

Worked Example - Clause 53.18 application (development)



What controls apply?

<p>Clause 53.18 Standard W2 Standard W3</p>	<p>Construction of a building greater than 50m², or an extension to an existing building of greater than 50m², in the following zones:</p> <ul style="list-style-type: none"> Commercial (all) Industrial (all) Public Use Zone (all) Special Use Zone Comprehensive Development Zone Urban Growth Zone – <u>only if no PSP</u> Residential Zones – for <u>non-residential development</u>. This includes the Township Zone.
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What are the requirements?

Standard	Objectives <i>Outcomes to be achieved</i>	Standards <i>How must/should be achieved</i>
<p>Standard W2 Stormwater management for buildings and works</p>	<p>To encourage stormwater management that maximises the retention and reuse of stormwater.</p> <p>To encourage development that reduces the impact of stormwater on the drainage system and filters sediment and waste from stormwater prior to discharge from the site</p> <p>To encourage stormwater management that contributes to cooling, local habitat improvements and provision of attractive and enjoyable spaces.</p> <p>To ensure that industrial and commercial chemical pollutants and other toxicants do not enter the stormwater system</p>	<p>The stormwater management system should be designed to:</p> <p>Meet the current best practice performance objectives for stormwater quality as contained in the <i>Urban Stormwater - Best Practice Environmental Management Guidelines</i> (Victorian Stormwater Committee, 1999).</p> <p>Minimise the impact of chemical pollutants and other toxicants including by, but not limited to, bunding and covering or roofing of storage, loading and work areas.</p> <p>Contribute to cooling, improving local habitat and providing attractive and enjoyable spaces</p>
<p>Standard W3 Site Management</p>	<p>To protect drainage infrastructure and receiving waters from sedimentation and contamination.</p> <p>To protect the site and surrounding area from environmental degradation prior to and during construction of subdivision works.</p>	<p>An application should describe how the site will be managed prior to and during the construction period and may set out requirements for managing:</p> <ul style="list-style-type: none"> Erosion and sediment. Stormwater. Litter, concrete and other construction wastes. Chemical contamination.



Design to stop polluted runoff reaching stormwater system:

- Roofed, designated storage area
- Internal drainage design – polluted run off directed to sewer/sump
- Bunding (physical barrier)



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Example – Large format commercial development

Part (30%) roof connected to 15,000lt watertank (toilets)

Part (50%) roof connected to raingardens. All car parking drains to rain gardens

Loading bay undercover

Table 1: Catchment type or WSUD asset surface area

Catchment area	Area (m ²)	Area as a per cent of site area	Area treated by	Treatment size
50% roof	2,112m ²	35.2%	Raingarden	45.0m ³
30% roof	1,268m ²	21.1%	Rainwater tank for 30 staff toilet flushing (20L/pp/day = 0.6KL/day)	15,000 Litres (15KL)
20% roof	845m ²	14.1%	No treatment	-
Carpark + driveways	862m ²	14.4%	Multiple raingardens	80.0m ³
Walkway	104m ²	1.7%	Raingarden (included in above)	-
Garden	684m ²	11.4%	-	-
Raingarden	189m ²	2.1%	-	-
Total	6,000m²	100.0%	-	-

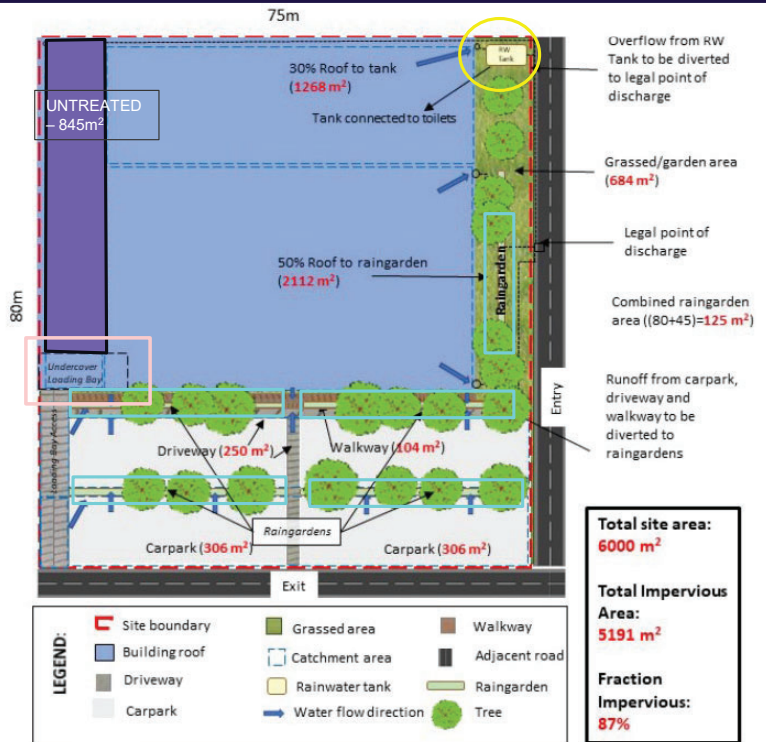
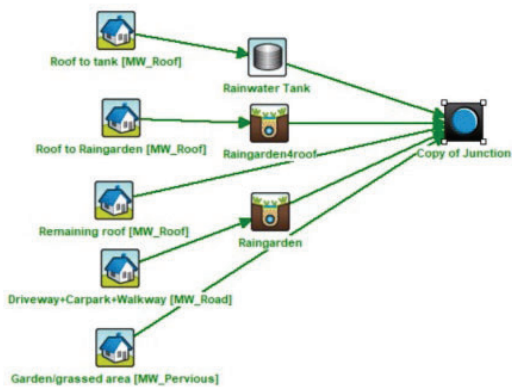


Table 4: MUSIC modelling compliance results

	Sources	Residual load	% Reduction
Flow (ML/year)	3.11	2.68	13.8
Total suspended solids (kg/year)	269	33.3	87.7
Total phosphorus (kg/year)	0.717	0.297	58.5
Total nitrogen (kg/year)	7.16	3.78	47.2
Gross pollutants (kg/year)	110	18.2	83.4

Compliance rating using STORM = 106%

Note: For a commercial building it is fair to assume that the number of occupants in the building is equal to the number of bedrooms in STORM, if toilet flushing demand is the only demand used. If there are more than 100 occupants, then the tank will need to be split, and occupants' usage spread across multiple tanks in STORM – checking that the total tank volume is not greater than the actual tank.



	% requirement	% reduced
Flow	Maintain 1.5 ARI at pre-dev levels	13.8
TSS	80	87.7
Phosphorus	45	58.5
Nitrogen	45	47.2
Gross pollutants	70	83.4

Engineering to check based on SWMS

MUSIC modelling results

Table 5: STORM modelling compliance results

Development type: Commercial/Retail

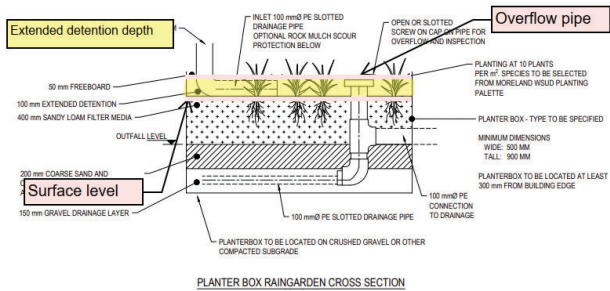
Allotment site (m²): 6,000.00

STORM rating %: 106

Bedrooms = no. of staff

Description	Impervious area (m ²)	Treatment type	Treatment area / volume (m ² or L)	Occupants / number of bedrooms	Treatment %	Tank water supply reliability (%)
Roof_1_to raingarden	2,112.00	Raingarden 100mm	45.00	0	128.70	0.00
Roof_1_to tank	1268.00	Rainwater tank	15,000.00	30	48.60	94.00
Walkways carpark	966.00	Raingarden 100mm	80.00	0	133.35	0.00

Raingardens modelled at 100mm – relates to extended detention depth (surface level to top of overflow)



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Fully compliant with W2

- ✔ Meets BPEM:
 - STORM rating >100%
 - BPEM % reduction met in MUSIC
- ✔ Cooling/greening:
 - Trees in car park – shading of hard surface
 - Inclusion of raingardens and landscape areas – minimize hard surface, maximise landscape amenity
- ✔ Minimise pollutant/toxicants reaching receiving waters:
 - Loading area under cover

Compliance with W3 – condition plan

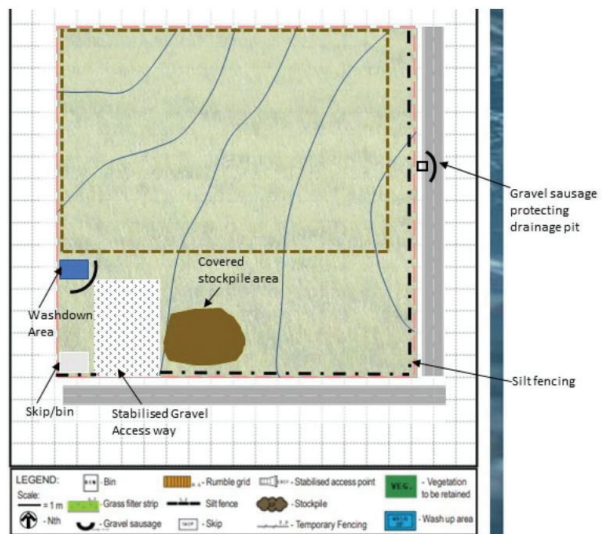
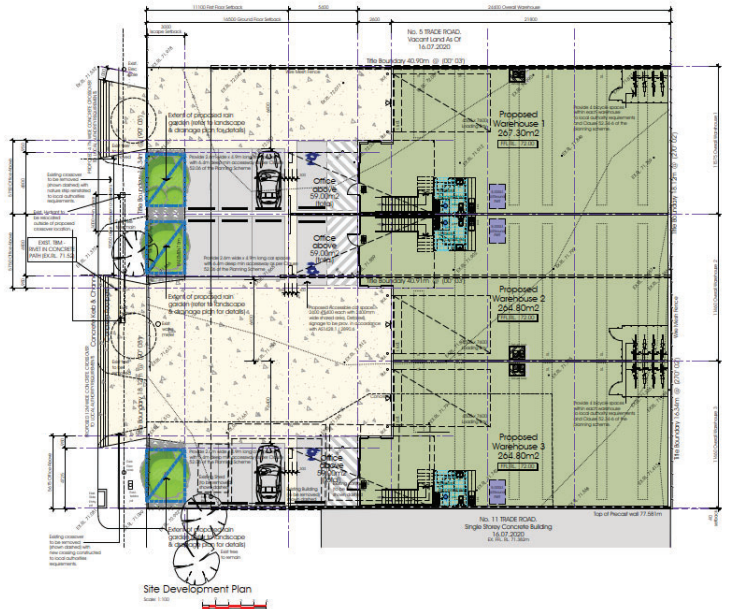


Figure 7: Proposed site management plan

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Real life example – Construction of three warehouses with ancillary offices



Merri-Bek Planning Scheme	
Zone	Industrial 1 Zone
Overlays	Development Contributions Plan Overlay (Schedule 1)
PPF	15.01-2L-05 Environmentally sustainable development 19.03-3L Water supply, sewerage and drainage in Merri-bek
PSAs Strategic	<i>Integrated Water Management Strategy 2020 – Towards a Water Sensitive Future</i>

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Environmentally Sustainable Design

On this page:

- [Sustainable design assessment in the planning process](#)
- [Merri-bek's Sustainable Design standards](#)
- [Resources for sustainable design](#)
- [Water Sensitive Urban Design \(WSUD\)](#)
- [Installing solar panels on heritage homes](#)

Melbourne Water and our WSUD resources provide guidance on the design of raingardens. You can find the following resources about:

- biofiltration systems in Development Services Schemes guidelines on the [Melbourne Water website](#)
- Moreland City Council WSUD resources available for download on our [Water page](#)
- Moreland City Council WSUD Technical Notes (C120-WSUD) on our [Technical notes Page](#)

For our example townhouse WSUD response, you can:

- See the [Merri-bek guidance \(draft VDR\)](#) (in particular page 3) and the accompanying Merri-bek guidance STORM report within the [sample SDAs response \(RDE\)](#).
- See our prepared standard [WSUD treatments for developers - standard drawings \(PDF\)](#)

Principles for preferred stormwater management - large-scale developments (10 or more dwellings on a lot, apartments, industrial, and commercial)

The principles for preferred stormwater management within large-scale developments (10 or more dwellings on a lot, apartments, industrial and commercial) are:

- MUSIC – water tanks must be connected to toilets. Merri-bek will not accept irrigation connection as the sole reuse due to the inconsistency
- Maximise non-trafficable roof drainage to rainwater tanks and plumb this water into the maximum number of toilets for flushing
- Where trafficable rooftop areas are required to be treated, they can be treated by above-ground planter-box raingardens where the size and location is practicable, subject to drainage design. Should runoff from trafficable areas need to be collected for toilet flushing; the relevant water treatment measures that achieve the required water quality must be proposed upstream and downstream of the tanks.
- Where the treatment of driveways, car parks, and hardscapes is required, they can be treated by permeable paving where their specification is practicable based on their intended use and location. A section and details of any permeable paving must be provided before the condition stage of the planning process.
- Where in-ground raingardens are proposed for the treatment of driveways, car parks and hardscapes, civil drainage design information is required before the condition stage of the planning process to demonstrate their feasibility and functionality. The information required upfront will include (but is not limited to) stormwater overland flow path and site grading, runoff collection system, surface level (RL) at the top of the raingarden, depth of the raingarden, the invert level of the outlet which connects to the stormwater system (or Council's Legal Point of Discharge (LPOD)), the level and details of the overflow (details of the overflow pit), detention depth and infiltration layers.
- Raingardens must connect to the stormwater system or Council's LPOD via gravity and without the need for a pumping system. The raingarden location and design must ensure that it will not create an unreasonable impact on building structures and adjoining properties during a flooding or storm event.

We will not accept any of the following:

- Proprietary stormwater management treatment systems
- Buffer strips or swales, unless they are part of a treatment train or precursor to a bio-retention system

19.03-3L Water supply, sewerage and drainage in Merri-bek

14/02/2023
C225more

Strategy

Encourage precinct scale integrated water management and recycling systems.

15.01-2L-05 Environmentally sustainable development

10/06/2022

Integrated water management

Reduce total operating potable water use through appropriate design measures such as water efficient fixtures, appliances, equipment, irrigation and landscaping.

Encourage the appropriate use of alternative water sources (including greywater, rainwater and stormwater).

Incorporate best practice water sensitive urban design to improve the quality of stormwater runoff and reduce impacts on water systems and water bodies.

- DCP does not fund stormwater quality infrastructure – on-site treatment required.
- Supporting local policies on ESD and WSUD – stormwater management forms part of an integrated response
- Clear guidelines and requirements for what treatment options will/will not be accepted and under what conditions.

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What should the application include?

53.18 – Buildings and works applications

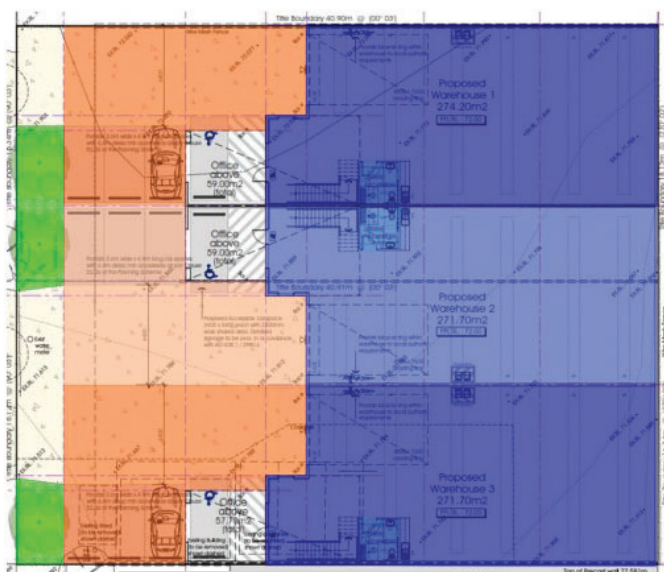
- STORM report – commercial only (water tanks/raingardens)
- Stormwater strategy and MUSIC modelling – everything else
- Engineering design (unless water/detention tanks only)
- Site plans and concept landscape plan
- Site Management Plan (can be conditioned)

The application material must have sufficient detail for you to be able to answer 3 key questions:

1. What are they doing to meet Best Practice (ie comply)?
2. Does it actually meet Best Practice?
3. Is it on the plans?

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Step 1 – What are they doing?



- Roof catchment to rainwater tank
- Driveway/carpark catchment to raingarden
- Permeable landscaped areas

Figure 2: WSUD Plan

Concept plan summarizing what areas are being treated by what asset alongside written summary

Details of proposed SWQ treatment provided in SDA

Stormwater initiatives

Rainwater Tank (5,000L Rainwater tank for toilet flushing)

The roof catchment area of each unit (as described above) will be diverted to rainwater tank(s). Each unit will be provided with a 2,000L tank. The rainwater collected will be used for toilet flushing and bin wash down.

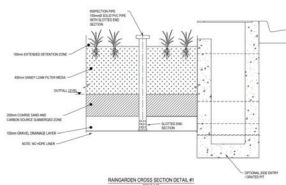
Raingarden

Exposed car park / driveway runoff of Unit 1 of 139m² will be diverted towards 4m² of raingarden before being released at the legal point of discharge.

Exposed car park / driveway runoff of Unit 2 of 138m² will be diverted towards 4m² of raingarden before being released at the legal point of discharge.

Exposed car park / driveway runoff of Unit 3 of 138m² will be diverted towards 4m² of raingarden before being released at the legal point of discharge.

The raingardens will be implemented within the landscaped areas adjacent to the driveway and will be installed at least 300mm away from boundary or structural footings.



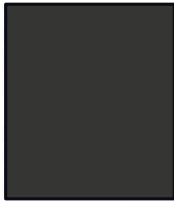
Report confirms inground rain garden proposed with 100mm EDD (Council standard drawing)

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Step 2 – Does it comply?

Melbourne Water STORM Rating Report

TransactionID:
Municipality:
Rainfall Station:
Address:



Assessor:
Development Type: Commercial/Retail
Allotment Site (m2): 1,409.00
STORM Rating %: 100

STORM rating
100% - complies

Check inputs
against application
plans

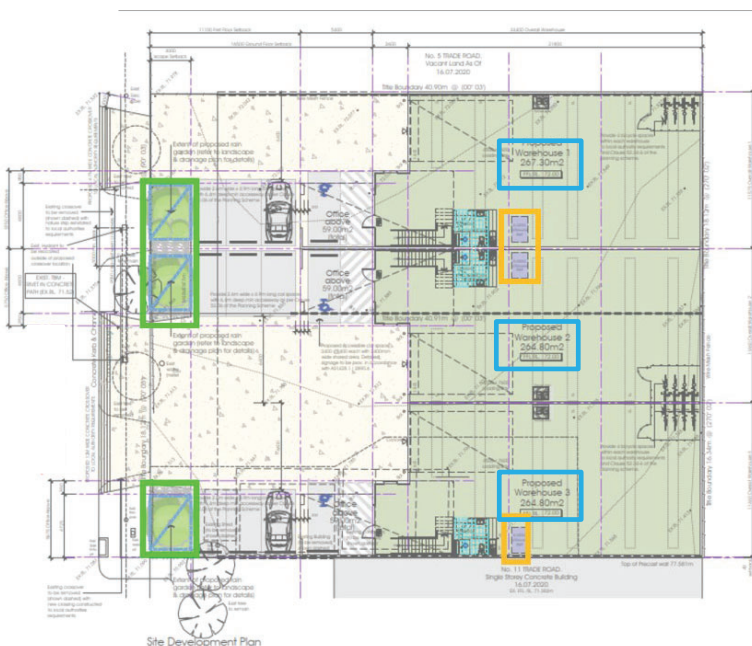
Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof 1 to RWT	274.20	Rainwater Tank	5,000.00	5	99.80	97.00
Roof 2 to RWT	271.70	Rainwater Tank	5,000.00	5	100.10	97.00
Roof 3 to RWT	271.70	Rainwater Tank	5,000.00	5	100.10	97.00
Driveway 1 to Raingarden	139.00	Raingarden 100mm	4.00	0	131.10	0.00
Driveway 2 to Raingarden	138.00	Raingarden 100mm	4.00	0	131.20	0.00
Driveway 3 to Raingarden	138.00	Raingarden 100mm	4.00	0	131.20	0.00
Remainder of impervious	129.90	None	0.00	0	0.00	0.00

Raingardens modelled at
100mm EDD – matches
report

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3. What's on the plans?



1. Cross check against model inputs

- 3 x 5,000 rainwater tanks (underground)
- 3 x raingardens (undimensioned) in car park/landscaping strips
- Slight discrepancy in warehouse roof areas (total 817.6m² in STORM, 796.9m² on plan)
- ✗ Car parking area (impervious) not shown
- ✗ Staff numbers not provided (modelling assumes 5 per warehouse)
- ✗ No LPD

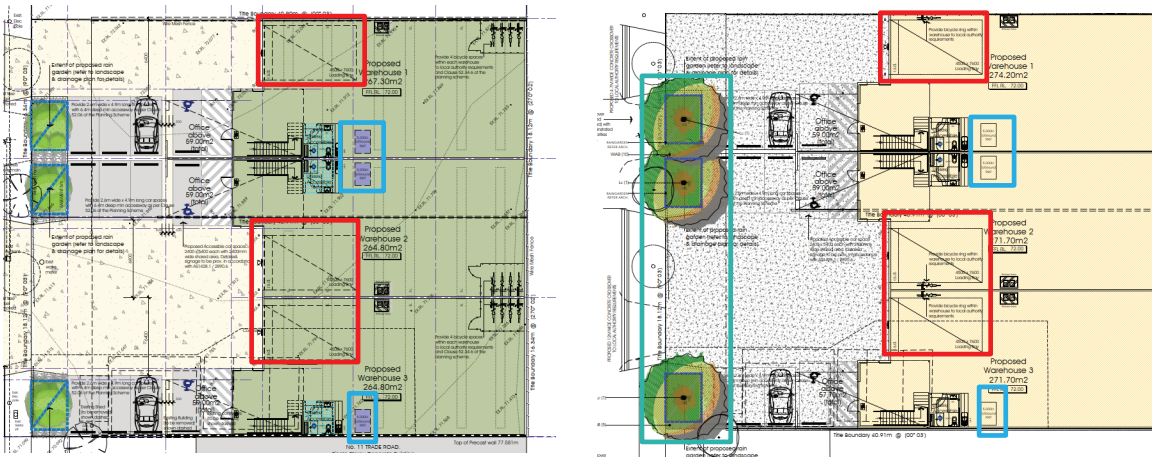
Area Analysis

Total site area (No. 7-9 Trade Place) - 1,409.00m ²	
Proposed Warehouse	
Warehouse area -	796.90 m ² (TOTAL)
Office Area -	177.00 m ² (TOTAL)
Total Building -	973.90 m ² (TOTAL)
Total site coverage -	69.12 %

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3. What's on the plans?



2. Merits review

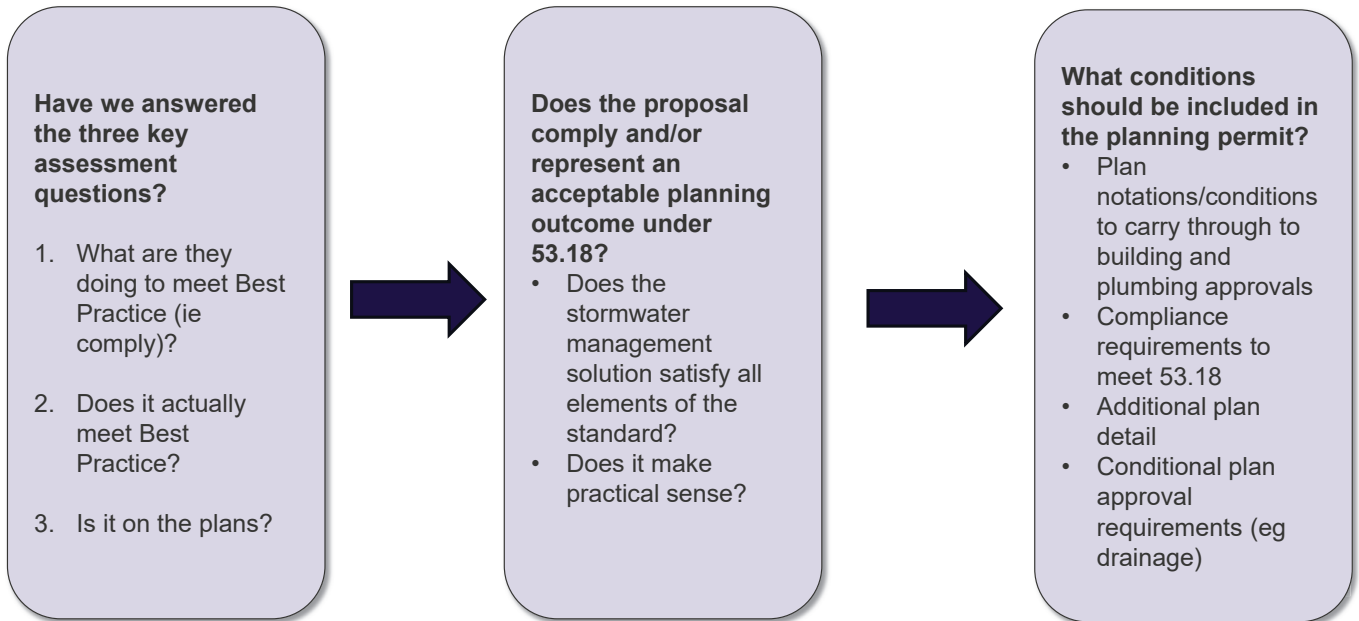
- Loading bays located undercover – minimizes pollutant run off (W2)
- Raingardens co-located with landscape strips; trees included along frontage – urban cooling/greening (W2), location and asset type complies with Council preference
- Tanks located under slab but next to toilets – some additional plumbing requirements but relatively conventional solution for this type of development

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3. What's on the plans?

Location and type of SWQ treatment	✓
Size of SWQ treatment	✓
Whose land is it on?	✓
SWQ treatment shown on landscape plan	✓
Legal point of discharge	✗
Plan dimensions consistent with modelling inputs	Close enough to not raise concerns with integrity of STORM result

DECISION TIME!



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Suggested conditions

Amended plans (Condition 1)

- Legal point of discharge
- Notation requiring tanks to be connected to toilets
- Show area of car park (optional)
- Show standard rain garden section from ESD report on landscape plan (optional)

Engineering/Drainage plan approval

- Standard condition
- Include requirement for design of raingarden to be included

Site Management Plan

- Mandatory condition to satisfy W3



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