

Lucretia Way Basin – Hybrid Options

The City of Marion is proposing to construct a hybrid wetland and basin within the footprint of the existing basin.

Background

The construction of a wetland at the site of the Lucretia Way basin was identified as a priority by the Hallett Cove Creeks Stormwater Management Plan (SMP). In response to the drying out of the basin during the summer of 2018/19, Council investigated three improvement options:

- Reinstating Waterfall Creek to a natural channel.
- Retaining the existing basin with minor works.
- Converting the basin into an offline wetland.

Following consultation with the community, and recognising the importance of the amenity value that the basin provides, two variations of a hybrid online option are being considered.

Design overview

Both designs incorporate the water quality improvement features and aesthetics of a wetland with the detention and peak flow reduction benefits of a basin. The designs have been developed with regard to feedback from previous consultation. Both options will include the removal of sediment that has accumulated in the existing basin and placement of an impermeable liner to reduce water loss from the basin. Sketches of the concepts are attached.

Option A incorporates multiple deep pools, with shallow macrophyte zones between them. Option A incorporates the following elements:

- An online system, with no high-flow bypass. A review of flow rates and expected velocities indicates that the expected flow velocities through the basin can be managed such that they do not remobilise sediment and do not damage vegetation.
- Inlet ponds for sediment capture at both inlets. A gross pollutant trap is also proposed on the southern (pipe) inlet.
- Areas of shallow water with aquatic plantings for water quality treatment purposes.
- Pools of deep water (approximately 1.5 m depth).
- A new outlet structure will be built to control the water levels in the basin. The normal operating range of water in the basin will be ± 0.3 m. The outlet structure will include provisions for dewatering for maintenance purposes.
- The existing spillway will be retained and will act as a high flow discharge.
- Areas of filling within the existing basin footprint, removal of existing exotic species and planting of native species.
- Pedestrian paths (compacted rubble) around the perimeter of the basin and out onto the new peninsula.

Option B has a similar proposed operation to Option A, but has a larger footprint and more open water, with only two shallow macrophyte zones. The features of Option B are as follows:

- An online system, with no high-flow bypass.
- Inlet ponds for sediment capture and a gross pollutant trap on the southern (pipe) inlet.
- Two areas of shallow water with aquatic plantings for water quality treatment purposes.



- Regrading of the existing edges of the wetland to provide a flat 'shelf' approximately 2.5 m wide which will be planted with dense reeds.
- Large areas of open water (approximately 1.5 m depth).
- A new outlet structure will be built to control the water levels in the basin. The normal operating range of water in the basin will be ± 0.3 m. The outlet structure will include provisions for dewatering for maintenance purposes.
- The existing spillway will be retained and will act as a high flow discharge.
- A pedestrian path (compacted rubble) around the perimeter of the basin.

What are the benefits of the proposed design?

The proposed basin will capture and remove litter, suspended solids and nutrients generated by runoff from the upstream urban catchments prior to discharge into the conservation park. Having the basin online maximises the volume of water that will be treated.

Based on a qualitative assessment of the potential water quality benefits of both options, it is considered that Option A would likely provide a greater level of treatment due to the greater area of macrophytes (dense vegetation) that will filter the water. The clearer water (during low flow events/no flows) would provide a suitable habitat for introducing native fish with a high level of diversity and abundance. Macroinvertebrates are also likely to thrive in the dense wetland environment offered by Option A, providing further water quality improvements

Option B would not achieve the same level of water quality improvement, and it is possible that pest fish species may thrive. Water birds may prefer to land and take off within the larger open water environment, however bird numbers and diversity are likely to be greater with Option A, given the additional vegetation and habitat area.

A formalised operations and maintenance strategy will mean that captured sediments are removed from the basin, minimising the risk of resuspension during flood events.

The basin (both options) will also result in:

- Improved biodiversity through diversification of plant species.
- Enhanced natural environment through removal of exotic vegetation.
- Creating amenity for users of the reserve.
- Education opportunities and improved recreation (should this be desirable).

What will the basin look like?

The basin will look similar to the ponds in upstream Glade Crescent wetland (refer Figure 1). There will be visible areas of open water with dense fringing vegetation. Option A will have more vegetation than Option B.

How often will the basin dry out?

An impervious liner will be constructed to minimise the losses from the basin, thereby maximising the duration during which there will be water in the deeper pools. The shallow pools will still dry out during summer. Water balance modelling shows that water will be retained within the deeper pools during most years. The basin may still empty during extended dry periods, but this will be infrequent.

The proposed plantings and a formalised maintenance strategy will mean that the amenity impacts of the basin drying out will be less than compared to the current basin.



Will the basin reduce peak flows into the conservation park?

The basin is proposed to be online (there will be no high flow bypass channel). Keeping the basin online, with a normal operating level below the invert of the existing spillway culverts, will result in some peak flow reduction during high flow events.

Previous modelling undertaken as part of the SMP found that due to the size of the upstream catchment, even if the basin was empty at the onset of a large flow event it would have minimal impact on reducing peak flows.



Figure 1 Glade Crescent wetland

How will safety near the basin be managed?

The basin will be designed to ensure the safety of all users while encouraging close access to the water. The design will follow best practice design methods that help keep the users of the space safe. Measures such as gentle batters at the edges, incorporating safety benches and using thick vegetation to discourage entry at some locations will all be used for the basin to avoid fencing. A typical edge profile is shown in Figure 2.



Legend

- Wetland
- Landscaping
- Pathway





Legend

- Basin
- Landscaping
- Pathway



Lucretia Way Basin
Hybrid Option B

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