




AMETI, AUCKLAND WSUD WALK


Activating WSUD Project
Building better homes towns and cities science challenge



AMETI WSUD walks

 Dotted line indicates route

15 Numbers indicate sites of interest

 Arrows show direction of travel

SHORT WALK: Panmure Rail station

- 1 – **Stormwater planters** growing 3-storey green screen of 3 native climbers, dense native landscaping buffering southbound passengers from wasteland, feature of local geology.
- 2 – **Conventional roadside planters** separate commuters from traffic and soften hard-scape; edges are seats with suitable plant trimming
- 3 – Mana whenua identified in terrace inscriptions. Costly maintenance of grassed terraces due to shape, poor access and up-lights in grass. Trees have died, remnant tree is ringbarked by weed-eater.
- 4 – **Roadside tree pits** with broad inlets and mostly healthy kohekohe trees, Potaka Lane
- 5 – **Car park raingardens** integrate existing street tree into main raingarden, different shapes/edges contrast vulnerability to vehicle intrusion, size impacts maintenance and cost
- 6 – **Tree pits in Bus station overbridge with poured permeable paving**; Road median barrier of raised planters effective visually but costly to maintain and dead areas have not been replanted or mulched, so require continual spraying
- 7 – Compare maintenance, health and aesthetics of trees planted in grass vs. **raingarden** along Quinlan St where there are multiple clustered structures

LONG WALK: Panmure Station to Van Damm's Lagoon

- 8 – New car park for soccer created from de-contaminated, landlocked area
- 9, 10 – Cluster of works along new Te Horerata Rd linear park/road/walkway/cycle path. Open drain upgraded to wetland/pond, trees & dense planting; grass swale
- 11 – Cluster of works at Van Damm's lagoon: new vehicle access/forebay to allow sediment removal; new public walkways/access, CIPTED, pest plant replacement (and regrowth)



AMETI WSUD walk

Start: train station

15 Numbers indicate sites of interest

↘ Arrows show direction of travel



Site 1. Stormwater planter green screen

Lava geological feature



Irrigation detail

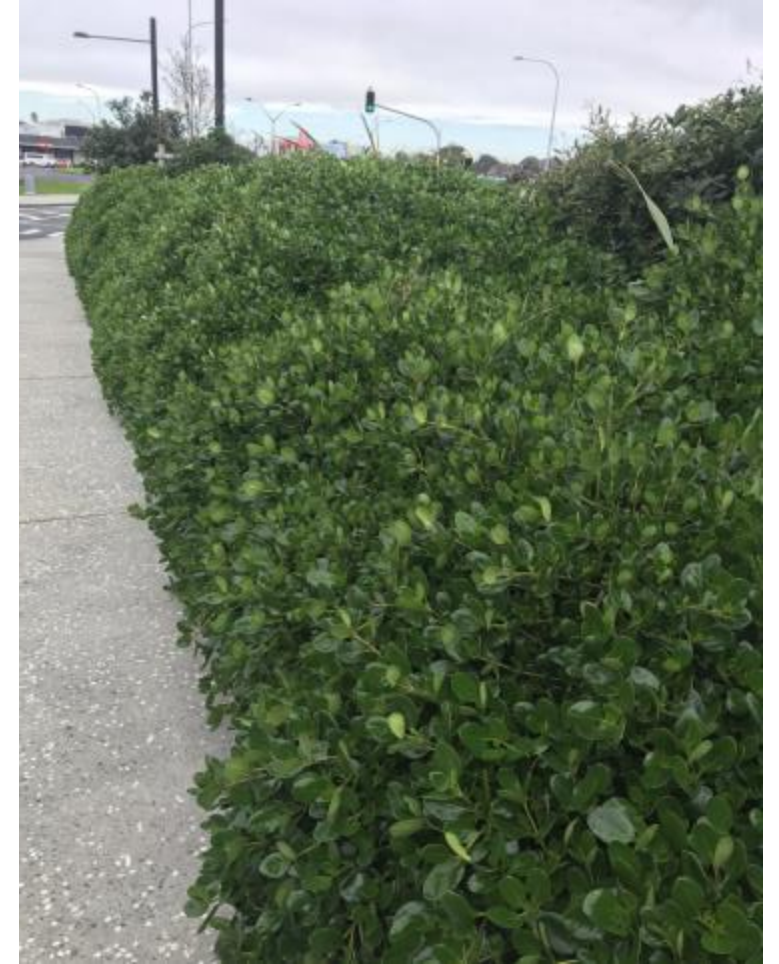
Panmure train /bus station



Site 2. Conventional planting by train platform screens adjacent wasteland



Site 2. Raised roadside planters on Quinlan Street do not receive stormwater so require irrigation (and its maintenance). Trimming at ground level (right) reduces weed invasion and litter input but prevents seating.



Bus/train station environs – sites 2 & 3



Site 3. Raised, unevenly-shaped, grassed terraces with up-lights are costly to maintain due to difficult access



Site 2. Plants in narrow, raised planter boxes have died and need replacing with new mulching



Site 2. Raised planters in the Ellerslie Highway median need traffic closure to trim but add high amenity and reduce headlight glare

Potaka Lane: site 4



2013



2017 (dead tree)

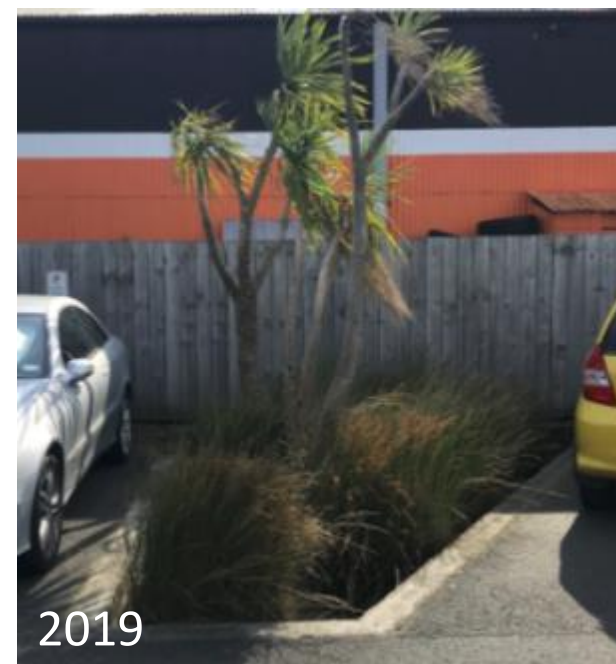


Site 4. Potaka Lane roadside tree pits with oioi groundcover and kohekohe trees shortly after establishment in 2013 and in late 2018

Panmure park and ride raingardens: site 5



Site 5. Raingarden shape and location influence vulnerability of edges and trees to vehicle damage. The roundabout is vulnerable although identifying the edge with contrasting edge colour helps. Really ugly retrofit of warning stakes and inadequate groundcover.



Site 5. Seamless integration of pre-existing trees within rain garden (left); location of overflow near edge allows efficient checks; bare areas should be replanted and re-mulched to avoid ongoing spraying. Right photos show expensive rain gardens – one carpark wide creates a long area of edge to maintain relative to treatment area and greater damage to trees: one larger rain garden would be more cost effective



2013



2019

Panmure park and ride raingardens: site 5

Kohekohe trees in raingarden are generally very healthy in this media that has relatively high organic content, and are now sturdy enough to allow removal of the temporary stakes. ; Right photo shows both groundcovers (sedge and oioi) have been topped – severe topping is not suitable maintenance for oioi as it stunts and may kill it (oioi grows from leaf tips).

Ellerslie Highway overbridge: site 6



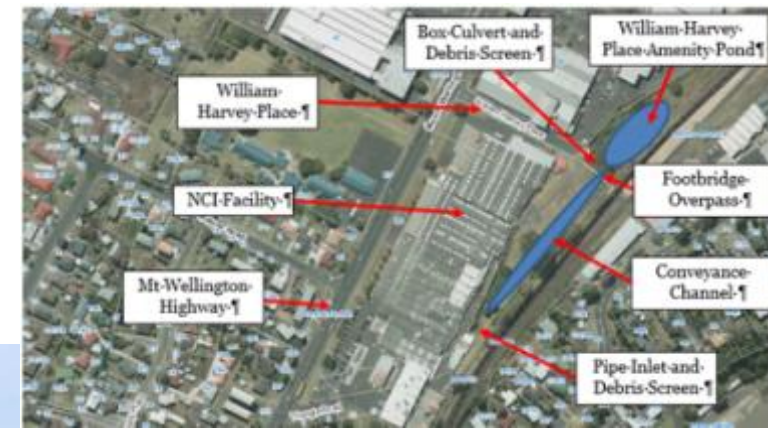
Site 6. Tree pits in overbridge with permeable paving (poured-in-place resin-bound pebbles). Resin must be kept away from the trunk or it 'ring-barks' the tree; use inner ring and loose gravel.

Quinlan Street: site 7

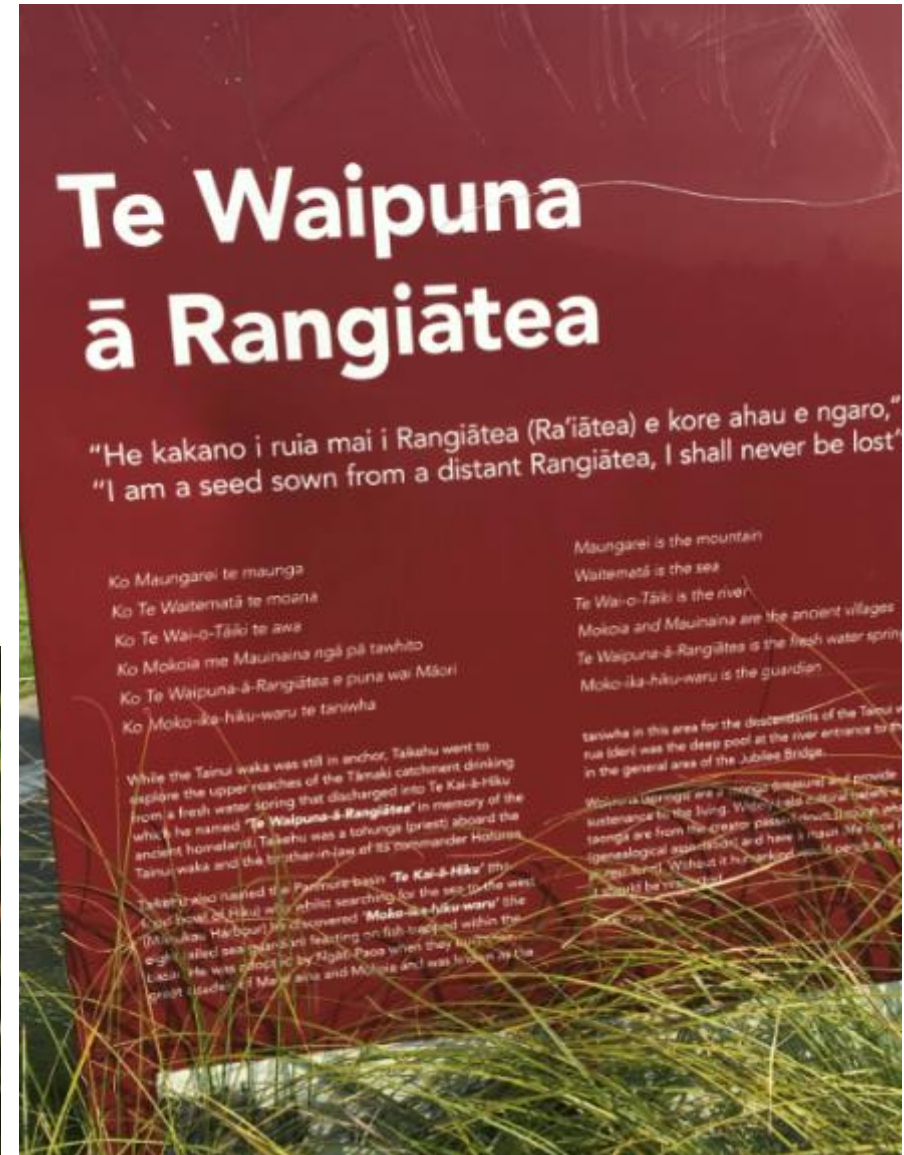


Site 7. Trees in landscaped areas with under-planting are generally healthier and much less vulnerable to damage during maintenance and from vandalism. The poles (left) are effective but ugly protection from mowers (left), as is the herbicide over-spray. In contrast trees with groundcover (centre) and in the rain garden (right) are more aesthetic. However, up-lights in the rain garden are hard to find and require additional maintenance to retain clear of plants and this also introduces potential for plant damage and weed invasion.

Te Horeta Road, cycle & walkway, wetlands: Sites 9 & 10 (site 8 = new soccer carpark)



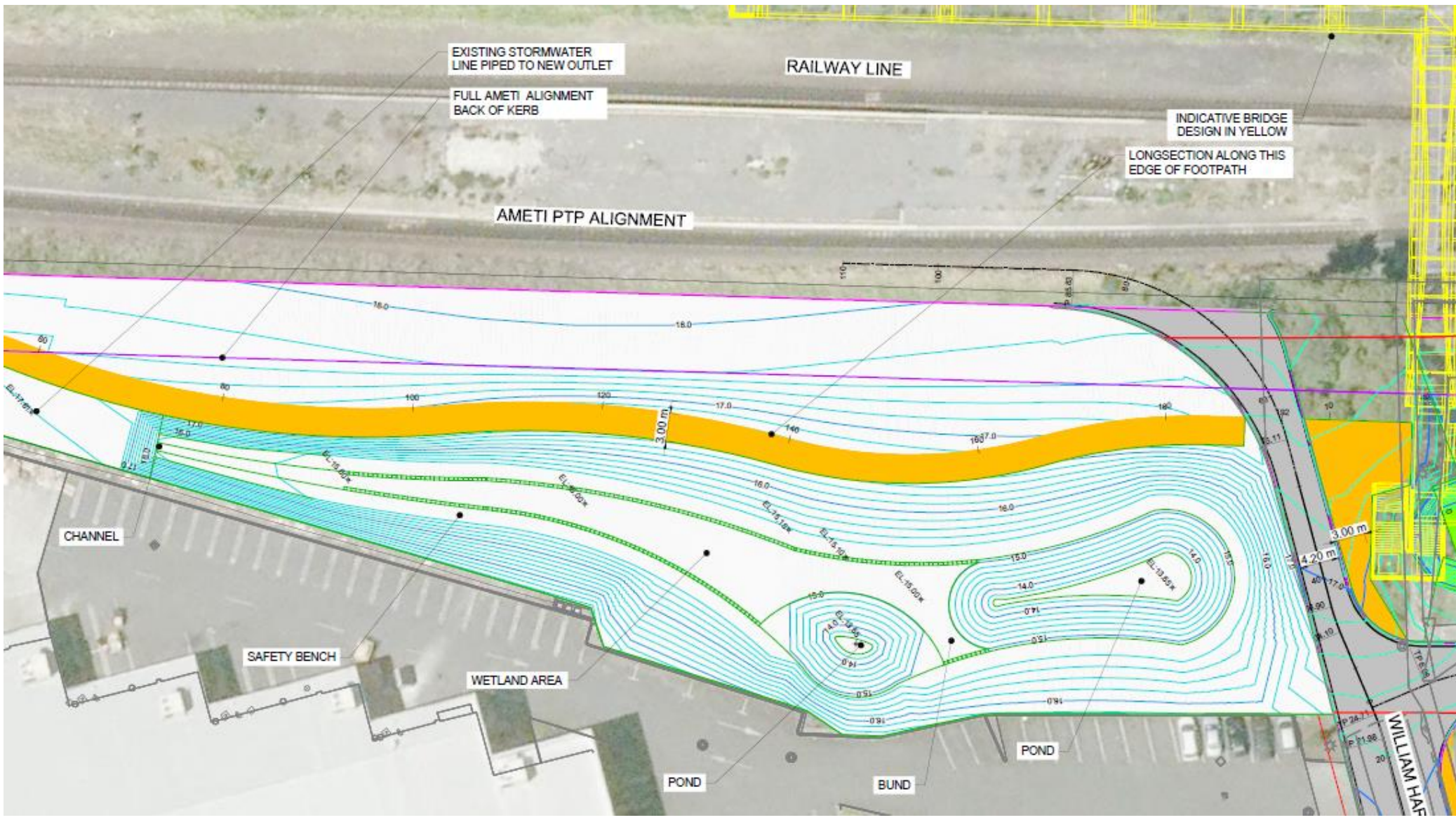
Sites 9,10. Trees in grass are well protected from mowers by stakes; their placement is generally linear for efficient mowing and allowing additional traffic lane in future. Edge of short sedges (foreground) require less trimming than shrubs (background) to maintain sightlines. Dense planting and viewing structure deters access to wetland. Wetlands aesthetic and functional (high proportion of emergent plants provide plenty of opportunities for sediment settling and biotic films; little raupo. Overflow outlets are visible and grates are largely clear, unlikely to block



Sites 9,10. Plants are native, locally-appropriate to area. Plants are dense and tall enough (in water and on land) to exclude and resist invasion by most weeds (except moth plant along edges); manuka flowers provide food for pollinators; interpretation panel helps explain significance and cultural history

Te Waipuna wetland

Te Waipuna wetland at Willian Harvey Place showing contouring earthworks to create two 1.5 m deep ponds



Van Damm's Lagoon enhancements: site 11

- Enhanced community asset: safer, more open, more accessible with two new parking areas, regraded banks, wider paths and new boardwalks create through-paths
- Weeds and unwanted species were replaced by low native groundcovers and trees (enhancing sight lines/visibility)
- Inlets reconfigured, enhancing function and aesthetics
- Cultural significance value revealed with signs and sculpture; historic walls retained
- Waterfall noise, depth and mature trees with native birds (tui, riroriro, piwakawaka, pukeko, shag) provide 'natural', restorative experience in very busy area
- Contaminated material identified, covered (NIMTL – Cd, Pb & PAH in soils; lagoon sediment Cd, Cr, Pb, Zn)
- Access for silt removal from lagoon created (1:8 track); second outlet created to increase flow capacity
- Inlet gross litter screens/traps; oil and grease tubes
- Future: enhance inflow water quality and ecological quality with pre-treatment by upstream industrial owners by litter traps, Zinc roof replacement and reduce peak flows to reduce water levels that rise up to 3.4 m in storms, submerging eastern footpaths



Te Horeta Road entrance to Van Damm's Lagoon



Access provided for machines to side of lagoon for sediment removal. Track is relatively narrow and now shrubs are overhanging the track (some have died with summer drought), so truck access is likely to damage plants. Due to this and probably damage to gravel surface ensure contracts have a clause requiring reinstatement (and before/after photos). Maintenance should establish a dense edge (unlikely if vegetation overhangs the path and then is severely cut back – exposing soil will allow weeds to establish).

Note steep slope to right – maintenance feature as needs continual spraying or hand-trimming – plant or rock mulch to decrease cost

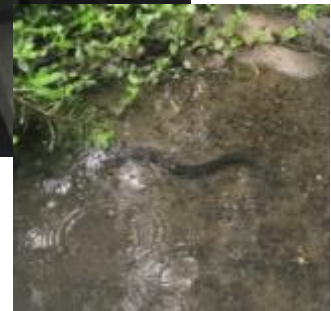
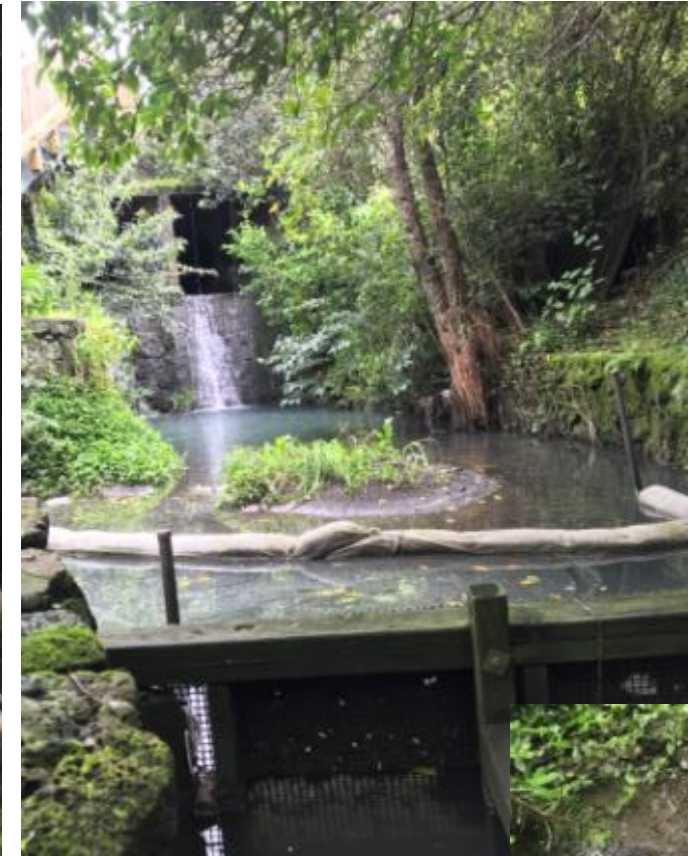


Before

Van Damm's Lagoon inlets



After



New inlets. Left with enhanced energy dissipation (out of sight under the bridge, along with an oil & grease boom present in March 2019); Right & top: inlet with litter screen that has bypass flow exacerbated by accumulation of sediment stabilised with vegetation (indicating inadequate frequency of maintenance). A little (25 cm eel) was seen in the pool below this inlet.

Van Damm's Lagoon and outlets



Outlets. There is high potential for blockage due to the large trees (and dead wood) in the catchment. Debris removal from the overflow grates is important. Adding a second overflow provides backup. The original grate (right) is a 1.52 m diameter ach culvert with screen that has some very broad 'gaps'; the new grate is has a smaller surface area as it is relatively small and steep relative to the diameter of the pipe.

The sewer pipe has been encased, reducing visual impact. Somehow taggers have accessed this and sprayed graffiti in places where it is really difficult to remove. A locked gate to enable access to the top of the pipe would allow removal of the graffiti. It provides a shag perch.

Very high energy flows keep inlets and narrow section of stream clear, the sediment is deposited as soon as flood-water can spread laterally – under canopy of forest. If sediment backs up, it will fill the lovely clear channel and remove habitat, potentially also smother the trees.



Eastern interceptor prior to AMETI

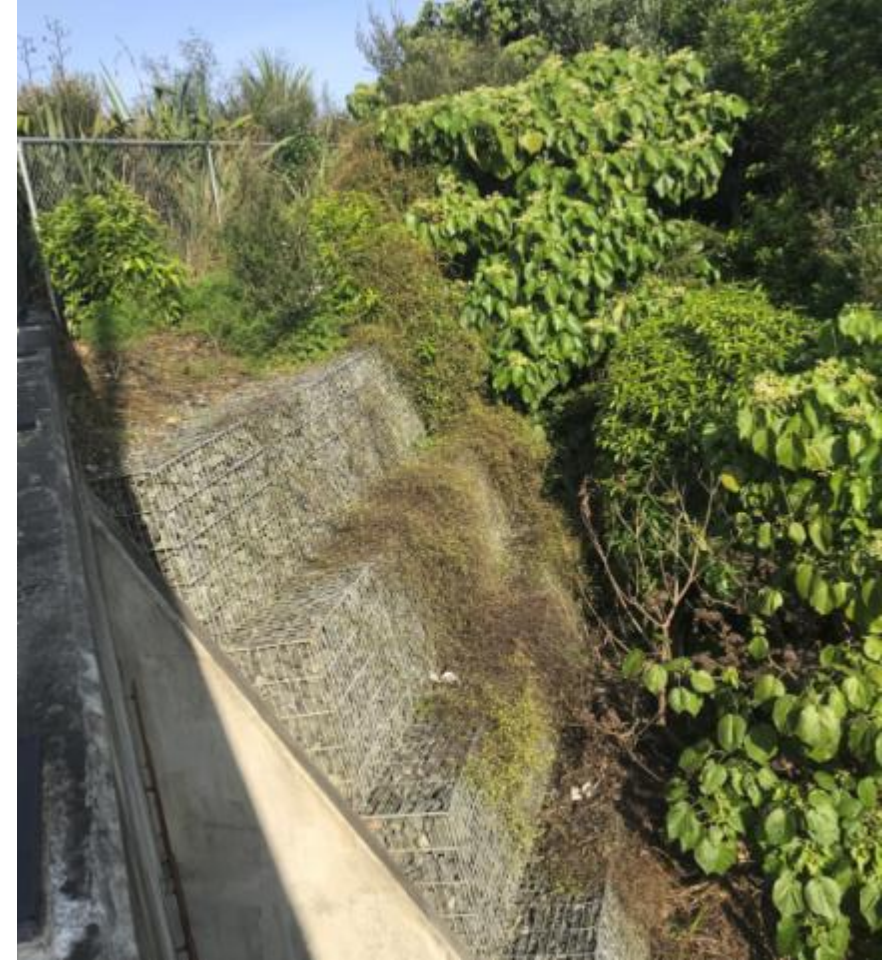
Van Damm's Lagoon



By April 1 2019 the lagoon appeared full of sediment again; pest plants established in the sediment included new willows (up to 4 m height). Removal back to the 1-1.5 m depth volume will cost \$X00,000 – unless sediment is pushed through to Panmure Basin in a big storm (this photo was taken in late March 2019, with the last large storm event being Christmas 2018). Dewatering is difficult because the area is online and large.

Surrounding landscaping has some beautiful established and ecologically valuable trees, and recent planting is generally very healthy – but some pest weeds are well established (privet, moth plant, acacia, castor oil plant). The recent drought resulted in death of some 3-4 year old plants (mainly karamu and manuka). The lagoon has raupo and native rushes along the true LHS, retained as habitat

Van Damm's lagoon: Mt Wellington highway entrance



Entrance to Van Damm's lagoon uses permeable gravels and avoids removing existing trees (ti kouka, cabbage trees); undergrowth is removed to improve views and safety (left); low maintenance swale uses native sedges (centre); native pohuehue grows over and visually softens the gabion wall, providing potential cover and food for native lizards (right)