

InSite Water integrated water management (IWM) and stormwater assessment tool.

Background

The City of Ballarat requires development applications to provide reports and other supporting information associated with environmentally sustainable design (ESD) and stormwater management including on-site detention (OSD) and water sensitive urban design (WSUD).

Traditionally this type of information may have been submitted in the form of OSD4, STORM, MUSIC, and other similar software outputs / reports. City of Ballarat officers are noticing the varied approaches and are looking at ways to provide clarity on requirements and gain a better understand of the reporting options in the industry, streamlining approvals where possible.

Summary

InSite Water provides a simple, clear, fast user interface that guides you through every part of best practice IWM design and compiles it all into a printable report at the end.

The City of Ballarat has commenced a three (3) month trial (concluding 30th June 2024) to allow all planning and building applicants in the Ballarat municipality to use the software for free. When you register to use InSite Water you can:

- ✓ Create and save as many projects as you like.
- ✓ Work on projects, then save them to continue later.
- ✓ Use InSite's calculations to help you work out your stormwater treatment types and sizes, and to size your stormwater detention and/or retention tanks and optimize rainwater tanks.
- ✓ Calculate your equivalent STORM score.
- ✓ Get an immediate answer on whether your design meets 'best practice' standards.

During this trial period, consultants are encouraged to utilize the InSite Water assessment tool for small scale subdivisions and developments and submit reports for approval.

Key Considerations

As part of the trial, the City of Ballarat will review how InSite Water complies with the Infrastructure Design Manual (IDM). Compared to the latest IDM v5.4, when used correctly, outputs are expected to comply with IDM requirements. Below is a summary of comparisons, noting compliance can be checked against the InSite Water generated report.

Application

| IDM Topic | IDM Requirement | Complies | Comment | IDM Reference | | | | | | | | | | | | |
|---|---|-----------------|--|---|---------|--|---------|---|---------|--|--------|------------------|--------|-----|--|--------------|
| Calculation Method | Calculation Method Boyd's or Swinburne | Yes | InSite Water can use both methods, but by default it uses the Swinburne Method (preferred by the City of Ballarat) | 19.3.2 Basic Principles and limitations | | | | | | | | | | | | |
| Smaller Development Sites Only | With certain adjustments, methods based on these assumptions are appropriate for developments up to ~5ha in area, and upstream catchments to ~50ha in area. | Yes | InSite Water is optimised for smaller development applications, it should not be used for sites larger than ~5ha and upstream catchments to ~50ha in area. | 19.3.2 Basic Principles and limitations | | | | | | | | | | | | |
| PSD Calcs using Boyd's Method | Reduce the nominal PSD by 25% for storage in tanks or basins whose plan shape is basically constant with increasing depth, or 40% for storage in pipes or horizontal cylindrical tanks. | Yes | InSite Water allows PSD override – you can manually subtract 25% or 40% from InSite's default calculated PSD. | 19.3.2 Basic Principles and limitations | | | | | | | | | | | | |
| PSD Calcs using the Swinburne Method | A better approach, however, is to use the Swinburne Method, which makes soundly based adjustments to compensate for both the above nonlinearities. | Yes | No adjustment required, InSite recreates all the options of OSD4W, including choosing the shape of the storage: Above Ground, Pipe or Tank. | 19.3.2 Basic Principles and limitations | | | | | | | | | | | | |
| OSD Design Parameters | The original design event should be assumed to have been based on a 1EY (1-year) event. | Yes | This can be manually set, by default it is a 0.2EY (1-in-5 year) event. | 19.3.3 Design Parameters | | | | | | | | | | | | |
| OSD Design Parameters | <p>Annual exceedance probability for the current design event.</p> <p>Table 9 Annual Exceedance Probabilities for Minor Drainage in Urban Areas</p> <table border="1"> <thead> <tr> <th>Drainage System</th> <th>Capacity</th> </tr> </thead> <tbody> <tr> <td>Urban Residential Areas</td> <td>20% AEP</td> </tr> <tr> <td>Commercial centres of 10 shops or less</td> <td>10% AEP</td> </tr> <tr> <td>Industrial areas or where surcharge would seriously affect private property</td> <td>10% AEP</td> </tr> <tr> <td>Drainage through Private Industrial Property</td> <td>5% AEP</td> </tr> <tr> <td>Commercial areas</td> <td>5% AEP</td> </tr> </tbody> </table> | Drainage System | Capacity | Urban Residential Areas | 20% AEP | Commercial centres of 10 shops or less | 10% AEP | Industrial areas or where surcharge would seriously affect private property | 10% AEP | Drainage through Private Industrial Property | 5% AEP | Commercial areas | 5% AEP | Yes | These can be set in the FLOW dropdown menu in InSite to match the IDM and checked in the InSite water standard report. | Section 16.6 |
| Drainage System | Capacity | | | | | | | | | | | | | | | |
| Urban Residential Areas | 20% AEP | | | | | | | | | | | | | | | |
| Commercial centres of 10 shops or less | 10% AEP | | | | | | | | | | | | | | | |
| Industrial areas or where surcharge would seriously affect private property | 10% AEP | | | | | | | | | | | | | | | |
| Drainage through Private Industrial Property | 5% AEP | | | | | | | | | | | | | | | |
| Commercial areas | 5% AEP | | | | | | | | | | | | | | | |

| IDM Topic | IDM Requirement | Complies | Comment | IDM Reference |
|-----------------------|--|----------|--|-----------------------------|
| OSD Design Parameters | Coefficients of runoff Table 10 specifies minimum runoff coefficients. | Yes | <p>InSite Water will calculate the actual proportions of pervious and impervious areas and consider the likelihood of soil permeability reducing progressively during prolonged rainfall events, to determine appropriate runoff coefficients as recommended in section 16.7.</p> <p>NOTE for Subdivisions: the runoff coefficients in Table 10 can be entered as impervious areas as a proportion of the site area to use InSite for small land subdivision sites where the actual site areas are not known.</p> | Section 16.7 |
| OSD Systems | <p>The most commonly acceptable systems are as follows:</p> <ul style="list-style-type: none"> • Conventional rainwater storage tanks. • Driveways bounded by kerbs of not less than 100 mm in width. • Underground pipes and tanks of various configurations. • Underground pipes and tanks with pumped outfalls. • Lined, in-ground storage basins with pumped outfalls. • Excavated earthen dams with gravity outfalls (in low-density residential Developments). | Yes | <p>All these systems can be modelled in InSite Water by using the default Swinburne method and choosing the shape of the storage: Above Ground (drives and earthen dams), Pipe or Tank.</p> <p>Rainwater tanks can be modelled as:</p> <ol style="list-style-type: none"> 1. Conventional water tanks – there is an option for where 30% of volume is deemed available for OSD. This is based on supercomputer modelling of tanks and this approach is optimised to reduce the impact of short duration high intensity summer storms of a duration less than 1 hour and a return time of more than one week. 2. Hybrid, but with a dedicated OSD storage in the top section of the tank (aka leaky tanks). | 19.3.5.1 Acceptable Systems |

The Integrated Water Management Challenge

In-Site water is an online integrated water management website toolkit designed for use on sites up to 1 ha in Australia that need quick and accurate water design answers.

This site is simple to use but provides robust stormwater design and engineering answers. The equations in this site are based on Melbourne Water's Water Sensitive Urban Design (WSUD) Engineering Procedures (CSIRO Publishing 2005), the new ARR (Engineers Australia 2016), and Australian stormwater industry best practices.



RAINWATER TANK SIZING



DETENTION TANK SIZING



STORMWATER QUALITY



WATER EFFICIENCY

InSite Water Overview

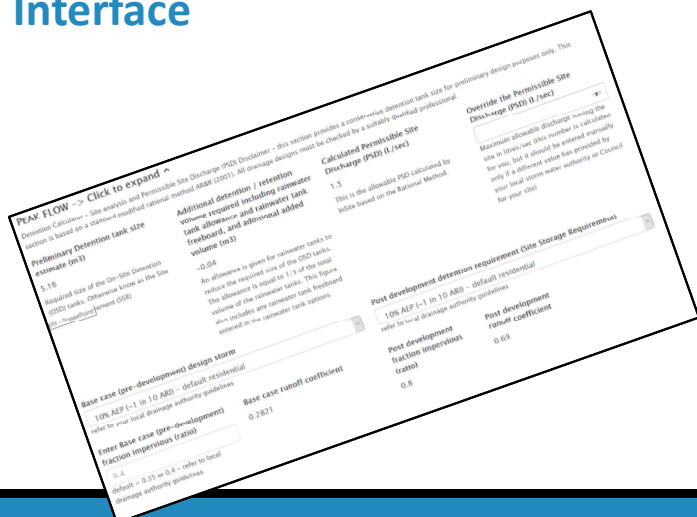
- An Integrated Water Management Tool
- In-Site will allow you to optimise:
 - detention or retention tank sizing
 - water treatments such as raingardens
 - water savings through efficiency
 - water tank sizing



InSite Water Common Users

- Designed for Single Lots, ideal for:
 - Planners, Developers and Builders;
 - ESD Consultants and Drainage Engineers; and
 - Council Planning Submissions
 - Council Legal Point of Discharge Submission

Easy to Use, Web Based Interface



InSite Water Management

Water Saving, Water Quality, Detention Calculator



InSite Water – Innovating Current Practice

- Key feature involves the incorporation of **detention tanks** and calculations for **stormwater drainage**.
- **Water efficiency modelling** indicating water use also demonstrated integrating WELS Rating standards.

Credibility and Assurance

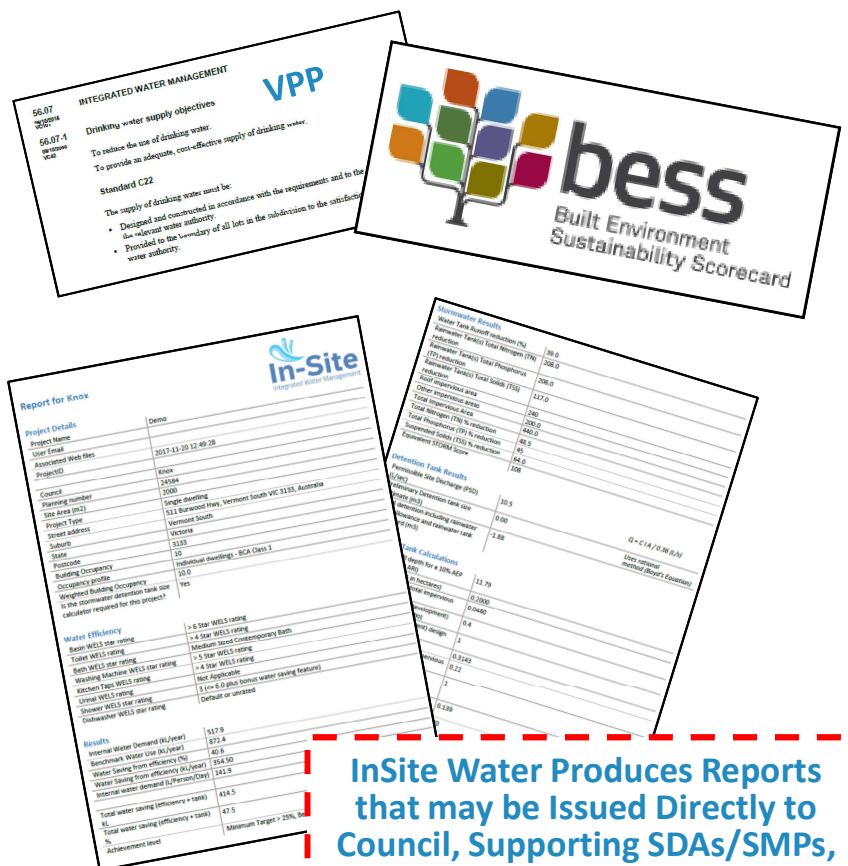
- Incorporates relevant **Australian Design Standards and Runoff Guides** into calculations coupled with industry **Best Practice Guidelines and Policies** from **Government Authorities**.
- Significant direct input and consultation from **leading experts and industries** including **Melbourne Water, Water Sensitive South Australia, Stormwater Australia, RMIT University and The University of South Australia**.

InSite Water Features Compared with Other Calculators

| | InSite Water | STORM | OSD4W |
|---------------------------------------|--------------|-------|-------|
| Water Efficiency Targets | | | |
| Appliances and Fixtures (WELS Rating) | ✓ | ✗ | ✗ |
| Volume Reduction Targets | | | |
| Rainwater Tank Water Retention | ✓ | ✓ | ✗ |
| Pervious Paving Infiltration | ✓ | ✗ | ✗ |
| Water Treatment Targets | | | |
| Bioretention Basins/ Raingardens | ✓ | ✓ | ✗ |
| Green Roofs Tree pits | ✓ | ✗ | ✗ |
| Flow Reduction Targets | | | |
| Detention Tank Sizing | ✓ | ✗ | ✓ |

Addressing Councils' ESD and SDA Requirements

- Facilitates an efficient **Sustainable Design Assessment in the Planning Permit (SDAPP)** process between Developer and Council supporting **Sustainable Design Assessments (SDAs)** and **Sustainability Management Plans (SMPs)**.
- Works as a plugin to **BESS** for calculating Water and Stormwater Categories and Points.
- Aligns with **WSUD** and **Environmental and Environmentally Sustainable Development (ESD) Policies** in Councils' **Municipal Strategic Statements (MSS)** and **Local Planning Policies (LPP)**.



InSite Water Produces Reports that may be Issued Directly to Council, Supporting SDAs/SMPs, a part of Planning Permit Applications and RFIs