

# ESD Design and Documentation Checklist

## Better Quality Two Dwellings (BQ2D)



Merri-bek  
City Council

This 'ESD Design and Documentation Checklist' is designed to help demonstrate that the proposed development complies with the ESD requirements of the Better Quality Two Dwellings (BQ2D) initiative. It has been created to support the Designer to understand Merri-bek Council's ESD expectations. Every item on the checklist must be demonstrated on the architectural plans.

### Benefits of ESD Certification

- Identifies opportunities for improving environmental performance during the early design stage.
- Provides certainty that ESD requirements have been resolved prior to lodgement.
- Makes the planning process more efficient by eliminating the need for an ESD referral.
- Eliminates the need for ESD related planning permit conditions.



An application will be eligible for an Environmentally Sustainable Design Certification once a pre-application meeting has been held with the Council's Urban Planning Unit and written advice is provided confirming the development qualifies for the BQ2D.

### Acronyms:

BESS	Built Environment Sustainability Scorecard
NatHERS	Nationwide House Energy Rating Scheme
NCC	National Construction Code

SPOS	Secluded Private Open Space
STORM	Stormwater assessment tool
WELS	Water Efficiency Labelling and Standards

### Merri-bek Guidance Plans:

For the purposes of providing guidance on what our expectations are for high-quality documentation, refer to the [Merri-bek Guidance Plans](#). The Merri-bek Guidance Plans are an example set of plans for a typical three-unit development. It provides a graphical description of how to demonstrate the environmentally sustainable design initiatives of a BESS Assessment.

### Disclaimer:

Merri-bek City Council is committed to achieving best practice outcomes in Environmentally Sustainable Development (ESD), from design through to construction and operation. We appreciate design is a complex process with many moving parts and the best way to achieve both planning and ESD outcomes is to be transparent with our expectations to help guide an application to a planning approval under the Better Quality Development stream and what needs to be submitted to gain Officers support.

Although this is a comprehensive checklist, there may be site specific requirements that may be flagged during the ESD Certification process. This Checklist is not to be relied upon as construction documentation or detailed design advice. When applying this checklist to a planning application, it should be adapted to site specific circumstances. No warranty is provided on the accuracy of this material or any omissions from the material. Merri-bek City Council accepts no liability for any loss or damages incurred in connection with this Checklist.

# 1. Stormwater Management

## Optimising Water Sensitive Urban Design (WSUD)

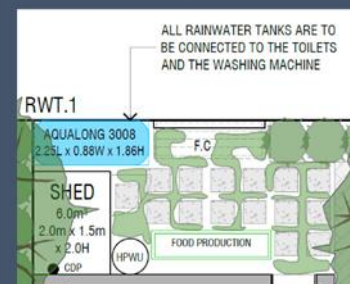
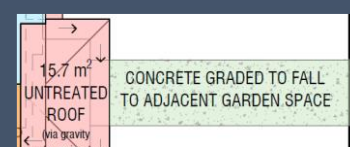
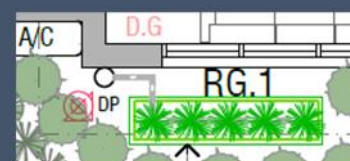
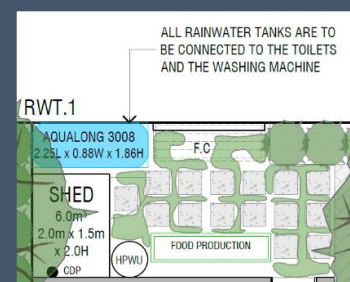
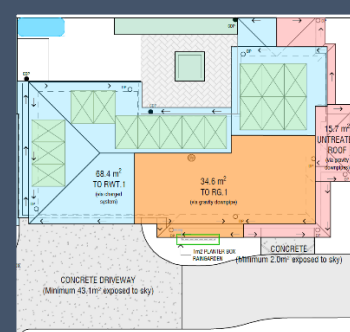
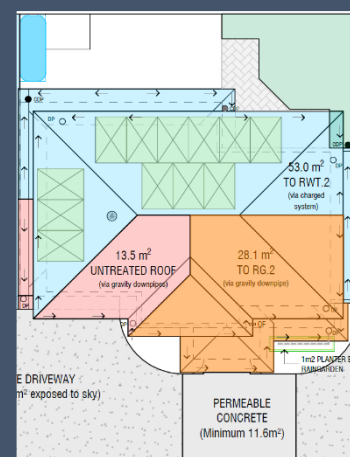
- Maximise the roof catchment area directed to a rainwater tank by using multiple downpipes and charged pipes. Since charged pipes are underground and hold water within the pipe permanently, ensure charged pipes do not go under building slabs.
- Maximise rainwater tank capacity above the minimum 2,000 litre tank and ensure the rainwater tank reliability is a minimum of 80%.
- Increase the reuse of the collected stormwater by connecting the tanks to the washing machines in the laundry. This will allow an additional bedroom to be selected in STORM.
- Reduce the amount of concrete surfaces within the site. Small areas such as a pedestrian footpath, stairs, or concrete stepping pads do not count as hard surfaces and can be considered as non-treated areas in STORM. Document this on the plans and grade away from the building, title boundaries or neighbouring properties.
- Introduce above ground raingardens within the front setback or within common area. A charged pipe can be directed to an above ground raingarden.

The following stormwater treatment methods **are not accepted**:

- Proprietary stormwater treatment systems
- Inground raingardens, buffer strips, infiltration sand and swale drains
- Planter box raingardens that are in secluded private open spaces
- Terrace or balcony catchment are not permitted to be directed to rainwater tank

### 1.1 Treatment measures shown on Roof Plan and WSUD

- ☐ WSUD is included in the architectural plans
- ☐ Roof plan drawn accurately  
Includes eaves, valleys, hips, parapets, party walls, box gutters are shown. This helps us visualise how the catchment area flows to the proposed downpipe location.
- ☐ Downpipe locations  
Where boundary to boundary construction, or eaves with varying heights are proposed, charged downpipe locations are shown:
  - No more than 12 metres apart ideally within 1.2 metres of a valley
  - At the end of every box gutter
- ☐ Treatment areas shown and areas annotated in sqm
  - Treatment areas distinguished with various hatching and shades
  - Non-treated hard surfaces shown (untreated roof, concrete surfaces)
  - Description of treatment method and area shown in sqm
- ☐ Details of WSUD treatment methods shown
  - Rainwater tank locations, size and capacity and what it connects to (i.e., toilets, washing machine, irrigation)
  - Raingarden locations and size dimensioned
  - Permeable paving including area shown in sqm
- ☐ Demonstration of how rainwater reaches treatment system
  - Direction of gutter water flow
  - Internal downpipes are directed to the legal point of discharge
- ☐ Provide Maintenance Schedule for stormwater treatment methods
  - Rainwater tank maintenance schedule
  - Raingarden maintenance schedule
  - Permeable paving maintenance schedule
  - [Refer to Melbourne Water WSUD Maintenance Guide](#)



## Tips for optimising stormwater catchment

### Rainwater Tank as an On-site Detention

- Maximum on-site stormwater detention (OSD) is no more than 500 litres per tank.
- OSD is in addition to treatment capacity shown in STORM.
- Tanks must be sized to accommodate capacity shown in STORM plus OSD capacity.

### Raingarden treatment methods

- Multiple charged downpipes may be directed to an above-ground raingarden.
- In-ground raingardens are not permitted.
- Sectional detail provides information on how to construct a planter box raingarden.

### Consultation with Engineer

- Prior to finalising the WSUD Plan, consultation with a structural and drainage engineer is recommended to ensure proposed outcomes are feasible

## 1.2 Rainwater Tanks

### a. ☐ Rainwater tank

- Minimum 2,000 litre capacity
- Minimum roof catchment area of 50 sqm

### b. ☐ Rainwater tanks shown on the Floor Plans

- Drawn to scale
- Tank location does not impede access (i.e., access to SPOS, to shed, clothesline, bins, located in front of a window)
- If in-ground tank is proposed, location is outside 'tree canopy zone'

### c. ☐ Rainwater tank annotations documented on the Floor Plans

- Annotation of size (L x W x H) and capacity
- Annotation where the tanks will be connected to (i.e., toilets, washing machines, irrigation, etc)
- If connection to washing machines, ensure gutter guards, first flush diverters and filters are annotated to be installed

## 1.3 Raingardens

### a. ☐ Ensure raingarden aligns with Merri-bek expectations

- Above ground planter box raingarden
- Minimum size is 1 square metre
- Size of raingarden is equal to 2-4% of roof catchment area
- Located 300mm from a building footing or title boundary
- Not located in the secluded private open space

### b. ☐ Raingarden information shown on Floor Plans

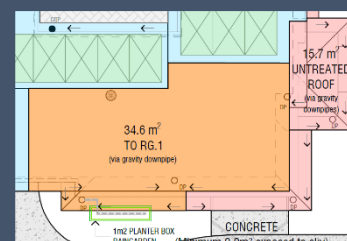
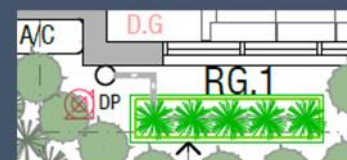
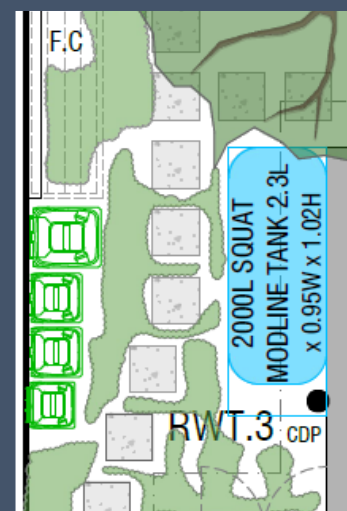
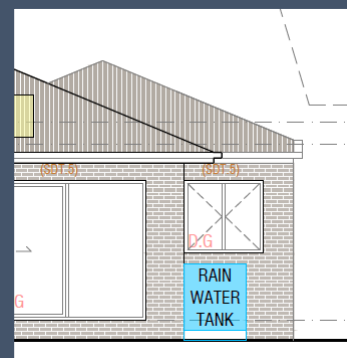
- Shown on Ground Floor Plan, WSUD Plan and Landscape Plan
- Size of raingarden annotated in (L x W x H)
- Dimensioned as being 300mm from a building or a boundary
- Demonstrate how downpipes are directed to raingardens

### c. ☐ Raingarden information shown on Elevations

- If located in front of a window, show raingarden in elevation

### d. ☐ Raingarden sectional detail provided


- Consistent with a [Merri-bek raingarden detail](#)
- Contains a submerged zone and a PVC liner



STORM Rating Report									
Project/ID:	1000000	Location:	MORRISLAND	Address:	1000000	Project/ID:	1000000	Location:	MORRISLAND
Client/ID:	1000000	Project/ID:	1000000	Location:	MORRISLAND	Address:	1000000	Project/ID:	1000000
Address:	1000000	Project/ID:	1000000	Location:	MORRISLAND	Address:	1000000	Project/ID:	1000000
Development Type:	1000000	Project/ID:	1000000	Location:	MORRISLAND	Address:	1000000	Project/ID:	1000000
Stormwater Rating %:	100	Project/ID:	1000000	Location:	MORRISLAND	Address:	1000000	Project/ID:	1000000
Description	Impervious Area (m²)	Treatment Type	Treatment Area (m²)	Occupancy Factor (%)	Treatment %	Tank Volume (m³)	Tank Volume (m³)	Treatment %	Tank Volume (m³)
Lot 1 to RPT1	68.40	Rainwater Tank	0.0000	4	176.00	62.88			
Lot 2 to RPT2	52.80	Rainwater Tank	0.0000	3	129.60	62.88			
Lot 3 to RPT3	113.00	Rainwater Tank	0.0000	3	114.60	69.36			
Lot 4 to RPT4	34.60	Raingarden 100mm	1.000	0	121.15	0.00			
Lot 5 to RPT5	26.10	Raingarden 100mm	1.000	0	122.90	0.00			
Lot 6 untreated roof	15.70	None	0.000	0	0.00	0.00			
Lot 7 untreated roof	15.70	None	0.000	0	0.00	0.00			
Concrete driveway	90.00	None	0.000	0	0.00	0.00			

## 2. Energy Requirements

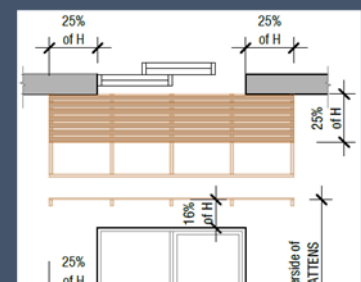
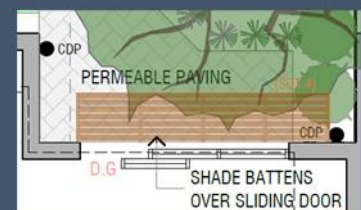
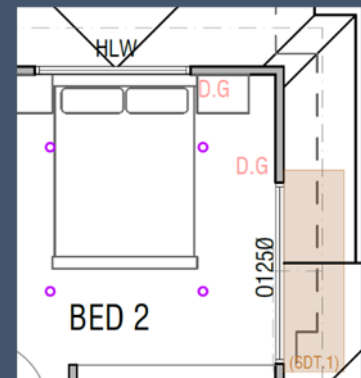
Tips for maximising thermal performance	
<ul style="list-style-type: none"><li>➤ North facing windows limited to a maximum of &lt;25% of the floor area</li><li>➤ East facing windows limited to a maximum of &lt;15% of the floor area</li><li>➤ West facing windows equal 10-15% of the floor area</li><li>➤ South facing windows equal to 10-15% of floor area for views and breeze pathways</li><li>➤ Refer to page 36 and 37 of the <a href="#">‘Energy Smart Housing Manual’</a></li></ul>	
2.1 Solar photovoltaic (PV) System	
<p>a. <input type="checkbox"/> Solar PV system information provided in BESS</p> <ul style="list-style-type: none"><li>- System size, orientation, inclination is accurately presented in BESS</li><li>- SDA to include the Merri-bek Zero Carbon Development Guidelines <a href="#">‘Solar Photovoltaic System’</a> factsheet.</li></ul>	
<p>b. <input type="checkbox"/> Provision for solar PV system drawn accurately on the Roof Plan</p> <ul style="list-style-type: none"><li>- 4 kW capacity (12 panels) shown for a 3 bedroom dwelling</li><li>- 5kW capacity (16 panels) shown for a 4 bedroom dwelling</li><li>- Panels orientated north, followed by west then east</li></ul>	
<p>c. <input type="checkbox"/> Solar PV system information provided on plans</p> <ul style="list-style-type: none"><li>- Location of PV panels shown on the Roof Plan</li><li>- Number and size of panels drawn to scale (1100mm x 1700mm)</li></ul>	
2.2 Energy Efficient Fixtures and Fittings	
<p>a. <input type="checkbox"/> Energy appliances shown on the plans screened from street</p> <ul style="list-style-type: none"><li>- Air conditioning condenser unit does not impede access to SPOS</li><li>- Hot water system does not impede access to SPOS</li></ul>	
<p>b. <input type="checkbox"/> Reverse cycle space heating and cooling is specified as minimum MEPS</p> <ul style="list-style-type: none"><li>- Specified in BESS</li><li>- Specified in the ESD Summary Table</li></ul>	
<p>c. <input type="checkbox"/> Clothesline drawn to scale</p> <ul style="list-style-type: none"><li>- Located in an area easily accessible from the laundry</li></ul>	
<p>d. <input type="checkbox"/> Energy efficient lighting</p> <ul style="list-style-type: none"><li>- External lighting controlled by motion detectors</li><li>- Internal lighting to achieve maximum illumination density of 4W/sqm</li></ul>	
2.3 NatHERS Thermal Performance Assessment	
<p>a. <input type="checkbox"/> 7 star NatHERS Whole of Home ‘Certificate Previews’ included in SDA</p>	
<p>b. <input type="checkbox"/> Windows have been specified in the NatHERS as per the plans, plus:</p> <ul style="list-style-type: none"><li>- If windows have U-value &lt;3.5, specify window framing on plans.</li><li>- Opening percentages depict style and opening restriction as per plans.</li><li>- Adjustable shading devices specified for applicable windows</li></ul>	
<p>c. <input type="checkbox"/> Insulation:</p> <ul style="list-style-type: none"><li>- If wall insulation greater than R2.7, provide a wall detail on the plans.</li><li>- Ceilings with a pitched roof to show a R2.5 perimeter insulation</li></ul>	
<p>d. <input type="checkbox"/> Wall and roof cladding materials consistent with Material Schedule</p>	
<p>e. <input type="checkbox"/> Solar absorptance values specified for walls and roof</p>	
<p>f. <input type="checkbox"/> Ceiling penetrations included in NatHERS</p> <ul style="list-style-type: none"><li>- Skylights and roof windows as per the Roof Plan</li><li>- Exhaust fans and penetrations included</li></ul>	





### 3. Indoor Environmental Quality (IEQ)

3.1 Daylighting and Ventilation	
a. <input type="checkbox"/> Compliance with NCC Part 3.8.4.2 Natural Light	- Windows not less than 10% of the floor area of that room
b. <input type="checkbox"/> Compliance with Part 3.8.5 Ventilation	- Openable windows with a ventilating area not less than 5% of floor area
3.2 Thermal Comfort	
a. <input type="checkbox"/> Double glazing specified	- Double glazing 'DG' annotated to each habitable room window, sliding door and skylight on the plans, elevations and NatHERS Report
3.3 Window Shading	
a. <input type="checkbox"/> Shading of North facing habitable room windows	<ul style="list-style-type: none"> <li>- Evidence of shading is demonstrated on floor plans and elevations for all windows greater than 600mm in height.</li> <li>- Acceptable shading options include eaves, pergolas, shrouds, louvers, and adjustable shading devices.</li> <li>- If fixed external horizontal shading is proposed, demonstrate: <ul style="list-style-type: none"> <li>- The depth of the shading device is equal to 25 percent of the distance between the underside of the shading device and the sill height of the window</li> <li>- The device extends horizontally to both sides of the window or the glazed door by a distance equal to the horizontal projection of the device</li> </ul> </li> <li>- Sectional diagram of the shading device demonstrating width and depth</li> </ul>
b. <input type="checkbox"/> Adjustable Shading Devices (ASD)	<ul style="list-style-type: none"> <li>- Provided to all east, west, north-east, north-west and south-west facing habitable room windows and glazed doors.</li> <li>- Draw and label adjustable shading devices 'ASD' to all applicable windows on the floor plans and elevations.</li> <li>- Annotation that the device is operable from within the dwelling.</li> <li>- Shading device fits within head height and underside of eave</li> <li>- Diagram or image of adjustable shading device/s provided.</li> <li>- Selected adjustable shading device allow window openability and functionality</li> </ul>



### 4. Water Efficiency

4.1 Water Efficiency	
a. <input type="checkbox"/> Water efficiency specified in ESD Summary table	
b. <input type="checkbox"/> Water efficiency, fittings and connections meet minimum requirements	<ul style="list-style-type: none"> <li>- Shower 4 WELS rating</li> <li>- Kitchen taps 5 WELS rating</li> <li>- Bathroom taps 6 WELS rating</li> <li>- Toilets 4 WELS rating</li> </ul>



## 5. Transport

Tips for Transport	
<b>Electric Vehicle (EV) Infrastructure</b> <ul style="list-style-type: none"> <li>➤ Claiming this credit is not an obligation to install a car charger. It is simply a commitment to install the electrical cabling during construction so retrofitting later is not required.</li> <li>➤ Refer to the Merri-bek Zero Carbon Development Guideline "<a href="#">Electric Vehicle Infrastructure</a>" document.</li> </ul>	
5.1 Transport	
<b>a. <input type="checkbox"/> Electric Vehicle (EV) charging</b> <ul style="list-style-type: none"> <li>- Indicative location of the EV charging infrastructure within the garages</li> <li>- Annotation stating, "Level 2 (Mode 3) 32 Amp car charging infrastructure to each garage with dedicated circuit running from main switchboard to the garage."</li> </ul>	



## 6. Urban Ecology

Urban Heat Island Effect (UHIE)	
<b>Urban Heat Island Effects</b> <ul style="list-style-type: none"> <li>➤ Dark colours, materials and finishes are to be limited to reduce the impact on the Urban Heat Island Effect</li> <li>➤ Solar absorptance (SA) levels are used for roof and brick colours</li> <li>➤ Light reflectance values (LRV) are used for paint colours ranging from zero (absolute black absorbing all light and heat) to 100% (pure white reflecting all light)</li> <li>➤ West facing walls colours should always be predominantly light to medium</li> </ul>	
6.1 Building Colours	
<b>a. <input type="checkbox"/> Roofs and driveways are specified with light to medium colours</b> <ul style="list-style-type: none"> <li>- Roof and driveway colours are shown with a solar absorptance (SA) value of less than or equal to 0.60</li> </ul>	
<b>b. <input type="checkbox"/> Cladding is specified with light to medium colours</b> <ul style="list-style-type: none"> <li>- A minimum of 75% of the facades are specified with colours that are considered to be light to medium</li> <li>- Bricks are shown with a solar absorptance (SA) value of less than or equal to 0.60</li> <li>- Cladding colours have a light reflectance value (LRV) of at least 40.</li> </ul>	

Colour	Solar Absorptance
Classic Cream™	0.32
Surfmist®	0.32
Paperbark®	0.42
Evening Haze®	0.43
Shale Grey™	0.43
Sandbank®	0.46
Dune®	0.47
Windspray®	0.58
Pale Eucalypt®	0.60
Bushland®	0.62
Headland®	0.63
Wilderness®	0.65
Jasper®	0.68
Manor Red®	0.69
Woodland Grey®	0.71
Loft®	0.71
Monument®	0.73
Ironstone®	0.74
Cottage Green®	0.75
Deep Ocean®	0.75

## Policy Basis and Further Resources:

This Checklist responds to the following clauses of the Merri-bek Planning Scheme:

<a href="#">Clause 11.01.1S</a>	Settlement
<a href="#">Clause 12.01-1L</a>	Biodiversity in Merri-bek
<a href="#">Clause 13.01-1S</a>	Natural hazards and climate change
<a href="#">Clause 15.01-2S</a>	Building Design
<a href="#">Clause 15.01-2L-04</a>	Energy Efficiency in Merri-bek
<a href="#">Clause 15.01-2L-05</a>	Environmentally Sustainable Development

This Checklist also responds to the following local, Victoria government and federal government initiatives:

<a href="#">NCC 2022 NatHERS Heating and Cooling Load Limits</a>
<a href="#">NCC 2022 Whole-Of-Home Efficiency Factors</a>
<a href="#">Victorian Gas Substitution Roadmap</a>
<a href="#">Elevating ESD Targets Planning Policy Amendment (CASBE)</a>