



Summary of Groundwater Issues at Mapua FCC Site

The Mapua FCC site is underlain by a shallow sandy gravel aquifer, which is recharged by rainfall infiltrating through the soil surface. Groundwater moves slowly beneath the site and discharges via seepage into the Mapua Channel to the east and into the Waimea Inlet to the south-west. Some groundwater beneath the site also migrates in a more southerly direction down the Mapua Peninsula. Some privately owned wells are located on the Mapua Peninsula, however none are used for drinking water purposes, as all properties receive a reticulated water supply that is managed by Tasman District Council.

The remediation of the FCC site has significantly reduced the mass of OCP contaminants in the site soils so as to make them suitable for future residential, commercial and open space uses. However, lower levels of OCPs remain in the site soils and the re-agents that were used in the treatment process are also present in the treated soil that was returned to the site. These re-agents include nitrogen, phosphorous, copper and iron. The presence of these chemicals does not cause any problems in the site soils, but they can be leached into the groundwater beneath the site. This leaching occurs when rainwater infiltrates through the soil surface and/or when elevated groundwater levels inundate the treated soil that has been returned to the site.

A network of groundwater observation bores have been installed at the site, and these are sampled, along with privately owned boreholes to the south of the site (properties on Tahi Street) to monitor any changes in groundwater quality.

The results of this monitoring have shown that groundwater beneath the site has been affected by the FCC site activities and by some of the subsequent remediation works. The most commonly occurring chemicals in the groundwater derived from the site are nitrogen (in the form of either nitrate or ammonia) and the organochlorine compounds referred to as DDX, aldrin, dieldrin and lindane. Isolated occurrences of elevated concentrations of phosphorous, copper and iron also occur within the site.

Figure A shows the general pattern of dissolved chemicals in groundwater, indicating that groundwater for a distance of around 100 m downgradient (south) may show a slight influence from the effects of the site. A full sampling survey of on-site and privately owned bores was completed in November 2009. It showed that the only exceedances of the Drinking Water Standards in off-site bores occur at 13 Tahi Street (ammonia-nitrogen, aldrin and dieldrin) and at 26 Tahi Street (nitrate-nitrogen).

The sampling shows considerable variation in chemical concentrations occurs within the site, which reflects the influence of variable chemical residues within the soil, differing levels of inundation by the water table and differing permeabilities which will affect both the rates of rainwater infiltration and groundwater throughflow. Given the slow rate at which groundwater moves through the strata (estimated to be less than 1 m/day on average) it is to be expected that elevated chemical concentrations in groundwater beneath the site may occur for many years to come, although the indications from the monitoring to date is that there is a general trend that chemical concentrations from the site activities are decreasing over time.

The main potential adverse effects arising from the elevated groundwater concentrations primarily relate to seepage onto the beach front. The sampling of surface seepage leaving the site into the marine environment has shown elevated concentrations of DDX and ADL, and ammonia in the east. These elevated concentrations will be readily diluted by the significantly greater flow and volume of water that occurs in the Waimea Inlet and the Mapua Channel, however there may be potential for a localised area of adverse effects in the groundwater seepage areas on the beach, related to the growth of slimes and/or effects on snails and shellfish. Whether or not any adverse effects occur will be determined by monitoring of the beach environment.

The available groundwater sampling data indicates that within the site and to the immediate south of the site, it would be prudent that groundwater should not be used for drinking, and as a general precaution within the site and along its southern boundary, exposure of groundwater (via excavations) and contact with groundwater should be avoided.

Signed: 

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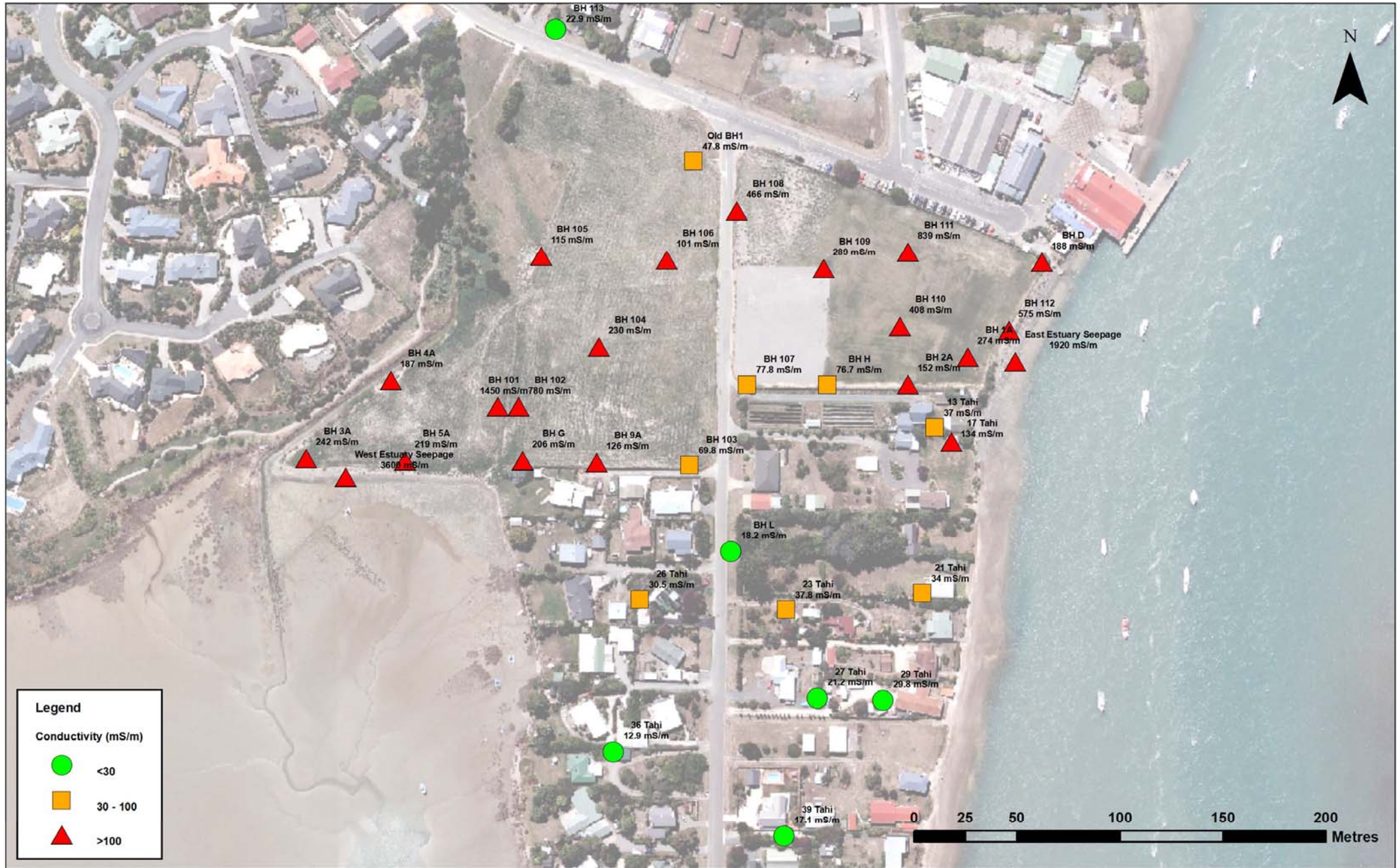


Figure A: Conductivity values in November 2009