



15 May 2025

Emmaus Sydenham School

370 Sydenham Rd, Sydenham VIC 3037

Sustainable Design Assessment

Job no: SH364920

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Document Version



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EXECUTIVE SUMMARY

SUHO was engaged by Roam Architects to provide a Sustainable Design Assessment for a proposed primary school development at 370 Sydenham Rd, Sydenham VIC 3037. The proposed development is within the jurisdiction of the Brimbank City Council, and for a development of this size, the council requires a Sustainable Design Assessment (SDA) to be produced as part of its planning approval process.

The Built Environment Sustainability Scorecard (BESS) has been used to quantitatively assess the proposed development's sustainable design measures. The BESS report summarises the sustainable design initiatives incorporated into the proposed development and benchmarks them against industry best practice.

Categories	Minimum required	Category score	Weighting	Overall Contribution	Compliance Achieved?
Management	-	16%	4.5%	1%	
Integrated Water Management	50%	87%	22.5%	20%	YES
Operational Energy	50%	77%	27.5%	21%	YES
Indoor Environment Quality (IEQ)	50%	56%	16.5%	9%	YES
Transport	-	22%	9.0%	2%	
Waste & Resource Recovery	-	33%	5.5%	2%	
Urban Ecology	-	50%	5.5%	3%	
Innovation	-	0%	9.0%	0%	
Overall BESS Score	50%	-	100%	57%	YES

Overall, the development has met the requirements outlined in the BESS assessment, achieving an overall score of 57%.



DOCUMENT EVIDENCE

The items below are required to be marked on the plans and specified in the ESD table within the town planning drawing sets.

Items to be marked on drawings:

- > Site plans showing a notation regarding water efficient fixtures and appliances.
- > Drawings indicating catchment areas to tanks.
- > Site plans showing Rainwater tank, drawn at the correct size and labelled as connected to the toilet.
- > Site / Landscape plan detailing the implementation of water-efficient landscaping practices.
- > Provide a written description of the average lighting power density to be installed in the development and specify the lighting type(s) that will be used.
- > Roof plans showing location solar photovoltaic system.
- > For CO₂ concentrations, proposed approach to achieve this air quality and details of monitoring and control.
- > Indicate bicycle parking spaces for students and employees on the floor plans.
- > Showing the location of general and recycling bins on floor plans.
- > Site and/or floor plan showing the amount of common space. The floor plan drawings highlighting communal space area and calculations of size.
- > Plans showing vegetated areas.
- > Note showing light colour roof (low absorptance value < 0.45) on roof plans and elevations.
- > Roof plans showing location of 20 kW solar photovoltaic system.



Items to be included in the ESD Table:

ESD Initiatives	Description
General	<ul style="list-style-type: none"> > The project will align with the Sustainable Design Assessment report prepared by SUHO for all ESD initiatives.
Management	<ul style="list-style-type: none"> > A preliminary facade assessment has been undertaken in accordance with NCC2022 Section J4D6
Integrated Water Management	<ul style="list-style-type: none"> > Refer to WSUD Plan for details > The building to be provided with a 10,000L rainwater tank. > Rainwater tanks connected to the toilets for flushing purposes > WELS rating for water fittings/fixtures <ul style="list-style-type: none"> - Taps (bathroom and kitchen) – 5 Star - Dishwasher – 4 Star - Toilets – 4 Star - Urinals – 4 Star
Operational Energy	<ul style="list-style-type: none"> > All exposed floors and ceilings (forming part of the envelope) demonstrate meeting the required NCC2022 insulation levels (total R-value upwards and downwards) > All wall and glazing demonstrate meeting the required NCC2022 facade calculator (or better than the total allowance) > Heating and cooling system within one Star of the most efficient equivalent capacity unit available, or CoP & EER not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available > Hot water system within one Star of the best available, or 85% or better than the most efficient equivalent capacity unit > The maximum illumination power density (W/m²) of the development will meet the requirements in NCC2022 > 20kW Solar PV on the roof of the development
Indoor Environment Quality	<ul style="list-style-type: none"> > Commitment to Outside Air Fan in office providing O/A rates 50% above minimum from AS1668, and O/A provision to ensure CO2 concentration remains below 800ppm > All paints, sealants and adhesives meet the maximum total indoor pollutant emission limits
Transport	<ul style="list-style-type: none"> > 12 bike spaces provided for both student and employees
Waste & Resource Recovery	<ul style="list-style-type: none"> > Recycling facilities provided at least as convenient for occupants as facilities for general waste.
Urban Ecology	<ul style="list-style-type: none"> > 22% of the site is covered with vegetation > Light colour roof (low absorptance value <0.45) to minimise urban heat island effect



PROJECT OVERVIEW

The proposed Primary School is located at 370 Sydenham Rd, Sydenham VIC 3037.

Description	Area
Site Area	1327m ²
Built Up Area	780m ²
BESS Score	57%

The development is in NCC Climate Zone 6. The following aerial photo shows the location of the site.



Figure 1: Aerial view of subject site



MANAGEMENT

Credit	Categories	Description
2.3	Thermal Performance Modelling	<p>A preliminary façade assessment has been undertaken in accordance with NCC 2022 Section J requirement.</p> <p>See Appendix B for details.</p>

INTEGRATED WATER MANAGEMENT

Credit	Categories	Description
1.1	Water Efficient Fittings	<p>The development will include efficient fittings and fixtures to reduce the volume of mains water used. The following WELS star ratings are specified:</p> <ul style="list-style-type: none"> > Taps (bathroom and kitchen) – 5 Star > Dishwasher – 4 Star > Toilets – 4 Star > Urinals – 4 Star <p>Rainwater runoff from the roof area of the building will be collected and stored in a rainwater tank. A 10,000L rainwater tank will be provided for the building. Rainwater tanks are to be connected to the toilets.</p>
2.1	Stormwater Treatment	<p>A storm rating of over 117% has been achieved by implementing the below WSUD treatments.</p>
2.1	Rainwater Tanks	<p>Rainwater runoff from the roof area of the building will be collected and stored in rainwater tanks. The building will be provided with a 10,000L rainwater tanks that will be used for rainwater harvesting for toilets.</p> <ul style="list-style-type: none"> > 884m² of roof area of Building will be diverted into a 10,000L rainwater tank.



OPERATIONAL ENERGY

Credit	Categories	Description										
1.1, 2.1	Energy Efficiency	<p>Prior to the building construction stage of the project, a Section J DTS (NCC 2022) assessment will occur with the following commitments:</p> <ul style="list-style-type: none">> All exposed floors and ceilings (forming part of the envelope) demonstrate meeting the required NCC 2022 insulation levels (total R-value upwards and downwards) <table border="1"><thead><tr><th colspan="2">NCC 2022 requirement</th></tr></thead><tbody><tr><td>Roof and Ceiling</td><td>A minimum total R-Value of R3.2</td></tr><tr><td>Walls</td><td>A minimum total R-Value of R1.0</td></tr><tr><td>Glazing</td><td>Glazing Performance values are required to be equal to or less than those specified below. U-value = 4.07 SHGC = 0.5</td></tr><tr><td>Floor</td><td>Floor (including concrete slab on ground) without in-slab heating will require to achieved minimum total R-Value of 2.0</td></tr></tbody></table> <ul style="list-style-type: none">> All wall and glazing demonstrate meeting the required NCC 2022 Façade Calculator – See Prelim. Façade Calculator in Appendix B.> Heating and cooling systems within one Star of the most efficiency equivalent capacity unit available, or Coefficient of Performance (CoP) & Energy Efficiency Ratios (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available.> Water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit. <p>Alternatively, prior to the building construction stage of the project, energy modelling will occur with the aim of exceeding requirement of NCC 2022, using an NCC J1V3 method. This will be achieved through the use of high-performance building fabric and glazing, low energy lighting and building services. This method will allow for flexibility in glazing performance and maintain the BESS Energy score.</p> <p>Our BESS assessment has been prepared to ensure that energy section and overall compliance is maintained.</p>	NCC 2022 requirement		Roof and Ceiling	A minimum total R-Value of R3.2	Walls	A minimum total R-Value of R1.0	Glazing	Glazing Performance values are required to be equal to or less than those specified below. U-value = 4.07 SHGC = 0.5	Floor	Floor (including concrete slab on ground) without in-slab heating will require to achieved minimum total R-Value of 2.0
		NCC 2022 requirement										
Roof and Ceiling	A minimum total R-Value of R3.2											
Walls	A minimum total R-Value of R1.0											
Glazing	Glazing Performance values are required to be equal to or less than those specified below. U-value = 4.07 SHGC = 0.5											
Floor	Floor (including concrete slab on ground) without in-slab heating will require to achieved minimum total R-Value of 2.0											
2.6	Fossil Fuel-Free Development	The development will be all electric and fossil fuel-free. No gas connection will be provided for the development.										
2.7	Energy Consumption	Heating and cooling system will be chosen within one Star of the most efficient equivalent capacity unit available, or Coefficient of Performance										



	(Heating and cooling system)	(CoP) & Energy Efficiency Ratios (EER) of the most efficient equivalent capacity unit available.
3.2	Hot water system	Hot water system will be chosen within one Star of the best available, or 85% or better than the most efficient equivalent capacity unit.
4.2	Renewable Energy Systems - Solar PV	<p>The building will be provided with 20kW PV systems on the roof.</p> <p>The tilt angle will be at least 10 degrees to allow for appropriate energy production and self-cleaning.</p>



INDOOR ENVIRONMENT QUALITY

Credit	Categories	Description		
1.4	Daylight Access	<p>See below summary for the percentage of the floor area to achieve a Daylight factor of at least 2%.</p> <table><tr><td>school</td><td>55%</td></tr></table> <p>Please refer to Appendix F for daylight report showing compliance with best practice requirements.</p>	school	55%
school	55%			
2.3	Ventilation (Natural Ventilation)	<p>72% of regular use areas will be effectively naturally ventilated.</p> <p>Please refer to Appendix G for ventilation markups</p>		
2.3	Ventilation (Mechanical Ventilation)	<p>All spaces will be provided with O/A fans which will commit to provide 50% increase on O/A provision from AS1668.</p> <p>O/A will be provided in the office spaces to ensure that CO2 concentration in the rooms remains below 800ppm.</p>		
4.1	Air Quality (VOC & Formaldehyde)	<p>All paints, adhesives and sealants, carpets, and engineered wood will meet the total indoor pollutant emission limits.</p>		



The following building materials will comply with TVOC Content limit as per the table below:

- > Low VOC paints, adhesives and sealants

Product Category	TVOC Limit [g/L]*
General purpose adhesives	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100

Table 1: TVOC Content - Paints, Adhesives and Sealants



TRANSPORT

Below is a summary of BESS credits which have been targeted for this project.

Credit	Categories	Description
1.4	Bicycle Parking	Students and employees will be able to securely park their bicycles within the development. A total of 12 spaces will be provided for the development.

WASTE & RESOURCE RECOVERY

Credit	Categories	Description
2.2	Operational Waste - Convenience of Recycling	<p>Recycling facilities are as convenient for occupants as facilities for general waste.</p> <p>The development will be provided with bins for general waste and recycling waste.</p>
	Construction Waste Management	A minimum of 80% of all construction and demolition waste generated on-site will be reused or recycled.
	Construction Environment Management	The builder will identify environmental risks related to construction and include management strategies such as maintaining effective erosion and sediment control measures during construction and operation and ensure that appropriate staging of earthworks.



URBAN ECOLOGY

Credit	Categories	Description
1.1	Communal Spaces	<p>100m² of the common space will be provided for the development.</p> 
2.1	Vegetation	<p>Vegetated areas will be incorporated throughout the site. 22% of the site will be covered with vegetation, excluding permeable non-vegetated areas such as gravel and permeable pathways.</p>
Light Colour Roof		<p>Light colour roof will be provided for the development with a low absorptance value < 0.45 to reduce the urban heat island effect.</p>



MATERIAL

Categories	Description
Timber	All timber used in the development will be Forest Stewardship Council (FSC) or Program for the Endorsement of Forest Certification (PEFC) certified, or recycled/reused.
Joinery	<p>Wherever possible, joinery will be manufactured from materials/products certified under any of the following:</p> <ul style="list-style-type: none"> > Global GreenTag - https://www.globalgreentag.com/; and > Good Environmental Choice (GECA)
Flooring	<p>Wherever possible, flooring will be selected from products/materials certified under any of the following:</p> <ul style="list-style-type: none"> > Carpet Institute of Australia Limited, Environmental Certification Scheme (ECS); > Global GreenTag - https://www.globalgreentag.com/; and > Good Environmental Choice (GECA). <p>Alternatively, flooring must be durable, include some eco-preferred content, be modular and/or come from a manufacturer with a product stewardship program and ISO 14001 certification.</p>
VOC & Formaldehyde	All paints, adhesives and sealants, carpets, and engineered wood will meet the total indoor pollutant emission limits.



APPENDIX A – BESS OUTPUT REPORT



BESS Report

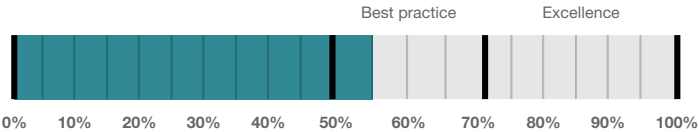
Built Environment Sustainability Scorecard



This BESS report outlines the sustainable design commitments of the proposed development at 370 Sydenham Rd Sydenham Victoria 3037. 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 Brimbank 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



57%

Project details

Name	Emmaus Sydenham School
Address	370 Sydenham Rd Sydenham Victoria 3037
Project ID	0827FDFF-R2
BESS Version	BESS-9

Site type	Non-residential development
Account	esd@sustainabilityhouse.com.au
Application no.	
Site area	1,327 m²
Building floor area	780 m²
Date	15 May 2025
Software version	2.1.0-B.596



Performance by category

● This project ● Maximum available

Category	Weight	Score	Pass
Management	5%	16%	●
Integrated Water Management	23%	87%	✓
Operational Energy	28%	77%	✓
Indoor Environment Quality	17%	56%	✓
Transport	9%	22%	●
Waste & Resource Recovery	6%	33%	●
Urban Ecology	6%	50%	●
Innovation	9%	0%	●

Buildings

Name	Height	Footprint	% of total footprint
School	1	780 m ²	100%

Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	Building	% of total area
Public building				
School	1	780 m ²	School	100%
Total	1	780 m²	100%	

Supporting Evidence

Shown on Floor Plans

Credit	Requirement	Response	Status
Integrated Water Management 2.1	Location of any stormwater management systems (rainwater tanks, raingardens, buffer strips)	To be printed	✓
Integrated Water Management 3.1	Annotation: Water efficient garden details	To be printed	✓
Operational Energy 4.2	Location and size of solar photovoltaic system	To be printed	✓
Transport 1.4	Location of non-residential bicycle parking spaces	To be printed	✓
Waste & Resource Recovery 2.2	Location of recycling facilities	To be printed	✓
Urban Ecology 1.1	Location and size of communal spaces	To be printed	✓
Urban Ecology 2.1	Location and size of vegetated areas	To be printed	✓

Supporting Documentation

Credit	Requirement	Response	Status
Management 2.3a	Section J glazing assessment	Uploaded SDA Report - Appendix B - Preliminary DTS Report (Uploaded)	✓
Integrated Water Management 2.1	STORM report or MUSIC model	Uploaded SDA Report - Appendix C - WSUD Report (Uploaded)	✓
Operational Energy 1.1	Energy Report showing calculations of reference case and proposed buildings	Uploaded SDA Report - Appendix B - Preliminary DTS Report (Uploaded)	✓
Operational Energy 3.7	Average lighting power density and lighting type(s) to be used	Uploaded SDA Report - Appendix B - Preliminary DTS Report (Uploaded)	✓

Credit	Requirement	Response	Status
Operational Energy 4.2	Specifications of the solar photovoltaic system(s)	Uploaded	✓
Indoor Environment Quality 1.4	A short report detailing assumptions used and results achieved.	Uploaded SDA Report-Appendix F Daylight Report (Uploaded)	✓

Credit summary

Management Overall contribution 4.5%

		16%
1.1 Pre-Application Meeting		0%
2.3 Thermal Performance Modelling - Non-Residential		50%
3.2 Metering - Non-Residential		N/A ✦ Scoped Out
There is only one tenancy hence sub-metering is not required.		
3.3 Metering - Common Areas		N/A ✦ Scoped Out
There is only one tenancy hence sub-metering is not required.		
4.1 Building Users Guide		0%

IWM Overall contribution 22.5%

		87%	✓ Pass
1.1 Potable Water Use		80%	✓ Achieved
2.1 Stormwater Treatment		100%	✓ Achieved
3.1 Water Efficient Landscaping		100%	
4.1 Building Systems Water Use		0%	

Operational Energy Overall contribution 27.5%

		Minimum required 50%	77%	✓ Pass
1.1 Thermal Performance Rating - Non-Residential	<div><div></div></div>		37%	
2.1 Greenhouse Gas Emissions	<div><div></div></div>		100%	
2.2 Peak Demand	<div><div></div></div>		100%	
2.6 Electrification	<div><div></div></div>		100%	
2.7 Energy consumption	<div><div></div></div>		100%	
3.1 Carpark Ventilation	<div><div></div></div>		N/A	✦ Scoped Out
			N/A	
3.2 Hot Water - Non-Residential	<div><div></div></div>		100%	
3.7 Internal Lighting - Non-Residential	<div><div></div></div>		100%	
4.1 Combined Heat and Power (cogeneration / trigeneration)	<div><div></div></div>		N/A	✦ Scoped Out
			No cogeneration or trigeneration system in use.	
4.2 Renewable Energy Systems - Solar	<div><div></div></div>		100%	
4.4 Renewable Energy Systems - Other	<div><div></div></div>		N/A	✦ Scoped Out
			No other (non-solar PV) renewable energy is in use.	

IEQ Overall contribution 16.5%

		Minimum required 50%	56%	✓ Pass
1.4 Daylight Access - Non-Residential	<div><div></div></div>		55%	✓ Achieved
2.3 Ventilation - Non-Residential	<div><div></div></div>		88%	✓ Achieved
3.4 Thermal comfort - Shading - Non-Residential	<div><div></div></div>		0%	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential	<div><div></div></div>		0%	
4.1 Air Quality - Non-Residential	<div><div></div></div>		100%	

Transport Overall contribution 9.0%

		22%
1.4 Bicycle Parking - Non-Residential	<div><div></div></div>	100%
1.5 Bicycle Parking - Non-Residential Visitor	<div><div></div></div>	0%
1.6 End of Trip Facilities - Non-Residential	<div><div></div></div>	0%
2.1 Electric Vehicle Infrastructure	<div><div></div></div>	0%
2.2 Car Share Scheme	<div><div></div></div>	0%
2.3 Motorbikes / Mopeds	<div><div></div></div>	0%

Waste & Resource Recovery 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%

		50%
1.1 Communal Spaces		100%
2.1 Vegetation		75%
2.2 Green Roofs		0%
2.3 Green Walls and Facades		0%
3.2 Food Production - Non-Residential		0%

Innovation Overall contribution 9.0%

		0%
1.1 Innovation		0%

Credit breakdown

Management Overall contribution 4.5%

		16%
1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 50% towards the category score.	
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?	
Question	Criteria Achieved ?	
Project	No	
2.3 Thermal Performance Modelling - Non-Residential		50%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2022 Section J4D6?	
Question	Criteria Achieved ?	
Public building	Yes	
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2022 Section J (Energy Efficiency), NABERS or Green Star?	
Question	Criteria Achieved ?	
Public building	No	
3.2 Metering - Non-Residential		N/A ✦ Scoped Out
There is only one tenancy hence sub-metering is not required.		
This credit was scoped out	There is only one tenancy hence sub-metering is not required.	
3.3 Metering - Common Areas		N/A ✦ Scoped Out
There is only one tenancy hence sub-metering is not required.		
This credit was scoped out	There is only one tenancy hence sub-metering is not required.	
4.1 Building Users Guide		0%
Score Contribution	This credit contributes 16.7% towards the category score.	
Criteria	Will a building users guide be produced and issued to occupants?	
Question	Criteria Achieved ?	
Project	No	

IWM Overall contribution 22.5%87% ✔ Pass

Do you have a reticulated third pipe or an on-site water recycling system?: No

Are you installing a swimming pool?: No

Stormwater profile

Which stormwater modelling software are you using?: Melbourne Water STORM tool

STORM score achieved: 117

Flow: -

Total Suspended Solids: -

Total Phosphorus: -

Total Nitrogen: -

Rainwater tank profileWhat is the total roof area connected to the rainwater tank?: 884 m²
Rainwater Tank 1

Tank Size: Rainwater Tank 1 10,000 Litres

Irrigation area connected to tank: Rainwater Tank 1 -

Is connected irrigation area a water efficient garden?: No
Rainwater Tank 1

Other external water demand connected to tank?: Rainwater Tank 1 -

Fixtures, fittings & connections profile

Building: School

Showerhead: Scope out

Bath: Scope out

Kitchen Taps: >= 5 Star WELS rating

Bathroom Taps: >= 5 Star WELS rating

Dishwashers: >= 4 Star WELS rating

WC: >= 4 Star WELS rating

Urinals: >= 4 Star WELS rating

Washing Machine Water Efficiency: Scope out




Which non-potable water source is the dwelling/space connected to?: Rainwater Tank 1

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

1.1 Potable Water Use80% ✔ Achieved

Score Contribution	This credit contributes 31.2% 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	1322 kL
Output	Proposed (excluding rainwater and recycled water use)
Project	951 kL
Output	Proposed (including rainwater and recycled water use)
Project	585 kL
Output	% Reduction in Potable Water Consumption
Project	55 %
Output	% of connected demand met by rainwater
Project	98 %
Output	How often does the tank overflow?
Project	Never / Rarely
Output	Opportunity for additional rainwater connection
Project	153 kL
2.1 Stormwater Treatment	
 100% ✓ Achieved	
Score Contribution	This credit contributes 56.2% towards the category score.
Criteria	Has best practice stormwater management been demonstrated?
Output	Min STORM Score
Project	100
Output	STORM Score
Project	117
3.1 Water Efficient Landscaping	
 100%	
Score Contribution	This credit contributes 6.2% towards the category score.
Criteria	Will water efficient landscaping be installed?
Question	Criteria Achieved ?
Project	Yes
4.1 Building Systems Water Use	
 0%	
Score Contribution	This credit contributes 6.2% towards the category score.
Criteria	Where applicable, have measures been taken to reduce potable water consumption by >80% in the buildings air-conditioning chillers and when testing fire safety systems?
Question	Criteria Achieved ?
Project	-

Operational Energy Overall contribution 27.5%

		Minimum required 50%	77%	✓ Pass
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Project profile				
Use the BESS Deem to Satisfy (DtS) method for Non-residential spaces?:				
Are you installing any renewable energy system(s) (other than solar photovoltaic)?:				
Energy Supply:				
Solar Photovoltaic system profile				
System Size (lesser of inverter and panel capacity): Solar Photovoltaic system				
Orientation (which way is the system facing)?: Solar Photovoltaic system				
Inclination (angle from horizontal): Solar Photovoltaic system				
Non-residential Deemed-to-Satisfy profile				
Do all exposed floors and ceilings (forming part of the envelope) demonstrate meeting the required NCC2022 insulation levels (total R-value upwards and downwards)?:				
Does all wall and glazing demonstrate meeting the required NCC2022 facade calculator (or better than the total allowance)?:				
Are heating and cooling systems within one Star of the most efficient equivalent capacity unit available, or Coefficient of Performance (CoP) & Energy Efficiency Ratios (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available?:				
Are water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit?:				
1.1 Thermal Performance Rating - Non-Residential				37%
Score Contribution		This credit contributes 36.4% towards the category score.		
Criteria		What is the % reduction in heating and cooling energy consumption against the reference case (NCC2022 Section J)?		
2.1 Greenhouse Gas Emissions				100%
Score Contribution		This credit contributes 9.1% towards the category score.		
Criteria		What is the % reduction in annual greenhouse gas emissions against the benchmark?		
2.2 Peak Demand				100%
Score Contribution		This credit contributes 4.5% towards the category score.		
Criteria		What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?		
2.6 Electrification				100%

Score Contribution	This credit contributes 13.6% towards the category score.	
Criteria	Is the development all-electric?	
Question	Criteria Achieved?	
Project	Yes	
2.7 Energy consumption		100%
Score Contribution	This credit contributes 18.2% towards the category score.	
Criteria	What is the % reduction in annual energy consumption against the benchmark?	
3.1 Carpark Ventilation		N/A  Scoped Out
N/A		
This credit was scoped out	N/A	
3.2 Hot Water - Non-Residential		100%
Score Contribution	This credit contributes 4.5% towards the category score.	
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?	
3.7 Internal Lighting - Non-Residential		100%
Score Contribution	This credit contributes 9.1% 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 J7D3a of the NCC 2022 Vol 1?	
Question	Criteria Achieved ?	
Public building	Yes	
4.1 Combined Heat and Power (cogeneration / trigeneration)		N/A  Scoped Out
No cogeneration or trigeneration system in use.		
This credit was scoped out	No cogeneration or trigeneration system in use.	
4.2 Renewable Energy Systems - Solar		100%
Score Contribution	This credit contributes 4.5% towards the category score.	
Criteria	What % of the estimated energy consumption of the building class it supplies does the solar power system provide?	
Output	Solar Power - Energy Generation per year	
Public building	25,540 kWh	
Output	% of Building's Energy	
Public building	88 %	
4.4 Renewable Energy Systems - Other		N/A  Scoped Out
No other (non-solar PV) renewable energy is in use.		
This credit was scoped out	No other (non-solar PV) renewable energy is in use.	

IEQ Overall contribution 16.5%

		Minimum required 50%	56%	✓ Pass
--	--	----------------------	-----	--------

1.4 Daylight Access - Non-Residential			55%	✓ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.			
Criteria	What % of the nominated floor area has at least 2% daylight factor?			
Question	Percentage Achieved?			
Public building	55 %			
2.3 Ventilation - Non-Residential			88%	✓ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.			
Criteria	What % of the regular use areas are effectively naturally ventilated?			
Question	Percentage Achieved?			
Public building	72 %			
Criteria	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668.2:2012?			
Question	Percentage Achieved?			
Public building	50 %			
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?			
Question	Value			
Public building	800 ppm			
3.4 Thermal comfort - Shading - Non-Residential			0%	
Score Contribution	This credit contributes 17.6% towards the category score.			
Criteria	What percentage of east, north and west glazing to regular use areas is effectively shaded?			
Question	Percentage Achieved?			
Public building	0 %			
3.5 Thermal Comfort - Ceiling Fans - Non-Residential			0%	
Score Contribution	This credit contributes 5.9% towards the category score.			
Criteria	What percentage of regular use areas in tenancies have ceiling fans?			
Question	Percentage Achieved?			
Public building	0 %			
4.1 Air Quality - Non-Residential			100%	
Score Contribution	This credit contributes 5.9% towards the category score.			

Criteria	Do all paints, sealants and adhesives meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Public building	Yes
Criteria	Does all carpet meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Public building	Yes
Criteria	Does all engineered wood meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Public building	Yes

Transport Overall contribution 9.0%

		22%
1.4 Bicycle Parking - Non-Residential		100%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	Have the planning scheme requirements for employee bicycle parking been exceeded by at least 50% (or a minimum of 2 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Public building	Yes	
Question	Bicycle Spaces Provided ?	
Public building	12	
1.5 Bicycle Parking - Non-Residential Visitor		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Have the planning scheme requirements for visitor bicycle parking been exceeded by at least 50% (or a minimum of 1 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Public building	No	
Question	Bicycle Spaces Provided ?	
Public building	-	
1.6 End of Trip Facilities - Non-Residential		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Where adequate bicycle parking has been provided. Is there also: * 1 shower for the first 5 employee bicycle spaces plus 1 to each 10 employee bicycles spaces thereafter, * changing facilities adjacent to showers, and * one secure locker per employee bicycle space in the vicinity of the changing / shower facilities?	
Question	Number of showers provided ?	
Public building	-	
Question	Number of lockers provided ?	
Public building	-	
Output	Min Showers Required	
Public building	1	
Output	Min Lockers Required	
Public building	12	
2.1 Electric Vehicle Infrastructure		0%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	No	
2.2 Car Share Scheme		0%

Score Contribution	This credit contributes 11.1% towards the category score.
Criteria	Has a formal car sharing scheme been integrated into the development?
Question	Criteria Achieved ?
Project	No
2.3 Motorbikes / Mopeds	0%
Score Contribution	This credit contributes 22.2% towards the category score.
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?
Question	Criteria Achieved ?
Project	No

Waste & Resource Recovery Overall contribution 5.5%

	33%
--	-----

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 5.5%

		50%
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 : * 1m ² for each of the first 50 occupants * Additional 0.5m ² for each occupant between 51 and 250 * Additional 0.25m ² for each occupant above 251?	
Question	Common space provided	
Public building	100 m ²	
Output	Minimum Common Space Required	
Public building	64 m ²	
2.1 Vegetation		75%
Score Contribution	This credit contributes 50% 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	22 %	
2.2 Green Roofs		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Does the development incorporate a green roof?	
Question	Criteria Achieved ?	
Project	No	
2.3 Green Walls and Facades		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Does the development incorporate a green wall or green façade?	
Question	Criteria Achieved ?	
Project	No	
3.2 Food Production - Non-Residential		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	What area of space per occupant is dedicated to food production?	
Question	Food Production Area	
Public building	-	
Output	Min Food Production Area	
Public building	20 m ²	

Innovation Overall contribution 9.0%

	0%
--	----

1.1 Innovation	0%
Score Contribution	This credit contributes 100% towards the category score.
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?

Disclaimer

The Built Environment Sustainability Scorecard (BESS) has been provided for the purpose of information and communication. While we make every effort to ensure that material is accurate and up to date (except where denoted as 'archival'), this material does in no way constitute the provision of professional or specific advice. You should seek appropriate, independent, professional advice before acting on any of the areas covered by BESS.

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APPENDIX B – PRELIMINARY DTS REPORT



NCC 2022 Volume 1 - Preliminary DTS Check

SUHO has developed this NCC 2022 fabrics compliance check to act as a guide for the Deemed-to-Satisfy requirements. This is to be used strictly as a guide only and is not an official compliance report.

Please note: These DTS values are a guide for general compliance.

Project Summary:

Project Name: Emmaus Sydenham School
SUHO Job Number: SH364920
Floor Level: Ground Level
Climate Zone: 6
Building Class: 9b

Envelope Description

Under Section J for NCC 2022, the external walls, roof, floor and glazing of this building has been considered as the conditioned envelope.

Section J1: Building Fabric Requirements

Note: All exposed floors and ceilings (forming part of the envelope) demonstrate meeting the required NCC 2022 insulation levels (total R-value upwards and downwards)

Construction Type	NCC 2022 DTS Requirements
J1.3 Roof	R3.2(Bridged) required to the Roof and Ceiling Construction. Maximum Roof colour solar absorptance of 0.45 (or less).
J1.5 Walls*	Envelope walls required to achieve a minimum of R1.0 (bridged) or R1.4 (bridged)

J1.5 Glazing*	Glazing Performance values are required to be equal to or less than those specified below.				
	<u>Method 1 - Individual Orientations</u>				
		N	E	S	W
	Maximum Glazing U-value	4.89	4.14	3.50	4.37
	Maximum SHGC	0.81	0.51	0.33	0.44
	<u>Method 2 - All Orientations</u>				
	Maximum Glazing U-value	4.07			
	Maximum SHGC	0.50			
J1.6 Floors**	The elevated floor require R2.0 (Bridged).				

* For NCC 2022, the walls and glazing performance requirements are calculated as a combined facade for each floor level. There are two methods for calculating the performance values:

- Method 1 - Calculates performance requirements for each orientation (North, East, South and West).
- Method 2 - Combines all four orientations into one combined performance requirement.

The DTS glazing performance values for J4D6 have been calculated using the minimum wall R-values required. The results provided are completely dependent on the % area of glazing, the wall construction R-values and shading. Therefore as the design develops these values will also change.

**This assumes there is no in-slab heating or cooling.

Note:

1. Thermal bridging calculation is subjective to the framing details (Framing member dimensions and spacing) of each construction (Roof, ceiling, wall and floor). Any changes to the framing details will have an impact to the bridged R-value.
2. This is the minimum requirement for NCC2022 Section J compliance by following DTS method, based on this specific building design, building class and climate zone. If there any changes to them the results will be subjective to the changes.
3. Zone thermal comfort assessment is not required if the DTS method is being followed for the compliance assessment.
4. JV3 assessment can assist to find flexible specifications for compliance but the building has to comply with Zone thermal Comfort benchmark is the verification method (JV3) has been followed.

Facade Calculator

Project Name:	Emmaus Sydenham School
---------------	------------------------

Wall Details:				
Fabric	CPS Wall Name	Location	R-value	U-value
Fabric 1	External Wall	External	1	1.00
Fabric 2				0.00
Fabric 3				0.00
Fabric 4				0.00
Fabric 5				0.00
Fabric 6				0.00
Fabric 7				0.00
Fabric 8				0.00

SUHO Job #:	364920
Floor Level:	Ground

Total Façade Area Details (m²):			
North	East	South	West
106.4	138.8	156.4	116.4

Climate Zone:	6
Building Class:	Other

Door Details:	
Name	Area (m²)
D1	2.3
D2	4.4
D3	3.1

Glazing Details:												
Window Entry							Proposed Values		Shading Entry		Factors	
Name	Orientation	Fabric #	Height (m)	Width (m)	Window Multiplier	Area (m²)	Proposed U-value	Proposed SHGC	P (m)	H (m)	Blind Factor	Display Glazing
W1	N	Fabric 1	1	2.9	2	5.80			3	1.4		
W2	N	Fabric 1	1.5	3		4.50						
W3	N	Fabric 1	2.4	7.1		17.04			3	2.8		
W4	E	Fabric 1	2.4	2.6		6.24						
W5	E	Fabric 1	2.4	6.2		14.88			3	2.8		
W6	E	Fabric 1	2.4	2.4	4	23.04						
W7	S	Fabric 1	2.4	2.4	2	11.52						
W8	S	Fabric 1	2.4	4		9.60						
Skylights windows	S	Fabric 1	2.1	19.7		41.37						
W8	W	Fabric 1	2.4	2.4	6	34.56						
						0.00						
						0.00						
						0.00						
						0.00						
						0.00						
						0.00						
						0.00						
						0.00						
						0.00						
						0.00						

Facade Calculator Warnings:

Display:	
Shading calculations:	Hide
Additional Calculations:	Hide

DTS - Wall Calculations & Maximum Glazing Requirements:				
Method 1 - Individual Orientation				
	N	E	S	W
Glazing Percentage (%)	25.7%	31.8%	40.0%	29.7%
DTS Minimum Wall R-value	1.00	1.00	1.00	1.00
Achieved Wall R-value	1.00	1.00	1.00	1.00
Maximum Glazing U-value	4.89	4.14	3.50	4.37
Maximum SHGC	0.81	0.51	0.33	0.44
Method 2 - Combined				
Glazing Percentage (%)	32.5%			
DTS Minimum Wall R-value	1.00			
Achieved Wall R-value	1.00			
Maximum Glazing U-value	4.07			
Maximum SHGC	0.50			
All Display Glazing (if applicable)				
Maximum Glazing U-value	-			
Maximum Display Glazing SHGC	-			

APPENDIX C – WSUD REPORT



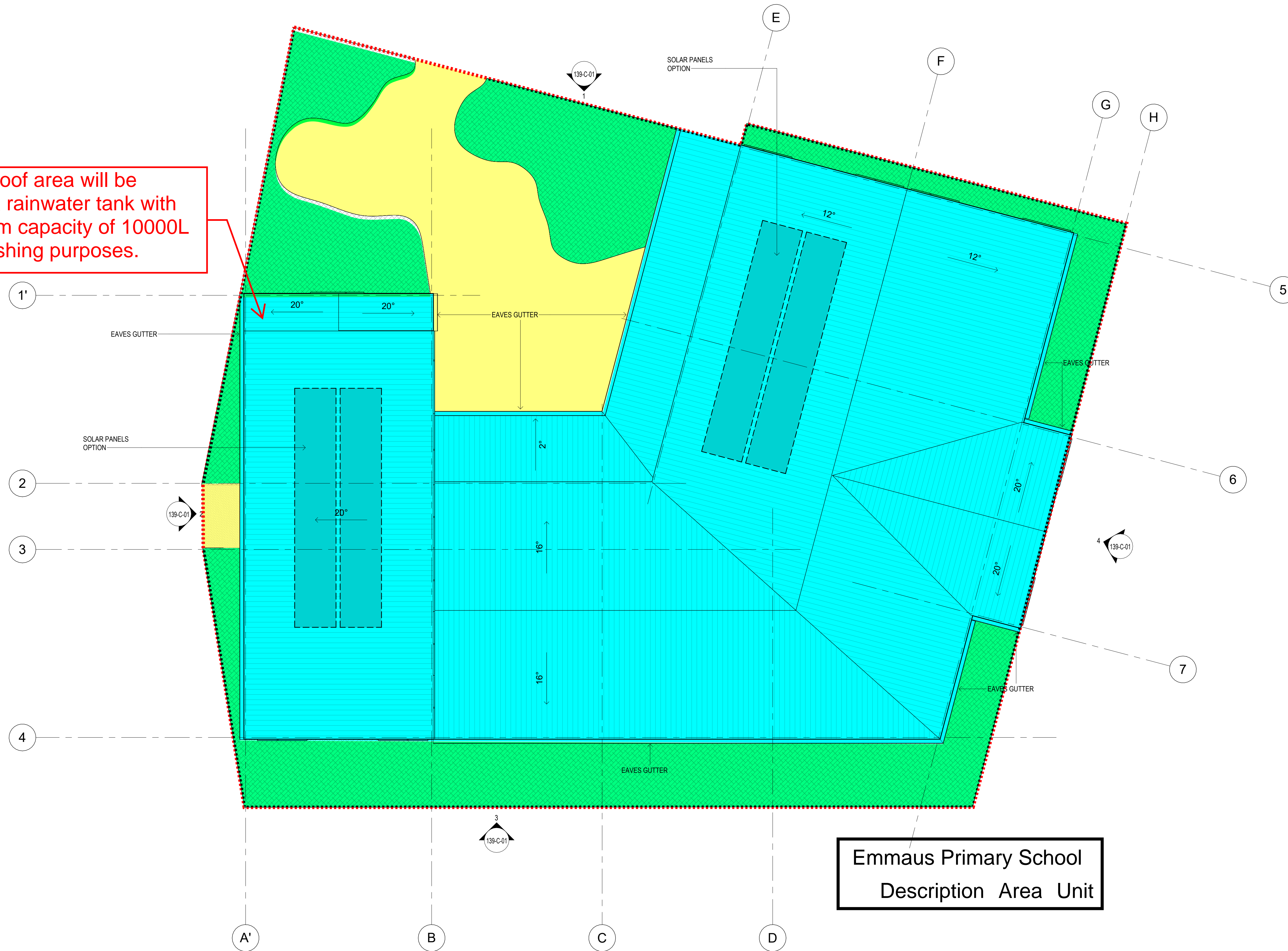


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ISSUE	DATE	REVISIONS
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The entire roof area will be served by a rainwater tank with the minimum capacity of 10000L for toilet flushing purposes.



Emmaus Primary School
Description Area Unit

CLIENT
EMMAUS COLLEGE

PROJECT TITLE
EMMAUS SYDENHAM

PROJECT NUMBER
139

PROJECT NORTH
GRAPHIC SCALE

SCALE
1:100 AT A1 DO NOT SCALE
STATUS

TOWN PLANNING
DRAWING

ROOF PLAN

DRAWING NUMBER
139-B-02

ISSUE



STORM Rating Report

TransactionID: 0
Municipality: BRIMBANK
Rainfall Station: BRIMBANK
Address: 370 Sydenham Rd, Sydenham VIC 3037

Sydenham
VIC 3037

Assessor:
Development Type: Commercial/Retail
Allotment Site (m2): 1,327.00
STORM Rating %: 117

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof	884.00	Rainwater Tank	10,000.00	100	136.40	64.00
Impermable area	145.00	None	0.00	0	0.00	0.00

APPENDIX D – WSUD MAINTAINANCE PLAN

The following provides a guide to the timing of inspection and maintenance activities for the typical components of this system.

Component	Key Activities	Typical Frequency
Roof	Remove leaf litter and debris Check general condition of roof for signs of leakage, including broken tiles, and rusting	1 month
Gutters and Downpipes	Remove leaf litter and gross pollutants Check general condition of drainage systems for signs of leakage, including damaged pipes and rusting	1 month
First Flush Device	Inspect inlet screens for blockages or fouling Inspect silt traps and collection pits, clean as required Inspect diversion pit and remove any build-up of sludge blocking the diversion valve Check all float operations and activation switches (if applicable) Check general condition of components for loose connections, wear and tear, and signs of leakage	1 - 3 months
	Arrange licensed EPA contractor to remove built-up sludge accrued in all pits (if applicable)	6 months
Tanks	Ensure inlet and overflow screens are not blocked or fouled Remove excess layers of sludge and biofilms on tank walls if affecting the colour or smell of the tank water Check general condition of tank for signs of damage or leakage	3 – 6 months
Pumps	Pumping systems are to be maintained in accordance with the manufacturers' specifications	Refer manufacturers' details
Vegetation	Prune surrounding vegetation and overhanging trees to reduce leaf litter and debris	6 months
Filtration Pits	Full inspection including cleaning of the grate and sediment trap.	12 months
Filtration Media Inspection	Filter media inspection to look for sediment build up at inflow and outlets points. Holes that appear in the filter media (or other signs of erosion in preferential flow paths) should be filled. In addition to the regular inspection schedule, this inspection should be conducted after major storm events.	3 months
Filtration Media Replacement	Filtration media cartridge replacement	4 years

Table 2: WSUD maintenance program



Tips for undertaking maintenance

Things to look for and how to fix them.

Leaf litter / debris in gutters	Pump not working
Regularly clear your gutters. Make sure you cover the tank inlet if you're rinsing down the gutters to avoid debris entering the tank.	Check operating instructions for your pump. Check that pumps are kept clear of surface water (flooding), vegetation, and have adequate ventilation. Pumps should be serviced every few years to prolong the pump life.
Blocked downpipe	Mains backup or pump not working
If you see water spilling from the edge of the gutters check that the downpipe is not blocked, removing any debris.	Have you heard the pump operating? If the mains backup switching device fails many people do not notice for a long time. Consider a manual system if the switching device is problematic and you don't mind operating it manually.
First flush diverter clogging	Overflow
To clean out, unscrew the cap at the base of the diverter and remove the filter. Wash the filter with clean water and the flow restrictor inside the cap.	Check that the overflow is not blocked and that there is a clear path for water to safely spill from the tank through the overflow pipe when full. Check that a clean mesh screen is safely in place to prevent mosquitoes entering the tank.
Debris on the mesh cover over inlets / outlets	Sediment / debris build-up in tank (more than 20mm thick)
The fine stainless steel mesh is similar to fly screen mesh. It should be cleaned regularly to ensure it does not become blocked with leaves and other material.	Over time a small amount of fine sediment will collect in the bottom of your tank and this is harmless and natural. It should not be disturbed until it is approx 20 mm thick which may take many years. To clean your tank out simply empty your tank and wash out with a high-pressure washer or hose.
Dirt and debris around the tank base or side.	Base area
Keep leaf build-up, sticks, pot plants and other items off the lid of your tank. Use a hose to remove dust and dirt from the outside of the rainwater tank and ensure there is no debris on the base, bottom lip and walls of your tank.	Tanks must be fully supported by a flat and level base. Check for any movement, cracks or damage to the slab or pavers. If damage is observed, empty the tank to remove the weight and have the fault corrected to prevent damage to the tank. There is no warranty from suppliers for damage to a rainwater tank if the base has failed.
Smelly water or mosquitos	Monitoring the water level
Rainwater tanks can smell if there is debris in the gutters. Check the gutters and leaf strainers are clean. Mosquitos or wrigglers can make their way into your tank if they are small enough to pass through the inlet strainer. A very small amount of chlorine (approx 4 parts per million) can be put in the tank to kill off mosquitos or the bacteria causing odours. The chlorine will disinfect the water and then evaporate. Chlorine tablets from a pool supplier can be used (but check the recommended dose based on your tank capacity).	A range of devices are available to monitor water level. Some simple float systems can be used effectively.

Acknowledgement: Information from PJT Green Plumbing's 'Maintenance Guide for Your Rainwater Tank' was used to develop this fact sheet.



Maintenance manual

Rainwater tanks

Site address: 370 Sydenham Rd, Sydenham VIC 3037

Planning permit number: _____

Rainwater tank maintenance

This manual lists the key tasks required to maintain a domestic rainwater tank and the recommended frequency of each task. This manual can be submitted with planning permit applications for developments that include the installation of a domestic rainwater tank. Once endorsed, the property owner is responsible for continuous implementation of rainwater tank maintenance, in accordance with the guidance in this manual.

Rainwater tanks are an exceptional tool for environmental protection. They collect and store roofwater for use inside and outside the home. This simultaneously reduces the demand on our precious potable mains water and limits the amount of stormwater pollutants that enter our sensitive Bay.

Maintenance of rainwater tanks is relatively easy however it is important to do the following key tasks to ensure the quality of water is high:

- stop leaf litter and debris entering the tank.
- prevent bird droppings and dust building up in the gutters.
- prevent mosquitos and other animals entering the tank.

Tank connected to	toilet only <input checked="" type="checkbox"/> toilet & irrigation <input type="checkbox"/> toilet & laundry & irrigation <input type="checkbox"/> toilet & laundry & hot water & irrigation <input type="checkbox"/>
Rainwater tank location	
Planning drawing number showing rainwater tank location	
Rainwater tank construction date	
Date of final building inspection	
Tank volume (litres)	
Area or percentage of the roof that is connected to the tank via gutters and downpipes	

For more information please visit www.portphillip.vic.gov.au or contact the Sustainability team via:

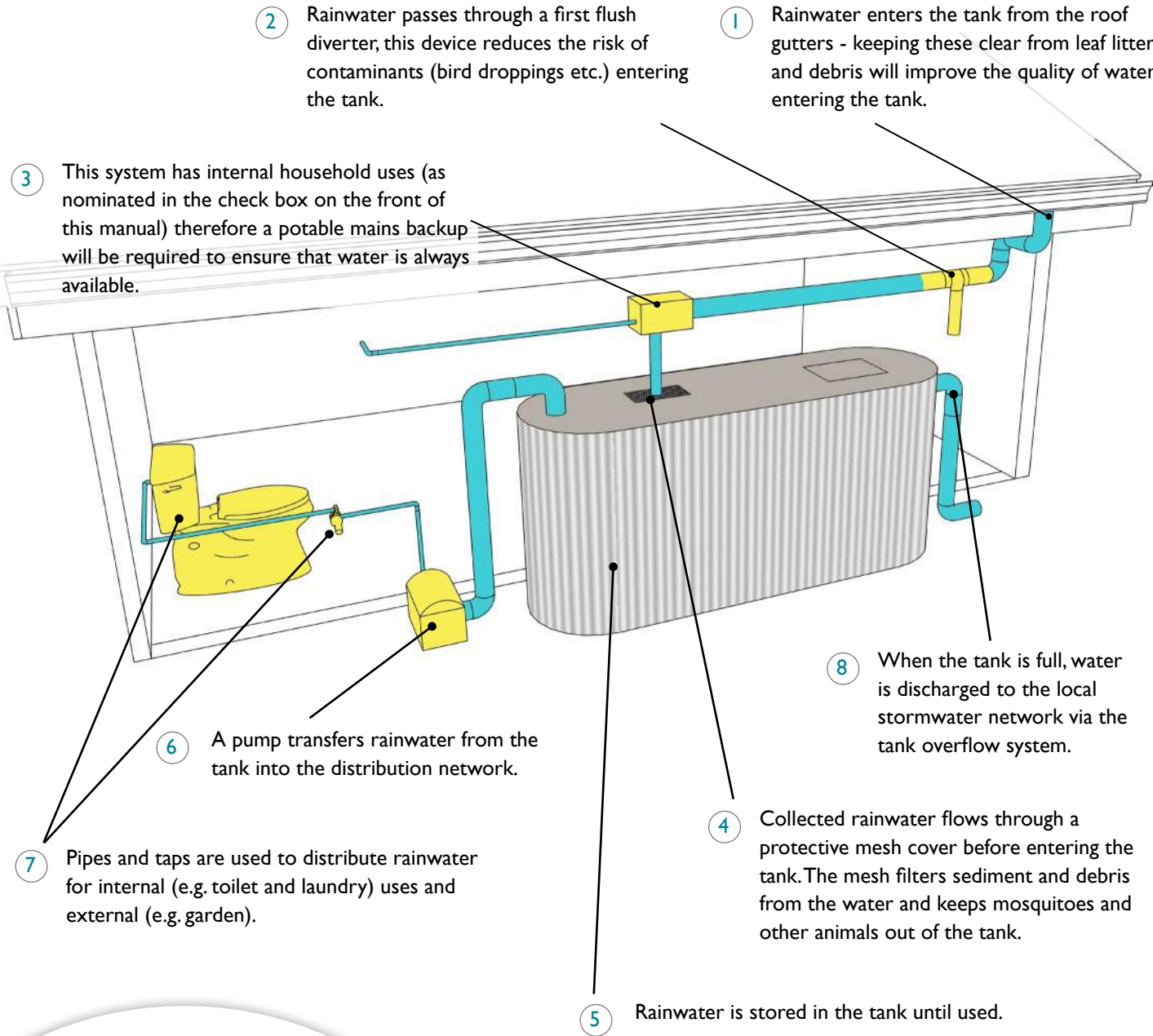
Phone: 03 9209 6777
email: sustainabledesign@portphillip.vic.gov.au



Maintenance Overview

Rainwater Tank Maintenance

The following diagram identifies the key items which are important for rainwater tanks and their maintenance.



Maintenance Checklist

The property owner is responsible for checking the maintenance items in this checklist at the recommended frequency at the bottom of the table. The maintenance log at the bottom of the page should be filled in once each maintenance check is complete. Upkeep of this maintenance log should continue throughout the life of the rainwater tank.

Item	Rainwater tank element	Inspection item	Y/N	Likely maintenance task
1	Roof gutters and downpipes	Is there leaf litter or debris in the gutters?		Remove by hand and dispose responsibly.
2	First flush diverter	Is there anything blocking the first flush diverter (leaves etc)?		Remove by hand and dispose responsibly.
3	Potable mains back up device	Is the potable mains back up switch operating correctly?		Repair or replace device. Consider a manual switching device.
4	Mesh cover	Has the mesh cover deteriorated or have any holes in it?		Replace mesh cover.
5	Tank volume	Is there large amounts of sediment or debris sitting in the bottom of the tank, reducing the volume available in the tank to store water?		Remove sediment and dispose responsibly.
6	Pump	Is the pump working effectively? Have you heard it on a regular basis?		Check the potable mains back up is not permanently on. Repair or replace pump.
7	Pipes and taps	Are pipes and taps leaking?		Repair as needed.
8	Overflow	Is the overflow clear and connected to the stormwater network?		Remove blockages and/or restore connections to stormwater network.
9	Supporting base	Are there any cracks or movement of pavers?		Empty the tank to reduce weight then repair any damage to the base.

Maintenance frequency

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
All tasks	x			x			x			x		

Regular maintenance will improve the water quality and extend the life of your system. A well maintained tank isn't likely to need to be cleaned out for up to ten years (when there is more than 20mm of accumulated sediment).

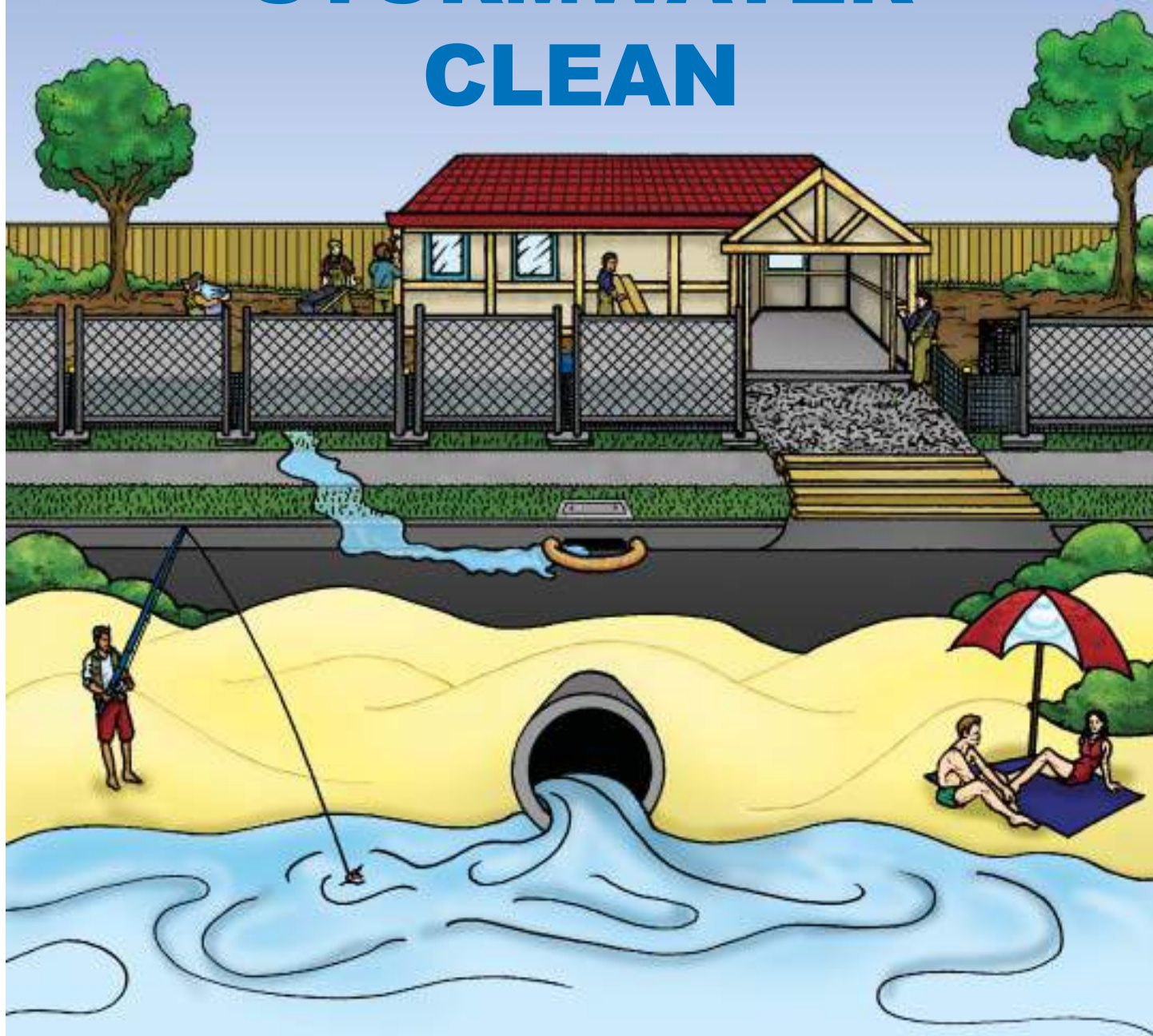
Maintenance Log

Maintenance date	Maintenance undertaken

APPENDIX E - CONSTRUCTION STORMWATER SITE MANAGEMENT PLAN



KEEPING OUR STORMWATER CLEAN



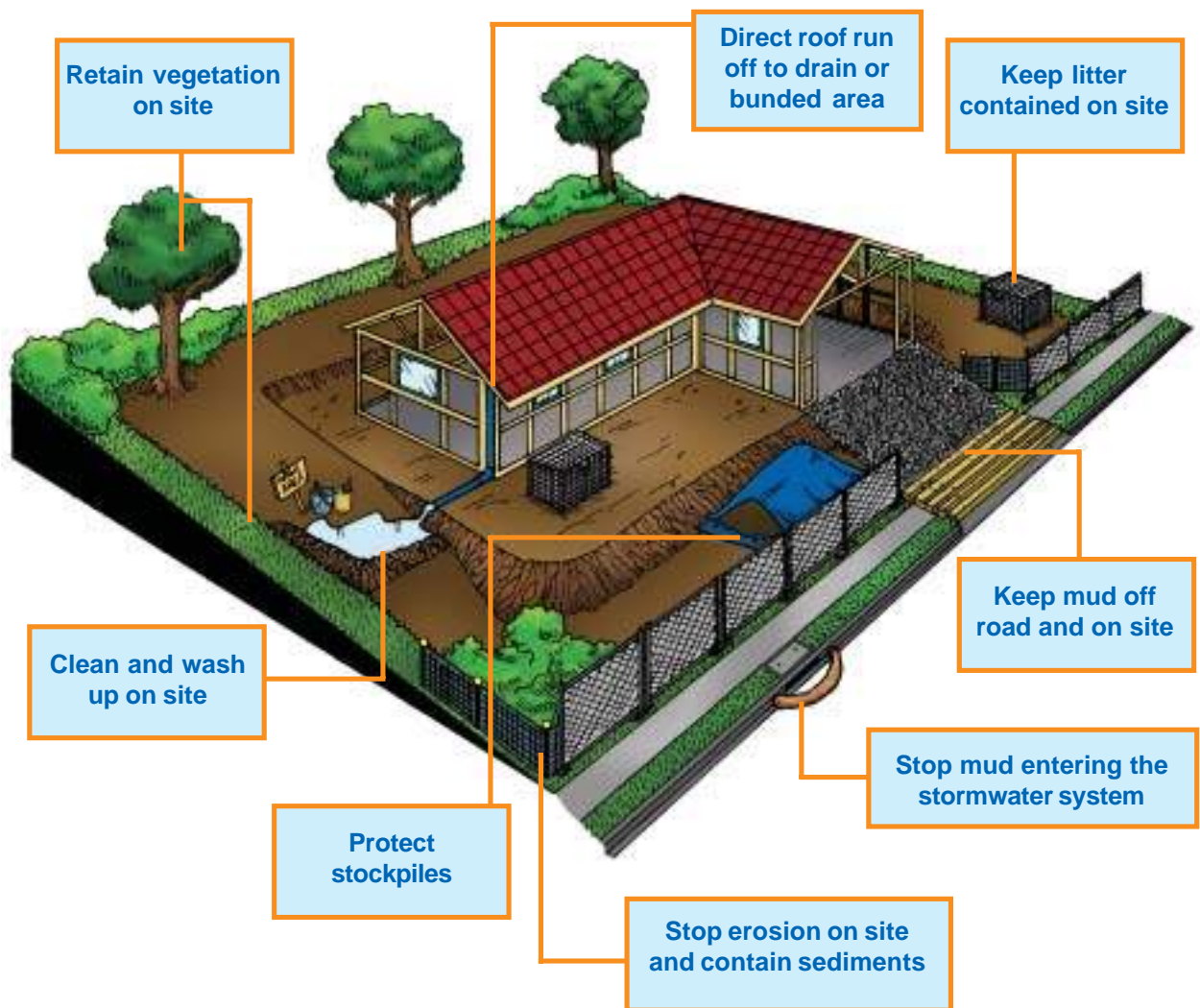
A BUILDER'S GUIDE

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

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



SITE RULE 1

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

..... Page 4



SITE RULE 2

Stop erosion onsite and contain sediments.

..... Page 6



SITE RULE 3

Protect stockpiles.

..... Page 12



SITE RULE 4

Keep mud off road and on site.

..... Page 16



SITE RULE 5

Keep litter contained on site.

..... Page 18



SITE RULE 6

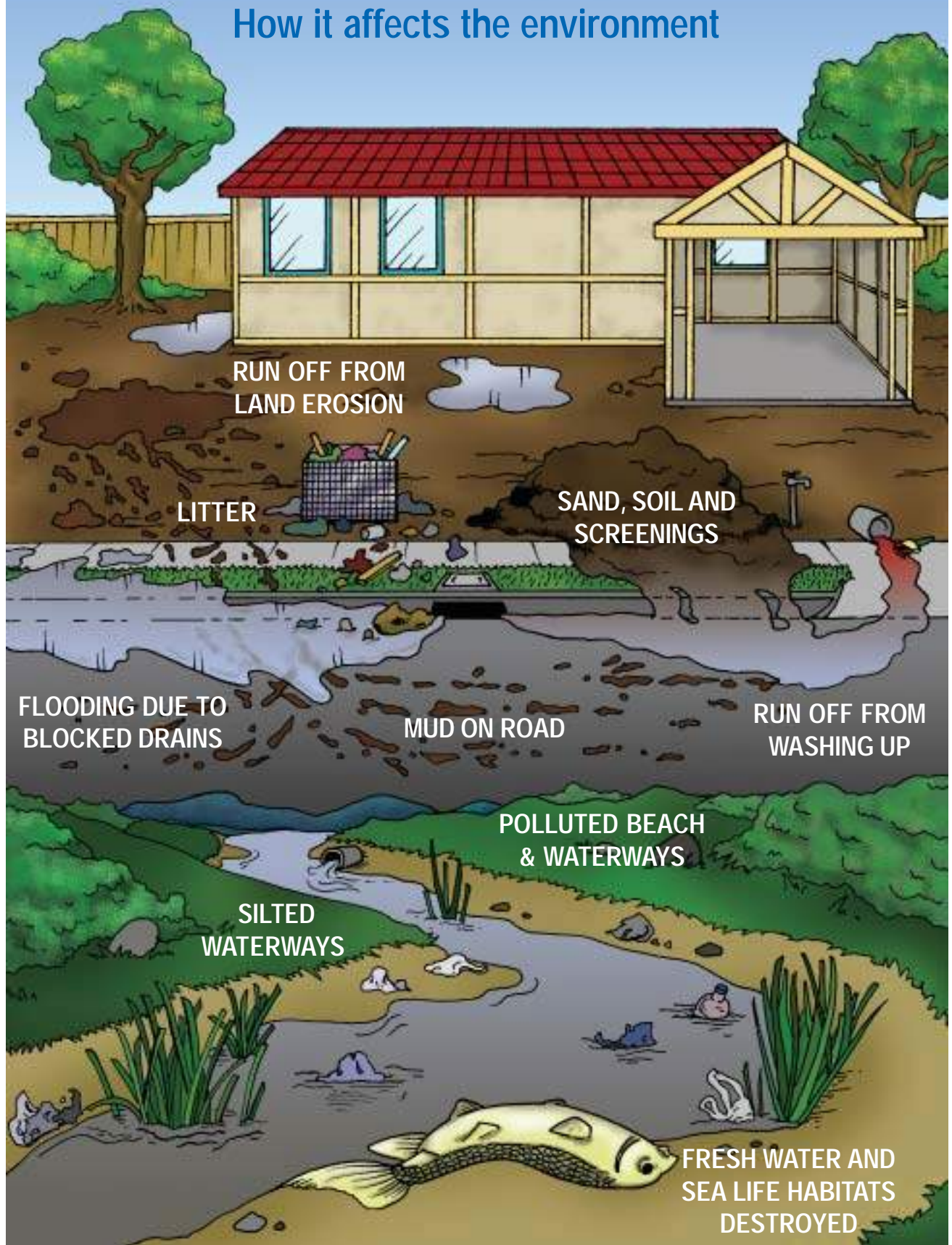
Clean and wash up on site.

..... Page 21

Use the Site Management Plan..... Page 23

PROBLEMS ON OUR BUILDING SITES

How it affects the environment



WHY DO I NEED TO PROTECT OUR ENVIRONMENT?

It's the law!

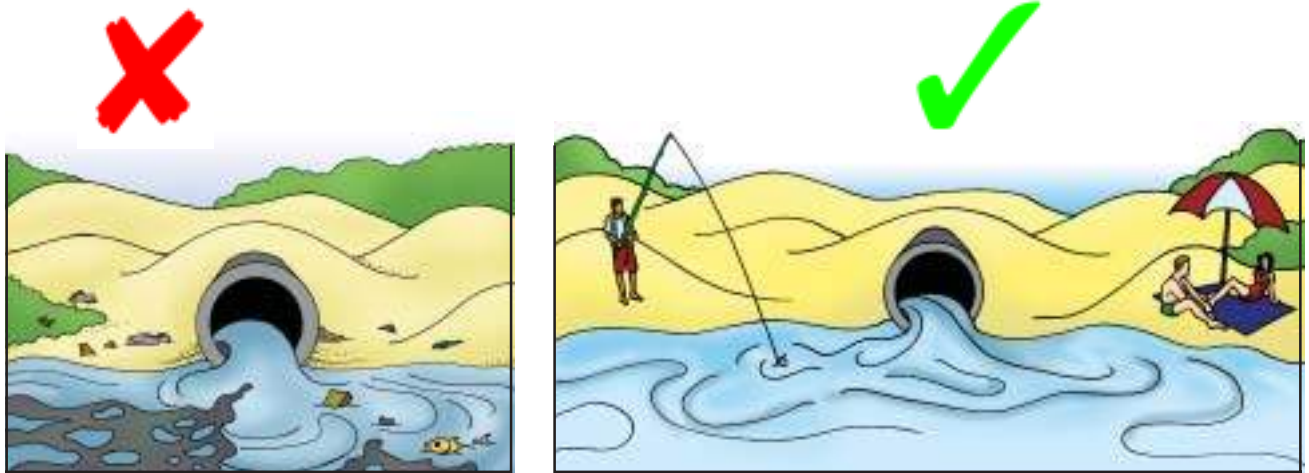
Sediment from building sites can pollute stormwater. There are State and local council laws which make this an offence.

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

For NT Contractors look under Sediment Control in the NT Yellow Pages

STABILISED DRIVEWAYS

For aggregate look under sand, soil and gravel in the NT 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
See also silt fencing – in the NT Yellow Pages

PORTABLE TOILETS

See Toilets – Portable in the NT Yellow Pages

TEMPORARY FENCING

See Temporary Fencing Hire Contractors in the NT Yellow Pages

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
Civil Contractors Federation NT
www.civilcontractors.com
Keep Australia Beautiful Victoria – CleanSites Program
www.kabcnt.org.au/
Victorian Litter Action Alliance
www.litter.vic.gov.au
NT Environment Protection Authority
www.ntepa.nt.gov.au
Environment Protection Authority Victoria
www.epa.vic.gov.au
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

SITE MANAGEMENT PLAN

Building Company: _____ Date: ____/____/____
 Site Address: _____
 Client Name: _____ Contact Number: () ____-____



LEGEND:
 Tree: Green (existing), Brown (to be removed)
 Building: Red (existing), Grey (to be removed)
 Road: Yellow (existing), Blue (to be removed)
 Other: Green (existing), Brown (to be removed)
 Symbols: Tree, Building, Road, etc.

CLEAN SITE CHECKLIST

Please photocopy to use on site

SITE DETAILS:
 Building Company: _____
 Site Supervisor: _____
 Date: ____/____/____
 Site Address: _____
 Client Name: _____
 Contact Number: () ____-____

SITE RULE	TASK	CHECK
SITE RULE 1: Check Council requirements and plan before you start work on site.	Cross over away from lowest point Sediment control fences on lowest site Stockpiles away from lowest point Marked trees and vegetation to keep on site	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
SITE RULE 2: Stop erosion on site and contain sediments	Sediment control fences in place Catch drains on high side of site Vegetation areas kept at boundary Downpipes set up as early as possible	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
SITE RULE 3: Protect stockpiles	Seal and cover for stockpiles Seal drainage at downwater pit	<input type="checkbox"/> <input type="checkbox"/>
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	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
SITE RULE 5: Keep litter contained on site.	Litter bins in place with lid closed Site fencing in place	<input type="checkbox"/> <input type="checkbox"/>
SITE RULE 6: Clean and wash up on site.	Cutting and shade up area on site Clean equipment off before washing Sediment filters downpipe Contain all washings on site	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

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





SITE RULE 2

Stop erosion and keep sediment on site

Why is erosion a problem?

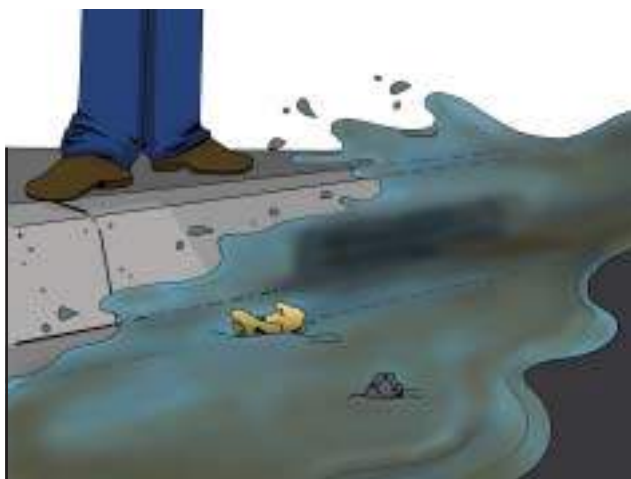
Sediment escaping from building sites can:



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.

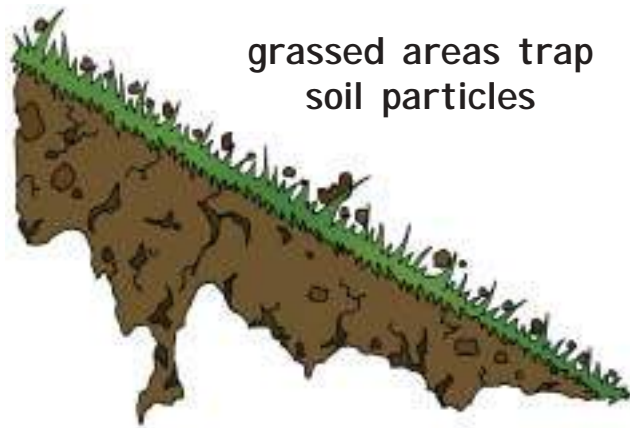


4. Overload and clog local stormwater filtration systems such as raingardens and swales.

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.

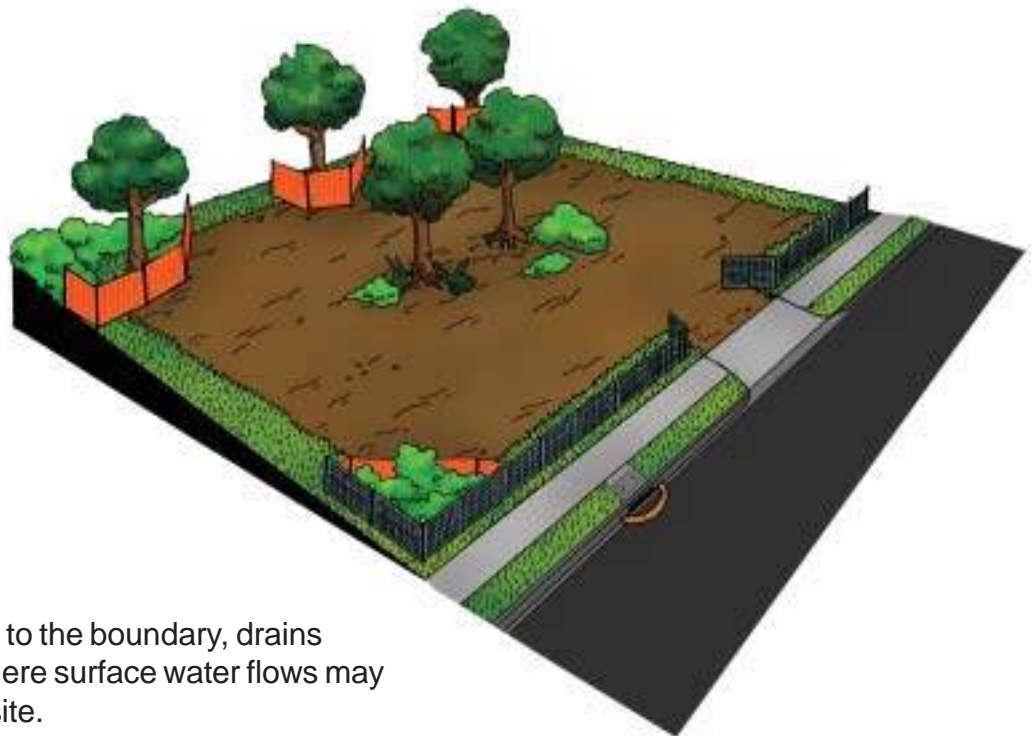


grassed areas trap soil particles

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 banded 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 banded area.

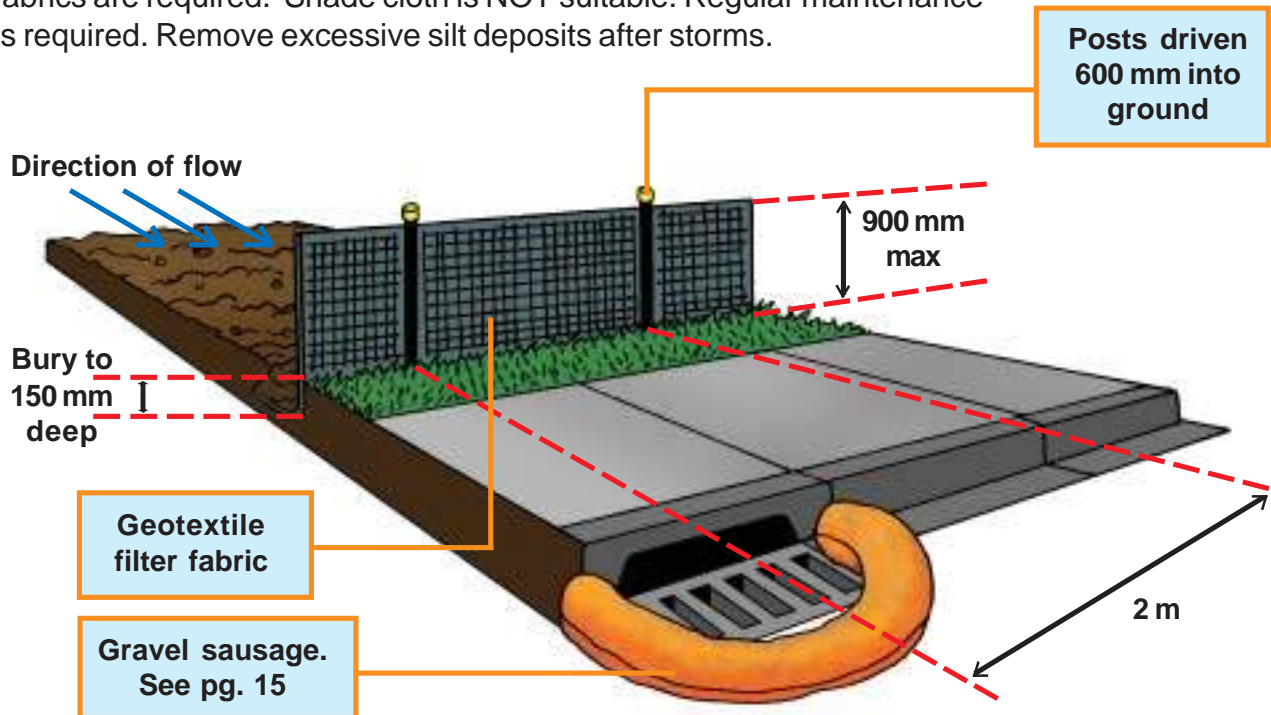


This lets water seep into the ground with less damage to the surface of the soil.

METHODS TO CONTAIN SEDIMENT ON SITE

Method 1 - Sediment Control Fences

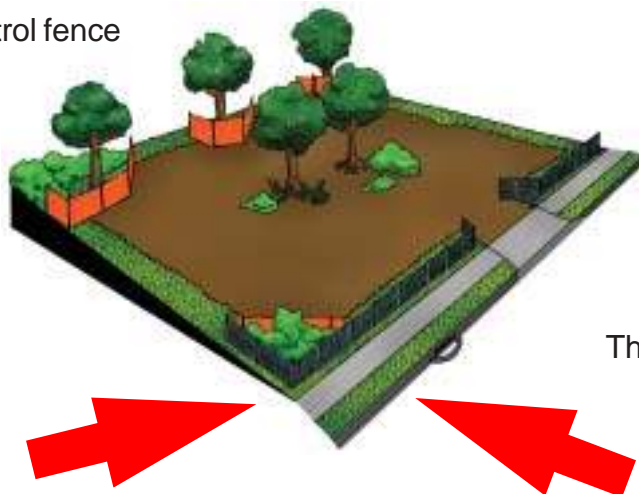
Sediment control fences stop sediment from being washed off site. The fence allows muddy water to pond behind it and for sediment to settle as the water slowly filters through. Geotextile fabrics are required. Shade cloth is NOT suitable. Regular maintenance is required. Remove excessive silt deposits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

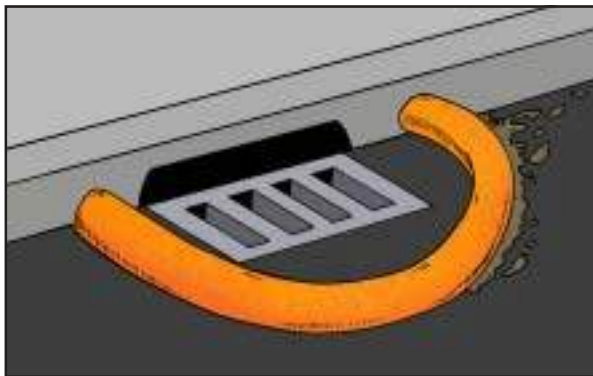
Choose a set area to do all your cutting. This area should be on the building site and away from all stormwater drains.

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?

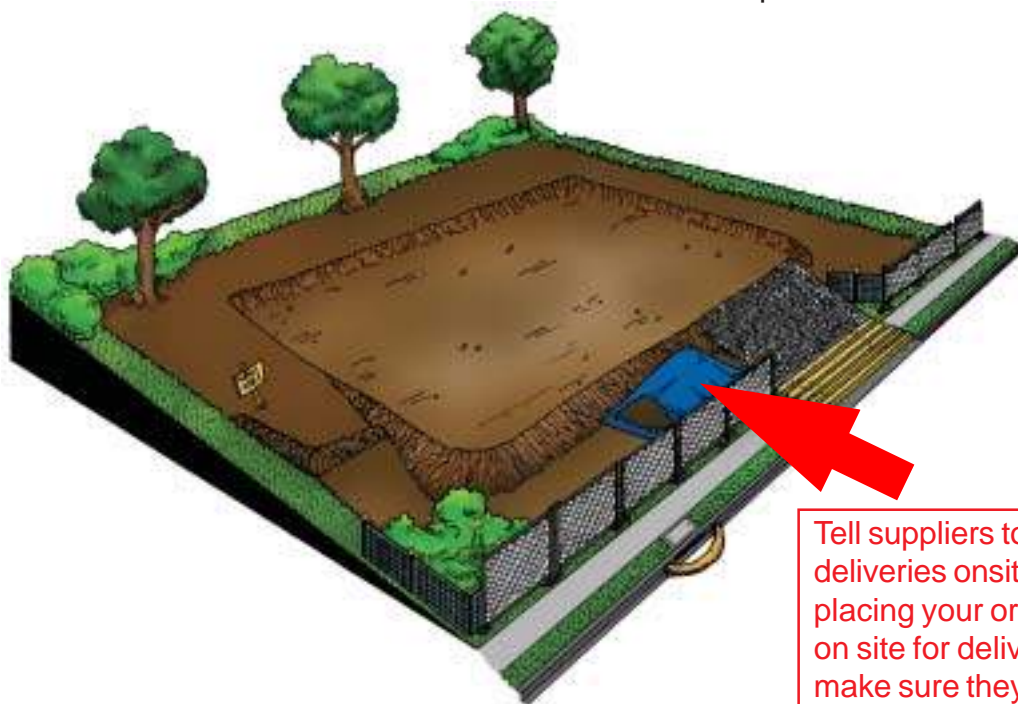


Sand, soil, screenings, dust or sludge from concrete and brick cutting, and other materials escaping from building sites can cause many problems.

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.

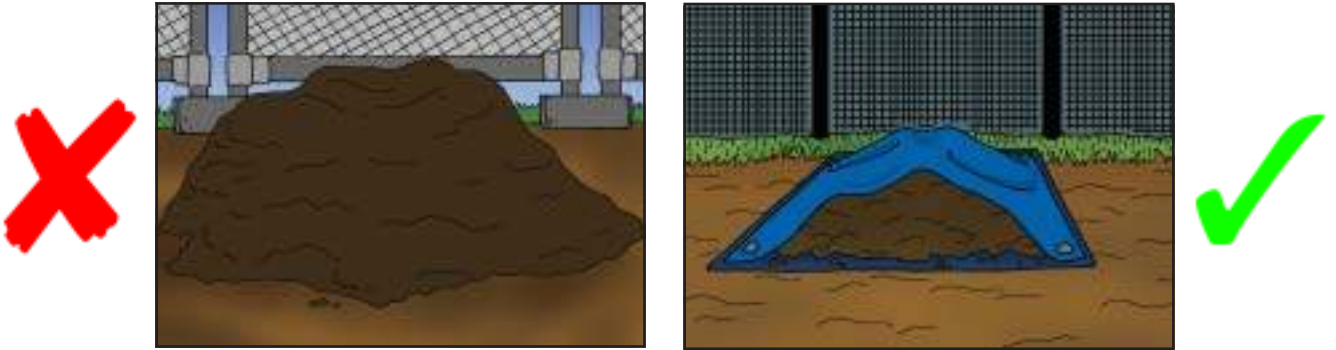


Tell suppliers to place deliveries onsite when placing your order or be on site for deliveries to make sure they are put in the right place.

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.

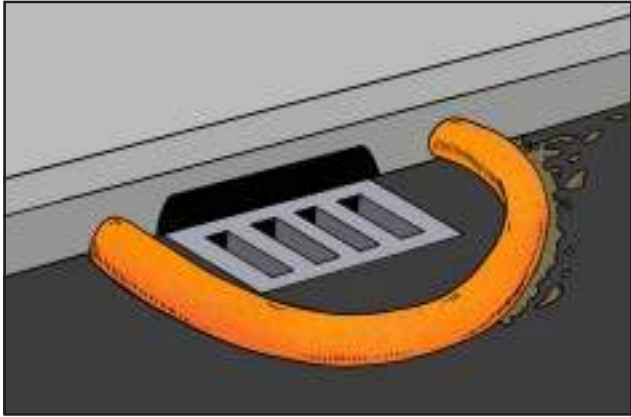
Method 1 - Cover Stockpile

- a) Place a tarp, plastic or banded 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.

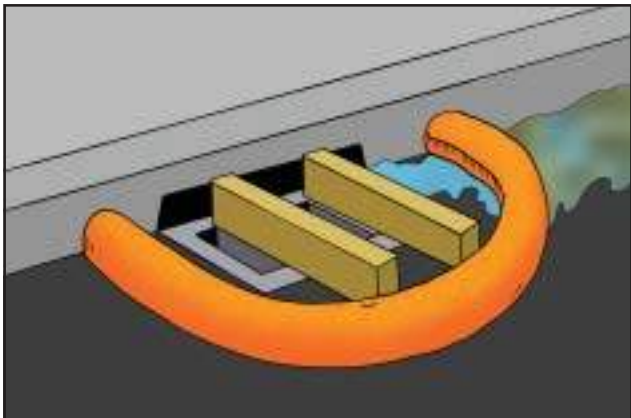


TO BUILD A GRAVEL SAUSAGE:

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?

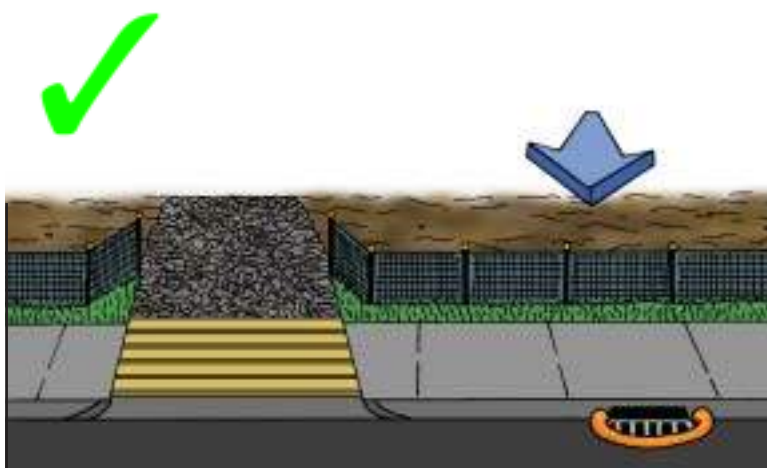
Two things happen when vehicles go on and off the site:

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?

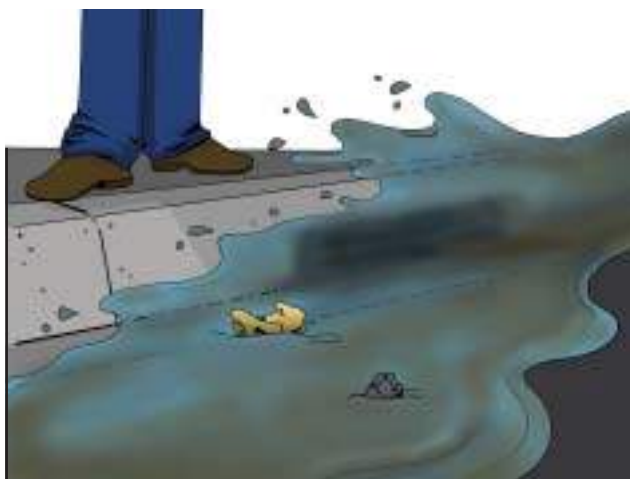


Many building sites have both building rubble and other rubbish spread across them.



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.

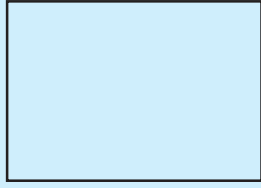
A FENCE DOES NOT NEGATE THE NEED FOR A BIN.



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.

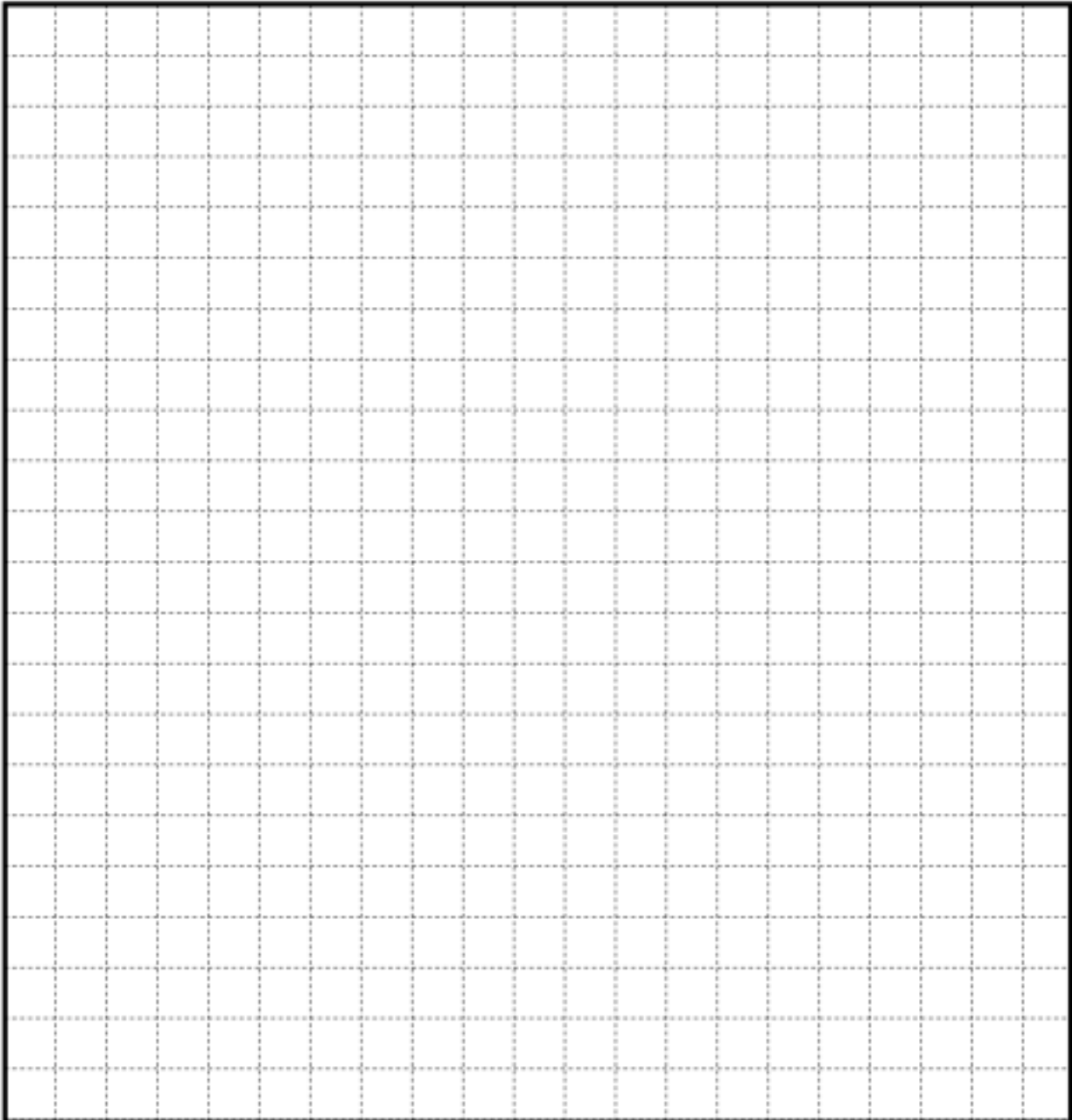
Wash oil based paints in solvent baths until clean. **DO NOT PUT THE SOLVENT ON THE GROUND.** Contact a waste disposal company for removal.

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



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

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.

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Environment
Protection
Authority Victoria



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Melbourne Water on 131 722
or email enquiry@melbournewater.com

Desktop publishing and editing was done by:

First published in 2002
Second edition, revised, published 2002
Third edition, revised, published September 2003
Fourth edition, revised, published October 2006



APPENDIX F – DAYLIGHT REPORT

The table below summaries the percentage of floor area to achieve at least 2% of Daylight factor.

Area	% DF Achieved
School	55%

Daylight simulation calculations have been undertaken using Design Builder v7, which uses the Radiance Daylighting simulation engine. The Design Builder Radiance simulation provides a detailed multi-zone physics-based calculation of illumination levels on the working plane of a building. The calculations allow light to be transmitted through exterior and interior windows and the shading and reflective effect of local shading devices and component/assembly blocks is included.

Modelling parameters and assumptions are generally based on Green Star IEQ-4 requirements as follows:

- > Uniform Design Sky
- > Internal floor reflectance = 30%
- > Internal wall reflectance = 70%
- > Internal ceiling reflectance = 80%
- > Working plane defined as 0.7m

Glazing light transmittance assumptions were as follows:

- > High performance Double Glazing with following values
- > Visible Light Transmittance = 60% for windows



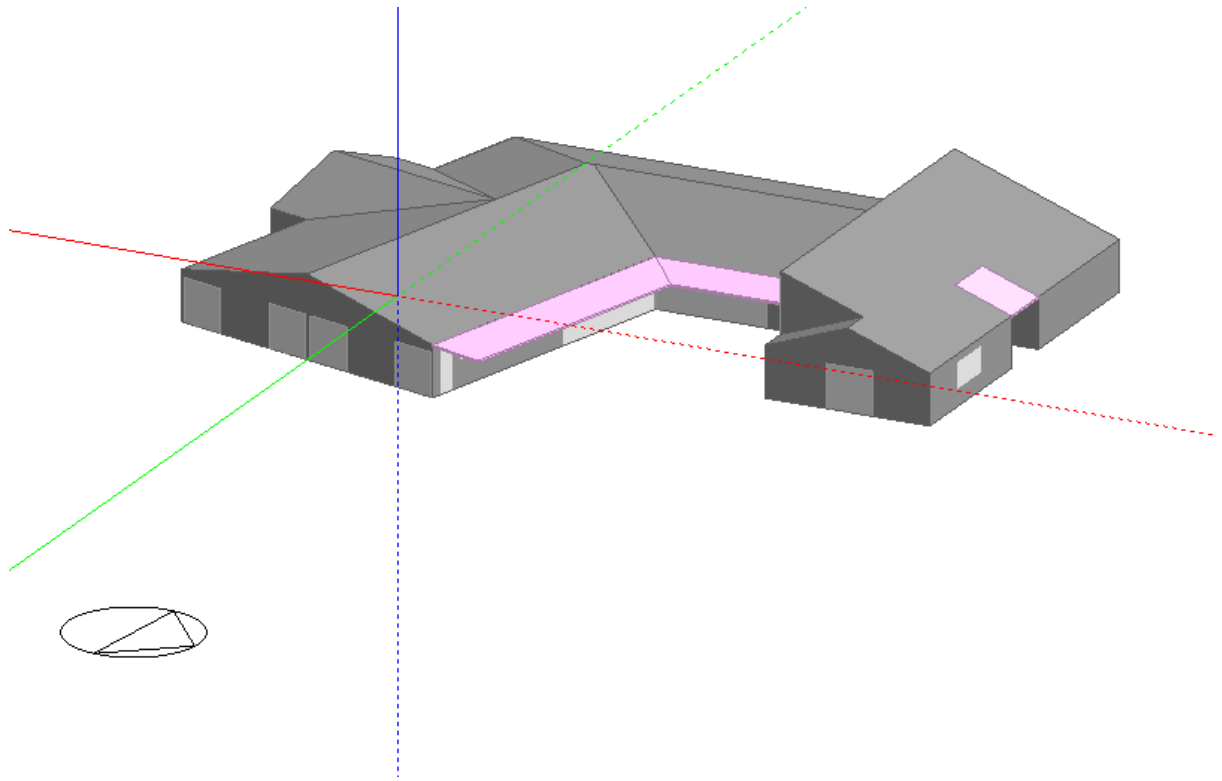


Figure 4. Model Geometry used for Daylight Modelling

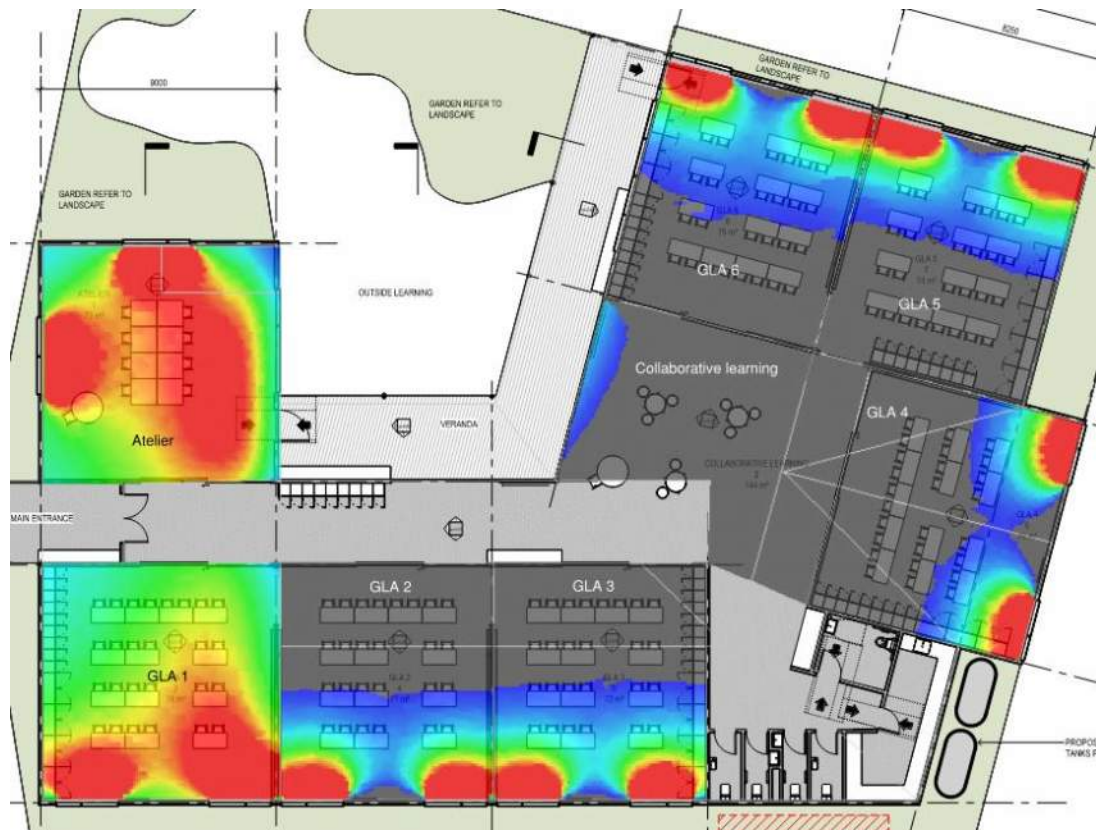


Figure 5: Daylight Map for Ground Floor



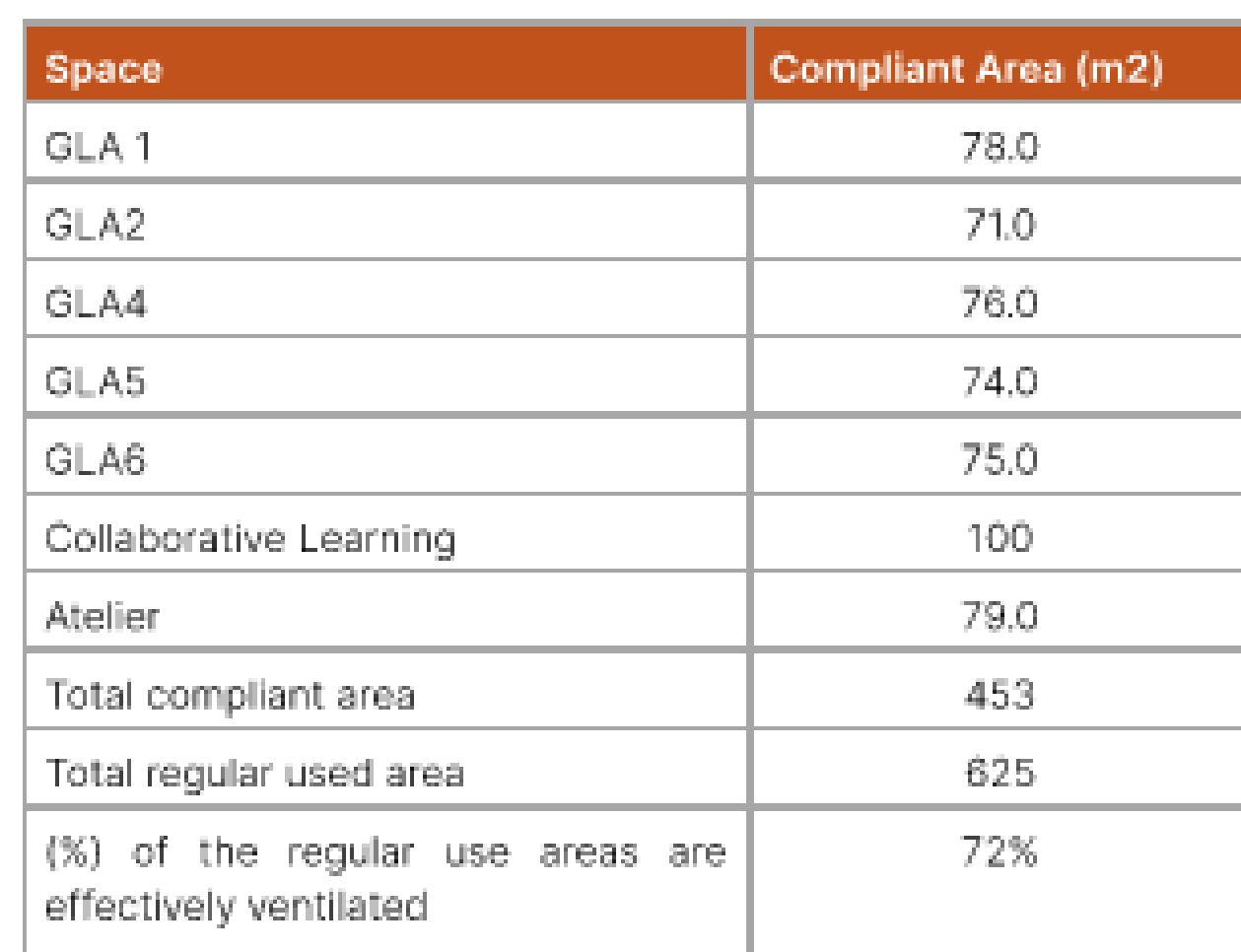
Space	Nominated Area (m2)	Compliant Area (m2)	Compliant Area (%)
GLA 1	84.0	84.0	100%
GLA2	75.0	33.7	45%
GLA3	75.0	37.0	49%
GLA4	81.1	32.7	40%
GLA5	78.9	35.2	45%
GLA6	78.9	41.5	53%
Learning area	81.7	3.2	4%
Atelier	84.0	84.0	100%
Total	638.6	351.3	55%

Table 2: Daylight Compliance zone



APPENDIX G – VENTILATION MARK-UPS





DRAWING NUMBER	ISSUE
139-B-01	