

Onepoto Domain – Korean Garden Proposal

Ground conditions

The Onepoto crater floor is saturated estuary silt up to 50metre deep. Its salt content makes the area unsuitable for use as a garden.

Prior to the 1950s most of the Onepoto crater floor was a tidal mangrove swamp and wetlands deeply filled with uncompressed tidal silt. Excavations from the harbour while building the Harbour Bridge were used to build a dam across the mouth of the crater and this forms the lower part of Tarahanga Street. Harbour silt, similarly salt laden, was also dumped over the area to a depth of a metre or more. Soil was later added as a covering and this varies from 100mm to a metre in depth.

The silt is salt laden and this prevents most types of plants from growing. Some trees have been planted in deeper soil or on mounds but in general the trees are both stunted in growth and shallow rooted which leads to them being unstable.

The water saturated silt is also unsuitable for building upon being compressable and unstable.

Lagoon

The ponds were made as stormwater control ponds. They are kept, as far as possible, with a salt content that is 70% that of the estuary. A specific gravity (SG) reading of 1.020 keeps the algal weed under control, when it drops below this level the weed can grow so the pond is flushed with estuary water to clean out the pond and raise the SG back to a suitable level.

Flooding

The floor of the Onepoto crater is below high tide level and this can lead to flooding during heavy rainfall.

Onepoto Crater contains a catchment area of approximately 40 hectares within the crest of the crater walls which roughly coincide with Exmouth Road, Sylvan Avenue, and Howard Road. There is one outlet for this catchment



Trees are shallow rooted in the area suggested because the high salt level inhibits the growth of the tap roots.



This shows a typical flood with the level at 650mm. The highest water level, measured as 800mm, on this tide can be seen from the wet area left on the table legs.

and that is a single culvert pipe of approx 450mm diameter running below Tarahanga Street. The estuary end of the pipe has flood gates that close when the tide rises above half way and prevent inflow of tide and also, during this time, outflow of rainwater.

The tides in Auckland Harbour are indicated by a height relative to a reference point. The average of the high tides is 3.1 metre and average of low tides is 0.4 metre. The highest tides rising to 3.6 metres.

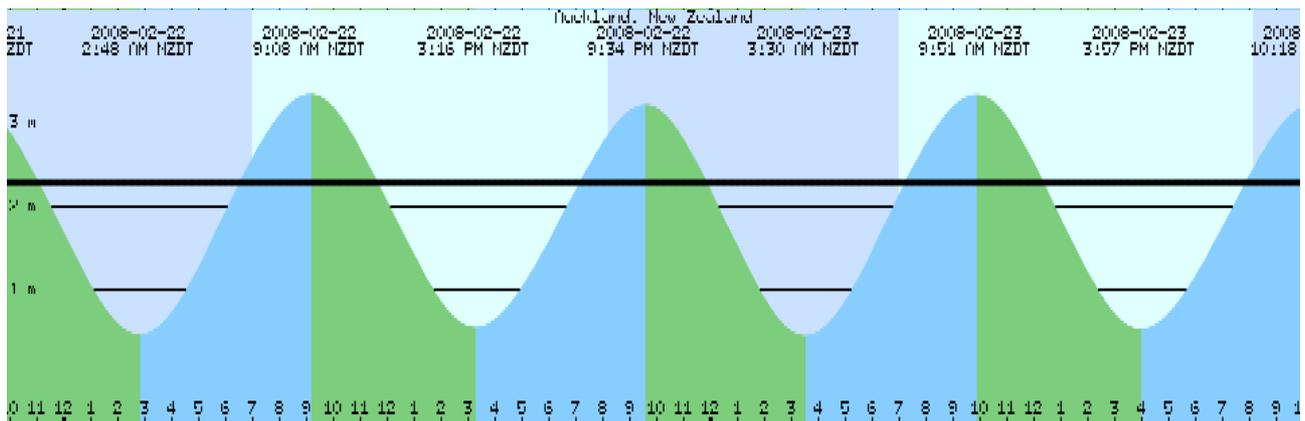
The lagoon water level is held at a nominal 2.2 metres relative to the tide reference by the weir gate outlet and this means that the high tide can be up to 1.4 metre higher than the lagoon and also that the outflow will be prevented by the flood gates being closed by the tide for 5 hours each tide, twice a day.

The total area of the ponds is around 2 hectares, roughly 5% of the total catchment. This means that each 1mm of rainfall could raise the pond levels by 20mm if the outflow is closed. If rain continues for some time then the runoff will be held in the ponds during the high tides and just 20mm of rain could then result in a rise of a metre and consequent overflowing onto the surrounding area. This flooding occurs several times a year, but as it usually drains out each low tide and the area of the flooding is clear of anything that would be damaged by it, it is currently of little consequence.

As the pond is brine then the flood waters are also quite salt laden.



Rain in October 2007 brought floods on several days.



Tidal graph for Auckland with a line indicating the Onepoto Lagoon water level.

Korean Garden

In order to provide a suitable environment for growing a range of plants, rather than only those able to withstand salt and flooding, it would be necessary to provide a raised area built up from soil to be above the flood level. This would need to be at least 1.2 metres above the normal pond water level. As the area suggested is less than half of this height an overlay of around 1000 cubic metres of soil would be required.

This would not preserve the nature of the area as is required by the Reserve Management Plan.

Plants would also require irrigation as there is no natural fresh water within the crater except for rainwater runoff which becomes brackish when it gets into the streams and drains.

Pavilion

The ground in the proposed area is unsuitable for building as it is unstable and saturated. The Reserve Management Plan also requires that buildings and trees be kept away from the ponds as these are designated for recreational use by radio controlled model yachts.

While the design may be without walls it is 8.5 metres tall and would still significantly disturb the airflow.

It has been suggested that there would be a platform with an open fire. This would be completely incompatible with the area due to the flooding described above. The foundations would need to ensure that everything was higher than spring high tide level of 3.6 metres above reference, at least 1.4 metres above the pond water level, otherwise it could be damaged by very heavy rainfall during a peak tide.

Equity of usage

The soccer club rooms have restrictions on their hours of usage and on the number of days they may be used. It would be equitable if all buildings had the same restrictions.