

Sustainable Design Assessment (SDA) - residential

For planning applications of 3 to 9 dwellings and non-residential of 100 to 999sq.m.

ESD in the Planning Permit Application Process:

Darebin City Council is committed to promoting Environmentally Sustainable Design (ESD) as an integral part of new developments within the municipality. This is in accordance with State and Local Planning Policy, including Plan Melbourne, Darebin's ESD Policy 22.12 and the Darebin Municipal Strategic Statement (MSS),

ESD can be done easily by following the Sustainable Design Assessment in the Planning Process (SDAPP) program. This is a practical approach to assessing the sustainability of your project during the planning permit application process to achieve more sustainable building outcomes for the long-term benefit of the wider community.

What is a Sustainable Design Assessment (SDA)?

An SDA is a simple sustainability assessment of a proposed design at the planning stage. An SDA addresses the 10 Key Sustainable Building Categories and demonstrates that a holistic ESD review has been undertaken during a project's early design stages. It identifies beneficial, easy to implement and best practice initiatives and includes a BESS and STORM report. The items listed in each category should be deleted if not relevant.

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Response Guidelines

Project Information

The applicant should state the property address and the proposed development's use and extent. They should describe neighbouring buildings that impact on or may be impacted by the development. It is required to outline relevant areas, such as site permeability, water capture areas and gross floor area of different building uses.

Environmental Categories

The applicant should describe the development's sustainable design approach and summarise the project's key ESD objective under the 10 Key Sustainable Building Categories. These are Management, Energy, Water, Stormwater, Indoor Environment Quality, Transport, Waste, Urban Ecology and Materials. Any innovative ESD items or design approaches should also be included.

Objectives

Within this section the general intent, the aims and the purposes of the category are explained.

Design response

This section comprises a list of ESD considerations in italics. These are to be deleted by the applicant and information about their own development inserted for assessment by the ESD Officer and planner. The response should include the following:

- Assessment Method Description - what standards have been used to assess the applicable issues. Refer to the section 'Relevant Standards' under each Sustainable Building Category
- Benchmarks Description - The applicant is required to briefly explain the benchmark applied as outlined within the chosen standard.
- How does the proposal comply with the benchmarks? – Demonstrate this by making references to the design brief, drawings, specifications, consultant reports or other evidence that proves compliance with the chosen benchmark.

ESD Matters on Architectural Drawings

Architectural drawings should reflect all relevant ESD matters where feasible. As an example, window attributes, sun shading and materials should be noted on elevations and finishes schedules, water tanks and renewable energy devices should be shown on plans. The site's permeability should be clearly noted. It is also recommended to indicate water catchment areas on roof- or site plans to confirm water re-use calculations.

BESS and STORM reports

The SDA must have the full BESS or published BESS number and Melbourne water STORM assessments attached to the SDA template. Insite Water and MUSIC can also be used. A copy can be made of the published report on the BESS website if any changes to the BESS report are required.

PLEASE NOTE

- ESD element options listed in the statement are prompts for discussion.
Non-relevant elements should be deleted from the statement.
- Applicants are encouraged to exceed the benchmark targets.
- The Sustainable Design Assessment (SDA) and all associated plans and schedules must be consistent with one another.
- Note: The *Trade Practices Act 1974* contains provisions relating to misleading or deceptive conduct and false or misleading representations. The Act ensures that the public, and in that the Council, are provided with accurate information in order to make informed decisions. Organisations which make environmental or 'green' claims should ensure that their claims are scientifically sound and appropriately substantiated as serious penalties can apply for activities that are in breach of the Act.

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Project Information:

Planning Permit Applicant:

Property Address:

Project Description:

Project Description:

Site Area (m ²):	Site Coverage – impervious surfaces (m ²):
<input type="text"/>	<input type="text"/>

The sustainable design approach of your building project and its key ESD objectives:

1. Management

Relevant BESS credits for residential and non-residential

1.1 Pre-application meeting, 2.1/ 2.2/2.3 Thermal Performance modelling. 3.1/3.2/3.3 Metering, 4.1 Building Users Guide

Design Issue	Design response	Drawing reference
Pre-application meeting	<i>Has an ESD professional been part of the design process from the beginning. Were they at a pre-application meeting with council?</i>	
Thermal performance modelling	<i>Aim for a minimum of 6.5 stars for each dwelling. Provide preliminary reports.</i>	
Metering	<i>Are there separate meters for residential, communal and non-residential spaces. Are there separate meters for individual residents for water, electricity and gas?</i>	
Building Users Guide (BUG)	<i>Provide all residents with a copy of a building users guide or have information in a prominent location on the buildings ESD features e.g. water tanks and how residents can save on energy and costs e.g shorter showers, thermal curtains, etc.</i>	
Other		

Relevant Standards:

- ASHRAE and CIBSE Commissioning handbooks
- International Organization for standardization – ISO14001 – Environmental Management Systems

References and useful information:

Waste Reduction for Construction

<https://www.sustainability.vic.gov.au/You-and-your-home/Waste-and-recycling/Household-waste/Construction-waste>

2. Water Efficiency

Objectives: To ensure the efficient use of water and associated utility bills, to reduce mains water use, To encourage the collection and reuse of rainwater and stormwater, To encourage the appropriate use of alternative water sources (e.g. grey water)

Relevant BESS credits – 1.1 Potable Water use reduction, 3.1 Water Efficient landscaping, 4.1 Building Systems water use reduction

Design Issue	Design response	Drawing reference
BESS 1.1 Potable Water use reduction	<i>Install appliances to within one star of the best available (refer to the WELS website) and provide details in the BESS report</i>	
BESS 1.1 Water for Toilet Flushing	<i>Connect as many toilets as possible to a water tank/s to avoid using drinking quality water for flushing</i>	
Location and size of water tank/s	<i>Try to keep water tanks away from bedrooms to reduce noise issues. Install water tanks above the minimum requirement where possible. Minimise the distance between water tanks and toilets/ point of use to reduce pump sizes.</i>	
Area of roof draining to rainwater tank	<i>Ensure roof area going to tank and area listed under the STORM/ MUSIC tool are consistent. Provide a plan showing where all impervious areas are draining.</i>	
Irrigation	<i>Irrigate gardens using the water tank.</i>	
BESS Water 3.1 – Water efficient landscaping	<i>Use drought tolerant and indigenous plants.</i>	
Others	<i>n/a</i>	

Relevant Standards:

- BESS, Green Star
- Water Efficient Labelling Scheme (WELS) provides information on appliances and fittings; highest available ratings are recommended.
- NCC provisions provide minimum standards; improvements on these minimum requirements are strongly encouraged

References and useful information:

Water Efficient Labelling Scheme (WELS) www.waterrating.gov.au

Your home - <http://www.yourhome.gov.au/water>

Melbourne Water Why we need to save water - <https://www.melbournewater.com.au/water-data-and-education/environmental-issues/why-we-need-save-water>

3. Energy Efficiency

Objectives: to ensure the efficient use of energy and reduce total operating greenhouse emissions, to reduce energy peak demand and minimize associated energy costs

BESS credits houses and townhouses - 1.2, 2.1, 2.2, 2.3, 2.4, 3.2, 3.3, 3.4, 3.5, 4.5

BESS credits residential mixed use, apartments - 1.2, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.4, 3.6, 4.2

BESS credits non-residential – 1.1, 2.1, 2.2, 2.3, 2.4, 3.1, 3.2, 3.7, 4.2

Design Issue	Design response	Drawing reference
Thermal performance and GHG emissions	<p>Provide preliminary energy ratings NatHERS for 1 – 4 townhouses or 30% for larger developments, ensuring the worst performing one is included (e.g. west facing) or provide information on how energy efficiency requirements will be achieved.</p> <p>Houses/ townhouses to have a minimum 6.5 NatHERS score</p> <p>Install heating and cooling systems to within 1 star of the best available</p> <p>Non-residentials energy reduction for heating and cooling (BESS)</p>	
Gas consumption	It is strongly recommended to not install gas to any development	
Hot Water System	Install electric solar hot water or electric heat pump hot water.	Draw and label on the plans
External lighting	Is the external lighting controlled by a motion detector?	Draw and label on the plans
Clothes drying	Provide an external clothes rack in a sunny position	Draw and label on the plans
Efficient heating and cooling system	<p>Install ceiling fans</p> <p>Install HVAC units within one star of the highest star rating possible based on the size of the room.</p>	Draw and label on the plans
Efficient Lighting	<p>Does the development achieve a maximum illumination power density of 4W/sqm or less?</p> <p>Non-residential – W/m² at least 90</p>	Show number size, angle and direction on plans
Electricity Generation	<p>Install photo voltaic (solar) panels that provide a minimum of 30% of the estimated energy consumption.</p> <p>Install or provide space for battery storage.</p>	Indicate plant system and size on plans
Reduction in electricity and gas use	<p>External clothes lines maximised and drawn and labelled on the plans.</p> <p>Use induction cook tops, Install no gas</p> <p>Use energy efficient appliances to within one star of the best available.</p>	Draw and label clothes lines

References and useful information:

Energy Smart Housing manual <https://www.sustainability.vic.gov.au/You-and-your-home/Building-and-renovating/Energy-Smart-Housing-Manual>

Your Home www.yourhome.gov.au

National Construction Code Australia www.abcb.gov.au

Window Efficiency Rating Scheme (WERS) www.wers.net

Minimum Energy Performance Standards (MEPS) www.energyrating.gov.au

Energy rating of appliances - https://reg.energyrating.gov.au/comparator/product_types/

Energy information <http://www.sustainability.vic.gov.au/>

4. Stormwater Management

Objectives: To reduce the impact of stormwater runoff, to improve the water quality of stormwater runoff, to achieve best practice stormwater quality outcomes, to incorporate Water Sensitive Urban Design principles

BESS Credits – 1.1 Stormwater Treatment

Design Issue	Design response	Drawing reference
STORM, InSite or MUSIC rating	<i>Minimum Standard of 100% met or exceeded. Include the full STORM or MUSIC report with the SMP. Provide a WSUD plan showing where all impervious surfaces drain to</i>	
Rainwater Tanks	<i>Provide details of any water tanks including area of roof run-off, size of tank and proposed water uses (e.g. toilet flushing, garden). Indicate rain water tank's location and size on plans (if applicable). Connect tanks to toilets as they are used all year.</i>	<i>Indicate rain water tank location and size on plans</i>
Stormwater Treatment	<i>Comply with Clause 53.18. Reduce stormwater pollution by installing raingardens, buffer strips, tree pits, etc. to filter pollution before it goes to the local creeks. They must be located in communal areas. All treatments such as raingardens or swales must be detailed including area to be treated, size, type of treatment, sections, plants, maintenance, etc.</i>	<i>Draw and label clearly on the plans</i>
Stormwater detention	<i>Most developments will require on-site stormwater detention. Check with the Darebin engineering department for acceptable flows and storage volume. Overflow pipes must drain by gravity to the LPOD. The on-site detention system may be able to be combined with a retention tank used to meet stormwater requirements.</i>	
Impervious surfaces	<i>Maximise permeable surfaces to reduce stormwater. Install ribbon/ landscape strips and permeable paving to driveways where possible.</i>	
Other		

Relevant Standards:

- STORM rating, minimum 100% is required
- Compliance with Clause 53.18 Stormwater management in Urban Development is required for most developments.
- Environmental Protection Authority Victoria
- NCC provisions and the Building regulations provide minimum standards; improvements on these minimum requirements are strongly encouraged

References and useful information:

Melbourne Water STORM calculator www.storm.melbournewater.com.au
 STORM help http://storm.melbournewater.com.au/help/treatment_types.asp
 MUSIC (model for urban stormwater improvement conceptualisation) <http://www.toolkit.net.au/music/>
 Water Sensitive Urban Design Principles www.melbournewater.com.au
 WSUD design - <https://www.melbournewater.com.au/water-data-and-education/environmental-issues/why-we-need-save-water/tips-saving-water/raingardens>
 Clearwater - <https://www.clearwatervic.com.au/>
 Site Management Plans
<https://www.melbournewater.com.au/planning-and-building/developer-guides-and-resources/standards-and-specifications/develop-site>

5. Indoor Environment Quality (IEQ)

Objectives: To achieve a healthy indoor environment quality for the wellbeing of building occupants, to provide a naturally comfortable indoor environment to lower the need for building services, such as artificial lighting, mechanical ventilation, cooling and heating.

BESS Credits houses and townhouses – 2.2, 3.1, 3.2, 3.3,

BESS Credits other residential – 1.1, 1.2, 1.3, 1.5, 2.1,

BESS Credits non-residential – 1.4, 2.3, 3.4, 3.5, 4.1

Design Issue	Design response	Drawing reference
Ventilation	<i>Ensure all rooms have 2 openings where possible ideally on adjacent or opposing walls. Maximise operable windows. Use windows that allow for higher levels of ventilation such as casement, double hung and sliding. Install ceiling fans</i>	
Daylight	<i>Ensure all rooms have a window, skylight or daylight tube wherever possible. Draw and label clearly on the plans. Maximise the size of windows while considering heat loss and heat gain. Avoid rooms with small light courts. Consider what development could occur on the neighbouring property and block daylight access</i>	
Passive solar design	<i>Maximise north facing windows, particularly to living areas. Install operable windows to all rooms. Maximise operable windows ideally on opposing walls. Have cross flow ventilation wherever possible.</i>	<i>Note type on plans</i>
Double Glazing	<i>Install double glazing to reduce heat loss particularly in living/ kitchens and south facing rooms. Minimise glazing facing east or west as it will lead to heat gain. Do not have excessive glazing facing south as this will lead to heat loss</i>	<i>Show shading elements on plans including size</i>
External Shading	<i>Fixed shading to the north at an adequate size to shade effectively. Provide a section of the shading. Use the 25% formula from the Energy Smart Housing manual on page 39 for houses and townhouses. Adjustable external shading to east and west windows and glazed doors that covers the glazing.</i>	<i>Draw and label on the plans. Provide an image of the shading and a section of north shading</i>
Orientation	<i>Maximise apartments with access to north sun for winter. Install north facing clerestory windows with shading for rooms without north windows. Reduce or eliminate rooms facing south. If rooms must face south locate bedrooms, bathrooms and laundries south, not living areas.</i>	<i>Show openings/eave s/shading devices on plans and elevations</i>
Hazardous Materials and VOC	<i>Minimise the use of toxic materials. Consider the use of low VOC paints, glues, grouts and sealants to protect occupants health.</i>	<i>Note on plans</i>
Acoustics	<i>Install double glazing to reduce noise and heat loss through windows.</i>	<i>Note on plans</i>
Others	<i>n/a</i>	

References and useful information:

Sustainability Victoria Energy Housing manual

<https://www.sustainability.vic.gov.au/energy-efficiency-and-reducing-emissions/building-or-renovating/planning-and-design/energy-smart-housing-manual>

Your Home www.yourhome.gov.au

Good Environmental Choice Australia Standards www.geca.org.au

Eco specifier <http://www.ecospecifier.com.au/>

6. Transport

Objectives: To minimise car dependency, to ensure that the built environment is designed to promote the use of public transport, walking and cycling, to promote EV car charging

BESS Credits residential – 1.1, 1.2, 1.3, 2.1, 2.3

BESS Credits non-residential – 1.4, 1.5, 1.6, 2.1, 2.3

Design Issue	Design response	Drawing reference
Providing Bike Storage	<i>Garages if used for bike parking must be free of obstructions, laundries, too many doors or need to be moved for bin access, etc. Ideally garages would be larger than the minimum requirement. Bike parking must be secure, easy to access and undercover. Not bike parking in front of car bonnets.</i>	<i>Draw size and dimensions on the plans including access pathway sizes</i>
Provisions for alternative transport	<i>Provide details of local public transport.</i>	
Electric car charging	<i>Provide battery charging points in garges and carports or at a minimum the wiring required to install in the future.</i>	
Other	<i>n/a</i>	

References and useful information:

Bike Parking Experts <https://www.bicyclenetwork.com.au/our-services/bike-parking-experts/>

Off-setting Car Emissions Options www.greenfleet.com.au

Australian Electric Vehicle Association - <https://www.aeva.asn.au/>

7. Waste Management

Objectives: To ensure waste avoidance, reuse and recycling during the design, construction and operation stages of development, to ensure long term reusability of building materials, to maximise recycling, glass recycling and food organic and garden organic (FOGO) collection, to provide for hard waste and E-waste collection, to promote zero waste and a circular economy

Design Issue	Design response	Drawing reference
Construction Waste Management Plan (WMP)	<i>Can the materials or fixtures in the existing building be used or sold by someone else e.g windows to a second hand dealer?</i> <i>Can building materials be recycled or reused to minimise waste e.g. concrete, bricks, timber</i>	
Operation Waste Management Plan	<i>Collection by the council is preferred.</i> <i>Shared bins maybe required for developments of 5 or more dwellings. Provide space for shared FOGO bins.</i>	<i>Draw size and dimensions on the plans including access pathway sizes</i>
Size and location of waste and recycling areas	<i>Include storage areas, location of where bins will be collected from, dimensions of bins and space to access the bins. Recycling bins must be as accessible as waste bins. Private bins cannot be stored on council land for collection.</i>	
Food waste and Green Waste	<i>Provide details of separation of waste including recycling, glass recycling, green waste, hard waste and food waste. Indicate space allocation for waste on plans.</i>	
Other recycling	<i>Provide space for e-waste, hard waste. Consider zero waste and circular economy strategies. Use recycled materials</i>	
Other	<i>n/a</i>	

References and useful information:

Construction and Waste Management <https://www.epa.vic.gov.au/your-environment/waste/construction-and-demolition-waste>

Preparing a WMP <https://www.melbourne.vic.gov.au/sitecollectiondocuments/waste-management-plan-guidelines.pdf>

Metropolitan Waste and Resource Recovery Group Multi Units Toolkit <https://www.mwrrg.vic.gov.au/planning/multi-unit-developments-toolkit/>

Guide to best practice for waste management in multi-unit developments

<https://www.sustainability.vic.gov.au/About-Us/Publications/Guide-to-Best-Practice-for-Waste-Management-in-Multiunit-Developments>

8. Urban Ecology

Objectives: To protect and enhance biodiversity, to provide sustainable landscaping, to protect and manage all remnant indigenous plant communities, to encourage the planting of indigenous vegetation and edible gardens

BESS credits residential – 2.1, 2.2, 2.3, 2.4, 3.1,
BESS credits non-residential – 1.1, 2.1, 2.2, 2.3, 3.2

Design Issue	Design response	Drawing reference
Communal spaces	<i>Provide gardens, BBQ areas, seating areas for residents and staff to meet</i>	
On Site Topsoil Retention	<i>Retain on-site topsoil and put back in place after construction</i>	
Existing trees and vegetation	<i>Retain significant trees and existing vegetation wherever possible.</i>	<i>Draw and label any trees to remain or be removed</i>
Landscape areas to be designated	<i>Provide a description of all new, existing retained and existing demolished landscaped areas and indicate how the design has enhanced the sites biodiversity.</i>	<i>Show on relevant site/floor/landscape plans.</i>
Edible gardens	<i>Provide space for edible gardens for health and to reduce food miles</i>	
Maximising vegetation	<i>Install green walls, green roofs and green facades. Install planter boxes on ground level and on balconies and landscape strips to the side and centre of driveways. Discuss the installation of street trees with council, particularly where crossovers are being removed.</i>	<i>Draw and label on the drawings</i>
Urban Heat Island Effect (UHIE)	<i>Maximise vegetation and permeable areas, minimise dark coloured materials. Use permeable paving in the front section of a driveway or a landscape strip.</i>	
Other		

References and useful information:

Department of Sustainability and Environment www.dse.vic.gov.au

Growing Green Guide (green roofs, facades and walls) City of Melbourne

<http://www.growinggreenguide.org/>

Green Roof Technical Manual <http://www.yourhome.gov.au/materials/green-roofs-and-walls>

9. Innovation

Objective: To encourage innovative technology, design and processes in all development, which positively influence the sustainability of buildings

Design Issue	Design response	Drawing reference
Significant Enhancement to the Environmental Performance	<i>Carbon Neutral building Significant sized photovoltaic (solar panel) system</i>	
Innovative Social Improvement	<i>Well designed, large communal spaces for residents provided when not expected under BADS. Communal sharing of facilities such as a communal laundry or shed/ studio.</i>	
New Technology	<i>Solar PV batteries installed.</i>	<i>Draw and label any trees to remain or be removed</i>
New Design Approach	<i>Build to rent, design</i>	<i>Show on relevant site/floor/ landscape plans.</i>
Other	<i>Please note Low VOC, 80% construction waste recycled are not innovative.</i>	<i>Draw and label on the drawings</i>

References and useful information:

Green Building Council Australia www.gbca.org.au

Victorian Eco Innovation lab www.ecoinnovationlab.com

Environment Design Guide <http://www.environmentdesignguide.com.au/>

10. Building Materials

Objectives: To minimise the environmental impact of materials used by encouraging the use of materials with a favourable lifecycle assessment, use recycled, recyclable materials, use third party certified and recycled timber, Materials are not listed in BESS however they must be addressed in the SMP.

Design Issue	Design response	Drawing reference
Retention of existing structure and materials.	<i>Provide a description of the intended re-use of existing structures and /or materials within the proposed design. Show on relevant floor/site/demolition plans and elevations/sections.</i> <i>Can the materials or fixtures in the building be used or sold by someone else e.g windows to a second hand dealer</i>	
Reused or Recycled Materials	<i>Can recycled materials be used e.g. recycled timber, recycled content concrete?</i>	<i>Indicate structures to be retained</i>
Embodied Energy minimised	<i>Provide a description of intended materials to be used that have sustainable production processes (including low embodied energy etc.) Try to minimise the use of concrete and aluminium.</i>	
Sustainable Timber	<i>Use third party certified timber and timber products to avoid illegally logged timber.</i>	
Design for Disassembly	<i>Where possible screw in fixtures and fittings and avoid glues.</i>	
Other		

References and useful information:

Building Materials <http://www.yourhome.gov.au/materials>

Embodied Energy <http://www.yourhome.gov.au/materials/embodied-energy>

Waste minimisation <http://www.yourhome.gov.au/materials/waste-minimisation>

Good Environmental Choice Australia Standards www.geca.org.au

Ecospecifier <http://www.ecospecifier.com.au/>

Forest Stewardship Council Certification Scheme <http://au.fsc.org/>

Programme for the Endorsement of Forest Certification (PEFC) <http://www.pefc.org/>

Appendix 1 –BESS report

BESS Report

Built Environment Sustainability Scorecard



This BESS report outlines the sustainable design commitments of the proposed development at [redacted] VIC 3072. 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 Darebin 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

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

59%

Project details

Address [redacted]
Project no [redacted]
BESS Version BESS-5

Site type Non-residential development
Account [redacted]
Application no. [redacted]
Site area 531 m²
Building floor area 534.0 m²
Date 27 May 2021
Software version 1.7.0-B.360

Performance by category

Category	Weight	Score	Pass
Management	5%	14%	✗
Water	9%	71%	✓
Energy	28%	65%	✓
Stormwater	14%	100%	✓
IEQ	17%	67%	✓
Transport	9%	62%	✗
Waste	6%	67%	✗
Urban Ecology	6%	0%	✗
Innovation	9%	0%	✗

● Your development ● Maximum available

This is only the front page of the BESS report. If the BESS report is published the council will have access to the full report on the BESS website.

Appendix 2 – STORM report



STORM Rating Report

TransactionID: 689138
 Municipality: DAREBIN
 Rainfall Station: DAREBIN
 Address: 1 test Street

NORTHCOTE
 VIC 3070

Assessor: JANINE PARKER
 Development Type: Residential - Multiunit
 Allotment Site (m2): 1,135.00
 STORM Rating %: 109

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
roof 1	63.00	Rainwater Tank	2,500.00	3	166.00	82.00
roof 2	58.00	Rainwater Tank	2,000.00	3	170.00	82.00
roof 3	60.00	Rainwater Tank	2,000.00	3	170.00	82.00
roof 4	70.00	Rainwater Tank	3,000.00	4	170.00	82.00
driveway treated	50.00	Raingarden 100mm	1.00	0	128.10	0.00
driveway untreated	65.00	None	0.00	0	0.00	0.00
roof 1 untreated	22.00	None	0.00	0	0.00	0.00
roof 2 untreated	18.00	None	0.00	0	0.00	0.00
roof 3 untreated	20.00	None	0.00	0	0.00	0.00
roof 4 untreated	22.00	None	0.00	0	0.00	0.00

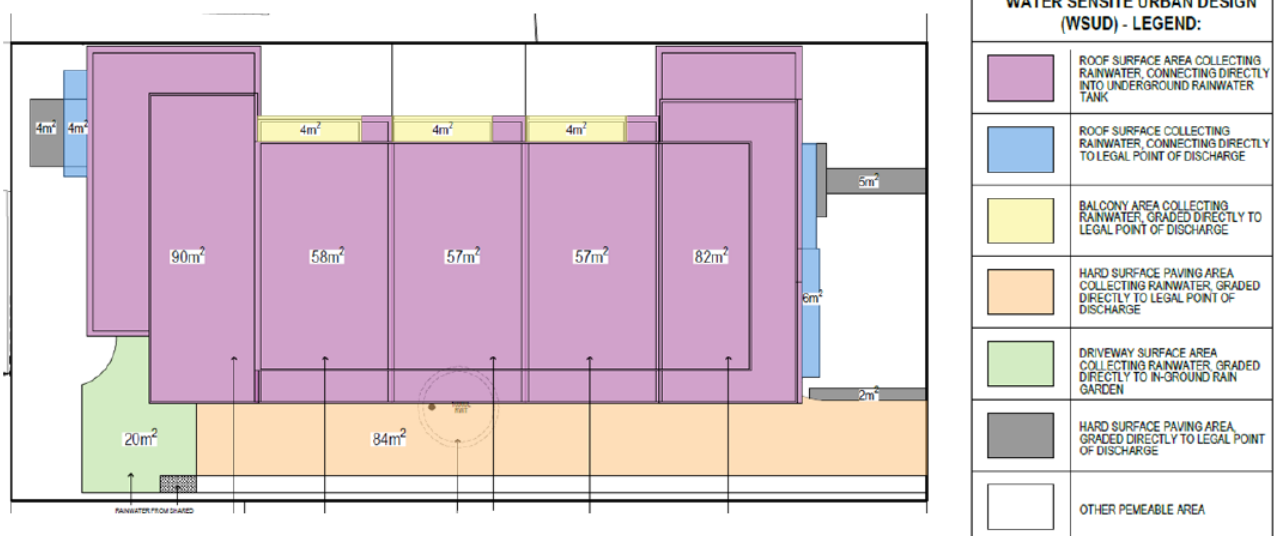


Figure 2: WSUD plan