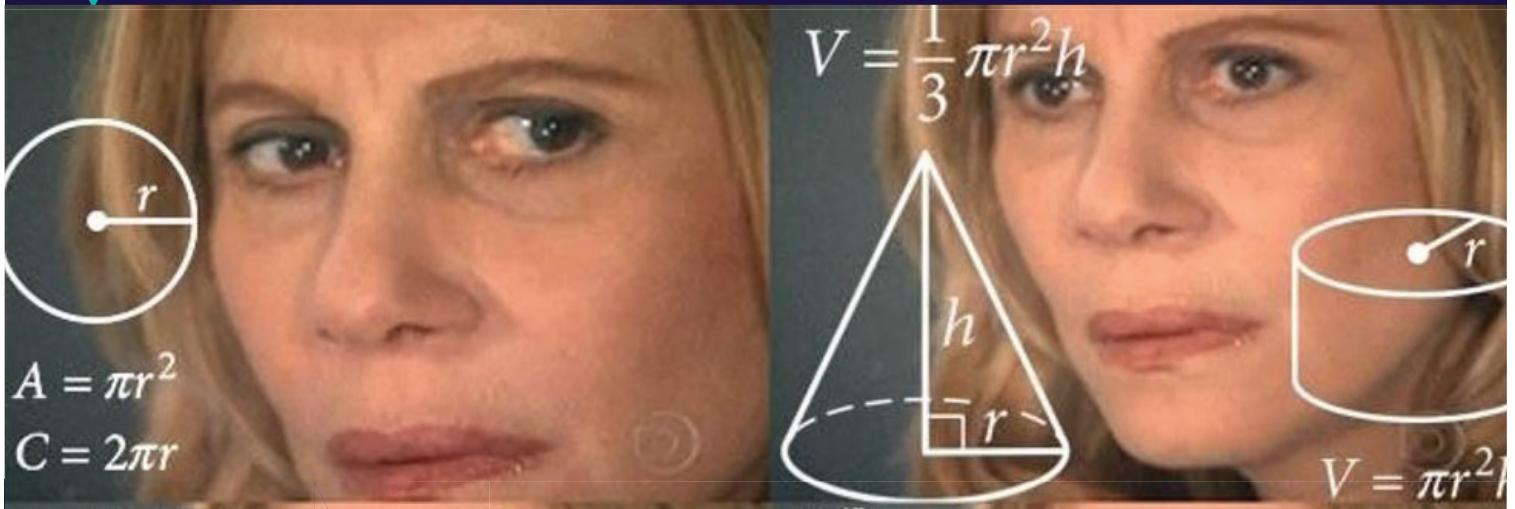


Stormwater Modelling for Planners



STORM – What am I looking for?

<https://storm.melbournwater.com.au/>

Storm rating
≥100%

STORM Calculations Results

Return to Calculations

STORM Calculation Results: Storm Rating: 101%
Required Water Quality objectives achieved

Select Report Format:
PDF Format
XLS Format
Export Result

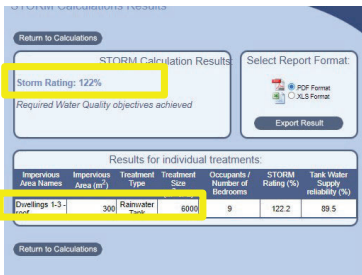
Results for individual treatments:

Impervious Area Names	Impervious Area (m ²)	Treatment Type	Treatment Size (m ² or L)	Occupants / Number of Bedrooms	STORM Rating (%)	Tank Water Supply reliability (%)
roof area	600	Rainwater Tank	10000	10	90.8	98.2
driveways	250	Raingarden 300mm	8	0	134	0
paths	20	None	0	0	0	0

Return to Calculations

STORM CALCULATOR

STORM – FAQs and requirements

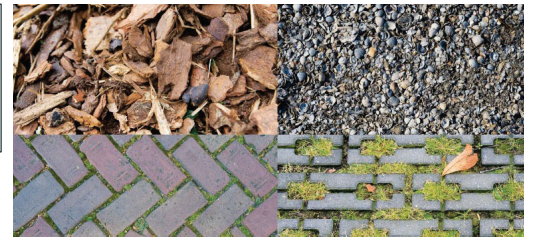
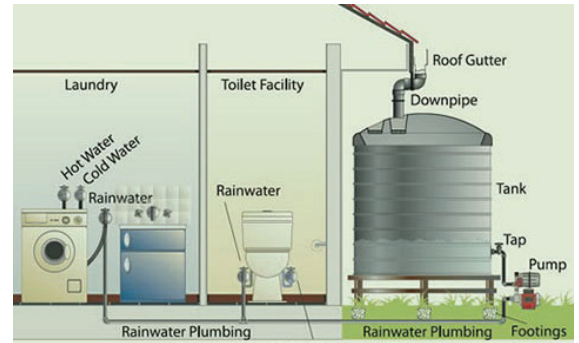


Tanks **MUST** be connected to toilets to count towards BPEM – condition/note on plan

It's OK to combine treatment in STORM



Permeable paving is not modelled in STORM – treated as pervious surface*



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* Being updated in next version of STORM 3

InSite Report – what am I looking for?

- Requires account
- Sites <10,000m² only
- Can tailor to Council drainage parameters
- Broader range of assessment than STORM

Stormwater Calculations



Report for Yarra Ranges

Project Details

Project Name	60 Victoria Road, Lilydale		
InSite User Email			
Web files link			
Site Area (m ²)	870	Project ID	1767
Planning number			
Development type	Single dwelling extension		
Existing site details	Residential >750m ² per dwelling		
Street address	60 Victoria Road, Lilydale VIC, Australia		

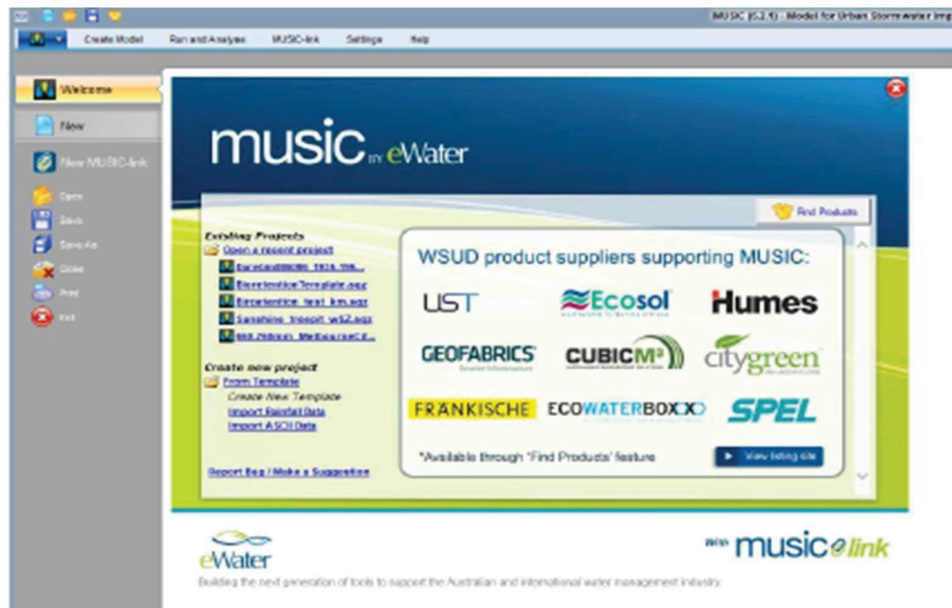
Results

VOLUME	FLOW	QUALITY	EFFICIENCY
Objective: Reduce annual average runoff volume by harvesting or infiltrating stormwater Target: No increase in pre-development annual average runoff volume (Up to a 10% increase is allowed to account for uncertainties)	Objective: Control peak discharge flow (litres per second) with adequate on site detention Target: less than or equal to zero. If greater than zero this is the additional Site Storage Requirement (SSR) volume required	Objective: Improve stormwater runoff water quality (Equivalent to STORM score) Target: Achieve a score of 100 or more. This corresponds to a 45% reduction in nitrogen runoff	Objective: Increase drought resilience Target: Achieve greater than 25% potable water use reduction
VOLUME RESULT	FLOW RESULT	QUALITY RESULT	EFFICIENCY RESULT
-40.2	-1.3	83	38.7
% change in annual average volume	m ³ of additional site storage required	Pollution reduction score (out of 100)	% water saving
VOLUME PASSES	FLOW PASSES	QUALITY FAILS	EFFICIENCY PASSES

Quality must pass

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4



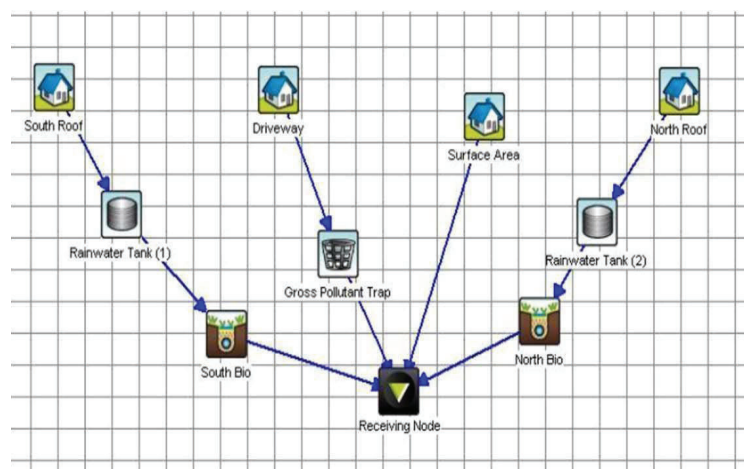
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MUSIC – what needs to be provided?

What do I need to see?

- **Model file (.sqz)**
- **Stormwater Strategy (or similar) including:**
 - Model schematic
 - Summary of results
 - Details of size and location of internal catchments (what's being treated)
 - Details size and location of treatment assets (what's doing the treatment)
- Model parameters



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What am I looking for?

- Does the % reduction meet BPEM targets?

	Sources	Residual Load	% Reduction
Flow (ML/yr)	67.9	38.2	43.8
Total Suspended Solids (kg/yr)	9270	1830	80.3
Total Phosphorus (kg/yr)	20.2	6.79	66.4
Total Nitrogen (kg/yr)	154	74.3	51.7
Gross Pollutants (kg/yr)	2570	5.97	99.8

What are the engineers looking for/at?

- Assumptions behind the modelling
- Do the spatial assumptions make sense?
- Calcs and flows

Flows	Engineers to advise (1.5 ARI pre-development levels)
Total Suspended Solids (TSS)	≥80%
Total Phosphorus (P)	≥45%
Total Nitrogen (N)	≥45%
Gross Pollutants (Litter)	≥70%

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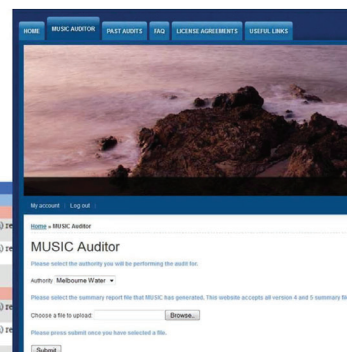
7

How do I know it's right?

www.musicauditor.com.au

- Checks for potential issues with a model
- Identifies where standard parameters (inputs) have been varied
- Requires applicants to provide a .mrt file (Summary Report) of their model

Parameter	User Input	Check	Guideline	Source Nodes	Comments
Urban (Node 4) Music Help					
Field Capacity (mm)	80	not equal	20	Use of 20 mm (suitable for clay soils with low infiltration) or Variations need to be explained.	
Soil Storage Capacity (mm)	120	not equal	30	Use of 30 mm (suitable for clay soils with low infiltration) or Variations need to be explained. EAQ	
Initial storage (% of Capacity)	30	not equal	25	Default expected, variations need to be explained.	
Urban (Node 5) Music Help					
Field Capacity (mm)	80	not equal	20	Use of 20 mm (suitable for clay soils with low infiltration) or Variations need to be explained.	
Soil Storage Capacity (mm)	120	not equal	30	Use of 30 mm (suitable for clay soils with low infiltration) or Variations need to be explained. EAQ	
Initial storage (% of Capacity)	30	not equal	25	Default expected, variations need to be explained.	
Agricultural (Node 6) Music Help					
Node Type	Agricultural	not equal	Urban	Only urban source nodes generally accepted. Urban source nodes should be used for pervious areas within urban areas. Forest nodes only appropriate for well established forested areas. Agricultural nodes are only appropriate to represent existing farming areas prior to development. EAQ	
Field Capacity (mm)	80	not equal	20	Use of 20 mm (suitable for clay soils with low infiltration) required by MW guidelines. Variations need to be explained.	
Soil Storage Capacity (mm)	120	not equal	30	Use of 30 mm (suitable for clay soils with low infiltration) required by MW guidelines. Variations need to be explained. EAQ	
Initial storage (% of Capacity)	30	not equal	25	Default expected, variations need to be explained.	
Urban (Node 7) Music Help					



ENGINEERS ONLY!

1/8

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STORM in practice – Worked example

Three dwellings on a lot (GRZ)



Minimum information requirements to check STORM (residential)

- Site area
- Total impervious area
- Total pervious area
- Roofed areas (to water tanks)
- Number of bedrooms

Site area – 1367.57sqm
 Total pervious – 568.41sqm
 Total impervious – 799.16sqm

Dwelling 1 roof – 149.17sqm
 Dwelling 2 roof – 134.29sqm
 Dwelling 3 roof – 143sqm
 Everything else - 372.7sqm

Site Area 1367.57m² = 100%

Dwellings 305.89m² = 22.36%

Unit 1 - 107.62m²

Unit 2 - 96.31m²

Unit 3 - 101.96m²

Ext Conc roofed 137.49m² = 10.05%

Unit 1 Garage - 25.03m²

Portico - 4.32m²

Outdoor Living - 12.20m²

Unit 2 Garage - 23.59m²

Portico - 3.56m²

Outdoor Living - 10.83m²

Unit 3 Garage - 25.03m²

Portico - 3.46m²

Outdoor Living - 12.55m²

inc tanks & sheds 6.6m² & 10.32m²

External Conc 355.78m² = 26.01%

Turf/grass/garden 568.41m² = 41.58%

STORM Calculation Results:

Storm Rating: 52% **oh no!**

An additional 48% of treatment is required to achieve Water Quality objectives

Select Report Format:

PDF Format
 XLS Format

Export Result

Results for individual treatments:

Impervious Area Names	Impervious Area (m ²)	Treatment Type	Treatment Size (m ² or L)	Occupants / Number of Bedrooms	STORM Rating (%)	Tank Water Supply reliability (%)
Dwelling 1 - roof	149.17	Rainwater Tank	2000	3	95.6	72.2
Dwelling 2 - roof	134.29	Rainwater Tank	2000	3	102	73.4
Dwelling 3 - roof	143	Rainwater Tank	2000	3	97.1	76.2
Everything else	372.7	None	0	0	0	0

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Return to Calculations

STORM Calculation Results:

Storm Rating: 65%

An additional 35% of treatment is required to achieve Water Quality objectives

Select Report Format:

PDF Format
 XLS Format

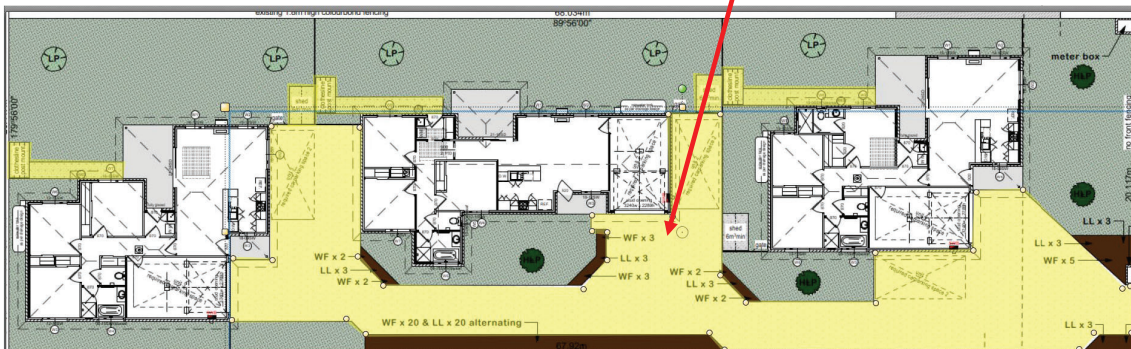
Export Result

Results for individual treatments:

Impervious Area Names	Impervious Area (m ²)	Treatment Type	Treatment Size (m ² or L)	Occupants / Number of Bedrooms	STORM Rating (%)	Tank Water Supply reliability (%)
Dwelling 1 - roof	149.17	Rainwater Tank	5000	3	120	89
Dwelling 2 - roof	134.29	Rainwater Tank	5000	3	124	87
Dwelling 3 - roof	143	Rainwater Tank	5000	3	120	89
Everything else	372.7	None	0	0	0	0

Bigger rainwater tanks ≠ higher treatment because it's based on how much stormwater will be reused.

Key issue is the amount of untreated hard surface (common property driveway) – this either needs to be reduced OR additional treatment assets proposed





What next?

STORM Calculation Results

Storm Rating: 99%

An additional 1% of treatment is required to achieve Water Quality objectives

Select Report Format:

PDF Format
XLS Format

Export Result

Results for individual treatments:

Impervious Area Names	Impervious Area (m ²)	Treatment Type	Treatment Size (m ² or L)	Occupants / Number of Bedrooms	STORM Rating (%)	Tank Water Supply reliability (%)
Dwelling 1 - roof	149.17	Rainwater Tank	4000	3	114.4	89
Dwelling 2 - roof	134.29	Rainwater Tank	4000	3	121.1	87
Dwelling 3 - roof	143	Rainwater Tank	4000	3	115.4	89
Everything else	75	None	0	0	0	0

1. Re-run STORM to see if this can be resolved with a plan tweak or if additional treatment is required

Definitely not a plan tweak – water tanks alone only get them to BPEM with 75sqm of hard surface

2. Think two steps ahead of your applicant – know what you will accept:
 - Issue is the driveway – common property, so different maintenance context.
 - Raingarden/swale – high treatment but also high maintenance. Location adjacent to driveway also has higher risk of damage, but may be able to be designed out (siting, barrier)
 - Permeable paving – what products are locally available? Price?