groundtruth

GORDON KEAR PROPERTY

Review of Long Term Ownership

14 December 2017

A report for

Palmerston North City Council

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1. INTRODUCTION

1.1 Background

The Gordon Kear Property was originally purchased by Council in 1975. Subsequently around two thirds of the total 745 hectares was established as a radiata pine plantation for commercial return. The remainder of the property has been maintained in native forest and shrublands.

In 2006 an area of land and plantation forest within the property was exchanged for what is now Arapuke Forest Park. The total area of the Gordon Kear property is now 678 hectares.

Harvest of pine plantations at Gordon Kear began with roadlining (recovery of trees along access roads) in 2007. Clearfell harvest occurred between 2009 and 2016 and plantation forest areas are now replanted in radiata pine. The total area planted in radiata pine has been reduced a little to a total of 401 hectares. As well as the earlier forest exchange, some small areas have not been re-established where there is particularly low growth or harvest difficulties.

Palmerston North City Council wishes to undertake a review of its long-term ownership of the Gordon Kear Property, now that harvest of the first rotation is complete. The requirement for this review was identified in a Council resolution of 17 November 2008, as follows:

That the Council reviews its long term ownership of Gordon Kear Forest once the harvest is complete. Any such review is to consider the community value of Gordon Kear Forest in terms of recreational opportunities and environmental services.

This review has the following scope

1. Review the commercial, environmental and social value of long term ownership of Gordon Kear Forest.
2. Objectively examine and present current and future value of forest ownership in terms of both commercial returns and community value in terms of recreational opportunity and environmental services.
3. Identify options for different ownership structures and also land use development opportunities
4. Review ownership against PNCC commercial and other policies (e.g. biodiversity, recreation).
5. Provide recommendations on the long-term approach to forest ownership.

This review has been undertaken predominantly using existing documents and staff knowledge.

1.2 Location and Context

The Gordon Kear Property is located approximately 16 kilometres south of Palmerston North, in the headwaters of the Kahuterawa Stream. It is approximately 25km by road from The Square and is accessed from Scotts Road, between Linton and Tokomaru.

This property has linkages to other properties owned or vested in Palmerston North City Council (PNCC) that span significant areas of the lower ranges adjacent to Palmerston North and make up a considerable area of the catchment of the Turitea and Kahuterawa Streams. Other PNCC properties through this area are shown in Figure 1, along with the location of the Gordon Kear Property.

The property is close to the PNCC owned Arapuke Forest Park and the Te Araroa walking trail passes through both of these properties. It also adjoins the Tararua Forest Park. Its native forest areas are connected to the Hardings Park area of Turitea Reserve via the Tararua Forest Park.

The combination of forest (native and plantation) properties held by PNCC provide a wide range of ecosystem services from water supply in the Turitea Catchment to soil and water protection across all properties to biodiversity and recreational linkages. Potential recreational walking linkages to the Gordon Kear Property have been identified in both the Turitea Reserve Management Plan and the Kahuterawa Outdoor Recreation Plan. This latter plan also identifies potential opportunities for some recreational activities, like 4WD events that could complement different activities in Arapuke Forest Park.

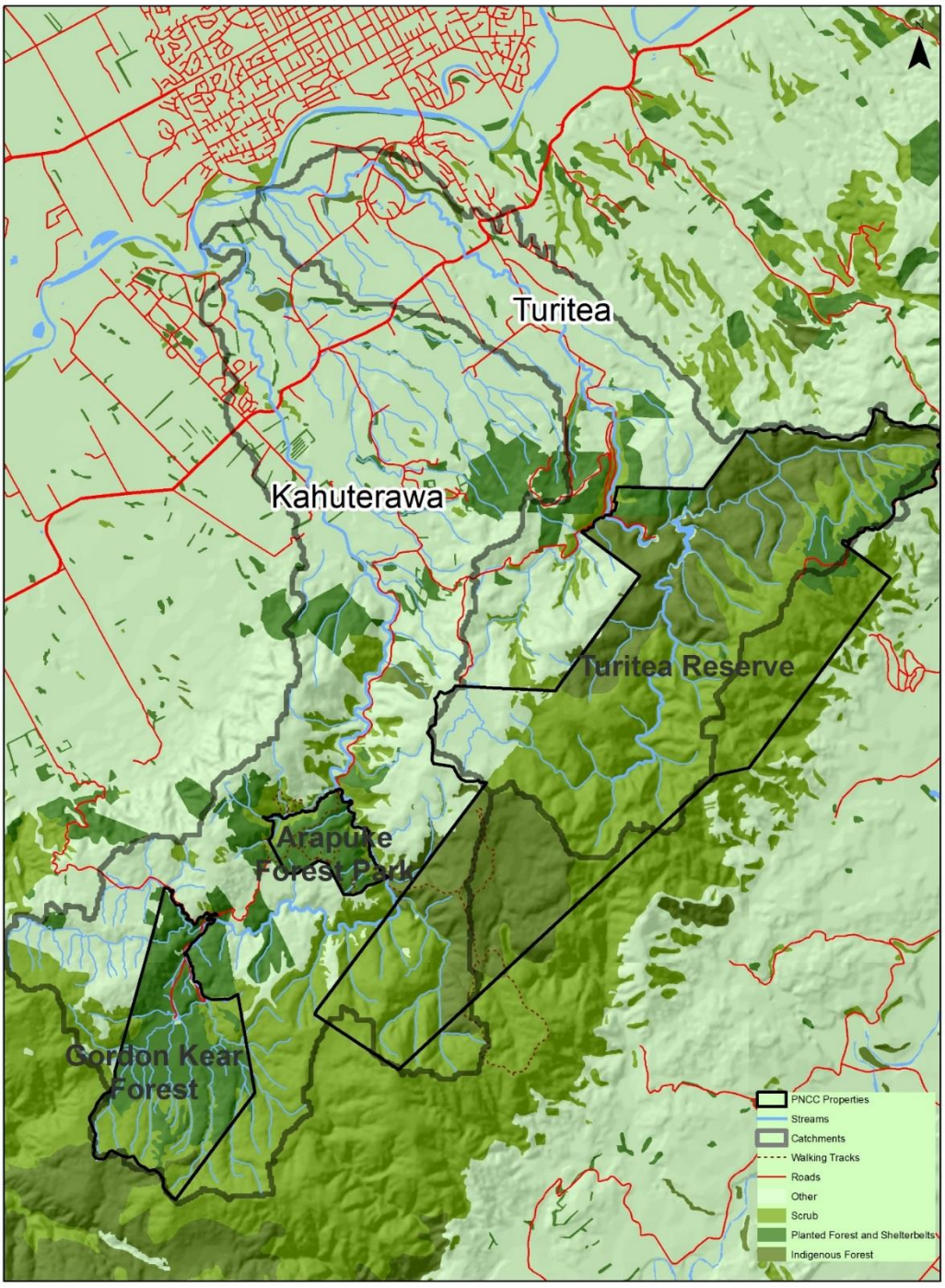

Figure 1: Map of Council forest properties within Kahuterawa and Turitea Stream catchments

2. APPROACH

This review must examine community and environmental values of ownership as well as commercial value. A brief review of the commercial value and return from forest ownership is provided. An examination of the community and environmental values is then undertaken.

Direct comparison of commercial, community and recreational values is difficult. This review identifies the key potential community and environmental values to Council of the Gordon Kear Property and examines their current value, strategic importance, and likelihood of obtaining this value. This information is then considered alongside commercial information to review the value of long term ownership.

The Gordon Kear Property is currently held as a freehold property by Council. There are other approaches to ownership that Council could consider, such as retaining land ownership but selling the plantation tree crop. The advantages and disadvantages of some possible ownership options are also broadly examined.

Gordon Kear Property and the Proposed City Vision

This review of ownership needs to broadly align with the proposed vision that is being consulted on for the Council 10 year plan (2018-28). This proposed vision is:

Palmerston North: Small city benefits, big city ambition

The range of strategic planning documents prepared by Council are currently being reviewed and a new set of simplified and integrated documents are being prepared to assist in achieving the vision of Palmerston North: Small city benefits, big city ambition. The five strategic goals proposed to achieve this vision are:

- An innovative and growing city
- A creative and exciting city
- A connected and safe community
- An eco city
- A driven and enabling Council.

The long term ownership of the Gordon Kear Property is also considered in terms of how it contributes to these goals.

Figure 2: Gordon Kear Property, 401 ha re-established in radiata pine following harvest.

3. CURRENT AND FUTURE VALUE OF GORDON KEAR FOREST

3.1 Commercial Forestry

Background

Establishment of the plantation forest on the Gordon Kear Property through the 1970's and early 1980's was supported by the use of two Government Forestry Encouragement Loans. These loans allowed accumulation of interest to be paid back at harvest. The loans also had a portion that was suspensory. At the time of establishment the loan interest rates appeared very favourable (around 6%), but had a major impact on long term performance of the forest investment.

Consequently the first rotation forest did not make the returns that a debt free forest would have made. There was also considerable overestimation of forest growth rates in the original feasibility studies in the 1970s.

Harvest of the first rotation forest was carried out between 2007 and 2016 and the forest has now been re-established in radiata pine ranging in age from 1 year to 7 years old. The second rotation forest investment presents a significantly different situation for a number of reasons:

- The actual performance of the forest in terms of growth and costs are now well known from the first rotation.
- Poorly producing areas are identified and either removed from the forest investment or managed less intensively
- Silvicultural management can be aligned with the known performance of the forest – so better, more sheltered areas are pruned and managed more intensively – and less productive areas are managed under lower cost silvicultural approaches.
- Major investment in harvest roading infrastructure is now in place from the first harvest. This eases management and significantly reduces costs at the second rotation harvest, beginning in around 20 years time.
- There has been significant improvement in genetics of radiata pine used in the second rotation that will improve its growth and form.

This section reviews likely cash flow and return for the current plantation forest crop.

Forest and land value

Forest value
The plantation tree crop is currently young (1-7 years old). Because all forests are very different in their growth, costs etc and there are a limited number of forest sales, it is not possible to effectively value forests based on market transactions. Annual forest valuations for Gordon Kear Forest are undertaken using standard valuation methodology that examines both the cost of forest establishment (in the case of a very young forest) and future forest cash flows for older forests.

Forest value increases over time (other things being equal) with growth of the forest and decreasing time until harvest revenues are received.

The June 2017 forest valuation for Gordon Kear Forest is $640,898

Land value
Land value is assessed separately using valuation practices based on market transactions of similar rural land. The June 2017 valuation of land on the Gordon Kear Property is as follows:

Certificate of title	Area (ha)	Land value	Improvements / site works value	Total Value	Notes
242473	665.9878	$1,230,000	$335,000	$1,565,000	Main forest property
WN225/68	12.1406	$130,000	$135,000	$265,000	Property on south west boundary with house

Cash flow and return from forest investment

Cash flow and return on the forest investment has been modelled over the period from forest re establishment in 2010 to the potential completion of harvest of the second rotation in around 2044.

The rate of return on investment can be considered in two ways

- *Return over entire second rotation:* The costs and revenues were modelled assuming all stands are clearfelled at age 28. The assumptions used in developing this cash flow are provided in Appendix 1. Land cost is not included, this is the same approach as is taken with the forest valuations.

- *Return on future investment and revenues from forestry:* Just the future costs and revenues are modelled to assess return on any future investment. Land is not included.

Cash flow summary
Total annual forest costs are around $100,000 - $250,000 per annum between 2018 and 2026 as silviculture (pruning and thinning) is completed and then reduce to around $30,000 - $40,000 per annum. Forest harvest begins from 2037-38 with income of around $1.2 million per year for 7 years. Total net harvest income (after harvesting, roading and transport costs) is estimated as $8.4 million over this period.

Return on investment
The estimated rate of return for the entire second rotation, from establishment in 2010 to completion of harvest in 2044 is 6.0 %. This assessment of cash flows from 2010 – 2044, includes the past investment in establishment costs and the full period from planting to harvest.

The rate of return on the cashflows from the present (2017) to 2044 is greater at 9.3 %. This is due to some of the early establishment costs not being included, and the reduced time until harvest. This amounts to the return on money invested in forest management from now on.

Land
The cost of land has not been included in these cash flows, however the basic annual costs associated with the land, such as rates, have been. The value of the land will move in line with similar property values.

Summary
Plantation forestry at Gordon Kear is likely to provide a return on investment of around 6%, in line with similar forestry ventures around New Zealand. The fact that this is a second rotation forest with infrastructure in place, and that management is now being fine-tuned based on performance from different areas in the first rotation, reduces risk and is likely to improve return compared with the first rotation.

As outlined in this review, there are a range of social and environmental values also provided from the Gordon Kear Property, in addition to this commercial return. If it is considered that some of these values have future strategic importance to Council, the forestry return can be seen as a way to fund the ownership of the property.

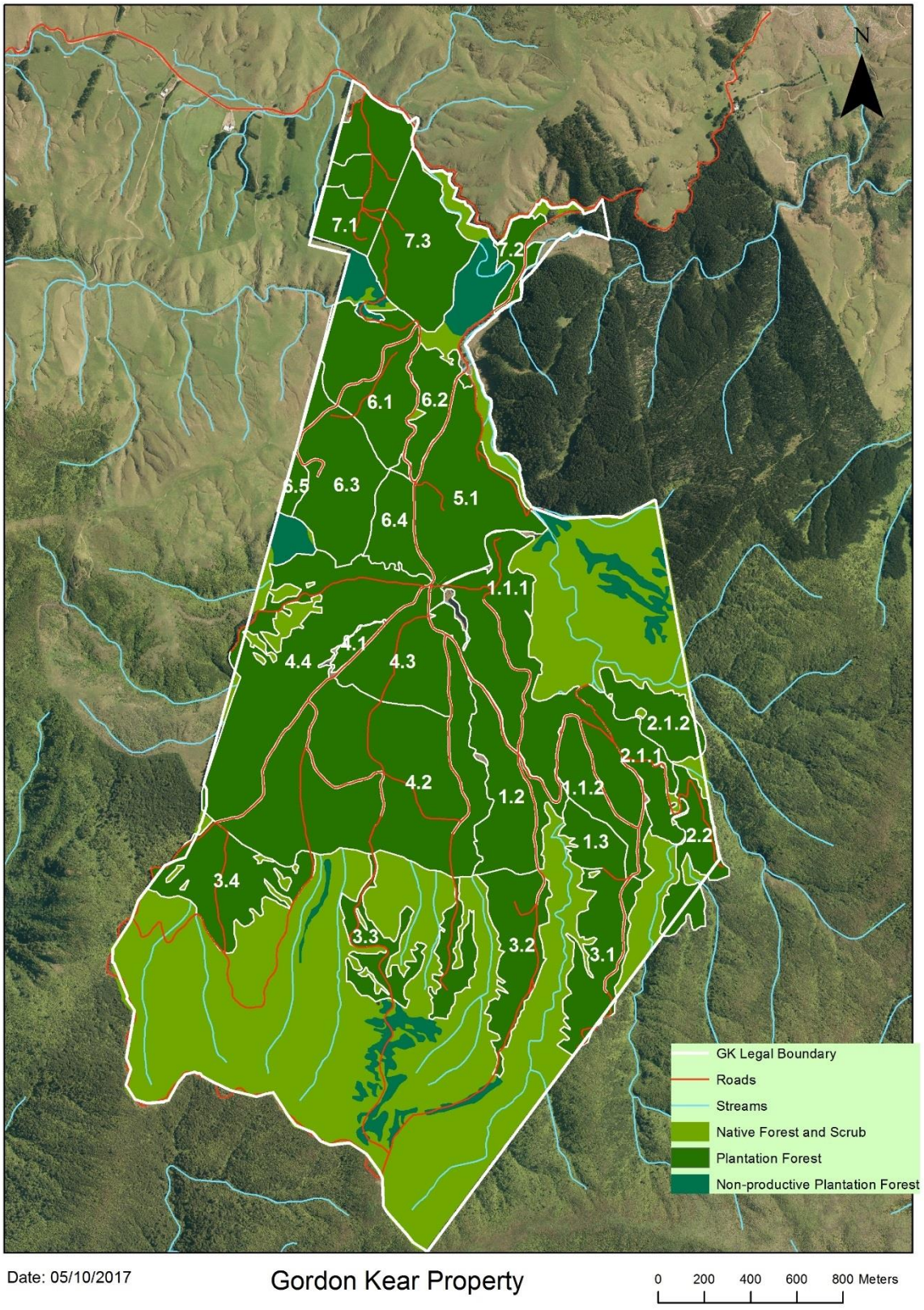

Figure 3: Map of Gordon Kear Property

3.2 Other commercial land use opportunities

3.2.1 Wind Energy

Overview
Parts of the Gordon Kear property are likely to be in areas that are an attractive wind resource for energy generation. In 2008 the Motorimu Windfarm obtained a resource consent for 80 turbines in areas adjacent to GKF. The company involved collapsed and the consent was later surrendered.

Since this time the development and consenting of windfarms has moved on, as have the associated planning requirements. District Plan Change 15B addresses windfarms and landscapes. It identifies sensitive areas of the skyline of the Tararua Ranges including some areas at the south east of the Gordon Kear Property. Consenting wind turbines in these areas is likely to be very difficult.

It is also important to note that there was considerable discussion of the possible Motorimu Wind Farm at the time of consenting the Turitea Wind Farm. Surrendering the Motorimu consent reduced the cumulative impact of wind turbines. While any turbines on an area of the front (more western) ridge of the Gordon Kear property are not in the sensitive skyline area under plan change 15B, they are likely to be significantly more difficult to consent now due to concerns over cumulative effects of wind turbines across the landscape.

Any transport of large turbine components into the area would be difficult. This is likely to further reduce the attractiveness of any proposal as large turbines are now well established as the most financially attractive option.

If a wind energy project did eventuate it could potentially match well with forestry as the least productive areas for forestry are generally the sites with the best wind for turbines.

Value
No value at this stage

Strategic – Future value
There may be some scope for wind energy on the western ridges and possibly on elevated areas in the south of the property. This could provide an ongoing future income. It could also contribute to providing further renewable energy and reducing carbon emissions.

Likelihood
Relatively low likelihood due to potential consenting and access issues

Comment
It is uncertain if this could be a future land use on the property. However, it would only occur over some of the more exposed areas. These areas have poorer forestry return due to exposure, so a mix of some wind turbines on exposed ridge areas within the forestry operation could be possible. These options can be kept open through ownership. They could also be provided if the property was not owned by Council.

3.2.2 Pastoral Farming

Overview
Pastoral farming would require removal of second rotation trees which are now one to seven years old and would result in a loss of this plantation forestry investment. The deforestation of the area would also incur deforestation penalties under the New Zealand Emissions Trading Scheme. Given the current net stocked plantation forest area of 401 hectares and carbon table sequestered carbon levels of around 800 tonnes

per hectare at harvest (as replanted trees are less than 9 years old) penalties could amount to $5.6 million at current carbon price of $17.50 per tonne. This penalty amount is in fact likely to be an underestimate as trees were over 30 years old at harvest so carbon tables would identify higher sequestered carbon levels.

This is not a high pasture production area. Climate associated with relatively high altitude (around 400m) and wind exposure reduce grass growth. This site would most likely be used as a sheep and beef production unit, in line with adjacent farming operations. These are not particularly financially attractive. Current annual net returns for North Island hill country farms are $200/ha (Beef and Lamb monitor farms report 2017).

The combination of costs of land conversion and very high carbon penalties for a relatively small annual return means that pastoral farming can be largely ruled out on this site. Some grazing could potentially occur in the early years of the second rotation when grass growth is present before the forest canopy is developed to a point it shades out grass. However there is no fencing in place and the expense of fencing and difficulty of management would not be warranted for the small returns involved.

Value
No value

Strategic – Future value
No obvious strategic value from agriculture.

Likelihood:
Unlikely to occur.

Comment
There appears to be little opportunity for pastoral farming and no commercial or other reason to convert to pasture from forest.

3.2.3 Subdivision

Overview
The ability to subdivide land for sale is controlled through the District Plan. The proposed district plan (which is at a final appeals stage) identifies specific areas for rural residential subdivision. These areas are focused on where services / infrastructure can be cost effectively delivered and where productive land will not be lost. These proposed areas do not include the Gordon Kear property. Consequently consenting of subdivision of Gordon Kear into smaller lots would be difficult. Relatively poor access via Scotts Road also makes the area less attractive from a subdivision and land sales viewpoint. Scotts Road is classified in the District Plan as a Restricted Access Road which greatly reduces any potential for subdivision.

The property does have an existing separate title to approximately 12 hectares of land with a house. Most of that land is covered by plantation forest. This area is already subdivided and could be sold if desired. The relative importance of this particular area has not been considered. It may include areas that would be more favourable for any future wind energy generation. It is also worth noting that one advantage of retaining the separate land title with the house is that the tenant keeps an informal eye and ear on the Gordon Kear property and therefore provides an element of security.

Value
Low

Strategic – Future value:
Subdivision of this area is not aligned with Councils District Plan and any future subdivision in the area seems unlikely.

Likelihood
Subdivision is unlikely due to consenting issues and limited demand.

Comment
Subdivision and sale of smaller lots does not appear to be an opportunity. Sale of the existing separate land title with house could be considered if desired.

3.3 Water Supply

Overview

The Turitea catchment provides around 60% of the water supply for Palmerston North. Storage is provided through two dams. The farsighted view of early Councillors resulted in the Turitea catchment being protected in the late 1800s for water supply.

As the population of Palmerston North has grown, the potential for the Kahuterawa catchment to provide an additional water source to the Turitea has been identified over recent decades. A September 1995 review of Gordon Kear Forest presented to the Council's Finance Committee identified that "The Kahuterawa catchment has often been considered as a future water supply area for the City".

The Gordon Kear Property is in the head of the Kahuterawa catchment and encompasses a natural basin that would appear to have some potential for damming and water storage.

There does not appear to have been any detailed consideration of the water supply opportunity. A 1996 Water Supply Development Plan Design Report, prepared by Royds Consulting for Council very briefly identified that potential exists in the Kahuterawa for storage to be increased. No analysis was done and the study assumed that it would require replication of the Turitea upper dam, pipe and water treatment plant.

The 2014 water supply asset management plan (which is under review) identifies a number of points that are relevant to the significance of any potential future water supply from the Kahuterawa and possibly the Gordon Kear Property in particular.

Section 5.9 of the asset management plan identifies that the water supply system is more sensitive to increases in demand than reductions. The water production capacity from the bores and treatment plant is unlikely to meet the needs from the growth in Whakarongo and City West areas. Either new bores or some storage are required in the next 10 years.

The current lower cost and good quality of bore water means that the PNCC water supply asset group see more bores as being the way increases in demand will be satisfied over the short – medium term. Currently the water asset group at PNCC are seeking long term consent for bore water take to ensure their access to this resource over the next approximately 20 years. This consent is being obtained to ensure security of access to the resource over this period.

Beyond this 20 year period there is less certainty over supply from groundwater. Changes in demand and the level of groundwater utilisation could make this supply more constrained in the future. This 20 year timeframe equates broadly to the timing of harvest of the second forest rotation, so would form a logical re-evaluation point for water supply possibilities associated with the Kahuterawa and Gordon Kear Property.

We are not aware of any work that has been done looking at the potential and engineering suitability of water supply from the Gordon Kear Property. However, it can be observed that the flatter areas of the property form a natural basin and there does appear to be a logical damming point within the property. It is also interesting to note that this basin is at approximately 340m altitude and the Turitea lower dam is at 140m. This may offer some opportunities for moving water to the Turitea dam and treatment facilities.

In summary, maintaining ownership would provide the option of future development of an additional water source for the city. This water supply could be required if the ground water resource becomes more constrained or impacted in future.

Value

No utilisation for water supply at this stage

Strategic – Future value

Potentially this is high. There is uncertainty over whether it will be required, and little work has been done on its suitability. However, ability to maintain ownership of a good water supply catchment area that is contained within PNCC ownership and adjacent to DOC conservation forest could have high value in the long term.

Likelihood

This site could provide water from a largely protected catchment, so high water quality is likely. Likelihood of supply will be dependent on greater understanding of engineering practicalities.

Comment

Maintaining ownership of a property which could have potential to provide an additional long term water supply appears to have high strategic importance.

Provision of a commercial return from the existing second rotation plantation forest crop will occur at the same stage that serious re-evaluation of water supply may be required. In this way the forestry operation is effectively covering the cost of holding this property.

3.4 Environmental values and services

3.4.1 Biodiversity

PNCC strategies

PNCC has a biodiversity strategy prepared in 2013. This strategy is currently under review. The overall thrust of the biodiversity strategy may not change significantly. The current strategy has an overall aim of "Increasing the health and extent of terrestrial and aquatic biodiversity in the city". Under this aim it has four strategic drivers:

- Increase planting around the city. This includes investigating and implementing options for increasing planting projects, planting margins of river streams and gullies, and ensuring original habitat types are represented across the city.
- Continue and increase predator control. Actions broadly identify coordinated efforts with Horizons, DOC and community groups – achieving targeted and effective predator control.

- Actively promote biodiversity. Develop projects with iwi, promote value of biodiversity widely across the community.
- Protect and restore the City's terrestrial and aquatic biodiversity. Actions include more ecological assessment to help with prioritisation, planting and improvement in relation to small stream habitat quality, working through district planning processes to enhance biodiversity.

Work under the 2013 biodiversity strategy and work prior to it has not considered biodiversity values within the Gordon Kear Property. There are significant areas of native forest vegetation and also waterway networks within the property that have biodiversity value.

Existing biodiversity values at Gordon Kear

Of the 678 hectare total area of the Gordon Kear Property, almost 250 hectares is native vegetation. This native vegetation includes around 146 hectares that is mature or semi mature native forest. These forest areas are likely to have been significantly modified by original native forest logging, but now contain quite mature kamahi and occasional tawa in the canopy (see image below). Scattered through this canopy are occasional rimu, miro and hinau. Considerable areas of the native forest are on relatively easy, rolling terrain. A forest type dominated by kamahi would have originally been common through this area of the Manawatu. However following major canopy collapse as a result of high deer and possum numbers in the mid 1900's these areas have become uncommon, so are significant. In addition to the more mature native forest areas, regenerating forest is present throughout gullies and other unplanted areas. This forest is dominated by species common in early forest regeneration such as mahoe, pate and also kamahi. There is also a diversity of longer lived forest species such as rimu.

A list of plant and bird species identified in a field assessment of the property on 25 May 2017 is provided in appendix 2.

The Kahuterawa Stream has important fisheries diversity. Gordon Kear Property is important to the water quality and habitat for these species.

The current biodiversity values of the Gordon Kear Property can be summarised as:

Remnant kamahi dominated forest: Areas of more mature native forest remnant in the Gordon Kear Property are interesting in that they contain a high proportion of Kamahi (Weinmannia racemosa) in the canopy. These areas are shown as B1, B2 and B4 in the map below. Kamahi was a common canopy species through forests in the upper slopes of the Turitea Catchment but was severely impacted by possums and deer in the mid 1900's so is now a much less common component of the forest across the Turitea and Kahuterawa. These forest areas also contain regenerating rimu (Dacrydium cupressinum). The Gordon Kear area was historically known as Motorimu and apparently had dense stands of rimu that supported a local sawmill and small community. A list of species in these areas is provided in Appendix 2.

Regenerating forest areas: Regenerating forest occurs on steep unplanted faces and gullies. These areas are dominated by species such as mahoe (Melicytus ramiflorus) and pate (Schefflera digitata). They contain a diversity of other forest species seedlings and will regenerate into a diverse mature forest. One of the larger areas of this type of forest is shown as B3 in the map below.

Waterway network: A relatively flat and good quality waterway network is present on the property. This has had impacts during the clearfell operations but is now rapidly returning to its pre – harvest quality. Some small amounts of fish survey have been undertaken in this area in the past which showed relatively low diversity of species. This is likely to be a feature of the steep and swift Kahuterawa Gorge below the forest which will impede fish movement, and also the greater altitude (over 300m) compared to the lower Kahuterawa. The lower Kahuterawa Stream in the vicinity of and below Black Bridge is identified as having high diversity of native fish species and also being a trout spawning stream. The Horizons One Plan,

Schedule B identifies Banded kokopu, shortjaw kokopu, koaro and redfin bully as being present. More survey of fish species is required to determine which species are present within the Gordon Kear Property.

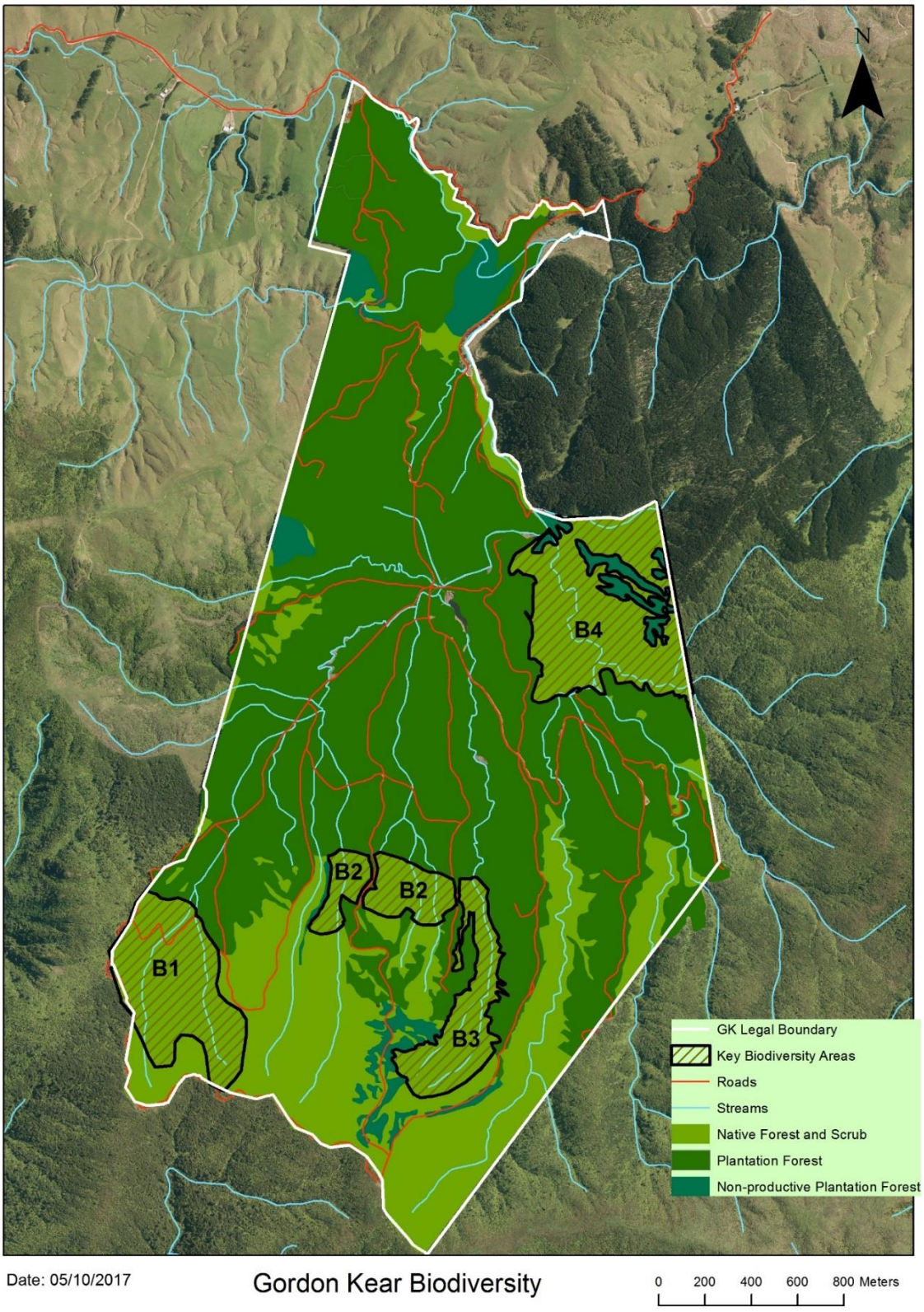

Figure 4: Native vegetation and key biodiversity areas

Bird species: Sites around the edge of the Gordon Kear Property have been surveyed annually using five minute bird counts and also rodent tracking tunnels to provide "non treatment" data for comparison with the intensive biodiversity management in Turitea Forest. A significant diversity of native bird species are present, though in considerably lower numbers than Turitea.

Figure 5: Kamahi dominated native forest with tawa and occasional miro and rimu

Biodiversity opportunities

The Gordon Kear Property has significant potential for biodiversity restoration. The area currently has only a very small amount of possum control undertaken by Horizons Regional Council and no targeted control of other predators.

Linkages between the Gordon Kear Property and other areas provide opportunities. The property is relatively close to other areas of PNCC controlled land where biodiversity management is occurring. It is around 2km from Arapuke Forest Park and the Sledge Track where some predator control is occurring. It is approximately 6km from the intensively managed Turitea Reserve water supply catchment. The Gordon Kear Property also adjoins Tararua Forest Park.

The government recently established a Predator Free 2050 initiative, with the ambitious goal of making New Zealand predator free. Predator Free 2050 will support landscape scale predator control. There is potential for Gordon Kear to become part of a large area of coordinated predator control across Gordon Kear, Arapuke, Turitea, the northern Tararua Forest Park and private land potentially through to Manawatu Gorge. This would expand the major biodiversity benefits already achieved in Turitea. Coordinated biodiversity management could make a major contribution to enhancing biodiversity across the whole city. Previous Council documents including the Turitea Reserve Management Plan and Kahuterawa Outdoor Recreation Plan have identified the potential for the twin catchments of the Turitea and Kahuterawa Stream to provide key biodiversity linkages from the ranges to the city.

As already identified, the Gordon Kear Property supports significant biodiversity. This includes a range of insect feeding bird species such as tomtit, grey warbler and fantail within the plantation forest stands as well as a wider range of species such as bellbird and tui in native forest remnants and gullies within the property. Intensive predator control is not currently undertaken in the forest, so these species are at

relatively low levels compared to those seen in the Turitea Reserve. With future predator control, significant increases in the populations of these bird species would be possible.

The Gordon Kear Property has potential to enhance waterway networks through adjusting forest planting boundaries and increasing areas of native vegetation around waterways in key areas. Careful examination of replanted areas could be undertaken and minor adjustment of boundaries made during silviculture where necessary to expand some riparian areas. Improvement of fish passage in waterways would also improve the value of the area for native fish species.

There is opportunity for the Gordon Kear Property to strongly demonstrate the way that biodiversity can be enhanced and integrated within a forest production system. Such as through the diversity of habitat provided by native and plantation forests, improved management of wateways and predator control. This provides an opportunity for PNCC to provide leadership in this area, encouraging others in the rural areas of the city to enhance biodiversity through their forests. The property also has potential to provide research opportunities for local university and other researchers to examine the integration of biodiversity management with production forest systems, and a range of studies of predator control and other biodiversity management.

Value

The area has moderate biodiversity value associated with the presence of significant forest remnants, the presence of important downstream fisheries values, and native species already present across the property.

Strategic – Future value

Gordon Kear also has moderate future biodiversity value due to its connections with other natural areas and potential to be part of a wider coordinated predator control / biodiversity restoration network across the city. Intensive predator control in the area would result in improved biodiversity values.

Likelihood

There is high likelihood that increases in biodiversity could be provided if investment was made.

Comment

The Gordon Kear Property has important biodiversity values on a city wide assessment. It has opportunity to contribute to wider enhancement of biodiversity and creation of a linked up biodiversity network through the whole city. It also has opportunity to demonstrate best practice in integrating biodiversity into production forest systems, for example showing the way native species utilise the diversity of habitat provided by a combination of native and plantation forest areas, and how predator control and waterway management can enhance biodiversity.

Figure 6: The Gordon Kear Property is a matrix of pine plantations and native forest remnants and provides opportunity to represent best practice in integrating biodiversity management into production forestry.

3.4.2 Soil and water protection

Terrain across the property varies. Much of the central area of the property is relatively easy terrain without erosion problems. Steep gully faces occur in some of the south western areas of the property and around major waterways in other areas. The long term native and plantation forest cover on these areas reduces soil erosion.

Any erosion occurring within the Gordon Kear Property will increase the sediment loadings within the Kahuterawa catchment, impacting on downstream environmental values. These impacts are particularly significant because of the native fish species and trout spawning values present in the catchment.

Forests (both native and plantation) reduce runoff and buffer flood flows from catchments. Maintaining forest cover on the property has some benefit in reducing flood peaks in the Kahutearawa Stream. However, because the forest is only a portion of the catchment this affect is only part of the picture of hydrology for the catchment.

Value

Plantation and native forest cover on the Gordon Kear Property has moderate value in contributing to wider soil and water protection within the Kahuterawa catchment.

Strategic – Future value

Value will continue to be important at the same or higher level. Increases in climatic extremes with predicted climate change could make soil and water protection values provided by these forests in the catchment more important.

Likelihood

There is a high likelihood that the plantation and native forests of the Gordon Kear Property will continue to provide this value

Comment

Soil and water protection is an ongoing value of forest cover on the property, though not a key reason for its ownership by PNCC.

3.4.3 Carbon

Both plantation and native forest on the Gordon Kear Property provides major carbon storage. Under the NZ Emissions Trading Scheme (ETS) it is classified as a pre 1990 forest and is consequently not eligible for issue of carbon credits. The exception to this is the issue of a free allocation of pre-1990 units as partial compensation for the impact of the ETS on pre 1990 plantation forest land. This allocation has already been claimed. There appear to be very few areas within the property that were not afforested at 1990. Consequently there is no significant opportunity for carbon credits under the ETS. However the ETS is a policy instrument for trading carbon and forest on the Gordon Kear Property is still a significant ongoing and increasing carbon store for the city. Growth and improvement in native forest areas as well as growth of the second rotation plantation forest is sequestering carbon.

It is possible that the future regulatory structure under the ETS may acknowledge other management approaches that PNCC could take to increase carbon storage in the forest. This could include changes in management of forest stands to increase standing carbon or pest animal control in native forest areas to increase growth and standing carbon.

The opportunity for recovery of biomass material from the forest at harvest has been considered in the past. This involves the use of low grade material such as branches and offcuts at harvest. Use of these for heat and electricity generation has zero net emissions of carbon dioxide and can replace some fossil fuel energy sources. However, there is usually minimal commercial return to the forest from this, so it is unlikely to be attractive unless the carbon markets or government policies change considerably. There would also be relatively small volumes of this biomass material available from Gordon Kear Forest. There may be some long term opportunity for research and demonstration of biomass systems.

Value

Provides significant carbon storage – though this is outside the tradable emissions of the NZ ETS.

Strategic – Future value

May have opportunity to increase carbon storage in the future through management. There is a small possibility that research and demonstration could be undertaken in relation to biomass production, though this is unlikely to be commercially viable.

Likelihood

High likelihood. Maintaining and enhancing forest cover on the site will continue to store carbon.

Comment

The forest has some value in demonstrating carbon storage. This is not a major component of its overall value.

3.5 Community Recreational Opportunity

PNCC has an active recreation strategy (2013). This is currently being reviewed and will be replaced by an Active Community Plan that sits under the Creative and Liveable Strategy. Active recreation encompasses both organised sporting activities as well as less structured outdoor activities such as walking, mountain biking, tramping etc. Key principles in relation to active recreation identified in the 2013 active recreation strategy include that it is

- Family friendly and appeals to a wide range of age groups
- Good value for money to the community
- Enables a wide range of activities in different settings
- Builds on local and regional partnerships
- Shows what Palmerston North has to offer
- Sustainable – taking into account community needs now and in the future

At the time it was written, the Active Recreation Strategy identified that one area where the city had a lower than national average rate of park provision was in the "natural park" category, based on parks owned by PNCC. Since the strategy was prepared this has been addressed to some degree by the development of additional tracks into the Hardings Park area in the southern end of Turitea Reserve.

The Gordon Kear Property has potential to provide a wide range of active outdoor recreation activities in a natural park setting. This includes activities ranging from walking to picnicking, tramping, horse riding and four wheel drive (4WD). The relatively large size of the Gordon Kear Property (678 ha) means there is potential to separate activities that might be in conflict (e.g. 4WD and walking) into different areas. The presence of an established forestry roading network and relatively easy terrain through much of the forest also increase recreational opportunity.

The Kahuterawa Outdoor Recreation Plan sets the current approach to recreational opportunity at the Gordon Kear Property. Under this strategy the property is identified as a "controlled access zone". The activities supported include:

- Public foot access on the Te Araroa Trail Route. This appears to be becoming more popular year by year. An estimated 600 people hiked this section of the Te Araroa trail in the 2016/17 season plus an unknown number of walkers and cyclists who may have travelled the Burtons Track to Shannon.
- Access on an organised event basis: e.g for horse riding, 4WD, orienteering etc. This has not been publicised and has been little utilised at this stage.

Other points identified in the Kahuterawa Outdoor Recreation Plan that relate to the Gordon Kear Property include:

- Potential development of a walking loop from Black Bridge to the Sledge Track and around a loop through the headwaters of Kahuterawa Stream to the Gordon Kear Property.
- Importance of ability to kayak the Kahuterawa Stream from Gordon Kear in flood conditions occurring 3-4 times per year.
- Possible establishment of a tramping route providing a connection between the Sledge Track and Arawaru to link to the southern boundary of the Gordon Kear Property and the Te Araroa Trail.
- Examine the feasibility and value of an overnight hut that could support the loop to the Gordon Kear Property / Te Araroa Trail. Gordon Kear Forest is one day's walk, 28km, from Palmerston North for southbound Te Araroa hikers, so stopping overnight at this point may suit these people.

The Kahuterawa Outdoor Recreation Plan is likely to be reviewed by the end of 2020.

Arapuke Forest Park has been developed by PNCC over recent years and provides excellent recreational opportunity, particularly for mountain biking. Gordon Kear is close by (2km away) so offers opportunity in the future to build on mountain biking activity and interest at Arapuke and also spread use if necessary.

Active recreational opportunities at Gordon Kear include:

- Longer mountain bike traverses – including links to Burtons Track in the south
- Longer tramps linking to Hardings Park
- 4WD access
- Camping: not currently included under the Kahuterawa Outdoor Recreational Plan (KORP), but there is some interest in providing ability for camping by those on the Te Araroa Trail.
- Possible overnight hut or lodge servicing the Te Araroa Trail and a loop from the Sledge Track.
- Horse riding – potentially in controlled access areas

These opportunities are present, but there is little information on the recreation needs of the people of Palmerston North. A recreational needs analysis was undertaken in 2016. This focuses particularly on sport and does not assess the demand for the range of informal active recreation opportunities that the Gordon Kear Property could provide. These activities are clearly important in Palmerston North, with the Manawatu Mountain Bike Club, for example, having several hundred members.

A significant issue with expansion of recreational use is the poor road access to the property. Scotts Road is unsealed, narrow and winding. This results in problems if larger numbers of vehicles are accessing the area and is not really suitable for horse floats or other trailers. The past approach to dealing with this has been to focus recreational access on Kahuterawa Road. This has aimed to avoid costs of road upgrade for greater recreational access and also help separate recreational vehicles and forestry traffic.

In summary, the Gordon Kear Property provides some outdoor recreation opportunities and linkages at present but these are largely undeveloped. It has potential to be developed in conjunction with some user groups to support occasional events. It is only 2km from Arapuke Forest Park, providing potential for longer mountain biking linkages.

There appears to be potential to expand future outdoor recreation use, particularly if there is any improvement in the Scotts Road access. More information is required on the demand for these types of outdoor recreation and particular user needs – before the recreational value of the Gordon Kear Property can be fully understood. PNCC are likely to undertake an active recreation needs assessment in the near future. The Gordon Kear Property could have significant recreational value in the longer term, depending on needs and any future development of the road access.

Figure 7: The relatively easy terrain of much of Gordon Kear Property, presence of plantation and native forest, and the presence of a good network of forestry roads all provide increased opportunity for recreation.

Value

The Gordon Kear Property has some existing recreational value but this is relatively low and undeveloped at present.

Strategic – Future value

There could be significant future recreational value across a range of outdoor recreational uses. This future value is difficult to examine in detail because of the lack of information on recreational user needs.

Likelihood

There is moderate likelihood that recreational use will increase and there is certainly ability to provide for recreational use. However a current constraint exists in that public road access via Scotts Road is not suitable for large numbers of vehicles.

Comment

The area has significant outdoor recreation potential but also has uncertainty around the level of need for delivery of this recreational opportunity and future standard of Scotts Road.

3.6 Cultural value

Cultural values associated with Gordon Kear Forest that may be of interest to Rangitaane o Manawatu have not been investigated at this stage. Past examinations in preparation of the Turitea Reserve Management Plan and the Kahuterawa Outdoor Recreation Plan record that the Tararua Range is identified by Rangitaane as their mountains. They acknowledge and link back to these mountains. The different trees and birds of the area were seasonal food sources for Rangitaane that they would move around following and collecting. Rangitaane have an important relationship with the area as kaitiaki. Habitation by Rangitaane is likely to have been temporary, associated with travel and food gathering

Further work needs to be undertaken to engage with Rangitaane o Manawatu to identify any important cultural values. This would be particularly important if the ownership of the Gordon Kear Property was likely to change.

3.7 Other uses or values

Any other land use that would require deforestation will incur the high cost of deforestation penalties as discussed in relation to pastoral farming (4.2.2), reducing its attractiveness.

The property does not have obvious potential for any more intensive agricultural or horticultural uses. Difficult terrain on some areas, relatively cool and wet climate and wind exposure reduce long term primary production opportunities beyond forestry and pastoral use.

There may be some commercial tourism opportunities associated with the Te Araroa Trail and potential for outdoor activities such as mountain biking, 4WD etc. There could be potential to establish lodge accommodation operated under concession. However, there do not appear to be activities at this location that are stand out in relation to those available in other parts of the district or region. While there may be some potential for this use it is uncertain how successful or significant it would be.

Consideration of energy and water supply potential does raise an additional possibility in the form of small scale hydro power generation. If at some future stage a water supply storage dam is established at the Gordon Kear property there may be potential to pass this water through a power generation turbine on its way to the city or to the Turitea Reservoirs.

4. DISCUSSION

4.1 Summary – A Matrix of community and environmental values

Based on the discussion of each of the community and environmental values in section 3, their current value, potential strategic importance and likelihood are given a broad rating in the table below. The table has been sorted based on the scores applied. Commercial value is discussed separately.

Value	Current Value	Strategic importance (future value)	Likelihood	Total	Comment
Biodiversity	3	3	3	9	Existing values present, linkages and good ability enhance biodiversity
Water supply	1	5	3	9	Very high potential strategic importance if needed
Recreation	2	3	3	8	Significant potential but uncertainty over needs
Soil and water protection	2	2	3	7	Ongoing moderate importance
Carbon	2	2	3	7	Ongoing moderate importance
Wind energy	1	2	1	4	Some potential but unlikely
Farming	1	1	1	3	Commercially unattractive and unlikely
Subdivision	1	1	1	3	Unlikely and in conflict with Council strategies

Notes
Scoring: 1: Little or none, 2: Some, 3: significant, 4: high, 5: very high
Cultural values have not been assessed at this stage

The matrix above provides a simple generalised way of looking at the different community and environmental values. It is not a comprehensive assessment and it is difficult to compare in detail the size and relative importance of these values without significant additional work. The table above suggests the following broad points:

- Biodiversity, water supply and recreation values associated with the Gordon Kear Property may have significant strategic value.
- Water supply is a potential future value that could have very high importance to the city.
- There are a combination of social and environmental values provided by the property at present that have significant likelihood of being important in the future - including biodiversity, water supply, recreation, soil and water protection and carbon.

The combination of community and environmental values from the property is an important consideration in decisions on its long term ownership.

Commercial Value

Examination of commercial value suggests that plantation forestry at Gordon Kear will provide a return of around 6% over the current rotation. This is broadly in line with other forestry investments of this type in New Zealand.

Forestry is often used to form part of a mixed long-term investment portfolio as it can be "counter cyclic" to returns from shares or other investments. There is flexibility in the timing of when a forest is harvested once it approaches maturity (from around 26 years onwards), so harvest can be accelerated when log prices are good and delayed when they are poor.

Summary – combined value

The Gordon Kear Property has a combination of several current and potentially strategically important social and environmental values. This is combined with the potential to earn a return from the forestry investment. In combination this provides important current and potential value to Council.

4.2 Ownership structures

PNCC currently have freehold ownership of the land and forest at Gordon Kear. Ownership is in two titles:

- CT 242473 (665.9878 hectares) comprising the main area of the property
- CT WN225/68 (12.1406 hectares) comprising the house on Scotts Road on the south western corner of the property and an associated small land holding.

A number of ownership scenarios, including the current freehold ownership, and their advantages and disadvantages are outlined in the table below.

Ownership type	Description	Advantages	Disadvantages
Full private ownership (current)	Land and plantation forest owned by PNCC	• PNCC has full flexibility of use and access now and in the future • Ability to strategically develop values such as recreation in the future • Full forest return received by PNCC	• Costs of forest silviculture and management continue
Sale of forestry right	Land ownership retained but the plantation forest crop sold	• Income received from forest sale • PNCC no longer responsible for forest management costs • Some potential may be retained to develop values such as recreation.	• Small income as young forests are of low value • Loss of flexibility access and use in having to comply with forest owner requirements
Access rights only	Land and plantation forest sold, some recreational access rights retained	• Income received from forest and land sale • No longer responsible for ongoing costs • Still have some access e.g. Te Araroa Trail.	• No future opportunity to develop values such as water supply and recreation. • Small income from young forest • Loss of future return from established second rotation forest
Sale of property, including plantation forest. No ownership or rights	Full sale, no rights retained.	• Income received from forest and land sale • No longer responsible for ongoing costs	• No future opportunity to develop infrastructure / assets such as water supply and recreation. • Small income from young forest • Loss of future return from established second rotation forest

It is important to note that options involving land sale may not necessarily be attractive to purchasers. As discussed under previous sections of this report, there is very little opportunity for development of this land through subdivision and there are no obvious attractive options for land use change.

4.3 Ownership and the City Vision

In discussing long term ownership of the Gordon Kear Property, the relevance of the property to achievement of the proposed new city vision - *Palmerston North: Small city benefits, big city ambition,* needs to be considered. The property has particular relevance to the goal of an *eco city* but also potentially to achieving an *innovative and growing city* and *a creative and exciting city*. Relevance of the property to each of these goals is briefly discussed below.

An innovative and growing city

This goal includes transforming the economy to a low carbon economy and enhancing an innovation ecosystem. The Gordon Kear Property has useful relationships to this including:

- Ability for research and development around forest carbon and biomass technologies
- Potential additional renewable energy opportunities around wind, small scale hydro power and biomass generation.
- Innovation, research and development working with Massey University and others on enhancing biodiversity within production forest systems.

A creative and exciting city

This includes making the city an exciting place where talented people choose to live. A city that has great recreational options and experiences – without hassle and cost. The Gordon Kear Property has potential to contribute to an exciting network of easily accessed outdoor recreation experiences. Allowing people to refresh, stay healthy and have a wide range of experiences and places that are part of why they choose to live here.

An eco city

This encompasses a reduced ecological footprint and protecting, maintaining and enhancing the natural environment. The natural environment and interconnectedness of our natural assets is valued. The proposed approach to this goal also identifies that Council will take a lead in "demonstrating good practice while harnessing our natural assets, including providing a plentiful and safe water supply".

The Gordon Kear Property and its plantation and native forests form a significant natural asset owned by PNCC and can have value in achieving this goal, including through:

- Providing leadership in the integrated management of a forest asset to provide high quality biodiversity and recreation outcomes as well as commercial returns for the city.
- Maintaining and enhancing biodiversity values across native forest and other areas of the Gordon Kear Property.
- Assisting in maintaining water quality in the Kahuterawa Catchment and potentially contributing to future water supply.
- Fostering interconnectedness of natural areas through the headwaters of the Kahuterawa and Turitea catchments to provide the biodiversity and natural area framework to the city.

5. RECOMMENDATIONS

Sale of the property would yield income from the sale price. However, it is expected that the young age of the plantation forests would mean that the value would be discounted by a potential purchaser. The lack of options for use of the land may mean that land sale value is not particularly high. Sale would also remove the ability to strategically develop other social and environmental values of the property in the future – including recreational use, biodiversity restoration and possible water supply opportunities.

Council could consider selling the portion of the property that includes the house on Scotts Road and 12 hectares. However, it would need to consider possible implications of more complicated neighbour relationships and opposition to future developments (e.g. recreation, wind turbines etc) as well as any current security value of having a tenant on site.

Given the value of the Gordon Kear Property in contributing to a number of strategic objectives of Council, and that retaining the property provides a commercial return, it is recommended that Council retains ownership of the property. The following key recommendations are made:

- Maintain Council ownership of the Gordon Kear Property
- Consider ways to enhance the community environmental values of the property including biodiversity, recreation and water supply in order to maximise value to the city
- Continue to carefully manage the commercial forest estate to maximise overall return at low risk.
- Maintain a watching brief on opportunity and benefits from sale of the house and small holding.

Forestry Cash Flow: Assumptions

Silviculture

Silviculture costs are based on applying two different regimes across two broad areas of the plantation forest:

- Clearwood / pruning regime: Three pruning lifts to approximately 6.5m applied to areas of better growth with more shelter from prevailing winds. A single thinning operation to remove trees not selected for the final crop.
- Framing regime: Single thinning operation to provide structural timber applied to less productive areas.

Yields

For clearwood areas, average yields achieved from the first rotation across all of Gordon Kear have been used as a basis and then increased by approximately 15%. This increase is justified by the fact that only better quality areas are being managed for clearwood in the second rotation and there will be an improvement in genetics and in management in the second rotation.

Log Grade	Clearwood Regime Yield (m3/ha)
P1/P2	125
A, S1/S2	150
K, L1/L2	150
Pulp	75
Total	500

For framing regime areas, average yields from framing stands across Arapuke forest were used as a basis. It is assumed that any reduction in yield from slightly higher altitude at Gordon Kear Forest will be offset by improved genetics and management.

Log Grade	Framing Regime Yield (m3/ha)
P1/P2	0
A, S1/S2	275
K, L1/L2	165
Pulp	110
Total	550

Harvest costs

Harvest costs are based on first rotation harvest costs. Roading costs are assumed to be at a lower level than the first rotation as roads are now in place. A cost is necessary for some repairs and upgrade of existing roads and re-forming skids. Major new engineering costs are assumed to not be required. Harvest costs used are set out below.

Item	Cost $/m3
Temporary roads and skids	$2.00
Log and load	$28.00
Log transport	$28.00
Harvest management	$3.50

Log prices

Based on average of prices over last 12 quarters as used in annual forest valuation

Grade	$/m3
P1/P2	$165.00
A/S1/S2	$100.00
K/L1/2	$90.00
Pulp	$55.00

The following list was produced on a site visit on 25 May 2017

Native plant species

Common Name	Scientific Name
Rimu	*Dacrydium cupressinum*
Pate	*Schefflera digitata*
Putaputaweta	*Carpodedus serratus*
Karamu	*Coprosma robusta*
Mingimingi	*Coprosma proinqua*
Wheki	*Dicksonia squarrosa*
Koromiko	*Veronica stricta var stricta*
Whauwhaupaku, Five finger	*Pseudopanax arboreus*
Horoeka, Lancewood	*Pseudopanax crassifolius*
Makomako, Wineberry	*Aristotelia serrata*
Astelia	*Astelia species*
Kotukutuku	*Fuchsia excorticata*
Kiokio	*Parablechnum novae-zelandiae*
Rarauhe, bracken	*Pteridium esculentum*
Rewarewa	*Knigtia excelsa*
Toetoe	*Austroderia toetoe*
Hinau	*Elaeocarpus dentatus*
Hangehange	*Geniostoma ligustrifolium*
Kanono	*Coprosma grandifolia*
Manuka	*Leptospermum scoparium*
Tutu	*Coriaria arborea*
Tawa	*Beilschmiedia tawa*
Miro	*Prumonpitys ferruginea*
Kamahi	*Weinmannia racemosa*
	Coprosma rhamnoides
Kapuka	*Griselinia littoralis*
	Polystichum species
Lowland horopito	*Psedowintera axillaris*
White rata	*Metrosideros diffusa*
	Cyathea smithiii
Mountain horopito	*Psedowintera colorata*
Kareao, supplejack	*Ripogonum scandens*
	Blechnum species
Kowaowao, hounds tongue	*Microsorum pustulatum subsp. pustulatum*
	Coprosma tenuifolium ten
Mingimingi	*Leucopogon fasciculatus*
Bush snowberry	*Gaulteria antipoda*
Mata, waterfern	*Histiopteris incisa*
Pukatea	*Laurelia novae-zealandiae*
	Gahnia species
Heketara	*Oleria rani*
	Carex species
Kamu, bastard grass, hook grass	*Carex uncinata*

Common Name	Scientific Name
Red bidibidi	*Acaena novae-zelandiae*
Porokaiwhiri, pigeonwood	*Hedycarya arborea*
Drooping spleenwort	*Asplenium flaccidum*
Ponga, silver fern	*Cyathea dealbata*
Kaiwharawhara, Perching lilly	*Atelia solandri*
Kiekie	*Freycinetia banksii*
	Lycopodium species
Rata, akatawhiwhi, orange flowering rata	*Metrosideros fulgens*
Toro	*Myrsine salicina*

Exotic plant species

Common Name	Scientific Name
Gorse	*Ulex europaeus*
Fox glove	*Digitalis purpurea*
Monterey pine	*Pinus radiata*
Broom	*Sarothamnus scoparius*
Tasmanian blackwood	*Acacia melanoxylon*
Exotic grasses	

Birds

The following list is obtained from a site visit on 25 May 2017 and from five minute bird counts conducted annually on the edge of Gordon Kear Forest between 2003 and 2016.

Native birds observed:

Bellbird
Fantail, Piwakawaka
Greywarbler, Riroriro
Kereru
Kingfisher, Kotare
Longtailed cuckoo, Koekoea
NZ Falcon, Karearea
Paradise shelduck, Putangitangi
Rifleman, Titipounamu
Shining Cuckoo, Pipiwharauroa
Silvereye, Tauhou
Swamp harrier (harrier hawk), Kahu
Tomtit, Miromiro
Tui
Whitehead, Popokatea

Exotic birds observed:

Chaffinch
Dunnock
Goldfinch
Greenfinch
Magpie
Pheasant
Redpoll
Rosella
Skylark
Songthrush
Welcome swallow
Yellowhammer