Pākōwhai Flood Resilience Project: Detailed Site Assessment

Summary of Tonkin + Taylor's report for Hawke's Bay Regional Council | March 2025

Floods leave more than debris and silt in their wake. They expose the history of the land – layers of human industry, agriculture, and waste that once seemed long buried. As part of Hawke's Bay Regional Council's (HBRC) post-Cyclone Gabrielle flood resilience work, environmental and engineering consultancy Tonkin + Taylor (T+T) was commissioned to peel back the soil along the proposed Pākōwhai Secondary Stopbank. What they found was a landscape marked by the familiar traces of rural life: old farm waste, fragments of asbestos, the occasional buried tyre, and the chemical signatures left by generations working the land.

This *Detailed Site Investigation* (DSI) builds on a preliminary assessment completed in September 2024, which identified several sites where activities listed on the Hazardous Activities and Industries List (HAIL) had taken place in the past – think landfills, livestock dips, spray races, farm dumps, and buildings containing lead-based paint or asbestos. In response, the DSI focused on 12 areas along the proposed stopbank footprint – some buried and half-forgotten, some still semi-active. These are places that have been machinery laydowns, burn pits, woolsheds, sheep dips and dumping grounds for anything from tree trunks to chunks of old concrete.

The report also responds to obligations under the Order in Council (OiC) established after Cyclone Gabrielle. While the OiC streamlines regulatory approvals, it places a specific duty – Condition 17 – on HBRC to minimise adverse effects from disturbing potentially contaminated land. This investigation was commissioned to do just that: establish what's in the ground before it gets moved around. The aim: to better understand any contaminated land risks, so that the rebuild can proceed safely and with care.

Scope of work

Between 3 and 6 December 2024, 35 machine-dug test pits and 53 hand-dug locations were excavated. Soil samples – some taken from as deep as 3.5 metres below ground – were tested for heavy metals, hydrocarbons, organochlorine pesticides (OCPs), asbestos, and more. In total, 135 samples were analysed, including six field duplicates to confirm data quality. Results were then compared against a range of criteria, including national standards for human health (NESCS), ecological soil guideline

values, and HBRC's own acceptance thresholds for fill suitable for stopbank construction.

The investigation revealed a range of results – some expected, others more variable. While many findings were typical of working rural land, including localised farm-related dumping, several sites presented more significant risks. In particular, the private landfill contains materials that go beyond standard agricultural use and will require a higher level of care and management.

What we found

Overall, the results were consistent with what one might expect to find on rural land throughout Aotearoa. The most common issues related to historical agricultural and horticultural activities – burn pits, buried farm waste, dips and spray races – and the presence of older buildings that likely contain asbestos or lead-based paint.

Of the 12 sites investigated, there are some that will require more careful management. These included sites where asbestos-containing material (ACM) was confirmed in buried fill or surface fragments, and areas where heavy metals or OCPs were detected at concentrations that exceed health or environmental thresholds. In a handful of locations, contaminants were also detected above the acceptance limits for offsite landfill disposal.

On the whole, though, there were no unexpected findings. In most cases, any contamination identified was relatively localised and aligned with known historical land use. There is no evidence to suggest widespread environmental risk across the site.

Site-by-site summary

Site 1

This site, a private closed landfill, reveals what might be described as the soil equivalent of a garage cleanout on steroids: concrete, brick, glass, car tyres, timber, ACMs and some tree trunks. Fill extends up to 3.5m deep.

Soils here recorded elevated levels of heavy metals and hydrocarbons. One test pit contained enough ACM to trigger Class B asbestos controls. Zinc levels in one sample exceeded landfill leachability criteria, which will require careful handling if any of this material is taken offsite. Suffice to say, soils from Site 1 are unsuitable for stopbank construction.

Site 2

Site 2 was also used for stockpiling and laydown. Like Site 1, it contained buried fill to a depth of up to three metres, with variable amounts of concrete, demolition debris, mechanical waste, and ACM (identified as old lino in one sample). While human health

criteria weren't exceeded, heavy metals and hydrocarbons were above the threshold for stopbank fill reuse.

Site 3

This grassy, unassuming paddock hides buried fill up to 2.8m deep. One sample (S3_TP5) contained asbestos at 0.013% w/w – again triggering Class B controls. While other contaminants were below health risk thresholds, the presence of asbestos complicates the picture. Caution is warranted.

Sites 4a and 4b

These former farm waste and stock burial areas were surprisingly benign. Trace asbestos was spotted but not detected in soil samples. Contaminant levels were low across the board. These areas can be reused in construction.

Site 4c / Site 7b

This area includes an old woolshed, stockyard, and livestock dip. Elevated concentrations of Dieldrin and arsenic were detected in surface soils – most notably around the dip, stockyard and old furnace structure. Dieldrin levels in one sample exceeded landfill leachability criteria. This is unsurprising given the site's former use, and the contamination is expected to be shallow and localised. Nevertheless, soils from this area will need to be excluded from stopbank fill.

Site 5

A patchwork of orchard waste and Gabrielle flood debris, with a burn pit in the centre. Arsenic and copper were elevated in the pit – likely due to the burning of treated timber – while stockpiled soil nearby was relatively clean. The site can be partially reused, with the burn pit area excluded.

Site 6

A typical mixed-use rural storage site: sawdust piles, green waste, some machinery and a burn pit. Surface soil here showed elevated arsenic – again probably linked to historic treated timber use. Stockpiled soils, however, were clean enough for reuse.

Site 7a

This site, centred around the Pākōwhai Memorial Hall, shows signs of lead and asbestos weathering from building materials. Soil near the building showed lead levels close to the NESCS SCS threshold of 3,300 mg/kg (p.15). TCLP tests showed lead and zinc leachability above landfill limits. The soil 'halo' around the building, as the report describes, is likely not suitable for reuse.

Site 7c

A residential property with two small asbestos-clad outbuildings. Soil samples showed low levels of contamination – above background but below health risk. ACM was identified on the surface and detected at trace concentrations in the soil.

Site 7d

A mix of flood debris, burn piles, and stacked chemical drums. Low levels of heavy metals and hydrocarbons were detected, along with some surface ACM fragments – but none of the soil samples exceeded relevant thresholds. If the ACM fragments are safely removed, the site can be reused.

Site 8

Good news. This site, made up of tidy paddocks, and one of the favoured possible stopbank material 'borrow' sites, showed only one marginal mercury exceedance in topsoil (0.11 mg/kg). As this is just above the lab's reporting limit (0.1 mg/kg) and within its margin of error, it is not considered significant. Underlying soils were clean.

Conclusion

This investigation is a detailed excavation – literally and figuratively – of the soil beneath the Pākōwhai Secondary Stopbank. The findings provide a clear and practical path forward. Some areas of higher risk were identified, such as in landfill areas, requiring a higher level of management controls during construction of the stopbank. These will be refined during development of the stopbank design.

A Contaminated Site Management Plan (CSMP) will be developed to guide construction works. This will set out how potentially contaminated soils are handled, what stays on site, and what needs to be disposed of – and where. With these measures in place, the stopbank upgrade can proceed safely, ensuring both environmental responsibility and flood resilience.