3711 www.tfd.com.au
$135 per kit - does 2-3 16 sq houses

OTHER EQUIPMENT

Coates Shorco Sykes 131994
Supply : silt fence $125 100 m
Hire: Rumble Grids $180 p/week for 2 panels
Hire: Environmental settlement tanks 4 m tank $542 p/week

PORTABLE TOILETS

See Toilets – Portable in the Yellow Pages

TEMPORARY FENCING

See Fencing Contractors in the Yellow Pages
Australian Temporary Fencing 131716
Victorian Temporary Fencing 03 9484 4000

BRICK AND TILE CUTTING

Slop Mop Recycling Products
www.slopmop.com.au 0418 825 301 Brikasaurus: capture and recycle waste water for brick and tile cutting operations.
Slopmop: water delivery & waste clean up system for use behind concrete saws and grinders.

Useful information is available from:

Master Builders Green Living Builders
www.mbav.com.au
HIA GreenSmart Program
www.greensmart.com.au
Keep Australia Beautiful Victoria – CleanSites Program
http://www.kabv.org.au/
Victorian Litter Action Alliance
http://www.litter.vic.gov.au
Environment Protection Agency Victoria
www.epa.vic.gov.au
See Publication 981 – Reducing stormwater pollution from construction sites
Melbourne Water
www.melbournewater.com.au

SITE RULE 1

Check Council requirements and plan before you start work on site.

Questions to ask BEFORE you start

Planning, BEFORE you start a job, will make a big difference to how well you manage your site. Check Council requirements for site management. Complete a site management plan (one can be found at the back of this booklet).

Where is the lowest point on the site?

Water always runs to the lowest point. It is important to know where this point is when planning your site. It will affect where you put your crossover, stockpile materials and sediment fence. Leave a buffer of vegetation along the lowest boundary.

Where will I put the crossover?

Try to put the crossover as far away from the lowest point as possible. As water runs to the lowest point it is more likely to be wet and muddy. [See Page 16.]

Where will I keep my stockpile?

Stockpiles are best kept on site, as far away from the lowest point as practical. [See Page 12.]

Where will I build my sediment control fence?

Sediment control fences should be built on the lowest side/s of a site prior to erecting a temporary fence. A flat site may not need sediment control fences. [See Page 9.] These are a primary management measure to keep sediment on site.

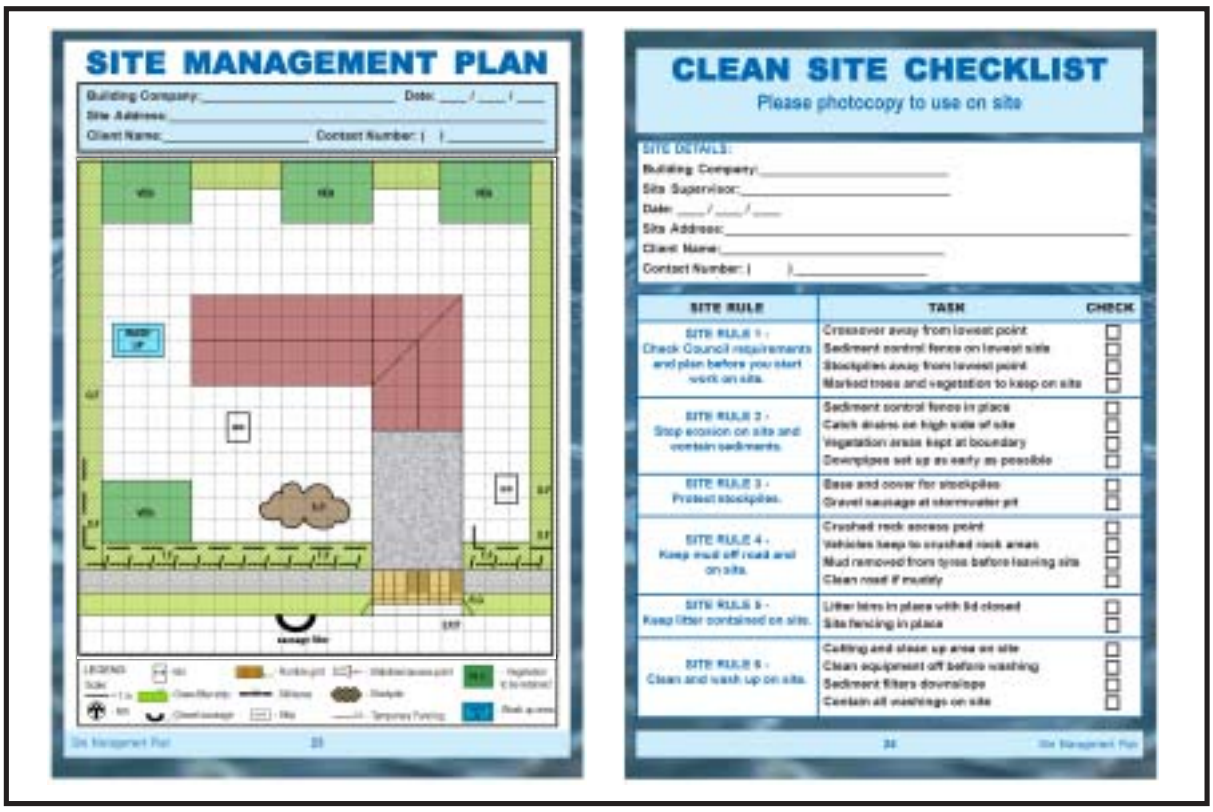
Which trees and vegetation will be kept on site?

Rope or fence off the areas you are going to keep. Keeping vegetation such as grassed areas will help to prevent damage to the surface of the site later on and may trap sediment. [See Page 7.]

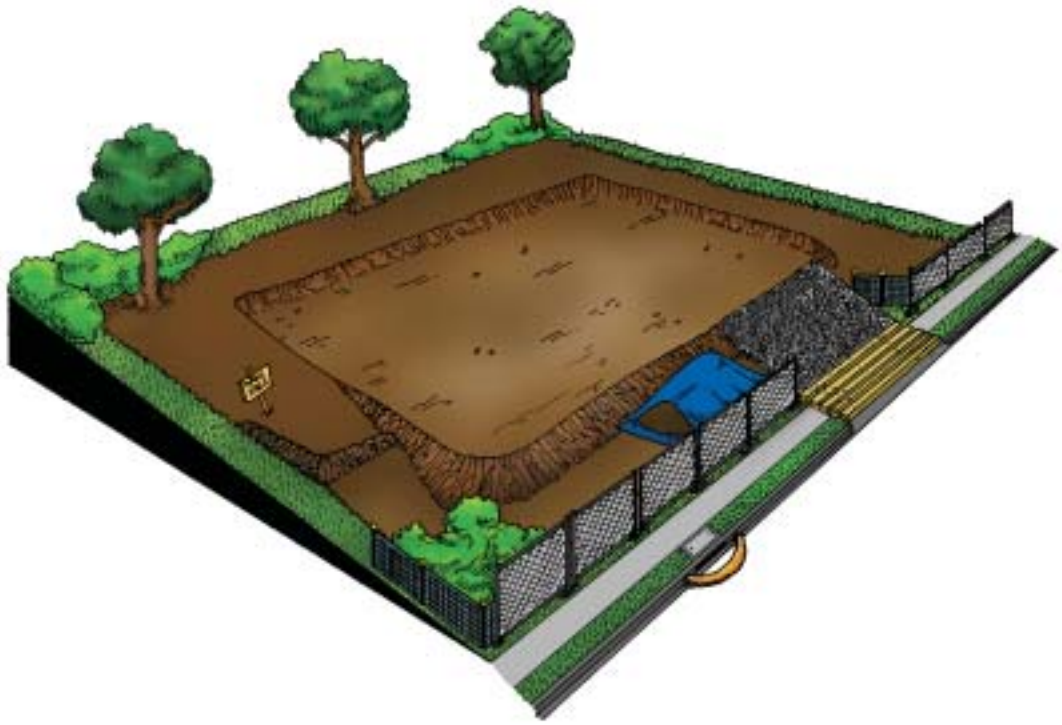
Why fence my site?

Many councils require sites to be fenced. Site fencing helps to keep building activities to the site, helps stop movement of litter, and helps to keep a site safe by stopping members of the public wandering on site. [See Page 20.]

SITE READY TO START JOB



For copy of plan & checklist photocopy pages 23 & 24.



SITE RULE 2

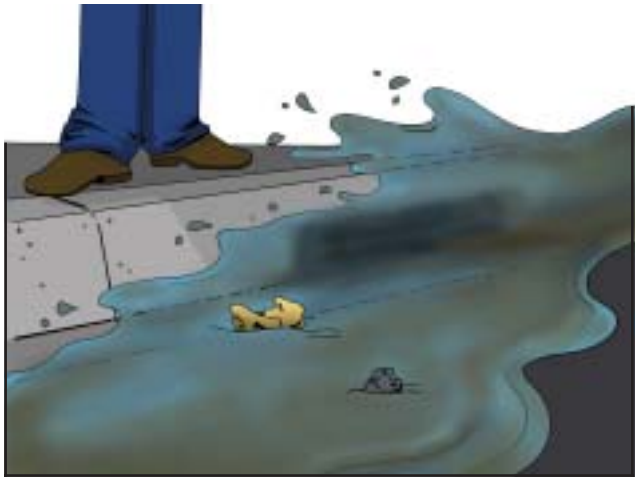
Stop erosion and keep sediment on site

Why is erosion a problem?

Sediment escaping from building sites can:

1. Make roads and footpaths slippery for vehicles and pedestrians, increasing public liability risk.

2. Enter the stormwater system and make stream and river water cloudy which can kill plants and animals in creeks and the bay.



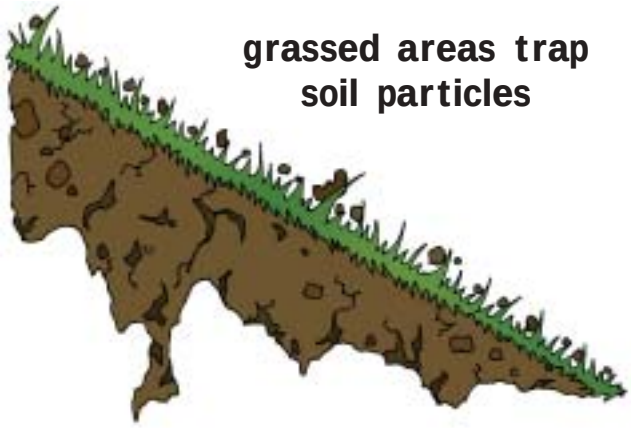
3. Cause blockages to the stormwater system including the side entry pit and pipes, increasing the chance of flooding and requiring regular cleaning.

4. Overload and clog local stormwater filtration systems such as raingardens and swales.

METHODS TO CONTROL EROSION

Control Method 1 - Keep areas of vegetation as a buffer strip at the site boundary.

To prevent sediment leaving site use existing grassed areas and a sediment control fence.



Vegetation helps protect the soil from the effects of rain and surface water by:

- Slowing the flow of water across the ground. Fast water is able to carry more soil particles off site
- Holding the soil together and minimising erosion
- Acting as a filter to trap soil particles.

Decide what areas of vegetation you are going to keep on site. Mark and protect trees, shrubs and grassed areas that you are keeping. Then apply for the relevant permits to remove vegetation.

Protect areas close to the boundary, drains and gutters, and where surface water flows may carry sediment off site.

Control Method 2 - Early downpipe connection

Connecting downpipes to the stormwater or onsite detention system has a number of benefits:

- Less drainage problems on site
- Less mud on site after rain
- A safer site
- Reduce damage to building foundations
- Less downtime after storms
- Projects get finished sooner.

Aim to have the downpipes connected as soon as the roof is installed (temporary or permanent).

Control Method 3 - Pipe roof water onto a grassed or bunded area.

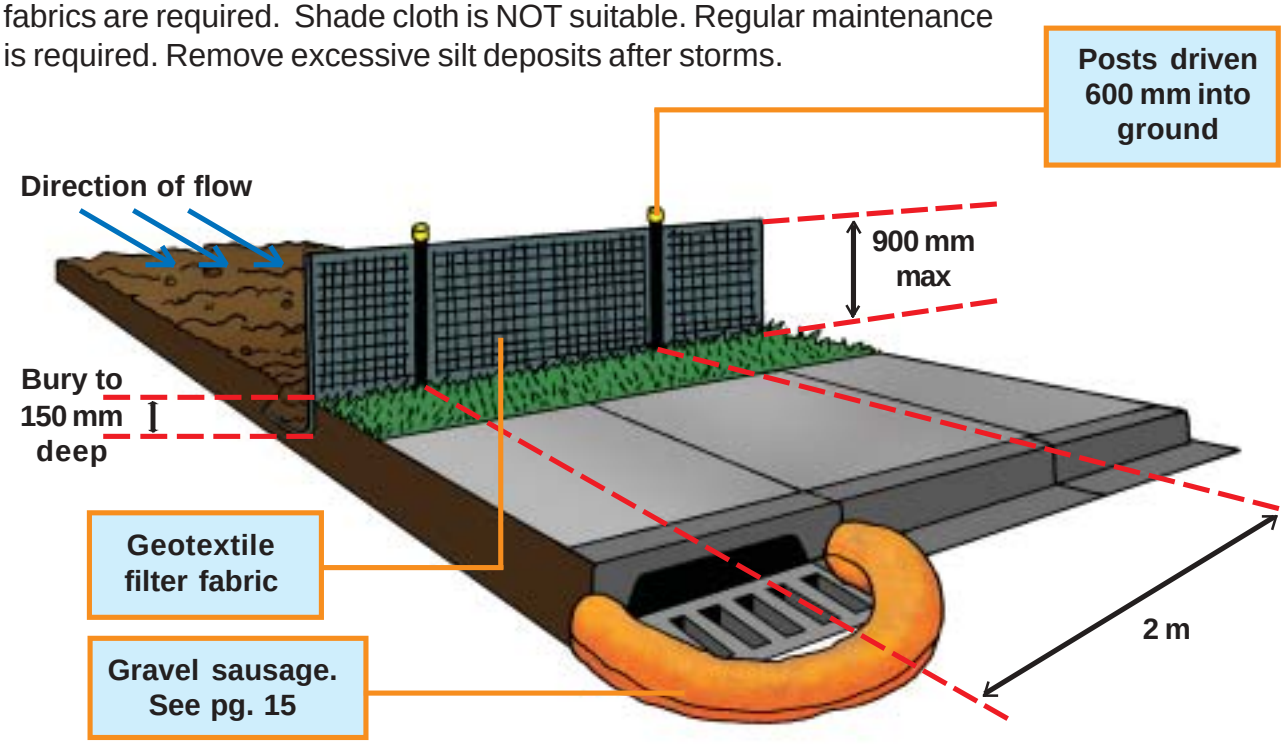
If you cannot connect to the stormwater system, pipe the water away from the building onto a vegetated area where there is good ground cover or to a bunded area.

This lets water seep into the ground with less damage to the surface of the soil.

METHODS TO CONTAIN SEDIMENT ON SITE

Method 1 - Sediment Control Fences

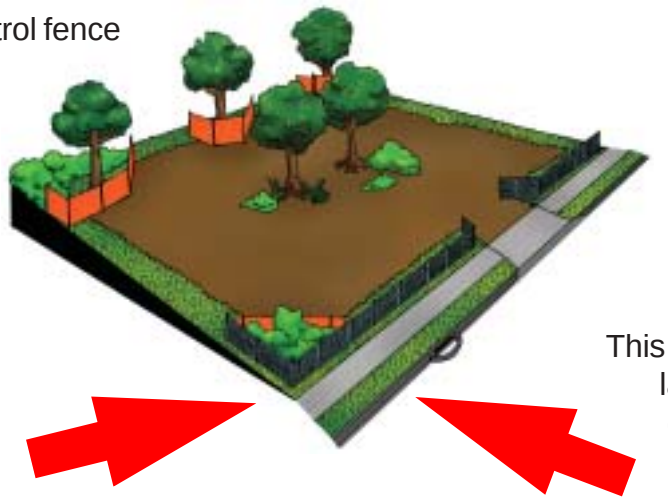
Sediment control fences stop sediment from being washed off site. The fence allows muddy water to pond behind it and for sediment to settle as the water slowly filters through. Geotextile fabrics are required. Shade cloth is NOT suitable. Regular maintenance is required. Remove excessive silt deposits after storms.



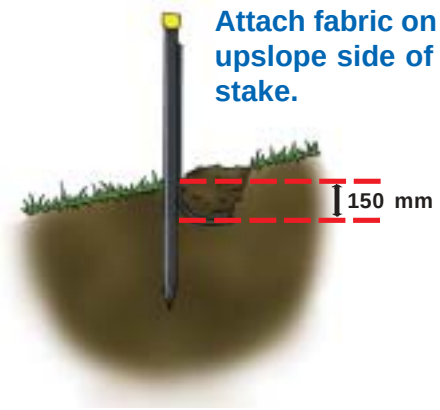
TO BUILD A SEDIMENT CONTROL FENCE:

a) Identify the low point of site.

Place sediment control fence along boundaries where the low point is.



This is the point where the land will allow water to carry sediment off the building site.



b) Dig a trench along the fence line before temporary site fencing is installed.

The trench will be used to bury the base of the sediment control fabric.

The trench should be 150 mm deep.

c) Put in 1500 mm wooden posts (38 mm) or star pickets.

Put 1.5 m star pickets at a maximum of 2 m apart and 600 mm deep.

Put 1.5 m wooden posts (38 mm) at 1.2 m intervals (max 2 m) and 600 mm deep.

d) Fix geotextile to posts

Geotextile material allows water to pass through but traps sediments.

Use cable ties or staples to attach the geotextile to the upslope side of the fence posts.

Only join fabric at the pickets with a 150 mm overlap (wrap around post).

e) Spread volume of water.

Put a star picket 1.5 m upslope of the others every 20 m (if the fence is longer than 20 m). This spreads the volume of water that flows through each section of fence.

Turn ends up slope to allow for ponding.

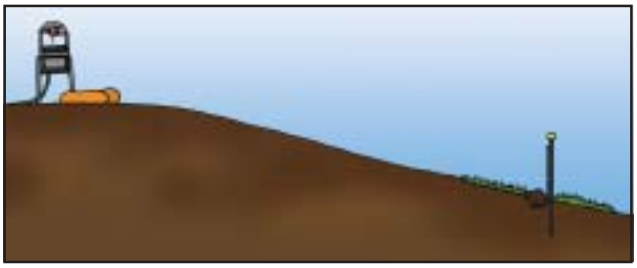
Method 2 - Control dust and slurry from cutting

A large amount of dust can be made from cutting materials such as concrete, bricks and tiles. When mixed with water this material can be turned into slurry and washed into waterways. Cement changes the acidity of water which may then kill water plants and animals. The following methods will help keep this waste on site and out of the waterways:

a) Cut materials on site

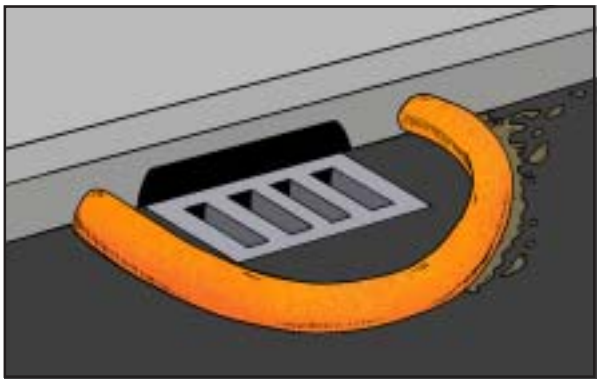
Choose a set area to do all your cutting. This area should be on the building site and away from all stormwater drains.

Equipment is available that captures water used in the cutting process (see page 3).



b) Put sediment control filters downslope

Sediment logs should be placed downslope to catch cutting slurry. A back-up sediment fence may also be used.



c) Use a gravel sausage or sediment log

When cutting must take place near stormwater drains, use gravel sausages or sediment logs.

Alternatively, you can buy sleeves from geotextile companies and fill these with sand.

Always clean up and correctly dispose of captured sediment.

d) Clean up when finished

When you have finished cutting, clean up your equipment in the cutting area.

Use a broom to clean up and get rid of the slurry where it can't get into the stormwater system. Dispose of in waste container

DO NOT HOSE THE SLURRY AWAY

SITE RULE 3

Contain stockpiles on site

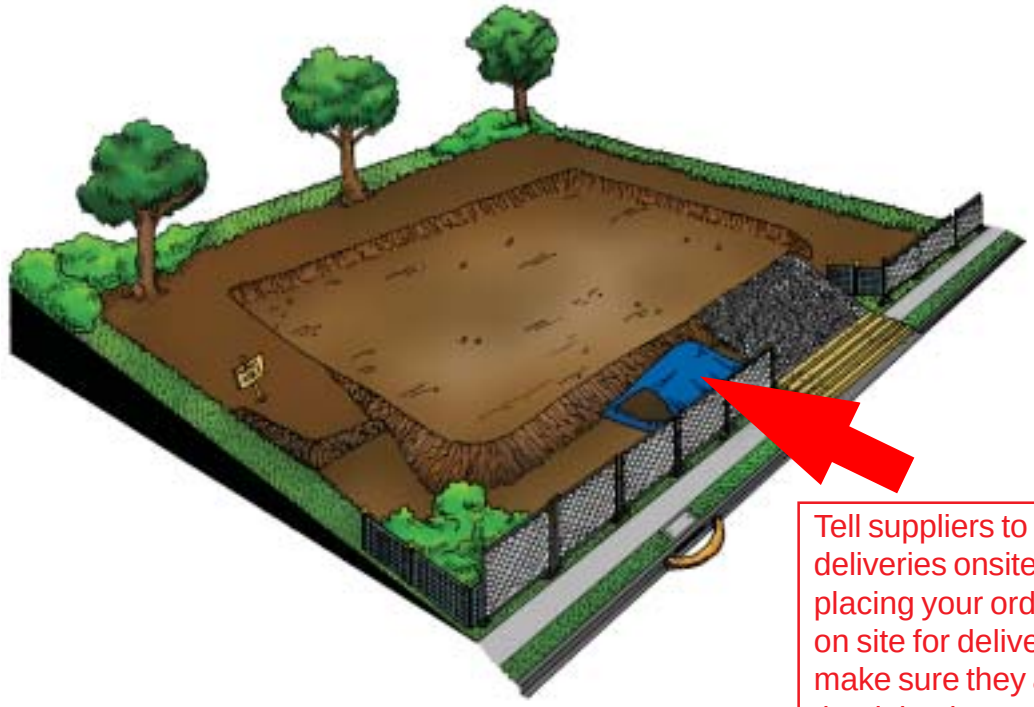
Why are sand, soil and screenings a problem?

Sand, soil, screenings, dust or sludge from concrete and brick cutting, and other materials escaping from building sites can cause many problems.

Putting stockpiles such as sand, gravel, topsoil and mulch across footpaths and roads will cause a hazard to both vehicles and pedestrians.

Sediment can smother stormwater filtering systems including swales and raingardens.

Stockpiles should be stored on site, not on footpaths or roads.

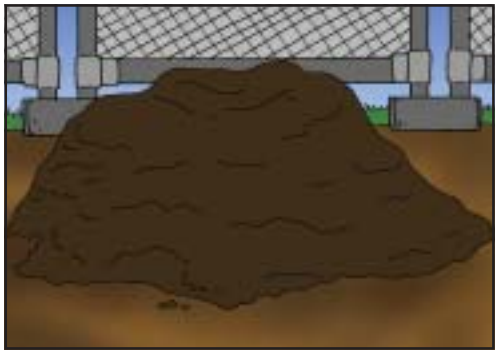


Tell suppliers to place deliveries onsite when placing your order or be on site for deliveries to make sure they are put in the right place.

Stockpiles not stored properly can get washed or blown away and pollute the stormwater.

This is particularly true of stockpiles that:

- Are high
- Have steep sides
- Are put on hard surfaces where they can be blown or washed away.



KEEPING STOCKPILES ON SITE

Place the stockpile in a designated area on site, and upslope of the sediment control fence.

If exposed for some time, stockpiles should be covered with a tarp.

In some cases it may be impossible to store stockpiles on site. In this case, a different set of control methods will be used.

WHEN UNABLE TO STORE STOCKPILES ON SITE

You may have to store a stockpile off site (although never on the footpath, gutter or road). Contact the council to make sure that you have the appropriate council permits.

The council will tell you how stockpiles stored off site are to be managed. Materials may be stored on tarps or on pallets. Containers such as rubbish skips with opening sides that you can get into easily are a good idea.

Material must not get into drains, gutters or the stormwater system

The following control methods can be used when storing materials or working off site.

Method 1 - Cover Stockpile

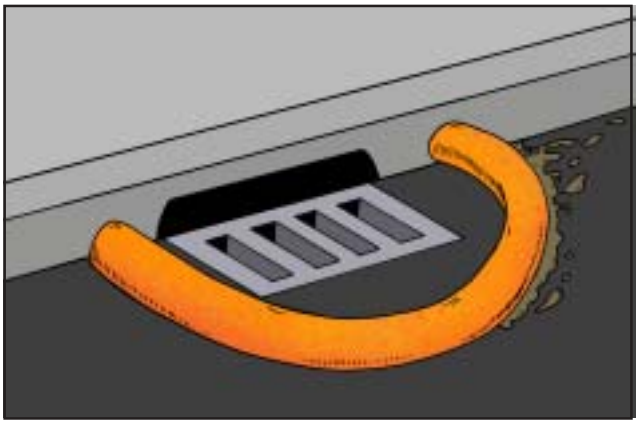
a) Place a tarp, plastic or bunded pallet under the area where the stockpile will be placed.

b) Place a secured covering over the stockpile.

c) Then place sediment control logs around the downslope base of the stockpile.

Method 2 - Protect Downstream Stormwater Pit with a Gravel Sausage or Sediment Log

A gravel sausage or sediment log is a temporary collection device that can be used when stockpiles are stored or cutting is done off site.
It is also a useful precautionary measure at all sites.

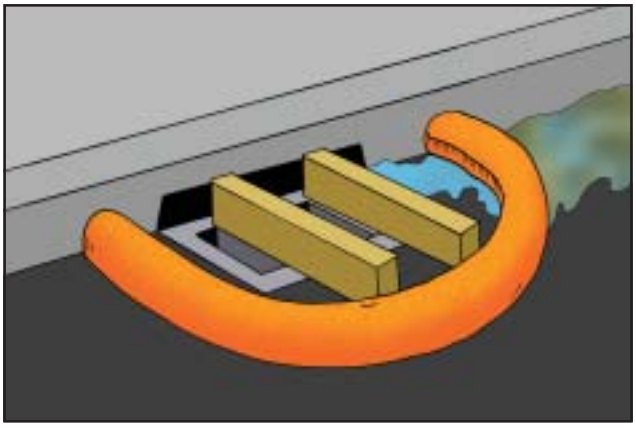


TO BUILD A GRAVEL SAUSAGE:

a) Make the sausage sleeve

A gravel sausage is made from a geotextile sleeve filled with 25 - 50 mm gravel.

The gravel sausage should be 150 mm high.



b) Put the gravel sausage across the opening of the inlet pit

Make sure that the sausage is tight with the kerbing on the upslope side of the inlet pit and extends beyond the grate.

There should be a 100 mm gap between the front of the pit and sausage. Use wooden blocks to keep the 100 mm gap.

c) Clean out gravel sausage regularly

When soil and sand builds up around the gravel sausage, this should be collected and disposed of on site.

Regular maintenance is required.

DO NOT HOSE SEDIMENT DOWN THE GUTTER

SITE RULE 4

Keep mud off road and on site

Why is mud a problem?

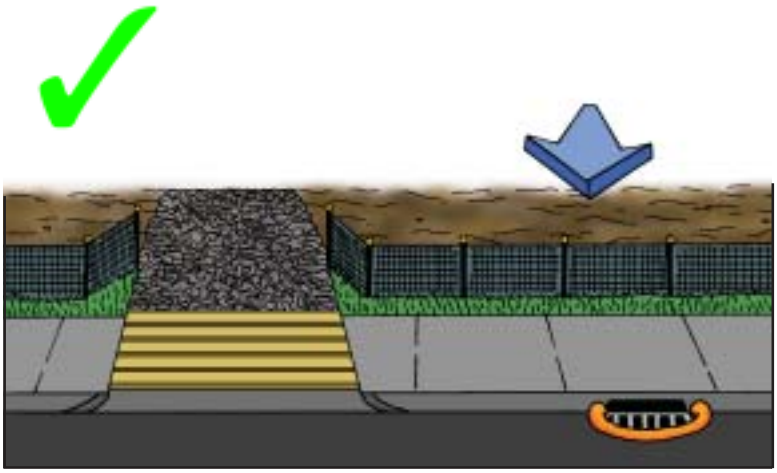
Two things happen when vehicles go on and off the site:

1. The surface area of the site is damaged making it dangerous.

2. Mud is carried back onto the roads and footpaths, and washes into the stormwater system.

METHODS TO CONTROL MUD

The following simple methods will help you to protect the surface of your site and help stop vehicles from dropping mud on the road from their wheels. The best way to do this is to put crushed rock on the crossover or access point of your building site.



Putting crushed rock on the access point of your site is a good way to prevent damage and provide a dry access point for vehicles. Where possible park vehicles off site.

Make sure gravel does not collect in the gutter or on the footpath.

Control Method 1: Build a crushed rock crossover

Remove a 3m or greater strip of soil from road (or where concrete crossover ends) to nearest building point or a minimum of 5 m.

Use road base or 40 mm aggregate or crushed rock to a depth of 200 mm.

Restrict vehicle access to this point.

Control Method 2: Keep to crushed rock path

Only drive where you need to. Keep to a set path (preferably on crushed rock).

Control Method 3: Remove mud from tyres

Use a shovel to remove mud from truck tyres before leaving site.

Control Method 4: Clean road

If mud goes on road, remove as much as possible and put it back on site.

Use a broom or a shovel.
DO NOT USE A HOSE.

SITE RULE 5

Keep litter contained on site

Why is litter a problem?

Many building sites have both building rubble and other rubbish spread across them.

This causes many problems:

You may now have an **UNSAFE WORK ENVIRONMENT!**
This could increase the chance of legal and public liability problems

Litter blowing off site can block stormwater drains.

Litter may spoil local creeks and eventually find its way to the coast.

METHODS TO CONTROL LITTER

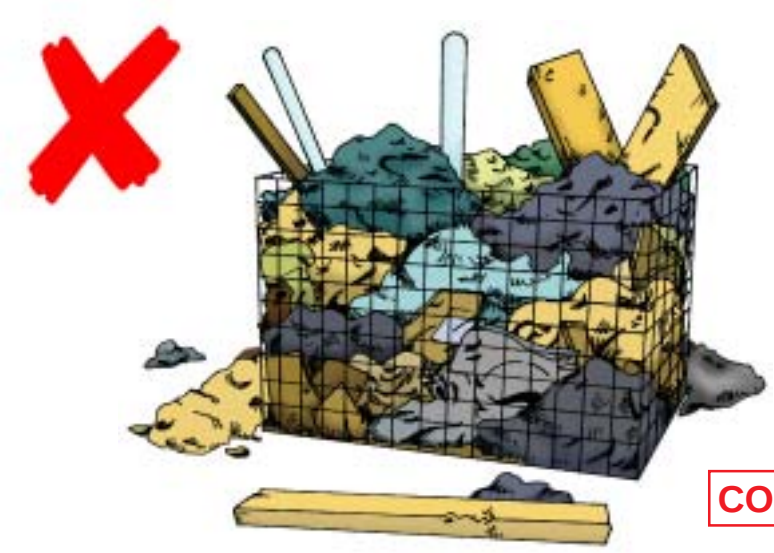
The following simple methods will help you to stop litter leaving your site or being a hazard on site.

Control Method 1: Litter bins or covered skips

A mesh bin with a closeable lid is suitable for larger items like cardboard boxes, plastic wrapping and polystyrene.

Mesh to be 50 mm or smaller

A smaller bin is okay for smaller rubbish like paper, food wrapping and drink containers that may be blown off site. Council bins may be restricted from building sites.



Empty the litter bin regularly. Don't allow overflow. Where possible, collect the materials from the litter bin for recycling and /or keep different materials in separate bins.

CONSIDER A RECYCLING BIN

Control Method 2: Site fencing

Site fencing will help to keep litter from being carried off site by wind or water and provide security.

A FENCE DOES NOT NEGATE THE NEED FOR A BIN.

Check council requirements for temporary fencing and avoid trip hazards on footpath.

Remember to install a sediment control fence prior to installation of the temporary fence.

SITE RULE 6

Clean and wash up on site

Why is washing up a problem?

When cleaning up after painting, plastering or concreting it's most important to keep the wash water out of the stormwater system.

Problems to the environment include:

1. Oil based paints form a thin film over the surface of the water. This starves water plants and animals of oxygen

2. Paints and petrol chemicals can contain toxic compounds

3. Concrete changes the acidity of waterways which can kill water plants and animals. Concrete washings can harden and block drains

4. Roads around a building site can become dirty, slippery and dangerous.

METHODS TO CONTROL WASHING UP

The following simple methods will help you to stop the contamination of stormwater from paint, plaster or concrete washings.

Control Method 1: Have a set washing up area

Choose a set area to do all your washing up. This area should be on the building site and away from all stormwater drains. It should be bunded and contain wash out barrels.

You could use the same area you have chosen for tile and brick cutting.
Contain chemicals and slurry onsite.
Put sediment control fences downslope.

NOTE: SEDIMENT CONTROL FENCES WILL NOT STOP CHEMICALS

Control Method 2: Get rid of concrete slurry on site

Collect wash water from concrete mixers and pumps in a wheel barrow and get rid of it in your wash area. You can also safely get rid of concrete slurry by tipping small amounts in a ditch lined with plastic or geotextile liners. When the water evaporates or soaks into the surface the solids can then be put into a skip bin or recycled in construction or as road base.

Control Method 3: Clean equipment off before washing

Brush dirt and mud off equipment before you wash it. Spin rollers and brushes to remove paint before you wash them in a wash out bin.

You will then need less water to clean this equipment.

Control Method 4: Clean painting tools carefully

Use one container to wash the brush and another to rinse it. Let the first container stand overnight to let solids settle. Then pour out the water on to the ground if it is not too dirty and put settled solids in a bin.

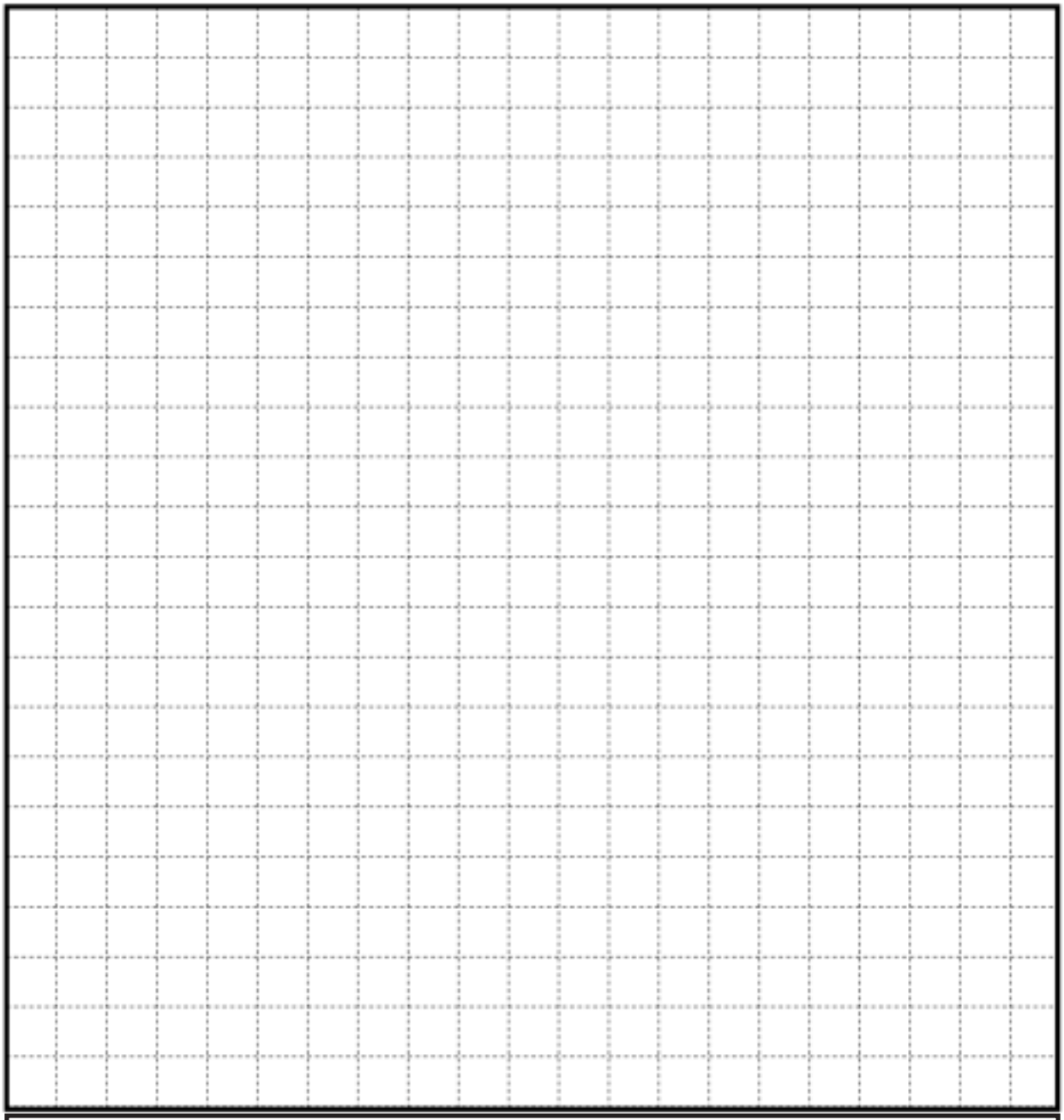
Wash oil based paints in solvent baths until clean. DO NOT PUT THE SOLVENT ON THE GROUND. Contact a waste disposal company for removal.

SITE MANAGEMENT PLAN

Building Company:_____ **Date:** ____ / ____ / ____

Site Address:_____

Client Name:_____ **Contact Number: ( )** _____



LEGEND:

Scale:

= 1 m

- Nth

- Bin

- Grass filter strip

- Gravel sausage

- Rumble grid

- Silt fence

- Skip

- Stabilised access point

- Stockpile

- Temporary Fencing

VEG. - Vegetation to be retained

- Wash up area

CLEAN SITE CHECKLIST

Please photocopy to use on site

SITE DETAILS:

Building Company:_____ **Date:** ____ / ____ / ____

Site Supervisor:_____

Site Address:_____

Client Name:_____ **Contact Number: ( )** _____

SITE RULE	TASK	CHECK
SITE RULE 1 - Check Council requirements and plan before you start work on site.	Crossover away from lowest point	☐
	Sediment control fence on lowest side	☐
	Stockpiles away from lowest point	☐
	Marked trees and vegetation to keep on site	☐
SITE RULE 2 - Stop erosion on site and contain sediments.	Sediment control fence in place	☐
	Catch drains on high side of site	☐
	Vegetation areas kept at boundary	☐
	Gravel sausage at storm water pit	☐
	Downpipes set up as early as possible	☐
SITE RULE 3 - Protect stockpiles.	Base and cover for stockpiles	☐
	Gravel sausage at stormwater pit	☐
SITE RULE 4 - Keep mud off road and on site.	Crushed rock access point	☐
	Vehicles keep to crushed rock areas	☐
	Mud removed from tyres before leaving site	☐
	Clean road if muddy	☐
	Clean stormwater pit and maintain gravel sausage	☐
SITE RULE 5 - Keep litter contained on site.	Litter bins in place with lid closed	☐
	Site fencing in place	☐
SITE RULE 6 - Clean and wash up on site.	Cutting and clean up area on site	☐
	Clean equipment off before washing	☐
	Sediment filters downslope	☐
	Contain all washings on site	☐

6 RULES FOR A CLEAN WORKSITE

SITE RULE 1 -

Check Council requirements and plan before you start work on site.

SITE RULE 2 -

Stop erosion on site and contain sediments.

SITE RULE 3 -

Protect stockpiles.

SITE RULE 4 -

Keep mud off road and on site.

SITE RULE 5 -

Keep litter contained on site.

SITE RULE 6 -

Clean and wash up on site.

Melbourne Water

Victoria The Place To Be

EPA VICTORIA

For copies of this guide please contact:
Melbourne Water on 131 722
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Appendix C Flow and Detention Calculations

WGA Engineers have completed stormwater flows and detention calculations. These are attached on the overleaf.

CIVIL WORKS

SCALE 1:150

PAVEMENT LEGEND:

- PEDESTRIAN CONCRETE PAVEMENT
- GENERAL DUTY VEHICULAR ASPHALT PAVEMENT
- PAVER/BRICK PAVEMENT
- PROPOSED DECK. REFER STRUCTURAL DWGs FOR DETAILS
- VEHICULAR CONCRETE PAVEMENT

NOTES:

1. THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT CONSULTANTS DRAWINGS, SPECIFICATIONS & REPORTS.
2. REFER TO ARCHITECTS DRAWINGS FOR ANY TREES TO BE REMOVED OR RETAINED AND FOR ANY TREE PROTECTION REQUIREMENTS.
3. SAWCUT EXISTING HARD SURFACES PRIOR TO EXCAVATION TO PROVIDE CLEAN EDGE FOR NEW PAVING TO MATCH (TYPICAL).
4. REFER SERVICES DRAWINGS FOR DOWNPIPE REQUIREMENTS ON NEW BUILDINGS, WALKWAYS & FOR CONNECTION OF DPT's TO WATER TANKS. CONTRACTOR TO ALLOW TO CONNECT ALL DOWNPIPES TO EITHER THE WATER TANK OR THE UNDERGROUND DRAINAGE SYSTEM. UNLESS OTHERWISE SHOWN ON THE SERVICES DRAWINGS REFER TO PLUMBING INDUSTRY COMMISSION (www.pic.gov.au) TECHNICAL SOLUTIONS/ROOF PLUMBING/STORMWATER DRAINAGE - CHARGED SYSTEMS TO RAINWATER TANKS FOR FURTHER DETAILS. ALL DOWNPIPES DENOTED DPT TO BE CONNECTED TO AN ADJACENT TANK.
5. TANK BASE TO BE AS PER MANUFACTURERS REQUIREMENTS. (TYPICAL).
6. CONTRACTOR TO ALLOW TO CAP OFF & SEAL ANY REDUNDANT DRAINS AS A RESULT OF THE DEMOLITION OF EXISTING BUILDINGS.
7. DOOR THRESHOLD RAMPS TO BE 280mm LONG @ 1 in 8 (MAX.) 35mm FALL IN ACCORDANCE WITH AS 1428.
8. REFER STRUCTURAL DWGs FOR SAFETY IN DESIGN (SID) NOTES & REQUIREMENTS. (TYP)
9. CONTRACTOR TO ALLOW TO SET FOOTINGS DOWN TO MIN. 200mm BELOW U/S OF ALL EXTERNAL PAVEMENT. (LEVEL VARIES)

LEGEND:

18.57	EXISTING LEVEL
EIL 75.35	EXISTING INVERT LEVEL
CL 73.60	PROPOSED TOP OF PIT (COVER LEVEL)
IL 71.25	PROPOSED INVERT LEVEL
15.02	PROPOSED FINISHED SURFACE LEVEL
BE 15.02	PROPOSED EARTHWORKS BENCH LEVEL
TRW 15.75 / BRW 14.50	PROPOSED TOP OF RETAINING WALL LEVEL (TRW) / PROPOSED BOTTOM OF RETAINING WALL LEVEL (BRW)
DP	PROPOSED DOWNPIPE
DPT	PROPOSED DOWNPIPE CONNECTED TO WATER TANK
GI	PROPOSED GRATED INLET
FP	PROPOSED FLUSHING POINT
IO	PROPOSED INSPECTION OPENING
B	PROPOSED BOLLARD
BRS	PROPOSED BIO-RETENTION SWALE
AG	PROPOSED AGI DRAIN
	PROPOSED STORMWATER DRAIN
X X X X X	DENOTES EXISTING SERVICES TO BE DEMOLISHED
	PROPOSED STORMWATER PIT, REFER PIT SCHEDULE FOR DETAILS.
CROWN	OVERLAND FLOW PATH WITH FLOW DIRECTION AND HIGH POINT
RW 1 & 2	PROPOSED RETAINING WALLS (RW1 & RW2), REFER DRAWINGS FOR DETAILS.
TG1	PROPOSED ACO K200 TRENCH GRATE OR GRATED DRAIN. MIN. 200MM DEPTH WITH SLOPING CHANNEL TO DRAINAGE OUTLETS. H.D & HEELGUARD SAFE GRATE.
TG2	PROPOSED ACO K100 TRENCH GRATE OR GRATED DRAIN. MIN. 150MM DEPTH WITH SLOPING CHANNEL TO DRAINAGE OUTLETS. L.D & HEELGUARD SAFE GRATE.
K	PROPOSED BARRIER KERB, REFER DRAWINGS FOR DETAILS.
FK	PROPOSED FLUSH KERB, REFER DRAWINGS FOR DETAILS.
SD	PROPOSED SPOON DRAIN, REFER DRAWINGS FOR DETAILS.
CTE	PROPOSED PAVEMENT THICKENED EDGE. (CTE). REFER DWG FOR DETAILS.
CJ	CONSTRUCTION JOINT IN PAVEMENT
SCJ	SAWCUT JOINT IN PAVEMENT
DCJ	DOWELLED CONSTRUCTION JOINT IN PAVEMENT
WPJ	WEAKENED PLANE JOINT IN PAVEMENT
DEJ	DOWELLED EXPANSION JOINT IN PAVEMENT
TJ	TROWELLED JOINT IN PAVEMENT
D / SW	DENOTES EXISTING DRAINAGE/STORMWATER SERVICES
T / C	DENOTES EXISTING TELSTRA/COMMUNICATION SERVICES
W	DENOTES EXISTING WATER SERVICES
F	DENOTES EXISTING FIRE SERVICES
G	DENOTES EXISTING GAS SERVICES
E	DENOTES EXISTING ELECTRICAL SERVICES
S	DENOTES EXISTING SEWER SERVICES
FH	DENOTES EXISTING FIRE HYDRANT
LP	DENOTES EXISTING LIGHT POLE
K&C	PROPOSED KERB & CHANNEL, REFER DRAWINGS FOR DETAILS.

When sheet printed full size, the scale bar is 100mm.

0 50 100mm

WARNING

BEWARE OF UNDERGROUND SERVICES

THE LOCATION OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DISCLAIMER:

PLEASE NOTE THIS WGA DRAWING HAS BEEN PREPARED USING ARCHITECTURAL BACKGROUNDS AND LAYOUTS, SURVEY INFORMATION AND/OR 'AS BUILT' BACKGROUNDS AS SUPPLIED BY OTHERS. WGA CAN NOT ENSURE THAT THE INFORMATION SHOWN IS ACCURATE AND ENTITIES USING THESE DRAWINGS ACCEPT ALL LIABILITY IN THE USE OF THIS INFORMATION. WGA WILL NOT ACCEPT ANY LIABILITY FOR INACCURACIES IN THE INFORMATION PROVIDED. THIS DRAWING MUST NOT BE USED FOR SET OUT PURPOSES UNDER ANY CIRCUMSTANCES.

PRELIMINARY ISSUE
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REV.	DATE	DESCRIPTION	DRAFT	ENG.	CHKD
C	19.07.21	TOWN PLANNING ISSUE	RZ	RZ	
B	12.05.21	TOWN PLANNING ISSUE	RZ	RZ	
A	16.04.21	DD ISSUE	RZ	RZ	

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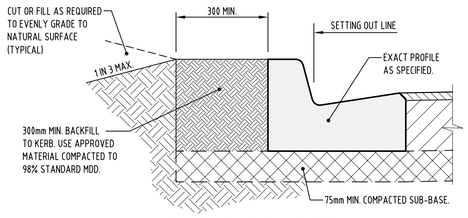
CIVIL WORKS

A1 | Scale 1:150 | Job Number | Sheet No. | Rev.
Design RZ | Drawn RZ | DRAWING NUMBER WGA201630-DR-CV-0002 C

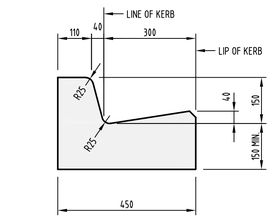


(PROVIDE TOOLED JOINTS AT MAX. 3.0m CTS.)

KERB (K&C/K&T) INSTALLATION DETAIL

(AG NOT SHOWN FOR CLARITY)

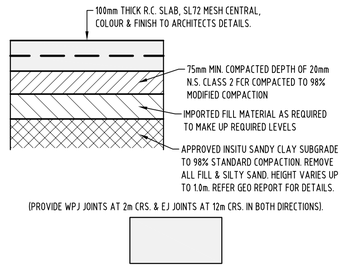
SCALE - 1:10



(PROVIDE TOOLED JOINTS AT MAX. 3.0m CTS.)

BARRIER KERB & CHANNEL (K&C)

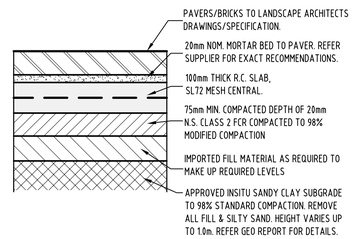
SCALE - 1:10



(PROVIDE WPJ JOINTS AT 2m CRS. & EJ JOINTS AT 12m CRS. IN BOTH DIRECTIONS).

PEDESTRIAN CONCRETE PAVEMENT

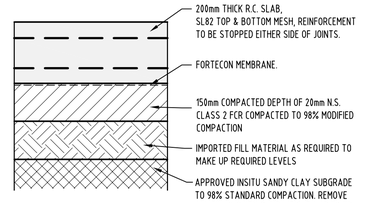
NTS.



(NOMINATED JOINTS IN RC SLAB TO REFLECT THROUGH TO PAVER/BRICK JOINTING)

PAVER/BRICK PAVEMENT

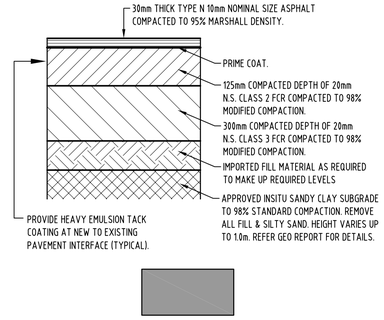
NTS.



(PROVIDE SCJ JOINTS AT 5m CRS. & DEJ JOINTS AT 15m CRS. MAX. TYPICAL).

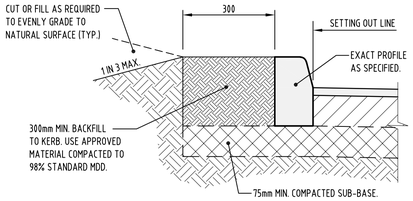
VEHICULAR CONCRETE PAVEMENT

NTS.



GENERAL DUTY CARPARK ASPHALT PAVEMENT

NTS.

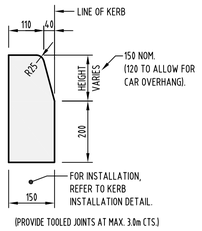


(PROVIDE TOOLED JOINTS AT MAX. 3.0m CTS.)

KERB (K) INSTALLATION DETAIL

(AG NOT SHOWN FOR CLARITY)

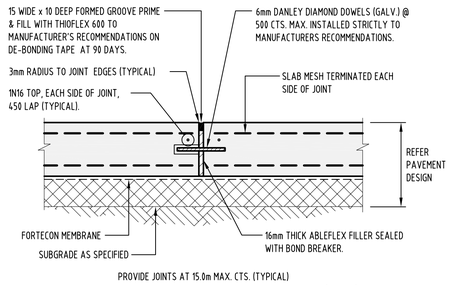
N.T.S.



(PROVIDE TOOLED JOINTS AT MAX. 3.0m CTS.)

BARRIER KERB (K)

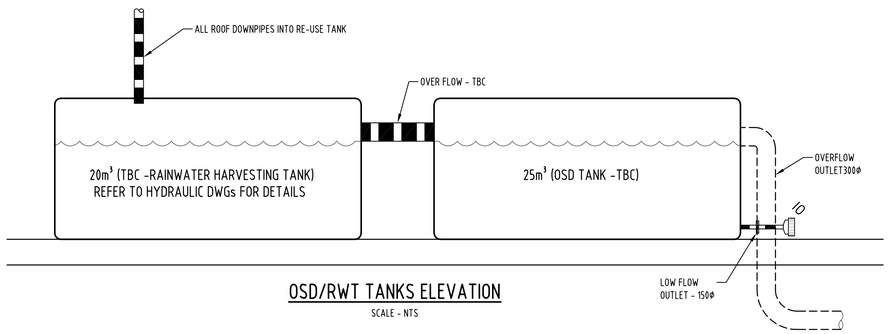
SCALE - 1:10



PROVIDE JOINTS AT 15.0m MAX. CTS. (TYPICAL)

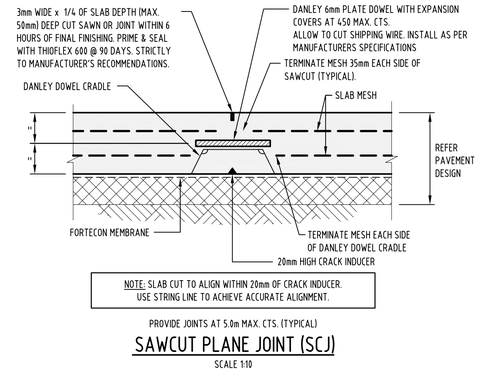
DOWELLED EXPANSION JOINT DETAIL (DEJ)

SCALE 1:10



OSD/RWT TANKS ELEVATION

SCALE - NTS

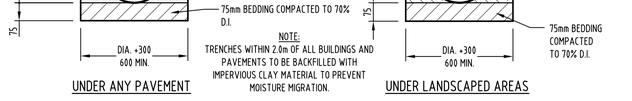


NOTE: SLAB CUT TO ALIGN WITHIN 20mm OF CRACK INDUCER. USE STRING LINE TO ACHIEVE ACCURATE ALIGNMENT.

PROVIDE JOINTS AT 5.0m MAX. CTS. (TYPICAL)

SAWCUT PLANE JOINT (SCJ)

SCALE 1:10



UNDER ANY PAVEMENT

UNDER LANDSCAPED AREAS

PIPE TRENCH DETAILS

NOTE:
THE SITE IS OVERLAIN BY SILTY SANDS (VARIES NOMINAL 800mm DEEP). THE CONTRACTOR IS TO ALLOW TO STRIP OUT ALL SILTY SANDS TO REVEAL THE NATURAL SANDY CLAY SUBGRADE UNDER ALL PAVEMENTS AND TO BUILD PAVEMENTS UP OFF THE SANDY CLAY SUBGRADE.

When sheet printed full size, the scale bar is 100mm.

0 50 100mm

REV.	DATE	DESCRIPTION	DRAFT	ENG.	CHKD
C	19.07.21	TOWN PLANNING ISSUE	RZ	RZ	
B	12.05.21	TOWN PLANNING ISSUE	RZ	RZ	
A	16.04.21	DD ISSUE	RZ	RZ	

WGA
WALLBRIDGE GILBERT AZTEC
Level 2, 31 Market Street, South Melbourne
Victoria 3205
Telephone 03 9696 9522
Email melbourne@wga.com.au

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

St. IGNATIUS SENIOR SCHOOL
27 PENINSULA DRIVE, DRYSDALE, VIC 3222

CIVIL DETAILS - SHEET 2 OF 2

A1	Scale AS SHOWN	DRAWING NUMBER Job Number	Sheet No.	Rev.
Design RZ	Drawn RZ	WGA201630-DR-CV-0004		C

WALLBRIDGE GILBERT
Consulting Engineers
20 Market Street
South Melbourne 3205

Basic Stormwater Detention Assessment

Job No: WGA201630
Title: St Ignatius Senior Building
Location: GEELONG(GREATER)

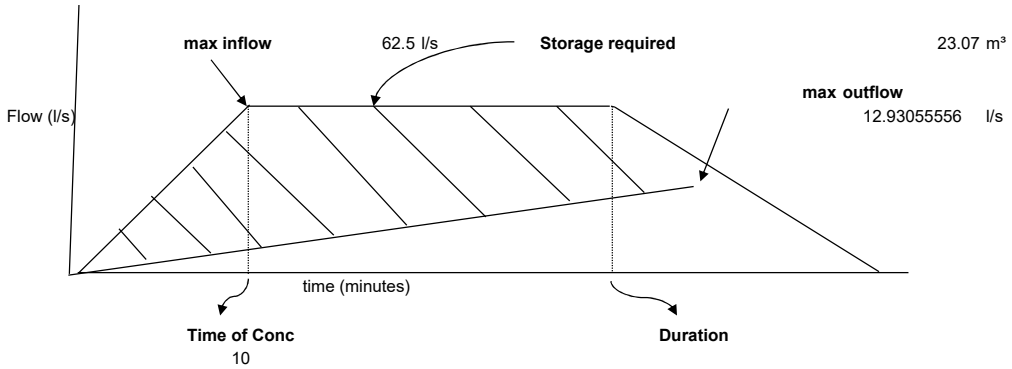
Date: 19/07/2021
Designer: CS/CP/EC
Checked: CP

Area	1,900	m²
Coeff Permeability	1	
Time of conc.	10	min
ARI Storm	20 Year	
Max Outflow Qp (PSD)	12.93	l/sec

Q(flow) for 100 YR tank outlet
95 L/s 300dia

PSD	12.93	L/s
ARI	5 YR	
Co	0.35	

N	Duration min	Intensity mm/hr	Inflow rate Ip l/sec	Inflow Vol Vi m3	Max Storage Smax m3	
0	5.00	118	62.5	18.74	14.86	
1	6.00	110	58.1	20.91	16.25	
2	7.00	103	54.4	22.85	17.42	
3	8.00	97	51.3	24.61	18.40	
4	9.00	92	48.6	26.23	19.24	
5	10.00	88	46.2	27.72	19.96	
6	15.00	71	37.6	33.86	22.23	
7	20.00	61	32.2	38.58	23.07	25 kL OSD PROVIDED
8	25.00	54	28.3	42.43	23.04	
9	30.00	48	25.4	45.70	22.43	
10	40.00	40	21.3	51.07	20.03	
11	50.00	35	18.5	55.41	16.62	
12	60.00	31	16.4	59.08	12.53	
13	70.00	28	14.8	62.28	7.97	
14	100.00	22	11.7	70.06	-7.53	
15	130.00	19	9.8	76.17	-24.68	
16	160.00	16	8.5	81.30	-42.83	
17	190.00	14	7.5	85.78	-61.63	
18	220.00	13	6.8	89.77	-80.91	
19	250.00	12	6.2	93.41	-100.55	
20	280.00	11	5.8	96.77	-120.46	
21	310.00	10	5.4	99.89	-140.61	
22	340.00	10	5.0	102.83	-160.96	
23	370.00	9	4.8	105.60	-181.46	
24	400.00	9	4.5	108.23	-202.11	
25	430.00	8	4.3	110.73	-222.87	
26	460.00	8	4.1	113.13	-243.75	
27	490.00	7	3.9	115.43	-264.73	
28	520.00	7	3.8	117.64	-285.79	
29	550.00	7	3.6	119.78	-306.93	
30	580.00	7	3.5	121.84	-328.14	



LOCALITY:GEELONG(GREATER)	A	B	C	D	E	F	G
ARI 1 in 20	3.437054855	-0.653594171	-0.029286876	0.008084925	0.000236108	-0.000147163	-0.0000233

B.3 Locations of Rainwater Harvesting

Refer to architectural Ground Floor Plan for locations and notes on rainwater harvesting.

Appendix C – Daylight Assessment

A daylight assessment has been carried out for the Saint Ignatius Senior School using the IES VE Software.

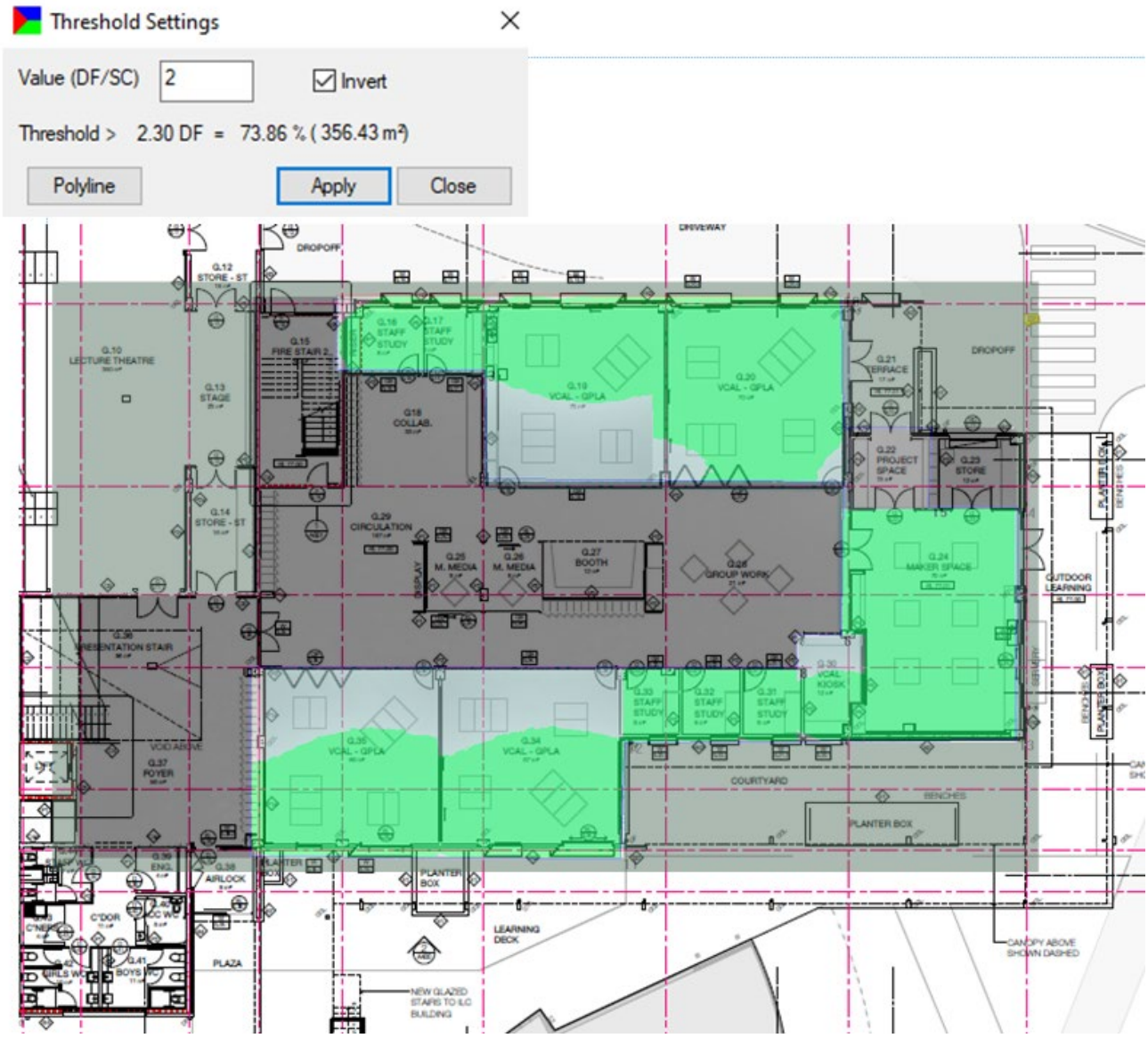
The analysis showed that for the primary usable spaces the percentage of area achieving a daylight factor of 2% or above was 68% of area.

The following table shows the daylight factor for each level and the total weighted daylight factor.

Area	Area of Primary Space Above DF 2% (m^2)	Area of Primary Space (m^2)	% Area of Primary Space Above DF 2%
Lower Ground	12	12	100%
Ground*	356	481	74%
South Level 1	348	477	73%
North Level 1	245	428	57%
Level 2	422	692	61%
	1,383	2,090	66%

*Note that lecture theatre is excluded from primary space

The modelling results for ground are shown on the overleaf as a sample of the calculations to determine results in the table above.


Threshold Settings
Value (DF/SC) 2
Invert
Threshold > 2.30 DF = 73.86 % (356.43 m²)
Polyline
Apply
Close

The assumptions mate for the daylight analysis are shown in the following table.

Element	Description
Weather file	ACADS-BSG/CSIRO Melbourne Regional Office Test Reference Year
Sky	Uniform Design Sky
Software	Integrated Environmental Solutions – Virtual Environment 2019 with Radiance Toolkit
Working Plane	Daylight factors taken at floor level
Floor / Roof Reflectance	0.3
Wall Reflectance	0.7
Ceiling Reflectance	0.8
Ground Reflectance	0.2
External Wall Reflectance	0.5 (Medium paint colour)
External Glazing VLT	Single glazing with VLT 58% Note- this is similar to the glass selected to meet the energy efficiency requirements for these spaces
Internal glazing VLT	Not Applicable

Appendix D – Sample Building User Guide

The sample building user guide – *Building User's Guide – Expected Content* has been attached on the overleaf.

Building User's Guide -

Expected Content

City of Port Phillip ASSIST
03 9209 6777 www.portphillip.vic.gov.au/contact_us.htm

General Building Information

Building Orientation

Location of the building on a map with surrounding services (train stations, tram/bus stations, post office, shopping centres, schools and childcare centres).

Brief description of the building.

Building's access

Location of bike, motorcycle and car parking, including all modes of visitors' parking on a site plan + site specific pictures.

Communal spaces

Location and description of communal and shared spaces on architectural/ landscape drawings.

Disabled facilities

Provide information on ramp locations, disabled toilets, lifts, disabled refuge areas.

Security

CCTV

Provide information on the CCTV system, operation and purpose.

Access control

Provide description and pictures of security systems to control access to the building.

Building Environment

Heating:

Description of the operating and maintenance of the heating system.

A picture of the installed system is to be provided.

Receipts, warranties and product users notice are to be annexed to the Building user's guide.

Cooling and ventilation

Description of the operating and maintenance of the cooling/ventilation system.

A picture of the installed system is to be provided.

Receipts, warranties and product users notice are to be annexed to the Building user's guide.

Lighting

Description of the lighting system (detection lighting, passive infrared lighting, etc.).

Receipts, warranties and product users notice are to be annexed to the Building user's guide.

External shading

Description, operation and purpose of the external shading device.

Picture of the installed device and operating system.

Water management

Cold Water system

Description of WC water flush systems.

Description of the potable water system.

Description of the grey water system.

Description of the purple water system (tap and third pipe location).

Description of the black waster system (pipe location).

Water tanks location, description, picture and maintenance.

Receipts, warranties and product users notice of the water tank are to be annexed to the Building user's guide.

Hot Water System

Description, operation, location and maintenance of the Hot Water System.

Receipts, warranties and product users notice are to be annexed to the document.

Water reduction strategy

Description and location of the metering system.

WELS certificate of water appliances.

Picture of the water meter, submeters.

Power

Energy production

PV: location and maintenance of PVs systems.

Receipts, warranties and product users notice are to be annexed to the document.

Energy saving strategy

Description and location of energy meters and systems.

Cleaning and Waste Management

Cleaning of windows, facades and common areas.

Required cleaning frequency and description of products to be used.

Waste management

Location and pictures of bins and waste facilities, including organic waste disposal systems and opportunities within the development where compost can be used.

Waste reduction strategy

Compost guide.

Soft Plastic strategy.

E Waste.

Open space management

Description of the open space (landscape plan), irrigation and maintenance strategies.

Picture of the open space and the irrigation systems to be provided.

Emergency Information

Fire safety

Description of the fire/smoke alarm system and maintenance.

Location of Emergency exist and assembly points on a site plan.

Accident/incident reporting

Contact details of appropriate emergency services.

Location of first kit aid + picture of kit.

Appendix E – Response to Council Comments

The following table shows responses to Council comments for the Sustainable Design Assessment V1 and associated planning documentation. References are made to parts of this SMP that show further evidence where applicable.

Item	Council Comment	Response
a)	Management- Building user guide: Sample Building user guide is provided in the report and need to provide appropriate building user guide prior permit for this project to claim management credit.	As per correspondence with Council, the Building User Guide section in this report is not a 'sample' but a template of expected content for a Building User Guide. It is a template recommended by the City of Greater Geelong on previous projects. The Building User Guide is a task undertaken during the end of construction completed after selection of equipment and commissioning generally at the same time as operation and maintenance manuals. There is little information at hand at this stage of the project that can go into the Building User Guide. Moreover the BESS credit states "Will a building users guide be produced and issued to occupants?" which is in future tense. And then in the guidance section the evidence requirements are described as follows: Documentation & evidence required A commitment to producing and issuing a Building Users' Guide. **Note that a Building Users' Guide does not need to be produced prior to permit**, but checking that this commitment has been fulfilled will form part of any planning enforcement check. Therefore a project specific Building User Guide will not be produced at this stage. The project does commit to creating and handing over a Building User Guide in line with the template in Appendix D as originally documented.
b.	BESS Water 1.1 Potable Water Use Reduction: the submitted report shows that Dishwasher and Urinal have been selected as scoped out. As per the BESS help notes, in this case 'default or unrated' must be selected from the drop-down list. Otherwise, evidence must be provided to support the claim in BESS.	Refer to Architectural plans. There are no breakout spaces where Dishwashers will or can be installed and there are no urinals proposed in the toilets. Therefore it is appropriate to scope these items out of the BESS assessment.
c.	BESS for Energy 3.7 Internal Lighting – Non-Residential: The Applicant has been claimed credits in BESS for Energy 3.7 Internal Lighting – Non-Residential, meaning that 90% of each 'area' within the development (defined by building class) should meet a maximum illumination power density (W/m2) of Table J6.2a of the NCC 2019 Vol 1. The Applicant	A table of the benchmarks in Table J6.2a of the NCC 2019 Vol 1. and 20% saving on that benchmark has been provided in Appendix A for the NCC part J assessment and in Section 4.2 Energy Efficiency

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ABN:50 800 554 305

Item	Council Comment	Response
	should copy and paste this table into their SMP and nominate what illumination power density is appropriate for this development, for each area. The targeted/committed illumination power density should then be clearly stated/marked on the plans.	
d.	IEQ 1.4 Daylight Access – Non-Residential: It is well understood that there are limited credits available (only IEQ 1.4 Daylight Access – Non-Residential appears) in the BESS tool for Indoor Environment Quality for non-residential developments. Council's ESD Officer is yet to review the daylight modelling.	Refer to Appendix C of this SMP. Further information on Daylight Modelling has been provided.
e.	Stormwater: Stormwater section assumes 100 occupants for 20kL water tank. The rainwater tank capacity is 20kL as indicated in the submitted SMP. The plans must also state that the tank(s) collects rainwater from all the roofed area and will be connected to all toilets for use in toilet flushing. Whether this figure is appropriate or not, the 20kL system is undersized especially given the above. With approximately 100 people regularly on site as in STORM report, the proposed tank size appears underestimated. Evidence must be shown on SMP report to support this size of the rainwater tank and the assumption of 100 people.	There are 16 classrooms. Allowing 20 students per classroom that equates to 320 students. The maximum number of allowable occupants in STORM is 100, therefore 100 has been input into the STORM calculator. The proposed 20kL tank has been sized to meet the requirements of STORM and BESS Water calculations and meets best practice according to those benchmarks.
f.	Catchment plan: A complete response to the stormwater management requirements involves the preparation and submission of a site layout plan showing the different catchment areas size and the proposed stormwater treatment measures consistent with the STORM report, plans and the BESS report. The underlying must be a roof plan that indicates slopes of different roofs to predict the potential path of rainwater from source to treatment destination. The catchment plan must include all the site and all the impervious areas including the paved areas in the private open space.	An updated WSUD report has been provided in Appendix B
g.	Daylight: It has been modelled in BESS that 67% of the floor areas of the development will achieve a 2.0% daylight factor (DF), which has earned the development credits in IEQ - Daylight Access – Non-Residential. Daylight factor of 2% of the primary floor area has been claimed without any evidence to support. This needs to be substantiated with calculations and provided in the SMP report and noted on plans.	Refer to Appendix C of this SMP. Further information on Daylight Modelling has been provided.
h.	Section J report: It is indicated in the BESS report notes that preliminary section J report was undertaken. This preliminary section J report was not sighted to confirm whether the credits claimed in the BESS calculator have	Please refer to Appendix A of this report for the Section J report The peak energy for the reference is 495kW, the peak energy for the

Item	Council Comment	Response
	included in the report. The overall 3% improvement claimed for heating and cooling energy consumption against reference case. Detail NCC 2019 Section J modelling report need to be provided prior construction stage. The development does not appropriately highlight to Greater Geelong LPP 22.71 Energy Performance objectives, specifically "reducing peak energy demand" (see below). A complete response to Clause 22.71 Energy performance of Council's ESD Policy, requires commitments to address peak energy demand reduction. This can be addressed by providing appropriate solar photovoltaic (PV) system that shall assist with improving the development's peak energy demand and reducing base building energy expenditure.	proposed is 368kW. These figures have been included in the NCC calculations in Appendix A. It is noted this is a 29% improvement in peak demand when compared to reference case by virtue of low power lighting and air conditioning. Therefore the project team claims this is sufficient to meet LPP 22.71 for peak demand.
i	Waste 2.2 – Operational Waste – Convenience of Recycling: Credits have been claimed in BESS for Waste 2.2 – Operational Waste – Convenience of Recycling. Substantial Linking information for operational waste from a waste management plan/equivalent needs to be provided, otherwise this credit should not be claimed.	School / architect to provide the description of operational waste to meet recycling requirements.
j	BESS tool – Waste 1.1 Communal Spaces: The credit for communal space 450m2 had been claimed, however, Location and square meter areas must be provided in the plan to claim this credit.	The Communal Spaces credit is in the Urban Ecology section. The Ground Collab 33 m^2 Ground Booth 12 m^2 Ground Group Work 21 m^2 Level 1 Collab 33 m^2 Level 1 Booth 34 m^2 Level 1 Group Work 21 m^2 Level 1 Breakout 104 m^2 Level 1 Senior Lounge 38 m^2 Level 2 Collab 37 m^2 Level 2 Breakout Space 105 m^2 The sum of these areas is 450m^2 Refer to architectural plans

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