Ecologically Beneficial Native Afforestation Site Prioritisation

for carbon sinks and other purposes

Kāpiti Coast District

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Paul Hughes

OpenGeo

Contents

Introduction

Investment in native afforestation is an opportunity where community social values can be enriched, where economic activities can be protected and boosted, and where ecological processes and systems can be restored and enhanced.

Native afforestation can have many ecological benefits that increase the value of a site to a community compared to present land uses.

This report clarifies what native afforestation is, and its benefits over commercial plantation afforestation.

It then identifies the types of ecological benefits that can be gained from native afforestation, and where these benefits occur across the landscape.

Using a study site on the Kapiti Coast, priority sites were then selected with high and diverse ecological benefits to locate practical opportunities for native afforestation.

These priority native afforestation sites provide significant additional ecological benefits compared to any investment solely for carbon sinks.

Aside from this type of ecological benefits site prioritisation, analysis of social and economic benefits of native afforestation should also be undertaken as separate studies for any area.

Native afforestation definition

Native afforestation is the restoration or revegetation of an indigenous native forest ecosystem where none exists at present.

Commercial afforestation is the use of forest for commercial extractive purposes such as timber production.

Ecological benefits compared to commercial afforestation

There are several ecological benefits that native afforestation has compared to commercial afforestation:

- Avoid periodic deforestation and extensive soil disturbance as in commercial plantation afforestation.
- Better habitat for indigenous wildlife than commercial plantation afforestation.

Native afforestation ecological benefits considered

Terrestrial ecosystems

Threatened Environments

Many of New Zealand's lowland forest ecosystems have been severely depleted by native forest clearance in the past. To restore these ecosystems requires that significant native afforestation occurs within these ecosystem extents. These ecosystems are defined by Threatened Environments which the government has determined are those environments with less than 20% native forest remaining where native forest was the cover in historical times.

As well as accounting generally for this benefit, there needs to be an element of representativeness within a given area to ensure that all Threatened Environments present benefit from significant native afforestation.

Buffers to existing native forest

Native forests suffer from edge effects and from an Island Biogeography factors that affect ecosystem integrity. Any areas within native forest are a priority for reafforestation, followed by areas that connect areas of native forest in close proximity to increase size, and buffers to any consolidated native forest especially where there are indentations in the perimeter.

Wet soils

Wet soils are areas where there would have been wet native forests historically, such as kahikatea forest and other wetland vegetation types. Wet native forests are part of the diversity that occurs within terrestrial ecosystems, and have been severely depleted in the past, more so than Threatened Environments.

Periodically floodable land

Periodically floodable land comprises fertile areas where there would have been rich native forests such as low terrace podocarp forest. Periodically floodable native forests are part of the diversity that occurs within terrestrial ecosystems, and have been severely depleted in the past, more so than Threatened Environments.

Corridors

Historically there was unlimited connectivity within contiguous native forest. With extensive lowland native forest clearance many of these vital connections have been lost or fragmented.

Corridors serve ecologically to connect native forests:

- Mountains to the sea as an altitudinal ecotone.
- Horizontally to allow species to move within similar native forest types and altitudes.
- Along rivers and stream margins.
- To allow southward species movement to enable them to survive global warming.
- For bird species to move between the mainland and offshore islands (e.g. Kapiti Island).

Potential corridors were identified based on the remaining native forest remnants. Some areas of the district lack remnants to provide a foundation and significant additional work is required to

restore these connections.

Aquatic ecosystems

Riparian Margins

Most New Zealand freshwater ecology evolved with native forest riparian margins that provided shade, food input sources, low evaporation, and minimal temperature fluctuation. To restore healthy native freshwater ecology requires reinstatement of native forest riparian margins, particularly where no trees exist at present. This applies to rivers, lakes, and wetlands.

Periodically floodable land

Periodically floodable land is part of the complex freshwater ecosystem providing ephemeral habitat that is part of the diversity of freshwater ecosystems.

Erosion prone land

The erosion of soil and rock adds silt and sediment to rivers that can stress and disrupt downstream aquatic ecosystems. Streambanks are a source of remobilised silt and sediment if not vegetated with native forest that can hold the streambanks with mature extensive root systems.

Headwaters

River system main stems need healthy water to ensure the health of the freshwater ecosystem network. They can only do that if the source of any main stem is native forest that provides stable water quantity and quality without pollutants or excess sediment and there is somewhere for migratory native species to passage to.

Catchments of sensitive aquatic ecosystems

Many freshwater catchments discharge into sensitive or special ecosystems such as lakes, estuaries and special marine areas such as Marine Reserves.

In this area 3 dune lakes in the north are sensitive, as are the Waikanae Estuary and the Kapiti Marine Reserve where the Waikanae River discharges into both.

Districtwide native afforestation ecological benefits assessment

Areas considered included grassland, exotic forest, harvested forest, or scrub. All exotic forest is included because after harvest there is often the opportunity to change the land use to native forest and gain the resultant ongoing ecological benefits.

All ecological benefits were mapped and prioritised so that the overall ecological benefits of available sites could be assessed. Both terrestrial and aquatic ecosystems benefits were looked at separately and combined.

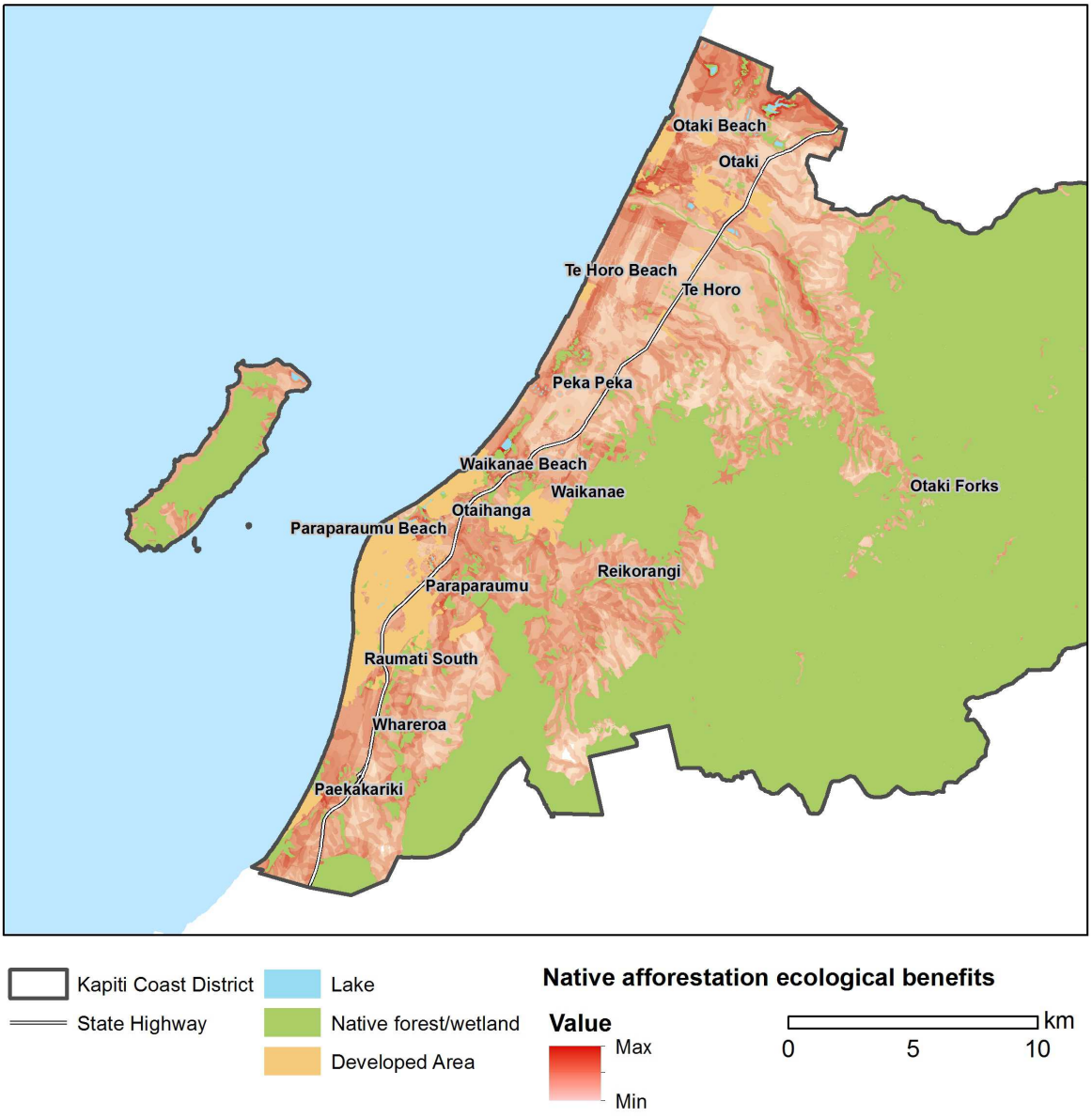

Figure 1 Kāpiti Coast District native afforestation ecological benefits

Priority native afforestation ecological benefit sites identified

While many areas have multiple ecological benefits, several priority sites were identified with a significant area, a high number of ecological benefits, and where not significantly built on.

3,927 hectares of priority sites were identified – 5% of the District.

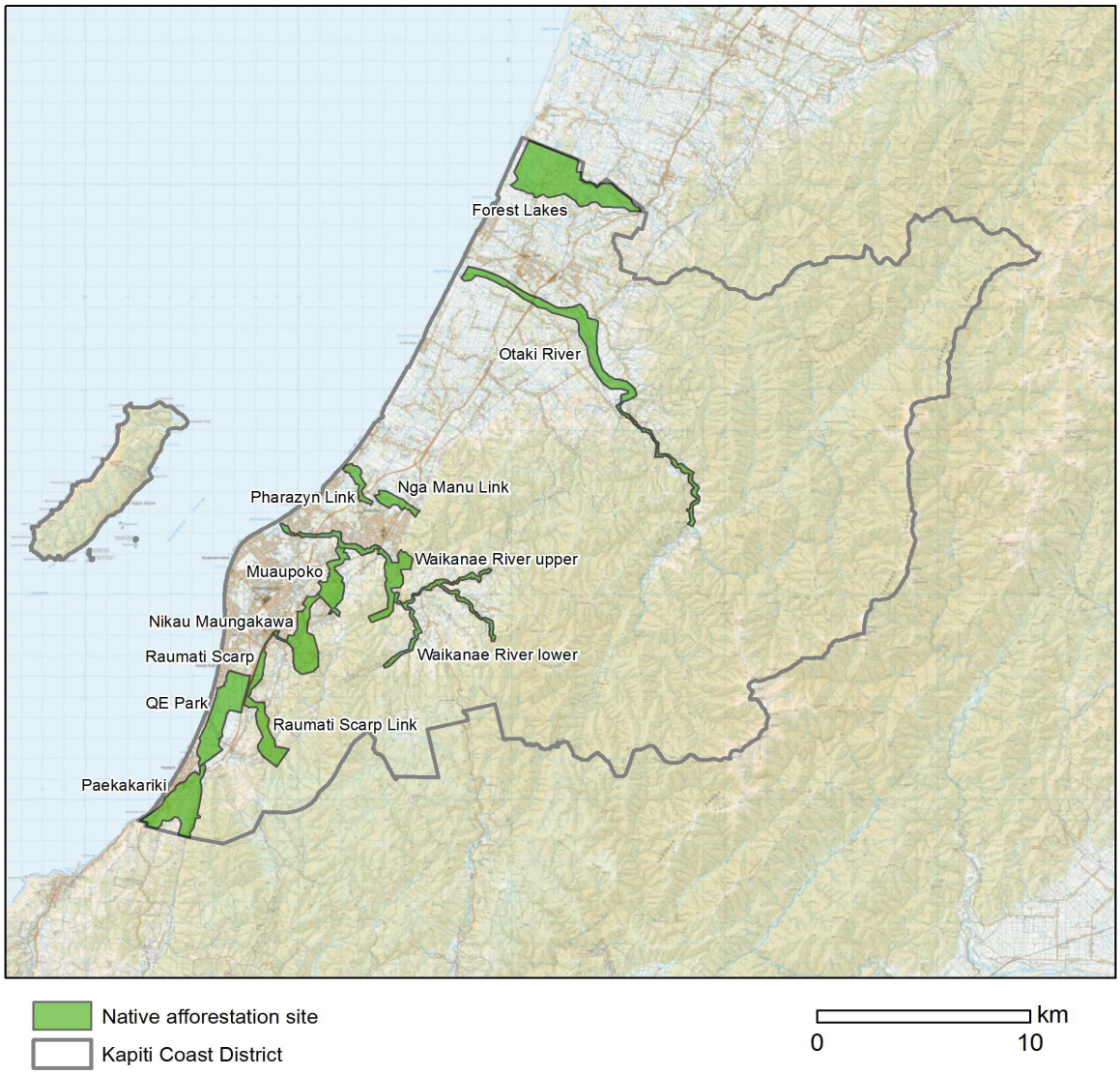

Figure 2 Kāpiti Coast District priority native afforestation ecological benefit sites

Forest Lakes

Significant ecological benefits

Catchment of sensitive aquatic ecosystems, Threatened Environment, freshwater headwaters, native forest buffer, wet soils, native forest corridor.

Existing land use

Pasture, wetland and lakes.

Tenure

Private landowners.

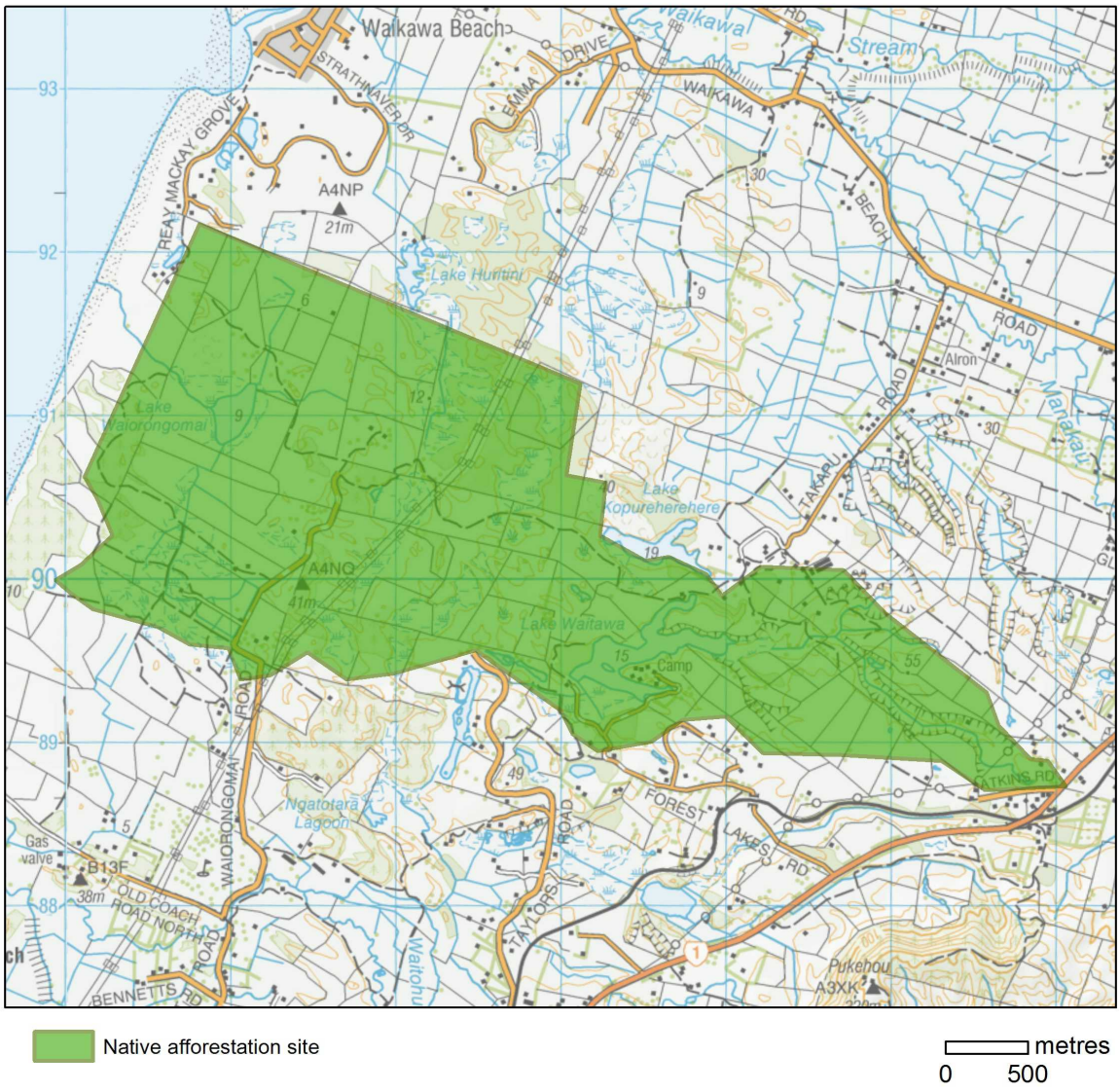

Figure 3.1 Forest Lakes native afforestation site 888 ha.

Paekakariki

Significant ecological benefits

Native forest buffer, native forest corridor, periodically floodable land, riparian margins, erosion prone land, freshwater headwaters.

Existing land use

Pasture, native forest and scrub.

Tenure

NZTA, Council.

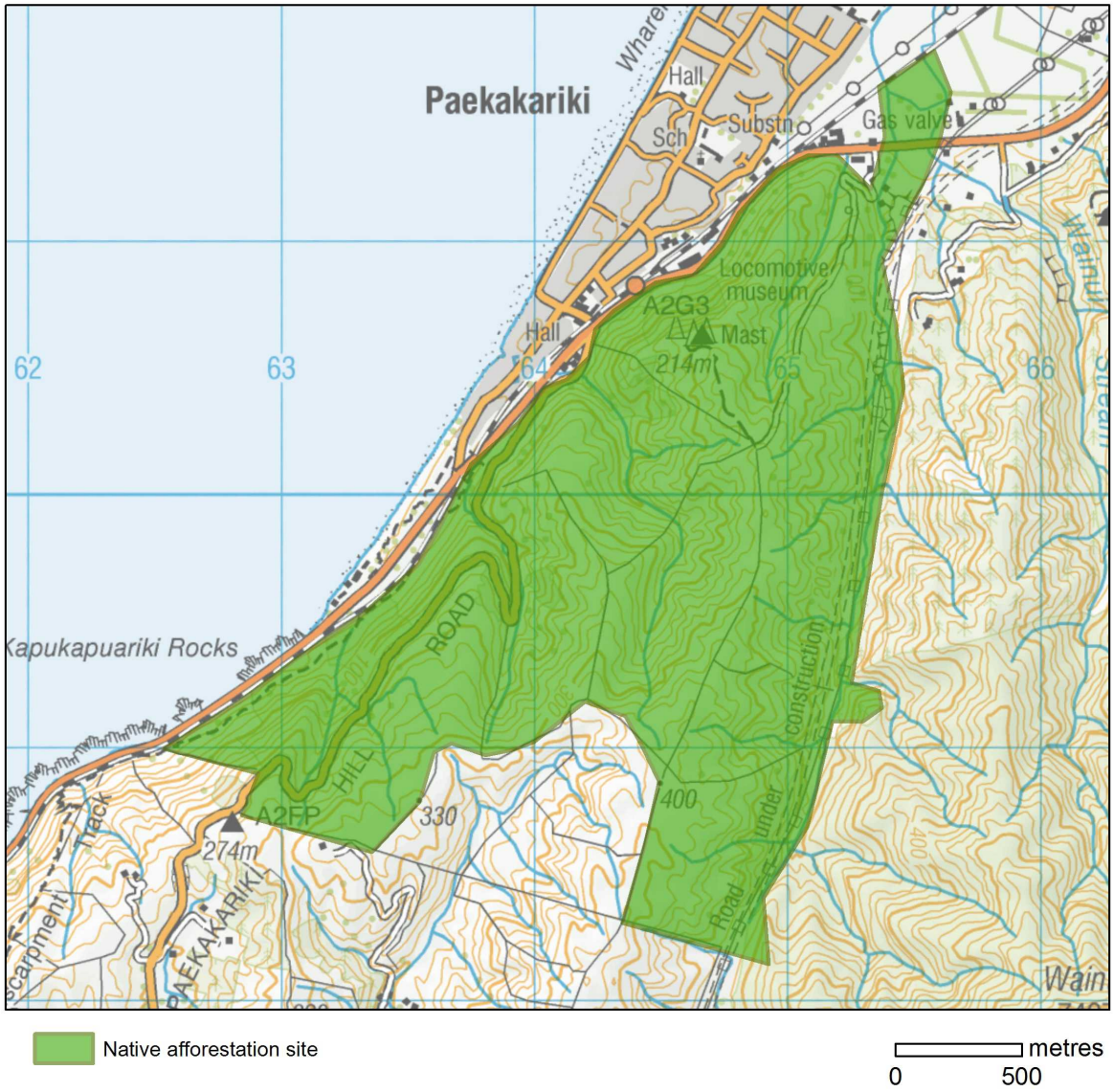

Figure 3.2 Paekakariki native afforestation site 429 ha.

Muaupoko

Significant ecological benefits

Native forest corridor, Threatened Environment, wet soils, periodically floodable land, riparian margins, freshwater headwaters, catchment of sensitive aquatic ecosystem.

Existing land use

Pasture and native forest.

Tenure

Private landowners, Council and DOC.

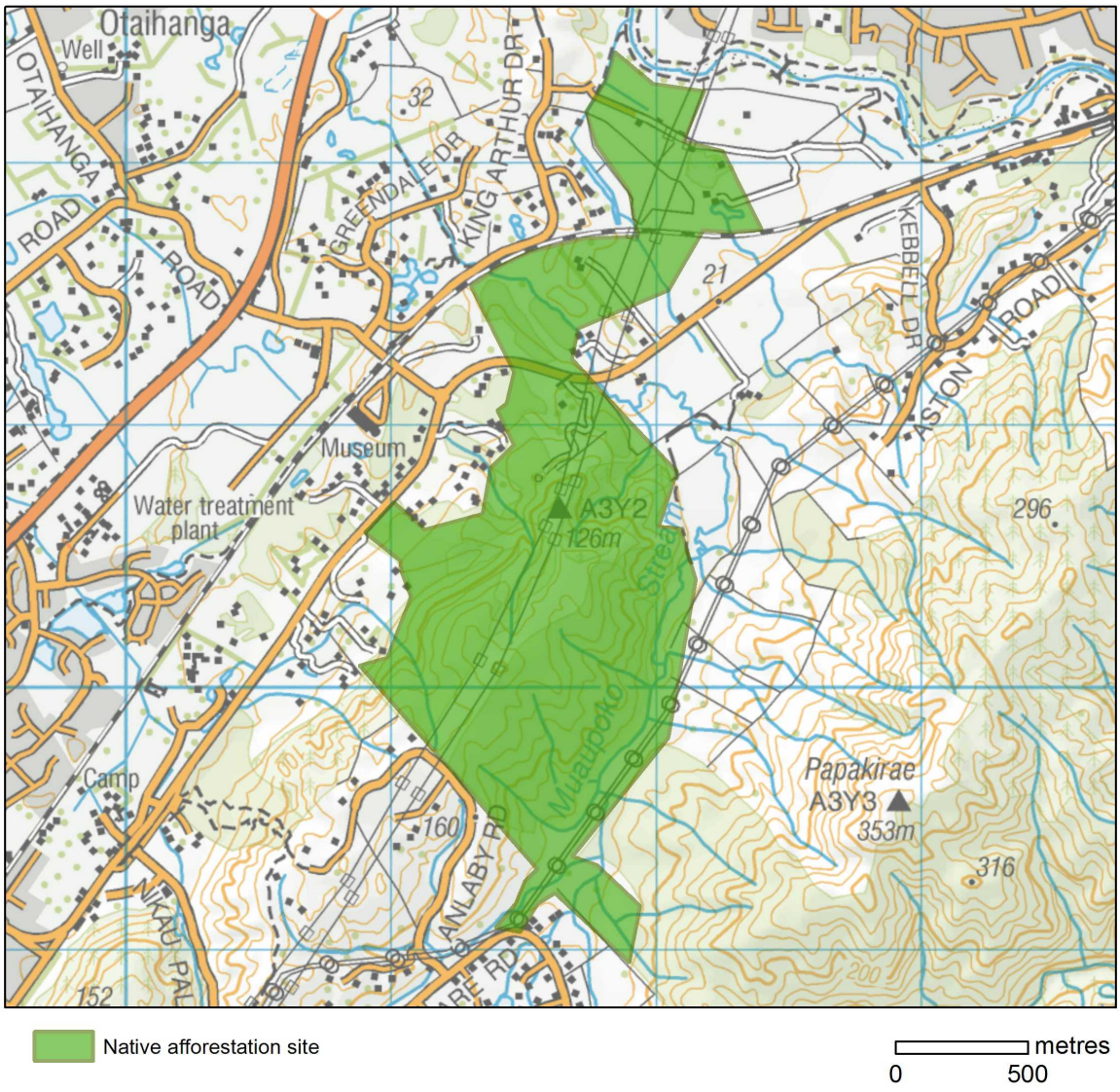

Figure 3.3 Muaupoko native afforestation site 206 ha.

Nga Manu Link

Significant ecological benefits

Native forest buffer, wet soils, periodically floodable land, Threatened Environment, native forest corridor.

Existing land use

Pasture, wetland and native forest.

Tenure

Private landowners.

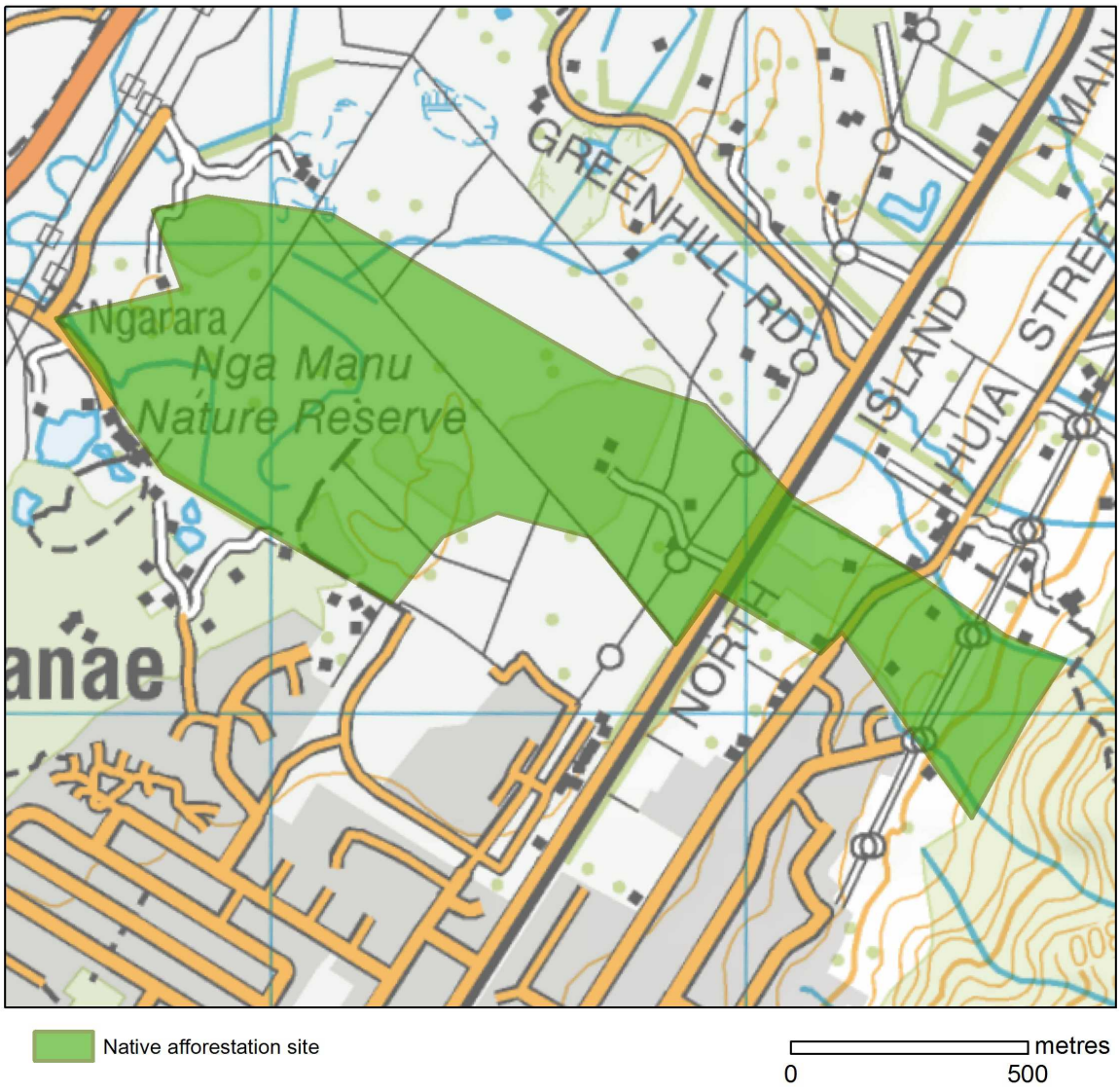

Figure 3.4 Nga Manu Link native afforestation site 91 ha.

Nikau Maungakawa

Significant ecological benefits

Catchment of sensitive aquatic ecosystems, native forest buffer, native forest corridor, freshwater headwaters, riparian margins.

Existing land use

Pasture, native forest and pines.

Tenure

Private landowners and Council.

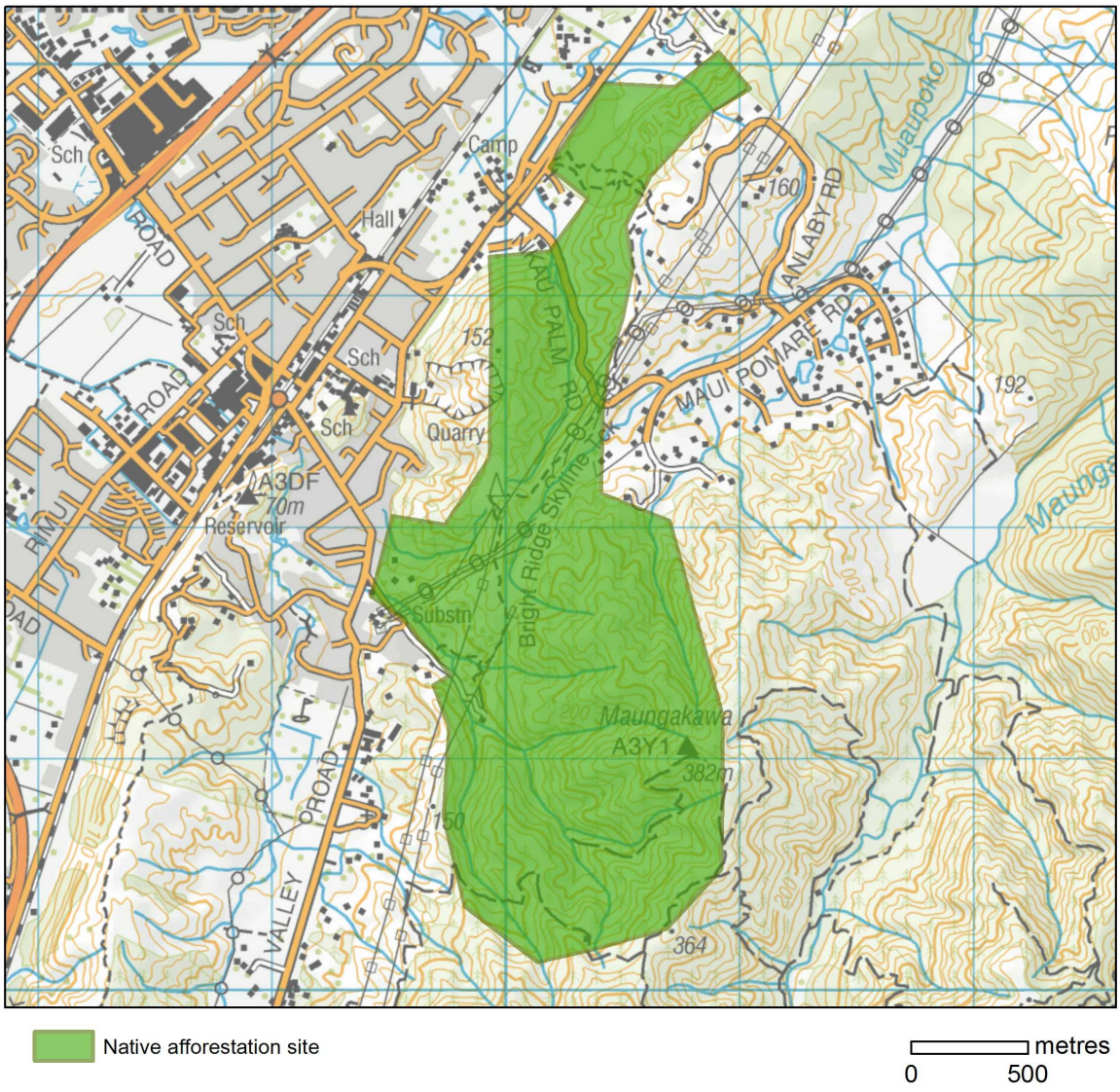

Figure 3.5 Nikau Maungakawa native afforestation site 308 ha.

Otaki River

Significant ecological benefits

Native forest buffer, wet soils, periodically floodable land, corridor, riparian margins, Threatened Environment, erosion prone land.

Existing land use

Pasture, native forest, and wetland.

Tenure

Private landowners, Council, DOC, LINZ and Greater Wellington.

Figure 3.6 Otaki River native afforestation site 630 ha.

Pharazyn Link

Significant ecological benefits

Native forest buffer, Threatened Environment, wet soils, periodically floodable land, corridor, riparian margins.

Existing land use

Pasture, native forest, wetland and lake.

Tenure

Private landowners, NZTA and Council.

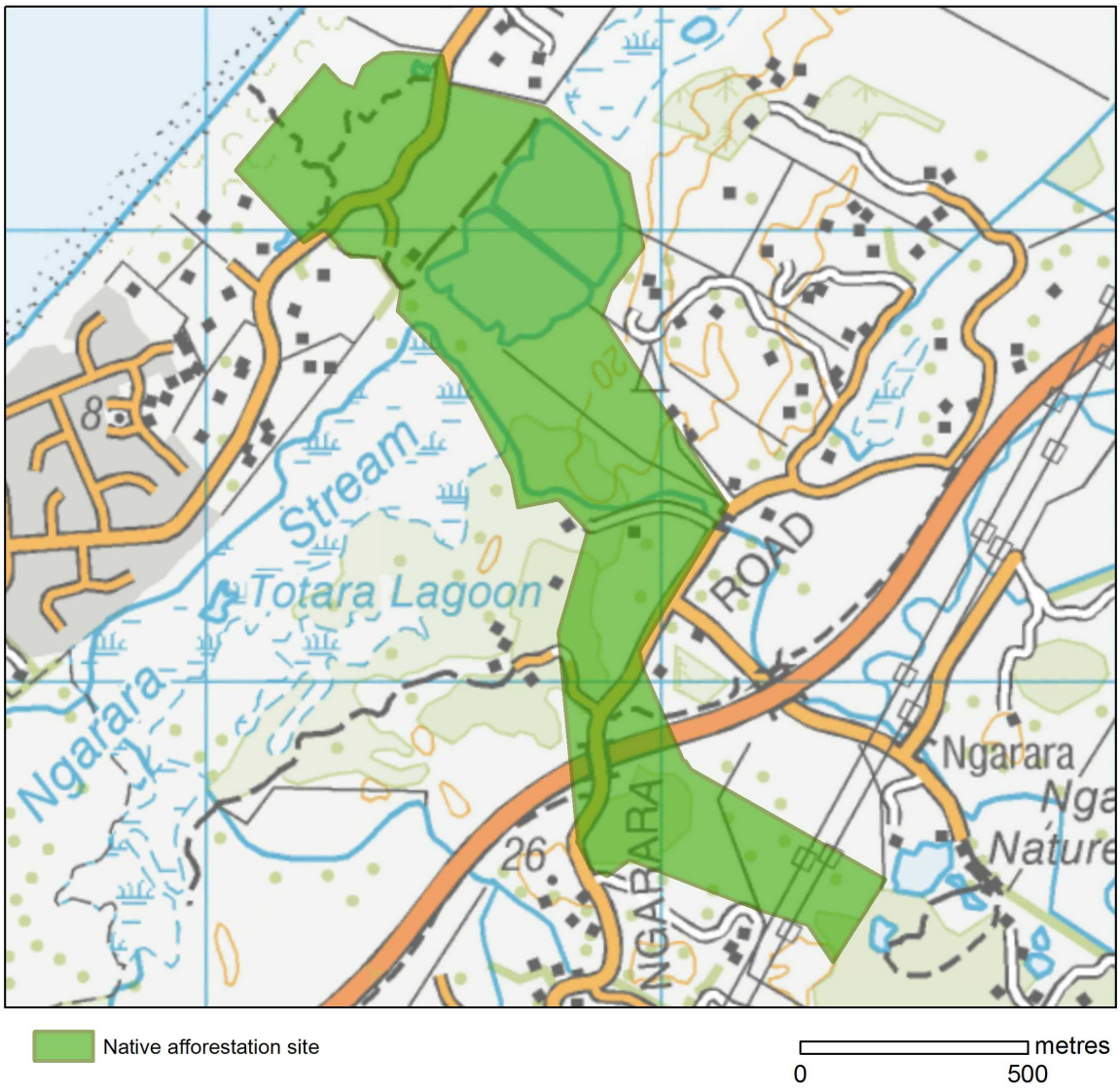

Figure 3.7 Pharazyn Link native afforestation site 79 ha.

QE Park

Significant ecological benefits

Threatened Environment, wet soils, periodically floodable land, riparian margins.

Existing land use

Pasture, wetland and native forest.

Tenure

DOC, NZTA.

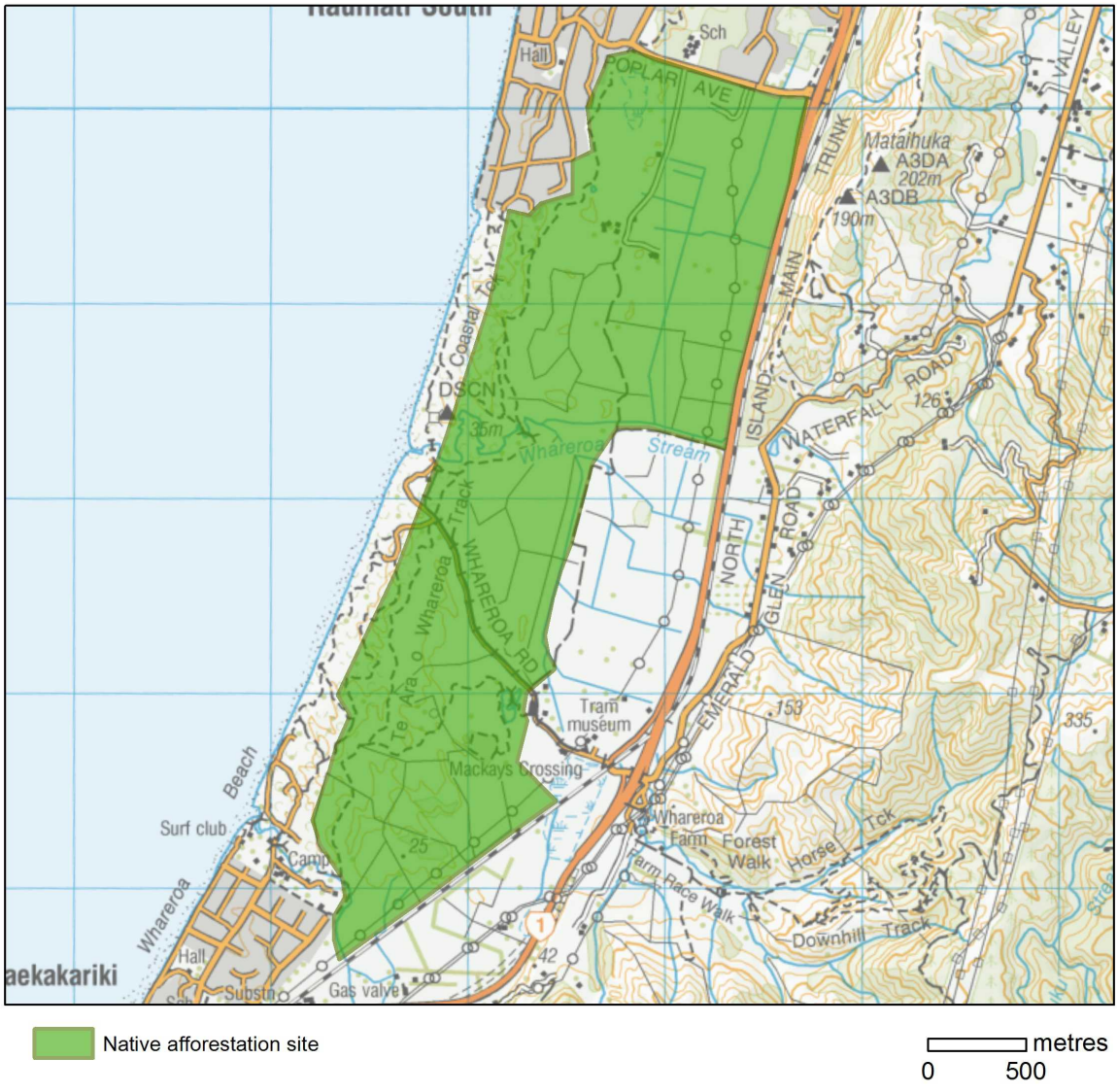

Figure 3.8 QE Park native afforestation site 451 ha.

Raumati Scarp

Significant ecological benefits

Native forest buffer, corridor, riparian margins.

Existing land use

Pasture, wetland, scrub and native forest.

Tenure

Council, private landowners.

Figure 3.9 Raumati Scarp native afforestation site 78 ha.

Raumati Scarp Link

Significant ecological benefits

Freshwater headwaters, native forest buffer, corridor, riparian margins, erosion prone land.

Existing land use

Pasture, native forest and scrub.

Tenure

Private landowners, Council and DOC.

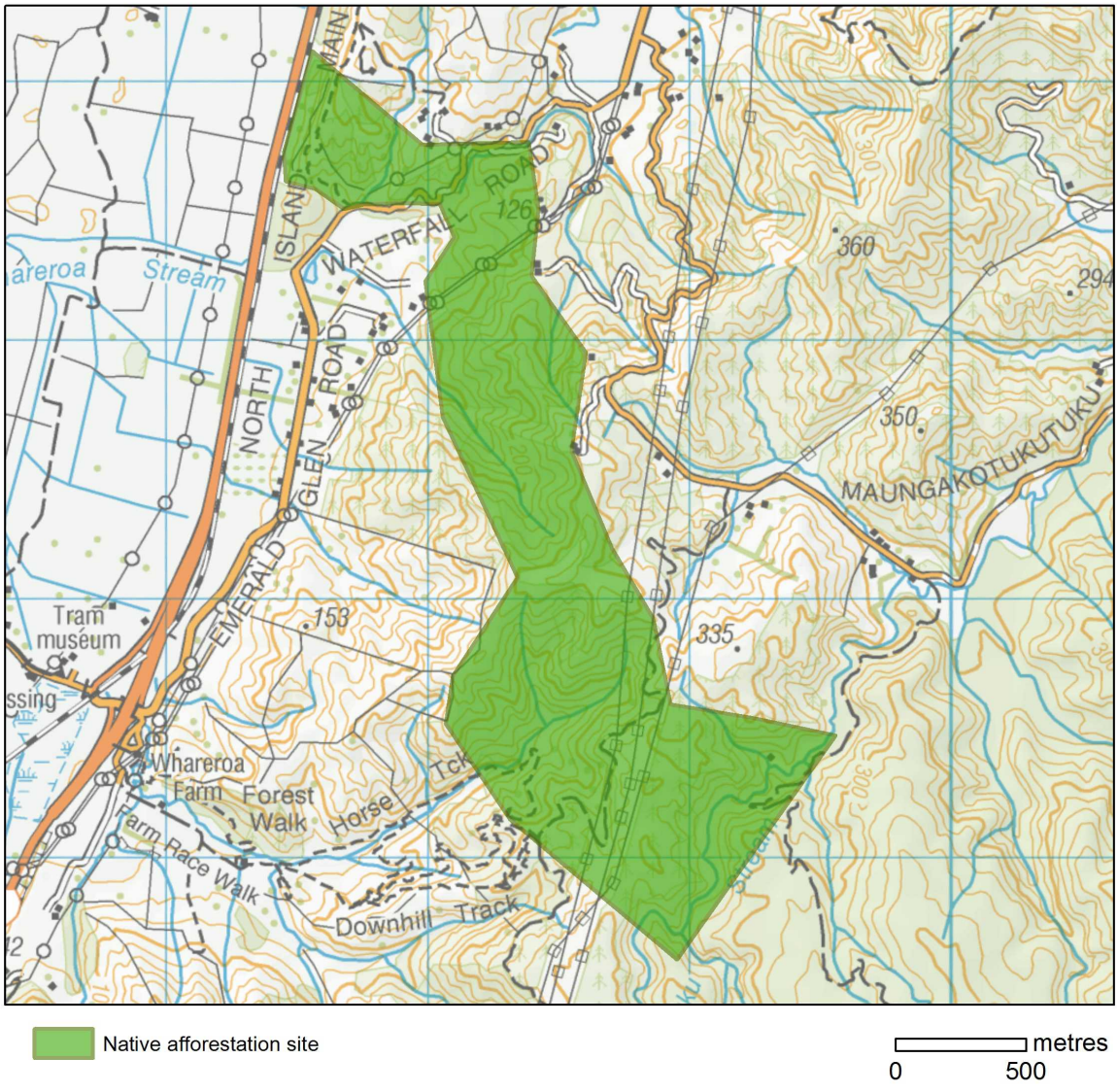

Figure 3.10 Raumati Scarp Link native afforestation site 209 ha.

Waikanae River Lower

Significant ecological benefits

Catchment of sensitive aquatic ecosystems, Threatened Environment, riparian margins, erosion prone land, corridor, periodically flooded land, native forest buffer.

Existing land use

Pasture, native forest, park.

Tenure

Council, Greater Wellington, DOC, private landowners.

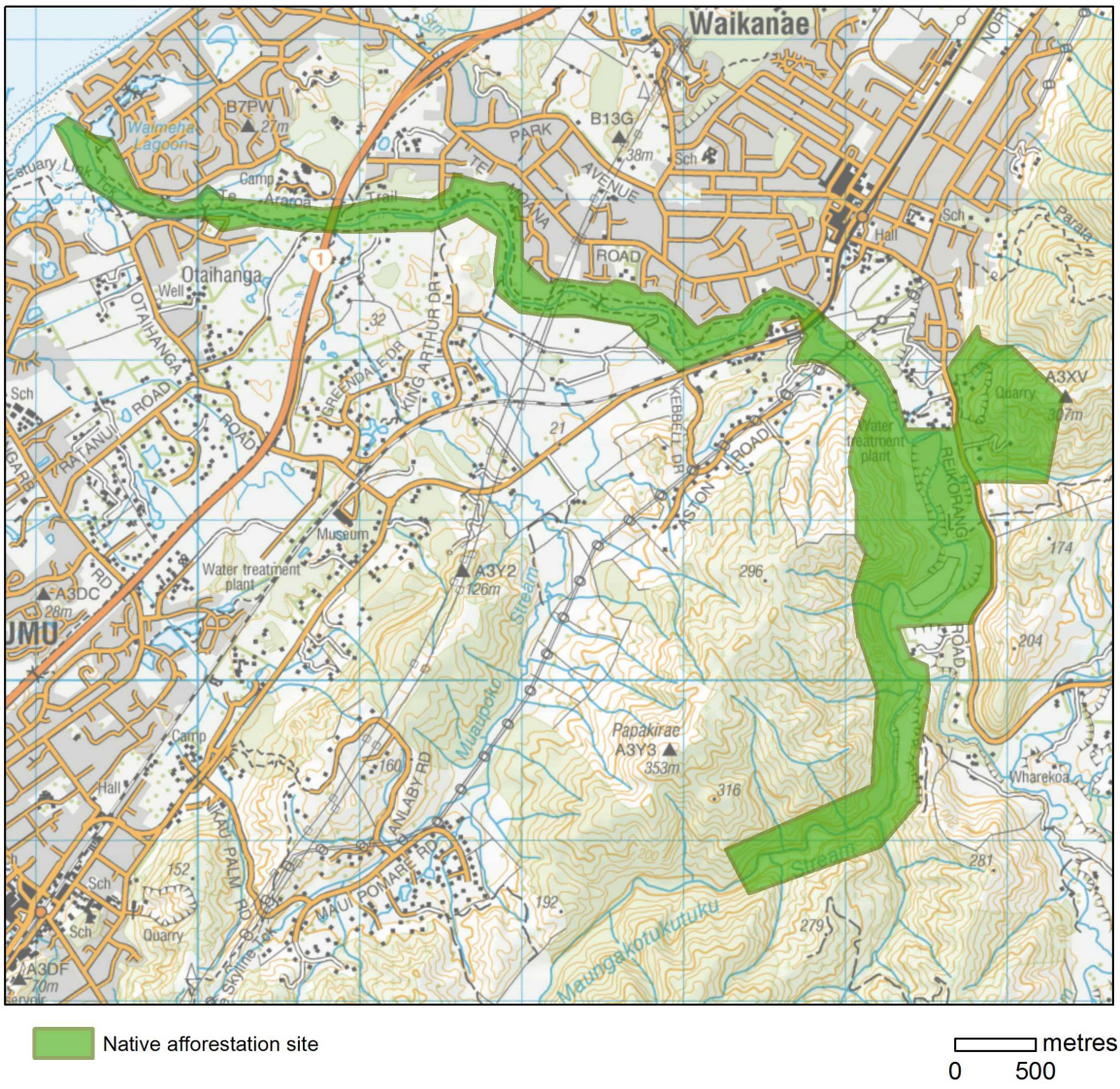

Figure 3.11 Waikanae River Lower native afforestation site 333 ha.

Waikanae River Upper

Significant ecological benefits

Catchment of sensitive aquatic ecosystems, riparian margins, corridor, periodically flooded land, native forest buffer.

Existing land use

Pasture, native forest.

Tenure

Council, DOC, private landowners.

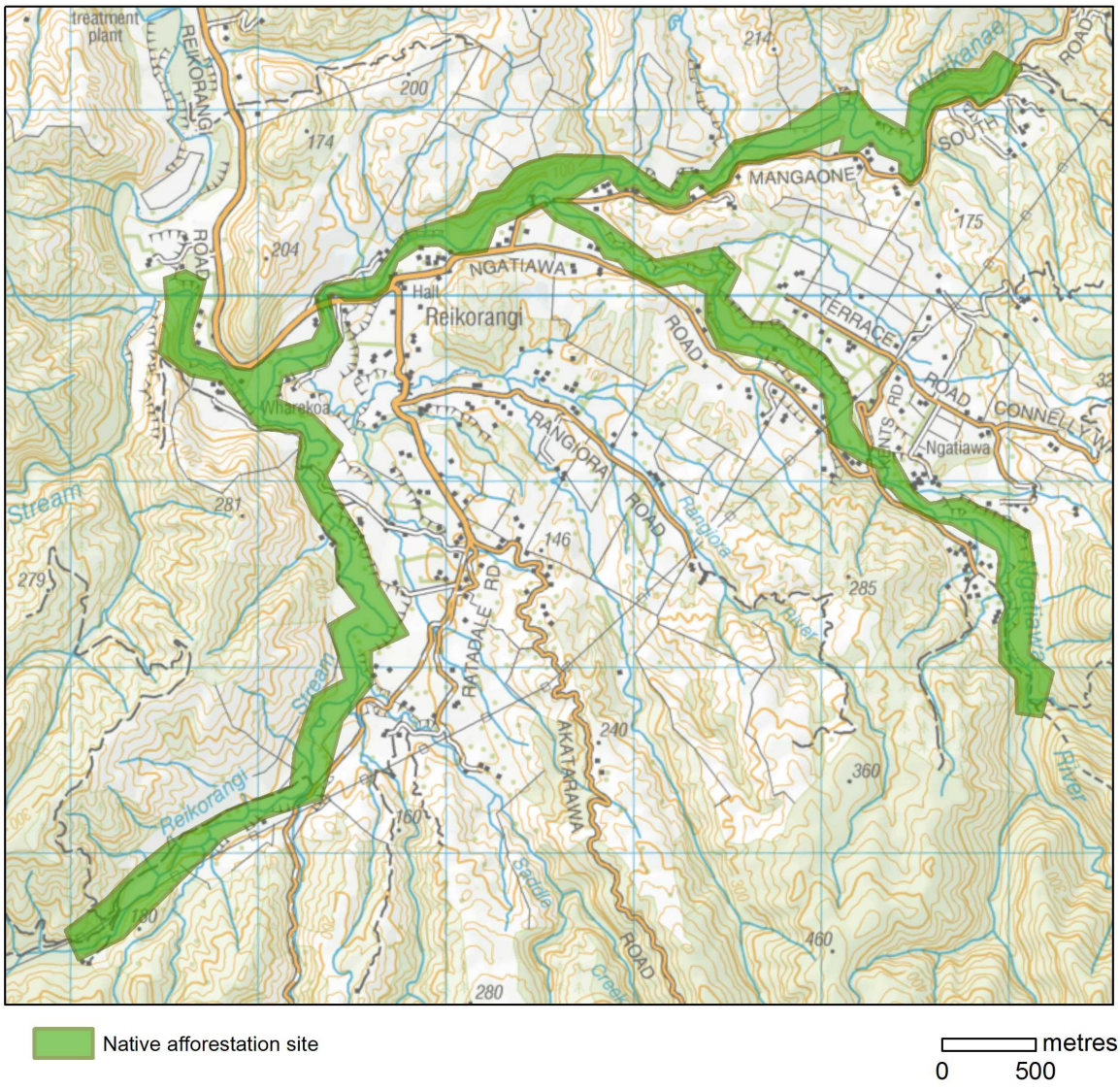

Figure 3.12 Waikanae River Upper native afforestation site 220 ha.

Other native afforestation ecological benefit site opportunities

This report identifies sites with high ecological benefits across the board. There are significant ecological benefits to be gained from other sites that have high value for individual ecological benefits such as threatened environments, riparian margins, wet soils, native forest and margins, periodically floodable land, or corridors.

Some other significant site opportunities identified include:

- All freshwater riparian margins – threatened environments, wet soils, native forest and margins, periodically floodable land.
- Foothills north of Waikanae to South Manakau – corridor.

Conclusions

This report identifies practical opportunities to gain maximum ecological benefit from any investment in native afforestation.

Native afforestation can have many ecological benefits that increase the value of a site to the community over and above any economic, social or carbon sink benefits.

The process is applicable to any organisation wishing to undertake native forest revegetation for ecological purposes, as it identifies many layers of value to the investment.

It is applicable to any organisation that wishes to offset carbon emissions and benefit the community ecologically at the same time. This particularly applies to Councils and Central Government Agencies.
