

Karaaf Saltmarsh & Constructed Wetlands Reports

1. **Watertech Report (2021)** – commissioned by OC1 to examine both the quality and the volume of the stormwater being delivered by the North Torquay developments (the Quay, Stretton, Dunes and Zeally Sands) through the Sands lakes and waterways into the Karaaf Saltmarsh. This report also examined and reported on the damage being done by this stormwater to the Karaaf Saltmarsh.

Key Findings

- The volume of stormwater being delivered into the Karaaf Saltmarsh was estimated as being 915ML above pre development levels;
 - The North Torquay developments constructed wetlands were all undersized and therefore unable to achieve the legislated 'State Environment Protection Policy (SEPP) stormwater quality levels for pollutants;
 - A key cause of the underestimated stormwater volumes was that the fraction impervious for all these developments had been substantially underestimated (.45 instead of between .7 and .8);
 - The Karaaf Saltmarsh was being seriously damaged by this excess stormwater which was causing substantial dieback amongst its salt tolerant flora;
2. **Ecology and Heritage Report (2021)** – commissioned by the Department of Environment, Land, Water and Planning (DELWP) to examine the impact on the Karaaf Saltmarsh of new development boundaries in North Torquay being considered under the "Distinctive Area Landscapes (DAL)" process which was to determine the future development boundaries of the Torquay township.

Key Findings

- Any extension of the development envelope around the Karaaf Saltmarsh catchment area would lead to significant damage to the Karaaf Saltmarsh;
 - Stormwater management and particularly enforcement of legislated stormwater standards by the responsible authorities needed to be substantially improved;
3. **State-wide Assessment of Fringing Vegetation (2020) – Arthur Rilah Institute (AHI)** – this report by a DELWP research division included the Victorian Index of Estuary Condition (2017) in the broader report. The condition assessment of the Thompson Creek which includes the Karaaf Saltmarsh rated the Thompson Creek's hydrology as being the best estuarine example in Victoria of the negative impact of stormwater on a natural system.
 4. **The Sands Onsite Lakes Assessment (2017) – GHD** – commissioned by the Sands Owners corporation to assess the impact of the North Torquay stormwater flows on the Sands lakes and waterways.

Key Findings

- Turbidity which measures the suspended solids in the stormwater had increased in the Sands lakes from 12.66 NTU prior to 2014 to 153NTU between 2014 and 2017. The cause of this increase was the North Torquay

developments. The Sands lakes and waterways were effectively becoming the sediment pit for all the North Torquay developments;

- Nutrient concentrations were also elevated and exceeding water quality criteria. This again was most likely caused by the North Torquay developments;
- The impact on the Sands system was the destruction of aquatic vegetation designed to reduce nutrient loads and the introduction of exotic aquatic vegetation and to create eutrophication and algal blooms;
- The impact of increased stormwater run off and encroachment of saline-intolerant weedy species was also noted as continuing on into the Karaaf Saltmarsh;