

Project Kea: Energy from Waste Plant

Planning Report



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EXECUTIVE SUMMARY

Under section 88 of the Resource Management Act 1991 (“**RMA**”), the applicant, South Island Resource Recovery Limited (“**SIRRL**”), is applying for resource consents from Waimate District Council and Environment Canterbury (Canterbury Regional Council) to authorise the construction and operation of an Energy from Waste (“**EfW**”) Plant in the Waimate District of the Canterbury Region. The proposed development is known as “Project Kea”.

In the *Waste to Energy Guide for New Zealand Factsheet*, dated August 2020, Ministry for the Environment states that Energy from Waste technologies refer to:

“a family of technologies that process some kind of waste material to generate energy. Different technologies use a range of waste materials as ‘feedstock’ for the processing plant, and each plant might produce energy in the form of heat, electricity or a fuel”.

Under the Canterbury Air Regional Plan and Canterbury Land and Water Regional Plan, the application is to be considered as a **Discretionary Activity** overall.

Under the Waimate District Plan, the application is to be considered a **Discretionary Activity** overall.

SIRRL requests that the resource consent applications be publicly notified to enable the community to be informed of the project and participate in the consenting process.

SIRRL is a New Zealand registered company. Its shareholders collectively have extensive experience in waste collection, waste logistics, design, delivery and operation of EfW Plants overseas.

Information received from Ministry for the Environment (“**MfE**”) confirms that that in 2021:

- 3,537,798 tonnes of waste were sent to Class 1 landfills in the North Island.
- 804,686 tonnes of waste were sent to Class 1 landfills in the South Island.
- A total of 4,342,484 tonnes of waste was sent to class 1 landfills in New Zealand.

MfE acknowledges that New Zealand has a problem with the amount of waste being generated and being sent to landfills.

SIRRL’s objective is to provide New Zealand a more environmentally sustainable alternative to the current reliance on Class 1 and Class 2 landfills for the disposal of non-recyclable MSW (including Construction

and Demolition waste (“**C&D waste**”). There is an on-going need to manage waste at the very bottom of the waste hierarchy.

SIRRL strongly supports the New Zealand Government’s waste management strategy to move New Zealand towards a circular economy concept of waste management; and move New Zealand’s waste management strategies steadily up the waste hierarchy, and to minimise the amount of material that ends up at the very bottom of the waste hierarchy.

SIRRL notes that international experiences have demonstrated that EfW Plants are an integral element of a holistic national waste management solution. Internationally, EfW Plants are accepted as playing an important role in the waste hierarchy concept, the focus being on recovering value from materials that cannot be reused or recycled and are a genuine residual waste.

Together, the shareholders of SIRRL have the necessary expertise and financial capability to construct and operate an EfW Plant in New Zealand.

There are more than 2,500 EfW Plants operating worldwide. Project Kea will use the best available technology for energy recovery, treatment of air emissions, recycling of water, and recovery of by-product streams for reuse in industry. The technology to be used in Project Kea has been developed and refined internationally over more than three decades.

SIRRL is committed to constructing Project Kea at a cost of approximately \$350 million NZD. The construction of Project Kea is estimated to add \$94 million to the gross domestic product of Waimate, Waitaki and Timaru annually over the 2-year construction period, and \$77 million annually once operational.

To support the resource consent application, and in accordance with the requirements of Schedule 4 and the relevant sections of the RMA, this Planning Report assess the effects of the proposed activities on the environment.

This Planning Report concludes that overall, the actual and potential effects of Project Kea on the environment will be “minor”, and will not be contrary to the objectives and policies of the relevant statutory documents. Furthermore, Project Kea will be part of a holistic waste management solution and aligns with the circular economy concept by assisting to minimise the amount of residual waste that is disposed of to landfill at the bottom of the waste hierarchy.

Project Kea will enable the development and operation of an environmentally sound and sustainable EfW Plant for the energy recovery and disposal of non-recyclable MSW.

This Planning Report is informed by the technical reports outlined in **Table 1** below.

Table 1. List of technical reports

No.	Name
Technical Report 1	Operational and Technical Overview Report, prepared by Babbage Consultants Ltd (“ Babbage ”)
Technical Report 2	Preliminary Site Investigation Report, prepared by Babbage
Technical Report 3	Hazardous Substances Report, prepared by Babbage
Technical Report 4	Landscape Assessment Report, prepared by Brown NZ Ltd
Technical Report 5	Air Quality Emissions Assessment, prepared by Pattle Delamore Partners Limited (“ PDP ”)
Technical Report 6	Human Health Risk Assessment, prepared by Environmental Risk Sciences Pty Ltd (“ enRiskS ”)
Technical Report 7	Acoustic Assessment Report, prepared by SLR Consulting NZ Limited
Technical Report 8	Transportation Assessment Report, prepared by Commute Transportation Consultants (“ Commute ”)
Technical Report 9	Life Cycle Analysis Report, prepared by SLR Consulting Australia Pty Ltd
Technical Report 10	Economic Impact of Project Kea, prepared by Infometrics
Technical Report 11	Flood Assessment Report, prepared by Babbage
Technical Report 12	Stormwater Report, prepared by Babbage
Technical Report 13	Earthworks Report, prepared by Babbage
Technical Report 14	Domestic Wastewater Discharge to Land, prepared by Babbage
Technical Report 15	Electrical Safe Distance, prepared by Babbage

Technical Report 16	Waste Acceptance Criteria, prepared by Renew Energy Ltd (“REL”)
Technical Report 17	Surface and Groundwater Assessment, by Babbage
Technical Report 18	Consultation Summary Report, prepared by Babbage
Technical Report 19	Land Use Capability Assessment, prepared by Babbage

STATEMENT FROM SIRRL

New Zealand needs “Energy from Waste” to be part of the national waste management solution

SIRRL is proposing Project KEA for the simple reason that we care about the health of the environment, the health of people and the legacy that we leave for future generations.

It is a simple fact that modern human civilisation gives rise to the creation of vast amounts of waste. Waste, both its creation and disposal, is one of the global problems that New Zealand and humanity faces.

New Zealand, like many other parts of the world, considers waste and the management of it, in terms of the “Waste Hierarchy”.

The Waste Hierarchy (illustrated below) prioritises the ways that waste is dealt with from a perspective of minimising the impacts on the environment and the planet.

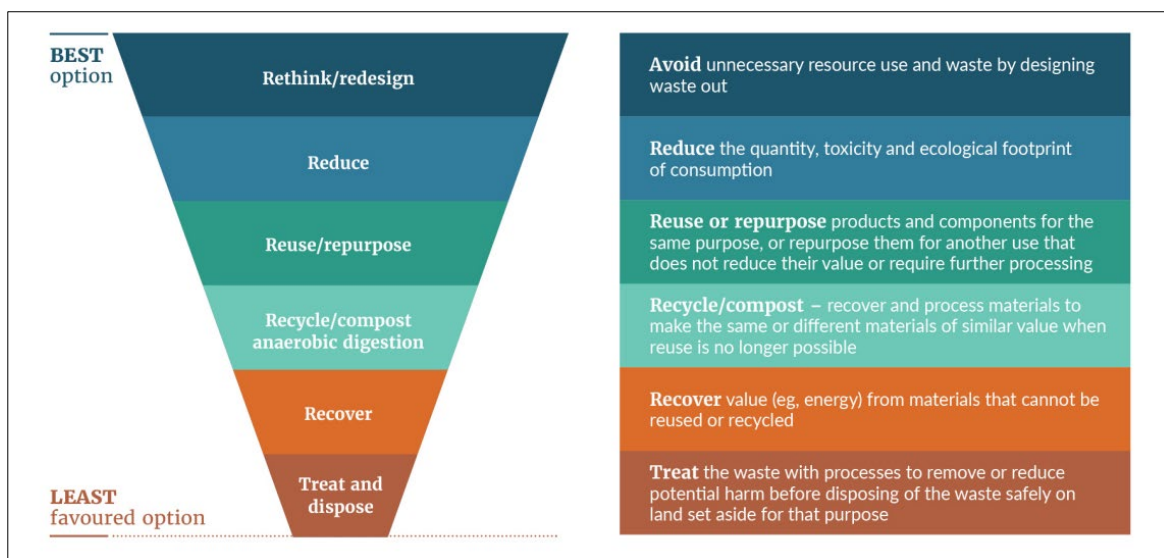


Figure 1: The Waste hierarchy

From an overall world perspective, the objective is to manage waste at the highest level possible. The aspirational goal is a ‘circular economy’, whereby all waste is managed within levels 1, 2 and 3, and there is no residual waste that requires disposal.

However, although all New Zealanders, and the world, share in the aspirational goal of a 100% circular economy and thus 0% residual waste, the reality of the situation is somewhat different.

Countries such as Germany, Austria and the Netherlands show us that despite all efforts, an amount of residual waste that cannot be reused or recycled still exists, and this residual waste must be managed in an environmentally beneficial way to achieve its disposal.

Acknowledging that an amount of residual waste will continue to exist in the foreseeable future, EfW processes are located at the top of the “residual waste hierarchy” with clear and proven benefits over landfills which exist at the bottom of any waste strategy (whether it be a waste hierarchy or residual waste hierarchy).

It is sometimes challenged that EfW dis-incentivises waste minimisation measures because it can become “the easy option”. SIRRL’s view is that EfW is one critical component of an overall holistic waste management strategy. When integrated with other initiatives that firstly promote elimination, re-use and recycling, EfW creates the best possible overall waste management solution.

Such integrated solutions are best demonstrated by countries such as those in the table below. These countries incorporate EfW to dispose of residual waste whilst also achieving comparatively very high rates of reuse and recycling.

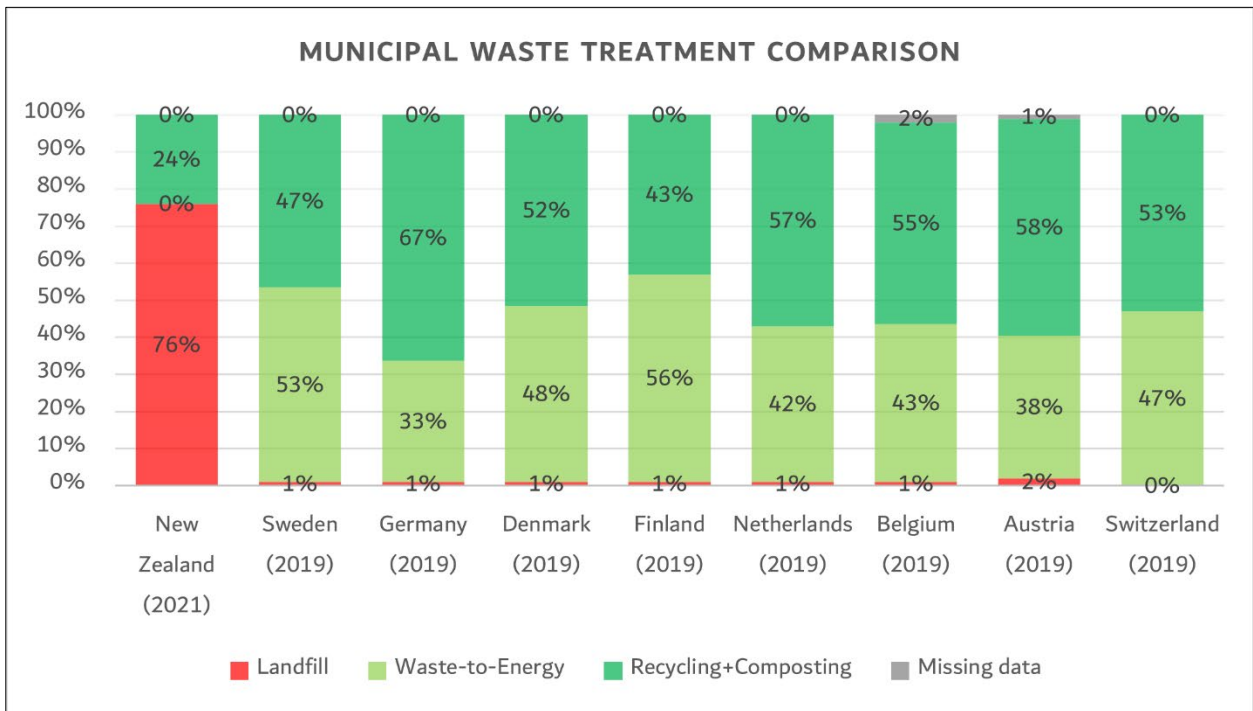


Figure 2: Municipal waste treatment comparison

(Source: Ministry for Environment of NZ and Confederation of European Waste-to-Energy Plants)

SIRRL believes that New Zealand’s continued focus on landfills is outdated, environmentally negative, not aligned with international best practice, nor supportive of New Zealand’s objectives to reduce greenhouse gas emissions and maintain an international clean green image.

Assessing Global Warming Potential (“GWP”) for various industries or alternatives for waste management is important to correctly understand which options best support NZ initiatives towards reducing global warming. New Zealand is comparatively well behind the rest of the developed countries in respect to such

an analysis. One of the reasons for this being that with respect to residual waste, alternatives of significant scale to landfill haven't been previously proposed in NZ.

However, with SIRRL now proposing an EfW facility, as an alternative to landfills, a GWP analysis is of relevance and useful. SIRRL has undertaken and provided the results of a Life Cycle Assessment in accordance with ISO standards and modelling which is used in the United Kingdom to assist authorities to evaluate and compare various waste solution alternatives.

SIRRL has used experts from the United Kingdom, as they are unaware of this expertise existing in NZ. It is further noted that the New Zealand Government has not provided guidance to councils as to how they may assess GWP when processing resource consent applications (relevant RMA provisions coming into force on 30 November 2022).

The Life Cycle Assessment results are set out in Technical Report 9. The Project Kea facility is modelled using several scenarios, including differing transport options (i.e. road and road/rail) and the potential recycling of by-product streams (e.g ash). The Life Cycle Assessment shows conclusively that Project Kea will have a lower GWP than an equivalent modern landfill designed and constructed to today's best engineering and operational practice.

A further note worth recognising is that landfills are the 2nd biggest emitter of methane in NZ after agriculture due to fugitive methane being released and not captured by the landfill gas capture systems. Landfills account for 9% of NZ's biogenic methane emissions [/https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/transforming-recycling/1](https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/transforming-recycling/1).

This may not sound significant, however noting that methane is estimated to have a GWP of some 80x CO₂ over a 20yr period and 25x over a 100yr period, the importance of curbing methane emissions becomes apparent.

It is commonly accepted in New Zealand that a modern landfill assumes a landfill gas capture efficiency of 95% [*refer Dome Valley resource consent application*]. However, this level of capture is deemed 'fanciful' in many other countries, including the United Kingdom, where the modelling used to determine GWP is generally taken to be around 70% and does not allow for a landfill gas capture efficiency of greater than 90% on the basis that this is not deemed possible or realistic.

For the purposes of comparing Project KEA against a landfill scenario, we have used 90% landfill gas capture. Even at this 'unrealistically high level', the comparison still overwhelmingly shows that Project Kea has a significantly lower GWP than an equivalent sized landfill.

EfW facilities using incineration are no different to other industries in that the technology involved is improved and the operational practices enhanced over time. Since the first large scale MSW incinerators began operating over 50 years ago, the technology, control and monitoring of these plants has increased dramatically. Much of this technology improvement has been focused on the reduction and control of

emissions to maintain air quality standards and protect against human health risks. The technology used today results in air emissions being controlled to such low levels that EfW incineration plants are operating successfully in metropolitan areas. These plants safely exist within or near populated areas, providing a critical component to a modern holistic waste management strategy.

SIRRL recognises that Project KEA is the first of its kind proposed in NZ and there will be initial concerns around accepting this technology. There may also be concerns as to whether New Zealand's relevant national standards adequately cover EfW facilities. To help address these concerns, SIRRL has included not only a technical report on air quality matters (which is a common in NZ), but also a specific human health risk assessment [*refer Technical Report No 6*]. Again (like the Life Cycle Assessment), a specific human health assessment is not commonly completed in New Zealand. It is common in New Zealand to illustrate compliance with National Environmental Standards and assume that compliance also implies adequate protection against human health risk. However, such human health assessments are commonly completed for similar projects overseas. SIRRL has utilised experts from Australia, who have specific expertise in undertaking human health assessments of EfW incineration plants.

There is one aspect to Project KEA that will even outstrip what is considered best practice throughout Europe, and that is the treatment of fly ash through vitrification. Currently New Zealand sends the vast majority (if not all) fly ash from its coal fired boilers to landfills or backfill for coal mines where the fly ash is quickly covered to ensure it does not blow away. This buried fly ash is then subject to water ingress and subsequent leaching and/or being exposed at some future date through erosion or development of the land. SIRRL do not accept that burying untreated fly-ash is an environmentally acceptable solution.

Accordingly, Project KEA will treat the raw fly-ash using a vitrification process to turn what is otherwise a very hazardous and difficult to handle material into a safe and recyclable product. This technology exists and is currently operating at the CNTY plant in Hi'An and is world leading. The process of vitrification does use significant energy which reduces the amount of electricity available for export from the plant, SIRRL believes that vitrification of fly ash is a very important aspect of Project KEA and is a core element of creating a world leading EfW facility.

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List of Technical Reports

Technical Report	Name
Technical Report 1	Operational and Technical Overview Report
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Technical Report 9	Life Cycle Analysis Report
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Technical Report 15	Electrical Safe Distance
Technical Report 16	Waste Acceptance Criteria
Technical Report 17	Surface and Groundwater Assessment
Technical Report 18	Consultation Summary Report
Technical Report 19	Land Use Capability Assessment

Glossary

Acronym	Definition
BGL	Below ground level
C&D Waste	Construction and Demolition Waste
CARP	Canterbury Air Regional Plan
CEMP	Construction Earthworks Management Plan
CHRA	Climate Change Response Act 2002
CLWRP	Canterbury Land and Water Regional Plan
CRPS	Canterbury Regional Policy Statement
ECAN	Environment Canterbury (Canterbury Regional Council)
EfW	Energy from Waste
HAIL	Hazardous Activities and Industries List
HHRA	Human Health Risk Assessment Report
HSNO	Hazardous Substances and New Organisms Act 1996
LCSIA	Level Crossing Safety Impact Assessment
MfE	Ministry for the Environment
MGI	Morven Glenavy Ikawai Irrigation Company
MSW	Municipal Solid Waste
NES- ETA	National Environmental Standards for Electricity Transmission Activities
NES-AQ	National Environmental Standards for Air Quality
NES-CS	National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health
NES-DW	National Environmental Standards for Sources of Human Drinking Water
NES-F	National Environmental Standards for Freshwater
NPS-ET	National Policy Statement on Electricity Transmission
NPS-FM	National Policy Statement for Freshwater Management
NPS-REG	National Policy Statement for Renewable Electricity Generation 2011



PSI	Preliminary Site Investigation
SIMT	South Island Main Trunk railway line
SIRRL	South Island Resource Recovery Limited (the applicant)
SNA	Signiant Natural Area
VPD	Vehicles per day
WDC	Waimate District Council
WMA	Waste Minimisation Act 2008

1 INTRODUCTION

1.1 Application and site details

The details of the application and the site are outlined in **Table 2** below.

Table 2. Details of the application and the site.

Applicant:	South Island Resource Recovery Limited (“ SIRRL ”)
Owner and occupier of the application site:	Murphy Farms Limited
Applicant’s Agent:	Babbage Consultants Limited PO Box 2027, Shortland Street, Auckland, 1140 Attention: Sukhi Singh Email: sukhi.singh@babbage.co.nz
Site location:	Rural lot situated at the intersection of Morven Glenavy Road and Carrolls Road in Glenavy, Waimate District, Canterbury Region
Site area:	14.85 ha
Legal description:	Rural Section 22268 (RS 22268)
Record of Title:	Reference C27B/314 (Appendix B)
Regional authority:	Environment Canterbury (Canterbury Regional Council) (“ ECAN ”)
Territorial authority	Waimate District Council (“ WDC ”)
Regional Plans:	Canterbury Land and Water Regional Plan (“ CLWRP ”) Canterbury Air Regional Plan (“ CARP ”)
District Plan:	Waimate District Plan (“ WDP ”)
Zone:	Rural Zone

1.2 General overview of an Energy from Waste Plant Process

A general overview of an Energy from Waste (“Efw”) process is illustrated in **Figure 3** below.

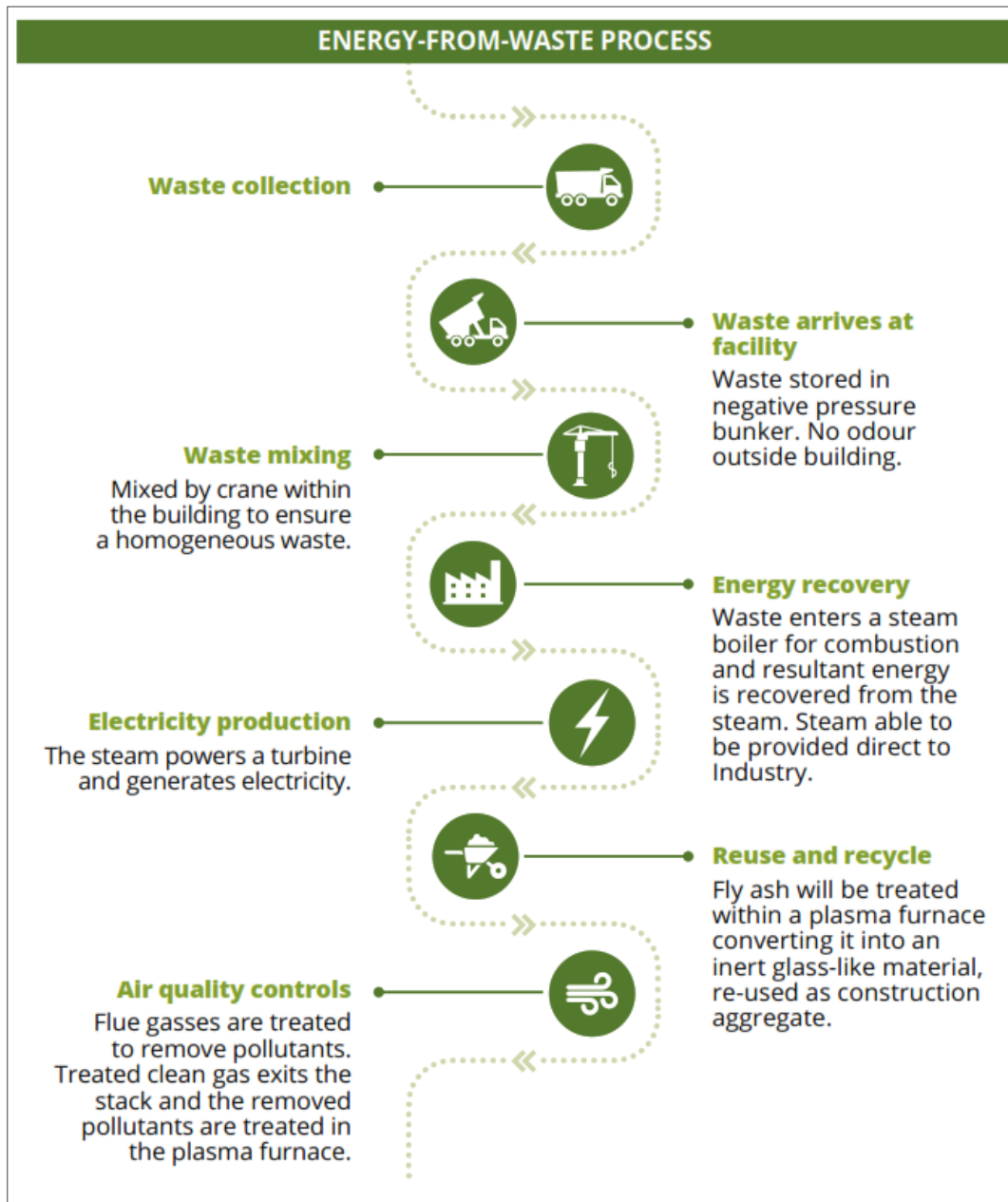


Figure 3: Overview of an Efw Process

Aligned with the above process, in brief, Project Kea will:

- Will use 365,000 tonnes per year of solid municipal and construction waste, which would otherwise be sent to landfill, and incinerate it in order to recover the inherent energy contained in the waste.

- The energy recovered is then turned into 30MW of electricity and fed into the local electricity network for use by electricity consumers.
- Air emissions from combustion are treated through a seven step process to ensure emissions discharged to air meet the required national environmental standards for air quality.
- Grate ash residue from combustion is captured and either disposed of to landfill or used as an aggregate in the construction industry.
- Fly ash residue from combustion is treated via a vitrification process and then either disposed of to a landfill or used as an aggregate in the construction industry.

1.3 Summary of the proposal

The key elements of Project Kea that are subject to this resource consent application are:

- The Project Kea facilities consist of: the main powerhouse building (52.5m tall); an exhaust stack (75m tall); administrative building; ancillary buildings (wastewater treatment plant, water pump building, workshop building, temporary storage of baled C&D waste, hazardous materials storage); a rail siding; and ancillary access, parking and manoeuvring areas.
- Two vehicle accesses into the Project Kea site are proposed from Morven Glenavy Road:
 - A 20m wide vehicle crossing for heavy vehicles (trucks) on the southern boundary (close to Carrolls Road) to access the approach bridge to the waste bunker in the main powerhouse building; and
 - A 11m wide vehicle crossing for light vehicles on the eastern boundary from Morven Glenavy Road to access the 70 car parking spaces for staff and visitors to the site.
- A rail siding is proposed along the western boundary, beside the South Island Main Trunk railway line (“SIMT”).
- Waste will initially be delivered by road only. Once commercial arrangements with KiwiRail are concluded then waste will ultimately be delivered by both road and rail.
- Morven Glenavy Rd; Carrolls Rd; the intersection of Carrolls Rd/SH1; and the railway level crossing (near Carrolls Road) will be upgraded to accommodate the safe operation of the roading network in the proximity of the Project Kea site.

- The Project Kea facility will operate for 24 hours per day and 365 days per year. It will have shifts of 14 operational staff working 7 days per week (Monday to Sunday) and 32 management, administrative and support staff working 5 days per week (Monday to Friday).
- The EfW Plant will consume 1,000 tonnes per day and 365,000 tonnes per year of waste feedstock, consisting of MSW and C&D waste which would otherwise be destined for landfill. The waste feedstock is to be sourced primarily from the Canterbury and Otago regions.
- The waste feedstock must meet the specified waste acceptance criteria in order to be used in the EfW Plant. The Project Kea facility is not a hazardous waste disposal facility.
- The EfW Plant will use proven Best Available Techniques for energy recovery, treatment of air emissions, recycling of water, and recovery of by-product streams for reuse in industry.
- The EfW Plant will generate 30MW of electricity under Output Mode 1 or 20MW of electricity plus 40 tonnes per hour of steam under Output Mode 2. The generated electricity will be connected to the local supply network.
- The EfW Plant will produce the following main by-product streams which are of value:
 - 80,000 tonnes of grate ash per year for use as an aggregate material.
 - 20,000 tonnes of industrial slag per year for use as an aggregate material.
 - Recover 7,000 tonnes of metal per year for recycling.
- The combustion emissions will undergo extensive treatment and cleaning before being discharged to air via the stack.
- Domestic wastewater from the administrative building, treated separately, will be discharged on-site to land via drip field irrigation.
- The EfW Plant does not produce a process wastewater stream, as process wastewater is recycled within the Plant.
- The EfW Plant will use approximately 2,500 m³ of water per day. A separate resource consent application for ground water take and use is currently being prepared and will be lodged with Environment Canterbury (“**ECAN**”) shortly.

- All aspects of the plant's operations and environmental performance will be actively monitored. Realtime information will be available online to both regulatory authorities and the public.

1.4 South Island Resource Recovery Ltd - Company overview

SIRRL is a New Zealand registered company that was formed in March 2021. SIRRL's shareholders are:

- Renew Energy Ltd ("**REL**") (40% shareholding). REL is a New Zealand registered company with experience in waste collection and waste logistics.
- China TianYing Incorporated ("**CNTY**") (41% shareholding). CNTY is a Chinese registered company with significant experience in energy recovery and waste handling. Since 2009, CNTY has designed and delivered 14 EfW Plants throughout Asia and have a further 8 currently under construction.
- Europe ZhongYing BV ("**EUZY**") (19% shareholding). EUZY is a Belgium registered company with experience in designing and delivering EfW Plants throughout Europe.

Information received from MfE confirms that that in 2021:

- A total of 3,537,798 tonnes of waste was sent to Class 1 landfills in the North Island.
- A total of 804,686 tonnes of waste was sent to Class 1 landfills in the South Island.
- A total of 4,342,484 tonnes of waste was sent to Class 1 landfills in New Zealand.

MfE acknowledges that New Zealand has a problem with the amount of waste being generated and being sent to landfills. There is an on-going need to manage waste at the very bottom of the waste hierarchy. SIRRL's objective is to provide New Zealand a more environmentally sustainable alternative to the current reliance on landfills for the disposal of non-recyclable MSW.

SIRRL notes that:

- It strongly supports the New Zealand Government's waste management strategy to move New Zealand towards a circular economy concept of waste management; and move New Zealand's waste management strategies up the waste hierarchy, and to minimise the amount of material that ends up at the very bottom of the waste hierarchy.
- International experiences have demonstrated that EfW Plants are an integral element of a holistic national waste management solution.

- Internationally, EfW Plants are accepted as playing an important role in the waste hierarchy concept, the focus being on recovering value from materials that cannot be reused or recycled.
- EfW Plants are higher on the waste hierarchy than disposal to landfill.
- Project Kea will provide energy in the form of heat and/or electricity to support growth of local industries and provide the opportunity to offset local coal consumption
- In future Project Kea could also support opportunities around horticultural activities through providing low grade heat and CO₂ to enhance growing operations.

Together, the shareholders of SIRRL have the necessary expertise and financial capability to construct and operate an EfW Plant in New Zealand using proven technology.

There are more than 2,500 EfW Plants operating worldwide. Project Kea will use the Best Available Technology for energy recovery, treatment of air emissions, recycling of water, and recovery of by-product streams for reuse in industry. The technology to be used in Project Kea has been developed and refined internationally over more than three decades.

SIRRL has conditionally purchased the subject site, with the intention of constructing and operating New Zealand's first large scale EfW Plant. SIRRL has carefully chosen this site, due to its central positioning to the South Island's main sources of MSW and its close proximity to State Highway 1 and the South Island Main Trunk Railway line.

SIRRL is committed to constructing Project Kea at a cost of approximately \$350 million NZD. The construction of Project Kea is estimated to add \$94 million to the gross domestic product of Waimate, Waitaki and Timaru annually over the two-year construction period, and \$77 million annually once operational.

Revenue for Project KEA is obtained through a combination of charging waste suppliers for the disposal of waste (gate fees) and selling the exported electricity, heat and by-product streams.

1.5 Summary of resource consent approvals required

Details pertaining to the resource consent approvals required to enable the construction and operation of Project Kea are set out in section 7 of this Planning Report. A summary of the resource consent approvals required is set out in **Table 3** below.

Table 3. Summary of resource consent approvals required.

Resource consent approvals required from ECAN	Activity status
To discharge contaminants to air from an EfW Plant.	Discretionary Activity
To discharge domestic wastewater to land from staff and visitor facilities associated with the operation of an EfW Plant.	Restricted Discretionary Activity
To discharge stormwater from roofs, roads, hardstand areas and other impervious surfaces within an EfW Plant.	Restricted Discretionary Activity
To take water for dewatering for carrying out excavation and construction works associated with the construction of an EfW Plant.	Restricted Discretionary Activity
To undertake earthworks over an unconfined or semi-confined aquifer.	Restricted Discretionary Activity
The storage and use of hazardous substances within the Project Kea facility.	Discretionary Activity
Resource consent approvals required from Waimate District Council	Activity status
Land use resource consent to construct and operate an EfW Plant and associated infrastructure as an industrial activity in the Rural Zone.	Discretionary Activity
The use of Temporary Construction Buildings.	Restricted Discretionary Activity
The installation/placement of signage associated with the Project Kea facility.	Discretionary Activity
The provision of parking, access and manoeuvring areas associated with the Project Kea facility.	Restricted Discretionary Activity
The payment of Financial Contributions.	Discretionary Activity
The storage and use of hazardous substances within the Project Kea facility.	Discretionary Activity

1.6 Bundling

Where there is an overlap between the activities and their effects (so that the consideration of one activity could affect the outcome of the other activities), consent authorities may “bundle” the activities and apply the most restrictive activity status when considering an application.

In this case, the bundling of all regional activities is considered appropriate, and the application is to be considered as a **Discretionary Activity** overall.

In this case, the bundling of all district activities is considered appropriate, and the application is to be considered a **Discretionary Activity** overall.

1.7 Consent duration

A term of 35 years is sought for all regional resource consents.

Land use resource consents are sought in perpetuity.

1.8 Lapse date

A lapse period of ten years is sought for all resource consents. Ten years is sought due to the complexities involved in establishing the EfW Plants here in New Zealand (i.e., procuring machinery and the required technology).

1.9 Notification

SIRRL is aware of the public interest in this proposal and requests that the application be processed on a publicly notified basis. Therefore, public notification is mandatory under sections 95A(2)(a) and 95A(3)(a) of the RMA.

1.10 Purpose of the Planning Report

In accordance with the requirements of Schedule 4 of the RMA, in brief, the purpose of this Planning Report is to:

- Describe the proposal
- Describe the proposal site
- Assess the proposal’s actual and potential effects on the environment

- Assess the proposal against matters set out in Part 2 of the RMA
- Assess the proposal against the relevant statutory documents
- Assess the proposal against any other relevant provisions or documents
- Describe the consultation undertaken

This Planning Report is informed by the following comprehensive package of technical reports covering a range of resource management issues:

- Technical Report 1: Operational and Technical Overview Report
- Technical Report 2: Preliminary Site Investigation Report
- Technical Report 3: Hazardous Substances Report
- Technical Report 4: Landscape Assessment Report
- Technical Report 5: Air Quality Emissions Assessment
- Technical Report 6: Human Health Risk Assessment
- Technical Report 7: Acoustic Assessment Report
- Technical Report 8: Transportation Assessment Report
- Technical Report 9: Life Cycle Analysis Report
- Technical Report 10: Economic Impact of Project Kea
- Technical Report 11: Flood Assessment Report
- Technical Report 12: Stormwater Report
- Technical Report 13: Earthworks Report
- Technical Report 14: Domestic Wastewater Discharge to Land
- Technical Report 15: Electrical Safe Distance
- Technical Report 16: Waste Acceptance Criteria
- Technical Report 17: Surface and Groundwater Assessment
- Technical Report 18: Consultation Summary Report
- Technical Report 19: Land Use Capability Assessment

2 THE ROLE OF PROJECT KEA (AN EFW PLANT) IN THE NATIONAL WASTE MANAGEMENT SOLUTION

2.1 Guidance from Ministry for the Environment on EfW Plants

In 2020, the MfE published *A Waste to Energy Guide for New Zealand* Factsheet (“**Factsheet**”). This is a non-statutory document. In this Factsheet, the MfE acknowledges that New Zealand has a problem with the amount of waste being generated and being sent to landfills. It states that:

“Our disposal of waste to municipal landfills increased by 48 percent in the last decade. This culminated in some 3.68 million tonnes of waste going to municipal landfills in 2018/2019 year. This excludes the waste sent to industrial, construction and demolition landfills, and also managed, controlled and cleanfill sites. Waste breaking down in landfills also creates harmful gas emissions.”

The Factsheet acknowledges that New Zealand’s waste situation prompts EfW Plants to be seen as an attractive solution, as it may help reduce the amount of waste going into landfills.

The Factsheet outlines four basic principles to consider when examining EfW Plant proposals:

- Principle 1: the proposal should support the goal of moving New Zealand steadily up the waste hierarchy towards a more circular economy approach to managing resources.
- Principle 2: the environmental impacts must be well managed, especially the greenhouse gas emissions.
- Principle 3: the proposal must be commercially viable over the long term.
- Principle 4: There should be a strong level of support from the community and Treaty partners.

Having carefully considered the above principles in the project planning phase, this section of the Planning Report outlines the alignment of Project Kea with these principles by asking the following questions:

- With respect to Principle 1 (alignment with New Zealand’s waste management and minimisation goals): How does Project Kea fit into and supports the “circular economy” and the “waste hierarchy” concepts?

- With respect to Principle 2 (environmental impacts): What are the effects on the environment of the construction and operation of Project Kea and how are these to be managed?
- With respect to Principle 3 (commercial viability over the long term): What are the waste trends in New Zealand and is there sufficient accessible waste available to meet the operational requirements of Project Kea?
- Principle 4 (level of support from the community and Treaty partners): How does Project Kea enable community and Treaty partners to participate in the planning process to enable their views and concerns to be heard?

Having regard to the principles outlined by MfE, the objectives of Project Kea are:

- To construct and operate an EfW Plant as a viable alternative to landfills, thereby reducing the demand for land as a natural resource to be used for waste disposal in the form of landfills in the South Island.
- To support the goal of moving New Zealand steadily up the waste hierarchy towards a more circular economy approach to managing resources.
- To retrieve possible by-product streams of value to enable these to be used as raw materials for other products.
- To operate using proven Best Available Techniques.
- To create an alternative source of energy generation for the local community.
- To contribute to the economic and social wellbeing of the Waimate, Waitaki and Timaru communities, and the wider community overall.
- To ensure that the actual and potential effects on the environment of operating an EfW Plant, are acceptable, and all effects are appropriately avoided, remedied or mitigated.
- To request public notification of the resource consent application for the construction and operation of the EfW Plant, supporting public participation in the resource consenting process to ensure that community views and concerns are heard and appropriately addressed.

2.2 What are the waste trends in New Zealand and is there sufficient accessible waste available to meet the operational requirements of Project Kea?

Available waste data and projections on waste destined for landfills

In 2019, MfE commissioned Business and Economic Research Ltd (“BERL”) to analyse the New Zealand waste stream and investigate the effects if a Waste to Energy incinerator was to be built here. The findings of this research are set out in the *Waste to Energy - The Incineration Option Report*, dated 2019, and commonly referred to as the “BERL Report”.

With respect to waste disposal in New Zealand, the BERL Report states that:

- Waste is disposed in two ways: landfill or recycling.
- Up until August 2019, landfills were classified from one to four:
 - Class 1: generally, accept MSW or industrial waste
 - Class 2: generally, accept construction and demolition waste
 - Class 3: are managed / controlled landfills
 - Class 4: accept only cleanfill material
- Data is not collected on the volumes of waste that is collected in landfill classes 2 to 4.

In 2019, the BERL Report estimated the waste destination by landfill types for 2021, based on previously available data and projections. It estimated that:

- The volume of recovered materials in 2021 will be between 5.1 million tonnes and 5.5 million tonnes.
- The volume of waste to Class 1 landfills will be between 3.8 million and 4.2 million tonnes

Table 4 sets out the upper and lower bands and destination of waste forecast for 2021 by the BERL Report. The BERL Report estimates that 19,629,581 tonnes of waste would be generated in 2021. Of this total, 28% was estimated to be recovered, and the remainder 72%, being 14,131,426 tonnes of waste, was estimated to be destined for landfills.

Table 4. Estimated waste destination by Landfill type 2021 (tonnes) (Source Table 5.3 of the BERL Report).

Waste destination	Eunomia forecast	BERL forecast	Total %
Class 1 landfill	3,870,889	4,192,290	21
Class 2 landfill	3,048,973	3,302,130	17
Class 3 landfill	76,227	82,553	0.4
Class 4 landfill	4,497,235	4,870,642	25
Farm dumps	1,613,005	1,746,933	9
Recovery	5,076,640	5,498,155	28
Total waste generated	18,124,683	19,629,581	100

To support their own advice from potential waste suppliers regarding future feedstock for Project Kea, SIRRL requested information from MfE regarding how much waste went to landfill during the 2015 to 2021 period. MfE was only able to provide information for Class 1 landfills. The information received from MfE is modified and presented in **Table 5**. It shows that in 2021:

- A total of 3,537,798 tonnes of waste was sent to Class 1 landfills in the North Island.
- A total of 804,686 tonnes of waste was sent to Class 1 landfills in the South Island.
- A total of 4,342,484 tonnes of waste was sent to Class 1 landfills in New Zealand generally.

Table 5. Waste received at Class 1 landfills between 2015 and 2021 (Source Official Information Response, dated 12 August 2022).

Year	North Island Class 1 Landfill tonnage received	South Island Class 1 Landfill tonnage received	Total
2015	3,222,415.37	727,951.58	3,950,366.95
2016	3,404,947.65	702,947.11	4,107,894.76
2017	3,494,308.76	736,514.46	4,230,823.22

2018	3,705,275.47	730,206.93	4,435,482.40
2019	3,499,671.95	707,455.29	4,207,127.24
2020	3,382,918.60	742,148.74	4,125,067.34
2021	3,537,798.32	804,686.46	4,342,484.78

SIRRL has used the above mentioned BERL Report projections for 2021, and the above information provided by MfE for the 2015 to 2021 period, to further estimate the waste received by the various landfill types in 2021 for the South Island (as set out in **Table 6**).

Based on the estimates in **Table 6**, with respect to confirming the availability of accessible waste feedstock to meet the operational requirements of Project Kea, it is noted that:

- In 2021, a total of 3,847,168 tonnes of waste was generated in the South Island
- Project Kea is committed to exclude recoverable and recyclable waste streams, which means that a total of 1,800,965 tonnes of waste material is theoretically available as feedstock (waste sent to Class 1, Class 2 landfills and the farm dumps).
- Project Kea will consume approximately 20% (365,000 tonnes) of the total 1,800,965 tonnes of waste material.

Based on the available waste data, it is concluded that there is sufficient accessible waste material available in the South Island to meet the operational requirements of Project Kea.

Table 6. Estimated waste received by various landfills in the South Island in 2021.

Waste destination	Total %	Estimated South Island landfill tonnage received 2021
Class 1 landfill	21	804,686
Class 2 landfill	17	651,413
Class 3 landfill	0.4	15,327
Class 4 landfill	25	957,960
Farm dumps	9	344,866

Recovery	28	1,072,915
Total waste generated	100	3,847,168

New Aotearoa New Zealand Waste Strategy

The Government has proposed a new national waste strategy, *New Aotearoa New Zealand Waste Strategy*, to outline the proposed vision and aspirations for a low-waste Aotearoa to 2050. The consultation on the proposed waste strategy closed on 10 December 2021.

While it is acknowledged that proposed strategy is currently in a draft stage (i.e. has not been formally adopted for implementation), it is a helpful document in that it sets out the latest information on waste challenges and trends in New Zealand.

With respect to waste generation, the *New Aotearoa New Zealand Waste Strategy* states that:

- New Zealand is among the highest generators of waste per capita in the developed world.
- In 2018, New Zealand sent 3.7 million tonnes of waste to municipal landfills (approximately 750kg per person). This is 49 per cent higher than the Organisation for Economic Co-operation and Development (“OECD”) average of 538kg per capita.
- The long-term trends suggest the amount of waste being sent to landfill is increasing. Between 2010 and 2019, total waste to municipal landfills increased by approximately 48 per cent.

The above statements align with the data presented in the **Table 6**, which confirms that New Zealand has a problem with the amount of waste being generated and being sent to the landfills. While not desirable, the reality is that the long-term trends suggest that there will be a continued need to manage waste at the bottom of the waste hierarchy, being that which is destined for landfills. New Zealand’s current waste problem, and for the foreseeable future, means that there is going to be accessible waste material available as feedstock for the operation of Project Kea. Project Kea has a role to play in reducing the amount of waste going into landfills.

With respect to New Zealand’s ability to export waste, the *New Aotearoa New Zealand Waste Strategy* states that:

- On the demand side, New Zealand’s ability to export waste to key markets is becoming increasingly constrained. This is partly due to the implementation of policies restricting the international movement of waste materials (such as China’s “National Sword” policy, which banned the import of most recycled plastics into China and the Basel Convention, which restricts the transboundary movement of waste), as well as a decrease in demand for imported feedstock. Export markets are accepting fewer materials and focusing on higher-quality products. This has highlighted New Zealand’s need to find viable onshore solutions to waste.

In light of the above concern, Project Kea provides a viable onshore solution to waste. It avoids the need to export waste generated in the South Island, by enabling the ability to process the waste locally where it meets the Waste Acceptance Criteria for Project Kea.

With respect to resource recovery, the *New Aotearoa New Zealand Waste Strategy* states that:

- Currently, domestic resource recovery and waste infrastructure system is limited in the types of materials that can be recovered and the volume of material able to be processed onshore.
- There is often economic opportunity in the waste thrown away. Insufficient effort is put into finding opportunities to add value by turning one producer’s unwanted by-product into the raw material for another.

In light of the above concerns, it is noted that one of the objectives of Project Kea is to retrieve possible by-product streams of value to enable these to be used as raw materials for other products. For example, Project Kea proposes to reuse grate ash (a by-product stream) as an aggregate for concrete manufacturing. Project Kea also proposes to recover 7,000 tonnes of metal per year for recycling. Project Kea objective is to recover material that are possible (such as metals) and identify economic opportunities for the by-product streams.

2.3 How does Project Kea fit into and support the “circular economy” and “waste hierarchy” concepts?

In New Zealand, waste management and minimisation are primarily managed by the Waste Minimisation Act 2008 (“WMA”), and the New Zealand Waste Strategy Reducing Harm, Improving Efficiency 2010 (“NZ Waste Strategy”).

The purpose of the WMA is to encourage waste minimisation and a decrease in waste disposal in order to protect the environment from harm; and provide environmental, social, economic and cultural benefits. New Zealand Waste Strategy sets out the Government's long-term priorities for waste management and minimisation in New Zealand.

As part of the *New Aotearoa New Zealand Waste Strategy*, the Government's proposal is to shift from a "linear economy" concept to a "circular economy" concept to manage waste. The concept of a circular economy is based on three global principles:

- *Design out our waste and pollution* – view waste as a design outcome. Loss of materials and energy through the production process is minimised.
- *Keep products and materials in use* – think in systems. Products are designed to be re-used, repaired and recycled, and waste materials for one process become input into another.
- *Regenerate natural systems* – shift perspectives from minimising environmental harm to doing good. Valuable nutrients are returned to the soil and ecosystems enhanced.

The New Aotearoa New Zealand Waste Strategy also promotes the concept of a waste hierarchy, a tool used globally for explaining the different priorities to reduce and manage waste. The circular economy concept is captured in the waste hierarchy, as illustrated in **Figure 4**. The waste hierarchy is based on the concept that:

- The most desirable steps are those at the top of the hierarchy, which seek to avoid generating waste in the first instance. This supports the first circular economy principle.
- In the middle are techniques for keeping materials circulating in the economy, in line with the second economy principle.
- At the bottom are the techniques least desirable, being destruction and dispose to landfill.

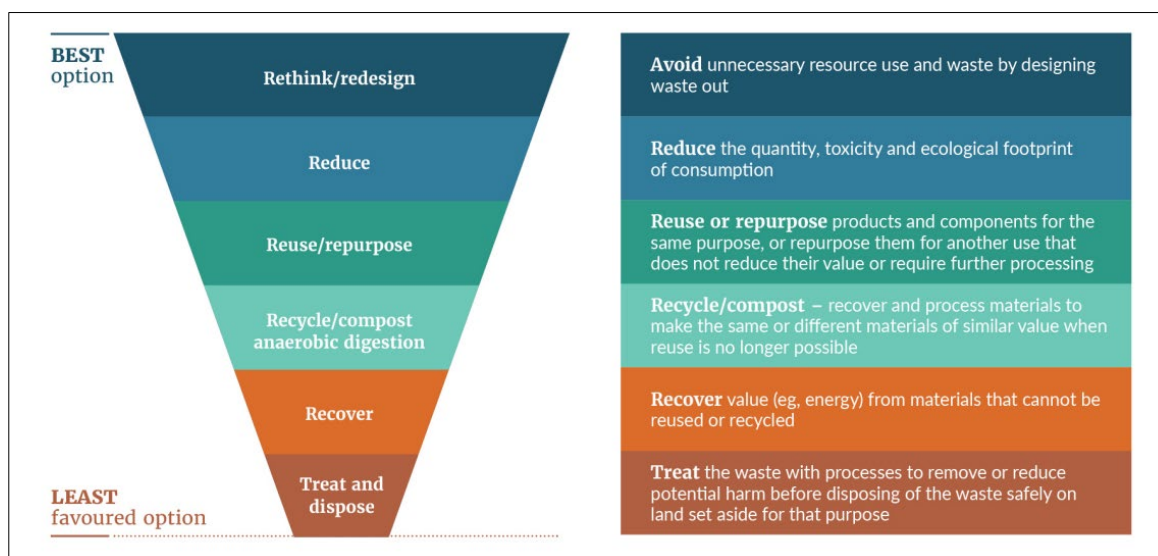


Figure 4: Waste hierarchy.

Project Kea will support, and will not undermine, the waste hierarchy and circular economy principles outlined above; and is an important piece of the waste management strategy for the following reasons:

- Project Kea will not compete with the “avoid, reduce, reuse / repurpose, recycle/compost” concepts (the top 4 tiers of the waste hierarchy), as it will use genuine residual waste, and will therefore be complementary to the waste management system.
- Project Kea will work alongside recycling processes and contributes to recycling through the recovery of metals.
- Project Kea aligns with the “recover” category within the waste hierarchy (5th tier), as it recovers value from genuine residual waste (waste that is unavoidable) and for which there is no potential reuse or recycling as feedstock to generate electricity and steam.
- Project Kea will “recover” possible by-product streams of value to enable these to be used as raw materials for other products. For example, Project Kea proposes to reuse grate ash (a by-product stream) as an aggregate for concrete manufacturing. Project Kea also proposes to recover 7,000 tonnes of metal per year for recycling.
- Project Kea aligns with the circular economy concept by assisting in minimising the amount of permanent disposal of residual waste that is required to be disposed of (such as to a landfill) under the 6th and last tier in the waste hierarchy (as a last resort).

- As a holistic solution to waste management in New Zealand, Project Kea will assist in leading to a zero-waste scenario, especially where the by-product streams of value are able to be used a raw material for other products.
- The Project Kea facility uses best available technologies, and is highly engineered to ensure best environmental performance, being safe for the environment and people.

In order to ensure that Project Kea promotes the top tiers of the waste hierarchy (and therefore the circular economy concept), the application includes Waste Acceptance Criteria (Technical Report 16) for feedstock to be accepted and used in EfW Plant. The Waste Acceptance Criteria includes:

- Waste Supply Contracts: Each supplier must hold a signed and valid Waste Supply Contract, which includes confirmation that recyclables will be minimised to the council standard that applies to the district in which the waste is generated.
- Recycling reward: A recycling reward will be introduced by Project Kea to encourage suppliers to reduce non-renewable waste on an on-going basis. To be eligible the supplier must have a verified recycling and supply strategy that is independently audited and annually reported on.
- Random and pre-acceptance testing: Project Kea will implement random inspection on acceptable MSW and recyclables.
- Gatehouse controls: The gatehouse may reject waste that does not meet the Waste Acceptance Criteria.
- Review: Waste Acceptance Criteria will be reviewed annually to ensure that Project Kea objectives continue to support the waste minimisation goals of New Zealand via a circular economy and the waste hierarchy concept.

2.4 What are the effects on the environment of the construction and operation of Project Kea and how are these to be managed?

Resource consent approvals are required from ECAN and WDC to enable the construction and operation of the Project Kea facility. This resource consent application has been prepared in accordance with the requirements of the RMA and informed by a comprehensive list of technical reports covering a range of resource management issues of relevance to a project of this nature. Resource consent approvals will only

be granted if the consenting authorities are satisfied that actual and potential effects of Project Kea on the environment are acceptable, and the proposal is not contradictory to the objectives and policies of the relevant documents.

2.5 How does Project Kea enable the community to participate in the planning process?

The applicant acknowledges that the Project Kea proposal represents a change to the status-quo for managing waste in the South Island. While EfW technology has been used overseas for many decades, it is a relatively new concept in New Zealand. Implementing good neighbour and corporate citizen principles, the applicant has requested public notification of the application to enable the community to be informed of the project and participate in the consenting process, so that their views and concerns can be heard.

3 DESCRIPTION OF THE SITE AND EXISTING ENVIRONMENT

3.1 Location

The Project Kea site is approximately 2 km north-east of Glenavy, which is in the Waimate District of Canterbury. Situated on the alluvial plains of the Waitaki River, and at the boundary of the Canterbury and Otago regions, Glenavy is a rural township which has a population of approximately 200 people.

Regarding proximity to other towns and cities, Project Kea site is located approximately (refer **Figure 5**):

- 2 km north-east of Glenavy
- 8 km south of Morven
- 16 km north of Oamaru
- 18 km south-east of Waimate
- 55 km south of Timaru
- 120 km north of Dunedin
- 190 km south of Christchurch

Regarding proximity to natural features in the wider vicinity, Project Kea site is located approximately (refer **Figure 5**):

- 3.1 km north of the Waitaki River, which is a major braided river that drains the Mackenzie Basin and runs approximately 209 km from the main divide eastward to the Pacific Ocean.
- 11 km south of the Waihao River, which runs into the Wainono Lagoon and also has permanent access to the Pacific Ocean through a culvert known as the Waihao Box.
- 5.5 km east of the foothills and valleys rising up around Waikakahi, Mount Harris and Broad Gully.

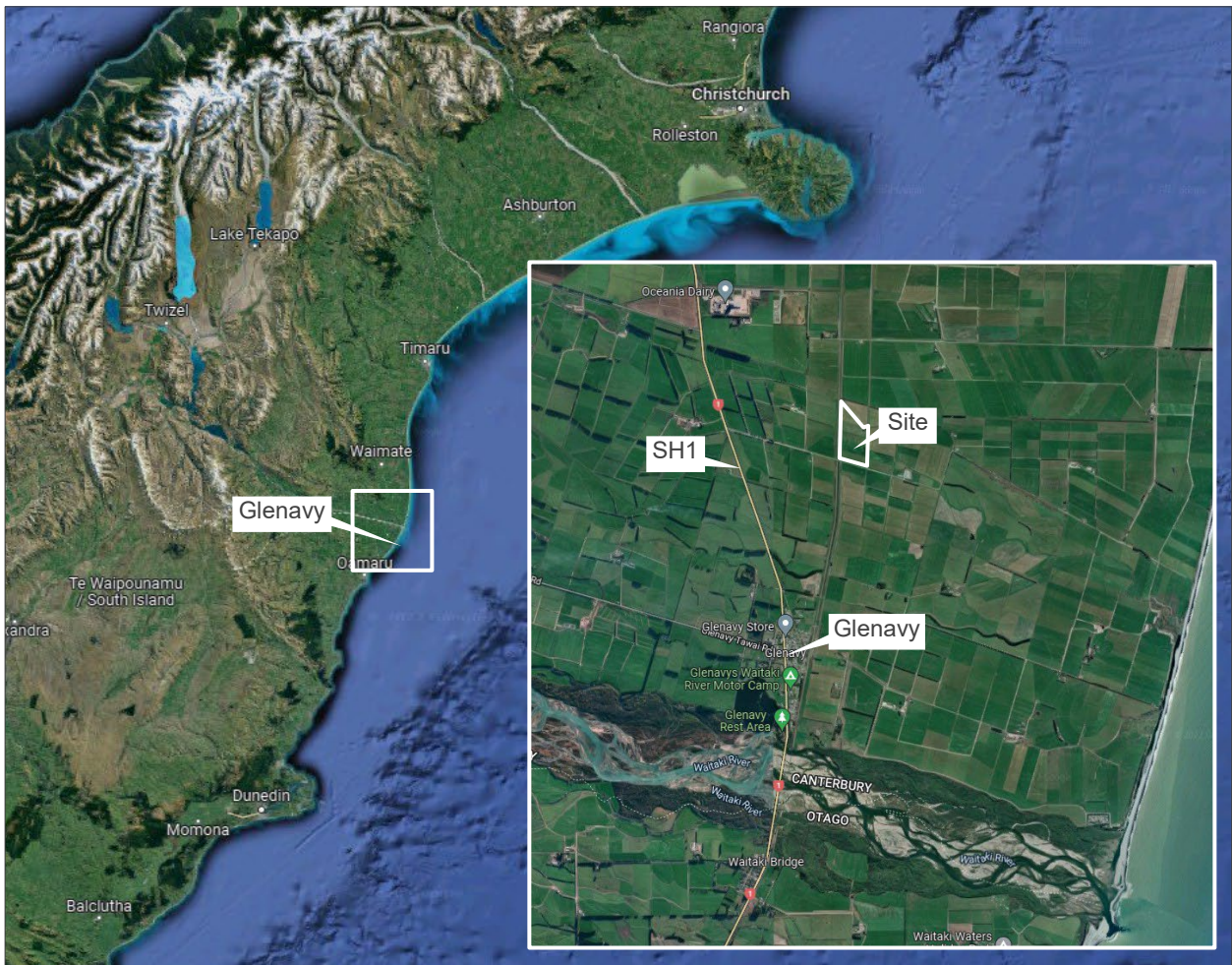


Figure 5: Project Kea site context (Source: Google Earth).

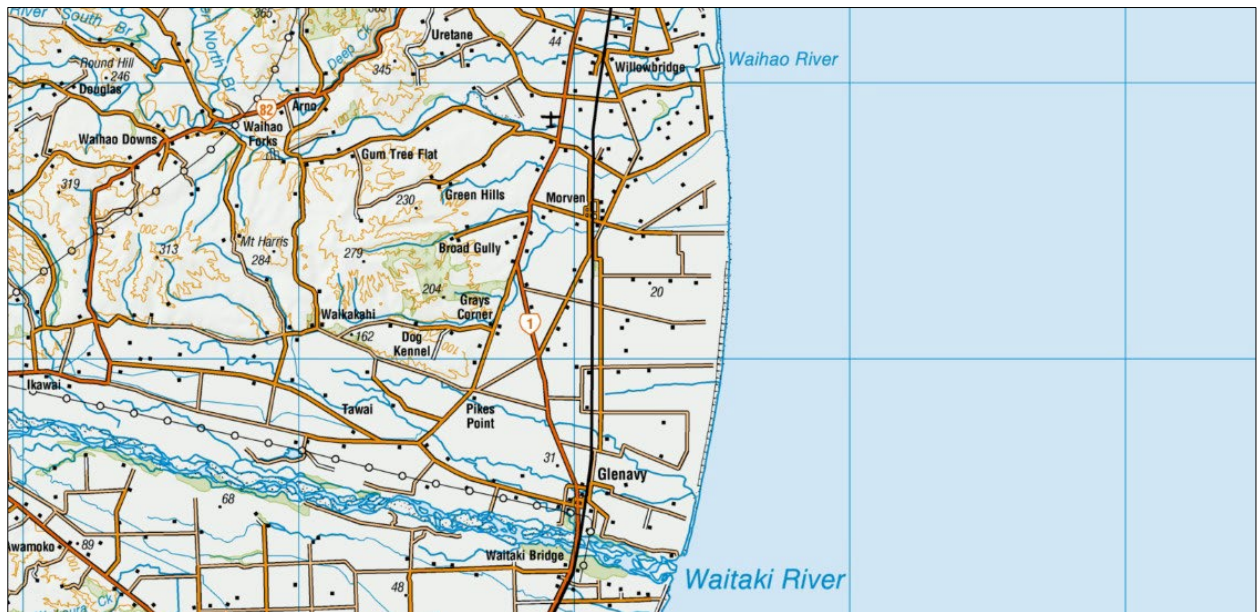


Figure 6: Natural features in the wider vicinity of the site (Source: Land Information New Zealand).

3.2 Project Kea site

The Project Kea site is an irregularly shaped rural lot with an area of approximately 14.85 ha and is legally described as RS 22268. It is bounded by the following features:

- Whitneys Creek is located along the northern boundary on the adjoining site.
- Morven Glenavy Road forms the eastern and southern boundaries.
- SIMT and an irrigation race forms the western boundary.

The site is currently used as pastoral farming, with improved pasture used for livestock grazing and cut-and-carry operations.

The site has a general west to east downwards slope with a minimal gradient of approximately 0.3%. The existing ground level of the site is generally 1.5m to 2m below the top of the SIMT on the western boundary.

Overall, the site can be generally characterised as a vacant, flat and low-lying paddock.



Figure 7: Aerial of the site (Source: Waimate District Council GIS)

3.3 Ecological

The Project Kea site is a working paddock. The ecological values of the site are degraded from its natural state due to tramping, grazing and monoculture.

3.4 Geology

The Project Kea site is underlain by glacial outwash deposits comprising gravels formed by successive periods of glacial advance, together with river terrace gravels. Previous geotechnical investigations undertaken on the neighbouring Oceania Dairy Factory site confirmed generally consistent natural soils comprising dense to very dense sandy gravel with some cobbles to the termination depth of investigations at 7.5m below ground level with standard penetration test N-values consistently >50.

3.5 Existing soil classification

With respect to the existing soil classification of the area within the general area of the Project Kea site, the Land Use Capability Assessment (“**LUC Assessment**”) (Technical Report 19) states that:

- Local soils have formed in the Burnham Formation sedimentary river deposits as part of the Waitaki River fluvial fan, one of the large fluvial fans that forms the Canterbury Plains.
- The fluvial nature of the Canterbury Plains and the sediments at the site are important as the geomorphology of fluvial fans and braided riverbeds are directly linked to soil depth and distribution, which is used in drawing boundaries between Land Use Capacity classes. With the Waitaki River originating on the Eastern side of the Southern Alps most sediments are derived from Greywacke sandstone, a hard sandstone that breaks down predominantly into gravel, sand and silt, with a relatively low clay content.
- S-Map (Manaaki Whenua, 2019) classes the Project Kea site area predominantly as Darnley soils, however with a low confidence. Several siblings of this soil type are listed for this site within S-Map (as shown in **Figure 8**) all very similar.

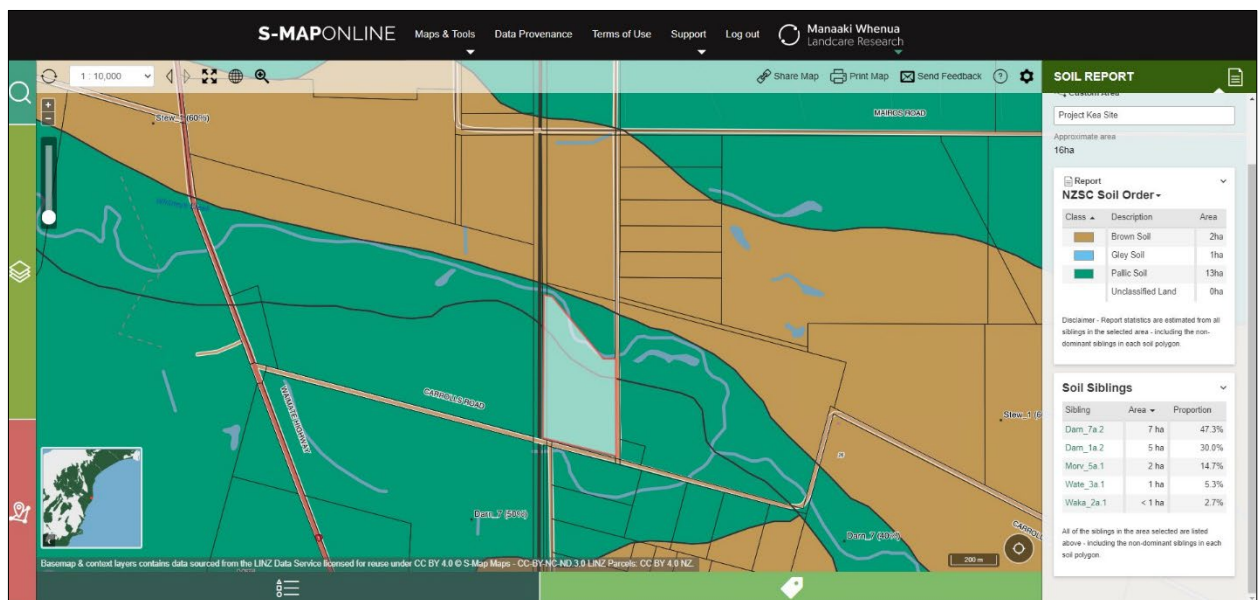


Figure 8: Soils at the Site (S-Map Online)

With respect to the existing Land Use Capacity classification, the LUC Assessment states that:

- The New Zealand Land Use Capability Map as available on Our Environment (Manaaki Whenua, 2021), classify the whole of the Project Kea site, south of Whitneys Creek, as LUC class 3 and the area north of the creek as class 4.
- This New Zealand scale map is deemed unsuitable to be confidently used for a small “farm” scale project. Therefore, a field assessment was carried out to create a site Land Use Capability map (refer to Section 6.16 of this Planning Report).

3.6 Rural character and landscape context

The Project Kea site sits in the centre of the Waitaki River’s former outwash plain and terraces north to north-east of Glenavy. The Project Kea site and its landscape context is detailed in the Landscape Assessment Report (Technical Report 4).

With respect to the Project Kea site itself, the Landscape Assessment Report states that:

- The Project Kea site is a flat, low lying, paddock that is largely devoid of features other than a line of Poplar and Willow trees next to Whitneys Creek that marks the site’s northern boundary. Some of those trees were in the process of being removed at the time of the writing of the Landscape Assessment Report. Also lined by smaller ditches (presumably for irrigation) around much of the site perimeter, the site is otherwise unremarkable within a landscape that is totally dominated by paddocks used for cattle grazing and dairy production. It reveals no distinctive or site-specific elements that are not found within the broad ‘checkerboard’ of other paddocks located between the foothills west of SH1 and the Pacific Ocean just over 3.7 km from the Project Kea site.
- The only “feature” of note in the very immediate vicinity of the subject site is a slight rise in the terrain immediately to the north – in the order of 8 to 9 m. This occurs beyond Whitneys Creek. Although not particularly notable in its own right, this change in elevation does help to differentiate between the lower outwash plain closer to the Waitaki River that includes the subject site and a slightly more elevated terrace that most of Morven Glenavy Road runs across in the direction of Morven village. This change also helps to visually separate the application site from farmhouses and other residential properties to the north, around Morven Glenavy Road, Mairos Road and Archibalds Road.

With respect to the Project Kea site's wider landscape setting, the Landscape Assessment Report states that:

- South of the Waitaki River and progressing northwards past the Alliance Pukeuri Abattoir, the landscape opens out from foothills to the south, revealing a landscape that is almost entirely dominated by a flat 'checkerboard' of farmland. Visually subdivided by a rectilinear matrix of pine, macrocarpa and willow shelterbelts, this planar landscape sits on a sequence of shallow river terraces that fall slowly, but inexorably, towards the Waitaki River and its accompanying bands of willows and other vegetation that demarcate both sides of the river from one another. The focus of travellers passing through this area falls on the working, rural production, landscape in closer proximity to SH1 and other local roads, while its flat nature limits the degree to which features beyond it are visible and influence perception of it.
- The settlement of Waitaki Bridge is also largely 'land locked'. Although located in close proximity to the south bank of the Waitaki River, it is closely hemmed in by shelterbelts, a stand of pines, silver birches and other trees at its western entrance (McPherson Road) and the gradually rising terrain both sides of the river. The 'village' has a quite contained quality, devoid of any real visual connection with the rural domain north of the Waitaki River.
- Although the Project Kea site is just over 3.1 km from the lower Waitaki River, it is effectively screened from that river by intervening shelterbelts and a sequence of gently rising river terraces that traverse the rural landscape east of Glenavy. Vegetation lining, and enclosing, the banks of the river provides a second 'line of defence' between its fairway and the Project Kea site, including dense stands of willows both east and west of the SH1 road and rail bridges over it.
- Similarly, even though the northern edge of Glenavy is just over 1.9 km from the Project Kea site, a series of shelterbelts and other planting spread across the intervening 'grid' of farm paddocks, preclude any direct interaction between it and the nearby settlement. Instead, the outlook from the margins of the settlement and nearby is entirely dominated by layers of open, flat, farmland interrupted by the aforementioned shelterbelts.
- North of Glenavy, this situation barely changes, although the distant foothills rising up around Waikakahi, Mount Harris and Broad Gully become more apparent and influential as the landscape opens out somewhat approaching the Oceania Dairy Factory site. Although successive lines of pines,

macrocarpa and willows still traverse this terrace / planar landscape, subdividing its farms and paddocks into the sort of geometric 'checkerboard' already described, that undulating sequence of low hills becomes increasingly important as a reference point in the landscape, while the blocky profile of the dairy plant also starts to rise up above intervening shelterbelts. It also helps to locate the Project Kea site, which would sit amid the flat plane of farmland to the right (east) of that established plant. For the most part, however, this remains a working landscape that is dominated by the array of paddocks and shelterbelts already described.

- This 'working rural landscape' character is also very marked across the open plain to the east of SH1 – around the small settlement of Morven and southwards from there. Following the path of Morven Glenavy Road and the side roads that branch laterally off it, a broad swathe of open pasture, more loosely criss-crossed by shelterbelts, is again revealed. This extends down towards Carrolls Road and the Project Kea site, without any significant breaks in, or variations on, this 'theme', apart from a scattering of farm dwellings and buildings near many of these roads and the increasingly obvious profile of the main factory building within the Oceania Dairy Factory complex as one travels southwards. This main block becomes increasingly prominent near Archibalds Road and Mairors Road, although its taller stack is noticeably less prominent in most such views.
- Nearly all of the landscape characteristics described above are also apparent in views from the west – as are experienced by those using the likes of Ikawai Middle Road and Tawai Ikawai Road.

The Waitaki River is one of Canterbury's major braided rivers. In regard to the protection of significant values, it is noted that neither the Waimate District Plan nor the Canterbury Regional Policy Statement identify any Outstanding Natural Landscapes or Areas of Outstanding Natural Character within the lower river's boundaries.

Similarly, even though the Wainono Lagoon Conservation area, east of Waimate and some 18 km from the Project Kea site, is identified as an Outstanding Natural Landscape in the Canterbury Regional Policy Statement, no other parts of the nearby coastline are attributed Outstanding Natural Landscape or Outstanding Natural Character status.

There are no areas of Significant Natural Areas, Significant Natural Features or other locations subject to higher order environmental constraints in the general vicinity of the Project Kea site.

3.7 Coastal environment

The Project Kea site is located approximately 4 km from the Pacific Ocean coastline. The coastline consists of a 12 km section of the coast from Morven Beach to the Waitaki River. This section, called the Northern Fan, is characterized by alluvial cliffs comprised of glacial outwash gravels and loess deposits. The cliff formations are the result of the truncation by coastal erosion during post-glacial sea level rise. Studies and monitoring of the Northern Fan and related beach systems have found that the area is a high energy, dynamic and mixed sand-gravel coastline.

With regards to potential coastal hazard risks on the Project Kea site, it is noted that:

- The Project Kea site is 3.5 km from the Hazard Zones identified in the Regional Coastal Environment Plan for the Canterbury Region. The site is unlikely to be subject to coastal erosion for the next 1,000 years.
- Due to the high cliffs along the coast of the Northern Fan, there is little to no risk of coastal inundation on most of the areas directly behind the coastline. Hazards from tsunami and storm surges are mostly related to strong currents, surges in the beaches and cliff face collapses. The site is not within a tsunami evacuation zone.

3.8 Transportation network

The Project Kea site is located on Morven Glenavy Road. **Figure 9** shows the location of the site in relation to the surrounding road network.

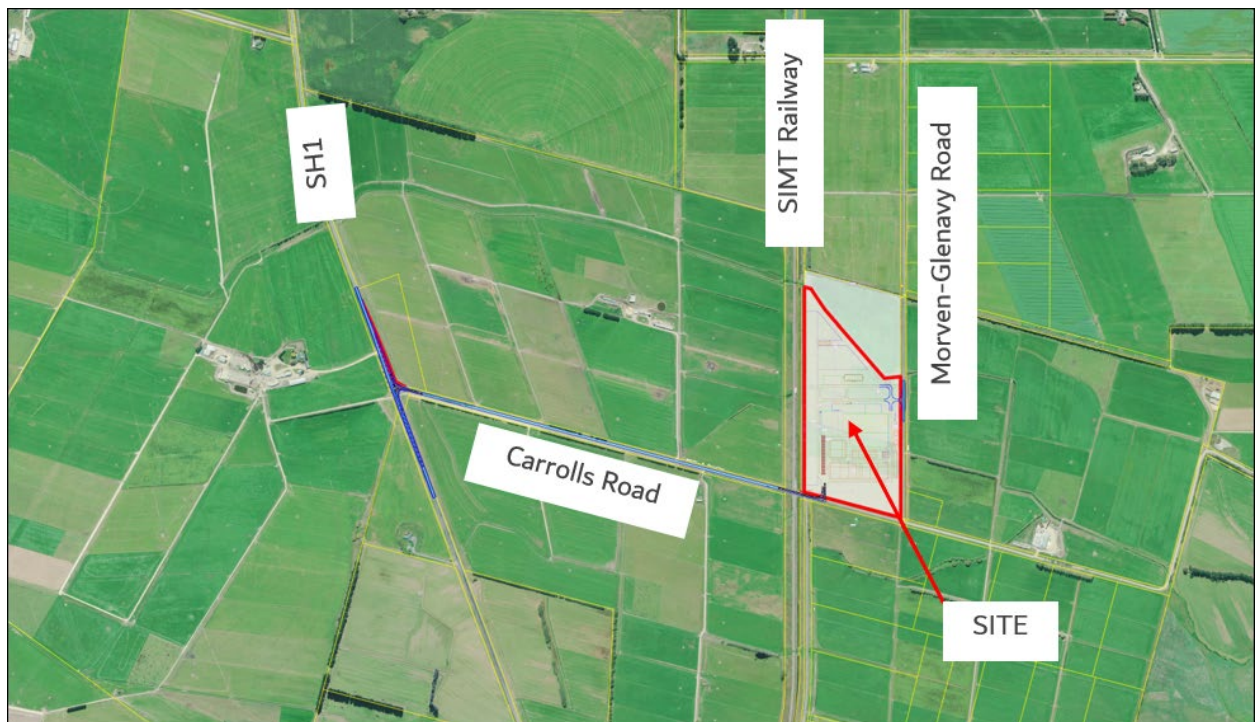


Figure 9: Surrounding transportation network.

The surrounding transportation network consists of:

- The SIMT runs along the western boundary of the site. The SIMT runs between Lyttleton and Invercargill along the east coast and connects to the Main North Line in Christchurch. The railway land adjacent to the site is subject to Designation 117, the requiring authority is New Zealand Railways Corporation, and is operated by KiwiRail for freight services.
- Morven Glenavy Road runs between Morven and Glenavy. It is a sealed road with a width of 6.5 m to 7 m, with no footpaths or open drains, and has an open speed limit of 100 km/hr. No traffic count data is publicly available however it is estimated to carry 200 vehicles per day (“vpd”) to 300 vpd.
- Carrolls Road extends east toward the site from SH1 and joins Morven Glenavy Road at the railway level crossing. It is an unsealed road with a width of 5 m and an open speed limit of 100 km/hr. A traffic survey was undertaken at the intersection of the road and SH1, and it is estimated that it carries less than 100 vpd.
- The Transport Assessment Report states that an assessment of the surrounding areas safety record concludes that there is no indication of any significant safety concerns near the Project Kea site.

- Given the rural nature of the site, there are no public bus services available.

3.9 Surface water

The Project Kea site is bordered by an irrigation race on the west boundary, running north to south along the SIMT. The irrigation race, owned by the Morven Glenavy Ikawai Irrigation Company (“MGI”), is an open channel with water flowing most of the year, usually from September to April each year (irrigation season), with a few exceptions when channels are “flushed” in off-season. The main races are below ground level but mounded earth of up to 0.5 m in height protects the main races from overland flows in most areas near the site.

The Waitaki River is a significant surface water body in the region, flowing west to east approximately 3 km to the south of the Project Kea site, into the Pacific Ocean.

There are no wetlands on or in the immediate vicinity of the site.

Whitneys Creek is located along the northern boundary of the Project Kea site, on the adjoining site. It is approximately 2.5m wide and 0.5m deep at the point where it crosses SH1, and it discharges to the Waitaki River mouth to the south-east of the Project Kea site. Whitneys Creek is a small local stream that runs from the hills at Pikes Point, over 12 km northwest of the Project Kea site, through an agricultural catchment dominated by dairy farming, to the Waitaki River mouth and the Pacific Ocean approximately 6 km to the southeast of the Project Kea site.

Whitneys Creek’s flow path has been modified with sections straightened and/or realigned to suit paddock layouts and farm boundaries, as is the case adjoining the Project Kea site. Whitneys Creek has very limited riparian vegetation. It is likely that the habitat within Whitneys Creek is highly degraded with the biotic community limited to invertebrate and fish communities tolerant of high sediment loads, warm temperatures and degraded water quality.

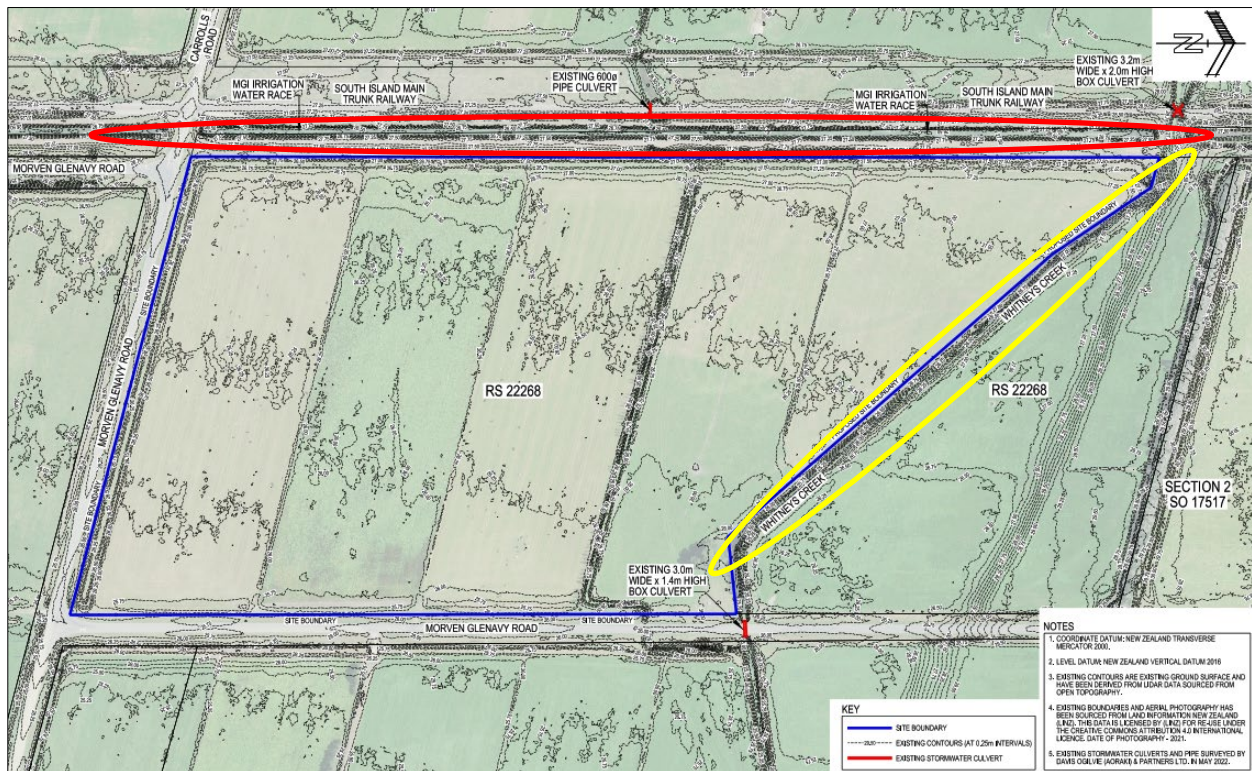


Figure 10: Existing surface water bodies and open channels in proximity to Project Kea site.

ECAN monitors the water quality in Whitney’s Creek, and a summary of the available water quality data is shown in Table 7 below.

Table 7. Summary of water quality data for Whitney’s Creek

Measurement		Upstream at SH 1			Downstream at Carrolls Road		
		Max	Average	Min	Max	Average	Min
Ammoniacal Nitrogen	mg/L	0.17	0.0	0.009	0.74	0.1	0.01
Dissolved Oxygen	mg/L	18.6	12.7	5.33	16.74	9.0	2.1
Dissolved Oxygen Saturation	%	170	116.3	63.1	152	80.2	14.1
Dissolved Reactive Phosphorus	mg/L	1.2	0.1	0.004	1.5	0.2	0.001
E. coli	MPN/100mL	-	-	-	2,420	500.7	2
Faecal Coliforms	Cfu/100mL	17,000	1,608.2	8	-	-	-
Nitrate-N Nitrite-N	g/m ³	2.1	0.4	0.01	4.5	1.5	0.003
pH		9.1	8.3	7.1	9	7.6	6.6

Total Nitrogen	g/m ³	3	1.1	0.37	5.2	2.2	0.43
Total Phosphorus	g/m ³	1.4	0.2	0.015	1.9	0.2	0.018
Total Suspended Solids	mg/L	205	18.3	0.8	220	8.8	0.4
Turbidity	NTU	120	7.3	0.7	150	4.6	0.2
Water Temperature (Field)	C	21.3	12.7	5.6	19.1	11.5	1.6

The wider catchment within which the Project Kea site is located is known to contain the Threatened – Nationally Critical Canterbury mudfish (*Neochanna burrowsius*). There have been several records of this species in various waterways including Whitneys Creek, approximately 4 km upstream from the Project Kea site. There are no records of mudfish east (downstream) of SH1 in the New Zealand Freshwater Fish Database, however it is possible they are present given the right conditions (slow flowing/still waterway/pond, with macrophyte coverage).

3.10 Ground water

With regards to groundwater underneath the Project Kea site, it is noted that:

- The site is located within the Whitneys Creek Groundwater Allocation Zone, which is one of the last zones in Canterbury with available groundwater allocation (refer **Figure 11**).
- The site is underlain by the Waitaki Gravel Aquifer, which extends from 2 metres below ground level (“mbgl”) to between 30 mbgl to 60 mbgl.
- Underlying the Waitaki Gravel Aquifer is the Cannington Terrestrial Aquifer, which extends from between 40 mbgl to 60 mbgl to basement rock and is semi-confined under the site.
- The Waitaki Gravel Aquifer receives recharge from the Waitaki River Catchment. Groundwater levels in the aquifer are also influenced by the local irrigation scheme through soil drainage from the irrigated fields and leakage from the channels.
- Data from monitoring wells, installed about 1.5 km northwest of the Site, show that irrigation directly influences groundwater levels, with a groundwater seasonal high during the peak of irrigation season and a seasonal low just before the irrigation restarts, with groundwater fluctuations of approximately 6m.

- As the Site is located further southeast from the monitoring location, based on the local piezometric contours, groundwater levels (measured in mRL) are likely 2m to 3 m lower. Available piezometric contours from ECAN show that groundwater levels at the Project Kea site are around 26 mRL to 24 mRL in September.
- Further groundwater monitoring data, from two bores at the edge of Whitneys Creek, 1.5 km upstream from the Project Kea site, shows groundwater levels raising from 5 mbgl to 2 mbgl from October to November.
- Monitoring near Whitneys Creek demonstrates that locally, there is some degree of separation between the aquifer layers through clay-bound gravels between 10 m and 15 m below ground level.
- Based on ECAN Well Database and local piezometric contours, there are 16 active (on use) water take bores either within a 2 km radius of the Project Kea site or directly downgradient.

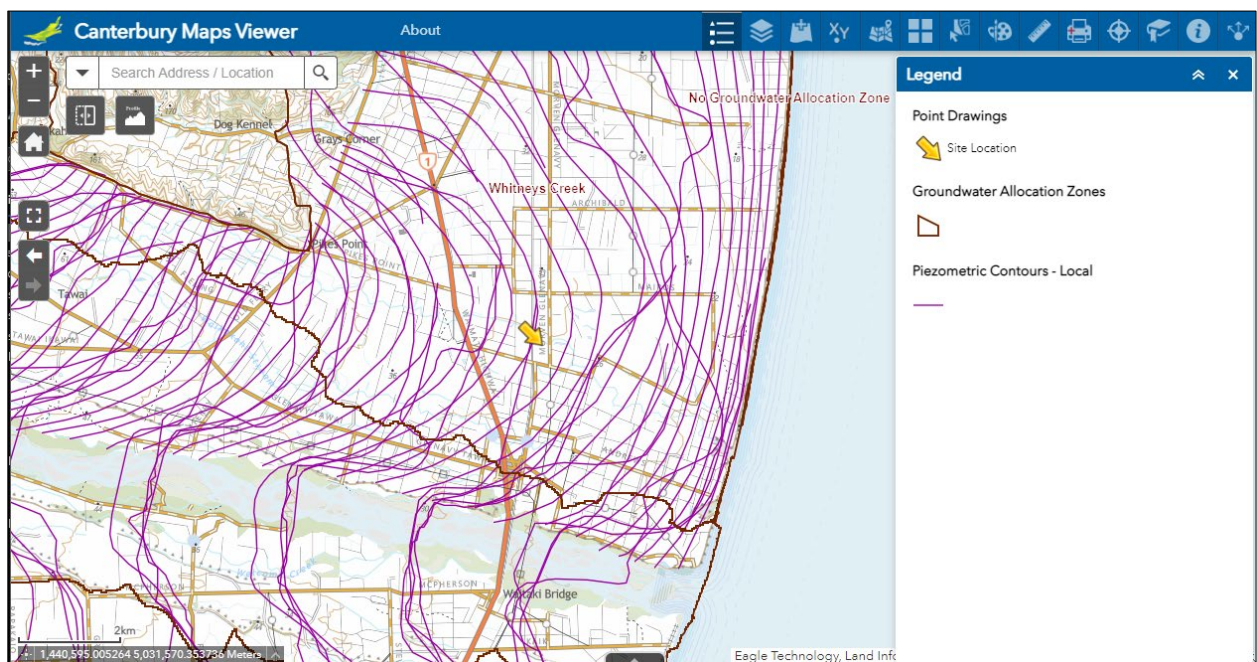


Figure 11: Whitneys Creek Groundwater Allocation Zone.

- ECAN has groundwater quality data from two bores in the vicinity of the Project Kea site (J41/0036 upgradient, and J41/0035 downgradient). The summary of the available data is set out in **Table 8**.

Table 8. Summary of groundwater quality for nearby bores

Measurement		J41/0036 (upgradient)		J41/0035 (downgradient)	
		14/02/1996	06/05/1996	23/02/1996	23/05/1996
Alkalinity, Total	g/m ³ as CaCO ₃	106	113	179	69
Ammoniacal Nitrogen	mg/L	0.042	0.027	<0.005	0.005
Calcium	mg/L	33	31	19	20
Chloride	mg/L	11	16	10	3
Conductivity	mS/m	30.1	29.7	20.8	21.5
Difference in Ion Balance	%	7.7	2.1	28.5	9.8
Faecal Coliforms	cfu/100mL	>400	80	<1	<1
Free Carbon Dioxide	g/m ³ at 25°C	28	47	47	28
Hardness, Total	g/m ³ as CaCO ₃	43	100	66	68
Iron, Total	mg/L	0.4	0.05	<0.120	<0.050
Magnesium, Dissolved	mg/L	5.7	6.1	4.4	4.4
Manganese, Total	mg/L	0.16	0.13	<0.04000	<0.01000
Nitrate Nitrogen	mg/L	0.97	2.6	3.1	3.2
Nitrite Nitrogen	mg/L	0.028	0.027	<0.006	<0.004
pH		6.8	6.6	6.8	6.6
Potassium, Dissolved	mg/L	2.3	2.6	1.4	1.5
Sodium, Dissolved	mg/L	18	19	17	17
Sulphate	mg/L	20	16	15	15
Sum of anions	meq/L	2.53	2.82	3.75	1.76
Sum of cations	meq/L	2.96	2.94	2.09	2.14
Total Coliforms	cfu/100mL	>400	150	20	17
Total Phosphorus	g/m ³	0.075	0.079	<0.008	<0.008
Total Dissolved Solids	mg/L	180	-	140	-
Total BOD	g O ₂ /m ³	3	-	<2.000	-

3.11 Ground water and surface water interaction

The Surface and Groundwater Assessment states that:

- The Waitaki River is a regional groundwater sink in the area.

- Not enough information is available on Whitneys Creek connection to groundwater, although it is expected that it is primarily sourced by groundwater, it may lose water into the aquifer in some places at sometimes.
- The surface-groundwater relationship can be inferred from piezometric contours, which indicate that Whitneys Creek does not seem to receive groundwater at or near the Project Kea site. The available piezometric contours point in the downstream direction where they cross the stream. Although seasonal high groundwater levels could lead to groundwater contributing to the stream temporarily, this would only occur over a limited period in the dry season. Such contributions, at the Project Kea site and in the region in general, could be significantly reduced with ongoing changes in irrigation infrastructure (piping of irrigation races) and practices (conversion of border dike to pivots).

3.12 Existing stormwater runoff

The Project Kea site is currently grassed and generally falls eastwards to Whitneys Creek and the Morven Glenavy Road. Stormwater runoff from the northern area of the site discharges directly to Whitneys Creek and the southern area to the water table drain along Morven Glenavy Road, which falls southwards to meet the water table drain along Morven Glenavy Road along the southern boundary of the site.

There is an existing 600 mm stormwater culvert below the SIMT, near the centre of the western boundary of the site (refer **Figure 10**). This pipe discharges to an open channel that crosses the site and exits the eastern boundary via a culvert below Morven Glenavy Road, and then discharges to Whitneys Creek.

3.13 Natural hazard risks – flooding

The WDP Flood Risk Map shows that the Project Kea site as located being within a Flood Risk Area. While the WDP provides definitions of what are deemed to be “Low Flood Risk” and “High Flood Risk”, it does not contain site specific detailed information to specify the category the site may fall within.

A Flood Assessment Report (Technical Report 11) has been prepared to assess whether the site is located within a “Low Flood Risk” or “High Flood Risk” area as defined by the WDP. The inputs into the flood modelling assumptions were informed by discussions and recommendations of ECAN staff. The flood modelling was completed for both the pre-development and post development scenarios. The findings of the pre-development scenario are outlined below.

The pre-development scenario assesses flooding based on the existing ground surface information.

With respect to the pre-development scenario, the Flood Assessment Report states that:

- **Figure 12** illustrates the pre-development flooding depths in the vicinity of the Project Kea site.

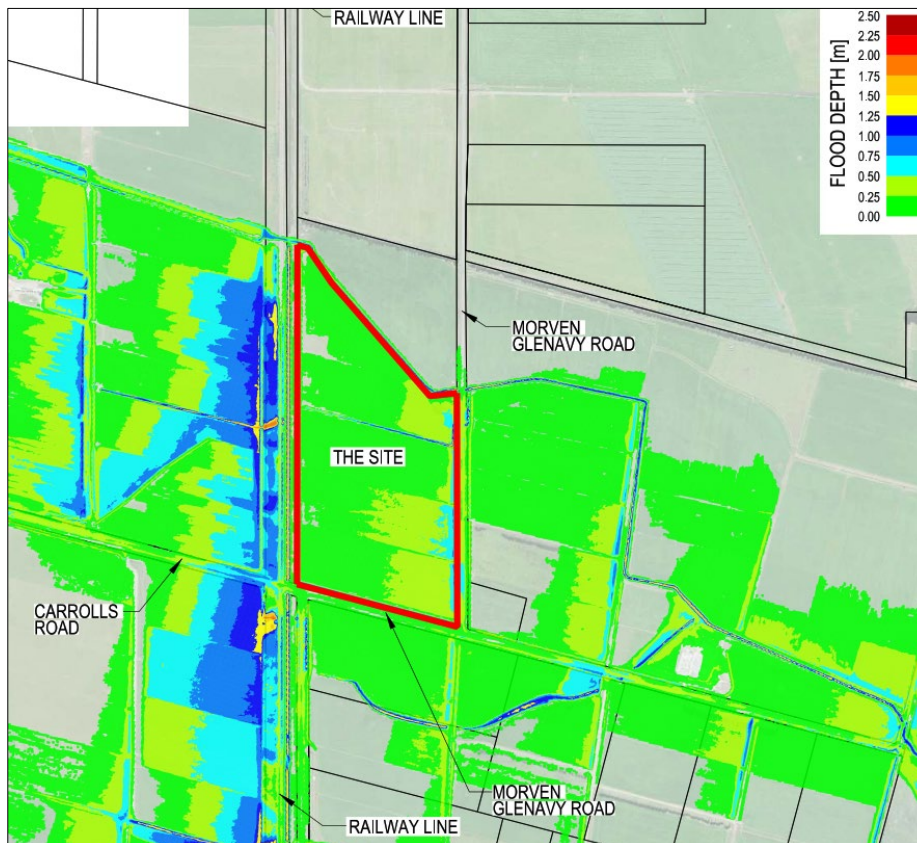


Figure 12: Flooding depths for pre-development scenario for Project Kea site.

- Flood modelling results indicate that in the pre-development scenario, the site is fully flooded during a 500-year event. The predicted flooding depths are up to 0.6 m, with velocities up to 0.5 m/s on the site (except within Whitneys Creek and drainage channels, where flow depth and velocities are higher).

This confirms that the Project Kea site is located within a “Low Flood Risk” as defined in the WDP:

“means areas where the product of water depth (metres) times velocity (metres per second) is less than 1 in areas subject to inundation during an event of 0.2% Annual Exceedance Probability”.

- The flood modelling indicates that the existing drainage channels upstream of the Project Kea site spread the flood waters across farmland over a wider area. Additionally, the existing railway

embankment acts as a barrier to the flood waters with water flowing onto the site from Whitneys Creek to the north and from Morven Glenavy Road to the south, rather than over the rail embankment.

- **Table 9** below sets out the predicted flood depths, levels and velocities for the pre-development scenario for selected locations adjacent to the Project Kea site.
- Maximum flood levels for the pre-development scenario are set out in **Table 9**.

Table 9. Pre-development flood depths, levels and velocities.

No.	Location	Flood Depth (m)	Flood Level (RL m)	Flood Velocity (m/s)
1	Whitneys Creek (north-western corner of site)	0.71	27.70	1.47
2	Whitneys Creek (north-eastern corner of site)	1.22	26.06	1.19
3	Morven Glenavy Rd (mid-eastern site boundary)	0.24	26.34	0.22
4	Morven Glenavy Rd (south-eastern corner of site)	0.13	26.08	0.88
5	Adjacent property (south of site)	0.75	24.95	0.30
6	Adjacent property (southeast of site)	0.15	26.21	0.43
7	Morven Glenavy Rd (south-western corner of site)	0.02	27.11	0.27
8	SIMT Railway (south-western corner of site)	0.42	27.82	0.52
9	SIMT Railway (mid-western boundary)	0.34	27.95	0.30
10	SIMT Railway (north-western corner of site)	0.00	28.50	0.00

3.14 Air quality matters

An Air Quality Emissions Assessment (Technical Report 5) has been prepared to assess the effects of Project Kea on air quality.

With respect to meteorology, the Air Quality Emissions Assessment states that:

- The topography of the surrounding area can influence wind speed and direction, and therefore, affect air pollutants transportation. The area around the Project Kea site is relatively flat and the terrain

features will have minimal influence on the winds experienced in this area. The nearest publicly available meteorological station is located in Waimate.

- The distribution of hourly average wind speeds and directions measured at Waimate for 2019 to 2020 is shown in **Figure 13**. The windrose shows that the predominant winds are from the northeast.

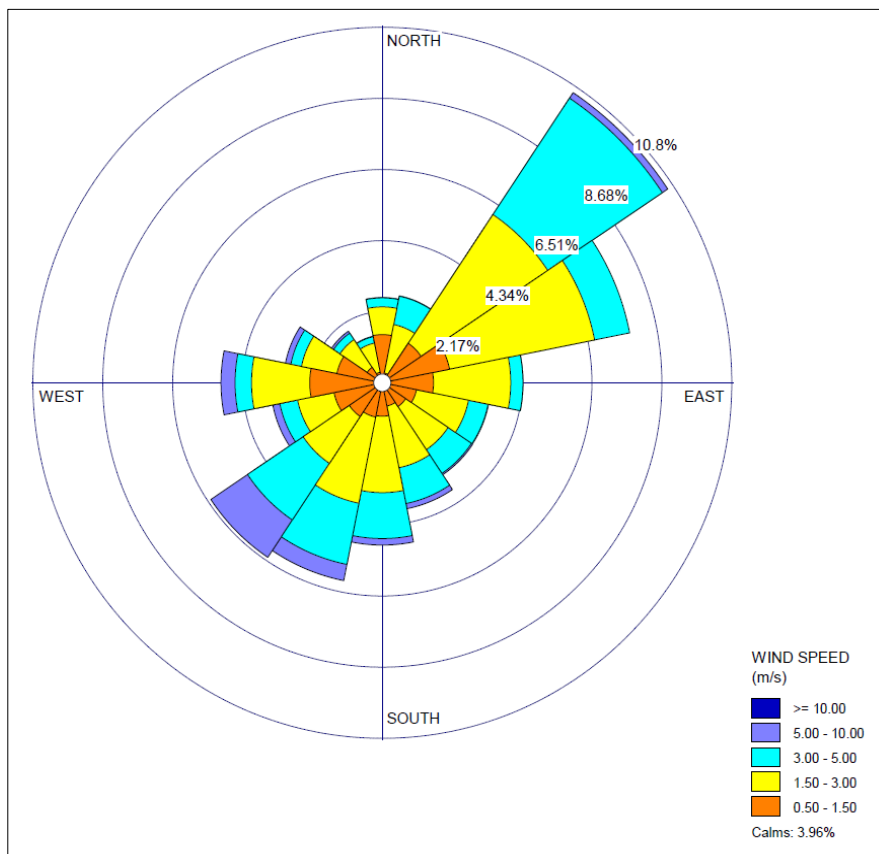


Figure 13: Wind speed and wind direction distribution for Waimate Meteorological Monitor (1-hour average) (2.5m height).

With respect to airshed matters, the Air Quality Emissions Assessment states that:

- Airsheds are areas designated by councils where ambient concentrations of pollutants (primarily PM₁₀) could reach levels higher than the NESAQ. The closest airsheds to the Project Kea site are Waimate (18 km away) and Oamaru (16 km away). The locations of these airsheds are shown in **Figure 14**.
- The Waimate airshed is considered polluted under section 17(4) of the NESAQ, and it is monitored.
- The Oamaru airshed is not deemed to be polluted and is not monitored.

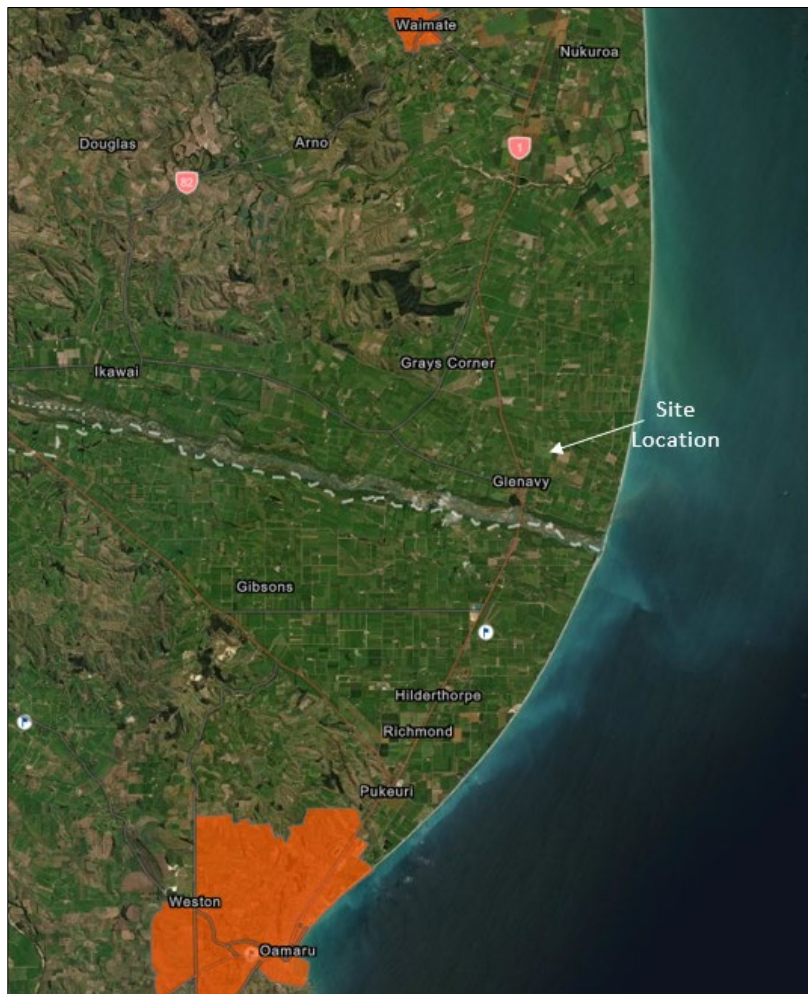


Figure 14: Waimate and Oamaru Airshed locations.

With respect to background air quality, the Air Quality Emissions Assessment states that:

- The Project Kea site is located in a rural area and distant from large townships and cities. Consequently, there are no air quality monitoring stations in the immediate vicinity. The absence of air quality monitoring in these rural areas is due to the general expectation that air quality is at an acceptable level.
- The closest air quality monitoring station, operated by ECAN, is located in Waimate, 18 km northwest of the Project Kea site. As the Waimate airshed is polluted, the monitoring data is unlikely to be representative of background concentrations at the Project Kea site.

- Waka Kotahi calculated background concentrations for the entire country, including the area unit in which the Project Kea site is located. This is more representative of the background concentrations than data from the Waimate station.
- As there is no 24-hour PM₁₀ concentration, the background PM₁₀ concentration is calculated based on guidance from the Auckland Council. Its monitoring data indicates that 24-hour PM_{2.5} concentrations are 37% of 24-hour PM₁₀ concentrations in rural areas.
- **Table 10** sets out the background data used in the Air Quality Emissions Assessment, which is based on Waka Kotahi's background data (area unit Waihao) and the default values from Ministry for the Environment *Good Practice Guide for Assessing Discharges to Air from Industry* (November 2016) (where no background concentrations could be determined).

Table 10. Background air quality data.

Pollutant	Averaging Period	Concentration (µg/m ³)	Source
PM ₁₀	24-hour	10.0	Waihao
	Annual	8.1	Waihao
PM _{2.5}	24-hour	3.7	Waihao
	Annual	2.3	Waihao
Nitrous Dioxide (NO ₂)	1-hour	37	Waihao
	24-hour	23	Waihao
	Annual	3	Waihao
Sulphur Dioxide (SO ₂)	1-hour	20	MfE ID
	24-hour	8	MfE ID
Carbon Monoxide (CO)	1-hour	5,000	MfE ID
	8-hour	3,000	MfE ID
Volatile Organic Compounds (VOC)	All averaging periods	0 ^[1]	-

Dioxins and Furans	All averaging periods	3.8 fg I-TEQ/m ³	MfE, 1999 ^[2]
Notes			
[1] Assumed to be negligible given the lack of nearby anthropogenic sources.			
[2] Mean rural South Island concentration (Culverden) (Ministry for the Environment, 1999).			

3.15 Cultural values

Project Kea is located in rohe Te Rūnanga o Waihao, Te Rūnanga o Arowhenua, Te Rūnanga o Moeraki and Te Rūnanga o Ngāi Tahu. In order to avoid duplication, a comprehensive description of cultural values which the applicant understands are relevant to the site and general location, together with the applicant's assessment of effects on cultural values is described in Section 6.17.

4 PROJECT KEA - DESIGN AND OPERATION

4.1 Summary of the proposal

The key elements of Project Kea that are subject to this resource consent application are:

- The Project Kea facilities consist of the main powerhouse building (52.5m tall); an exhaust stack (75m tall); administrative building; ancillary buildings (wastewater treatment plant, water pump building, workshop building, temporary storage of baled C&D waste, hazardous materials storage); a rail siding; and ancillary access, parking and manoeuvring areas.
- Two vehicle accesses into the Project Kea site are proposed from Morven Glenavy Road:
 - A 20 m wide vehicle crossing for heavy vehicles (trucks) on the southern boundary (close to Carrolls Road) to access the approach bridge to the waste bunker in the main powerhouse building; and
 - A 11 m wide vehicle crossing for light vehicles on the eastern boundary from Morven Glenavy Road to access the 70 car parking spaces for staff and visitors to the site.
- A rail siding is proposed along the western boundary, beside the SIMT.
- Waste will initially be delivered by road only. Once commercial arrangements with KiwiRail are concluded then waste will ultimately be delivered by both road and rail.
- Morven Glenavy Road, Carrolls Road, the Carrolls Road and SH1 intersection, and the railway level crossing (near Carrolls Road) will be upgraded to accommodate the safe operation of the roading network in the proximity of the Project Kea site.
- The Project Kea facility will operate for 24 hours per day and 365 days per year. It will have shifts of 14 operational staff working 7 days per week (Monday to Sunday) and 32 management, administrative and support staff working 5 days per week (Monday to Friday).
- The EfW Plant will consume 1,000 tonnes per day and 365,000 tonnes per year of waste feedstock, consisting of MSW and C&D waste which would otherwise be destined for landfill. The waste feedstock is to be sourced primarily from the Canterbury and Otago regions.

- The waste feedstock must meet the specified waste acceptance criteria in order to be used in the EfW Plant. The Project Kea facility is not a hazardous waste disposal facility.
- The EfW Plant will use proven Best Available Techniques for energy recovery, treatment of air emissions, recycling of water, a recovery of by-product streams for reuse in industry.
- The EfW Plant will generate 30MW of electricity under Output Mode 1 or 20MW of electricity plus 40 tonnes per hour of steam under Output Mode 2. The generated electricity will be connected to the local supply network.
- The EfW Plant will produce the following main by-product streams which are of value:
 - 80,000 tonnes of grate ash per year for use as an aggregate material.
 - 20,000 tonnes of industrial slag per year for use as an aggregate material.
 - Recover 5,500 tonnes of metal per year for in recycling.
- The combustion emissions will undergo extensive treatment and cleaning before being discharged to air via the stack.
- Domestic wastewater from the administrative building, treated separately, will be discharged on-site to land via drip field irrigation.
- The EfW Plant does not produce a process wastewater stream, as process wastewater is recycled within the Plant.
- The EfW Plant will use approximately 2,500 m³ of water per day. A separate resource consent application for ground water take and use is currently being prepared and will be lodged with ECAN shortly.
- All aspects of the plant's operations and environmental performance will be actively monitored. Realtime information will be available online to both regulatory authorities and the public.

4.2 Site layout

Project Kea site layout and location of buildings is shown in **Figure 15**.

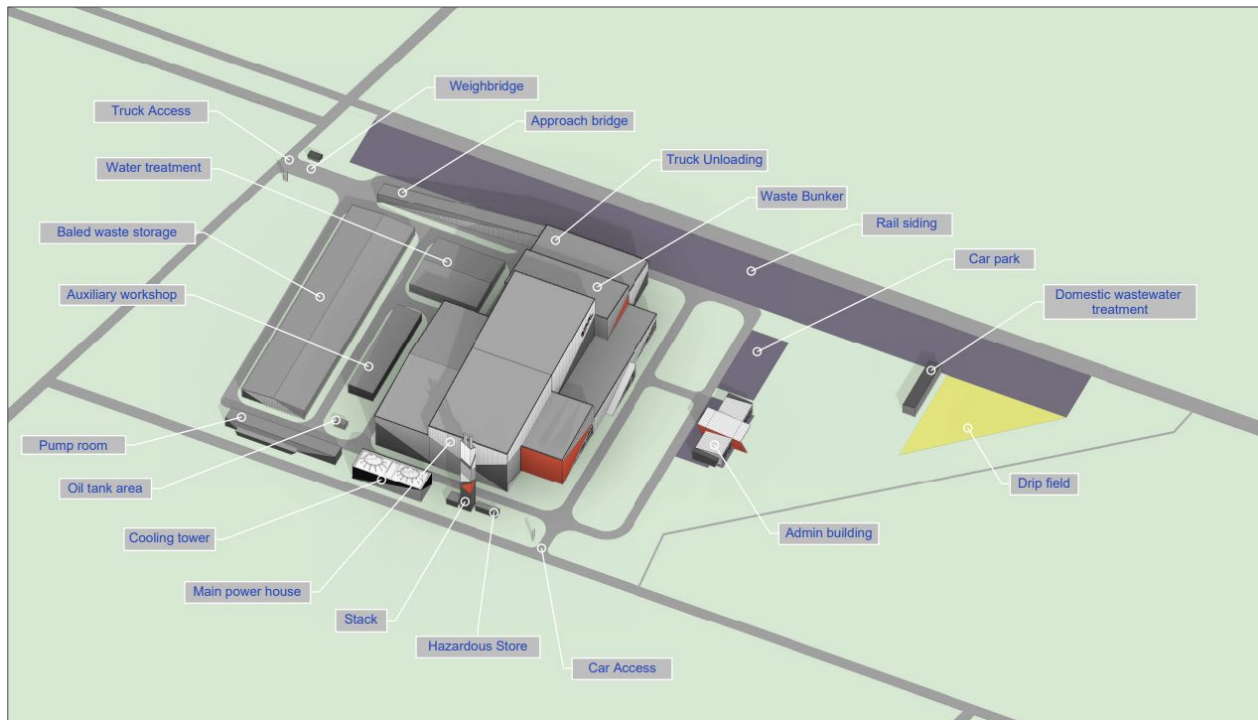


Figure 15: Site layout concept.

The site layout concept includes:

- Main powerhouse building located centrally within the site, with an approximate area of 20,000 m² and building height of 52.5 m. This building will contain the internal unloading area and waste bunker as well as the systems for combustion, electricity generation, flue gas treatment and solid by-product treatment.
- An exhaust stack located beside the main powerhouse building, with a height of 75 m.
- The main powerhouse building, and the exhaust stack are the most visible elements of the facility given their respective heights.
- Ancillary workshop building is to be located beside the main powerhouse building, having an approximate area of 1,410 m², and building height of approximately 17m.

- An ancillary building for temporary storage of baled waste, industrial slag and vitrified fly ash is to be located on the southern part of the site, with an area of 8000 m² and building height of approximately 12 m.
- An administrative building is to be located north of the main powerhouse building, with an area of approximately 3,300 m² and building height of approximately 15 m. It will contain the offices of the management staff, as well as the staff breakroom and amenity areas.
- The vehicle parking areas for staff and visitors is to be located beside the administrative building.
- Rail siding area and a container handling area is to be located along the full length of the western boundary of the site, approximately an area of 21,200 m².
- Various other smaller ancillary buildings are proposed, such as the wastewater treatment plant, water pump building, which are low level buildings of generally less than 7m in building height.
- The drip field for the discharge of treated domestic wastewater is to be located in the north-western part of the site.
- Heavy vehicles and light vehicles have separate access into the site. Heavy vehicle access is located along the southern boundary, leading into the bridge to the main powerhouse building to enable waste feedstock to be disposed of in the waste bunker area. Light vehicle access is located along the eastern boundary, from Morven Glenavy Road, leading into the car park area for staff and visitors to the site.

4.3 Site layout – 3D model simulations

A 3D model of the Project Kea site layout has been prepared. These are shown in a series of illustrations in **Figure 16** below.

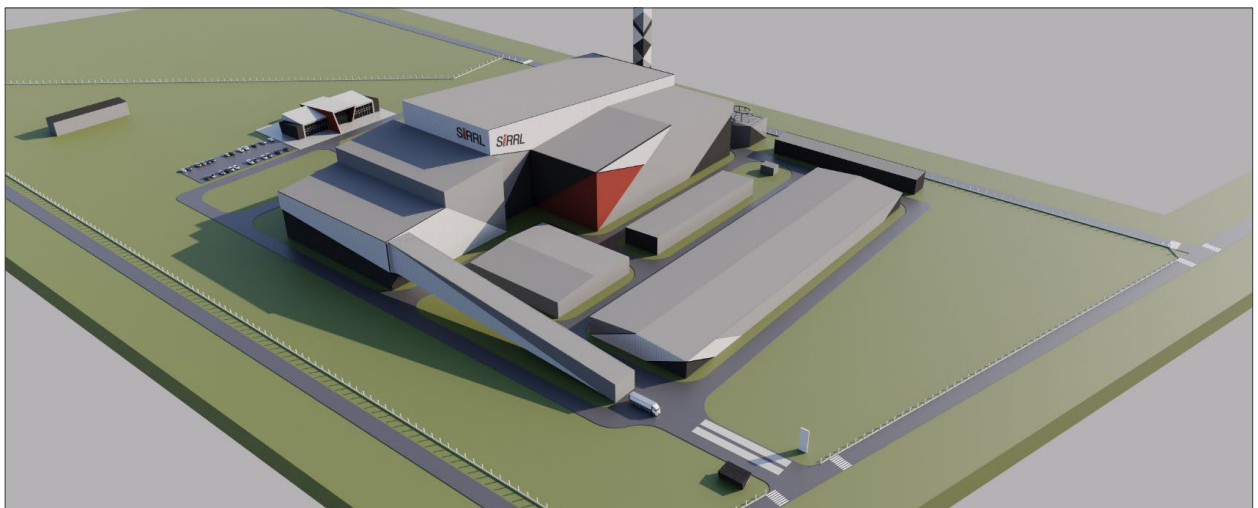
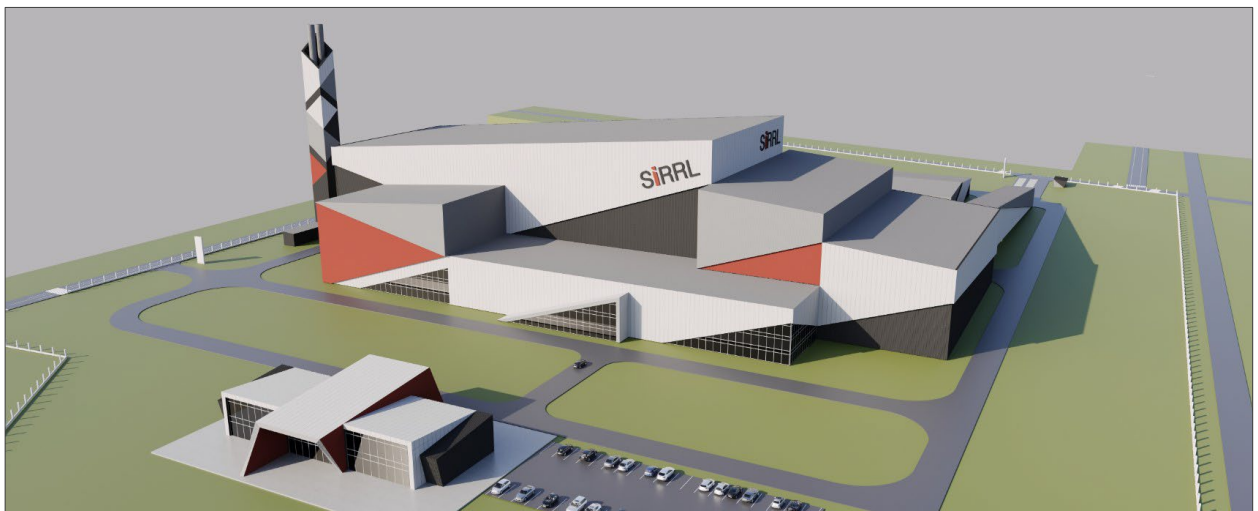
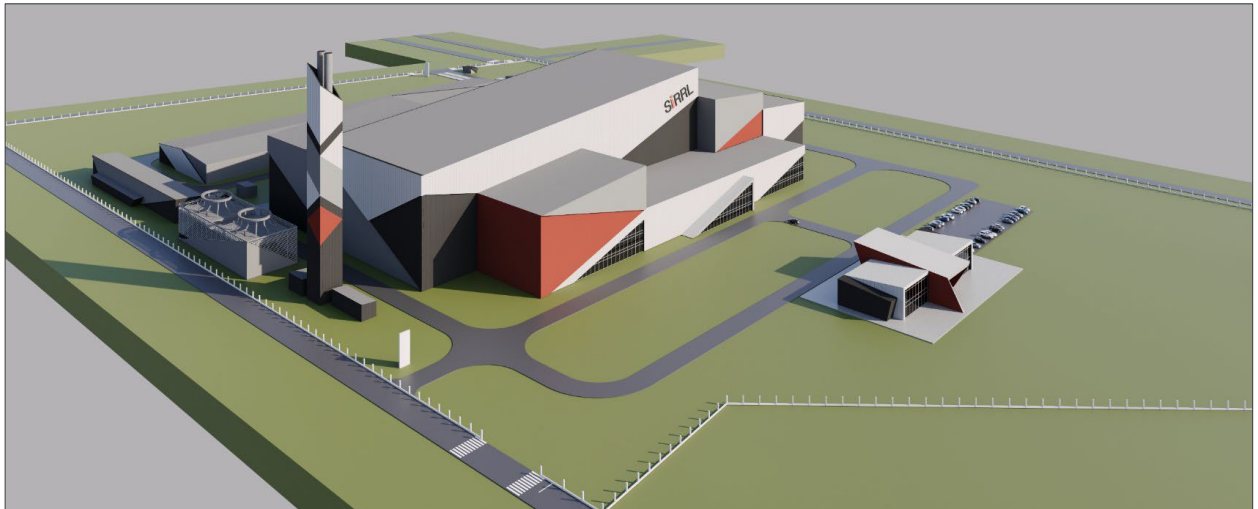


Figure 16: 3D model illustrations.

4.4 Energy from Waste Plant – Design and operation matters

The Operational and Technical Overview Report (Technical Report 1) sets out the details pertaining to the design and operation of Project Kea. This section provides an overview of the proposed waste acceptance at the EfW Plant and the key operational design features.

4.4.1 Operating hours

The EfW Plant will operate for 24 hours per day and 365 days per year. Annual shutdowns will be in a staged manner to undertake scheduled preventative maintenance while not impacting the continuity of the plant's waste collection and processing.

4.4.2 Waste feedstock delivery method

The delivery of the waste feedstock will have a Stage 1 and Stage 2 solution:

- Stage 1: At commencement of the operation the EfW Plant feedstock will be via trucks only, which will access the site from the entrance off Morven Glenavy Road (near Carrolls Road), across the approach bridge and into the main powerhouse building. The trucks will then tip the waste into the internal waste bunker. The plant will have no external exposed storage of waste.
- Stage 2: Following the successful conclusion of discussions with KiwiRail, waste feedstock will be received via both road and rail. The intent is to maximise the use of rail for delivery. Waste arriving by rail would be containerised or baled, and site design incorporates facilities for bales to be stored in an enclosed area (thereby mitigating any odour, visual or windblown litter effects).

4.4.3 Proposed waste acceptance criteria

One of the core objectives of Project Kea is to provide a more sustainable alternative to the disposal of MSW and construction waste to landfills. As a privately run EfW Plant, Project Kea will only accept MSW from entities that have signed and hold a valid waste supply contract. The feedstock will only be accepted where it meets the requirements set out in the Waste Acceptance Criteria (Technical Report 16).

In brief, the Waste Acceptance Criteria is:

- The following waste will not be accepted:

- Hazardous waste (as defined under the Resource Management (National Environmental Standards for Air Quality) Regulations 2004); and
- Contaminated soil.
- MSW accepted at Class 1 or 2 landfills will generally be accepted.
 - “Municipal Solid Waste” is defined within the Technical Guidelines for Disposal to Land, prepared by the Waste Management Institute of New Zealand, 2016 as:

“Any non-hazardous, solid waste from household, commercial and/or industrial sources. It includes putrescible waste, garden waste, biosolids, and clinical and related waste sterilised to a standard acceptable to the Department of Health. All municipal solid waste should have an angle of repose of greater than five degrees (5) and have no free liquids.”
- Acceptable MSW types include:
 - Construction and demolition (“**C&D**”) waste;
 - Household waste;
 - Commercial waste;
 - Industrial waste; and
 - Treated hazardous waste (i.e. waste that has been treated so it is no longer hazardous).
- While technically acceptable, the following MSW will be discouraged due to its low calorific value:
 - Clean fill material; and
 - Managed fill material.
- Special waste may be accepted from a Waste Supply Contractor where the waste manifest is received at least 5 days, and an acceptance certificate is issued at least 24 hours, in advance of consignment. The waste manifest must include for:
 - Potentially hazardous waste, the results of any testing of waste;
 - Treated hazardous waste, suitable information to confirm that the waste is not prohibited;

- Potentially malodorous waste, suitable information to determine whether the waste is acceptable (i.e. odour potential, rate of delivery, the timing of delivery, any pre-treatment carried out on the waste; and
- Malodorous waste that requires pre-treatment, confirmation that pre-treatment has occurred.

The following waste control measures are proposed, based on actions and historical performance at municipal landfills in New Zealand and international EfW Plants. The main elements are:

- Waste supply contracts, including recycling reward systems.
- Random and pre-acceptance testing
- Gatehouse controls
- Community complaints
- Rejected waste
- Notification of Regulatory Authorities

4.4.4 Overview of main processes within the EfW Plant

The EfW Plant has four main processes that work in parallel to recover energy, generate electricity and process by-product streams. These are:

- Process 1: Combustion and flue gas treatment
- Process 2: Steam and electricity generation
- Process 3: Solid by-product streams treatment
- Process 4: Factory wastewater treatment

An overview of the operation of an EfW Plant is illustrated in **Figure 17**.

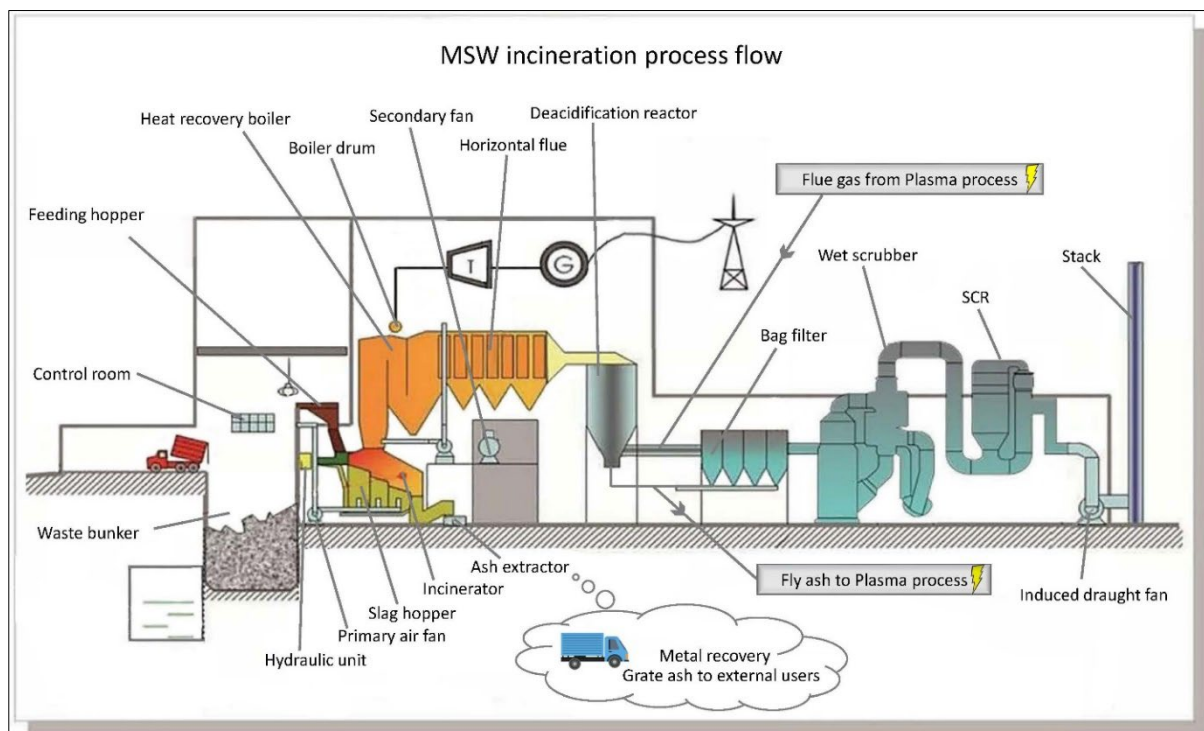


Figure 17: Overview of operation of an EfW Plant.

Process 1: Combustion and flue gas treatment

The following process recovers heat energy from the waste and treats the combustion flue gas:

- **Receival:** Trucks drive into the main building. The unloading floor is fully contained within the main building to prevent any odour emissions or risk of windblown litter.
- **Internal waste bunker:** Trucks tip the waste into the bunker which has a storage volume of around seven days. Moisture in the waste can form a leachate which is collected at the base of the bunker for on-site disposal into the furnace.
- **Furnace:** Using a grapple crane, the waste is transferred from the bunker, into the feeder chutes and onto the furnace grate where it is combusted at a temperature of no less than 850°C. The grate is specially designed and uses drying and combustion sections using forced air from underneath.

Diesel is used as the start-up fuel until combustion temperatures are maintained above 850°C after which the furnaces run solely on the feedstock.

- **Spraying:** The high temperature flue gas is sprayed in stages with ammonia water, slacked lime solution, dry slacked lime and activated carbon to reduce its temperature and remove NO₂ products, acid products, dioxins and heavy metal compounds.
- **Baghouse filtration:** The flue gas stream, which now contains lime, activated carbon and captured contaminants, flows through baghouse filters to remove particulates. These particulates are known as 'fly ash' and are sent to the plasma process for treatment.
- **Wet scrubber:** The flus gas stream is sprayed with a sodium hydroxide solution to 'scrub' particulates and contaminants. The liquid stream with contaminants is removed for on-site treatment and recovery.
- **Selective catalytic reduction:** The stream is sprayed with an ammonia solution to further decompose residual NO₂ and dioxin compounds.
- **Discharge:** The cleaned combustion emissions are discharged from the exhaust stack.

An overview of the gas flue treatment system is set out in **Figure 18**.

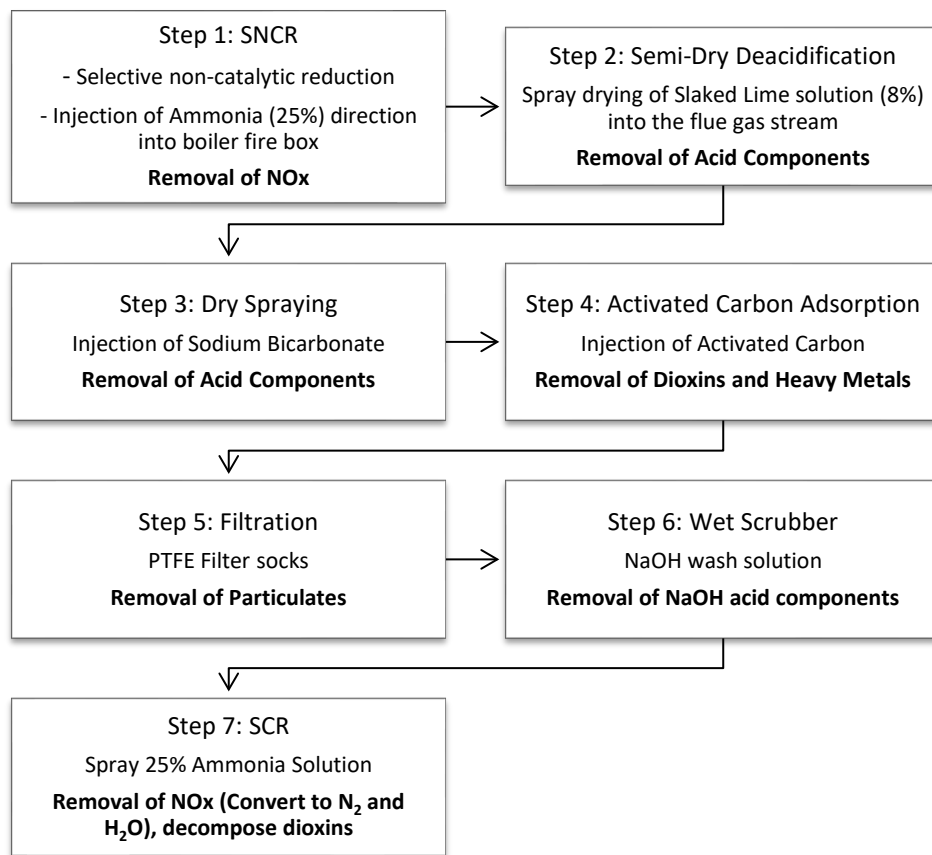


Figure 18: Main flue gas treatment system.

An overview of the vitrification flue gas treatment system is set out in **Figure 19**.

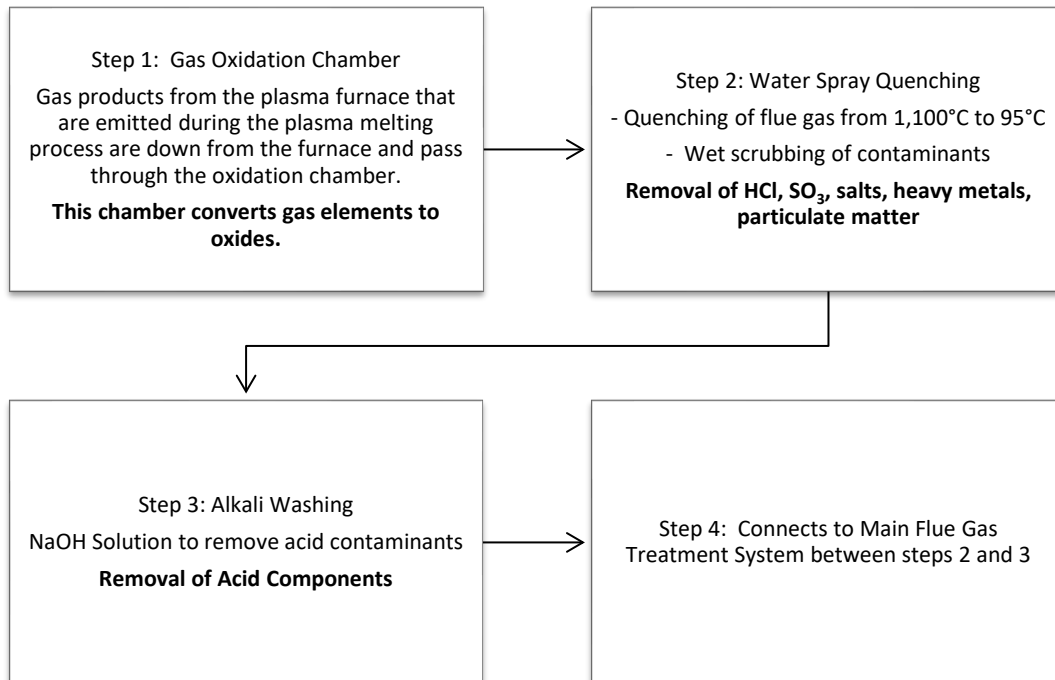


Figure 19: Vitrification flue gas treatment system.

Process 2: Steam and electricity generation

The following process converts the recovered heat energy into electricity:

- **Boiler feedwater system:** Boiler feedwater is supplied from a feedwater tank, chemically treated to protect the internal boiler surfaces from corrosion and scale, de-aerated and then supplied at pressure into the boiler drum.
- **Steam generation:** The walls and roof of the furnace are constructed of pipes which hold water. This water boils and creates steam which is collected in the steam drum on top of the furnace.
- **Superheater:** Saturated steam is drawn off the steam drum and passed through a superheater. This allows further energy to be recovered from the combustion gas stream into the steam flow.

- Steam turbine: The superheated steam is fed to the steam turbine which drives a generator. The turbine has stages which allows reduced pressure steam to be taken off part way for uses other than generating electricity. This allows the facility to have two modes of operation:
- Output Mode 1: 100% electricity (circa 30 MW); or
Output Mode 2: 70% electricity (circa 20 MW) and 30% steam (up to 40 T/h).
- Electrical generator: Electricity is generated to supply the local electricity network. The final output voltage will be determined during detailed design stage in conjunction with the local network operator (either 33kV or 110kV).
- Steam condenser: Low pressure steam exiting the turbine which has given up the majority of its energy is then condensed back into water for recycling back to the boiler feedwater tank. Condenser cooling is achieved through the use of cooling towers.

Process 3: Solid by-product streams treatment

The primary by-products which require treatment are grate ash and fly ash, discussed below.

Grate ash treatment:

- Cooling and collection: Once combustion on the furnace grate is complete, the grate ash falls from the end of the grate into a water bath. The water bath functions as a vacuum seal for the furnace and also cools the grate ash prior to it being removed.
- Metal recovery and grading: The grate ash stream is then passed through a metal recovery process to recover both ferrous and non-ferrous metals. Following metal recovery, it is graded and further processed depending upon the needs of the customer.
- Export: The plant will produce approximately 80,000 tonnes of grate ash per year. Communications are currently on-going with potential customers to use grate ash as a roading base material. Samples are currently being analysed and tested with a view of obtaining certification in New Zealand. Until certification is obtained, the grate ash would be used as a landfill cover.

Fly ash treatment:

- Additives: Raw fly-ash collected from the baghouse filters and additives are held in silos prior to being mixed and fed into the plasma furnace.

-
- Plasma furnace: The fly ash and additives mix are fed into the plasma furnace where it is subject to temperatures of 8,000°C to 10,000°C. The mix is melted into molten liquid.
 - Industrial slag: The molten liquid is tapped from the furnace and placed into a water quenching bath. This rapid cooling freezes the molten fly ash which creates a vitrified material (industrial slag).
 - Slag milling and sizing: The slag is removed from the quenching bath, ground and is then available for use as an aggregate.
 - The plant can produce approximately 20,000 tonnes of grate ash per year. Communications are currently on-going with potential customers regarding the use of the slag in concrete, concrete block manufacturing and as a road base aggregate. Samples are currently being analysed and tested with a view of obtaining certification in New Zealand. Until certification is obtained, the industrial slag product would be used as a landfill cover.
 - Gas oxidation chamber: Plasma furnace gas which is emitted during the melting process are drawn from the furnace and passed through an oxidation chamber which converts gas elements into oxides.
 - Gas cooling and purification: The oxidised gas is cooled using a water spray and further purified through a caustic solution.
 - Gas into flue gas treatment system: The semi-cleaned and cooled gas stream is fed into the flue gas treatment system prior to the dry lime addition step for final cleaning.
 - Plasma water treatment: a dedicated water treatment system (discussed below) is used to treat the contaminated water coming from the plasma gas purification process.

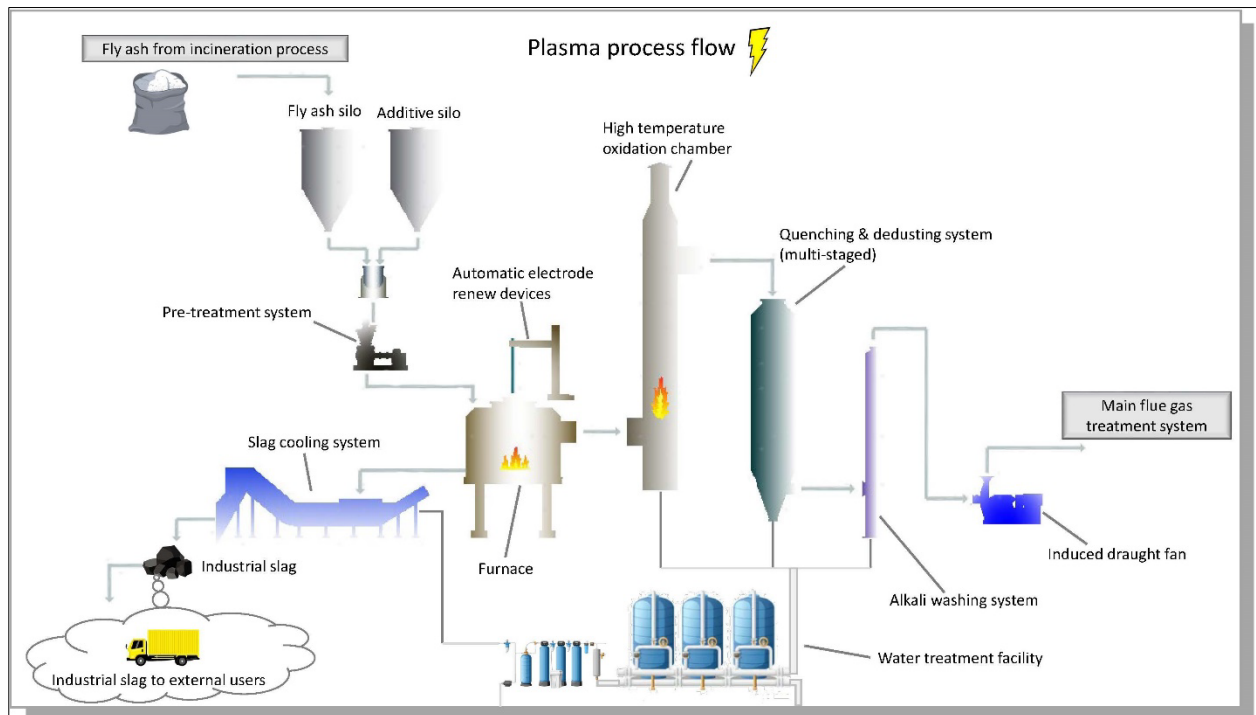


Figure 20: Plasma treatment process of fly-ash.

Process 4: Factory wastewater treatment

Two wastewater treatment systems will be in place to enable 100% recycling of process wastewater.

Wastewater from the FGT

Wastewater from the combustion flue gas treatment process predominately comes from the wet scrubber.

Treatment of the FGT wastewater stream involves the removal of contaminants so that the liquid can be recycled, and the contaminants can be appropriately disposed of back into the combustion, flue gas treatment and plasma process.

The treatment involves the removal of contaminants through successive stages of flocculation and sedimentation, filtration, and reverse osmosis. The removed contaminants are recycled to the furnace and the recovered water returned to the process water storage tank for reuse.

Wastewater from the Plasma Treatment Process

Wastewater from the Plasma Treatment Process predominantly comes from the wet scrubbing and quenching step.

The by-product streams of potassium chloride, sodium chloride and calcium sulphate are recovered from the treatment process for export to customers.

4.4.5 Waste bunker design and protection of groundwater

The bunker is constructed with a central core of reinforced concrete with a number of waterproof impermeable layers applied to both the inside and the outside of the bunker structure. This ensures that the leachate is sealed on the inside of the bunker and that groundwater is sealed on the outside of the bunker. The main bunker floor is approximately 8 m deep and the localized sump is approximately 10 m deep (i.e. a further 2 m lower than the bunker floor).

Bunker Floor

Figure 21 below outlines the preliminary design of the bunker floor. Final details will be determined following detailed structural design.

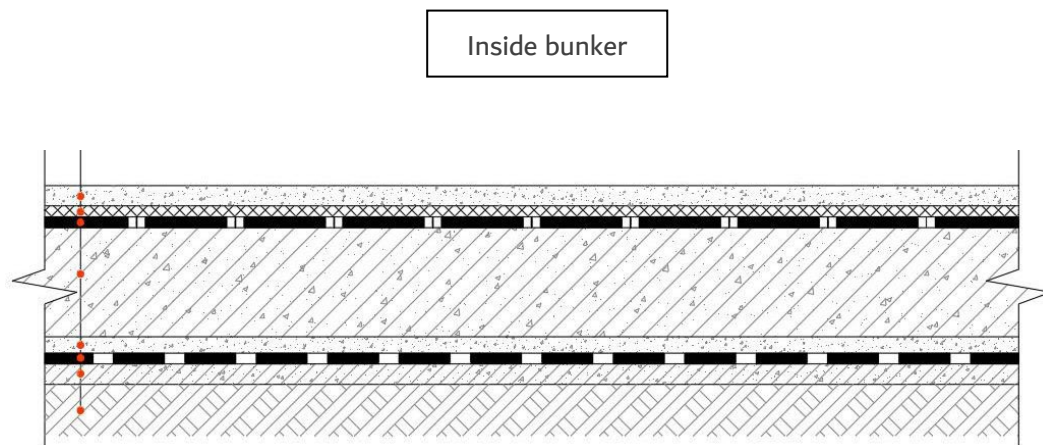


Figure 21: Bunker floor design.

The individual structural layers of the bunker floor (inside to outside) are:

1. 100mm thick polymer fiber concrete – contoured to create 1% fall

2. Epoxy-Coal Tar Based waterproofing. DFT not less than 1mm.
3. Deep Penetrating Sealer (DPS) waterproofing
4. In-situ poured reinforced concrete slab
5. 50mm thick fine grade concrete protective layer
6. 4mm thick SBS modified asphalt layer
7. 100mm thick concrete base
8. Compacted sub-grade

Bunker Walls

Figure 22 below outlines the preliminary design of the bunker walls. Final details will be determined following detailed structural design.

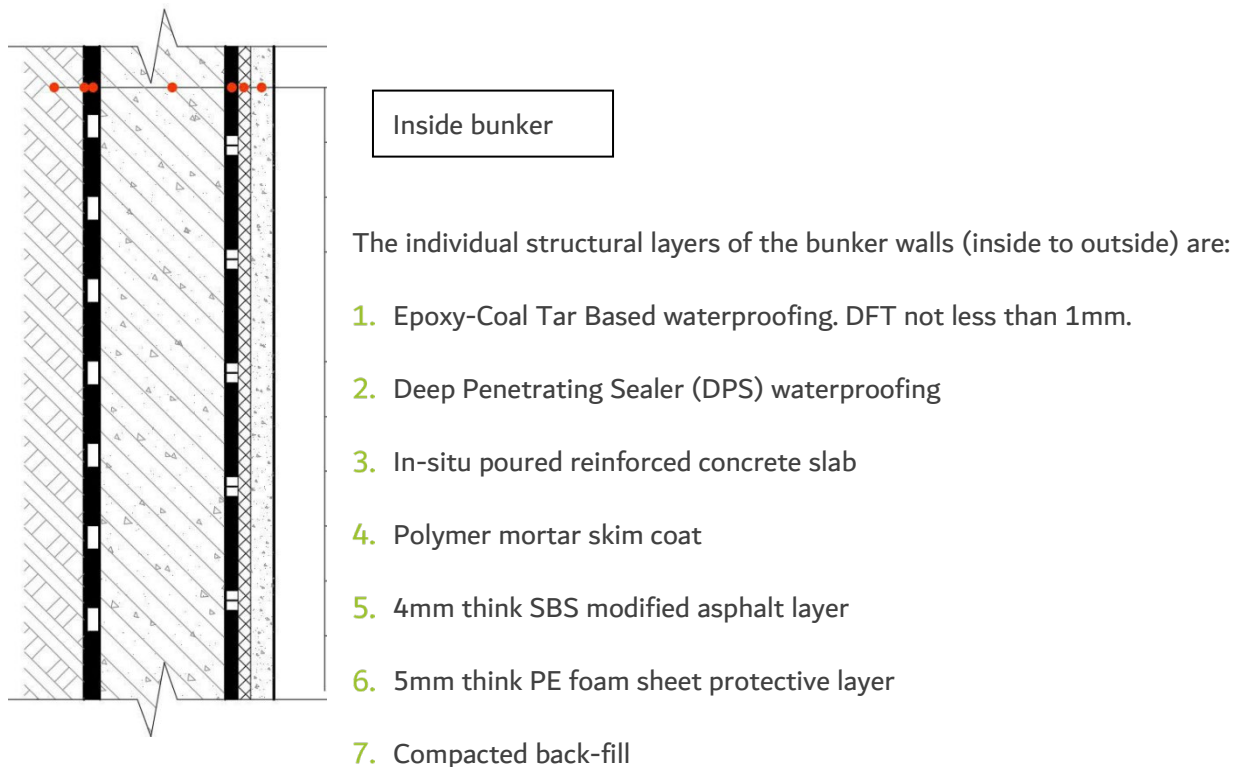


Figure 22: Bunker wall design.

Hydrostatic gradient

The ground water levels on site are expected to fluctuate between 2 mbgl and 8 mbgl. Please refer to the Surface and Groundwater Assessment (Technical Report 17).

The base of the bunker will be around 8m below existing ground level with the local sump used for leachate collection being 10mbgl.

The following factors exist which provide additional protection to the aquifer in the extremely unlikely circumstance whereby the leachate sump loses its integrity:

- The leachate sump will be constructed at a depth of 10 mbgl (existing).
- Leachate free drains to the sump meaning the pressure at the leachate sump inside the bunker is essentially 0 barg as there is no static head other than the shallow level of the leachate in the sump.
- The relative pressure on the outside of the leachate sump will range between 0.2 barg (when ground water level is 8 mbgl) and 0.8 barg (when ground water level is 2 mbgl).
- The resulting pressure gradient means that should any crack occur in the leachate sump and there be a breach in the waterproof membranes, then the hydrostatic pressure difference between the outside and inside of the sump will result in the ground water leaking into the leachate sump and not the leachate leaking outwards into the ground water.

To provide additional comfort as to the ongoing integrity of the bunker, monitoring bores will be installed both up and down gradient of the bunker. This will allow direct sampling of the ground water outside the bunker. Should any leachate be detected then this would indicate a failure of the internal membrane and a crack in the bunker sump and remedial works would be undertaken.

4.4.6 Odour control system

As the organic and biogenic material in the feedstock can decompose and create odour laden air, the EfW Plant has two key controls so that there is no detectable odour beyond the site:

- Primary control: The waste hall and the waste bunker are enclosed, and the air is drawn by forced draft fans (creating negative pressure) and using it as combustion air for the furnace where any odorous components are be destroyed.

- Secondary control: In the infrequent situation where both furnaces are shut down, the air will be extracted and treated in an ancillary odour treatment system (scrubber). The system uses a two-stage chemical scrubber to remove the odorous compounds in the air extracted from the waste bunker. This system is only used if both furnaces are undergoing maintenance simultaneously to ensure that the waste bunker is maintained under negative pressure.

4.4.7 Start-up diesel generators

The Project Kea facility is designed to be run off the electricity generated on the site. However, during the initial start-up and following significant maintenance shutdowns, the facility will not produce electricity and thus will rely on an external source of electricity to start-up. To achieve this, three diesel powered generators (2 MW each) will be installed on site. Other than the initial commission period, the generators will be infrequently used.

4.4.8 Environmental monitoring and reporting

The EfW Plant will be controlled from a central control room using plant-wide automation systems. The control system incorporates sensors measuring the operation and performance of all aspects of the Plant's functions. This includes the flue gas treatment system with continuous monitoring at the stack outlet by measuring: particulates, sulphur oxides (SO_x), nitrous oxides (NO_x), hydrochloric acid (HCl), carbon monoxide (CO), carbon dioxide (CO₂), hydrogen fluoride (HF) and oxygen (O₂).

The measurements will be available to the regulatory authorities and the public online and in real time. Other parameters which are not able to be instantaneously measured online, such as dioxins and heavy metals, are measured via sampling and lab testing every three months.

4.4.9 Maintenance and resilience

The system maintenance includes:

- The boiler lines require yearly inspection and maintenance. This is achieved without interrupting the plant's receipt and processing of waste as it has two separate lines with the shutdown of each staggered at different times of the year.
- The turbine and generator require yearly inspection and maintenance but do not need to be shut down. However, a major service requires a shutdown approximately every four years. During this major

service, while the turbine is shutdown steam can still be fed past the turbine and condensed. This means that, while no electricity is generated, waste can still be received and processed during this period.

Regarding the future resilience of the Project Kea facility:

- Interruption in waste feedstock: The onsite storage of waste includes up to 7,000 tonnes of MSW in the internal bunker and 45,000 tonnes of bailed construction waste in the dedicated storage warehouse. Assuming both storage capacities are operating at 50%, this will provide 26 days of operation at full combustion capacity. This level of storage, as well as the ability to turn down combustion capacity, will provide adequate risk protection against unforeseen interruption in waste feedstock.
- Interruption in ash removal: The ash by-products will typically be exported daily. In cases where storm or other events close roads and temporarily inhibit exporting by truck, the by-products will be stored on site until exporting can resume. The plant has the capacity to store up to 30 days of by-products should it be required.
- Flood risks: The site levels will provide more than 150 mm of freeboard above the calculated flood level during a 500-year flood event. This provides significant security for the plant against likely flood events.

4.5 Buildings - Development concept and designs

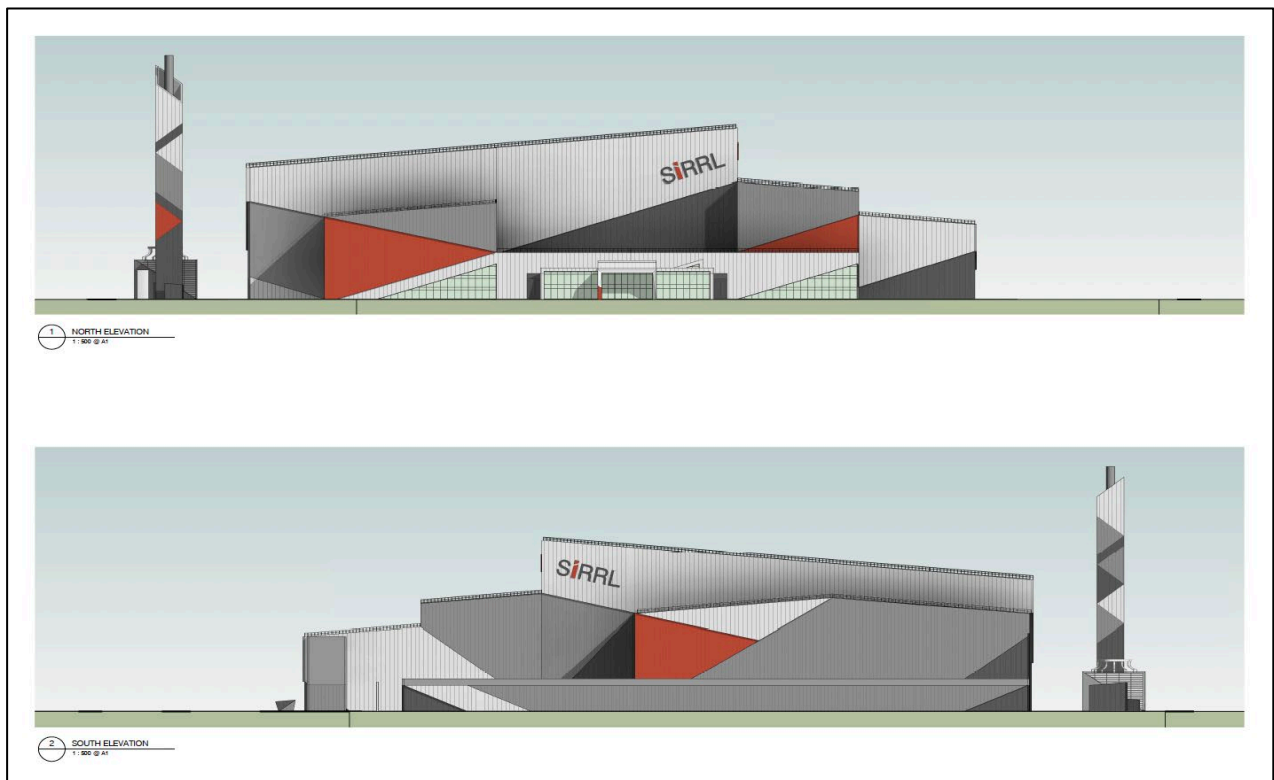
Careful consideration has been given to the development concept for Project Kea, including the building design, materials and colour selection. The development concept proposed is:

- Use of building colour palette and materials for the main powerhouse building, the stack, the ancillary workshop, and storage buildings, that are designed to:
 - both break up the profile of the development en masse, preventing it from being seeing overly monolithic; and
 - to ground it in its rural setting.
- The main powerhouse building would comprise of “panels” of dark to light grey that cut across its main walls and are interspersed with other panels of barn red (“Pioneer Red”). This division of the

building façade into smaller segments would be complemented by the use of vertical sheet cladding that is evocative of corrugated iron which is commonly used on farm buildings.

- The transition from darker colours closer to the ground to lighter colours higher up across the northern and eastern building façades help to “ground” the main buildings and lighten them up.
- Overall, the main powerhouse building, and the ancillary buildings will be significantly down-scaled and the colour palette will assist in making it seem reasonably recessive, but also distinctive, in a positive manner.

The development concept for building design is illustrated in **Figure 23**. The colour palette and material references are set out in **Figure 24**.



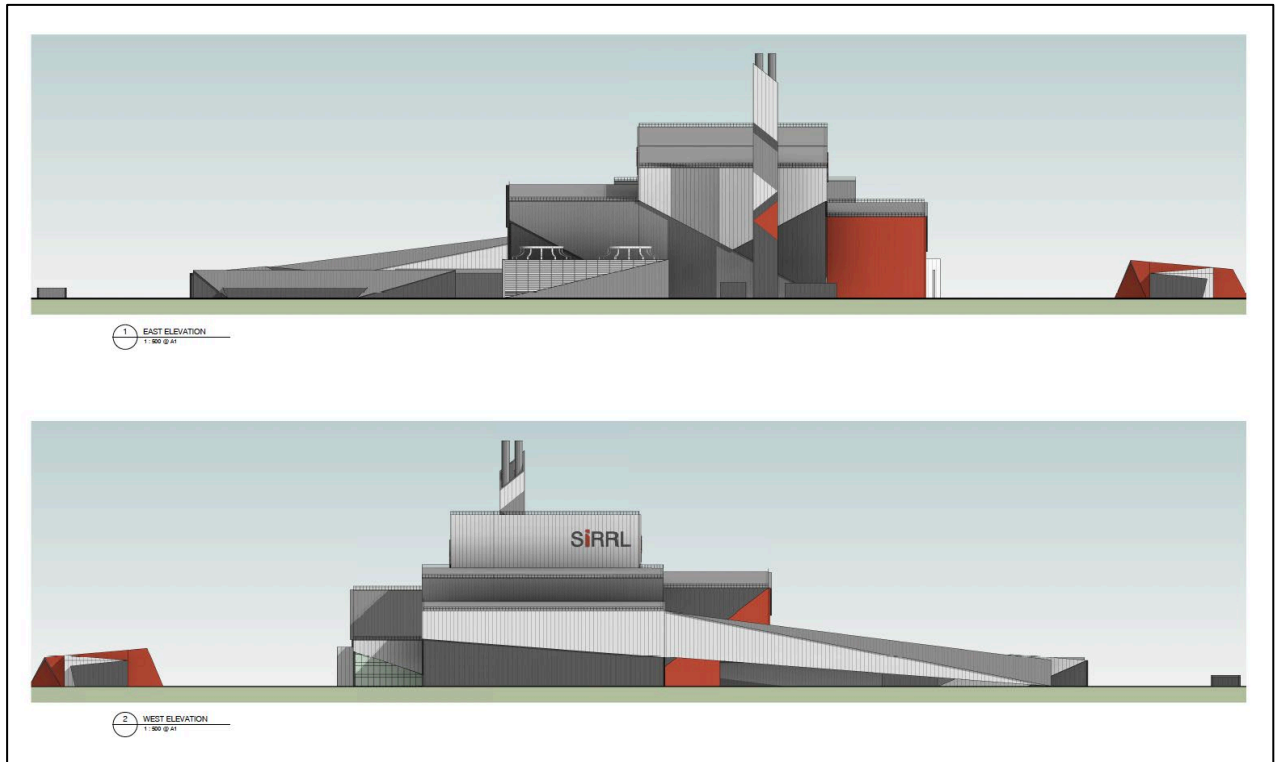


Figure 23: Project Kea development concept for building design.

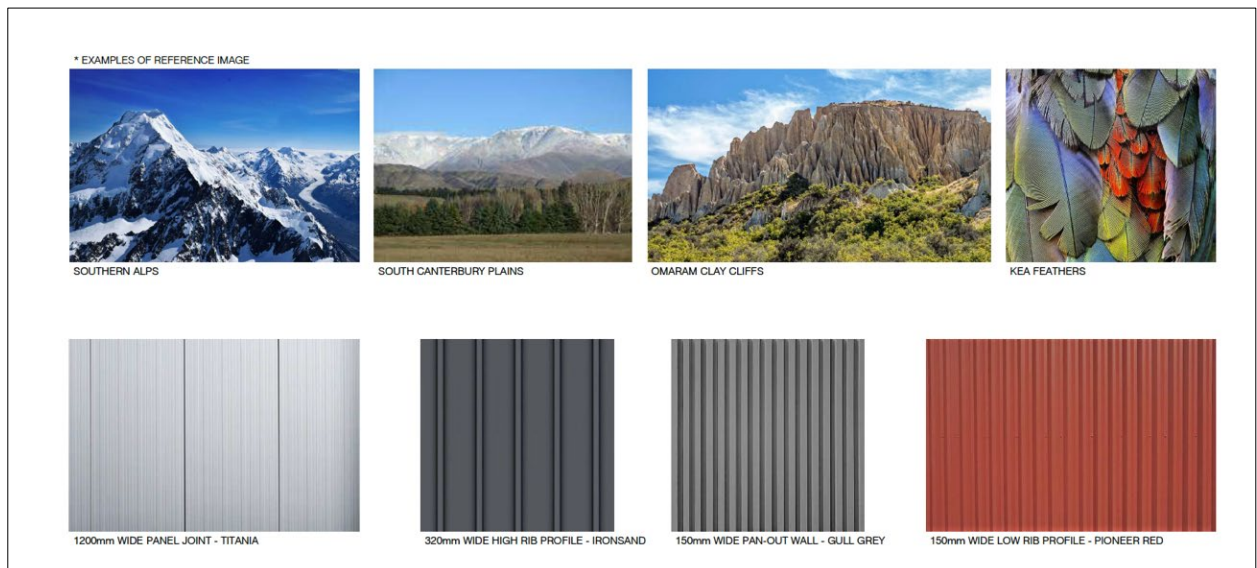


Figure 24: Project Kea colour palette and material references.

4.6 Landscape Mitigation Plan

A Landscape Mitigation Plan (refer **Figure 25**) has been prepared and is included in the Application Drawing Set in **Appendix C**. The Landscape Mitigation Plan has been prepared to reflect the rural character of Project Kea site's surrounds. The key elements of the Landscape Mitigation Plan are:

- Mitigation planting is designed in layers of both deciduous (faster growing) and evergreen (slower growing) trees that face towards Carrolls Road and Morven Glenavy Road.
- A 20m deep band of lowland shrub planting and kahikatea is to be located along the site's northern boundary, beside Whitneys Creek, located on the adjoining site.
- The shelterbelt planting and kahikatea are located to progressively break up the profile of the main powerhouse and ancillary buildings and the stack, with the deciduous trees (willow, poplar or similar) providing quicker intervention and visual buffering that is gradually complemented and 'in-filled' by the kahikatea also lining the site's margins and remnant paddocks (near Carrolls Road).
- In the long term, it is anticipated that the deciduous trees may be replaced by the kahikatea shelterbelts and creek-side planting. In addition to addressing Carrolls and Morven Glenavy Roads, this planting would provide a long-term buffer between Project Kea and the residential properties to both the north and north-east.
- The only side of the site which will not have in-depth planting is the west, as this area will provide for the future rail siding. There is insufficient room down that boundary and side of the site for substantial screen or mitigation planting, which faces towards the Waimate Highway / SH1. For this reason, particular attention has been paid to the colour and materiality of the proposed development to deconstruct and down-scale it. Visual mitigation along this boundary is via building façade colour and materiality selection.

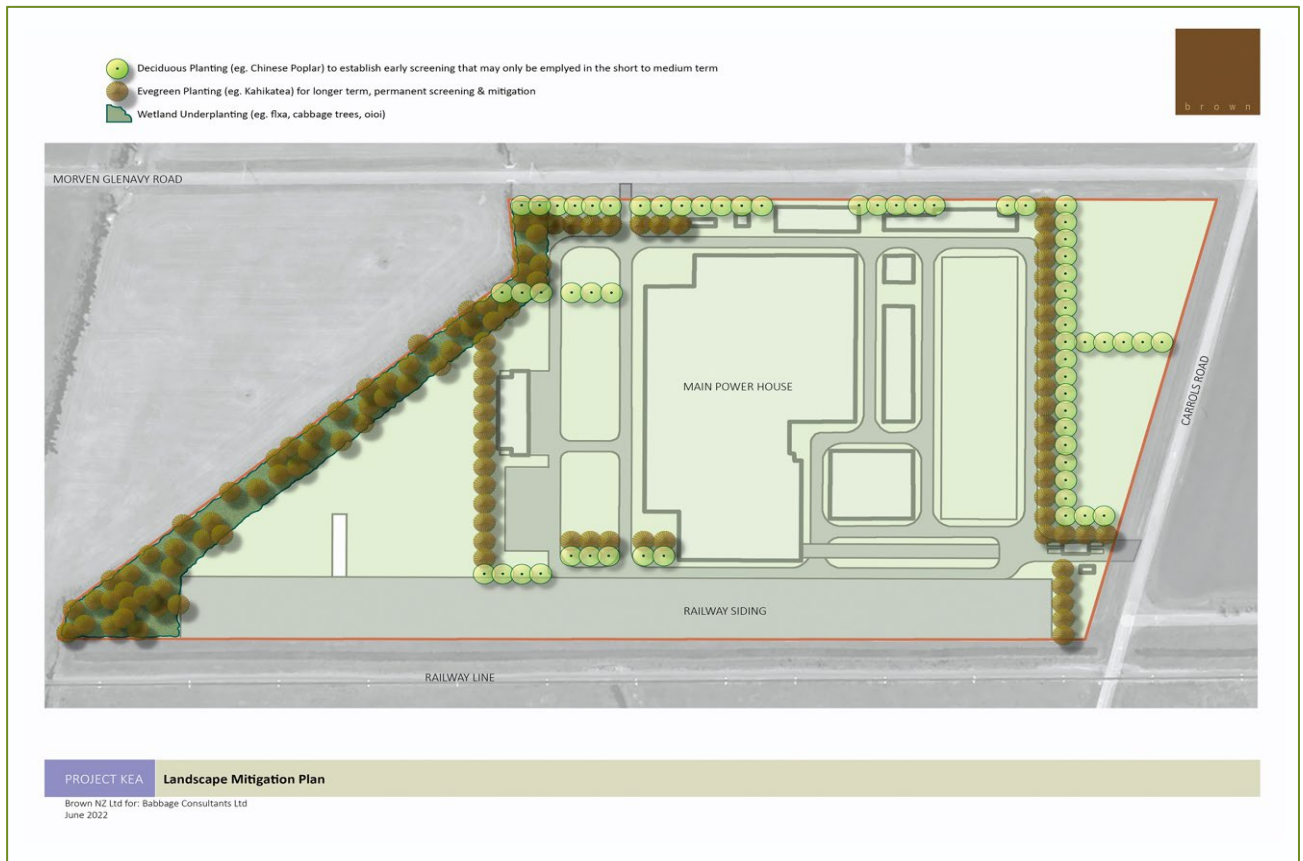


Figure 25: Landscape Mitigation Plan.

4.7 Staff numbers on site

Project Kea will have the following management and operational staff:

- 32 management staff working across general business hours (8:00 am to 5:00 pm) and 5 days per week (Monday to Friday).
- Shifts of 14 operational staff across 24 hours per day and 7 days per week (Monday to Sunday).

4.8 Signs

Three site identification signs will be installed:

- Three building façade signs of approximately 290 m² each are, located on the north, south and west building elevations of the main powerhouse building.

- Two free standing site identification signs each 30 m² and 9 m in height located beside the heavy and light vehicle accesses along the eastern and southern boundaries, from Morven Glenavy Road.
- Smaller directional signs located within the site for traffic management and EfW Plant operational safety purposes.

4.9 Transport/traffic matters

Vehicular access

The Project Kea site will be accessed via two new vehicle accesses, as shown in **Figure 26** Access for heavy vehicles is proposed long the southern boundary, leading into the bridge to the main powerhouse building to enable waste feedstock to be disposed of in the waste bunker area. Light vehicle access is proposed along the eastern boundary, from Morven Glenavy Road, leading into the car park area for staff and visitors to the site.

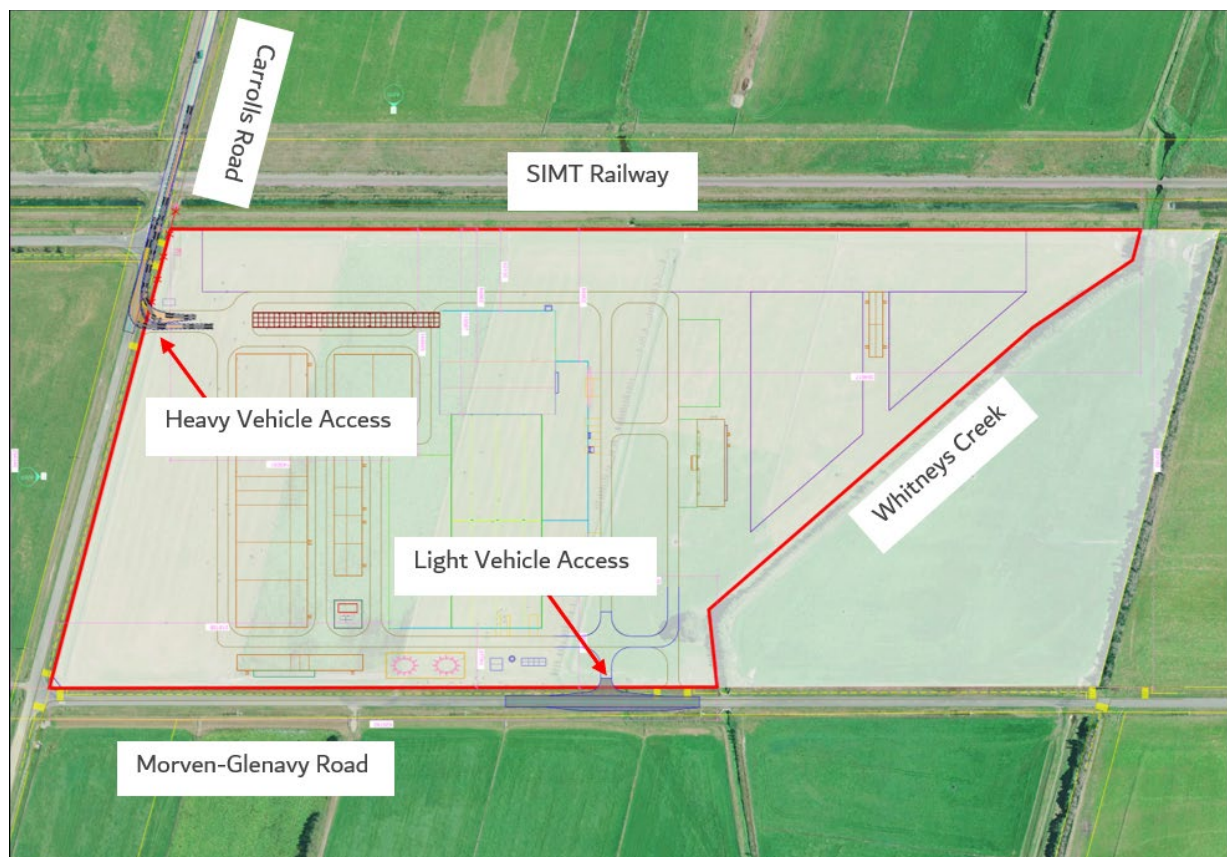


Figure 26: Vehicle accesses.

Car parking

70 car parking spaces are proposed:

- 32 spaces for all management staff;
- 28 spaces for inbound and outbound shift staff (allowing for shift overlap); and
- 10 spaces for potential visitors and maintenance vehicles.
- 3 accessible parking spaces and 4 bicycle spaces (two cycle stands) are to be provided at the entrance of the administrative building.

Transport improvements

The following transport improvements are proposed to enable the safe operation of the roading network in the proximity of the Project Kea site:

- The intersection of SH1 and Carrolls Road will be upgraded to include a right turning bay on SH1 northbound and an auxiliary left turning lane on SH1 southbound. Noting the 24-hour operation of the Project Kea facility, street lighting will also be upgraded at this intersection.
- The section of Carrolls Road between SH1 and the site's heavy vehicle access will be widened, sealed and have upgraded pavement. Edge marker posts and raised reflective pavement markers will also be installed for delineation purposes.
- The section of Morven Glenavy Road within the vicinity of the site's light vehicle access will have a widened shoulder.
- The Carrolls Road level crossing will be upgraded with barriers, flashing lights and bells. Discussions with KiwiRail have been undertaken to assess the safety of the existing crossing and the mitigation measures proposed. A Level Crossing Safety Impact Assessment ("LCSIA") has been completed by a consultant in co-operation with co-operation with KiwiRail. A copy of the LCSIA, as endorsed by KiwiRail is included in the Transportation Assessment Report.
- A new stock crossing tunnel will be constructed on Carrolls Road. Street lighting will be upgraded in the general area comprising the railway level crossing, the Morven Glenavy Road and Carrolls Road intersection, and the heavy vehicle access. Lighting will also be upgraded at the second Morven Glenavy Road intersection at the site's south-eastern corner.

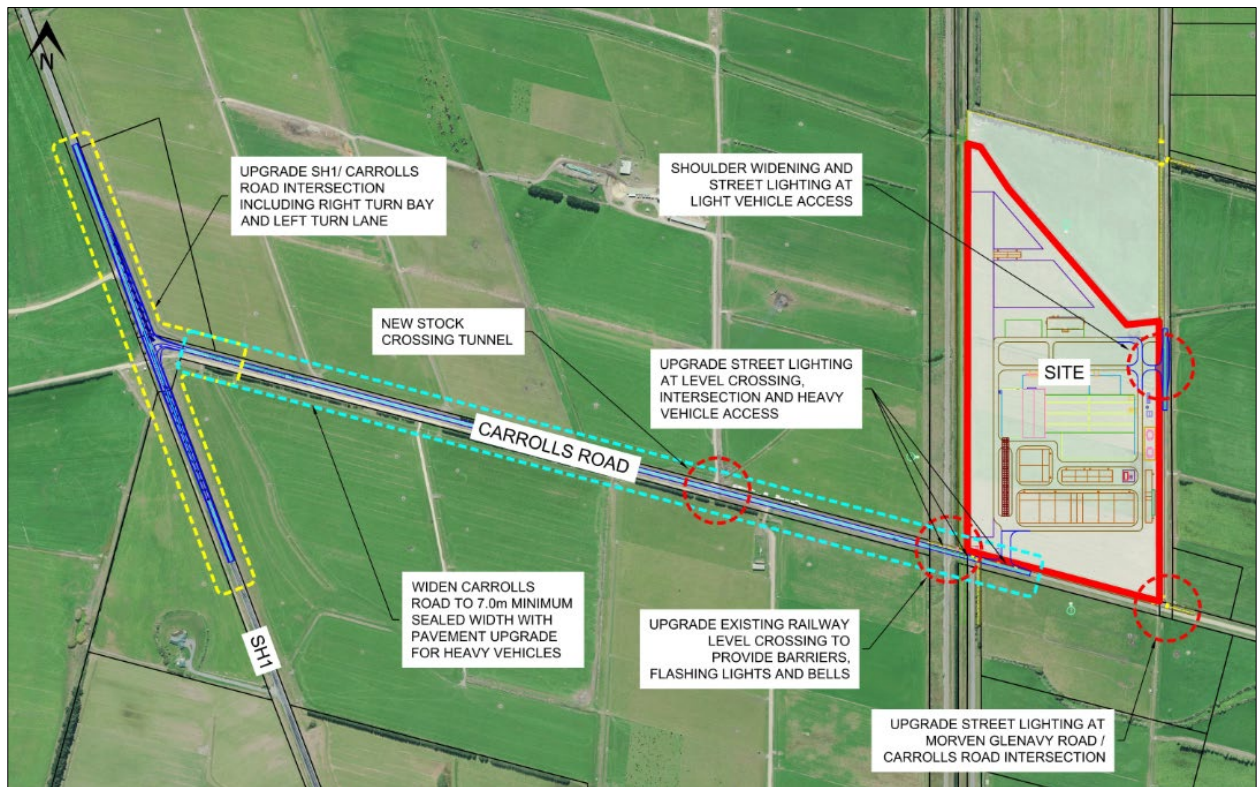


Figure 27: Overview of the proposed transport improvements.

- SIRRL acknowledges that the proposed upgrading of the intersection of SH1 and Carrolls Road will require additional land for road improvement purposes. The required additional land is owned by Murphy Farms Limited and extends into the easement area to the benefit of MGI. Both Murphy Farms Limited and MGI have provided letters of support confirming that they would provide the land required to enable the necessary upgrading works (refer **Appendix D**).

4.10 Infrastructure servicing – domestic wastewater

As there is no reticulated wastewater network servicing the Project Kea site, an on-site wastewater disposal system is proposed to treat and discharge the domestic wastewater stream produced on the site (i.e., wastewater from staff toilets, lunchroom, and from ancillary administration building).

For clarity, it is noted that the process factory wastewater and domestic wastewater will be managed and treated through completely separate treatment systems.

The details pertaining to the design parameters for the domestic wastewater disposal system is set out in the Domestic Wastewater Discharge to Land Report (Technical Report 14). The proposal is to install an

Aerated Wastewater Treatment System, providing biological and UV treatment of the wastewater prior to disposal to land via a dedicated drip field.

In brief, the details of the proposed system are:

- The system will be designed in accordance with the provisions of AS/NZS 1547:2012.
- Total volume of wastewater to be treated and discharged is 5,625 L per day.
- The proposed wastewater treatment system will comprise of:
 - Primary treatment, including anaerobic digestion and aerobic treatment
 - Secondary treatment, including filtration and ultraviolet treatment
 - Irrigation field: disposal through shallow subsurface drip irrigation field.
- The drip field area will have the following specifications:
 - Have an area of approximately 2,000 m².
 - The drip field area will be separated from Whitneys Creek by a distance greater than 20 m.
 - Capped by no less than 200 mm of good quality topsoil and be constructed with materials and soils of similar characteristics as the site.
 - Pressure compensating irrigation lines will be installed 1 m apart and be nominally 100 mm below ground level.
 - Seeded in grass and maintained by mowing. The field will not be used or accessed for any other purpose than inspection and maintenance.

4.11 Infrastructure servicing – water usage

This resource consent application does not include the “take and use of ground water” as a reason for resource consent application. A separate resource consent application for the “take and use of groundwater” is being prepared and will be lodged with ECAN in the near future.

However, for completeness purposes, it is noted that the Project Kea facility will use approximately 2,390 m³ of water per day. A breakdown of the water usage in the key processes is set out in **Table 11**.

Table 11. Water usage within the Project Kea site.

Process	Water use per day	Percentage of daily use
Cooling tower evaporations (part of the condensing system)	1,320 m ³	55%
Flue gas treatment system evaporation	480 m ³	20%
Grate ash pit evaporation	430 m ³	18%
Miscellaneous minor usage	160 m ³	7%
Total	2,390 m³	100%

4.12 Infrastructure servicing – stormwater discharge

The development of Project Kea site from a farm paddock to an industrial use, requires careful management of stormwater runoff as the resulting development will significantly increase the impermeable surfaces on the site, and the site is not connected to a reticulated stormwater system.

The Stormwater Report (Technical Report 12) explains the proposed stormwater management strategy for the operation of the Project Kea site.

Table 12 sets out the calculations of the impermeable and permeable surfaces resulting from the proposed site layout for the Project Kea development. The proposed stormwater management for the site is shown in **Figure 28**.

The proposed development will result in impermeable surfaces of approximately 62 % of the total site area. The proposed stormwater management strategy for the site is as follows:

- The increased stormwater flows are to be managed by three infiltration basins.
- The infiltration basins are designed to dispose of the full post development 10% AEP stormwater flows to ground soakage.
- The infiltration basins are designed in accordance with Christchurch City Council's Waterways and Drainage Guide.

- The disposal of the 10% AEP stormwater flows to ground ensures compliance with the following requirements of the CLWRP as:
 - There is no increase in the 20% AEP stormwater flows to existing water bodies (Whitneys Creek).
 - There would be no 10% AEP stormwater flows that would enter any other property.
- However, as the bases of the infiltration basins are likely to be within 1 m of the highest seasonal groundwater level, resource consent is required.
- The purpose of the infiltration basins is to provide treatment of stormwater prior to discharge to ground.
- The treatment of stormwater flows from the proposed vehicle pavement areas will primarily be provided by the three infiltration basins, which will treat the first flush of stormwater flow from the proposed vehicle pavement areas.
- In addition to infiltration basins, pre-treatment is to be provided for the proposed vehicle pavements by the installation of Enviropods within each catchpit.
- Overall, best practice treatment is being provided for vehicle pavements given the industrial nature of the proposed activity.
- Building roofs are assumed to be built from inert materials, therefore, pre-treatment is not required.

Table 12. Proposed impermeable and permeable surfaces on the Project Kea site.

Item	Quantity
Impermeable Surfaces:	
● Buildings	39,000 m ²
● Pavements	51,500 m ²
● Drip irrigation field	2,000 m ²
Total impermeable surfaces	92,500 m²
Permeable Surfaces:	

● Grassed and landscaped areas	35,400 m ²
● Infiltration basins	20,600 m ²
Total permeable surfaces	56,000 m²

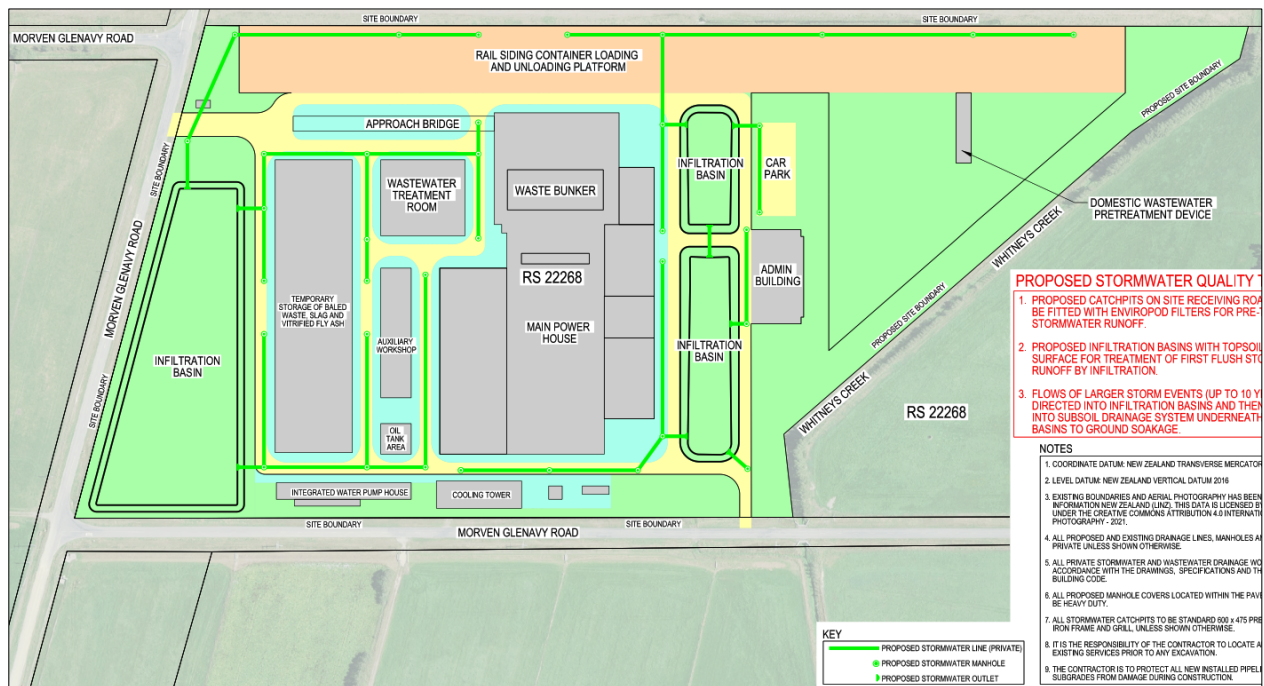


Figure 28: Proposed stormwater management for Project Kea site.

4.13 Infrastructure servicing – Electricity connection and supply

Project KEA will generate approximately 30MW of electricity for use by local industries and users.

SIRRL has consulted with Alpine Energy Limited (“AEL”) regarding the feasibility of supplying energy to the local AEL’s network.

A letter from AEL on this matter is included in **Appendix D**.

AEL confirms that:

- It is feasible for Project Kea to be connected to the AEL network. Electricity generated on the Project Kea site would be fed into the local AEL network.

- The most likely solution would be for AEL to run a new electricity network transmission line from the Project Kea site to the existing substation located on Cooneys Road. At the substation, the energy generated at the Project Kea site can be supplied into the wider AEL network.
- Any excess electricity generated by Project Kea, that is not consumed by users on the AEL network would then flow into the National Grid via the AEL network.
- The new electricity transmission line would be approximately 2.5km in length, and likely to be designed for 110kV to best support future load increases on the AEL network.

It is noted that the future electricity infrastructure required to enable AEL to connect Project Kea to the APL network is not proposed as part of this resource consent application.

As the new electricity transmission line will be constructed and owned by AEL, AEL will apply for all necessary resource consents in the future, following the completion of the route selection from the Project Kea site to the substation site.

4.14 Earthworks

The details pertaining to the proposed earthworks for site preparatory works is set out in the Earthworks Report (Technical Report 13). Earthworks are required on the site to achieve desirable finished ground levels to enable the construction of the proposed building platforms, road subgrades, construction of the waste bunker and the installation of infrastructure (including stormwater management devices).

The general scope of the earthworks includes:

- Importing and placement of clean fill to form building platforms and road subgrades.
- Site excavation is required for the construction of the waste bunker.
- Cut volumes are required for the construction of stormwater ponds.
- Existing topsoil to be re-spread on proposed landscape areas where possible, and rest to be disposed off-site.
- Construction period is expected to be a continuous period of approximately 12 months.

Earthworks quantities

The estimated earthworks quantities are set out in **Table 13**.

Table 13. Estimated earthworks quantities

Item	Quantity
Total earthworks area	148,000 m ²
Total cut volume:	85,000 m³
● Strip topsoil to stockpile to re-spread	9,000 m ³
● Strip topsoil to off site	36,000 m ³
● Cut to fill	40,000 m ³
Total fill volume:	130,000 m³
● Cut to fill	35,000 m ³
● Imported fill	95,000 m ³
Hardfill stabilisation:	
● Imported hardfill to stabilise building platforms and road	20,000 m ³

The earthworks include the following:

- Consist of the placement of between 1.0 m and 2.0 m of fill across the majority of the site, with the deeper fill placement in the western area of the site.
- The proposed depth of fill in the northern area of the site is generally less, between 0.25 m and 1.0 m, although up to 2.0 m near the western boundary.
- The finished levels on the site generally fall south-eastwards, with the proposed elevation near the north-west corner at RL 29.0 m and near the south-east corner at RL 26.5 m.
- Cut will be required for the construction of the stormwater infiltration basins in the southern and northern areas of the site. The cut depth for these basins is generally less than 0.75 m.
- A deeper cut, up to approximately 7.0 m is proposed for the waste bunker, limited to an area of approximately 90 m by 60 m in the central western part of the site.

Construction access and vehicle movements

The estimated earthworks construction heavy vehicle movements are set out in **Table 14**.

Table 14. *Estimated heavy vehicle movements during earthworks construction period.*

Construction Phase	Vehicle Type	Average vehicles/day	Average trips/day
Dispose excess topsoil off site	Truck and trailer	17	34
Import bulk fill to site	Truck and trailer	44	88
Import hardfill to site	Truck and trailer	9	18
Averages	-	70	140
		heavy vehicles/day	heavy vehicle trips/day

Erosion and sediment controls

A range of erosion and sediment controls are to be implemented, which have been designed in accordance with Environment Canterbury's Erosion and Sediment Control Toolbox, including:

- Installation of a stabilised construction access into the Project Kea site from the southern boundary from Moven Glenavy Road.
- Decanting earth bunds may be installed for smaller catchments areas up to 3,000 m², discharging treated runoff to the existing road water table drains.
- Runoff diversion channels to direct surface water runoff to sediment control devices.
- The existing open stormwater channel across the central area of the site is to be piped by extension of the existing 600 mm culvert across the site. This will either be carried out prior to earthworks in the area of the open channel or appropriate controls will be installed upslope of the channel.
- Implementation of specific erosion and sediment control measures to manage temporary and longer-term stockpiles.
- Progressive stabilisation of completed building platforms, road subgrades and landscaped/grassed areas.
- The groundwater within the bunker excavation is to be pumped from the excavation to discharge to the ground surface north of the bunker excavation to recharge to underlying aquifer.
- Monitoring and maintenance will be carried out in accordance with Environment Canterbury's Erosion and Sediment Control Toolbox.

Construction Earthworks Management Plan

The Construction Earthworks Management Plan (“**CEMP**”) will be prepared by the appointed contractor and submitted to Council prior to commencement of the earthworks. The Earthworks Report sets out the key matters to be included in the CEMP.

The applicant supports a condition of resource consent requiring the CEMP to be submitted to Council prior to the commencement of the earthworks.

Dust Management Plan

A Dust Management Plan will be prepared prior to the commencement of the earthworks. The matters to be included in the Dust Management Plan are set out in the Earthworks Report. In brief, dust generation will be monitored by the contractor and dust will be controlled by water application as necessary and will ultimately be controlled by progressive stabilisation of the completed earthworks surfaces.

The applicant supports a condition of resource consent requiring the Dust Management Plan to be submitted to Council prior to the commencement of the earthworks.

4.15 Storage and use of hazardous substances

The Hazardous Substances Report (Technical Report 3) details the hazardous substances used in the operation of the EfW Plant and the storage required on the Project Kea site.

Table 15 provides a summary of the types, volumes and storage method for the hazardous substances to be used on the Project Kea site.

Table 15. Summary of hazardous substances to be used and stored on the Project Kea site

Substance	HSNO # ^[1]	CAS # ^[2]	Volume	Storage
Aqueous Ammonia (25%)	HSR001526	1336-21-6	50,000 L	Bunded tank with spill protected tanker unload area
Sodium Hydroxide (30%)	HSR001576	1310-73-2	50,000 L	Bunded tank with spill protected tanker unload area
Sodium Hypochlorite (15%)	HSR003698	7681-52-9	1,000 L	Bunded portable container
Hydrochloric Acid (37%)	HSR001557	7647-01-0	1,000 L	Bunded portable container
Sulphuric Acid (40%)	HSR001572	7664-93-9	1,000 L	Bunded portable container
Biotrol 145	HSR002681	7681-52-9	80 L	Bunded portable container
Diesel Fuel	HSR001441	68334-30-5	100,000 L	Bunded tank with spill protected tanker unload area
Various oils and greases	Various	Various	1,000 L	Bunded portable containers
V-Guard 230	HSR002681	1310-73-2	200 L	Bunded portable container
V-Guard 231	HSR002681	1310-73-2	200 L	Bunded portable container
Visentia 210	HSR002684	7681-57-4	1,000 L	Bunded portable container
V-Charge 412	HSR002684	1327-41-9	1,000 L	Bunded portable container
Chlorine (Liquid)	HSR001058	7782-50-5	70 L	Bunded portable container
Metal Hydroxide Sludge (40%) ^[3]	N/A	N/A	30,000 L	Bunded tank with spill protected tanker loading area
Notes				
[1] Approval number of the hazardous substance under the Hazardous Substances and New Organisms (HSNO) Act 1996.				

[2] Registry number under the Chemical Abstracts Service (CAS) Registry.

[3] Approximately 40%. Metal Hydroxide Sludge is a by-product stream from the plasma treatment of fly ash. It contains the hydroxide compounds of low boiling point metals including zinc hydroxide and lead hydroxide. Approximately 1 T per day is produced and it is picked up from site by a hazardous waste truck for transport and disposal at a registered hazardous waste facility.

All hazardous substances to be used on the Project Kea site are covered by the approval index under the Hazardous Substances and New Organisms Act 1996 (“**HSNO**”), with the exception of the “metal hydroxide sludge”, which is a by-product from the plasma treatment process.

The metal hydroxide sludge contains hydroxide components of low boiling point metals, including zinc hydroxide and lead hydroxide. The metal hydroxide sludge does not have a HSNO approved number, however, based on its composition, it meets the definition of “hazardous substances” in Schedule 4 of the CLWRP.

All hazardous substances used and stored on the Project Kea site will be appropriately managed, and good practices implemented to minimise the risk of accidental discharges into the environment. All hazardous substances will be handled and stored in accordance with the HSNO approved storage and handling rules.

Prior to the operation of Project Kea, the applicant will prepare and implement an Environmental Management Plan for Hazardous Substances, which will address the following matters:

- A hazardous substances inventory and the maintenance of the inventory.
- The handling and control measures for each hazardous substance to protect the environment in the event of a spill.
- The inspection and audit procedures to be undertaken to ensure the handling and control measures function correctly.
- Incident response and procedures to be followed in the case of an accidental spill.

5 RESOURCE CONSENT APPROVALS REQUIRED

5.1 Introduction

This section outlines the resource consent approvals required for the construction and operation of Project Kea under the following relevant documents:

Regional Plans:

- Canterbury Air Regional Plan (“**CARP**”)
- Canterbury Land and Water Regional Plan (“**CLWRP**”)

District Plan:

- Waimate District Plan (“**WDP**”)

For the avoidance of doubt, the applicant is seeking resource consents under the rules identified in the tables below, and any other rules which may apply to the activity, even if not specifically noted.

5.2 Resource consent approvals required under the regional plans

Table 16. Resource consent approvals required under the CARP and LWRP.

Reasons for resource consent	Rule	Activity Status
To discharge contaminants to air from an EfW Plant		
<p>Except where prohibited under Regulations 7 to 12 of the NESAQ, the discharge of contaminants into air from burning in an incinerator of any material listed in Part A or Part B of Rule 7.7.</p> <p>The air discharge will contain products resulting from the combustion of MSW and C&D waste. Notes:</p> <ul style="list-style-type: none"> • The proposal is not prohibited under Regulations 7 to 12 of NESAQ. • The rules regarding ‘large scale fuel burning devices’ are not applicable to the proposal as the definition of this term specifically excludes ‘waste incineration devices’. 	CARP, Rule 7.8	Discretionary Activity

<p>The discharge of contaminants to air that is from an industrial or trade premise and is not managed by Rules 7.47-4.62; and is not a Prohibited Activity.</p> <ul style="list-style-type: none"> The air discharge from diesel generator. 	<p>CARP, Rule 7.63</p>	<p>Discretionary Activity</p>
<p>To discharge domestic wastewater to land from staff and visitor facilities associated with the operation of an EfW Plant</p>		
<p>To discharge domestic wastewater from a new on-site wastewater treatment plant onto land that does not meet the following condition of Rule 5.8:</p> <ul style="list-style-type: none"> Condition 1 states that the discharge volume does not exceed 2 m³ per day. The proposal is for a discharge volume of 5,625 litres / day (5.6 m³ per day). <p>The proposal complies with all other relevant conditions:</p> <ul style="list-style-type: none"> Condition 2: The site is greater than 4 ha Condition 3: There is no available wastewater network; the site is highly unlikely to be contaminated; the site is not an archaeological site; the treated wastewater will not enter any surface water; the drip field is greater than 20 m from Whitneys Creek; the dip field is greater than 50 m from any bore; the site is not in a Drinking Water Protection Zone; and high groundwater has been measured at 2 mbgl. Condition 4: The system will be designed in accordance with AS/NZS 1547:2012. Condition 5: The system will be operated and maintained in accordance with the supplier’s recommended procedures. Condition 6: The drip field area and design loading rate have been selected to ensure that ponding will not occur. 	<p>CLWRP, Rule 5.9</p>	<p>Restricted Discretionary Activity</p>

<ul style="list-style-type: none"> Condition 7: The system will not discharge any hazardous substance. 		
<p>To discharge stormwater from roofs, roads, hardstand areas and other impervious surfaces associated with the EfW Plant facility</p>		
<p>The discharge of construction-phase stormwater onto or into land that does not meet the following condition of Rule 5.94A:</p> <ul style="list-style-type: none"> Condition 1 states that the area of disturbed land from which the discharge is generated is less than 2 ha. The area of the Project Kea site to be disturbed is greater than 2 ha. <p>The proposal meets the remaining conditions:</p> <ul style="list-style-type: none"> Condition 2: The discharge will only be to ground on site and no water bodies. Condition 3: The discharge will only be to ground on site, and will not result in the increase in flow in receiving water body. Condition 4: The discharge is not from, into or onto contaminated land. Condition 5: The discharge will not contain hazardous substances. Condition 6: The discharge does not occur within a Community Drinking-water Protection Zone. 	<p>CLWRP, Rule 5.94B</p>	<p>Restricted Discretionary Activity</p>
<p>The discharge of stormwater into or onto land where the contaminant may enter groundwater or surface water, that does not meet the following conditions of Rules 5.96:</p> <ul style="list-style-type: none"> Condition 2(c): The bases of the proposed infiltration basins are likely to be within 1m of the seasonal ground water level. Condition 2(d): The discharge will be from land used for an industrial activity. 	<p>CLWRP, Rule 5.97</p>	<p>Discretionary Activity</p>

<p>The proposal meets the remaining conditions of Rule 5.96:</p> <ul style="list-style-type: none"> Condition 1: the discharge is not from, into or onto contaminated land. Condition 2(a): The proposed infiltration basis will be used to comply. Condition 2(b): The pond is part of the stormwater treatment system. Condition 2(e): There is no available reticulated stormwater system. Condition 2(f): Only stormwater from one site will be collected and discharged. <p>Note: The proposal meets all of the conditions of Rules 5.95:</p> <ul style="list-style-type: none"> Condition 1: The site is not contaminated or potentially contaminated land. Conditions 2 to 5: The discharge will only be to ground on site and no water bodies. 		
<p>To take water for dewatering for carrying out excavation and construction works associated with the construction of an EfW Plant facility</p>		
<p>The taking of water from groundwater for the purposes of dewatering for carrying out excavation, construction, maintenance and geotechnical testing and associated use and the associated use and discharge of that water, that does not meet the conditions in Rule 5.119:</p> <ul style="list-style-type: none"> Condition 1: the water take will exceed the specified 6-month period. Condition 3: the excavation for the waste bunker will be approximately 10 m below ground level, whereas the limit specified in Condition 3 is 8m. <p>The proposal meets the remaining relevant conditions of Rule 5.96:</p> <ul style="list-style-type: none"> Condition 2: the take or discharge is not from, into or onto contaminated or potentially contaminated land. 	<p>CLWRP, Rule 5.120</p>	<p>Restricted Discretionary Activity</p>

<ul style="list-style-type: none"> Condition 4: the take will not have a moderate, high or direct stream depletion effect on a surface water body. Condition 5: An assessment of interference effects does not show that any community, group or private drinking-water supply bore will be prevented from taking water. 		
To undertake earthworks over an unconfined or semi-confined aquifer		
<p>The use of land to excavate material over an unconfined or semi-confined aquifer that does not comply with the conditions of Rule 5.175:</p> <ul style="list-style-type: none"> Condition 2 requires that where the material excavated is more than 100 m³, there is more than 1 m of undisturbed material between the deepest part of the excavation and the seasonal highwater table, and the excavation does not occur within 50 m of any surface waterbody. <p>The proposed volume of excavated material will be more than 100 m³, and the proposed excavation will be below the seasonal high-water table level.</p>	CLWRP, Rule 5.176	Restricted Discretionary Activity
<p>The use of land for the deposition of more than 50 m³ of material in any consecutive 12 month period onto land which is excavated to a depth in excess of 5 m below the natural land surface and is located over an unconfined or semi-confined aquifer, where the seasonal high-water table is less than 5 m below the deepest point in the excavation, meeting the conditions set out in Rule 5.177:</p> <ul style="list-style-type: none"> Condition 1: only cleanfill material is to be used. Condition 2: the volume of vegetative matter in any cubic metre of material deposited will not exceed 3%. Condition 3: The cleanfill material will not be deposited onto groundwater, as groundwater will be suppressed by pumping prior to the placement of cleanfill material. 	CLWRP, Rule 5.177	Controlled Activity

<ul style="list-style-type: none"> Condition 4: Any cured asphalt deposited will be placed in land at least 1m above the highest groundwater level expected at the site. Condition 5: No material is proposed to be deposited onto or into land that is listed as an archaeological site. Condition 6: the applicant supports a condition of resource consent requiring that a Cleanfill Management Plan be prepared in accordance with Section 8.1 and Appendix B of “A Guide to the Management of Cleanfill”, Ministry for the Environment, January 2002, and be submitted to the Council prior to the commencement of earthworks 		
<p>The storage and use of hazardous substances within the Project Kea facility</p>		
<p>The use of land for the storage of hazardous substances listed in Part A of Schedule 4, that does not meet the condition 1 of Rule 5.181.</p> <p>Condition 1 requires that all hazardous substances are approved under Hazardous Substances and New Organisms Act 1996 (“HSNO”). The EfW Plant produces Metal Hydroxide Sludge, which is a by-product of the incineration process. The metal hydroxide sludge does not have a HSNO approved number, however, based on its composition, it meets the definition of “hazardous substances” in Schedule 4 of the CLWRP.</p> <p>The proposal meets all other relevant conditions of Rule 5.181:</p> <ul style="list-style-type: none"> Condition 2: An inventory of all hazardous substances on the site will be maintained and be made available to the Council and emergency services upon request. Condition 3: Storage vessels and spill containment measures will be inspected monthly and maintained and repaired if any defects are identified. 	<p>CLWRP, Rule 5.182</p>	<p>Discretionary Activity</p>

<ul style="list-style-type: none"> Condition 4: No hazardous substances will be stored below ground level. Condition 5: The site is not within a Community Drinking-water Protection Zone. Condition 6: No hazardous substances will be stored within 20 m of a surface water body or bore and there are no known active faults within 250 m of the site. 		
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5.3 Resource consent approval required under the Waimate District Plan

Table 17. Resource consent approvals required under the Waimate District Plan.

Reasons for resource consent	Rule	Activity Status
Land use resource consent to construct and operate an EfW Plant and associated infrastructure as an industrial activity in the Rural Zone		
<p>Industrial activities are not provided for as Permitted, Controlled or Restricted Discretionary Activities, and therefore are a Discretionary Activity, subject to compliance with Rural Zone Standards in Rule 8.</p> <p>The proposal meets all relevant standards:</p> <ul style="list-style-type: none"> Standard 8.1: there are no Significant Natural Areas or Significant Natural Features in the vicinity of the site, therefore, none will be affected by the proposal. Standard 8.3: there are no wetlands in the vicinity of the site, and therefore, no wetlands will be affected by the proposal. Standard 8.4.1: requires that all buildings must be set back a minimum of 7 m from the bank or edge of any open watercourse 	<p>Section 4 (Rural Zone), Rule 5.3</p>	<p>Discretionary Activity</p>

<p>or open drain. The proposal does not include buildings located within 7 m from the bank of Whitneys Creek or the edge of the MGI open channel irrigation race.</p> <ul style="list-style-type: none"> Standard 8.8: High Voltage Electricity Lines, part of the National Grid infrastructure, are shown on the planning maps along the eastern side of Morven Glenavy Road, whereas the site adjoins the western boundary of Morven Glenavy Road. This standard is complied with as no buildings or structures will be located within 12 m of the National Grid infrastructure. 		
<p>The use of temporary construction buildings</p>		
<p>To undertake construction activities that do not meet the Rural Zone Standard 7.18.1:</p> <ul style="list-style-type: none"> Standard 7.18.1 requires that temporary construction buildings must only be on the site for the duration of the project or 12 months, whichever is the lesser. The construction phase for Project Kea is anticipated to be over a 3-year period. <p>The proposal will comply with Standard 7.18.2 which relates to construction noise.</p>	<p>Section 4 (Rural Zone), Rule 4.2</p>	<p>Restricted Discretionary Activity</p>
<p>Signs</p>		
<p>To install signage associated on the application site, which will exceed the Permitted Activity Standards specified in Section 7 – Signs for Rural Zone:</p> <ul style="list-style-type: none"> Standard 1.1: The proposed signs will exceed the maximum height of 10m. Standard 6.2.4: The sign by the southern access (truck access) will exceed the 200m minimum specified distance from an intersection. 	<p>Section 7 (Signs), Rule 7.1</p>	<p>Discretionary Activity</p>

<ul style="list-style-type: none"> Standard 6.2.6: The proposed signs will exceed the specified maximum size of signs of 2 m². Standard 6.2.7: The proposed signs will exceed the maximum number of signs per site. 		
<p>Parking, access and manoeuvring areas</p>		
<p>To provide parking, access and loading areas on the application site, which do not meet the Permitted Activity Standards specified in Section 9 – Transportation for Rural Zone:</p> <ul style="list-style-type: none"> Standard 2.1.1: The plant will have 70 parking spaces which does not meet the minimum of 907 parking spaces based on 1.5 spaces per 100 m² GFA for industrial activities. Standard 2.5.1: The plant will have four cycle spaces which does not meet the minimum of 45 cycles spaces based on 1 space per 20 parking spaces required under Standard 2.1.1. Standard 2.15.1: The heavy vehicle and light vehicle crossings will have widths of 20 m and 11 m respectively which exceeds the maximum width of 9 m for non-residential activities. Standard 2.16.1: The heavy vehicle access will have a distance of 38 m from the nearest edge of Morven Glenavy Road which does not meet the minimum distance of 55 m between a crossing on a rural local road and an intersection with another rural local road. Standard 2.19.1: The plant will generate 136 heavy vehicle movements per day which exceeds the maximum of 20 movements per day per site. <p>The proposal meets all other relevant standards:</p> <ul style="list-style-type: none"> Standard 2.3: All parking spaces have been designed in accordance with AS/NZS 2890.1. 	<p>Section 9 (Transportation), Rule 1</p>	<p>Restricted Discretionary Activity</p>

<ul style="list-style-type: none"> ● Standard 2.4: 2 accessible spaces must be provided for 21 to 50 regular spaces and 1 accessible space for every additional 50 regular spaces. Three accessible spaces are required and proposed and will be located near the office building entrance. ● Standard 2.8: All vehicles can enter and exit the site in a forward manner. ● Standard 2.10: Heavy vehicles have been provided for and there is sufficient queuing space. ● Standard 2.11: Heavy vehicles have been provided for and there is sufficient queuing space. ● Standard 2.12: Surfaces will be compliant. ● Standard 2.13: The site is of sufficient size, and the parking areas sufficiently isolated from the frontage roads. ● Standard 2.14: The relevant vehicle crossing and access standards will be complied with. ● Standard 2.17: A sight distance of 210 m is required and more than 210 m is available from both vehicle access points. 		
<p>Financial Contributions</p>		
<p>Development that does not meet Section 10 - Financial Contributions Standard 1.3.1:</p> <ul style="list-style-type: none"> ● Industrial activities contributions for open space and recreation from development of 1.0 % of the assessed value of the development, up to the value of \$100 million and thereafter at a rate of 0.5 % of the assessed value of the development. OR ● Utilities development contributions for open space and recreation from development where the assessed value exceeds \$2 million: 	<p>Section 10 (Financial Contributions and Subdivision)</p>	<p>Discretionary Activity</p>

<ul style="list-style-type: none"> • 0.3 % of the assessed value of the development up to a value of \$100 million; and • 0.025 % of the assessed value of the development of between \$100 and \$600 million; and • 0.02 % of the assessed value of the development over \$600 million. 		
<p>Storage and use of hazardous substances</p>		
<p>The use and storage of hazardous substances which exceed the Permitted Activity quantities in the Rural Zone but are below those specified for non-complying activities.</p> <p>The following substances exceed the Permitted Activity quantities, but are below the volumes for non-complying activities as stated in Table 12.3 Rural Zones of Section 12 – Hazardous Substances:</p> <ul style="list-style-type: none"> • Category 3b: the volume of Diesel at 100,000 L will exceed the permitted activity quantity of 3,000 L. • Category 5: Oxidising substances will exceed the permitted activity quantity of 1,000 kg. • Category 8: Corrosive substances will exceed the permitted activity quantity of 100 L. <p>The proposal does not meet the following standards set out in Rule 2 of Section 12 – Hazardous Substances:</p> <ul style="list-style-type: none"> • Standard 2.1 requires that all sites where hazardous substances are stored, used, loaded or unloaded shall be sealed, banded and roofed or covered. 	<p>Section 12 (Hazardous Substances), Rule 1.3</p>	<p>Discretionary Activity</p>

<p>The tanker unload areas and large bunded tanks may not be covered but both areas will drain rainwater/spill to the water treatment plant.</p> <ul style="list-style-type: none"> Standard 2.5 requires that collection of hazardous substances for disposal or subsequent use, shall be in containers that seal and contain the hazardous substances collected. <p>The metal hydroxide sludge will be stored in tanks not containers.</p> <p>The proposal meets the remaining relevant Standards 2.2, 2.3, 2.6, 2.9 and 2.10. Standards 2.4, 2.7 and 2.8 are not relevant to the proposal.</p>		
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5.4 Summary of the resource consent requirements and bundling

Regional resource consents

Land use consent, water permit and discharge permit are required from ECAN for the following reasons:

- To discharge contaminants into air from combustion in an incinerator associated with the operation of an EfW Plant is a **Discretionary Activity**.
- To discharge domestic wastewater to land from staff and visitor facilities associated with the operation of an EfW Plant is a **Restricted Discretionary Activity**.
- To discharge stormwater from roofs, roads, hardstand areas and other impervious surfaces within an EfW Plant is a **Restricted Discretionary Activity**.
- To take water for dewatering for carrying out excavation and construction works associated with the construction of an EfW Plant is a **Restricted Discretionary Activity**.
- To undertake earthworks over an unconfined or semi-confined aquifer associated with the construction of an EfW Plant is a **Restricted Discretionary Activity**.
- To store and use hazardous substances within the Project Kea facility is a **Discretionary Activity**.

Where there is an overlap between the activities and their effects (so that the consideration of one activity could affect the outcome of the other activities), consent authorities may “bundle” the activities and apply the most restrictive activity status when considering an application.

In this case, the bundling of all regional activities is considered appropriate, and the application is to be considered as a **Discretionary Activity** overall.

District resource consents

Land use consent is required from ECAN for the following reasons:

- To construct and operate an EfW Plant and associated infrastructure, which is an industrial activity in the Rural Zone is a **Discretionary Activity**.
- To use temporary construction buildings is a **Restricted Discretionary Activity**.
- To install signage associated with the Project Kea facility in a Rural Zone is a **Discretionary Activity**.
- To provide parking, access and manoeuvring areas associated with the Project Kea facility is a **Restricted Discretionary Activity**.
- To pay financial contributions is a **Discretionary Activity**.
- To store and use hazardous substances within the Project Kea facility is a **Discretionary Activity**.

Where there is an overlap between the activities and their effects (so that the consideration of one activity could affect the outcome of the other activities), consent authorities may “bundle” the activities and apply the most restrictive activity status when considering an application.

In this case, the bundling of all district level activities is considered appropriate, and the application is to be considered as a **Discretionary Activity** overall.

5.5 Notification of the application

SIRRL is aware of the significant public interest in this proposal and requests that the application be processed by the Councils on a publicly notified basis. For this reason, public notification is mandatory under sections 95A(2)(a) and 95A(3)(a) of the RMA and no further notification tests are warranted.

6 ASSESSMENT OF EFFECTS ON THE ENVIRONMENT

6.1 Introduction

This section provides an assessment of actual and potential effects of the proposal on the environment, informed by the Technical Reports set out in Volume 2 of the application package. This section also outlines the measures proposed by the applicant to avoid, remedy or mitigate any actual or potential effects on the environment.

6.2 Effects on Air Quality (Amenity)

6.2.1 Introduction

An Air Quality Emissions Assessment (Technical Report 5) has been prepared by Andrew Curtis of PDP. The potential impacts of Project Kea on air quality arises from the following key sources:

- Combustion emissions;
- Odour emissions;
- Dust deposition; and
- Cumulative assessment.

In order to assess the effects of Project Kea on air quality, Mr Curtis identified “sensitive receptors” in the proximity of the Project Kea site. A sensitive receptor is defined as a location where people or surrounds may be particularly sensitive to the effects of air pollution (e.g., aged care facilities, hospitals, schools). Fourteen receptors representative of the local community within the area surrounding Project Kea site, and three receptors (one each) at the closest towns: Oamaru, Waimate and Duntroon were identified (refer **Table 18** and **Figure 29**).

This section describes the nature of the discharges to air from Project Kea and its potential effects on air quality. Mr Curtis also recommends a number of air quality related matters to be included as conditions of approved resource consent.

Table 18. Location of sensitive receptors close to the Project Kea site.

Receptor Name	Address	Closest Distance to EfW Plant (m)	Direction Relative to EfW Plant
R1	77 Mairos Road, Morven	1,250	N
R2	190 Mairos Road, Morven	1,300	NE
R3	197 Mairos Road, Morven	1,500	NE
R4	362 Archibalds Road, Morven	3,400	NE
R5	540 Archibalds Road, Morven	4,300	NE
R6	425 Carrolls Road, Glenavy	2,350	E
R7	91 Andrews Road, Glenavy	1,800	SE
R8	70 Andrews Road, Glenavy	1,600	SE
R9	319 Andrews Road, Glenavy	3,400	SE
R10	42 Parker Street, Glenavy	2,000	S
R11	Glenavy School	2,300	S
R12	26 Te Maiharoa Road, Glenavy	1,750	SW
R13	192 Glenavy Tawai Road, Glenavy	2,800	SW
R14	4636 Waimate Highway, Morven	1,800	W
R15	212 Waihao Back Road, Waimate	16,000	NW
R16	387 McEneaney Road, Pukeuri	15,500	S
R17	Duntroon School	33,000	W



Figure 29: Location of receptors close to the Project Kea site.

6.2.2 Combustion emissions

With respect to the assessment methodology for combustion emissions, the Air Quality Emissions Assessment states that:

- The atmospheric dispersion modelling was conducted using CALPUFF, which has been extensively used in New Zealand and Australia and is a recommended model by MfE, particularly for sites surrounded by complex terrain and/or complex settings.
- Project Kea will have two incinerators, each with its own flue gas treatment system and exhaust stack. As the stacks will be contained within a single common housing, one combined stack has been modelled.
- The EfW Plant designer has provided guaranteed emission values for the site operations. The stack emission rate has been calculated using the total emission rate from the two stacks.

With respect to the assessment of effects on air quality arising from the combustion emissions, the Air Quality Emissions Assessment states that:

- Nitrogen Dioxide (NO₂): predicted NO₂ concentrations, including background concentrations, are below the assessment criteria at all the sensitive receptor locations, with the highest 1-hour average of 69.0 µg/m³ and the highest 24-hour concentration of 42.6 µg/m³ outside the boundary. These values comply with the relevant 1-hour and 24-hour guidelines of 200 µg/m³ and 100 µg/m³, respectively.

The maximum off-site concentration (including background) is 3.7 µg/m³ which is well below the guideline of 40 µg/m³.

- Sulphur Dioxide (SO₂): predicted SO₂ concentrations, including background concentrations, are well below the assessment criteria at all the sensitive receptor locations, with the highest 1-hour average concentration of 42.7 µg/m³ and the highest 24-hour concentration of 14.1 µg/m³ outside the boundary. These values comply with the relevant 1-hour and 24-hour guidelines of 350 µg/m³ and 120 µg/m³, respectively.

It is concluded that there will be negligible adverse effects associated with SO₂ emissions from the Project Kea site.

- Particulate matter: for this assessment, an emission rate of 0.76 g/s for particulates has been guaranteed by the EfW Plant designer. It has been assumed that both PM₁₀ and PM_{2.5} have the same emission rate (0.76 g/s) and therefore the same predicted off-site concentrations apply to both contaminants.

The predicted 24-hour and annual average PM₁₀ concentrations, including background concentrations, are below the assessment criteria at all sensitive receptor locations, with the highest predicted values of 11.0 µg/m³ and 8.1 µg/m³, respectively outside the site boundary. These values comply with the relevant 24-hour and annual guidelines of 50 µg/m³ and 20 µg/m³, respectively.

The predicted 24-hour and annual average PM_{2.5} concentrations, including background concentrations, are below the assessment criteria at all sensitive receptor locations, with the highest predicted values of 4.7 µg/m³ and 2.3 µg/m³, respectively outside the site boundary. These values comply with the relevant 24-hour and annual guidelines of 25 µg/m³ and 10 µg/m³, respectively.

It is concluded that there will be negligible adverse effects associated with particulate matter emissions from the Project Kea site.

- Carbon Monoxide (CO): the predicted CO concentrations, including background concentrations, are well below the assessment criteria for all sensitive receptor locations, with the highest predicted 1-hour average concentration of 5,038 $\mu\text{g}/\text{m}^3$ and the highest 8-hour average concentration of 3,013 $\mu\text{g}/\text{m}^3$, outside the site boundary. These values comply with the relevant 1-hour and 8-hour guidelines of 30,000 $\mu\text{g}/\text{m}^3$ and 10,000 $\mu\text{g}/\text{m}^3$, respectively.

The overall conclusion is that there will be negligible adverse effects associated with the CO emissions from the Project Kea site.

- Metals: the predicted maximum 1-hour, 3-monthly and annual metal concentrations have been identified for the various metals anticipated to be emitted from the stack. The overall conclusion is that there will be negligible adverse effects associated with heavy metal emissions from the Project Kea site.
- Other contaminants: the predicted maximum 1-hour and annual concentrations for the remaining contaminants have been identified.

6.2.3 Odour emissions

With respect to the assessment methodology for odour, the Air Quality Emissions Assessment states that:

- The site has two main odour sources: the incinerator stacks and the standby odour scrubber.
- The predicted 1-hour off-site odour concentrations from the stack and scrubber have been assessed separately as the scrubber will only operate when both of the incinerators are off-line.

With respect to the stack odour emissions, the Air Quality Emissions Assessment states that:

- The modelled exit concentration of 500 OU/ m^3 is assumed as appropriate given the highly treated nature of the flue gas.
- As the modelling shows off-site odour concentrations below the standard, the site emissions concentrations would need to be up to 10 times higher (5,000 OU/ m^3) for adverse odour to be detected off-site from the stack.

With respect to the odour scrubber, the Air Quality Emissions Assessment states that:

- As there is no data available on what odour concentration will be exiting the scrubber, three scenarios with different odour concentrations have been modelled.
- It is extremely unlikely that odour would be detected at any nearby receptor, particularly when the actual frequency of scrubber operation is taken into effect.

6.2.4 Dust deposition

With respect to the assessment methodology for dust deposition, the Air Quality Emissions Assessment states that:

- The dust deposition for particles has been estimated using the default dust deposition properties in the CALPUFF model.
- The particle emission rate of 0.76 g/s has been used.

The Air Quality Emissions Assessment concludes that the predicted maximum 30-day deposition dust concentration off-site is estimated to be 0.09 g/m²/30 days, which is below the MfE guidance of 4 g/m²/30.

6.2.5 Potential generator emissions

The Project Kea site will have three 2MW generators on site which are only used during start-up when neither of the incinerators are operational, and these emissions have been considered separately. Any potential emissions will be for short periods of time. The maximum off-site concentrations from the generators were well below the assessment criteria for NO₂, CO, PM₁₀ and PM_{2.5}.

6.2.6 Cumulative assessment

The Oceania Dairy Factory is located 1.7 km northwest of the Project Kea site. The Air Quality Emissions Assessment states that both the Oceania Dairy Factory and Project Kea has the potential to cause cumulative emissions due to both sites producing combustion and odour emissions.

The Air Quality Emissions Assessment has used the air discharge information in the approved resource consent for Oceania Dairy Factory to undertake conservative screening level calculations. The assessment has analysed NO₂ and SO₂ concentrations off-site concentrations. The results show that:

- The maximum 1-hour concentration will occur less than 900 m from the source and decrease. The only sensitive receptor that has been identified that can be downwind of both the Project Kea site and Oceania Dairy Factory site during the same wind conditions is R7 (located 1.9 km and 3.6 km southeast, respectively). R7 being the location at 91 Andrews Road, Glenavy.
- With respect to sensitive receptor R7 (91 Andrews Road, Glenavy): based on the cumulative concentrations of NO² and SO² present at R7, it is concluded that the off-site effects will be less than minor.

6.2.7 Locality Assessment

Noting that the Project Kea site is located in proximity to several rural towns, with respect to the potential effects on these areas, the Air Quality Emissions Assessment states that:

- Glenavy:
 - the predicted concentrations at Receptors 10 and 11 (being suitably located to illustrate the effects on Glenavy) are well below the relevant guideline values and unlikely to result in adverse health effects.
 - It is highly unlikely that offensive and/or objectionable odour will be experienced in Glenavy.
- Waimate, Duntroon and Oamaru:
 - Based on the distance from the Project Kea site and the predicted modelling results, it is highly unlikely that residents of these towns will experience any adverse health effects from Project Kea or any odour effects.

6.2.8 Proposed conditions of consents

The Air Quality Emissions Assessment recommends a number of conditions of consent, which are supported by the applicant. In brief, the recommended conditions include:

- Discharge limits to specify that the discharge of contaminants into air shall only be from the stack, ancillary odour treatment system and the 36 MW Electricity Generator.
- The activities on the site shall not discharge odour, particulate matter or water droplets that result in offensive or objectionable adverse effects beyond the boundary of the Project Kea site.

- The individual stacks shall have an emission output not exceeding 155,865 Nm³/hr.
- No more than 365,000 tonnes of solid waste shall be processed each year.
- Combustion gases from the incinerator shall discharge via emission control equipment as appropriate from two stacks terminating not less than 75 m above ground level.
- The discharge from the stack shall be directed vertically onto the air and shall not be impeded by any obstruction above the stack which decreases the vertical efflux velocity.
- The opacity of emissions from the stack shall not be darker than Ringelmann Shade 1 as described in the New Zealand Standard 510:1973 (except in specified situations).
- The incinerator stack efflux velocity at a maximum continuous rating of the incinerator shall not be less than 13.5 metres per second.
- Undertake monitoring of flue gas, waste analysis, slag, dioxin, odour pollutants and heavy metals.

6.2.9 Conclusion

The Air Quality Emissions Assessment concludes that:

- Having assessed the worst-case conditions with air discharges from the Project Kea site, it is unlikely that Project Kea will result in adverse health effects at any sensitive receptors at or beyond the site boundary.
- The above conclusion is based on a conservative approach to modelling of the pollutant discharges and based on the site operating 24 hours a day, and seven days a week at capacity.
- The odour discharges from the scrubber and stack have been modelled separately using an odour concentration of 500 OU/m³ each. This is in line with data from other air discharges assessments on plants with a similar level of treatment.
- The air dispersion modelling results predict that the maximum off-site combustion emission concentrations are below the relevant assessment criteria.
- **Table 19** sets out the summary of combustion emissions and magnitude of change for each pollutant. The overall conclusion is that the impact from the Project Kea site operations on the environment is unlikely to result in any adverse health effects beyond the Project Kea site boundary.

Table 19. Summary of combustion emissions.

Pollutant	Period	Maximum Concentration (including background) ($\mu\text{g}/\text{m}^3$)	Relevant guideline ($\mu\text{g}/\text{m}^3$)	Percentage of guideline (%)	Magnitude of Change
NO ₂	1-hour	69.0	200	35%	Slight, Adverse: Less than Minor
	24-hour	47.6	100	48%	Slight, Adverse: Less than Minor
	Annual	3.7	10	37%	Negligible
SO ₂	1-hour	42.7	350	12%	Negligible
	24-hour	14.1	120	12%	Negligible
PM ₁₀	24-hour	11	50	22%	Negligible
	Annual	8.1	20	41%	Negligible
PM _{2.5}	24-hour	4.7	25	19%	Negligible
	Annual	2.3	10	23%	Negligible
CO	1-hour	5,038	30,000	17%	Negligible
	8-hour	3,013	10,000	30%	Negligible
Antimony (Sb)	1-hour	0.1	1.0	10%	Slight, Adverse: Less than Minor
	Annual	7.9×10^{-4}	0.3	0%	Negligible
Arsenic	1-hour	0.1	9.9	1%	Negligible

	Annual	7.9×10^{-4}	0.0055	14%	Slight, Adverse: Less than Minor
Beryllium	Annual	7.9×10^{-4}	0.02	4%	Negligible
Cadmium	1-hour	0.1	18	1%	Negligible
	Annual	7.9×10^{-4}	0.005	16%	Slight, Adverse: Less than Minor
Chromium VI	1-hour	0.1	1.3	8%	Negligible
	Annual	7.9×10^{-4}	0.0011	72%	Slight, Adverse: Less than Minor
Cobalt	Annual	7.9×10^{-4}	0.1	1%	Negligible
Copper	1-hour	0.1	100	0%	Negligible
	Annual	7.9×10^{-4}	490	0%	Negligible
Lead	3-month	0.001	0.2	1%	Negligible
Manganese	1-hour	0.1	9.1	1%	Negligible
	Annual	7.9×10^{-4}	0.15	1%	Negligible
Nickel	1-hour	0.1	1.1	9%	Negligible
	Annual	7.9×10^{-4}	0.02	4%	Negligible
Selenium	Annual	7.9×10^{-4}	20	0%	Negligible
Thallium	Annual	7.9×10^{-4}	0.7	0%	Negligible
Tin	Annual	7.9×10^{-4}	7,000	0%	Negligible
Vanadium	1-hour	0.1	30	0%	Negligible

	Annual	7.9×10^{-4}	0.1	1%	Negligible
Benzene	1-hour	7.6	580	1%	Negligible
	Annual	0.046	3.6	1%	Negligible
Xylene	1-hour	7.6	7,400	0%	Negligible
	Annual	0.06	200	0%	Negligible
Toluene	1-hour	7.6	15,000	0%	Negligible
	Annual	0.06	5,000	0%	Negligible
1,3,5- and 1,3,4- trimethylben- zene	1-hour	7.6	15,000	0%	Negligible
	Annual	0.06	60	0%	Negligible
Mercury	1-hour	0.01	0.6	2%	Negligible
	Annual	1.1×10^{-4}	0.13	0%	Negligible
Ammonia	1-hour	7.6	590	1%	Negligible
	24-hour	0.06	320	0%	Negligible
Dioxin	Annual	4.1×10^{-9}	3.5×10^{-6}	0%	Negligible
Hydrogen Chloride	1-hour	4.5	660	1%	Negligible
	Annual	0.04	26	0%	Negligible
Hydrogen Fluoride	1-hour	0.8	60	1%	Negligible
	Annual	0.006	29	0%	Negligible

6.3 Effects on Air quality (Human Health)

The CARP seeks to manage discharges to air in the best practicable manner. The CARP states that:

“Its principal purpose is to maintain air quality where it provides for people’s health and cultural wellbeing, or to improve it if it does not, whilst recognising the investment in, and significant contribution to the economy and social wellbeing of Canterbury of industrial and trade activities that discharge into air”.

Objective 5.2 of CARP seeks to ensure that ambient air quality provides for the health and wellbeing of Canterbury. In particular, Policy 6.1(a) of CARP states that discharges of contaminants into air, either individually or in combination with other discharges do not cause “diverse effects on human health and wellbeing”.

To assess the effects of discharges to air (as proposed by Project Kea) on human health, this application package includes a Human Health Risk Assessment Report (“**HHRA**”) (Technical Report 6), prepared by Environmental Risk Sciences. The HHRA undertakes a human health risk assessment in relation to the potential impacts on the community located outside the Project Kea site, associated with changes in air quality arising from the operation of Project Kea.

The HHRA uses the air quality modelling data results set out in the Air Quality Emissions Assessment (Technical Report 5), as the informational input to undertake the HHRA. In term of the “community” potentially affected by Project Kea, the HHRA focuses on the 17 sensitive receptor locations identified in Air Quality Emissions Assessment and set out in **Table 10** of this Planning Report.

The HHRA assesses:

- Exposure assessment: how people may be exposed to the emissions to air over short term (acute) and long term (chronic).
- Hazard or toxicity assessment: the hazards posed by (or toxicity of) the chemicals present in the emissions.
- Calculation of potential risks to health or risk characterisation.

HHRA has considered impacts on the community for the worst-case emissions scenario relevant to the operation Project Kea. In addition, a number of conservative assumptions were adopted in relation to the emissions to air of individual metals and volatile organic compounds.

The HHRA considered acute and chronic inhalation exposures as well as multi-pathway exposures associated with the deposition of metals and persistent organic pollutants (specifically dioxin-like compounds) to the ground and the potential for direct contact with soil and dust (indoors) and uptake of these chemicals into homegrown produce (fruit and vegetables, eggs, milk, and meat [beef and lamb]) and consumption of this produce.

HHRA has also considered whether the deposition of metals and dioxins/furans would have the potential to adversely affect water quality in rainwater tanks and the quality of produce such as grain and vineyard crops, as well as meat, milk and eggs grown in the area.

The HHRA concludes that:

- Inhalation exposures: all risks to human health are considered negligible for the duration of the Proposed EfW Plant. More specifically the following has been concluded:
 - no acute inhalation risk issues of concern
 - no chronic risk issues of concern
 - exposure to particulates derived from the EfW Plant within the community are considered negligible.
- Multi-pathway exposures:
 - all chronic risks to human health are considered negligible for the duration of the EfW Plant. More specifically the following has been concluded:
 - all calculated risks for individual exposure pathways are negligible and essentially representative of zero risk
 - all calculated risks for combined multiple pathway exposures are negligible and essentially representative of zero risk.
 - Emissions from the EfW Plant would have a negligible impact on water quality in rainwater tanks used for drinking water

- Emissions from the EfW Plant would have a negligible impact on crops and produce grown in the area.

6.4 Effects on the Transportation Network

The WDP states that land transport infrastructure, and roading in particular, is a significant component of the environment; and the road network is essential to the Waimate District's economic activity and to the convenience and wellbeing of residents and visitors.

A Transportation Assessment Report (Technical Report 8) ("ITA") has been prepared by Shu Mak of Commute Transportation Consultants to assess the transportation/traffic effects associated with Project Kea.

With respect to the level rail crossing in proximity to the Project Kea site, the ITA states that discussions with KiwiRail have been undertaken to assess the existing level crossing and the proposed development with the proposed mitigations (barriers and flashing lights and bells). A LCSIA has been completed by an external consultant in co-operation with KiwiRail. A copy of the LCSIA, as endorsed by KiwiRail, is included in the ITA.

With respect to traffic generation, the ITA states that:

- Truck trip generation: the proposal will cater for up to 68 trucks per day or 136 truck movements per day. The majority of the trucks are expected to be articulated truck and trailers.
- Light vehicle trip generation: the proposal will generate approximately 148 light vehicle movements (74 inbound and 74 outbound).
- Based on the above, the total predicted trip generation numbers are shown in **Table 20**. Project Kea is estimated to generate 284 vehicle movements per day.

Table 20: Calculated vehicular movements (Source: Transportation Assessment Report).

Movements	AM Peak Hour			PM Peak Hour			Daily		
	In	Out	Total	In	Out	Total	In	Out	Total
Heavy Vehicle	6	6	12	6	6	12	68	68	136
Light Vehicle	46	14	60	14	46	60	74	74	148

Total	52	20	72	20	52	72	142	142	284
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- The projected 284 vehicle movements per day, equate to: peak hour trip rates of 4.8 trips per ha (based on site area) or 0.12 trips per 100 m² (based on building area); and daily trip rates of 18.93 trips per ha (based on site area) or 0.47 trips per 100 m² (based on building area).
- In comparison to published data on trip generation, the Project Kea facility is considered to be best represented by warehouse type activities (noting that manufacturing activities have a higher trip generation rates). The published “warehouse” rates are above the predicted trip generation rates for Project Kea. Project Kea is considered to be a low traffic generating industrial activity and will not generate traffic volumes beyond that which would typically be expected by this type of activity.

With respect to traffic distribution, the ITA states that:

- In distributing vehicle movements onto the road network, it is assumed that all heavy vehicle movements and all light vehicle movements will travel to and from the Project Kea site via the SH1/Carrolls Road intersection.
- The following data has been used to estimate the distribution of traffic movements:
 - 85% of heavy vehicle movements travel to/from the north;
 - 15% of heavy vehicle movements travel to/from the south;
 - 70% of light vehicle movements travel to/from the north; and
 - 30% of light vehicle movements travel to/from the south.
- Based on the projected trip and distribution values, the estimated additional movements at the SH1/Carrolls Road intersection are summarised in **Figure 30**.

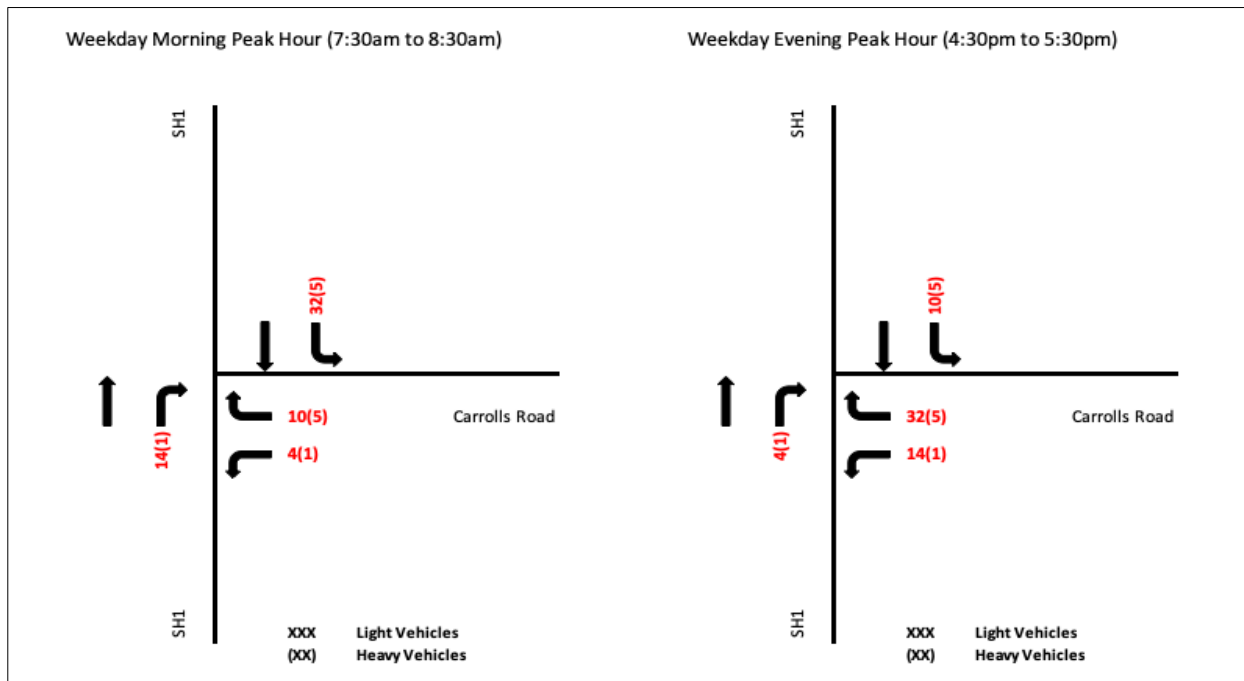


Figure 30: Additional movements at the SH1/Carrolls Road intersection.

- Figure 31 shows the combined existing plus the estimated additional traffic movements at the SH1/Carrolls Road intersection.

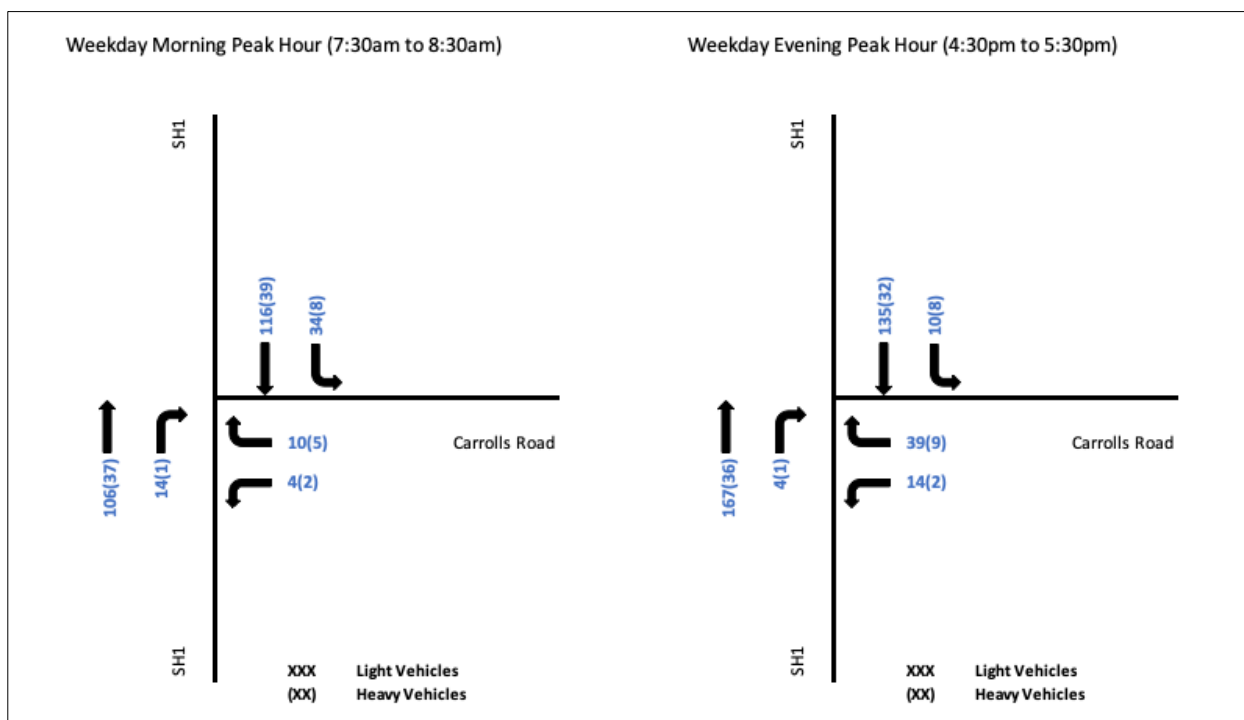


Figure 31: Total movements at the SH1 and Carrolls Road intersection.

In light of the projected increase in the traffic movements, with respect to the effects of Project Kea on the SH1/Carrolls Road intersection, the ITA states that:

- Traffic modelling for SH1/Carrolls Road was completed to understand how this intersection is likely to perform when the Project Kea becomes operational.
- *Morning peak:* The modelling results show that the intersection works well in the morning peak hour with and without the Project Kea development. Therefore, it is concluded that the additional traffic generated by Project Kea on the performance of the SH1/Carrolls Road intersection, with the proposed upgrades, is considered negligible.
- *Evening peak:* The modelling results show that the intersection works well in the evening peak hour with and without the Project Kea development. The degrees of saturation, average delays and queues are low. Therefore, it is concluded that the additional traffic generated by Project Kea on the performance of the SH1/Carrolls Road intersection, with the proposed upgrades, is considered negligible.

With respect to parking and loading matters as required under the WDP, the ITA states that:

- The WDP outlines the minimum parking requirements for various activities. An EfW Plant facility is not specifically listed in Table 9.1, which specifies the minimum parking space requirements. The WDP states that if any activity is not listed in Table 9.1, then the activity closest in nature to the new activity should be used. In this case, being similar to industrial activity, Project Kea requires 1.5 spaces per 100m² gross floor area, which equates to 907 vehicle parking spaces and 45 bicycle parking spaces. Project Kea proposes a total of 70 vehicle parking spaces and 4 bicycle parking spaces.
- The ITA assess the effects of the shortfall in the parking spaces, and notes that:
 - While the site is physically able to accommodate the required parking, the proposed parking spaces are sufficient to satisfy the parking demands generated by the proposal.
 - All parking demand is able to be accommodated on the Project Kea site, as such there is no need for any public car parking (hence no need for any cash payment towards the public car parking in lieu of the shortfall in proposed parking).

With respect to length of vehicle crossings, the ITA states that:

- The WDP specifies a minimum vehicle crossing length of 4m and maximum vehicle crossing length of 9m for industrial activities. Project Kea proposes a heavy vehicle access width of 20m and 11m for light vehicle access, both of which exceed the specified maximum lengths.
- The wider vehicle access widths are necessary for Project Kea to accommodate the swept path of articulated vehicles turning into and out of the site simultaneously.
- Noting that there are no footpaths along the proposed access frontages, and no nearby vehicle crossings, the adverse effects of the increased vehicle crossings is considered to be negligible.

Overall, the ITA concludes that:

- With respect to the effects of Project Kea on the roading network, the critical intersection for assessment is SH1/Carrolls Road. The additional traffic generated by Project Kea on the performance of the SH1/Carrolls Road intersection, with the proposed upgrades, is considered negligible.
- All minor downstream intersections (e.g., Morven Glenavy Road/Carrolls Road intersection) are anticipated to operate acceptably with the proposed development.
- The provision of 70 parking spaces and 4 bicycle parking spaces are considered sufficient to cater for all staff parking demands (including shift changeover), and potential visitor and maintenance vehicle parking demands.
- As all car parking demands are proposed to be accommodated on the Project Kea site, there will be no adverse effects on the surrounding area as a result of not providing the required parking spaces.
- No cumulative effects are expected with respect to the shortfall in the proposed parking spaces.
- No queuing back on Morven Glenavy Road is anticipated.
- The surface of all parking, loading and circulation areas on-site are proposed to be sealed to minimise noise and dust, and to ensure that vehicles can travel to and from the site in a safe manner during all weather conditions.
- The enclosed waste hall area is designed to ensure that the trucks carrying waste do not drag any unloaded waste out of the hall, and onto the road network.

- The proposed landscaping design for the Project Kea site ensures that it does not restrict visibility of motorists, nor create conditions causing icing of the road.
- The straight and flat alignment of Morven Glenavy Road and Carrolls Road ensures that the proposed vehicle accesses have more than 210m visibility as required by the WDP.
- The implementation of the recommended transport improvements (as set out below) will ensure the safe operation of the roading network in proximity to the Project Kea site.

Overall, the ITA concludes that there are no traffic engineering or transportation planning reasons to preclude the acceptance of the proposal.

With respect to the proposed Carrolls Road level crossing upgrades with barriers, flashing lights and bells, the LCSIA statement of findings states that:

“overall, it is considered that the recommended at-grade solution and proposed roading improvements to Carrolls Road provides an appropriate level of risk / hazard management as the crossing can achieve Criterion 1 with active level crossing controls, and is a ‘so far as and is a reasonably practicable’ solution”.

Proposed conditions of consents

The ITA recommends that the following transport improvements to enable the safe operation of the roading network in proximity to the Project Kea site be included in the conditions of consent, which are supported by the applicant. In brief:

- The intersection of SH1 and Carrolls Road is to be upgraded to include a right turning bay on SH1 northbound and an auxiliary left turning lane on SH1 southbound. Noting the 24-hour operation of the Project Kea facility, street lighting will also be upgraded at this intersection.
- The section of Carrolls Road between SH1 and the site’s heavy vehicle access will be widened, sealed and have upgraded pavement. Edge marker posts and raised reflective pavement markers will also be installed for delineation purposes.
- The section of Morven Glenavy Road within the vicinity of the site’s light vehicle access will have a widened shoulder.
- The Carrolls Road level crossing will be upgraded with barriers, flashing lights and bells.

- A new stock crossing tunnel will be constructed on Carrolls Road. Street lighting will be upgraded in the general area comprising the railway level crossing, the Morven Glenavy Road and Carrolls Road intersection, and the heavy vehicle access. Lighting will also be upgraded at the second Morven Glenavy Road intersection at the site's south-eastern corner.

6.5 Effects of Noise

An Acoustic Assessment Report (Technical Report 7) has been prepared by SLR Consulting NZ Limited. The Acoustic Assessment Report evaluates the noise effects from the Project Kea facility against the relevant noise rules set out in the WDP and predicts the noise levels likely to be generated by the construction and operation of the facility.

With respect to construction noise, the Acoustic Assessment Report states that:

- Rule 7.18.1 of Section 4 – Rural Zone of the WDP requires all construction noise to be measured, assessed and comply with the New Zealand Standard NZS 6803:1999 Acoustics – Construction Noise (“**NZS 6803**”)
- The assessment of construction noise is based on SLR's experience, information and data from previous developments of a similar scale.
- Construction works are expected to include site clearance and levelling, foundations, paving and building erection.
- **Table 21** sets out a summary of typically expected equipment and associated reference sound pressure levels. The approximate setback distances in **Table 21** have been calculated in accordance with the methodology in NZ 6803 and include façade corrections. Compliance with 70dB LAeq noise limit is expected at approximately 80m from the noisiest activity (impact piling), without mitigation measures such as screening in place.

Table 21. Construction equipment and typical noise emission levels.

Equipment	Noise level at 10m	Approximate setback distance to compliance without mitigation
Excavator (<20t) with bucket attachment	75 dB LAeq	25m

Vibratory compaction roller (≤ 20 t) ²	75 dB LAeq	25m
Non-vibratory Compaction roller (< 5 t)	60 to 65 dB LAeq	10m
Rotary piling rig	80 dB LAeq	45m
Driven impact piling	85 dB LAeq	80m

- Compliance with 70dB LAeq noise limit is expected at approximately 80m from the noisiest activity (impact piling), without mitigation measures such as screening in place.
- The assessment contains details of the typical equipment and associated sound pressure levels.
- As the nearest existing dwelling is over 500m from the works, construction noise is expected to comply with the relevant limits of NZS 6803.

With respect to noise generated by the operation of Project Kea site, the Acoustic Assessment Report states that:

- Rule 7.9 of Section 4 – Rural Zone of the WDP sets out the noise limits for noise generated on Rural zoned land.
- Details regarding the supply air ventilation for the incineration and steam generation units have not been finalised. However, it is considered that with proper selection of equipment in terms of noise emission, common methods of noise control such as screening, in-duct attenuators (if required) and appropriate siting, the system can comply with the relevant noise limits.
- Noise modelling has been completed for the site to predict operational noise levels. The noise model takes into consideration the following sources:
 - Unloading platform
 - Incineration and steam generation – main powerhouse building
 - Turbine and transformer room
 - Vehicle movements

The predicted operational noise levels are set out in **Table 22**. The daytime noise levels reported in the table represent the peak hour of activity anticipated at the Project Kea facility, noise levels over the whole of the daytime period are expected to be lower.

Table 22. Predicted operational noise levels.

Receiver number and address		Predicted noise level				Comment
		Daytime period (dB La10)		Night-time period (dB La10,1hr) ²		
		Predicted	Criteria ²	Predicted	Criteria ¹	
R1	77 Mairors Road	35	50	35	40	Complies
R2	197 Mairors Road	34	50	34	40	Complies
R3	190 Mairors Road	36	50	36	40	Complies
Notes						
[1] The daytime and night-time criteria have been reduced by 5 dB in accordance with NZS 6802, due to the noise sources associated with the proposal containing expected special audible characteristics.						
[2] Given the distance to receivers, the LAFmax criterion is readily expected to be achieved, thus the following assessment does not consider this criterion further.						

- Based on the predicted operational noise levels, the Project Kea site is expected to comply with the WDP daytime and night-time noise limit at all existing receivers. The noise levels at other receivers are not included in **Table 22** and can be expected to comply with the WDP limits as they have a greater separation distance from the noise sources and are therefore less exposed to noise.

With respect to cumulative noise effects, the Acoustic Assessment Report states that:

- The predicted worst-case noise level from the Project Kea 35 dB LAeq at 77 Marios Road. Should the potential instance of peak activity on the Oceania Dairy Factory and Project Kea sites occur at the same time, this may result in a cumulative level of 41 dB LAeq at 77 Marios Road, an increase of 1 dB above the Oceania Dairy Factory 'Stage 2' levels.

- The effect of a 1-2 dB change in noise levels is considered negligible, as differences of 1-2 dB in noise levels are considered to be imperceptible. Therefore, there would be no expected adverse cumulative noise effect at this receiver.

The Acoustic Assessment Report concludes overall that:

- Construction generated noise and vibration levels are expected to comply with the limits at surrounding properties due to the distance between the site and receivers.
- The predicted noise levels generated by the operation of the Project Kea facility can comply with the relevant daytime and night-time noise limits at the nearest surrounding noise sensitive dwellings. The assessment includes consideration of special audible characteristics (such as tonal elements) associated with the proposed activities and meteorological effects.
- The noise effects are considered reasonable with reference to section 16 of the RMA in terms of the proposed operation, confirming the suitability of the site for the EfW facility.

Proposed conditions of consents

The Acoustic Assessment Report recommends that the following conditions of consent, which are supported by the applicant:

- Construction activities should meet the guideline limits of NZS 6803:1999 Acoustics – Construction Noise and shall be measured and assessed in accordance with the same standard.
- Noise generated by the operation of the site shall not exceed the following noise limits at the notional boundary of the dwellings at the time of this consent (77, 190 and 197 Mairo Road):

Table 23. Noise limits at the notional boundary of the dwellings.

Receiver	Noise Limit	
	Monday to Saturday (7:00 am to 9:00 pm)	At all other times
	Sunday and public holidays (9:00 am to 5:00 pm)	
Rural Zone Receivers	55 dB LAeq, 1hr	45 dB LAeq, 1h 75 dB LAFmax

- Noise levels shall be measured in accordance with the provisions of NZS 6801:2008 Acoustics – Measurements of environmental sound and assessed in accordance with the provisions of NZS 6802:2008 Acoustics – Environmental noise.

6.6 Effects on Landscape and Visual Amenity

With respect to the rural amenity and environmental quality within the Rural Zone, the WDP seeks to ensure that *“a level of rural amenity which is consistent with the range of activities anticipated in rural areas, but which does not create unacceptable unpleasant living or working conditions for the District’s residents or visitors, nor a significant deterioration of the quality of the rural environment”*.

The WDP recognises that the Rural Zone may be the most appropriate environment for some utility, industrial, service or commercial uses to establish, provided the amenity and character of the rural area is maintained.

A Landscape Assessment Report (Technical Report 4) has been prepared by Brown NZ Limited, to assess the landscape and visual effects associated with Project Kea. The assessment focuses on the effects of the proposed main powerhouse building (up to 52.5m high) and the stack (75m high) directly east of the powerhouse, because of their elevation within the otherwise largely flat, outwash plain of the Waitaki River. The assessment also focuses on the changes to the rural character that would arise from the proposal, and the effects on residential properties around it.

The Landscape Assessment Report identifies the following key receiving environments exposed to the Project Kea site and the future development on it:

- The Waimate Highway / SH1;
- Local roads, including Carrolls Road, Morven Glenavy Road, Mairos Road, Archibalds Road and Pikes Point Road;
- Farms, farmhouses and lifestyle residences distributed around the application site – mostly located off the roads identified above; and
- The South Island Main Trunk railway line.

The audiences associated with the above key receiving environments and vantage points comprise of:

- The occupants of local farms and lifestyle blocks;

- Waimate Highway / SH1 users;
- Local road users;
- Farm workers; and
- Railway workers and any passengers on trains.

Based on the above, the Landscape Assessment Report employs five representative viewpoints that represent the full range of the public receiving environments and related audiences around the Project Kea site. **Table 24** sets out a summary of the effects ratings for all five viewpoints, based on the rating scale set out in the table.

Table 24. Viewpoint assessment summary.

Viewpoint		Existing Values	Prominence/ Visual Change	Landscape Effects	Amenity Effects
25	Waimate Highway / SH1 (south of site)	Low to Moderate	Low to Moderate	Low to Moderate (short term) Low (long term)	Low
26	Waimate Highway / SH1 (west of site)	Low to Moderate	Moderate	Moderate	Low to Moderate
27	Waimate Highway / SH1 (north-west of site)	Low	Very Low	Very Low	Very Low
28	Waimate Highway / SH1 (north of site)	Low to Moderate	Very Low	Very Low	Very Low
29	Mairos Road (north-east of site)	Low to Moderate	Low to Moderate	Low to Moderate (short term) Low (long term)	Low

Table 25. Effects rating matrix.

Effects description	Effects rating
No appreciable change to landscape character, together with landscape and amenity values: no visual intrusion / 'nuisance'.	Very Low
Limited change to landscape character; no appreciable change to landscape and amenity values: no visual intrusion / 'nuisance'.	Low
Increasingly evident change to landscape character; limited change to landscape and amenity values and a low level of visual intrusion / 'nuisance'.	Low to Moderate
Appreciable change to parts of the local landscape; more obvious impact on some landscape and amenity values, but still limited visual intrusion / 'nuisance'.	Moderate
Marked change to parts of the local landscape; obvious impact on some landscape and amenity values, including evident visual intrusion / 'nuisance'.	Moderate to High
Obvious changes to landscape character with degradation of landscape and amenity values, including obvious visual intrusion / 'nuisance'.	High
Severe degradation of landscape and amenity values accompanied by high levels of visual intrusion / 'nuisance'.	Very High

With respect to the effects ratings set out in **Table 25** for the five viewpoints, the Landscape Assessment Report identifies the following factors contributing to the ratings:

- The absence of any Outstanding Natural Landscapes or other areas of high environmental value close to the Project Kea site.
- The 'working', rural production, nature of the landscape found largely around the Project Kea site.
- The low to flat angle of viewing towards the proposed EfW Plant, reinforced by the change in river terrace elevation between the application site and Mairos Road – so that the proposed development sits down 'in the landscape' and not 'on top of it'.
- The viewing distance from key receiving environments, including the Waimate Highway / SH1, to the Project Kea site.

- The presence of intervening hedgerows and shelterbelts – between the Waimate Highway / SH1 and the Project Kea site, in particular.
- The presence of the Oceania Dairy Factory some 1.3km north-west of the application site – which both ‘pre-conditions’ those using local roads to the presence of factories in the north Waitaki River landscape and near SH1, but also contributes to the proposal’s effects in a cumulative manner.
- The much smaller scale of audiences that would be impacted by the proposed development away from the Waimate Highway / SH1.
- The limited presence of residential properties in close proximity to the subject site, together with the screen planting already found around many of them and their general orientation away from the site.
- The mitigation measures proposed for the Project Kea development (buildings and site), including the palette of building materials and colours to be used on the main powerhouse building and the planting around them.

With the strong focus on effects associated with use of SH1 and local residents means that the area north and south of Mairos Road, but still east of the Waimate Highway / SH1, is not covered in the above Viewpoint Analysis. Nor is the large catchment of farms west of the highway, at the edge of the lower Waitaki River valley. In regard to the effects on these other receiving environments, the Landscape Assessment Report states that:

- North and south of Mairos Road: Project Kea would have a limited impact on the values of the landscape spread out around it from south and east to north, and this would combine with its relatively isolated siting (relative to residential properties especially), its location at the foot of a terrace slope, and the mitigation measures already described to limit its impact overall. Recognising the limited level of public engagement with Project Kea within this area generally, the proposals effects would range from Very Low north of Mcleays Road and near the eastern ends of Mairos, Carrolls and Andrews Roads, to Low near Archibalds Road, and Low-Moderate near Mairos Road, as well as more proximate parts of Carrolls and Andrews Roads.
- West of Waimate Highway/SH1: Project Kea would be less prominent than the Oceania Dairy Factory, which is also intermittently apparent, but quite small-scale, and it would remain a secondary, background, element in views from virtually all of this sector. The effects generated by Project Kea on

most of the area west of the Waimate Highway would be of a Low to Very Low order. The only exception to this would comprise farm properties close to SH1, but not the roads and public domain generally west of it.

- Effects on local residents: Most of the dwellings are already screened from the Project Kea site by amenity planting and shelterbelts, while the flat lie of the land, viewing distance and orientation of individual houses would all help to limit Project Kea's impact on local properties. Therefore, the effects in relation to residential amenity would be quite limited and of a Low to Very Low order overall.

With regards to the appropriateness of Project Kea being located in the Rural Zone from a landscape and amenity perspective, the Landscape Assessment Report states that:

- The proposed buildings and structures are compatible with the character of the local environment, notwithstanding the close-up scale of the proposed main powerhouse building and stack.
- The proposed buildings and structures would not affect residential amenity values, including those related to outlook, sunlight and daylight admission.
- Noting the scale of the main powerhouse building and stack, it is acknowledged that not all adverse visual effects can be mitigated, but the location of the proposed development would ensure that any adverse visual amenity effects are kept to an appropriately low level.
- Any effects on landscape and visual amenity would be limited and in keeping with the general character and values of the site's northern Waitaki River's terrace landscape.
- Any adverse amenity effects arising from heavy vehicle movements would be minimised by the close proximity of the proposed plant to both the SIMT and SH1, and the absence of any residential properties on western Carrolls Road.

Overall, the Landscape Assessment Report concludes that:

- The landscape and visual amenity effects arising from Project Kea would be limited - typically of a Very Low to Low-Moderate order - less than that as surrounding mitigation planting matures;
- The proposal is consistent with the relevant objective, policy and rules framework of the WDP for the Rural Zone; and
- Project Kea is considered to be appropriate from a landscape and amenity standpoint.

6.7 Effects of Land Disturbance (Preliminary Site Investigation)

The Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (“**NESCS**”) seeks to ensure that land affected by contaminants in soil is appropriately identified and assessed. When soil disturbance and/or land development activities take place, it should be, if necessary, remedied or the contaminants contained to make land safe for human use.

Under the NESCS, land is considered to be actually or potentially contaminated if an activity or industry on the MfE Hazardous Activities and Industries List (“**HAIL**”) has been, or is more likely than not to have been, undertaken on the land. Consequently, a change in land use, subdivision, or development requires a Preliminary Site Investigation (“**PSI**”) of the land to determine if there is a potential risk to human health because of current or former activities that are occurring, or may have occurred, on the land under investigation.

In accordance with the requirements of NESCS, A Preliminary Site Investigation Report (Technical Report 2) has been prepared for the Project Kea site, noting the proposed change in land use from rural to industrial. The PSI states that:

- The Land Information Memorandum of the site and Environment Canterbury's Listed Land Use Register do not identify the site as containing current or previous hazardous or industrial activities on the site.
- No historic or current uses on the site have been identified, which are listed on the HAIL.
- Information received from the landowner indicate that prior to its current use in dairying, the land was used for sheep farming. Stock handling facilities to support the sheep farming activities were not located on the site.
- Overall, based on aerial photographs (1943 to current) from Canterbury Maps, it is determined that the site has been consistently used for pastoral farming with no known, or evidence of, farm rubbish dumps, sheep dip operations or other activity that would give reason for potential soil contamination. There is also no evidence or likelihood that the site was used as a primary agrichemical operational or storage facility.

- It is concluded that soil disturbance to enable the development of the Project Kea site is highly unlikely to pose a risk to human health.

The PSI concludes that pursuant to Regulation 8(4)(b) of the NESCS, the change in the use of the land to enable the construction of the EfW Plant is a Permitted Activity for the following reasons:

- A PSI has been completed;
- The PSI states that “it is highly unlikely that there will be a risk to human health if the activity is done on the piece of land”;
- The PSI is accompanied by a site plan referred to in the PSI; and
- The PSI and the site plan are being submitted to the consent authority as part of this resource consent package.

6.8 Effects of Earthworks

Earthworks are an important part of the land development process. The Earthworks Report (Technical Report 13) details the proposed earthworks necessary for site preparatory works to enable the establishment of Project Kea. Earthworks are required on the site to achieve desired finished ground levels to enable the construction of the proposed building platforms, road subgrades, construction of the waste bunker and the installation of infrastructure (including stormwater management devices).

With respect to the excavations for the waste bunker, the Geotechnical Appraisal states that:

- The excavations are anticipated to be achieved via cut batters and benching.
- For preliminary design purposes, temporary cut batters are recommended to be cut no steeper than 1V:3H within the lower 3 m of the excavation and 1V:1.5H within the upper 5 m, with a 3.0m wide bench between.
- Stability analyses has been undertaken based on above recommendations, which demonstrates a factor of safety of >1.3 is available for a range of effective stress parameters adopted for the gravel, which is considered acceptable for temporary works.
- Final temporary batter angles and excavation geometry will be confirmed following intrusive investigations during subsequent design stages.

The Earthworks Report outlines the methodologies proposed to enable careful management of the construction earthworks phase, to ensure that adverse effects on the environment are avoided, remedied or mitigated.

It is considered that the overall effects of construction earthworks will be acceptable, and will be less than minor for the following reasons:

- The earthworks are necessary to enable the establishment of Project Kea and are not greater than what is necessary for this development, and reasonably anticipated for a development of this size. The earthworks are necessary to: create suitable platforms for buildings, access, parking and manoeuvring areas; enable the installation of associated infrastructure; and enable the construction of the waste bunker (a key component of an EFW Plant).
- The earthworks are necessary to achieve higher finished ground levels of the site to enable the proposed rail siding to connect with the existing railway platform.
- The earthworks will not result in any instability of land or structures at or beyond the boundary of the site where the land disturbance occurs.
- The Geotechnical Appraisal (included in the Earthworks Report) confirms that the ground conditions provide good bearing capacity, and shallow foundations are expected to be suitable for all structures proposed on the site. The Geotechnical Appraisal also confirms that the gravel beds are not considered susceptible to liquefaction, and significant settlement as a result of proposed filling is unlikely.
- The excavations for the construction of the waste bunker will be undertaken in accordance with the final temporary batter angles and excavation geometry to be confirmed following intrusive investigations during the detailed design stage.
- All earthworks will be contained within the site, and any visual effects will be temporary in nature.
- The Earthworks Report adequately identifies the potential sediment related effects arising from the proposed earthworks. The proposed earthworks will be undertaken in conjunction with the implementation of a range of sediment and erosion control measures designed in accordance with ECan's Erosion and Sediment Control Toolbox. These measures include stabilised construction entrances, earth bunds, diversion bunds and channels, excavation controls, mulching, stockpiling, progressive stabilisation, dust control, and monitoring and maintenance procedures. The

implementation of these measures will ensure that any potential effects arising from sediment discharges will be appropriately managed.

- A CEMP and a Dust Management Plan will be prepared prior to the commencement of earthworks, to ensure that all adverse earthwork effects are appropriately managed.
- As winter earthworks are necessary during the continuous 12-month earthworks period, the Geotechnical Appraisal confirms that it is feasible as both the site and imported materials will consist of gravels which are low sediment generating materials. Regular monitoring and increased maintenance will be utilised during winter earthworks.
- Existing watercourses will be protected by the installation of runoff diversion channels to direct surface water runoff to sediment control devices. Silt fences are to be installed as secondary protection between the runoff diversion channels and the watercourses. Therefore, the sensitivity of the receiving environment to the potential effects of sediment discharges are not compromised given the potential level of discharge, and appropriate on-site management techniques.

6.9 Effects on Groundwater (Construction Phase)

Excavation of works over an unconfined aquifer system can potentially adversely affect groundwater quality, particularly in cases where there is little separation to groundwater.

The excavation of an 8m deep trench for the construction of the waste bunker, will likely encounter groundwater and require dewatering, particularly if the works are carried out during the irrigation season or when the MGI irrigation races are flowing. An assessment of effects on the surface and groundwater is required, as the exposure of groundwater during earthworks, and the required dewatering, have the potential to adversely affect surface and groundwater quantity (by pumping water out of the aquifer through the open excavation, and any resulting stream depletion) and quality (by discharge of water containing excavated material to surface or groundwater).

The Surface and Groundwater Assessment (Technical Report 17), assess the effects of proposed earthworks on the quality and quantity of groundwater and surface water. It concludes that the proposed construction methodology, including the dewatering of the trench and discharge to ground at the location, are not likely to have significant effects to surface and groundwater quantity or quality for the following reasons:

- As the groundwater levels at the Project Kea site are expected to vary seasonally from 1 to 8 m below ground level, the proposed dewatering is unlikely to significantly change groundwater levels for more than their natural seasonal variation. That is, low groundwater levels caused by the proposed dewatering activities are unlikely to be significantly different from seasonal low groundwater levels at the site.
- During the dewatering activities, water is expected to be discharged onto the paddocks at the northern portion of site, between the excavated areas and Whitneys Creek. If soils at the paddocks are over saturated, water will be discharged to the border dike irrigation channels bordering the Project Kea site, from where it is expected to infiltrate to the wider area of the farm.
- It is noted that the region is relatively dry, and soils are only over saturated during the rainy season following or during extensive precipitation events. As high groundwater levels occur during summer and the dry season, it is expected that minimum dewatering will be required when soils are over saturated from rainfall. Furthermore, as border dike irrigation will cease at the Project Kea site during constructions, groundwater levels are expected to be relatively lower than the previous seasonal high levels.
- As the aquifer is unconfined, particularly the shallow layers to 10-12 mbgl, and with high permeability, the discharge is expected to directly recharge the aquifer. Therefore, any effects of the dewatering to groundwater levels are expected to be limited to the excavation location and direct surroundings. As water is expected to be fully returned to the aquifer, it is unlikely that there will be any significant effects to groundwater quantity in the aquifer or the region.
- The dewatering of the excavation is unlikely to significantly change the quality of the water removed, except by the increase in suspended solids (fine sediments), by transportation of fine soil particles from the excavation. As the discharge of the water will be to agricultural land, and at least 1 m of soil will separate the discharge to the groundwater level, it is expected that any sediment particles will be retained by the filtration capacity of the soil profile. Therefore, effects to groundwater and surface water quality from the dewatering of the excavation and subsequent discharge, are unlikely to be significant.
- Dewatering will only be necessary during the earthworks, as the proposed bunker will be impervious and sealed from groundwater infiltration. Therefore, any effects of the dewatering to surface and

groundwater are considered temporary, to a maximum of one year (maximum expected duration of the earthworks).

With respect to the effects on neighbouring bores, the Surface and Groundwater Assessment states that:

- As the discharge to land occurs to the same aquifer and at the same rates, the effects to groundwater levels are the same but reversed. While the dewatering causes a cone of depression, the discharge causes a groundwater mound. As pump rates and aquifer properties are the same, the radius of both effects is the same but displaced by the distance of the dewatering to the discharge. Based on these assumptions and calculations, the effective radius of influence of the proposed dewatering will be reduced at Project Kea site's northern portion.
- The nearest active abstraction well to the Project Kea site is 500 m upgradient, outside of the expected extent of the maximum drawdown radius of the proposed dewatering. The closest well (J41/0050) is located 224 m from the bunker, within the Project Kea site but outside and the estimated effective radius of influence of the proposed dewatering. Furthermore, bore J41/0050 was not found at the Project Kea site and has no evidence of being used for recording water levels since 1999. Therefore, the proposed dewatering (and related discharge to land) are not expected to cause significant interference effects to any neighbouring bores.
- With respect to the effects on Whitneys Creek (stream depletion), the Surface and Groundwater Assessment states that:
 - A stream depletion was calculated using the Theis model for each abstraction rate. The effects of the abstraction at the excavation and the discharge at the northern paddock are expected to counter each other. Therefore, any stream depletion effects caused by the lowering of groundwater levels from the dewatering will have a corresponding, but reverse effect caused by the discharge. This occurs particularly at the northern boundary of the Site, near Whitneys Creek.

For the reasons outlined above, it is considered that the overall effects on groundwater during the construction phase will be less than minor.

6.10 Effects on Surface water and Groundwater (Operation Phase)

Leaching of contaminants from the waste bunker operation

During operation of the facility, MSW will be received and stored in the underground waste bunker. Moisture in the MSW can form a leachate that is collected at the base of the bunker for on-site disposal into the furnace. As the leachate collection at the base of the bunker (in a sump), will be located below seasonal low groundwater levels, an assessment of effects on groundwater quality is required.

The Surface and Groundwater Assessment (Technical Report 17), assesses the potential effects of the underground waste bunker and leachate collection on surface water and groundwater quality, and states that:

- The bunker construction (as described in the the Operational and Technical Overview Report) includes reinforced concrete structure with impermeable membranes, to seal the bunker against contact with groundwater. A pathway for contamination to groundwater is only likely if there is a crack in the concrete structure plus a loss of integrity of the impermeable membranes.
- The bunker is built underground, to a depth of up to 8mbgl, and leachate is constantly free drained to the sump and removed for disposal in the furnace. The bottom of the sump is proposed to be below the lowest seasonal groundwater levels, likely down to 10mbgl. Therefore, in the case of any crack forming, it is expected that the pressure differential between the bunker void and the surrounding groundwater will result in groundwater leaching into the bunker, where it will be captured at the sump by the wastewater system.
- Potential for contaminants to leak from the bunker into groundwater only exists in situation where a crack is present in the walls of the bunker, there is a loss of integrity to the impermeable membranes and the groundwater level is below the base of the bunker sump. It is extremely unlikely that potential contaminants will enter groundwater as a result of the proposed use and operation of the waste bunker. As the main pathway for contaminants from the waste bunker to reach surface water is through groundwater contributions to surface water, it is also extremely unlikely that potential contaminants will enter surface water as a result of the proposed use and operation of the waste bunker.

In order to avoid and mitigate adverse effects on groundwater quality due to the contaminant leaking into the aquifer in the highly unlikely event where waterproofing failure is also combined with groundwater levels lowering below the accumulated leachate levels within the waste bunker and sump, the Surface and Groundwater Assessment recommends that:

- Monitoring bores should be installed upgradient and downgradient of the Project Kea site.
- A Monitoring and Remediation Plan be prepared as a condition of resource consent.
- Groundwater levels should be monitored to confirm they remain higher than the base of the bunker sump. In this case, the risk of groundwater contamination is considered to be very low. If the groundwater levels drop below the leachate levels within the bunker sump, then groundwater quality monitoring should be carried out to detect any contamination.

The Surface and Groundwater Assessment concludes that:

“The proposed waste bunker design and operation provide a series of barriers (construction using impermeable layers) and measures (maintaining a pressure differential so that any failure results in groundwater entering the bunker instead of contaminants leaving it) to avoid contamination of groundwater during the facility operation. Furthermore, groundwater protection and monitoring are proposed, along with processes to ensure the bunker structural integrity. Therefore, effects to groundwater quality from the operation of the MSW bunker are unlikely to be significant”.

Effects of stormwater discharge to surface and groundwater

As the Project Kea site is not serviced by a reticulated stormwater network, a stormwater management plan for the Project Kea site has been prepared and detailed in the Stormwater Report (Technical Report 12).

With respect to stormwater, there are two key sources of contaminants: vehicle pavements and air discharge deposits. The stormwater management plan of the Project Kea site has been designed to protect public health and safety, and to prevent or minimise adverse effects of contaminants on freshwater. It is concluded that with the implementation of the proposed stormwater mitigation measures set out in the Stormwater Report, the proposed stormwater management approach for the Project Kea site is appropriate and adequate, and that the overall effects of the proposed stormwater discharge will be less than minor (both in terms of quantity and quality) for the following reasons:

- The effects of increased stormwater discharge from the Project Kea site will be mitigated by the construction of three infiltration basins, designed to dispose of the full post development 10% AEP stormwater flows to ground soakage. These infiltration basins have been designed in accordance with Christchurch City Council's Waterways and Drainage Guide.
- Pre-treatment is to be provided for stormwater runoff from proposed vehicle pavements (onsite access roads and railway siding) by the installation of Enviropods within each catchpit. The Enviropods will be fitted with 100-micron filters that will capture a large proportion of suspended solids, heavy metals and hydrocarbons within the stormwater runoff from vehicle pavement areas.
- The infiltration basins will be the primary means of treatment for air discharge deposits from all areas on the Project Kea site (including pavements, roofs and grassed areas). The infiltration basins have been designed in accordance with the Christchurch City Council's Waterways, Wetlands and Drainage Guide to treat the first flush stormwater flows from the proposed vehicle pavements, building roofs and grassed areas.
- The efficiency of the proposed stormwater treatment provided by infiltration basins has been assessed in accordance with Christchurch City Council's Waterways, Wetlands and Drainage Guide and other literature. A treatment efficiency of 80% for suspended solids and 60% for heavy metals and hydrocarbons. This assessment has resulted in estimated containment concentrations that would discharge from the base of the infiltration basins, as set out in **Table 26**.

Table 26. Stormwater contaminant concentrations

Vehicle Pavements, Building Roofs and Grassed Areas

Source	Contaminant	Pre-Treatment Contaminant Concentration		Post-Treatment Contaminant Concentration	
		g/m ³	mg/m ³	g/m ³	mg/m ³
Total Combined Surfaces	TSS	10.711	10711	1.3507	1350.7
	Zinc	0.0090	8.9888	0.0033	3.3467
	Copper	0.0019	1.8522	0.0007	0.6572
	Lead	0.0137	13.699	0.0027	2.7091
	TTPH	0.0013	1.3413	0.0003	0.3386
				1.3577	1357.7

Air Discharge

Source	Contaminant	Pre-Treatment Contaminant Concentration		Post-Treatment Contaminant Concentration	
		g/m ³	mg/m ³	g/m ³	mg/m ³
Air Discharge	Calcium	0.02530	25.301	0.01012	10.120
	Oxygen	0.01649	16.491	0.00660	6.5966
	Chlorine	0.01247	12.474	0.00499	4.9897
	Silicon	0.00303	3.0305	0.00121	1.2122
	Potassium	0.00254	2.5371	0.00101	1.0149
	Sulphur	0.00176	1.7619	0.00070	0.7048
	Iron	0.00176	1.7619	0.00070	0.7048
	Sodium	0.00169	1.6914	0.00068	0.6766
	Water	0.00155	1.5505	0.00062	0.6202
	Carbon	0.00106	1.0571	0.00042	0.4229
	Aluminium	0.00078	0.7752	0.00031	0.3101
	Magnesium	0.00078	0.7752	0.00031	0.3101
	Zinc	0.00035	0.3524	0.00014	0.1410
	Titanium	0.00028	0.2819	0.00011	0.1128
	Lead	0.00014	0.1410	0.00006	0.0564
	Phosphorous	0.00014	0.1410	0.00006	0.0564
	Bromide	0.00014	0.1410	0.00006	0.0564
	Chromium	0.00007	0.0705	0.00003	0.0282
	Manganese	0.00007	0.0705	0.00003	0.0282
	Strontium	0.00007	0.0705	0.00003	0.0282
	Copper	0.00007	0.0705	0.00003	0.0282
	Barium	0.00007	0.0705	0.00003	0.0282
Cadium	0.00003	0.0282	0.00001	0.0113	
Nickel	0.00001	0.0070	0.00000	0.0028	
Totals		0.07065	70.6523	0.02826	28.261

- The Surface and Groundwater Assessment uses the above stormwater contaminant concentrations data (post-treatment) to assess the effects of the stormwater discharge on groundwater and surface water. The Surface and Groundwater Report states that the operation of Project Kea has the potential to discharge contaminants (from roofs, vehicle pavements, walkways, and dust deposition from the air discharge) to groundwater. As the discharge to groundwater occurs in relative proximity to Whitneys Creek, there is potential that the discharge may occur indirectly to surface water. With respect to the

adverse effects of effects of stormwater discharge to surface and groundwater, the Surface and Groundwater Assessment states that:

- Stormwater discharge will occur mainly during the rainy season, when groundwater levels are at the lowest. Therefore, when stormwater discharges to ground and groundwater are occurring, the contributions of groundwater to Whitneys Creek are expected to be minimal to none.
- The proposed systems on the Project Kea site are designed in accordance with all relevant guidelines and best practices, and therefore, are expected to provide sufficient treatment for any potential contaminants from the Project Kea site.
- Babbage has carried out an assessment of expected concentrations of potential contaminants in the stormwater discharge based on the deposition modelling and the expected stormwater volumes and contaminants. All expected concentrations of potential contaminants are below the limits for a level of protection of 95% of species from Table S5B from Schedule 5 of the CLWRP, except for Chlorine concentration, which for the average discharge is still lower than the defined limit for a level of protection of 90% of species of the Australian and New Zealand Guidelines for Fresh & Marine Water Quality, and for worst-case is still lower than the maximum acceptable values (MAVs) and guideline values (GVs) stipulated by the Drinking-water Standards for New Zealand.
- All expected concentrations of potential contaminants (both average and worst-case scenario) are orders of magnitude lower than the relevant MAVs and GVVs stipulated by the DWSNZ, and therefore the discharge is unlikely to cause the receiving freshwater bodies (surface or groundwater) to exceed the limits stipulated in Schedule 8 (Region-wide Water Quality Limits) of the CLWRP.
- No off-site adverse effects on adjoining properties is expected due to the increased stormwater discharge on the Project Kea site, as the Stormwater Report confirms that:
 - There is no increase in the 20% AEP stormwater flows to existing water bodies (Whitneys Creek).
 - There would be no 10% AEP stormwater flows that would enter any other property.

- The stormwater management plan has been designed to capture only stormwater runoff and does not include the capture of hazardous substances on the Project Kea site. Careful consideration has been given to the management of hazardous substances on the site to ensure that firstly accidental spillage is avoided, and secondly, to ensure that where there is residual risk of discharge, it is contained on the site, and is not discharged into the stormwater system. Areas identified as being at risk of accidental spillage of hazardous substances, have been designed to capture any spillage and sloped to drain to the on-site wastewater treatment plant. It is further noted that the preparation of the Environmental Management Plan for Hazardous Substances prior to the operation of Project Kea, will ensure that appropriate management procedures are put in place to prevent hazardous substances from entering the stormwater systems.

For the reasons outlined above, it is considered that the overall effects on stormwater discharge on surface and groundwater during the operation phase will be less than minor.

6.11 Effects of Discharging Domestic Wastewater

As the Project Kea site is not serviced by a reticulated wastewater network, it proposes an on-site wastewater treatment system for wastewater from staff and visitor facilities on the site.

The details pertaining to the design parameters for the domestic wastewater disposal system is set out in the Domestic Wastewater Discharge to Land Report (Technical Report 14). The Domestic Wastewater Discharge to Land Report assesses the potential adverse effects of the disposal of domestic wastewater to land on:

- Soil status (as excessive loading and/or the discharge chemistry affects soil chemistry)
- Groundwater quality (if there are high contaminants loads)
- Surface water quality (if overland flows occur)

With respect to the effects of the proposed domestic wastewater discharge to land on soil quality, it is concluded that the potential effects will be less than minor for the following reasons:

- Waterlogging:
 - The proposed hydraulic loading rate of 3.5 mm/day is significantly less than the topsoil assimilative (absorption) capacity and below the calculated design irrigation rate of 230 mm/day, based on field measurements. The low application rate will allow the topsoil to

assimilate the irrigation demand via plant (grass) uptake and transpiration without exceeding saturation.

- Ponding is not expected to be a concern given the low application rate in comparison to the soils saturated hydraulic conductivity capacity and that the irrigation lines will be buried 100 mm below the surface to prevent overland flow during periods of high rainfall (i.e., when rain falls at rates faster than the receiving soils can drain).
- **Nutrients:**
 - the Project Kea site would receive a total irrigated nutrient load of 394 kg N/year (26 kg N/ha/year) and 53 kg P/year (4 kg P/ha/year). It should be noted that the modelled nutrient loads are taken into account with the remainder of the site (i.e., total area of 14.85 ha), given that it is being retired from dairying. For comparison, when under Murphy Farms Ltd, the Project Kea site was receiving fertiliser at a rate of 440 kg N/ha/year and 37 kg P/ha/year on permanent pasture, and 333 kg N/year and 72 kg P/ha/year on new grass.
 - Fertiliser applications, stock effluent, and irrigation all contribute to the nutrient loads to soil. These practices will be retired on the Project Kea site, thereby, the proposed irrigation will contribute to an overall reduction in nutrient loads.
- **Other contaminants:** the soils have the required capacity to treat and assimilate the loads of pathogens, BOD₅, and TSS resulting from the proposed activity, and the effects from the discharge on the soil will be very low.

With respect to the effects of the proposed domestic wastewater discharge to land on groundwater quality, it is concluded that the potential effects will be less than minor for the following reasons:

- **Nutrients:**
 - Due to its mobility through soil, nitrate is the primary nutrient of concern in groundwater. Nutrient loads can leach into the groundwater and contribute to surface water environments further down the catchment. The Drinking – Water Standards for New Zealand (“DWSNZ”) specifies an MAV of 11.3 g nitrate nitrogen/m³. Under current management practices, the entire farm leaches around 55 kg N/ha/year and 0.9 kg P/ha/year. Fertiliser applications, stock effluent, and irrigation all contribute to the leaching losses to groundwater. These practices

will be retired on the Project Kea site, resulting in the proposed irrigation contributing to an overall reduction in nutrient leaching to the wider catchment.

- Other contaminants:
 - The use of UV treatment should ensure that *E. coli* levels in the wastewater discharge remain low. There are no community water supply wells within 1 km of the Project Kea site, and no abstraction bores within 50 m of the proposed drip field. Therefore, the risks associated with *E. coli* from the discharge migrating and persisting in groundwater are considered very low.
 - Furthermore, BOD, TSS, and any microbes that enter the soil, will be treated within the soil profile through the mechanisms of filtration, adsorption and natural attrition.
- Mitigation measures:
 - Effects on groundwater will be significantly mitigated by adopting an appropriate irrigation regime that avoids field capacity being exceeded following irrigation and the adoption of an application rate (3.5 mm/day) that avoids preferential or bypass flow through large soil pores and cracks.
- The potential discharge will be in accordance with Schedule 5 (Mixing Zones and Receiving Water Standards) of the CLWRP, in particular to relevant water standards Table S5A and S5C. In addition, the potential discharge is unlikely to result in non-compliance of the receiving freshwater environments with the relevant values of Schedule 8 – Region Wide Water Quality Limits.

With respect to the effects of the proposed domestic wastewater discharge to land on surface water quality, it is concluded that the potential effects will be less than minor for the following reasons:

- No ponding is expected to occur, so there will be no direct discharges to surface water. No discernible adverse effects on groundwater are predicted, therefore, the quality of base-flows to far-field surface water bodies will not be affected.
- Even in the worst-case scenario, resulting in potential run-off from the drip field, the wastewater treatment outcome will be of a high quality and will not adversely affect water quality in Whitneys Creek.

- The potential discharge will be in accordance with Schedule 5 (Mixing Zones and Receiving Water Standards) of the CLWRP, in particular to relevant water standards Table S5A and S5C. In addition, the potential discharge is unlikely to result in non-compliance of the receiving freshwater environments with the relevant values of Schedule 8 – Region Wide Water Quality Limits.

6.11.1 Proposed conditions of consents

Domestic Wastewater Discharge to Land Report recommends a number of conditions of consent, which are supported by the applicant. In brief, the recommended conditions include:

- The contaminants discharged shall originate only from domestic wastewater generated from toilets, showers and kitchen facilities on the Project Kea site.
- The domestic wastewater treatment system shall incorporate both Primary, Secondary and UV treatment.
- The volume of treated wastewater discharged shall not exceed 5,650 litres per day.
- The treated wastewater shall not exceed the following limits:
 - BOD5 90% samples < 20g/m³: MAX 30g/m³
 - TSS 90% samples < 30g/m³: MAX 45g/m³
- The treated wastewater shall be discharged to an on-site shallow drip irrigation field of no less than 2,000m².
- Drip lines shall be installed nominally 1m apart and at a depth of nominally 100mm.
- The drip field shall be constructed to be no less than 150mm above the 500yr flood event level and shall be capped with no less than 200mm of quality topsoil.
- The drip field shall be greater than 20m from any surface water body and 50m from any bore used for the abstraction of water.
- The drip field shall be grassed and mown and shall not be used for stock grazing purposes.

6.11.2 Conclusion

Based on the findings of the Domestic Discharge to Land Report, it is concluded overall that effects of the proposed domestic wastewater discharge to land will be less than minor for the following reasons:

- With an appropriate drainage system in place, the proposed activity will have no discernible adverse effect on soil quality.
- The proposed wastewater discharge will have no discernible adverse effect on receiving groundwater quality.
- There is no direct discharge of treated wastewater to surface water bodies. The drip field is proposed to be located greater than 20m from Whitneys Creek. The proposed wastewater discharge will have no discernible adverse effect on surface water quality.
- The discharge to land is not within a Drinking Water Protection Zone.
- The system will only discharge treated domestic wastewater and will not include discharge of any hazardous substances.
- The proposed discharge is not within an area identified as an archaeological site.
- The proposed discharge will not be onto or into land that is potentially contaminated.

6.12 Effects of Discharging Stormwater

As the Project Kea site is not serviced by a reticulated stormwater network, a stormwater management plan for the Project Kea site has been prepared and detailed in the Stormwater Report (Technical Report 12).

The stormwater management plan of the Project Kea site has been designed to protect public health and safety, and to prevent or minimise adverse effects of contaminants on freshwater. It is concluded that with the implementation of the proposed stormwater mitigation measures set out in the Stormwater Report, the proposed stormwater management approach for the Project Kea site is appropriate and adequate, and that the overall effects of the proposed stormwater discharge will be less than minor (both in terms of quantity and quality) for the following reasons:

- The effects of increased stormwater discharge from the Project Kea site will be mitigated by the construction of three infiltration basins, designed to dispose of the full post development 10% AEP stormwater flows to ground soakage. These infiltration basins have been designed in accordance with Christchurch City Council's Waterways and Drainage Guide.
- The infiltration basins will provide treatment of stormwater prior to discharge to ground.
- The effects of increased stormwater discharge on the quality of the groundwater will be mitigated by the Enviropods and infiltration basins, which will provide the "best practice treatment" for the proposed vehicle pavement areas. The infiltration basins will treat the first flush of stormwater flow from the proposed vehicle pavement areas. Pre-treatment will also be provided for the proposed vehicle pavements by the installation of Enviropods within each catchpit. Overall, best practice treatment is being provided for vehicle pavements given the industrial nature of the proposed activity.
- No off-site adverse effects on adjoining properties is expected due to the increased stormwater discharge on the Project Kea site, as the Stormwater Report confirms that:
 - There is no increase in the 20% AEP stormwater flows to existing water bodies (Whitneys Creek).
 - There would be no 10% AEP stormwater flows that would enter any other property.
- The stormwater management plan has been designed to capture only stormwater runoff and does not include the capture of hazardous substances on the Project Kea site. Careful consideration has been given to the management of hazardous substances on the site to ensure that firstly accidental spillage is avoided, and secondly, to ensure that where there is residual risk of discharge, it is contained on the site, and is not discharged into the stormwater system. Areas identified as being at risk of accidental spillage of hazardous substances, have been designed to capture any spillage and sloped to drain to the on-site wastewater treatment plant. It is further noted that the preparation of the Environmental Management Plan for Hazardous Substances prior to the operation of Project Kea, will ensure that appropriate management procedures are put in place to prevent hazardous substances from entering the stormwater systems.

6.13 Effects on Flood Hazard Risks

The WDP has identified that the Project Kea site is located within a Flood Risk Area. As per the guidance note in Rule 7.12 of Section 4 – Rural Zone of the WDP, a Flood Risk Assessment Report (Technical Report 11) has been completed to undertake flood modelling for the pre-development and post-development scenarios for the Project Kea site.

The pre-development scenario assesses flooding based on the existing ground surface information. The modelling results confirm that the Project Kea site is located within a “Low Flood Risk” area as defined in the WDP.

The post development scenario is based on the proposed earthworks design to raise the finished site levels to enable connection to the railway line with the proposed railway siding. The earthworks design proposes to raise the existing ground surface by approximately 1 to 2 m.

In light of the proposed increase in the finished site levels for the Project Kea site, consideration of post-development flood hazard risk effects on the surrounding properties is an important matter for consideration.

A Flood Risk Assessment Report sets out the flood model parameters and assumptions used to model the post-development scenario to assess the flooding effects. These model parameters and assumptions were informed by discussions and recommendations of ECAN staff.

The Flood Risk Assessment Report sets out the flood model results for the post-development scenario. **Figure 32** shows the post-development flooding depths, and **Figure 33** shows the post-development velocities in general proximity of the Project Kea site.



Figure 32: Post-development flood depth.



Figure 33: Post-development flow velocity.

With respect to the potential flooding effects on the selected flood assessment locations in the post-development scenario, the Flood Risk Assessment Report states that:

- Project Kea site: in the post-development scenario, there is no flooding on almost all of the Project Kea site due to the post-development surface levels (as the site raised by fill placement above the 500-year flood levels). There is some predicted post-development flooding in the north of the site adjacent to Whitneys Creek and in the south area of the site where the proposed stormwater pond is located. The depth of flooding is predicted to be less than 0.5m above the general ground level and flood velocities are predicted to be less than 0.75 m/s. The free board to proposed building floor levels is predicted to be greater than 300 mm.
- Whitneys Creek: the flood depths and velocities within Whitneys Creek are generally predicted to reduce, thereby, resulting in no potential adverse effects.
- Morven Glenavy Road: flood flow depths at Locations 3 and 4 are anticipated to decrease by between 70 mm and 10 mm or approximately 29% and 8%. The velocities also decrease by approximately 5% and 8%. No adverse effects are likely along Morven Glenavy Road along the eastern boundary of Project Kea site.

The flow depth at Location 7 is predicted to increase by 70 mm or approximately 350% and the velocity increases by 0.62 m/s or approximately 230%. While these are proportionally large increases, the post-development flood depth is only 90 mm, and therefore, not likely to adversely affect the use of Morven Glenavy Road along the southern boundary of Project Kea site.

- SIMT: The flow depths at Locations 8 and 9 increase by between 10 mm and 20 mm or approximately 2% and 6%. The flood velocities at these locations are predicted to remain the same as the pre-development scenario. The increase in flood depth of 10 mm to 20 mm in a 1 in 500-year event is not considered to represent a significant adverse effect on the SIMT railway and is likely to be within the accuracy tolerance of the modelling.
- Properties to the south and south-east of the Project Kea site: the flow depths and velocities on these properties are predicted to increase by up to 25%. However, the increases for more frequent events such as the 100 year, and 10-year events would not be as significant and therefore not expected to

have any adverse effects on the agricultural operations or result in any significant increased damage to these properties.

The post-development flow depths at these locations increase by 80 mm and 30 mm or approximately 11% and 20%. The flood velocities at these locations also increase by approximately 20% and 25%. It is noted that these properties are used for agricultural purposes, and the predicted increases are for a 1 in 500-year flood event. The increases for more frequent events such as the 100 year, and 10-year events would not be as significant. The increase is therefore not expected to have any adverse effects on the agricultural operations or result in any significant increase in damage to property.

Based on the findings of the Flood Risk Assessment Report, it is considered that the flood risk hazards resulting from the development of the Project Kea site are acceptable and will not significantly exacerbate the risk of flooding or damage on the adjoining properties and the overall effects will be minor.

6.14 Effects of Storing and Using Hazardous Substances

The use and storage of hazardous substances is an important element of the operation of Project Kea. The management of the use and storage of hazardous substances is necessary to minimise the risks to people, property and the environment to acceptable levels.

The Hazardous Substances Report (Technical Report 3) outlines the hazardous substances to be used and stored on the Project Kea site and the proposed mitigation measures to avoid or minimise risks due to accidental spillages.

It is considered the adverse effects associated with the use and storage of hazardous substances on the Project Kea site are acceptable, and will be less than minor overall for the following reasons:

- Careful consideration has been given to the management of hazardous substances on the Project Kea site, with first priority being to avoid accidental spillage; and second priority being to ensure that where there is a residual risk of discharge (including accidental spillage), it is contained on-site and is not discharged into the environment (such as not entering surface water bodies, groundwater or stormwater systems).
- All hazardous substances are HSNO approved (with the exception of the metal hydroxide sludge). All hazardous substances will be stored and handled in accordance with HSNO and manufacturer requirements.

- The metal hydroxide sludge will be appropriately managed through storage in a bunded tank until it is loaded to a dedicated hazardous substance tanker for removal to a certified hazardous waste treatment and disposal facility.
- The proposal includes the following measures to avoid or minimise the risk of accidental spillage of the hazardous substances:
 - The Project Kea site will be fully fenced and have controlled access, to ensure that the site is secure.
 - Tanker unloading and loading facilities will be undertaken on dedicated tanker slabs sloped to capture any spill and drained to the on-site process wastewater treatment plant.
 - All permanent tanks will be contained in bunded areas with adequate capacities, and these areas will drain to the on-site process wastewater treatment plant.
 - All portable containers will be stored on concrete floors, sloped, and drained to the on-site process wastewater treatment plant. Those containers in use will be mounted over bund systems.
 - All hazardous substances will be adequately sign posted.
 - All hazardous substances will be stored above the 500-year flood level.
- The site is not in a Community Drinking Water Protection Zone, there are no known active faults within 250m, and no hazardous substances will be stored within 20m of a surface water body or a bore.
- The applicant supports a condition of resource consent requiring that an Environmental Management Plan for Hazardous Substances be prepared prior to the operation of Project Kea to address matters such as:
 - Hazardous substances inventory
 - List of pollution risks on site
 - Structural and procedural controls implemented to manage the identified risks
 - Handling and control measures for each hazardous substance

- Inspection and audit procedures.
- Incident response procedures
- An emergency response plan for any potential major spill of hazardous substances
- Details of maintenance, monitoring and inspections, roles, responsibilities and training needs of workers with respect to environmental management and who is responsible for keeping records.

6.15 Effects on the National Grid Infrastructure

The WDP, Planning Map 24, shows that the High Voltage Electricity Lines GNY-TIM-A are located on Morven Glenavy Road, on the eastern side of the Project Kea site (refer **Figure 34**). **Figure 34** shows that the High Voltage Electricity Lines are located in the road reserve area on the eastern boundary of Morven Glenavy Road, whereas the Project Kea site adjoins the western boundary of Morven Glenavy Road.

Rule 8.8 of Section 4 – Rural Zone of the WDP states that no buildings shall be located within 12 m (in any direction) of the visible outer edge of a National Grid support structure. The Project Kea development meets this requirement.

The New Zealand Electrical Code of Practice for Electrical Safe Distances (NZECP 34:2001) set out the minimum safe electrical distance requirements to protect person and property, vehicles and mobile plant from electrical hazards. Compliance with NZECP is mandatory.

Noting that Project Kea proposes to build within the proximity of the National Grid infrastructure, including the construction of the main plant building (about 52 m in height) and an exhaust stack (about 75 m in height), an assessment of the compliance with the relevant minimum separation distances stipulated in the NZECP has been completed. The assessment is detailed in the Review of Electrical Safe Distances Memo (Technical Report 15). The findings of the assessment are that the construction of the buildings closest to the National Grid infrastructure as proposed by Project Kea, will comply with the minimum safe distances for construction and buildings as stipulated in the NZECP.



Figure 34: Location of National Grid infrastructure relative to the Project Kea site.

6.16 Effects on the highly productive land

Refer to Section 8.9 of this Planning Report.

6.17 Effects on Cultural Values

6.17.1 Mana Whenua engagement and preparation of a Cultural Impact Assessment

Project Kea is located in rohe Te Rūnanga o Waihao (“**Waihao**”), Te Rūnanga o Arowhenua (“**Arowhenua**”), Te Rūnanga o Moeraki (“**Moeraki**”) and Te Rūnanga o Ngāi Tahu (“**TRoNT**”). SIRRL recognises the historical relationship that Ngāi Tahu has with the South Canterbury area. From the initial planning phase of Project Kea, SIRRL recognised the importance of, and has been committed to, undertaking meaningful consultation with mana whenua.

From the initial planning phase of Project Kea, SIRRL also recognised the importance of the completion of a Cultural Impact Assessment (“CIA”) to inform the Project Kea resource consent application package. A brief summary of the chronology of events and discussions with mana whenua in relation to Project Kea and the preparation of the CIA is set out in **Table 27** below.

Table 27. *Overview of chronology of events and discussions with mana whenua*

Date	Comments
15 September 2021	Media and public announcement of SIRRL intent to bring Project Kea to Waimate.
22 and 23 September 2021	Public information open days in Waimate
October 2021	Meeting with TRoNT Matters discussed: <ul style="list-style-type: none"> ● Briefing on Project Kea. ● Seek advice as to which Runanga should be consulted, and request contact details of the appropriate persons to be consulted with.
9 November 2021	Meeting with Waihao representatives – Zoom meeting Chair – Jo McLean and Waihao committee Purpose of meeting: <ul style="list-style-type: none"> ● Provide briefing on Project Kea.
28 April 2022	Media and public announcement of land purchase and confirmation of Project Kea site.
29 April 2022	E-mail from Sara Severinsen (Executive Member, Environment Portfolio Lead, Waihao) advising that: <ul style="list-style-type: none"> ● All engagement with Waihao is to be facilitated through Tania Richardson from Aukaha as the single conduit. Tania Richardson will work closely with Sara Severinsen (in Sara’s role as a member of the governing Executive Board, and the Waihao Environment Portfolio Lead).

Date	Comments
	<ul style="list-style-type: none"> ● Project Kea being a significant project, requires resourcing for engagement. Aukaha will provide engagement terms. ● Waihao will take the lead as mana whenua. ● If water is required from the Waitaki Catchment, then Waihao will work with neighbouring Runanga who share mana whenua for the waters of the Waitaki.
26 May 2022	<p>Meeting with Aukaha (Minutes of meeting set out in e-mail dated 1 June 2022):</p> <ul style="list-style-type: none"> ● Babbage provided an overview of Project Kea, and advised that the project timeline for the lodgement of the resource consent application is in September 2022, and outlined the specialist reports being prepared. ● Discussion on alignment of Project Kea with the government’s waste minimisation strategy and circular economy concept and climate change matters. ● Confirmation by Aukaha that there are no “red flag” matters on the Project Kea site (in terms of presence of any sites of significance to Mana Whenua). ● Babbage agreed to provide a list of likely resource consent types to Aukaha, to enable Aukaha to determine as to which Runanga would take a lead on Project Kea. ● Discussion on what the “engagement process with Mana Whenua” would look like and when the CIA would be drafted. ● Aukaha advised that the general view of Waihao is that it would be more appropriate for them to draft the CIA after they have had the opportunity to see the comments from ECAN’s peer reviewers. Aukaha also confirmed that they would like to see the full resource consent package prior to drafting the CIA. Babbage agreed to discuss with ECAN as to how to facilitate the completion of the CIA after the completion of the peer-review process by ECAN specialists.

Date	Comments
20 June 2022	<p>Email from Aukaha to Babbage:</p> <ul style="list-style-type: none"> ● Provided Babbage the CIA contract and costings. ● Advised that Moeraki, TroNT and Aoraki Environmental Consultancy Limited (on behalf of Arowhenua) have confirmed that they are happy for Waihao to take the lead on Project Kea, and consultation to occur with Waihao via Aukaha. ● Requested Babbage to provide an update regarding ECAN facilitating CIA completion and peer review of technical reports.
20 June 2022	<p>Email from Babbage to Aukaha advising that Babbage has discussed with ECAN the matter of how to facilitate the completion of the CIA following the peer-review by ECAN specialists. ECAN is to consider the matter and provide advice in due course.</p>
12 July 2022	<p>Email from Babbage to ECAN providing an update on Project Kea. Babbage advised ECAN that Aukaha would like to understand the findings of the ECAN specialist peer-reviews prior to the drafting of the CIA. Aukaha would also like to see the full application prior to the preparation of the CIA. Babbage requested ECAN's feedback as to how the preparation of the CIA could be facilitated in light of Aukaha's request to view the ECAN specialist peer-reviews prior to the drafting of the CIA, and whether a similar process has been facilitated by ECAN on another project.</p> <p>Babbage did not receive a formal response on this matter.</p>
22 August 2022	<p>Contract for the preparation of the CIA completed between Babbage and Aukaha. With respect to the timing of the delivery of the CIA, the contract stated "To be confirmed following acceptance of the project proposal". In light of the discussions with Aukaha to date, Babbage interpreted this to mean that the CIA will be prepared after Project Kea proposal has been accepted for</p>

Date	Comments
	processing and ECANS's expert peer review comments are available to Aukaha for consideration.
7 September 2022	Email from Tim Vial (Aukaha) to Babbage: <ul style="list-style-type: none"> ● Requesting an update on the progress of the technical reports. ● Advising that the technical reports and additional information is required to write the CIA, which usually takes 6-8 weeks. ● Requesting the date for the lodgement of the resource consent application. ● Requesting the resource consent lodgement date, to determine if the timeframe for the preparation of the CIA is compressed. ● Advised that the resource consent application would be incomplete without a CIA.
12 September 2022	Telephone discussion between Sukhi Singh (Babbage) and Tim Vial (Aukaha) in light of the 7th September 2022 e-mail: <ul style="list-style-type: none"> ● Sukhi Singh raised the concern that the comment in the e-mail that the resource consent application would be “incomplete without a CIA” did not accord with the agreed approach with Aukaha to date, and was a complete surprise. Aukaha had been very clear that they would like to see the full resource consent application and the findings of ECAN specialist peer-reviews prior to drafting the CIA. Based on this approach, it was agreed that the CIA would be prepared following the lodgement of the resource consent application. ● Sukhi Singh requested Tim Vial to discuss this matter with Tania Richardson, who was identified by Waihao as the key contact person involved in the discussions to date.
13 September 2022	Email from Tim Vial (Aukaha) to Babbage advising that:

Date	Comments
	<ul style="list-style-type: none"> ● There has been a genuine misunderstanding over the process of preparing CIA. ● Preferable to provide technical reports to ECAN and Aukaha, and then defer the lodgement of the application. This would enable peer review of technical reports and preparation of CIA prior to lodgement. This would also enable Aukaha to draw on the peer review comments in preparing the CIA. ● Confirmed that Waihao does not support the preparation of CIA after lodgement of application.
29 September 2022	<ul style="list-style-type: none"> ● Email from Tim Vial (Aukaha) to Babbage advising that: ● Tim Vial will be leading this project at Aukaha, and will be the first point of contact for all work on this proposal. ● The position of Waihao is that the application is incomplete without a CIA, and communicated to ECAN prior to the lodgement of the original application the previous week. ● Working with Waihao and TRoNT on reviewing the application, and considering whether sufficient information available to assess the cultural impacts. ● Request a site visit to support this assessment.
18 October 2022	<p>Through Aukaha, the applicant invited all members or representatives of Arrowhenua, Maeraki, Waihao and TRoNT to attend a site visit and provide an overview of Project Kea.</p> <p>The site visit was attended by the following people:</p> <ul style="list-style-type: none"> ● Sara Severinsen (Waihao) ● Tim Vial (Aukaha) ● Sara Severinsen's husband and daughter.

Date	Comments
	<ul style="list-style-type: none"> ● Paul Taylor, Director, SIRRL ● Paul Duder (Babbage) ● Sukhi Singh (Babbage) <p>At the request of Aukaha, the site visit was also attended by the Waimate District Council staff in an observation capacity.</p> <p>Key matters discussed:</p> <ul style="list-style-type: none"> ● Aukaha raised the concern as to the adverse effects of Project Kea (in particular the storage of hazardous substances on site) on Whitneys Creek, and the downstream environment as it flows into the Pacific Ocean. ● Aukaha expressed the view that the application package includes a large number of reports, and Aukaha is unlikely to complete the initial review until the end of November due to commitments to other projects. ● Aukaha will then advise Babbage of any further information required to complete the assessment following the initial review. ● Given the resourcing issue on the part of Aukaha, Babbage inquired whether it would be possible to sub-contract the drafting of the CIA to an iwi approved/appointed consultant. Aukaha confirmed that this approach is not supported. ● Aukaha confirmed that it needed to receive the findings of the ECAN specialist peer-reviews prior to the drafting the CIA. Babbage raised the concern that this puts the applicant in a challenging position, as it is not clear as to how Aukaha envisages this to occur under the resource consent processing framework, as the application would need to be first accepted

Date	Comments
	<p>for processing by ECAN under section 88 of the RMA, in-order for ECAN specialists to undertake a comprehensive review of the application package.</p> <ul style="list-style-type: none"> • Babbage acknowledged that a CIA is a document to be prepared by Aukaha, and Aukaha can provide it any time during the processing of the resource consent application. In light of Aukaha’s position that it needed to receive the findings of the ECAN specialist’s peer-reviews, Babbage accepted that the CIA would not be completed for some time, as the peer-review process by ECAN was still some time down the track.

As outlined above, Aukaha has confirmed that Waihao remains of the view that resource consent application for Project Kea is deemed to be incomplete without a CIA at the time of the lodgement of the application. Aukaha has been provided a copy of the original Project Kea resource consent application package in September 2022. This updated resource consent application will also be provided to Aukaha at the time of the lodgement. SIRRL acknowledges the importance of the completion of a CIA and looks forward to on-going engagement with Mana Whenua to assist in the completion of the CIA and informing the processing of this application.

In the absence of a CIA, a thorough consideration has been given as to what information can be used to inform an assessment of effects on cultural values under Schedule 4 of the RMA.

Chapter 4 (Provision for Ngāi Tahu and their relationship with resources) of the CRPS provides for Ngāi Tahu and their relationship with resources by setting out the tools and processes that ECAN will use to engage with Ngāi Tahu as tāngata whenua in the management of natural and physical resources.

Objective 4.3.7 of the CRPS states that:

“To be determined on a case-by-case basis, the Canterbury Regional Council should:

Seek a cultural impact assessment or cultural values assessment as part of an assessment of environmental effects under Schedule 4 of the RMA, where an application is likely to impact on a significant resource management issue for Ngāi Tahu. Iwi management plans can be used as a tool to guide consideration for a cultural

impact assessment or cultural value assessment as part of an assessment of environmental effects”.

Policy 4.14B of the CLWRP states that Ngāi Tahu values, and in particular those expressed within an iwi management plan, are to be given regard to when considering application for discharges which may adversely affect any identified sites and places of value:

“Have regard to Ngāi Tahu values, and in particular those expressed within an iwi management plan, when considering applications for discharges which may adversely affect statutory acknowledgment areas, nohoanga sites, surface waterbodies, silent file areas, culturally significant sites, Heritage New Zealand sites, any listed archaeological sites, and cultural landscapes, identified in this Plan, any relevant district plan, or in any iwi management plan”.

Both Objective 4.3.7 and Policy 4.14B clearly articulate that iwi management plans can be used as a tool to guide consideration for the cultural impact assessments as part of an assessment of effects on the environment.

It is anticipated that a CIA will be completed by Aukaha post lodgement of this resource consent application. It is further noted that Aukaha has confirmed that there are no “red flag” matters on the Project Kea site (in terms of the presence of any sites of significance to Mana Whenua) (refer to minutes of meeting dated 1 June 2022). From the applicant’s point of view, this was an important confirmation, as the applicant sought to ensure that there are no adverse effects on any sites of significance to Mana Whenua.

However, in the absence of a CIA at the time of the lodgement of this resource consent application, for the purposes of meeting the requirements of Schedule 4 of the RMA, this section provides an assessment of the effects on the environment of Project Kea using relevant iwi management plans as a guide for consideration of cultural effects.

In preparing this assessment, the applicant has also taken into account the description of cultural values set out in document titled “*Cultural Impact Assessment for Oceania Dairy Limited Discharge of Clean and Factory Wastewater, Pipeline and Ocean Outfall*”, prepared by Aukaha on behalf of Waihao, and dated 13 March 2019. This CIA was commissioned by Oceania Dairy Limited, to inform its resource consent application to establish a 7.5 km pipeline to discharge factory wastewater from the Oceania Dairy Factory

site (located at 30 Cooneys Road, Moven) to an ocean outfall located 500m off shore into the Pacific Ocean. The ocean outfall site is approximately 10km north of the mouth of the Waitaki River. While it is acknowledged that the Oceania Dairy Factory CIA relates to a different project, the purpose for referring to this CIA is that it is for a site located approximately 1 km from the Project Kea site, and assists in understanding the important cultural values in proximity to the Project Kea site generally. From the discussions with Aukaha to date, the applicant has not gained the impression that the cultural values differ significantly between the two sites.

The applicant recognises that it is for the Runanga to identify the relevant cultural values, and accordingly, they may wish to add to, or amend, the description of cultural values as they apply to the Project Kea site.

Below is an assessment of the effects of Project Kea on cultural values, guided by the following iwi management plans, strategy and a previous CIA:

- Waitaki Iwi Management Plan 2019
- Te Whakatau Kaupapa Ngai Tahu Resource Management Strategy for the Canterbury Region 1990;
- Iwi Management Plan of Kati Huirapa 1992 (Arowhenua Iwi Management Plan);
- The He Rautaki mō te Huringa o te Ahuarangi Climate Change Strategy 2018.
- *Cultural Impact Assessment for Oceania Dairy Limited Discharge of Clean and Factory Wastewater, Pipeline and Ocean Outfall*, prepared by Aukaha on behalf of Waihao, and dated 13 March 2019 (hereon referred to as the Oceania Dairy CIA).

6.17.2 Overview of cultural values

The Oceania Dairy CIA states that:

“Ngāi Tahu have a historical relationship and pattern of use with the catchments of the South Canterbury. The Crown formally recognised this significance with the enactment of the Te Rūnanga o Ngāi Tahu Act 1996 and the Ngāi Tahu Claims Settlement Act 1998.

...

Te Rūnanga o Waihao (Te Rūnanga) are the kaitiaki rūnanga for this area. They are responsible for assessing how any activity in their takiwā impacts upon their cultural values, beliefs and practices.

The takiwā of Te Rūnanga o Waihao centres on Wainono, sharing interests with Te Rūnanga o Arowhenua to Waitaki, and extends inland to Omarama and the Main Divide”.

The Oceania Dairy CIA further states that:

“Te Rūnanga o Waihao has a strong and inherent relationship with all areas of their takiwā (area). Te Rūnanga o Waihao has a duty to protect the spiritual and other values, including wāhi tapu, wāhi taoka, mahing kai and other natural resources, for the benefit of members of Ngāi Tahu Whānui.

An important aspect to Ngāi Tahu Whānui was the holistic management of the resource they depended on. This can be described as ‘Ki Uta Ki Tai’ (from mountain to coast) and stands as a pillar of resource management to mana whenua. With this holistic approach, mana whenua are able to enforce kaitiakitaka over the mana of the environment around us, while ensuring the resources gathered are healthy enough for future generations to depend on. Such resources could include mahika kai, species that were harvested for food; pounamu; materials for rongoā (medicine) and cultural artefacts.”

The Oceania Dairy CIA sets out the Ngāi Tahu cultural values as follows:

“4.1 Cultural and traditional principles for sustainable management

Traditional management is founded on cultural values which are central to the Ngāi Tahu worldview. These principles have close relationships between people and the environment, which must be balanced to ensure the health of the natural world and the ability for the world to sustain human life. This is akin to the non-Maori concept of ‘sustainable management’ and therefore, the following principles should be understood all together.

The following is not an exhaustive list, please see the glossary for additional terms and definitions.

Te Ao Maori

This is a holistic approach and effects from actions are considered across all dimensions; spiritual, mental, physical and social.

Whanaungatanga

This incorporates the inter-relationship between all parts of the ecology, well-being of mana whenua and the obligations on decision makers to ensure that all parts of the ecosystems are cared for.

Whakapapa

In a natural resource context this means understanding that all actions cause an effect, which in turn, causes other effects.

This incorporates:

- *traditional knowledge and scientific knowledge;*
- *ancestral decent rights which define authority with regard to who can and should act as kaitiaki (guardian);*
- *approval from the gods and non-human kaitiaki bestowed on individuals, whānau and hapū, who have the right and mana to look after the environment and to speak on behalf of it.*

Taonga tuku iho

The is a concept of treasures (knowledge, mahinga kai etc.) being passed down to use from our ancestors. The current generation has an obligation to control the effects of their actions, to ensure these treasures, resources, knowledge etc. are passed on to future generations in the same healthy condition that they were inherited with.

Mauri

This is the 'likeforce' which includes physical indicators such as high species diversity, high numbers of a certain species, as well as non-physical indicators such as being able to hear the bubbling water over the rocks compared to a trickle, being able to hear all of the different manu (birds) in the forest compared to one or two species.

This is used as one benchmark to measure health of the environment.

Mana

Mana is the prestige or power and is supernatural focus in a person, place or object and has been handed down from atua (gods) through the generations. Mana is given a person authority to lead and make decisions.

Rangatiratanga

Rangatiratanga is similar to mana in that it is the right to exercise authority, it is chieftainship and leadership. Rangatira (chief) are noble at birth and have high mana (prestige).

This incorporates tribal lands and waters of Ngāi Tahu, over which Ngāi Tahu hold authority to control, and manage the activities and people affecting the environment. It is closely linked to Article II of Te Tiriti o Waitangi (The Treaty of Waitangi).

Taonga

This means treasures or things that are prized and is both physical and non-physical. For example, Te Reo Māori (the Māori language) is a taonga, the weka as a food resource is also a taonga, and mana bestowed by the gods is also a taonga.

Kaitiaki

This is both the guardian spirit who communicates with the living world to warn of danger

4.2 Ngāi Tahu values

4.2.1 Wāhi tapu

Wāhi tapu are sacred sites for Ngāi Tahu and can include urupā (burial grounds), maunga (mountains) and tuhituhi neherā (rock art). Wāhi tapu are very closely linked with cultural landscapes and can be one and the same.

Māori burials can be in any place, including in the ground, in water, in rock clefts and up trees and very few burials are reported. This means that there are many burial places which are unknown. Urupā are sacred and disturbance is offensive.

Tuhituhi neherā (rock art) sites are of the highest sites of cultural significance to Ngāi Tahu because they provide an insight into the ancestor's beliefs, traditions, and lives. These sites are easily damaged because the art is drawn onto natural substrate, usually limestone, but in some cases, greywacke. This means that the art is vulnerable to erosion, rain, increased vegetation growth due to changes in climate and animals disturbing the area and human intervention. As a result of this, Ngāi Tahu history and taonga (treasure) is being lost.

4.2.2 *Wāhi Tūpuna (Cultural landscapes)*

Wāhi tūpuna are places that are important to Te Rūnanga o Waihao ancestral and contemporary significance and cultural traditional values.

The entire Waitaki catchment is a cultural landscape and it is dotted with archaeological sites which are all part of a wider cultural setting. Cultural landscapes include areas where archaeological artefacts or sites have been found, but it also includes the following:

- *Kāinga nohoanga are permanent settlements that would be inhabited year around for a long or short period of time, or seasonally, and were situated near resources to be worked.*
- *Umu is an oven and the areas where these are found is very diverse; from old stream banks, river terraces to low spurs or ridges.*
- *Wāhi mahi kohātu are sites for raw materials used for making stone tools*
- *Ara tawhito (trails or pathways)*
- *Maunga (mountains)*
- *Tauraka waka (canoe mooring sites) and wāhi pakaka (battle sites)*
- *Tuhituhi neherā (rock drawing sites)*
- *Ikoa tawhito (place names) and wāhi tohu (locators and their names in the landscape)*

Some of the cultural landscapes have been damaged or destroyed, and others that have survived exist in a landscape that has been modified in terms of the sites function or setting. The entire landscape is still significant to mana whenua.

4.2.3 Mahinga kai (mahika kai)

Mahinga kai is the heart of manawhenua culture and is more than just a steady food resource, it also includes areas well known for gathering or harvesting resources such as raupō and the habitats needed to support the mahinga kai practises.

Mahinga kai is the ability to not only feed the iwi but also feed visitors and show the highest level of hospitality. The ability to do this bestows mana on the mana whenua and when mahinga kai resources are scarce, the mana is depleted in the eye of the visitor.

Mahinga kai heavily relies on a healthy functioning ecosystem all the way from the mountains to the sea (Ki uta ki tai), including access to these sites and areas. A good resource is an indicator of a healthy ecosystem.

The ancestors of ngā rūnanga were hunter-gather types as traditional crops wouldn't grow in cooler weather. This meant that they would travel great distances and follow the seasonal food resources. When ngā rūnanga also gather these foods and resources in these same places, there is a very strong familial link which is very important to Kāi Tahu whānui (the wider Kāi Tahu family)...

4.2.4 Cultural health monitoring

Cultural health and ecological health with regard to water quality is different. Water that is considered ecologically healthy may not be culturally healthy, as determinants of cultural health are more holistic than ecological health.

Mātauranga Māori (customary knowledge) and water quality monitoring are not well integrated in western science. Te Rūnanga o Waihao seek to ensure that cultural health monitoring is undertaken so that water can support Ngāi Tahu values and uses.

Cultural health monitoring is considered important to this proposal. Currently, there is a lack of information and understanding with regard to cultural effects. Cultural health and effects should be measured to be better understood”.

6.17.3 Waitaki Iwi Management Plan 2019

The Waitaki Iwi Management Plan states that:

“Te Rūnanga o Arowhenua, Te Rūnanga O Waihao and Te Rūnanga o Moeraki (Kā Papatipu Rūnaka) have developed the Waitaki Iwi Management Plan as an expression of rakatirataka and in fulfilment of their kaitiaki responsibilities within the Waitaki Catchment”.

The Waitaki Iwi Management Plan was developed to:

- *“Describe the values held by Kā Papatipu Rūnaka relating to Aoraki, wai, mahika kai and wāhi tūpuna in the Waitaki catchment*
- *Identify the primary issues Kā Papatipu Rūnaka have regarding these matters in the Waitaki catchment*
- *Articulate Kā Papatipu Rūnaka policies and management guidelines for these matters*
- *Provide for the relationship that Kā Papatipu Rūnaka have with these resources.*
- *The area this iwi management plan covers is shown in Map 1.”*

Section 1.5 of the Waitaki Iwi Management Plan describes the traditional associations with the Waitaki River catchment. It explains that:

“The Waitaki River catchment has an historical and important role in the creation history of Kāi Tahu. The catchment is an extensive mahika kai area, is part of an integrated network of travel routes leading from coast to coast and inland and is a key element in the network of relationships which bind us as a people who belong to this island of Te Waipounamu.

....

Over many generations Manawhenua developed food gathering patterns based on the seasons and lifecycles of various birds, animals and plants. For Manawhenua mahika kai practices are at the heart of tribal identity. Mahika kai formed the basis of Kāi Tahu’s economy historically and plays an important role now. The Waitaki catchment provides a diversity of mahika kai resources.

There are numerous nohoaka (occupation sites), urupā, wāhi tapu and wāhi taoka associated with the Waitaki River because of the long history of use of the river as both a route into the interior and a source of mahika kai. These are all places holding the memories, traditions, victories and defeats of Kāi Tahu tūpuna. Urupā are the resting places of Kāi Tahu tūpuna and, as such, are a particular focus for whānau traditions.

The Waitaki Valley holds a major collection of rock art. The surviving rock art remnants are a particular taoka of the area, providing a unique record of the lives and beliefs of the people who travelled the river.”

The eco-cultural attributes of the Waitaki Catchment are set out below.

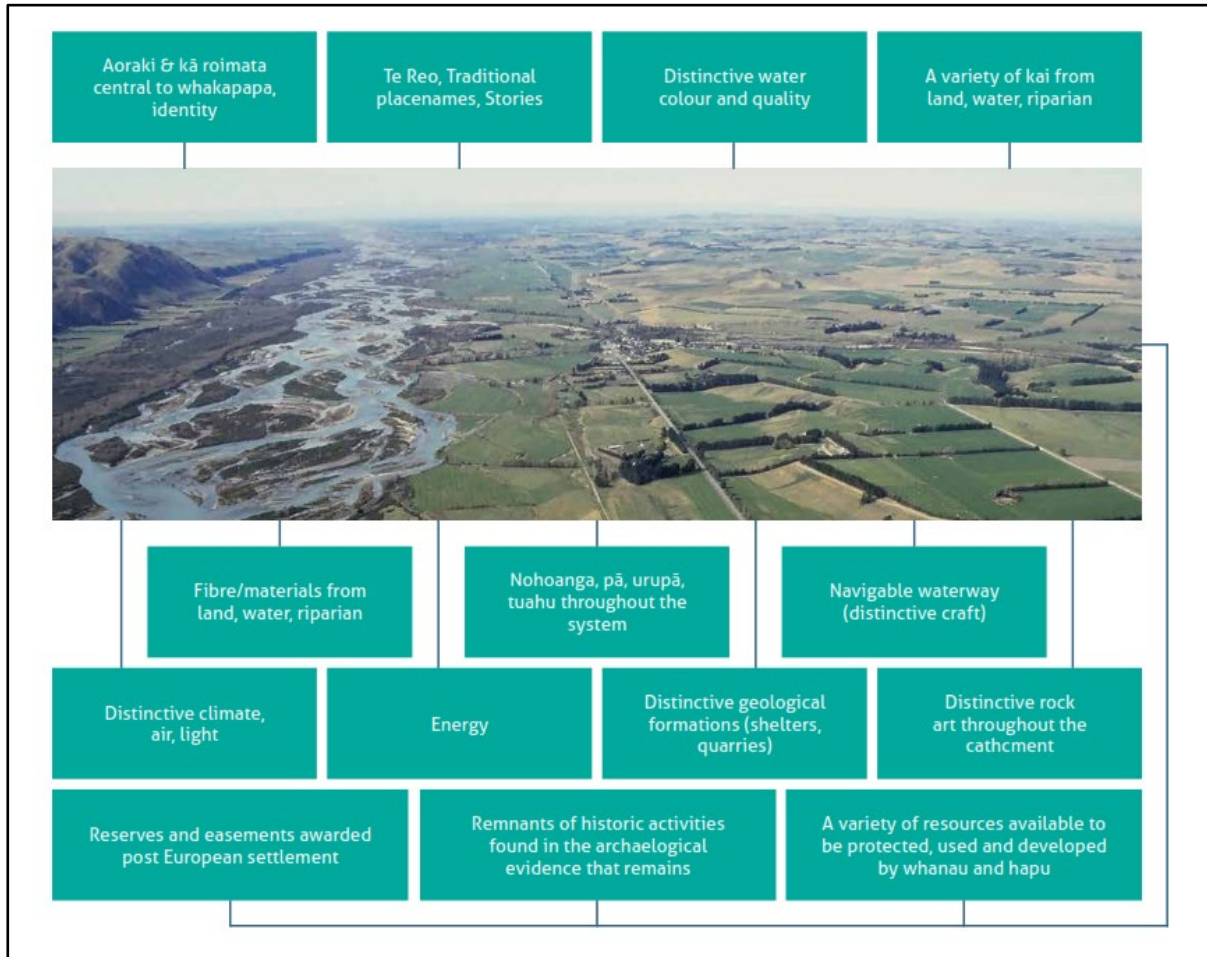


Figure 35: Eco-cultural attributes of the Waitaki Catchment (Figure 1 of the Waitaki Iwi Management Plan)

Table 28 below discusses the alignment of Project Kea with the Waitaki Iwi Management Plan.

Table 28. Alignment of Project Kea with the Waitaki Iwi Management Plan

Provision	Comments
Section 5 Wai/Water	
5.1 Overarching Objectives and Policies for Wai	
<p><u>5.1.1 Rights and interests</u></p> <p>Manawhenua rights and interests are given full effect in the management of wai in Waikaki</p>	<p>The associated policies seek to ensure that Manawhenua rights and interests in the Waitaki catchment are recognised.</p> <p>The applicant is committed to meaningful engagement with Manawhenua and support the preparation of a Cultural Impact Assessment, to ensure that Manawhenua rights and interests with respect to the Waitaki catchment are identified and considered as part of Project Kea development.</p>
<p><u>5.1.2 Cultural Health Monitoring</u></p> <p>1) Cultural health monitoring in the Waitaki catchment occurs.</p> <p>2) Cultural health monitoring is accepted by local authorities and the wider community as regular, legitimate and important measure of the state of water bodies and associated ecosystems.</p> <p>3) Mātauraka Māori (customary knowledge) is a hallmark of decision making on wai, including the monitoring of water quality.</p>	<p>The applicant supports cultural health monitoring in a manner which is consistent with any catchment-wide agreement between the Runanga and the Council and reflected in the statutory documents.</p> <p>The applicant anticipates that opportunities for cultural monitoring could be explored via the preparation of the CIA, and further engagement with Manawhenua.</p>
<p><u>5.1.3 Wai Tapu</u></p> <p>1) Wai tapu are recognised and managed in ways which are appropriate to their status as wai tapu.</p>	<p>The applicant supports the recognition and protection of wai tapu sites.</p>

<p>2) The mauri of the waters of Waitaki, Kā Roimata o Aoraki, is actively protected.</p>	<p>The applicant is not aware of any silent file identifying wai tapu sites at, or in close proximity to the Project Kea site.</p> <p>The presence of any silent files relating to the Project Kea site, nor within its immediate proximity, has not been highlighted in discussions with Aukaha to date.</p> <p>Project Kea will not denigrate the mauri of any waters of the Waitaki as the following measures are proposed:</p> <ul style="list-style-type: none"> ● Direct discharge to water is to be avoided. ● The stormwater and domestic wastewater discharges to land will use industry best practice. ● Factory process wastewater will be recycled in the EfW Plant. As such, there will be no discharges of factory process wastewater to land, nor water. ● Careful consideration has been given to the management of hazardous substances on the Project Kea site, to avoid any accidental spillage, to ensure the protection of the mauri of the waters. ● Appropriate erosion and sediment controls will be in place during earthworks phase.
<p>5.2 Surface and Groundwater Management</p>	
<p><u>5.2.1 Water quality</u></p> <p>1) Whanau and manuhiri (visitors) have safe and sufficient drinking water from ground and surface sources across the Waitaki catchment to support customary practices, uses and values.</p> <p>2) Wai/ water is managed in an integrated way – ki uta ki tai and recognising the inextricable</p>	<p>Project Kea will implement an integrated approach to ensure the maintenance of water quality. Project Kea application has been prepared recognising the inextricable relationship between water flow, water quality, ecosystem health and land uses.</p> <p>A comprehensive assessment of the effects on water quality is set out in the Surface and Groundwater Assessment (Technical Report 17). In brief:</p>

relationship between water flow, water quality, ecosystem health and land uses.

3) Water quality standards are set and maintained that are appropriate for the cultural value(s) of each water body and the customary uses and practices for which Kai Tahu and their ancestors value those water bodies.

4) Community supplies to reduce the rate and volume of water they take whenever waterways are under stress during periods of low flows.

5) Best practice urban development to protect water quality.

6) There is no direct discharge of storm water to waterways.

- The proposal avoids direct discharge of stormwater and domestic wastewater and other contaminants to surface and groundwater.
- Both the proposed stormwater and domestic wastewater discharges to land are treated prior to discharge using industry best practice.
- Appropriate management of hazardous substances is proposed to ensure that any accidental spillage does not cause adverse effects on water quality.
- Babbage has carried out an assessment of expected concentrations of potential contaminants in the stormwater discharge based on the deposition modelling and the expected stormwater volumes and contaminants. All expected concentrations of potential contaminants are below the limits for a level of protection of 95% of species from Table S5B from Schedule 5 of the CLWRP, except for Chlorine concentration, which for the average discharge is still lower than the defined limit for a level of protection of 90% of species of the Australian and New Zealand Guidelines for Fresh & Marine Water Quality, and for worst-case is still lower than the maximum acceptable values (MAVs) and guideline values (GVs) stipulated by the Drinking-water Standards for New Zealand.
- All expected concentrations of potential contaminants (both average and worst-case scenario) are orders of magnitude lower than the relevant MAVs and GVs stipulated by the Drinking

	<p>Water Standards New Zealand, and therefore the discharge is unlikely to cause the receiving freshwater bodies (surface or groundwater) to exceed the limits stipulated in Schedule 8 (Region-wide Water Quality Limits) of the CLWRP.</p> <ul style="list-style-type: none"> • The proposed systems on the Project Kea site are designed in accordance with all relevant guidelines and best practices, and therefore, are expected to provide sufficient treatment for any potential contaminants from the Project Kea site. • Whitneys Creek environments will be enhanced, by incorporating new native planting along the northern boundary of the Project Kea site. • The current fertiliser applications, stock effluent, and irrigation contributing to nitrogen loads to soil will be retired on the Project Kea site, thereby, Project Kea will contribute to an overall reduction in nutrient loads, contributing to the improvement in water quality. <p>The Surface and Groundwater Assessment concludes that the proposal is unlikely to result in any significant effects on surface water and groundwater quality.</p>
<p><u>5.2.2 Water quantity</u></p> <p><i>5.2.2.1 Use of water</i></p> <p>1) Wai is used efficiently</p> <p>2) A cultural allocation is secured sufficient to support Kā Rūnaka rights and interests in freshwater</p>	<p>A separate resource consent application for ground water take and use is currently being prepared and will be lodged with ECAN shortly. Project Kea will ensure that water is used sustainably and efficiently.</p> <p>This Project Kea application seeks resource consent to undertake temporary dewatering during the construction phase. In this regard the Surface and Groundwater Assessment concludes that any effects of</p>

3) Best practice farming methods match land use to suitability of land use types, climate and receiving environment.

4) Rural land use and irrigation take into account assimilative capacity of the soil and sensitivity of the receiving environment to nutrient loading.

5) The true economic value of water for irrigation and the true cost of environmental pollution are reflected in the management of water.

6) Farms in the Waitaki lead the farming industry in environmentally and culturally responsible land use and irrigation practices.

7) Water take consents avoid creating perpetual property rights.

8) Water harvesting and storage is consistent with Kā Rūnaka values and cultural uses.

5.2.2.2 Over allocation

1) streams carrying the source water (Kā Roimata o Aoraki) to the major tributaries are protected.

2) Over allocation of both surface and groundwater bodies is avoided.

3) Groundwater and surface water is high quality and supports customary uses.

5.2.2.3 Allocation Regimes

1) Ground and surface water are managed as on resource ki uta ki tai.

the dewatering to groundwater levels are expected to be limited to the excavation location and direct surroundings. As water is expected to be fully returned to the aquifer, it is unlikely that there will be any significant effects to groundwater quantity in the aquifer or the region.

This resource consent does not seek water allocation.

With respect to groundwater and surface water quality, refer to the response in the row above.

<p>2) The unique characteristics of the braided Waitaki River are protected.</p> <p>3) Flow and allocation regimes provide for:</p> <ul style="list-style-type: none"> a. the cultural health of wai, springs, and wetlands b. thriving mahika kai and indigenous species, and c. Manawhenua values and use <p>4) A cultural allocation of wai that provided for Manawhenua aspirations, including economic aspirations, is secured.</p>	
<p><u>5.2.3 Groundwater</u></p> <p>1) Manawhenua are engaged in the management of groundwater resources in the Waitaki catchment.</p> <p>2) Over allocation of groundwater bodies is avoided</p> <p>3) Permanent adverse impacts on aquifers, groundwater levels, and flows in surface water bodies, wetlands and springs are avoided.</p>	<p>A separate resource consent application for ground water take and use is currently being prepared and will be lodged with ECAN shortly. The applicant is committed to engaging with Manawhenua in regards to the future water take and use resource consent application.</p> <p>This resource consent application only relates to temporary take of groundwater for dewatering purposes during the construction phase.</p> <p>A comprehensive assessment of the effects of Project Kea on groundwater (quality and quantity) is set out in the Surface and Groundwater Assessment (Technical Report 17) and it concludes that:</p> <ul style="list-style-type: none"> ● the proposed construction methodology, including the dewatering of the trench and discharge to ground at the location, are not likely to have significant effects to surface and groundwater quantity or quality.

	<ul style="list-style-type: none"> As the aquifer is unconfined, particularly the shallow layers to 10-12 mbgl, and with high permeability, the discharge is expected to directly recharge the aquifer. Therefore, any effects of the dewatering to groundwater levels are expected to be limited to the excavation location and direct surroundings. As water is expected to be fully returned to the aquifer, it is unlikely that there will be any significant effects to groundwater quantity in the aquifer or the region. Dewatering will only be necessary during the earthworks, as the proposed bunker will be impervious and sealed from groundwater infiltration. Therefore, any effects of the dewatering to surface and groundwater are considered temporary.
<p><u>5.2.4 Damming</u></p> <p>1) Sub-catchments unmodified by dams are protected.</p>	<p>Project Kea does not propose any damming.</p>
<p><u>5.2.5 Discharges</u></p> <p>1) The direct discharge to waterways and moana of contaminants, nutrients and wastewater is avoided.</p> <p>2) Land use intensification and irrigation does not degrade rivers, springs, lakes and wetlands in the Waitaki catchment.</p> <p>3) Industrial and trade waste discharges to land water cease.</p>	<ul style="list-style-type: none"> Project Kea avoids direct discharges to waterways. Both the proposed stormwater and domestic wastewater discharges to land are treated prior to discharge using industry best practice. Project Kea avoids the discharge of factory process wastewater, as it will be completely recycled in the EfW Plant.

4) Nutrients limits for the Waitaki catchments protect Manawhenua values and support customary uses.

5) Nutrients loss from Crown land is understood and managed in accordance with best farming practice.

6) The mauri of pristine alpine rivers and lakes is protected.

- All hazardous substances will be stored above the 500-year flood level and not in close proximity to any waterways.
- The Surface and Groundwater Assessment Report concludes that the proposal is unlikely to result in any significant effects on the water level and quality of Whitneys Creek.
- Additionally, over time the mitigation landscaping along the edge of Whitneys Creek will enhance its ecological values.
- Earthworks will be undertaken with appropriate controls to divert clean water and to manage and treat sediment-laden water.
- The current fertiliser applications, stock effluent, and irrigation contributing to nitrogen loads to soil will be retired on the Project Kea site, thereby, Project Kea will contribute to an overall reduction in nutrient loads, contributing to the improvement in water quality in the Waitaki catchment.
- All hazardous substances will be appropriately stored and managed as per manufacturer requirements and the Environmental Management Plan. The storage and use of hazardous substances on the Project Kea site will use the best practicable option, with first priority being to avoid accidental spillage; and second priority being to ensure that where there is a residual risk of discharge (including accidental spillage), it is contained on-site and is

	<p>not discharged into the environment (such as not entering surface water bodies, groundwater or stormwater systems).</p> <ul style="list-style-type: none"> Project Kea proposes a waste management solution that avoids waste disposal areas being located in natural waters. Project Kea presents a waste management solution that is focused on reducing the demand of land resources for waste management purposes, thereby ensuring that the natural waters located on those land are not adversely affected, and our natural land and water resources are maintained for future generations.
<p><u>5.2.6 Cross mixing</u></p> <p>1) Waters in the Waitaki are not cross mixed.</p>	<p>Project Kea does not propose cross mixing of waters in the Waikaki.</p>
<p><u>5.2.7 Riparian management</u></p> <p>1) Riparian management supports ecological and Manawhenua values including access to waterways.</p> <p>2) Integrated riparian management occurs throughout the entire catchment.</p> <p>3) Riparian wetlands are fully protected and operate in their natural state, supporting flourishing populations of taoka species.</p> <p>4) Riparian margins are restored throughout the Waitaki catchment.</p> <p>5) Riparian margins are protected from the effects of livestock.</p> <p>6) Willow removal is managed to avoid impacts on wai maori and habitat for mahika kai species.</p>	<p>Project Kea proposes to enhance the Whitneys Creek environments, by incorporating native planting along the northern boundary of the Project Kea site.</p> <p>Project Kea will ensure that the riparian margin areas are retired, planted and enhanced into the future. The riparian margin areas along the Project Kea site will be protected from the effects of livestock.</p> <p>The applicant is committed to meaningful engagement with Mana Whenua to ensure the suitability of plantings. The applicant will prepare and implement a programme of establishment, post establishment protection and maintenance for the plantings.</p> <p>No works are proposed in any beds of rivers or natural wetlands.</p> <p>No river engineering works are proposed.</p>

<p>7) Waterways are free of chemicals, herbicides and poisons.</p> <p>8) Farm management practices and land management by Crown agencies supports the retention of riparian margins.</p> <p>9) natural variations in braided rivers and adjacent water bodies are protected.</p> <p>10) River engineering works and gravel extraction are carried out in ways that are sensitive to braided river ecosystems and cultural health.</p>	
<p>5.3 Surface water: by sub-catchment</p>	
<p><u>5.3.1 Overarching objectives</u></p> <p>1) Specific management approaches are developed to protect areas that are:</p> <ul style="list-style-type: none"> a) particularly sensitive to changes in flow allocation regimes or, b) at risk from land use intensification (hot spots) <p>2) The cultural health values of waterways including Kellands Pond, Haldon Arm, Lake Middleton, the Willowburn and those in the Ahuriri are restored and enhanced.</p>	<p>The applicant is committed to meaningful engagement with Mana Whenua and support the preparation of a Cultural Impact Assessment.</p> <p>The Project Kea site has not been identified as a particularly sensitive environment to flow allocation regimes or at risk from land use intensification.</p>
<p><u>5.3.5 Lower Waitaki Tributaries</u></p> <p>1) Waitaki flow and allocation regimes account for all extractions from the catchment.</p> <p>2) Springheads are protected and water quality is improved in the Waitaki Stream.</p> <p>3) Springheads are protected and water quality is improved in Whitney's Creek.</p>	<p>Many of the policies under this objective relate to flow and allocation regimes, which are generally outside of the scope of this resource consent application as the proposal does not involve water take and use. A separate resource consent application for ground water take and use is currently being prepared and will be lodged with ECAN shortly. The applicant is committed</p>

4) The Maerewhenua River is culturally healthy and supports Manawhenua values and uses.

5) The cultural and ecological values of all watercourses, artificial and natural, are recognised.

6) Braided river character and habitat in the Lower Waitaki is enhanced.

7) riparian management and flow regimes support Manawhenua use of the lower Waitaki nohoaka.

8) The Lower Waitaki wetlands are protected and enhanced.

to engaging with Manawhenua in regard to the future water take and use resource consent application.

The design and location of proposed activities on the Project Kea site have been carefully considered to ensure that adverse effects on Whitneys Creek are appropriately avoided or mitigated.

With respect to water quality in Whitneys Creek, the Surface and Groundwater Assessment concludes that proposed stormwater discharge to land:

- The proposed stormwater systems on the Project Kea site are designed in accordance with all relevant guidelines and best practices, and therefore, are expected to provide sufficient treatment for any potential contaminants from the Project Kea site.
- Babbage has carried out an assessment of expected concentrations of potential contaminants in the stormwater discharge based on the deposition modelling and the expected stormwater volumes and contaminants. All expected concentrations of potential contaminants are below the limits for a level of protection of 95% of species from Table S5B from Schedule 5 of the CLWRP, except for Chlorine concentration, which for the average discharge is still lower than the defined limit for a level of protection of 90% of species of the Australian and New Zealand Guidelines for Fresh & Marine Water Quality, and for worst-case is still lower than the maximum acceptable values (MAVs)

and guideline values (GVs) stipulated by the Drinking-water Standards for New Zealand.

- All expected concentrations of potential contaminants (both average and worst-case scenario) are orders of magnitude lower than the relevant MAVs and GVs stipulated by the DWSNZ, and therefore the discharge is unlikely to cause the receiving freshwater bodies (surface or groundwater) to exceed the limits stipulated in Schedule 8 (Region-wide Water Quality Limits) of the CLWRP.
- The current fertiliser applications, stock effluent, and irrigation contributing to nitrogen loads to soil will be retired on the Project Kea site, thereby, Project Kea will contribute to an overall reduction in nutrient loads, contributing to the improvement in water quality in the Waitaki catchment (which includes Whitneys Creek).
- Project Kea will be enhancing the Whitneys Creek environments, by incorporating nativee planting along the northern boundary of the Project Kea site.
- Project Kea will protect water quality in Whitneys Creek by avoiding direct discharges of stormwater and other contaminates into Whitneys Creek.

There are no wetlands on or in the immediate vicinity of the Project Kea site.

<p>5.4 Springs, Wetlands, Swamps and Seepages</p>	
<p>1) All existing natural wetlands are protected.</p> <p>2) Degraded natural wetlands are restored.</p> <p>3) Wetlands within Waitaki catchments are reinstated.</p> <p>4) Wetlands are protected from damage or destruction from livestock within Waitaki catchment.</p> <p>5) Flows and water levels sustain wetlands.</p> <p>6) The restoration of natural wetlands over the creation of artificial wetlands is prioritised.</p> <p>7) Constructed wetlands, while secondary to natural wetlands, provide for Manawhenua cultural uses and values.</p> <p>8) All remaining natural springs are identified, protected and enhanced.</p> <p>9) Access to wetlands and springs for Manawhenua cultural use is restored.</p>	<p>There is no wetland on the Project Kea site, nor in its proximity, therefore, all adverse effects on wetlands are avoided.</p>
<p>5.5 Coastal Interface</p>	
<p>1) Achieve a continuous flow of clean water, ki uta ki tai, that:</p> <ul style="list-style-type: none"> a) enables sediment movement and provides for opening of the Waitaki River mouth. b) protects the ecological health and natural character of the lower Waitaki River c) provides for the migration of indigenous taoka species, and 	<p>The Project Kea site is 3.9 km from the Pacific Ocean and 5.3 km from the Waitaki River mouth.</p> <p>It is noted that Whitneys Creek eventually flows to the Waitaki River mouth.</p> <p>Project Kea does not propose any works within the riverbed of Whitneys Creek that would restrict the continuous flow of clean water.</p>

<p>d) provides for Manawhenua cultural values and use.</p> <p>2) The connectivity of freshwater and the coastal environment is recognised and managed in an integrated way.</p> <p>3) The ecological and cultural values of coastal hāpua/ lagoons are recognised and protected.</p>	<p>Project Kea proposes to comply with all requirements for sedimentation management during the construction phase.</p> <p>The Surface and Groundwater Assessment concludes that Project Kea is unlikely to result in any significant effects on water quantity or quality of Whitneys Creek, and therefore, any downstream effects on the coastal interface are considered to be negligible to none.</p>
<p>Section 6 Mahika Kai and Ecosystems</p>	
<p>6.4 Rights and interests in Mahika Kai</p>	
<p>1) The mahika kai resource is healthy and abundant.</p> <p>2) Manawhenua have physical access to the resource and rights to harvest for cultural and economic use.</p> <p>3) Manawhenua are able to exercise kaitiakitaka and rakatirataka over the species and areas of value to them, as guaranteed by Te Tiriti o Waitangi.</p> <p>4) Agencies have a good understanding of contemporary importance of mahika kai as a way of life for Manawhenua.</p>	<p>Project Kea seeks to ensure that mahika kai resource is healthy and abundant. In this regard, great care has been taken to ensure that there are no significant adverse effects on water quality of Whitneys Creek.</p> <p>Project Kea will not result in adverse effects on mahika kai for the following reasons:</p> <ul style="list-style-type: none"> ● Direct discharges of stormwater and other contaminates to water bodies will be avoided. ● Both the proposed stormwater and domestic wastewater discharges to land will use industry best practice for treatment prior to discharge to land. ● The proposal involves the enhancement of the Whitneys Creek environments, by incorporating a band of native planting along the northern boundary of the Project Kea site.

	<ul style="list-style-type: none"> • The Surface and Groundwater Assessment Report concludes that the proposal is unlikely to result in any significant effects on the water levels and quality of groundwater and Whitneys Creek. • Project Kea will not restrict Manawhenua physical access to Whitneys Creek.
<p>6.5 Ecosystem wellbeing</p>	
<p>1) The historical range and distribution of indigenous biodiversity and mahika kai species within mahika kai areas are restored.</p> <p>2) Indigenous fish, bird and plant species are protected and where required, restored in all parts of the Waitaki catchment.</p> <p>3) Biodiversity management is integrated across landownership and -use boundaries.</p> <p>4) The Waitaki catchment supports a rich and diverse community of macroinvertebrates, supported by natural river and stream processes and clean water that allows the sensitive species to flourish.</p> <p>5) Breeding, nesting and roosting habitats for indigenous birds and aquatic species in waterways are protected.</p> <p>6) Russell lupins are eradicated from waterways.</p> <p>7) Areas of indigenous vegetation and habitat that are of significant value to Manawhenua are protected including wetlands, lakes, riparian areas and the river mouth.</p>	<p>No effects on ecosystem wellbeing are expected based on the following:</p> <ul style="list-style-type: none"> • Project Kea does not propose any works within the riverbed of Whitneys Creek, thereby, protecting the aquatic species and indigenous birds within the Whitneys Creek environments. • Direct discharges of stormwater and other contaminants to water bodies will be avoided. • Both the proposed stormwater and domestic wastewater discharges to land will use industry best practice for treatment. • The proposal involves the enhancement of the Whitneys Creek environments, by incorporating a band of native planting along the northern boundary of the Project Kea site. This will assist in providing habitats for aquatic species in Whitneys Creek, and thereby, increasing indigenous biodiversity, and contributing to the enhancement of the Waitaki catchment overall.

<p>8) Habitat for mahika kai species within wetlands is enhanced and restored.</p> <p>9) The value of springs in regulating water temperature in smaller streams is recognised and protected.</p>	<ul style="list-style-type: none"> • The Surface and Groundwater Assessment Report concludes that the proposal is unlikely to result in any significant effects on the water level and quality of groundwater and Whitney's Creek. • There are no wetlands on Project Kea site, nor in its immediate vicinity.
<p>6.6 Loss of Access to Mahika Kai Species and Areas</p>	
<p>1) Manawhenua have physical access to all rivers, river mouths or confluences, lakes wetlands, springs, river mouth and nohoaka.</p> <p>2) Rivers, lakes and associated vegetated floodplains, wetlands, springs and river mouths provide habitat for a multitude of thriving mahika kai species.</p> <p>3) Manawhenua have access to artificial and modified watercourses (that discharge into natural watercourse) on private land for mahika kai purposes.</p> <p>4) Mahika kai values in artificial and modified water bodies that discharge into natural waterways are identified and protected.</p> <p>5) Access via paper roads is protected, unless alternatives access arrangements are agreed.</p> <p>6) Barriers to accessing cultural materials and mahika kai for Kai Tahu customary and contemporary uses are removed.</p> <p>7) Manawheuna can define what constitutes sustainable harvest using matauraka Maori.</p>	<ul style="list-style-type: none"> • The Project Kea site does not contain any waterways, lakes, wetlands, riparian areas used for mahika kai gathering, nohoaka (refer maps in Iwi Management Plan for nohoaka locations), Māori reserves and easements. The proposal involves the enhancement of the Whitney's Creek environments, by incorporating a band of native planting along the northern boundary of the site. • Project Kea will not result in restriction to access to Whitney's Creek to Manawhenua. • Project Kea does not result in barriers to accessing cultural materials and mahika kai for Kai Tahu customary and contemporary uses. • Project Kea does not propose any works within the riverbed of Whitney's Creek, thereby, protecting the existing Whitney's Creek environments for mahika kai species.

<p>8) Manawhenua govern and manage the harvest of all customary resources, including classified species, via tikaka.</p>	
<p>6.7 Particular species</p>	
<p><u>6.7.4 Inaka</u></p> <p>1) Inaka spawning areas in the Lower Waitaki are identified, protected and restored.</p> <p>2) Manawhenua have increasing degrees of access for white baiting in the Lower Waitaki.</p> <p>3) Releases of elver into Lake Benmore are protected.</p> <p>4) Eel stocks throughout the catchment are restored.</p> <p>5) The abundance, health and distribution of the long fin eel population is restored, and distribution is restored to historic levels.</p> <p>6) Long fin eel populations throughout the Waitaki catchment are protected.</p> <p>7) The tuna trap and transfer programme is effective and comprehensive.</p> <p>8) Manawhenua can sustainably harvest and use tuna.</p> <p>9) Manawhenua initiatives to farm tuna species are successful.</p> <p>10) The international export of glass eels and elver ceases.</p> <p>11) Landowners increasingly decline access to commercial eelers.</p>	<ul style="list-style-type: none"> ● The Project Kea site is 3.9 km from the Waitaki River mouth. Project Kea site does not contain any wetlands. Effects on particular species identified in 6.7.4 would therefore be avoided. ● The Surface and Groundwater Assessment Report concludes that the proposal is unlikely to result in any significant effects on the water levels and quality of Whitneys Creek. Therefore, no adverse effects are anticipated on particular species set out in section 6.7.4.

<p>12) Existing stands of raupo on private land are protected.</p> <p>13) The profile of the value of raupo on private land, including for Manawhenua use, is raised.</p> <p>14) Manawhenua have improved access to raupo.</p> <p>15) Sustainable populations of weka exist throughout the catchment.</p> <p>16) Historic pa harakeke (areas where the harakeke resource was established and nurtured for customary use) are protected.</p>	
<p>6.8 Effects of water quality and quantity on Mahika Kai</p>	
<p>1) Groundwater management supports the unique biodiversity of lowland freshwater systems.</p> <p>2) Water quality and quantity supports the needs of mahika kai species and ensures whanau have an abundance of desirable places they can gather from.</p> <p>3) Groundwater quality and quantity supports the unique biodiversity of the resource.</p> <p>4) All food taken from natural waters, and artificial/ modified water courses that flow into natural water bodies, is fit for human consumption.</p> <p>5) All cultural materials are fit for use.</p> <p>6) Vegetation supports Manawhenua use of waterways and ecological values.</p>	<p>Project Kea will implement an integrated approach to ensure the maintenance of water quality. Project Kea application has been prepared recognising the inextricable relationship between water flow, water quality, ecosystem health and land uses.</p> <p>A comprehensive assessment of the effects on water quality is set out in the Surface and Groundwater Assessment (Technical Report 17). In brief:</p> <ul style="list-style-type: none"> ● The proposal avoids direct discharge of stormwater and domestic wastewater and other contaminants to surface and groundwater. ● Both the proposed stormwater and domestic wastewater discharges to land are treated prior to discharge using industry best practice.

<p>7) kai Tahu understands the existing health of taoka and mahika species and plans for continual improvement and enhancement.</p>	<ul style="list-style-type: none"> ● Appropriate management of hazardous substances is proposed to ensure that any accidental spillage does not cause adverse effects on water quality. ● All expected concentrations of potential contaminants (both average and worst-case scenario) are orders of magnitude lower than the relevant MAVs and GVs stipulated by the Drinking Water Standards New Zealand, and therefore the discharge is unlikely to cause the receiving freshwater bodies (surface or groundwater) to exceed the limits stipulated in Schedule 8 (Region-wide Water Quality Limits) of the CLWRP. ● Whitneys Creek environments will be enhanced, by incorporating new native planting along the northern boundary of the Project Kea site. ● The current fertiliser applications, stock effluent, and irrigation contributing to nitrogen loads to soil will be retired on the Project Kea site, thereby, Project Kea will contribute to an overall reduction in nutrient loads, contributing to the improvement in water quality. <p>The Surface and Groundwater Assessment concludes that the proposal is unlikely to result in any significant effects on surface water and groundwater.</p>
<p>6.9 In-stream works and infrastructure</p>	
<p>1) Applicants for in-stream works and infrastructure development identify opportunities to enhance and restore mahika kai species, habitat and conditions.</p>	<p>The proposal does not include any in-stream works or infrastructure development.</p>

<p>2) Mahika kai species have passage at all times, preferably through natural water courses, and through assisted methods where existing infrastructure requires.</p> <p>3) Infrastructure development mimics pre-development conditions where-ever possible.</p> <p>4) In-stream works have minimal effect on mahika kai species.</p>	
<p>6.10 Loss and degradation of wetlands, springs, and the Waitaki River Mouth</p>	
<p>1) Wetlands, springs, and the Waitaki River mouth are once again ‘hot spots’ for mahika kai species that are fit for human consumption.</p>	<p>The proposal does not include any works in any natural wetlands or springs or the Waitaki River mouth.</p>
<p>6.11 Pests and introduced species</p>	
<p>1) Mahika kai species are protected from predation by trout, salmon and other exotic species.</p> <p>2) The protection of indigenous mahika kai species is prioritised over the protection of the habitat of trout and salmon.</p> <p>3. Agency programmes increasingly extend the number of areas where indigenous species are protected from predation.</p>	<p>The proposed enhancement of the Whitneys Creek environments, by incorporating a native planting along the northern boundary of the Project Kea site, would support mahika kai species in the stream.</p>
<p>6.12 Riparian margins</p>	
<p>1) The entire Waitaki catchment is fully fenced and planted out, where Manawhenua consider topography and stocking rates make this practicable and necessary.</p> <p>2) Crack willow is removed from the Waitaki catchment.</p>	<p>The proposal includes the enhancement of the Whitneys Creek environments, by incorporating native planting along the northern boundary of the Project Kea site.</p>

6.13 Whanau cultural wellbeing	
<p>1) Whanau have easy access to information on how and where they can gather mahika kai in the Waitaki.</p> <p>2) Whanau have access to lands and resources in the catchment.</p> <p>3) Mahika kai practices in the Waitaki are revived.</p> <p>4) The allocation of space, water and nutrients for mahika kai purposes supports the revitalisation of mahika kai practices and cultural wellbeing.</p>	<p>Project Kea will not have any adverse effects on access to lands and resources in the catchment for mahika kai practices.</p>
Section 7 Wahi Tupuna: Cultural Landscapes	
7.1 Recognition and management of Wahi Tupuna	
<p>1) Cultural landscapes, and their respective components, are restored, enhanced and protected.</p> <p>2) Manawhenua have a strong, visible and presence in the Waitaki.</p>	<p>There are no identified archaeological sites, or any sites of significance located on the Project Kea site. The applicant is, however, committed to working with Mana Whenua to recognise the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga. Preparation of a Cultural Impact Assessment is supported.</p>
7.2 Wai in Wahi Tupuna	
<p>1) flows and management regimes support all related components of cultural landscapes including:</p> <ul style="list-style-type: none"> a) mahika kai b) cultural characteristics c) aesthetics d) wetlands 	<p>Project Kea will implement an integrated approach to ensure the maintenance of water quality. Project Kea application has been prepared recognising the inextricable relationship between water flow, water quality, ecosystem health and land uses.</p> <p>A comprehensive assessment of the effects on water quality is set out in the Surface and Groundwater Assessment (Technical Report 17). In brief:</p>

<p>e) mauri</p> <p>f) taoka and indigenous species</p>	<ul style="list-style-type: none"> ● The proposal avoids direct discharge of stormwater and domestic wastewater and other contaminants to surface and groundwater. ● Both the proposed stormwater and domestic wastewater discharges to land are treated prior to discharge using industry best practice. ● Appropriate management of hazardous substances is proposed to ensure that any accidental spillage does not cause adverse effects on water quality. ● All expected concentrations of potential contaminants (both average and worst-case scenario) are orders of magnitude lower than the relevant MAVs and GVs stipulated by the Drinking Water Standards New Zealand, and therefore the discharge is unlikely to cause the receiving freshwater bodies (surface or groundwater) to exceed the limits stipulated in Schedule 8 (Region-wide Water Quality Limits) of the CLWRP. ● Whitneys Creek environments will be enhanced, by incorporating new native planting along the northern boundary of the Project Kea site. ● The current fertiliser applications, stock effluent, and irrigation contributing to nitrogen loads to soil will be retired on the Project Kea site, thereby, Project Kea will contribute to an overall reduction in nutrient loads, contributing to the improvement in water quality.
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	The Surface and Groundwater Assessment concludes that the proposal is unlikely to result in any significant effects on surface water and groundwater.
7.3 Wahi Tapu	
<p>1) Wahi tapu are restored, enhanced and protected.</p> <p>2) No further wahi tapu are lost.</p> <p>3) The general public has an appropriate level of information about wahi tapu to enhance understanding of their value.</p>	<p>The applicant supports the protection of wāhi tapu.</p> <p>Aukaha has advised that there are no wāhi tapu sites on the Project Kea site. From the research to date, and discussions with Aukaha, the applicant understands that there are no wāhi tapu sites in the immediate proximity of the Project Kea site.</p> <p>Accidental Discovery Protocol will be followed during construction if archaeological material is discovered.</p>
7.4 Tuhituhi Nehera – Rock Art	
<p>1) Rock art is protected and sites are restored and enhanced.</p> <p>2) Manawhenua can access rock art sites.</p>	<p>There are no rock art sites on the Project Kea site. Based on discussions with Aukaha, the applicant understands that there are no rock art sites in the immediate proximity of the Project Kea site.</p>
7.5 Cultural reference condition	
<p>1) The cultural reference condition of cultural landscapes (including smells such as of tussock, totara, taramea and aesthetics and vistas) is protected.</p> <p>2) The integrity of views towards the Manawhenua tupuna Aoraki and his brothers Rakiroa (Mt Dampier), Rakirua (Mt Teichelmann), Rarakiroa (Mt Tasman) is protected from inappropriate development.</p> <p>3) There is an increase in the total percentage of indigenous cover</p>	<p>The Project Kea site is a working paddock, and its ecological values are degraded from its natural state due to tramping, grazing and monoculture. Proposed enhancement of the Whitneys Creek environments, by incorporating native planting along the northern boundary of the Project Kea site will increase indigenous vegetation cover.</p> <p>The landscaping plan for the Project Kea site incorporates native vegetation planting, which will contribute to increasing indigenous vegetation cover.</p>

7.6 Infrastructure and facilities in Wahi Tupuna	
<p>1) Infrastructure and facilities (toilets, rubbish and waste facilities) are located to avoid adverse effects on wahi tupuna and the characteristics of each site.</p>	<p>There are no identified archaeological sites, or any sites of significance to Manawhenua located on the Project Kea site.</p>
7.7 Contemporary Nohoaka	
<p>1) Nohoaka are highly desirable and easily accessible places for whanau to gather to experience the landscape as their tupuna died; and to rekindle the traditional practices of gathering food and other natural resources.</p> <p>2) Water quality adjacent to nohoaka sites provides for the needs of mahika kai, contact and wider Manawheuna values.</p> <p>3) Drinking water is readily available adjacent the nahoaka sites.</p>	<p>The nearest Nohoaka site, the Waitaki River mouth, is 3.9 km from the Project Kea site. No adverse effects on Nohoaka sites are expected.</p>
7.8 Maori Land	
<p>1) Manawheuna can use and develop Māori land according to the purpose it was given.</p> <p>2) Manawheuna are a significant land-owner in the Waitaki catchment.</p> <p>3) District plans enable the development of papakaika by Manawhenua throughout the Waitaki catchment.</p> <p>4) Fishing reserves and easements are identified, restored and enhanced.</p> <p>5) Access arrangements to fishing reserves and easements are formalised.</p>	<p>The Project Kea site is not Māori land, nor does it contain any interests associated with Manawhenua fishing reserves and easements.</p>

<p>6) landowners and councils understand the location and rights associated with Manawhenua fishing reserves and easements.</p> <p>7) The wai adjacent fishing easements and reserves are of an excellent quality that provides for mahika kai, contact recreation and wider Manawhenua values.</p>	
<p>7.9 Cultural Redress</p>	
<p>1) Manawhenua are partners with the Crown in managing the physical resource of the Waitaki catchment.</p> <p>2) Traditional place names are restored and widely used in the Waitaki catchment.</p>	<p>The applicant is also committed to meaningful engagement with Manawhenua, and support the preparation of a Cultural Impact Assessment.</p> <p>The Project Kea site is not in a Statutory Acknowledgement Area or Nohoaka (refer map 20 of Iwi Management Plan).</p>
<p>7.10 Resource Management Process</p>	
<p>1) Manawhenua are engaged at all levels of resource management decision making and implementation in the Waitaki catchment.</p>	<p>The applicant is committed to meaningful engagement with Manawhenua, and support the preparation of a Cultural Impact Assessment.</p>

6.17.4 Te Whakatau Kaupapa Ngai Tahu Resource Management Strategy for the Canterbury Region 1990

Table 29 below discusses the alignment of Project Kea with the Te Whakatau Kaupapa Ngai Tahu Resource Management Strategy for the Canterbury Region.

Table 29. Alignment of Project Kea with the Te Whakatau Kaupapa Ngai Tahu Resource Management

Provisions in the <i>Te Whakatau Kaupapa Ngai Tahu Resource Management Strategy for the Canterbury Region</i>	Comments
The Ngāi Tahu relationship with the land	
Policy: 1) That as a matter of policy the Canterbury Regional Council will treat as a matter of regional importance the Ngai Tahu ancestral relationship and cultural values concerning the land and waters within the Canterbury region.	The applicant is committed to meaningful engagement with Manawhenua, and support the preparation of a Cultural Impact Assessment.
Land use changes	
Policy: 1) If land use changes result in gifts of land and/or buildings being no longer required for their original use, such land and buildings should be returned to their original owners or the local Rūnanga as appropriate.	The Project Kea site is a vacant site.
Rural land use	
Policy:	The Project Kea site is not part of a Māori Reserve.

- 1) That planners should consider applications for building permits on such land in light of their original provision as community resources.
- 2) The planners should consider applications to initiate business ventures on such land in light of the original intention to provide an economic base for the communities associated with that land.
- 3) That at the time of the review of any District Planning Scheme, or the preparation of resource management plans, both Regional and District Plans should provide recognition of the originally intended purposes of Māori Reserve lands. The will involve consultation with the owners.
- 4) That the original purpose should be generously interpreted to include any activities which support the development of Ngai Tahu's communal base.
- 5) That applications to initiate community-owned business ventures should be actively encouraged and that unnecessary constraints should not be applied.
- 6) That applications to construct building for communal Ngai Tahu use, for example whare runanga (meeting houses), should be viewed favourably actively assisted

<p>7) That Ngai Tahu individuals and Runanga should be permitted to buy area of land near their marae for the purposes of building dwellings or establishing business ventures. Minimum area requirements should not apply in these circumstances.</p> <p>8) That similar policies should also apply to proposals in urban areas.</p> <p>9) That public parking places and areas of public recreation not be sited on Māori Reserve land without the consent of the owners of that reserve.</p> <p>10) That the local Runanga be consulted on all matters affecting Māori Reserve land in their area.</p> <p>11) That in determining applications by Ngai Tahu individuals or Runanga to initiate aquaculture ventures, whether water or land-based, the responsible authority should have a duty to consider the Treaty of Waitangi.</p>	
<p>General Water Policy Statement</p>	
<p>Policy:</p> <p>1) That no discharge into a water body should be permitted if it will result in contamination of the receiving water.</p>	<p>Project Kea will implement an integrated approach to ensure the maintenance of water quality. Project Kea application has been prepared recognising the inextricable relationship between water flow, water quality, ecosystem health and land uses.</p> <p>A comprehensive assessment of the effects on water quality is set out in the Surface and Groundwater Assessment (Technical Report 17). In brief:</p>

2) That no lowering of water levels in identified waiwhakaheketupapaku (water burial sites) should be allowed.

3) That the water quality and quantity of water in all waterways be improved to the point where it supports those fish and plant populations that were sourced from them in the past and that these mahinga kai are fit for human consumption.

4) That the Canterbury Regional Council should actively encourage the disposal of effluent onto land rather than into water, provided that the ground water is not polluted in the process.

5) Management Plans should be prepared for each river, their tributaries and catchments, and a coherent list of all water rights made, whether to abstract water or to discharge effluent. These management plans should be developed in consultation with the appropriate Runanga, and only adopted with their consent.

6) That when water rights to discharge effluent come up for renewal, investigations should be undertaken to determine if more modern technology would permit an improvement in the quality of any discharge.

7) That in the case of abstraction, more efficient use of water be encouraged. Any water “saved” in this manner should be returned to the

- The proposal avoids direct discharge of stormwater and domestic wastewater and other contaminants to surface and groundwater.

- Both the proposed stormwater and domestic wastewater discharges to land are treated prior to discharge using industry best practice.

- Appropriate management of hazardous substances is proposed to ensure that any accidental spillage does not cause adverse effects on water quality.

- All expected concentrations of potential contaminants (both average and worst-case scenario) are orders of magnitude lower than the relevant MAVs and GVs stipulated by the Drinking Water Standards New Zealand, and therefore the discharge is unlikely to cause the receiving freshwater bodies (surface or groundwater) to exceed the limits stipulated in Schedule 8 (Region-wide Water Quality Limits) of the CLWRP.

- Whitney's Creek environments will be enhanced, by incorporating new native planting along the northern boundary of the Project Kea site.

- The current fertiliser applications, stock effluent, and irrigation contributing to nitrogen loads to soil will be retired on the Project Kea site, thereby, Project Kea will contribute to an overall reduction in nutrient loads, contributing to the improvement in water quality.

waterways to enhance river flows, and not reallocated to other users.

8) That water right charges should reflect the extent to which the Canterbury Regional Council needs to monitor and supervise rights and ensure compliance.

9) That methods storing excess water, for example wetlands and dams, should be actively encouraged.

That wetland areas be created and expanded. All existing wetlands should be maintained at their present area at least, in recognition of their value as “buffers” in times of high rainfall and also to fish and plant communities.

11) That no further reclamation of wetlands be allowed.

12) That those Runanga which possess beneficial rights to a particular water body should be consulted on all management practices which will impact on that waterway or its resources.

13) That Maori Advisory Communities at both Regional and District levels should be consulted before any Catchment Management Plan is adopted, and the Committee advise the Council of any issues of concern to the tangata whenua and any requirements to be met in the preparation of the plan.

The Surface and Groundwater Assessment concludes that the proposal is unlikely to result in any significant effects on surface water and groundwater.

<p>14) That agricultural and chemical spraying be prohibited in any case where the effects of such spraying will be to degrade the quality of any water body affected the flora and fauna in the immediate vicinity of such water bodies.</p> <p>15) that the Canterbury Regional Council should encourage land owners or occupiers to plant vegetation on riparian trips to prevent contaminated run-off into any wetland, waterway or lake.</p> <p>17) That the Canterbury regional council, in consultation with the Ngai Tahu Maori Trust Board, appoint an Iwi Liaison Officer and provide appropriate administrative support for that officer.</p>	
<p>Mahinga Kai</p>	
<p>Policy:</p> <p>1) That the quality and quantity of water in all waterways be improved to the point where it supports those fish and plant populations that were sourced from them in the past, and that these mahinga kai are fit for human consumption.</p> <p>2) That wetland areas be created and expanded. All existing wetlands should be maintained at their present area at least, in recognition of their value as “buffers” in times of high rainfall and</p>	<p>Project Kea agrees that mahinga kai are fit for human consumption.</p> <p>With respect to quality and quantity of water in the waterways to support mahinga kai, refer to the row above.</p> <p>No adverse effects on mahinga kai are expected based on the following:</p> <ul style="list-style-type: none"> • Direct discharges of stormwater and other contaminants to water bodies will be avoided. • Both the proposed stormwater and domestic wastewater discharges to land will use industry best practice for treatment.

also their crucial importance to fish and plant communities.

3) Ngai Tahu maintain that future planning procedures should consider the fact that areas such as wetlands are important mahinga kai to Ngai Tahu.

4) Where productive mahinga kai areas still remain, strong policies should be adopted to maintain and enhance them. The Canterbury Regional Council should support the attainment of access provisions where necessary.

5) That local Ngai Tahu be allowed to establish temporary camps for the purpose of collecting mahinga kai during the appropriate seasons.

6) That the local Runanga should be involved in the management of all mahinga kai resources, including fresh and salt water fish.

7) That the Canterbury Regional Council actively encourage and support all initiatives to restock lagoons and other waterways with native fish species, and all initiatives to maintain those places as a suitable fishery habitat.

8) See also the Tribunal policies on water, especially as stated in Section 4, at 4-20 and 4-21.

- The proposal involves the enhancement of the Whitneys Creek environments, by incorporating a band of native planting along the northern boundary of the Project Kea site.
- The Surface and Groundwater Assessment Report concludes that the proposal is unlikely to result in any significant effects on the water level and quality of groundwater and Whitneys Creek.

The proposal includes the enhancement of the Whitneys Creek environments, by incorporating a band of native planting along the northern boundary of the Project Kea site.

The policies on water at pages 4-20 and 4-21 are addressed above.

Urupa

Policy:

- 1) The urupa must be given full statutory protection and access to those sites must be guaranteed.
- 2) That the Canterbury Regional Council should support moves to gain such protection, and should encourage others to acknowledge and respect Ngai Tahu's position.
- 3) The district schemes should provide for urupa to be subdivided from larger lots. This is important as any Ngai Tahu sites have urupa on them.
- 4) That urupa should be recognised as a predominant use on Māori-owned ancestral land.
- 5) That urupa should be recognised as a predominant use in any rural zone.
- 6) That if wheua are uncovered on privately owned land then immediate contact must be made with the Ngai Tahu Maori Trust Board, and the local Papatipu Marae and Runanga (local representative groups) for the interment in an appropriate Ngai Tahu urupa or cemetery, if that is the desire of the decedents.
- 7) That for wheua uncovered on Crown-owned property, these remains be reinterred on site and fenced off, after consultation with the Ngai

The applicant supports the recognition and protection of urupa. There are no urupa sites within the Project Kea site, nor its immediate surrounds.

The applicant is not aware of any silent files relating to urupa sites on the Project Kea site, or its immediate proximity.

<p>Tahu Maori trust Board. Free access to these sites must be guaranteed.</p> <p>8) A silent file will be kept on known burial sites by the Ngai Tahu Maori Trust Board. Where these sites are located out-side Maori Reserved land they have been given a number and the general area has been marked on the relevant map in Appendix A to Chapter 5. Anyone proposing any change on or near one of these sites should consult the Ngai Tahu Maori Trust Board through the Regional Council's Iwi Liaison Officer. The Ngai Tahu Maori Trust Board in turn can initiate contact with those people who have a direct interest in that particular site. All decisions will be made on a site by site basis.</p>	
Archaeological Sites	
<p>Policy:</p> <p>1) That all archaeological sites of interest to Ngai Tahu Whanui be given formal protection, and that the right to modify them shall remain solely with Ngai Tahu.</p> <p>2) That the decisions as to whether or not any such site is excavated rests with the affected Runanga and the Tribe alone – in consultation with family members where appropriate – and permission will be granted for each site individually. All such decisions shall be at the sole discretion of the affected individuals.</p>	<p>There are no archaeological sites on the Project Kea site, nor in its immediate proximity.</p> <p>The applicant is not aware of any silent files relating to archaeological sites on the Project Kea site, or its immediate proximity.</p> <p>Accidental Discovery Protocol will be followed, in consultation with Manawhenua and Heritage New Zealand, if archaeological material are discovered during construction.</p>

3) That, consistent with the policies on urupa above, no burials should be distributed. Should human remains be revealed, the excavation should stop immediately until approval for recommencement is given is given by the Ruunanga concerned.

4) That, with due deference to the Historic Places Act, Ngai Tahu retains the right to approve those who undertake the excavations and agree their criteria.

5) That a site is to be excavated in its entirety.

6) That all the material from the site must be processed and analysed in full as soon as possible following excavation. Ngai Tahu is dissatisfied with the amount of material which is removed from sites and then placed in storage awaiting future analysis. This results in the potential loss of information, and of the material itself, and often such material, we believe, becomes neglected by the investigators in favour of “fresh” material.

7) That if the excavation reports, either individually or collectively, suggest that further investigation or research is warranted, then this should be undertaken, up to the professional or scientific publication level if justified. The commitment to complete the task must be

<p>evident as a pre-requisite for Ngai Tahu approval.</p> <p>8) That strict academic and professional criteria and procedures must be met. In this respect Ngai Tahu request that consultants approved by the Runanga and Trust Board be involved, as several Ngai Tahu may qualify.</p> <p>9) That all excavating and subsequent processing must be undertaken with the measure of cultural sensitivity hat the sites merit, and the tikanga Maori must be observed.</p> <p>10) In addition to the above points, Ngai Tahu insist that all archaeological sites which reasonably may be expected to be affected by any development activities are investigated. These activities include sites that are in the line of, or nearby to any road, working area, dumping site, stock piling areas and so on. Such sites are as much at risk as any site directly affected by a development proposal.</p>	
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Rock Art Sites

<p>Policy:</p> <p>1) Rock Art sites of exceptional traditional, spiritual or scientific interest should not be disturbed. Before any new development proceeds that could disturb rock art sites, the developer (or planning authority if planning consents are required) shall consult with the</p>	<p>There are no rock art sites on the Project Kea site. Based on discussions with Aukaha, the applicant understands that there are no rock art sites in the immediate proximity of the Project Kea site.</p>
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Ngai Tahu Maori Trust Board. Ngai Tahu retain the sole right to determine which, if any, sites may be distributed, and consider that they are entitled to be told, if necessary in confidence, all planning are needed to form a reasoned determination.

2) Before the tribe could state its position in respect of any particular major development affecting rock art sites it would require:

a) a map of all areas that will be affected in the process of the development,

b) a comprehensive and factually informed picture of the distribution of sites.

3) To fulfil the needs of above paragraph, an extensive survey should be undertaken in order to pin-point all rock art sites potentially to be affected by future development. This would allow all parties to consider which development option is preferable, in a balance of all the proper interests, on the basis of sound factual information.

6.17.5 Iwi Management Plan of Kati Huirapa 1992 (Arowhenua Iwi Management Plan)

The Arowhenua Iwi Management Plan states that:

“The Takata Whenua (people of the land) are Kai Tahu, Kati Mamoe, Rapuwai, Hawea Waitaha (Iwi). The hapu (sub tribe) is Kati Huirapa. The Tipuna Marae (ancestral marae) is located at Arowhenua. The District (Rohe) of Kati Huirapa extends over the area from the Rakaia River to the Waitaki River.”

The history of the land goes back to about 850 AD when, according to tradition, Rakaihautu came to Te Waipounarnu (South Island) from Hawaiki in the canoe “Uruao”. The canoe landed at the boulder bank Nelson. While his son Te Rakihouia took some of the party down the coast, Rakaikautu led the remainder through the interior to Foveaux Strait. With his magic ko (digging stick) Rakauhautu dug the southern lakes (Te Kari Kari O Rakaikautu).

Te Rakihouia proceeded south in “Uruao” down the Canterbury Coast where he placed eel weirs at the mouths of the rivers. (The posts he left behind became known as Nga Pou Pou O Rakihouia.) The two parties met up at Waihao, then proceeded up the coast, making their headquarters at Akaroa.

Rakaihautu was buried at wai Kakahi (near Lake Forsyth). Te Uruao lies as part of the Waitaki river bed near Wai Kakahi (near Glenavy).”

Table 30 below discusses the alignment of Project Kea with the *Arowhenua Iwi Management Plan*.

Table 30. Alignment of Project Kea with the *Arowhenua Iwi Management Plan*

Provisions in the Arowhenua Iwi Management Plan	Response
The Takata whenua say clean up all rivers, lakes, all waterways, all coastal waters	
<p><u>Discharge of contaminants:</u></p> <p>1) All sewage, all wastewater discharges out of the rivers, lakes, sea, all natural waters</p> <p>2) All waters to be highest classified standard of water quality, with no waste discharges.</p>	<p>Project Kea will implement an integrated approach to ensure the maintenance of water quality. Project Kea application has been prepared recognising the inextricable relationship between water flow, water quality, ecosystem health and land uses.</p> <p>A comprehensive assessment of the effects on water quality is set out in the Surface and Groundwater Assessment (Technical Report 17). In brief:</p> <ul style="list-style-type: none"> The proposal avoids direct discharge of stormwater and domestic wastewater and other contaminants to surface and groundwater.

- Both the proposed stormwater and domestic wastewater discharges to land are treated prior to discharge using industry best practice.
- Appropriate management of hazardous substances is proposed to ensure that any accidental spillage does not cause adverse effects on water quality.
- Babbage has carried out an assessment of expected concentrations of potential contaminants in the stormwater discharge based on the deposition modelling and the expected stormwater volumes and contaminants. All expected concentrations of potential contaminants are below the limits for a level of protection of 95% of species from Table S5B from Schedule 5 of the CLWRP, except for Chlorine concentration, which for the average discharge is still lower than the defined limit for a level of protection of 90% of species of the Australian and New Zealand Guidelines for Fresh & Marine Water Quality, and for worst-case is still lower than the maximum acceptable values (MAVs) and guideline values (GVs) stipulated by the Drinking-water Standards for New Zealand.
- All expected concentrations of potential contaminants (both average and worst-case scenario) are orders of magnitude lower than the relevant MAVs and GVs stipulated by the Drinking Water Standards New Zealand, and therefore the discharge is unlikely to cause the receiving freshwater bodies (surface or groundwater) to exceed the limits stipulated in Schedule 8 (Region-wide Water Quality Limits) of the CLWRP.

	<ul style="list-style-type: none"> Whitneys Creek environments will be enhanced, by incorporating new native planting along the northern boundary of the Project Kea site. The current fertiliser applications, stock effluent, and irrigation contributing to nitrogen loads to soil will be retired on the Project Kea site, thereby, Project Kea will contribute to an overall reduction in nutrient loads, contributing to the improvement in water quality. <p>The Surface and Groundwater Assessment concludes that the proposal is unlikely to result in any significant effects on surface water and groundwater.</p>
<p><u>Hazardous and toxic substances:</u></p> <p>1) No spraying of pesticides, any toxic chemicals in or near rivers, lakes, sea, all-natural waters.</p>	<p>Where practicable, the programme for long-term maintenance of the plantings will avoid chemical pest and weed control methods in the riparian margin.</p>
<p><u>Solid wastes:</u></p> <p>1) No dumping of rubbish in or near rivers, lakes, sea, all-natural waterways.</p> <p>2) All rubbish, solid waste be removed from rivers, coastline, wetlands, all-natural waterways.</p> <p>3) All local authority waste disposal areas in wetlands, riverbeds and adjacent to rivers, lakes, coast, all-natural waters, be phased out and relocated away from waterways, wetlands and coastal areas.</p>	<p>Project Kea aligns with this objective, in that it offers an alternative to landfills, and the associated adverse effects on rivers, lakes and waterways.</p> <p>The proposed Energy from Waste Plant will support any programme of local authorities to phase out/relocate landfills that are located near water bodies. The Energy from Waste Plant will help shift demand away from those landfills.</p> <p>Preparation and implementation of a site management plan will ensure rubbish from the operation of the Plant will be disposed of appropriately.</p>

<p><u>Grazing animals in and adjacent to natural waters:</u></p> <p>1) No grazing animals in riverbeds, wetlands, or in the margins of coastal waters, creeks, streams, rivers, lakes, any natural waters</p>	<p>Project Kea does not propose grazing of animals in and adjunct to natural waters.</p>
<p><u>Discharges from ships in coastal waters:</u></p> <p>1) No dumping of wastes, dredging, any contaminants, in coastal waters.</p>	<p>This is not a relevant matter for Project Kea.</p>
<p><u>Contamination of food:</u></p> <p>1) All food taken from natural waters be fit for human consumption.</p>	<p>Project Kea agrees that all food taken from natural waters should be fit for human consumption.</p> <p>Project Kea will not result in contamination of food for the following reasons:</p> <ul style="list-style-type: none"> ● Direct discharges of stormwater and other contaminates to water bodies will be avoided. ● Both the proposed stormwater and domestic wastewater discharges to land will use industry best practice for treatment. ● The proposal involves the enhancement of the Whitneys Creek environments, by incorporating a band of native planting along the northern boundary of the Project Kea site. ● The Surface and Groundwater Assessment Report concludes that the proposal is unlikely to result in any significant effects on the water level and quality of groundwater and Whitneys Creek.

	<p>The proposal includes the enhancement of the Whitneys Creek environments, by incorporating a band of native planting along the northern boundary of the Project Kea site.</p>
<p>The Takata whenua say restore the life supporting capacity of all natural waters and waterways</p>	
<p><u>Abstractions, dams and diversion of water:</u></p> <p>1) All water be returned to the rivers.</p>	<p>Potential effects relating to water quantity will be addressed in the separate resource consent application for ground water take and use. This application is currently being prepared and will be lodged with ECAN shortly.</p>
<p><u>Water levels:</u></p> <p>1) Water level of lakes, lagoons, wetlands, all-natural waters be maintained at levels sufficiently high to sustain the life of these waters.</p>	<p>The Surface and Groundwater Assessment Report addresses the temporary dewatering during construction. The report concludes that the proposal is unlikely to result in any significant effects on the water level of groundwater and Whitneys Creek.</p> <p>Project Kea does not propose any dams or diversions of waters in the rivers.</p>
<p><u>Wetlands:</u></p> <p>1) No more drainage of wetlands.</p>	<p>The Project Kea site does not contain any natural wetlands.</p>
<p><u>Fish Passage:</u></p> <p>1) Passage for migrating fish maintained in all rivers, coastal lagoons, all-natural waterways.</p> <p>2) All river backwaters and outlets to drains, streams and springs be reinstated and maintained to ensure passage of fish.</p> <p>3) No drains in mahika kai areas be cleaned without consulting the Takata Whenua first.</p>	<p>The proposal does not involve any works in rivers, lagoons, or any other surface waterbody. All adverse effects on fish passage would therefore be avoided.</p>

<p>4) No outlets to rivers, lakes, streams, springs, lagoons, wetlands, any natural water be blocked or destroyed.</p>	
<p><u>Storing and releasing water from dams:</u></p> <p>1) The natural rises and falls of flows in rivers be maintained.</p>	<p>The proposal does not involve any damming of water.</p>
<p><u>Breeding area:</u></p> <p>1) Breeding areas for fish, birds, all species in waterways remain undisturbed.</p>	<p>The proposed works will avoid breeding areas for fish, birds, in waterways.</p>
<p><u>Wildlife corridors:</u></p> <p>1) Corridors of undisturbed vegetation be maintained along all rivers, and between rivers and forests, any areas of indigenous flora habitats of indigenous fauna to maintain the seasonal migration and movement of birds, all creatures.</p>	<p>The Project Kea site is a working paddock and its ecological values are degraded from its natural state due to tramping, grazing and monoculture.</p> <p>Project Kea will enhance and protect the riparian margin areas of Whitneys Creek, thereby enhancing the wildlife corridors.</p>
<p><u>Increasing area of wetlands:</u></p> <p>1) The restoration of existing wetlands and the construction of new wetlands be encouraged.</p>	<p>The proposal does not involve any construction of new wetlands, however, it includes the enhancement of the Whitneys Creek environments, by incorporating native planting along the northern boundary of the Project Kea site.</p>
<p><u>Natural habitat:</u></p> <p>1) The protection and restoration of natural habitats be encouraged.</p>	<p>Project Kea will enhance the riparian margin areas of Whitneys Creek, thereby enhancing the wildlife corridors and natural habitats in these areas.</p>
<p><u>Planting native species:</u></p>	<p>Project Kea will enhance the riparian margin areas of Whitneys Creek using planting of native species.</p>

<p>1) Where plantings are required to protect the margins for farmland adjacent to rivers, local native species should be used to restore habitats and depleted natural areas.</p> <p>2) The planting of flax and other native species which are a source of traditional materials be encouraged.</p> <p>3) People be encouraged to build and manage wetlands to treat wastes for irrigating land, providing the natural water quality in the ground and in springs and rivers downstream is not lowered.</p>	
<p>The Takata Whenua say that the hills and mountains, the sources of our life-giving waters, remain protected by the natural native vegetation.</p>	
<p><u>Burning:</u></p> <p>1) No burning of native vegetation and the effect that agriculture burning can have on riparian and wetland area.</p>	<p>The proposal does not involve any burning of native vegetation or agriculture burning.</p>
<p><u>Clearance of native vegetation:</u></p> <p>1) No logging or clearance of native vegetation.</p>	<p>Project Kea does not propose clearance of native vegetation.</p>
<p><u>Grazing high altitude area:</u></p> <p>1) The higher slopes and peaks covered by snow in winter, be free of grazing animals.</p>	<p>This is not applicable to Project Kea</p>
<p><u>Tracking:</u></p>	<p>This is not applicable to Project Kea</p>

<p>1) No scaring of the mountains with tracks and roads.</p>	
<p><u>Legal protection of heritage area:</u> 1) People be encouraged to enter into heritage covenants with suitable incentives and compensation where appropriate.</p>	<p>This is not applicable to Project Kea</p>
<p>The Takata Whenua say that all discharges of harmful contaminants into air which threaten the life support capacity of air, land and water should cease.</p>	
<p>1) All harmful contaminants removed from air discharges.</p>	<p>The Air Quality Emissions Assessment confirms that all components of the flue gas treatment system constitute Best Available Techniques, as identified by the European Commission published document for waste incineration for the control of emissions from the activity, including the control of discharges to air. The Air Quality Emissions Assessment also confirms that a conservative approach has been taken in the modelling of the pollutants' discharges.</p> <p>The impact from the Project Kea site operations on the environment is unlikely to result in any adverse health effects beyond the Project Kea site boundary as explained in Technical Reports on air discharges and human health.</p>
<p>The Takata Whenua say that any proposal to disturb ground where there was or is traditionally and customary use of ancestral lands, be referred to the Takata Whenua first.</p>	
<p>1) If any bones or artefacts are disturbed, Tikanga Maori the runanga be contacted and Tikanga Maori observed.</p>	<p>Accidental Discovery Protocol will be followed, in consultation with runanga and Heritage New Zealand, if archaeological material are discovered during construction.</p>

6.17.6 He Rautaki mō te Huringa o te Ahuarangi Climate Change Strategy 2018

This document sets out the strategy direction across the whole spectrum of Ngāi Tahu interests, assets and activities on impacts of climate change. The purpose of the strategy is to create Ngāi Tahu responses to the risks and opportunities presented by climate change, referencing the entire tribal structure, so that iwi, hapū and whānau aspirations can be met in changing world. This high-level strategy at its core will work with Papatipu Rūnanga throughout the implementation, ensures Ngāi Tahu's commercial and, cultural enterprises are successful and act responsibly in the face of climate change, provide support for whānau at-risk to climate effects, and recognises that participation in national and local government policy direction towards climate change can further the intended outcomes of the strategy.

This document sets out short-, medium- and long-term actions to enable the purpose of the strategy. These actions relate to identifying climate change impacts on taonga, resources and thereby cultural identity, associated education and mitigation of these impacts, securing management of key environmental assets and services, and reducing Ngāi Tahu's greenhouse gas emissions.

The purpose of the strategy is to create Ngāi Tahu responses to the risks and opportunities presented by climate change (as opposed to providing guidance to external parties on climate change matters).

6.17.7 Conclusion

Following consideration of the relevant iwi management plans, a review of the Oceania Dairy CIA and initial discussions with Aukaha, it is the applicant's view that there is no indication that there are any impacts of the proposal on a significant resource management issue for Ngāi Tahu. Consequently, in this case, it is considered that a CIA is not required as part of an assessment of environmental effects under Schedule 4 of the RMA (Provision 4.3.7). Nonetheless, the applicant is committed to undertaking meaningful consultation with mana whenua. Accordingly, the applicant has agreed with manawhenua that Aukaha will prepare a CIA on behalf of all relevant Runanga.

Having regard to the identified iwi management plans, and the Oceania Dairy CIA, it is considered that:

- The applicant recognises and supports the kaitiaki role of Ka Rūnaka and acknowledges the values of Te Ao Maori, Whanaungatanga, Whakapapa, Taonga tuku iho, Mauri, Mana, Rangatiratanga, Taonga, Kaitiaki, through both genuine engagement and the preparation of a Cultural Impact Assessment to inform Project Kea.

- Project Kea supports the holistic approach to the management of natural resources. As such, this resource consent application has been prepared taking a holistic approach to addressing resource management resources of relevance to Project Kea by integrating the consideration of both land use and regional consenting requirements into a single package. This approach ensures that all resource management issues of concern, have been considered in a holistic manner.
- In order to ensure an holistic approach to resource management, a separate resource consent is being prepared for groundwater take and use which will be lodged with ECAN shortly. Both this resource consent application and the future resource consent application for water take will be processed together.
- With respect to specific Ngāi Tahu Values identified in the Oceania Dairy CIA:
 - Project Kea will not result in any adverse effects on Wāhi tapu sites.
 - Project Kea will not result in any adverse effects on archaeological sites.
 - Project Kea ensures that the mauri of water is protected and enhanced for Whitneys Creek, and thereby the Waitaki catchment overall.
 - Project Kea ensures that the mauri of the air is protected.
 - Project Kea does not adversely affect mahinga kai species, and does not adversely affect manawhenua access to these resources.
 - Project Kea supports cultural monitoring, and opportunities for cultural monitoring could be explored in the CIA being prepared by Aukaha, and further engagement with Manawhenua.

6.18 Positive effects

The construction and operation of Project Kea will provide positive benefits to the South Island community. The following key categories of positive effects are discussed below:

- Provision of waste infrastructure
- Economic effects
- Energy security

6.18.1 Provision of waste infrastructure

- Will provide necessary infrastructure, a vital service to the community to function, a more environmentally friendly alternative to landfills.
- Provide an important component of the overall waste management system for South Island. Provide final point of disposal of residual wastes which cannot be reduced, reused or recycled.
- Provides a centralised, contained and controlled location for disposal of residual waste which has not been diverted or recycled. In the absence of such a controlled disposal system, there would be potentially significant adverse environmental and economic effects associated with uncontrolled waste
- By diverting waste from landfills, Project KEA assists in increasing the usable life span of those landfills.

6.18.2 Economic effects

Economic Impact of Project Kea Report (Technical Report 10) has been prepared by Infometrics. This Economic Report assess how Project Kea, both at the construction phase and the operation phase, will potentially affect the Waimate District economy, as well as Waikaki and Timaru Districts.

The key findings of the Economic Report are:

- Economy of Waimate: Waimate has a population of 8,290 (in 2021). Waimate, Timaru and Waitaki districts are strongly interconnected, and 9.3% of working Waimate residents commute out of the District for work, the majority going to Timaru, and to a lesser extent Waitaki. Waimate District's economy is highly concentrated in the primary sector, accounting for 41% of the District's jobs. Project Kea would assist the Waimate District's economy to diversify, thereby improving its overall economic resilience. By providing employment opportunities in Waimate, Project Kea would assist in reducing the commute out of the District.
- Construction - expenditure: Construction of Project Kea is expected to be worth \$242 million for suppliers in New Zealand, with the procurement of specialist equipment and contractors from overseas in addition to this. Project Kea will result in increased demand for non-residential construction industry. It is anticipated that 6% of the construction expenditure impact will go to the Waimate District, 24% to Waitaki District and 70% to Timaru District.

- Construction - job creation: the construction of Project Kea is estimated to support 359 full time equivalent jobs per year over a 2-year construction period. Most of these jobs are expected to accrue to Timaru and Waitaki businesses, as there is limited construction capacity within the Waimate District. Increased construction employment will in turn increase household incomes, which creates an induced worker spend locally. The induced effect is estimated to add 2 jobs per year in Waimate and 57 across Timaru and Waitaki over the 2-year construction period.

In total, the construction of Project Kea will increase total employment in Waimate District by 0.7%, and 1.0% across Timaru and Waitaki per year over the 2-year construction period, compared to 2021 employment.

Construction industry employment is expected to be 6.3% higher in Waimate and 5.9% higher across Timaru and Waitaki.

- Construction – GDP: Construction of Project Kea is estimated to add \$93.9 million (in 2021 prices) to the gross domestic product (“GDP”) of Waimate, Waitaki and Timaru Districts annually over the 2-year construction period. This includes a \$4.8 million annual increase in Waimate District and a \$89.1 million annual increase across Timaru and Waitaki over the construction period.
- Operation – job creation: operation of Project Kea will support 165 full time equivalent jobs. This will increase employment in Waimate District by 3.6%, and employment across Timaru and Waitaki Districts by 0.2%. The employment benefits are most pronounced in the electricity, gas, water and waste services industry as it includes 100 jobs at the Project Kea facility itself.
- Operation – employment in service industries: Project Kea will increase employment across transport, postal and warehousing by adding 18 jobs across Timaru and Waitaki Districts, reflecting contractors involved in logistics operations at the Project Kea facility. Construction employment will increase two jobs in Waimate and 11 jobs across Timaru and Waitaki Districts associated with electrical contractors, landscapers, and other maintenance personnel connected to maintaining the Project Kea facility. Demand for these industries spurs on additional demand for their suppliers, while increases in household incomes will further raise demand for industries such as retail, administrative, food and other services.

- Operation – increase in GDP: operation of Project Kea will contribute \$77.3 million per year to GDP of Waimate, Timaru and Waitaki Districts. \$48 million is estimated to be added directly to Waimate District's economy

6.18.3 Energy security

- Will provide an “embedded generation” capacity within the local electricity supply network.
- Increases security of supply of electricity to both residential and commercial customers.
- Provides opportunity for growth of both industry and the community due to increased supply of electricity.

6.18.4 Recycling of By-products

Project Kea produces a number of by-product streams that are able to be recycled and have commercial value. These are:

- Grate Ash and Vitriified Fly-Ash:

These ash products are the result of combustion. In other parts of the world, these ash products are used as a substitute for aggregate in roading manufacture. Currently in New Zealand, grate ash is sent to landfills. SIRRL supports a more sustainable solution. SIRRL is in discussions with a significant industrial consumer of aggregate, who is in the process of testing the ash products with a view of enabling its use within the New Zealand roading and construction sector. Recycling grate ash as an aggregate would potentially reduce the extraction from quarries of 80,000 tonnes per year and thereby extending the lifespan of the existing quarries.

- Gypsum, Sodium Chloride, Potassium Chloride:

These products result from the cleaning of the emissions from the fly-ash vitrification process. These are common products, used in in fertiliser manufacture. SIRRL is in discussions with a fertiliser manufacturing company, who currently imports these products from around the world. Having these products ‘made’ locally will replace some of imported materials, thus improving New Zealand's self-sufficiency.

- Ferrous and Non-ferrous metals:

Both ferrous and non-ferrous metals are recovered from the grate ash and vitrified fly ash streams. These metals will be supplied to recyclers.

7 ASSESSMENT OF ALTERNATIVE LOCATIONS, METHODS AND BEST PRACTICABLE OPTIONS

7.1 Introduction

Under clause 6(1)(a) of Schedule 4 of the RMA, if an activity will likely result in any significant adverse effects on the environment, a description of any possible alternative sites or methods for undertaking the activity must be included in the application. While the assessment of this report is that, overall, the activity will not result in “significant” adverse effects, this section still provides an assessment under this clause for completeness.

Additionally, 105(1) of the RMA states that for a resource consent application for a discharge permit that would contravene section 15 or section 15B, the consent authority must, in addition to section 104(1), have regard to:

- a) The nature of the discharge and the sensitivity of the receiving environment to adverse effects; and
- b) The applicant’s reasons for the proposed choice; and
- c) Any possible alternative methods of discharge, including discharge into other receiving environment.

7.2 Alternative locations

The applicant undertook a comprehensive site selection process before selecting the Project Kea site for the proposed activity. The site selection criteria were given careful consideration, and it included matters such as:

- Access to SH1.
- Access to a railway line.
- Access to water.
- Access to power connection (and export power).
- Air shed capacity.
- Flood hazards.

- The location of the site geographically within the South Island.

Based on meeting the key site selection criteria, the Project Kea site was selected, as it has the following locational benefits:

- Project Kea site is of a sufficient land area to enable the construction of buildings and the infrastructure required to service the development.
- Adjoins a railway line to enable waste feedstock to be delivered by rail.
- Appropriate boundary length with the railway line to enable a rail siding to be constructed.
- Appropriate site setback from SH1 to ensure accessibility, without disrupting the local road network.
- Availability of water
- Appropriate Airshed requirements.
- Supportive electricity network provider.
- Centrally located within the South Island for waste feedstock serviceability point of view.
- Adequate buffer distances to neighbouring properties.
- Suitable terrain and topography.
- Avoiding areas identified as being archaeological sites, culturally significant sites, ecological or landscape significance based on the available planning documents.
- Land without complexity of land ownership and title encumbrances in terms of land acquisition matters.

7.3 Assessment of alternatives – domestic wastewater discharge to land

The following alternative solutions for treating and disposing of domestic wastewater from the Project KEA site have been identified:

- Option 1: Piped connection to an existing municipal wastewater system

This option was deemed not to be a viable option due to the distance of the Project KEA site to the nearest potential municipal reticulated system (being approximately 20km (Waimate)); and considering the significant challenges involved in piping the wastewater over this distance.

- Option 2: Storage tanks and daily removal from site by tanker

Treated wastewater could be stored on site in a 30,000lt underground tank and then transferred by truck to a municipal treatment facility when the tank approaches full (approximately every 5 days). However, given the transport component, and the fact that the Waimate treatment plant also disposes to land, it is considered that this option does not provide any environmental benefits over local treatment and disposal on site.

- Option 3: discharge to land within the Project Kea site

This option was deemed to be the most efficient and sustainable solution, and preferred option for the reasons set out in the Domestic Wastewater Discharge to Land Report.

7.4 Best practice emission control

The Air Quality Emissions Assessment confirms that all components of the flue gas treatment system constitute Best Available Techniques “**BAT**”, as identified by the European Commission published document for waste incineration for the control of emissions from the activity, including the control of discharges to air. The Air Quality Emissions Assessment also confirms that a conservative approach has been taken in the modelling of the pollutants’ discharges.

8 ASSESSMENT OF STATUTORY DOCUMENTS

8.1 Introduction

Section 104(1)(b) of the RMA states that subject to Part 2, regard must be had to the provisions of the relevant statutory documents. This section assesses the relevant statutory documents. The assessment is informed by the information presented earlier in this Planning Report and the accompanying Technical Reports. This application is subject to a range of statutory planning documents, as detailed below.

8.2 Part 2 of the RMA

Part 2 of the RMA sets out the Act's purpose and principles. Any consideration of an application under section 104(1) of the RMA is subject to Part 2.

The Court of Appeal in *R J Davidson Family Trust v Marlborough District Council* [2018] NZCA 316 held that, in considering a resource consent application, the statutory language under section 104 plainly contemplates direct consideration of Part 2 matters, when it is appropriate to do so. Further, the Court considered that where a plan has been competently prepared under the RMA, it may be that in many cases there will be no need for the Councils to refer to Part 2. However, if there is doubt that a plan has been "competently prepared" under the RMA, then it will be appropriate and necessary to have regard to Part 2. That is the implication of the words "subject to Part 2" under section 104(1) of the RMA.

In the context of the application, where the objectives and policies of the relevant statutory documents were prepared having regard to Part 2 of the RMA, they capture all relevant planning considerations and contain a coherent set of policies designed to achieve clear environmental outcomes. They also provide a clear framework for assessing all relevant potential effects.

However, while an assessment against Part 2 is not necessarily required for the application, one is still provided for completeness.

Section 5 – Purpose

Section 5 of the RMA sets out the purpose of the RMA and requires a broad judgement as to whether the proposal would promote the sustainable management of the natural and physical resources. The exercise of judgement is informed by the principles of sections 6 to 8 and considered in light of the particular circumstances of each application.

With respect to section 5, it is considered that:

- Project Kea provides for the social, economic and cultural well-being of the community by providing a waste management solution that reduces the demand for land to be used for waste disposal purposes, thereby sustaining the potential of this land resource to meet the needs of future generations, while avoiding, remedying and mitigating the adverse effects on the environment.
- The air dispersion modelling result predict that the maximum off-site concentrations are below the relevant assessment criteria, and are unlikely to result in any adverse health effects. This ensures the safeguarding of the life-supporting capacity of air.

Project Kea sustainable The Human Health Risk Assessment concludes that risk to health and safety of people and communities will be negligible.

- Project Kea proposal includes transport improvements to ensure the safe operation of the roading network, thereby providing for health and safety of the people and communities using the local roading network.
- The noise effects of Project Kea are considered reasonable under the RMA, and will comply with the relevant noise standard, thereby ensuring that the development enables people and communities to provide for their health and safety.
- The landscape effects of Project Kea are proposed to be mitigated using landscape planting and use of building materials and colours.
- Project Kea safeguards the life supporting capacity of water, by ensuring that the construction methodology ensures that there are no significant effects on water quality and quantity of surface water bodies and groundwater.
- Project Kea safeguards the life supporting capacity of surface and groundwater, by ensuring that stormwater and domestic wastewater is appropriately treated prior to discharge to land.
- Project Kea safeguards the life supporting capacity of groundwater by ensuring that the waste bunker is designed to avoid adverse effects on groundwater, and mitigation is provided via appropriate monitoring measures.

- Project Kea safeguards the life-supporting capacity of air, water, soil and ecosystems and the health and safety of people and communities by giving priority to the avoidance of accidental spillage; and second priority to ensuring that where there is a residual risk of discharge (including accidental spillage), it is contained on-site and is not discharged into the environment (such as not entering surface water bodies, groundwater or stormwater systems).
- Project Kea development will avoid adverse effects on the National Grid, thereby, enabling people and communities to provide for their social, economic and cultural well-being.

Section 6 – Purpose

Section 6 of the RMA sets out a number of matters of national importance which must be recognised and provided for. With respect to Project Kea, it is noted that:

- *Section 6(a)*: Project Kea preserves and enhances the natural character of Whitneys Creek and ensures that it is appropriately protected from the effects of the proposed development.
- *Section 6(b)*: Project Kea site is not located within an area classified as an Outstanding Natural Landscape or Feature.
- *Section 6(c)*: Project Kea site does not contain areas of significant indigenous vegetation or significant habitats of indigenous fauna.
- *Section 6(e)*: The applicant is committed to working with Mana Whenua to recognise the relationship of maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu and other taonga.
- *Section 6(h)*: Project Kea appropriately manages significant risk of natural hazards.

Section 7 – Other matters

Section 7 identifies a number of “other matters” to be given particular regard to by a territorial authority. With respect to section 7, it is noted that:

- *Sections 7(a) and (aa)*: the applicant is committed to working with Mana Whenua to enable the consideration of kaitiakitanga and the ethic of stewardship.
- *Section 7(b) and (g)*: Project Kea enables the efficient use of land resources by reducing the need for land (as a finite and valuable natural resource) to be used for waste management purposes.

- *Section 7(ba) and (i)*: the Lifecycle Analysis Report concludes that Project Kea would deliver overall environmental benefits for global warming potential impact category assessed over the baseline scenario (landfill disposal)
- *Section 7(c) and (f)*: The built form, site layout and the use of technology within the Project Kea facility has been designed and carefully selected to ensure that any adverse effects on amenity values within the receiving environment are appropriately managed.
- *Sections 7(d)*: The site layout of Project Kea ensures that there are no adverse effects on the intrinsic values of the Whitney Creek environments.
- *Section 7(j)*: Project Kea will use MSW to generate 30MW of electricity under Output Mode 1 or 20MW of electricity plus 40 tonnes per hour of steam under Output Mode 2. Based upon the expected feedstock composition, it is anticipated that the electricity generated from Project KEA will be in the order of 63% renewable.

Section 8 – Treaty of Waitangi (Te Tiriti o Waitangi)

Section 8 requires the principles of Treaty of Waitangi (Te Tiriti o Waitangi) to be taken into account. With respect to Section 8, the applicant acknowledges the importance of Mana Whenua participation in this resource consent process. The applicant supports the preparation of a Cultural Impact Assessment and is committed to engaging with Mana Whenua in a meaningful way.

8.3 Resource Management (National Environmental Standards for Air Quality) Regulations 2004

The purpose of the NESAQ is to ensure a minimum level of health protection across New Zealand. The NESAQ consists of 14 separate but interlinked standards, including:

- Standards banning activities that discharge significant quantities of toxins;
- Standards for ambient outdoor air quality;
- Standards for new wood burners in urban areas; and
- Standards for large landfills to collect greenhouse gas emissions.

It is noted that NESAQ prohibits the use of “High temperature hazardous waste incinerators” under Regulation 12. “High temperature hazardous waste incinerator” is defined as follows in the NESAQ:

“means an incinerator that is designed and operated principally for burning hazardous waste at a temperature greater than 850°C as measured—

(a) near the inner wall of the incinerator; or

(b) at another point in the combustion chamber where the temperature is likely to represent the temperature in the incinerator”.

“Hazardous waste” is also a defined term in the NESAQ:

“means waste that—

(a) belongs to 1 or more of the categories in Annex I of the Basel Convention; and

(b) has 1 or more of the characteristics in Annex III of that Convention”

Waste Acceptance Criteria states that Project Kea will not accept hazardous waste (as defined in the NESAQ). Therefore, the proposed EfW Plant is not deemed to be “high temperature hazardous waste incinerator”.

However, it is noted that very small quantities of domestic use of hazardous waste may be present within the MSW. While this small stream of waste is referred to as “hazardous” as a general use of the term, MSW is not waste as per the definition of “hazardous waste” in the NESAQ (which includes: waste from clinical care in hospitals, waste from production of pharmaceutical product etc).

It is further noted that the *Landfill Guidelines*, dated April 200, published by the Centre for Advanced Engineering, recognises that:

“municipal solid waste is likely to contain a small portion of hazardous waste from households and small commercial premises that standard waste screening procedures will not detect. However, this quantity should not generally exceed 200 ml/tonne or 200 g/tonne.”

While the MSW stream may have a small portion of hazardous waste from domestic type of use (to acceptable levels), Project Kea is not a “High temperature hazardous waste incinerator” as defined in the NESAQ (which is targeted to capture true hazardous waste incinerators).

The Air Quality Emissions Assessment (Technical Report 5) undertakes an assessment of the potential air quality effects associated with Project Kea. The Air Quality Emissions Assessment concludes that Project Kea meets the requirements of NESAQ.

8.4 Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011

The NESCS seeks to ensure that land affected by contaminants in soil is appropriately identified and assessed. When soil disturbance and/or land development activities take place it should be, if necessary, remedied or the contaminants contained to make land safe for human use. The Preliminary Site Investigation Report (Technical Report 2) concludes that the development of Project Kea is highly unlikely to pose risk to human health, and pursuant to Regulation 8(4)(b) of the NESCS, the change in the use of the land to enable the construction of the EfW Plant is a Permitted Activity

8.5 Resource Management (National Environmental Standards for Freshwater) Regulations 2020

The NES-F regulates activities that pose risks to the health of freshwater and freshwater ecosystems through the setting of requirements for carrying out these activities that must be complied with. The purpose of the NES-F is to:

- Protect existing inland and coastal wetlands;
- Protect urban and rural streams from in-filling;
- Ensure connectivity of fish habitat (fish passage);
- Set minimum requirements for feedlots and other stockholding areas;
- Improve poor practice intensive winter grazing of forage crops;
- Restrict further agricultural intensification until the end of 2024; and
- Limit the discharge of synthetic nitrogen fertiliser to land and require reporting of fertiliser use.

There are no wetlands on the Project Kea site, nor in its proximity. The proposed works associated with Project Kea do not trigger the need for approval under the NES-F.

8.6 National Policy Statement for Freshwater Management 2020

The NPS-FM sets a national framework for how freshwater is to be managed. Te Mana o te Wai is the tenet of the NPS-FM. The objective of the NPS-FW is to ensure that natural and physical resources are managed in a way that prioritises:

- First, the health and wellbeing of water bodies and freshwater ecosystems;
- Second, the health needs of people (such as drinking water); and
- Third, the ability of people and communities to provide for their social, economic, and cultural wellbeing, now and into the future.

The Project Kea site adjoins Whitneys Creek, which is located along the northern boundary on the adjoining site. Overall, Project Kea is considered to be consistent with the NPS-FM and gives effect to the relevant objectives and policies as follows:

- Careful thought has been given to the site layout to ensure that the main powerhouse, waste truck access and all the other associated buildings are located centrally on the site, and away from Whitneys Creek. The is to ensure adequate separation is maintained between the main powerhouse and Whitneys Creek, thereby the health and wellbeing of Whitneys Creek is prioritised.
- Policy 3 of the NPS-FM requires that freshwater is managed in an integrated manner that considers the effects of the use and development of the land on a whole-of-catchment basis, including the effects on the receiving environment. In the context of Project Kea, a stormwater management strategy for the site has been prepared to ensure that land use planning is integrated with stormwater management strategy for the site (both during the construction and operation phases), so that the effects on the environment are considered holistically.
- Furthermore, it is noted that the EfW Plant does not produce a process wastewater stream, as process wastewater is recycled within the Plant. This avoids the need for process wastewater to be discharged to land, thereby avoiding all adverse effects on Whitneys Creek, being the closest freshwater receiving environment.

- Project Kea will not result in any loss of river extent, instead, it ensures that the ecological values of Whitneys Creek are enhanced. The Landscape Mitigation Plan proposes a 20m deep band of lowland shrub planting and kahikatea along Project Kea site's northern boundary, beside Whitneys Creek. This will provide landscaped buffer between the Project Kea site and Whitneys Creek, thereby enhancing the biodiversity within the stream environments.

Overall, Project Kea will enhance the Whitneys Creek environments.

8.7 National Policy Statement on Electricity Transmission 2008

The NPS-ET sets out provides a high-level framework that gives guidance for the management and future planning of the national grid. It states that the need to operate, maintain, develop and upgrade of the electricity transmission network is a matter of national significance. The objective of NPS-ET is to recognise the national significance of the electricity transmission network, while managing the adverse environmental effects of the network; and managing the adverse effects of other activities on the network.

Project Kea site is located in proximity of the National Grid infrastructure. Project Kea complies with the setback requirements for buildings and structures in proximity to the National Grid infrastructure as specified in the WDP. Project Kea also complies with the minimum safe distances for construction of buildings as stipulated in the New Zealand Electrical Code of Practice for Electrical Safe Distances (NZECP 34:2001). Therefore, Project Kea will not have an adverse effect on the National Grid infrastructure.

8.8 National Policy Statement on Renewable Electricity Generation 2011

The NPS-REG recognises the national significance of renewable electricity generation activities by providing for development, operation, maintenance and upgrading of new and existing renewable electricity generation activities, such that the proportion of New Zealand's electricity generated from renewable energy resources increases to a level that meets or exceeds the New Zealand Government's national target for renewable electricity generation.

The NPS-REG defines the term "renewable electricity generation" as:

"means generation of electricity from solar, wind, hydro-electricity, geothermal, biomass, tidal, wave, or ocean current energy sources". (underlined for emphasis).

Project Kea will generate 30MW of electricity under Output Mode 1 or 20MW of electricity plus 40 tonnes per hour of steam under Output Mode 2. The generated electricity will be connected to the local supply network. The waste feedstock for Project Kea will include both MSW and C&D waste, both of which contain a portion of biomass material. Based upon the expected feedstock composition as given in Technical Report 1 – Operational and Technical Overview, it is expected that the electricity generated from Project KEA will be in the order of 63% renewable.

8.9 National Policy Statement for Highly Productive Land 2022

The NPS-HPL came into force on 17 October 2022. The objective of NPS-HPL is to ensure that “Highly productive land is protected for use in land-based primary production, both now and for the future”.

The NPS-HPL requires every regional council (no later than 3 years after the commencement date) to map as highly productive land any land in its region that:

- Is in general rural zone or rural production zone; and
- Is predominantly LUC 1, 2, or 3; and
- Forms a large and geographically cohesive area.

Noting the very recent commencement of the NPS-HPL, a transitional definition of highly productive land applies until the councils complete the process of mapping highly productive land at a regional level. Under clause 3.5(7) of the NPS-HPL, the transitional definition of highly productive land is:

- “(a) is
- (i) zoned general rural or rural production; and
 - (ii) LUC 1, 2 or 3 land; but
- (b) is not:
- (i) identified for future urban development; or
 - (ii) subject to a Council initiated, or an n adopted, notified plan change to rezone it from general rural or rural production to urban or urban lifestyle.”

As the Project Kea site is zoned rural, it is partially captured in the transitional definition under (a)(i). The second part of the definition relates to the Land Use Capability classes. The NES-HPL defines LUC 1, 2 and 3 land as:

“means land identified as Land Use Capability Class 1, 2, or 3, as mapped by the New Zealand Land Resource Inventory or by any more detailed mapping that uses the Land Use Capability classification”. (underlined for emphasis).

The definition of “LUC 1, 2 and 3 land” enables the use of the Land Use Capability classification to inform a more detailed mapping to be completed. In accordance with this definition, a Land Use Capability Assessment (“**LUC Assessment**”) (Technical Report 19) has been completed for the Project Kea site.

The LUC Assessment explains that a site investigation was carried out using methods based on the national land classification system used by soil conservators for farm planning since the 1950s. The purpose of the LUC Assessment was to determine the Land Use Capability classes, subclasses, and distribution at the Project Kea site.

The findings of the LUC Assessment are:

- **Figure 36** illustrates the distribution of the LUC classes on the Project Kea site.

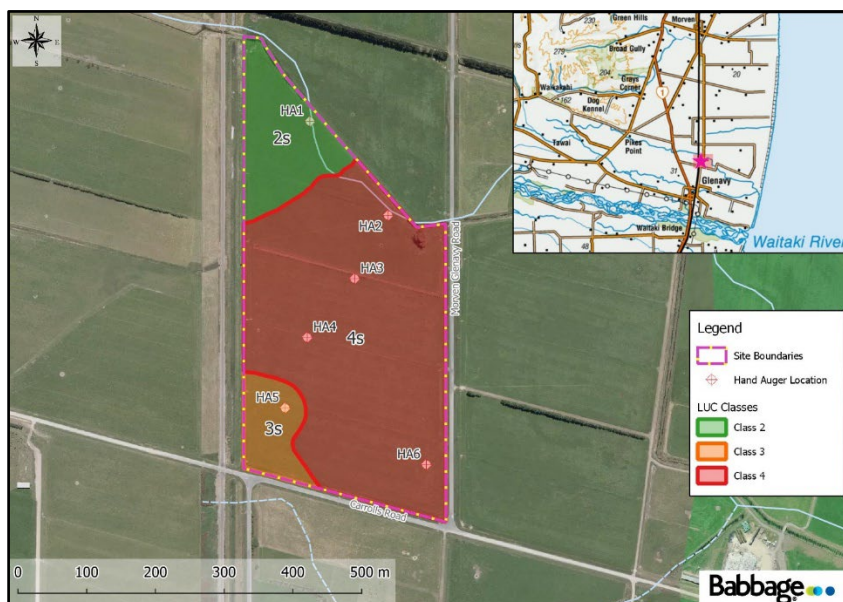


Figure 36: Distribution of LUC Classes on the Project Kea site based on site investigation.

- The summary of the distribution of the LUC classes on the Project Kea site are set out in **Table 31** below:

Table 31. LUC Class distribution at the Site

LUC Class	LUC subclass	Site area (m ²)	Site area (ha)	Percentage of the site area
2	S	24,153	2.42	16%
3	S	12,171	1.22	8%
4	S	114,760	11.48	76%

- The north-west corner of the Project Kea site contains LUC class 2 soil. The profile of these soils was described to 60 cm and consisted predominantly of silt loam with a moderate to strong structure in the topsoil and a weakly structured to structureless subsoil (>30 cm). Below 20 cm the soil was hard to penetrate with the auger, typical for pallic soils, and showed mottling, which is an indication of imperfect drainage. It is assumed that the higher elevated north-west corner of the site (south of the creek) indicates the distribution of these deeper soils, in line with the geomorphology of fluvial fans and braided riverbeds. Class 2s has slight limitations for arable use.
- The south-west corner of the Project Kea site contains LUC class 3 soil. The soil profile was of 30 cm of slightly gravelly (5-15% gravel) loamy silt on top of very gravelly (35-70% gravel) loamy silt. This corner of the site was slightly elevated (to a lower extent than the north-west corner described above). LUC class 3 soil has moderate limitations for arable use.
- The remainder of the site (76%) contains LUC class 4 soil. It contains slightly gravelly silt loam on top of very gravelly silt loam, with the very gravelly layer within 20 cm of the surface. LUC class 4 soil has “significant limitations for arable use or cultivation”.

Noting that 76% of the Project Kea site consists of LUC class 4 soils, overall, Project Kea is considered to be consistent with the NPS-HPL and gives effect to the relevant objectives and policies as follows:

- Aligned with the expectations of the NPS-HPL, a detailed mapping of the Project Kea using Land Use Capability classification has been completed. Consistent with clause 3.4(3), this assessment has had regard to the soil type, physical characteristics of the land and soil, and climate of the area.

- The LUC Assessment has concluded that 76% of the Project Kea site contains LUC class 4 soils. Therefore, the Project Kea site is not captured under the transitional definition of “highly productive land” set out in clause 3.5(7) of the NPS-HPL.
- While the significant majority of the Project Kea site is assessed to contain LUC class 4 soils, it also contains small areas of LUC classes 2 and 3. Clause 3.4(5) of the NPD-HPL sets out the guidance for the purposes of mapping of the LUC where there may be multiple LUC classes on areas of land:
 - Clause 3.5(b) states that “where possible, the boundaries of large and geographically cohesive areas must be identified by reference to natural boundaries (such as the margins of waterbodies, or legal or non-natural boundaries (such as roads, property boundaries, and fence-lines”.
 - Clause 3.5(c) states that “small, discrete areas of land that are not LUC 1, 2 or 3, but are within a large and geographically cohesive area of LUC 1, 2, or 3 land, may be included; and
 - Clause 3.5(d) states that “small, discrete areas of LUC 1, 2, or 3 need not be included if they are separated from any large and geographically cohesive area of LUC 1, 2, or 3 land”.

In particular clauses 3.5(b) and (d) are of relevance to the Project Kea site. The small parcels of LUC classes 2 and 3 soils on the Project Kea site are separated from the adjoining sites by the railway line, Whitneys Creek, legal property boundary and a road. In accordance with clause 3.5(d), these “small and discreet areas” of LUC classes 2 and 3 soils on the Project Kea site should not be included in the mapping of “highly productive land”, as these are “separated from large and geographically cohesive LUC 1, 2, or 3 land”. Therefore, the entirety of the Project Kea site is deemed not to be classified as “highly productive land”.

Overall, it is concluded that Project Kea aligns with the entirety of the NPS-HPL in that it is not located on land classified as highly productive land, and therefore, ensures that highly productive land is protected for use in land-based primary production, both now and into the future.

8.10 Canterbury Regional Policy Statement 2013

The CRPS achieves the purpose of the RMA by providing an overview of the resource management issues of the Canterbury Region and objectives, policies and methods to achieve the integrated management of natural and physical resources of the Canterbury. The CRPS was in place prior to the development of the relevant plans which currently determine planning approvals required for Project Kea. Accordingly, in our view, the relevant chapters of the CRPS are already incorporated in the CARP and CLWRP, but for completeness the relevant provisions of the CRPS is discussed below.

Chapter 4 (Provision for Ngāi Tahu and their relationship with resources) provides for Ngāi Tahu and their relationship with resources by setting out the tools and processes that the ECAN will use to engage with Ngāi Tahu as tāngata whenua in the management of natural and physical resources. Objective 4.3.7 states that on a case-by-case basis, ECAN should seek a cultural impact assessment or cultural values assessment as part of the assessment of environmental effects where an application is likely to impact on a significant resource management issue for Ngāi Tahu. In this regard, the applicant has been advised that Aukaha on behalf of Te Rūnanga o Waihao, with input from Te Rūnanga o Arowhenua, Te Rūnanga o Moeraki and Te Rūnanga o Ngai Tahu is to prepare a Cultural Impact Assessment. The applicant will provide the full resource consent application package to Aukaha following lodgement to enable the Cultural Impact Assessment to be prepared to inform the resource consent process for Project Kea.

Chapter 5 (Land-use and Infrastructure) focuses on development which results in changes to urban, rural-residential and rural areas, together with the infrastructural services which support that development. Chapter 5 also has a focus on recognising the importance of regionally significant infrastructure to a community's economic wellbeing, health and safety; and the need to provide for its establishment, retention and enhancement, as appropriate.

Arguably this policy, has relevance in an urban setting where properties are “served” by local or regional infrastructure. For Project Kea, the land use component and its infrastructure servicing needs have been considered in an integrated manner. The infrastructure needs of Project Kea (water supply, domestic wastewater and stormwater disposal) are all able to be serviced on site, without a need for reliance on a reticulated system. With respect to factory process wastewater disposal, the EfW Plant has been designed to recycle this waste stream, and therefore, removing the need for wastewater disposal systems off-site or as part of a reticulated network.

Chapter 7 focuses on freshwater. Objective 7.2.1 identifies the values and uses of freshwater that must be provided for and their relativity, to promote sustainable management of freshwater. Objective 7.2.2 and 7.2.3 set further goals for how water will be managed to provide for the values and uses set out in Objective 7.2.1. Project Kea aligns with the relevant objectives and policies as follows:

- Potential effects of Project Kea on the freshwater resources (both on quantity and quality), in particular on groundwater and on Whitneys Creek, has been considered in an integrated manner as part of the EfW Plant design and site layout, bulk earthworks design, domestic wastewater disposal system and the stormwater management strategy for the site.
- Project Kea proposes to recycle factory wastewater within the EfW Plant, thereby avoiding all adverse effects associated with the discharge of this waste stream on the freshwater systems.
- The Surface and Groundwater Assessment has been undertaken to ensure that adverse effects on the quality and quantity of freshwater systems is appropriately avoided, remedied or mitigated.
- Project Kea will enhance the freshwater environments and biodiversity for Whitneys Creek.

Chapter 11 provides a framework for managing natural hazard risk in Canterbury. The provisions seek to ensure that inappropriate development is not located in areas where natural hazards are mostly likely to occur. Where development must occur in areas subject to natural hazards, the potential adverse effects of those natural hazards are mitigated or managed by appropriate design and placement of structures and facilities. With respect to Project Kea, flooding is the key natural hazard risk identified for the site. A Flood Risk Assessment Report has been prepared to model the post-development scenario to appropriately manage this risk. Based on the findings of the Flood Risk Assessment Report, it is considered that the flood risk hazards resulting from the development of the Project Kea site are acceptable and will not significantly exacerbate the risk of flooding or damage on the adjoining properties and the overall effects will be minor.

Chapter 14 focuses on air quality. It seeks to ensure that the ambient and air quality meet the CO, NO₂, SO₂ and O₃ concentrations as set out in the NESAQ. It also seeks to ensure that the ambient air quality will improve in identified areas (including Timaru, Geraldine and Waimate) to meet the NESAQ for PM₁₀ concentrations; and that incompatible discharges to air and land-uses will be appropriately separated. With respect to Project Kea, the Air Quality Emissions Assessment concludes that Project Kea meets the

requirements of NESAQ, and that it is unlikely to result in adverse health effects at any sensitive receptors at or beyond the Project Kea boundary. Therefore, the proposal is consistent with the applicable objectives and policies of the CRPS.

Chapter 16 focuses on energy. It seeks to ensure that Canterbury's energy supply will be more diverse, with a greater proportion of renewable energy supply based on a greater variety of renewable energy sources. It also seeks to ensure that there is a greater use of small-scale distributed energy production. Project Kea will generate 30MW of electricity under Output Mode 1 or 20MW of electricity plus 40 tonnes per hour of steam under Output Mode 2. The generated electricity will be connected to the local supply network. The waste feedstock for Project Kea will include both MSW and C&D waste, both of which contain a portion of biomass material. Based upon the expected feedstock composition set out in Operational and Technical Overview Report, it is expected that the electricity generated from Project KEA will be in the order of 63% renewable. Project Kea contributes towards the objective of having a greater variety of renewable energy sources.

Chapter 19 (Waste Minimisation and Management) is of key relevance to Project Kea. The objectives seek to: minimise the generation of waste and minimise the adverse effects of waste.

The policies seek to:

- Apply the waste management hierarchy to all waste streams.
- Promote change of behaviour that will result in reduction of waste at source.
- Promote an integrated approach to waste management in the region.
- Enable the establishment of and use of appropriate communities' facilities and services such as waste-transfer facilities and recycling centres throughout the region.

Project Kea fits into the broader policy framework for waste management and minimisation as explained in Section 2 of this Planning Report.

8.11 Canterbury Air Regional Plan 2017

The CARP seeks to manage discharges to air in the best practicable manner. Its principal purpose is to maintain air quality where it provides for people's health and cultural wellbeing, or to improve it if it does

not, whilst recognising the investment in, and significant contribution to the economy and social wellbeing of the Canterbury of industrial and trade activities that discharge to air.

An evaluation of the relevant objectives and policies of the CARP is set out in **Table 32**.

Table 32: *Evaluation of the relevant objectives and policies of the CARP.*

Objective/Policy	Comment
<ul style="list-style-type: none"> ● Objective 5.1: Air quality protects the mauri and life supporting capacity of the environment. ● Objective 5.2 Ambient air quality provides for the health and wellbeing of the people of Canterbury. 	<p>The proposal aligns with these Objectives, as the Air Quality Emissions Assessment concludes that it is unlikely the proposal will result in adverse health effects due to air emissions from the Project Kea operations.</p>
<ul style="list-style-type: none"> ● Objective 5.4 Degraded ambient air quality is improved over time and where ambient air quality is acceptable it is maintained. ● Policies 6.4 – 6.6 	<p>The Air Quality Emissions Assessment concludes that the air dispersion modelling results predict that the maximum off-site combustion emission concentrations are below the relevant assessment criteria, the magnitude of change in the ambient air quality will be less than minor or negligible.</p>
<ul style="list-style-type: none"> ● Objective 5.5 Air quality is managed in a way that provides for the cultural values and traditions of Ngāi Tahu. ● Policy 6.2 	<p>The applicant supports the preparation of a Cultural Impact Assessment to inform this resource consent application.</p>

<ul style="list-style-type: none"> Objective 5.6 <p>Amenity values of the receiving environment are maintained.</p> <ul style="list-style-type: none"> Policy 6.28 	<p>The proposal aligns with this Policy, as the Air Quality Emissions Assessment concludes that there will be negligible adverse effects associated with odour emissions from Project Kea operations. With respect to dust deposition, the Air Quality Emissions Assessment concludes that the predicted dust deposition values will be below the MfE guidance.</p>
<ul style="list-style-type: none"> Objective 5.7 <p>Discharges from new activities are appropriately located to take account of adjacent land uses and sensitive activities.</p> <ul style="list-style-type: none"> Policy 6.9 	<p>The Air Quality Emissions Assessment has identified and assessed the effects of the proposed air discharges on the “sensitive receptors” in the proximity of the Project Kea site, and receptors in the closest towns. It concludes that Project Kea is unlikely to result in adverse effects on any sensitive receptors at or beyond the Project Kea site.</p>
<ul style="list-style-type: none"> Objective 5.9 <p>Offensive and objectionable effects and noxious or dangerous effects on the environment are generally avoided.</p>	<p>The Air Quality Emissions Assessment has not identified any offensive, objectionable, noxious or dangerous effects on the environment resulting from Project Kea that are required to be avoided.</p>
<ul style="list-style-type: none"> Policy 6.1 <p>Discharges of contaminants into air, either individually or in combination with other discharges, do not cause diverse effects on human health and wellbeing; or</p> <p>on the mauri and life supporting capacity of ecosystems, plants or animals; or</p> <p>significantly diminished visibility; or</p> <p>significant soiling or corrosion of structures or property.</p>	<p>Project Kea aligns with this Policy, as the Human Health Risk Assessment Report concludes that the adverse effects on human health, water quality in rainwater tanks and impacts on crops and produce are considered to be negligible.</p>

<ul style="list-style-type: none"> Policy 6.22 <p>Discharges from industrial activities shall identify the best practicable option to be adopted to minimise effects.</p>	<p>Project Kea will utilise the proven best available techniques defined by the Industrial Emissions Directive 2010/75/EU to minimise off-site effects.</p>
<ul style="list-style-type: none"> Policy 6.25 <p>Discharges from industrial activities shall address: discharges including PM₁₀; localised effects on location of sensitive receptors; mitigation and emission control options; duration of consent.</p>	<p>The Air Quality Emissions Assessment has identified and assessed the effects of the proposed air discharges on the “sensitive receptors” in the proximity of the Project Kea site, and receptors in the closest towns. It concludes that Project Kea is unlikely to result in adverse effects on any sensitive receptors at or beyond the Project Kea site.</p> <p>With respect to PM₁₀, the Air Quality Emissions Assessment states that the predicted 24-hour and annual average PM₁₀ concentrations, including background concentrations, are below the assessment criteria at all sensitive receptor locations.</p>

8.12 Canterbury Land and Water Regional Plan

The purpose of the CLWRP is to identify the resource management outcomes or goals for managing Canterbury’s land and water resources to achieve the purpose of the RMA.

An evaluation of Project Kea against the relevant objectives and policies in the CLWRP is set out below.

Discharge of contaminants to land or water (Policies 4.12 – 4.14B)

Project Kea aligns with policies relating to discharge of contaminants to land or water as follows:

- There are no direct discharges proposed to surface water bodies or groundwater of untreated sewerage, wastewater, hazardous waste, organic waste or leachate or untreated industrial or trade waste.

- Both the proposed stormwater discharge to land and domestic wastewater discharge to land ensure that the systems are designed to treat contaminants prior to discharge.
- There is no direct discharge of treated domestic wastewater to surface water or groundwater. The proposed discharge will not exceed the natural capacity of the soil to treat or remove the contaminant, and will not exceed the available water storage capacity of the soil.

Earthworks, land excavation and deposition of materials into land over aquifers (Policies 4.18 – 4.19)

- The loss or discharge of sediment or sediment-laden water and other contaminants from earthworks is proposed to be avoided, and if not achievable, the proposal uses best practicable option to minimise the loss or discharge to water.
- The proposed earthworks and land excavations are designed to avoid the contamination of groundwater.

Hazardous substances (Policies 4.25)

- The storage and use of hazardous substances on the Project Kea site will use the best practicable option, with first priority being to avoid accidental spillage; and second priority being to ensure that where there is a residual risk of discharge (including accidental spillage), it is contained on-site and is not discharged into the environment (such as not entering surface water bodies, groundwater or stormwater systems).

Site dewatering (Policies 4.76)

- During the dewatering activities, water is expected to be discharged onto the paddocks at the northern portion of site, between the excavated areas and Whitneys Creek. As water is expected to be fully returned to the aquifer, it is unlikely that there will be any significant effects to groundwater quantity.

8.13 Waimate District Plan

The WDP assists the WDC in exercising its functions under the RMA, to manage the specific resource management issues of the district.

An evaluation of Project Kea against the relevant objectives and policies in the WDP set out below.

Section 4- Rural Zone

- Objective 6 seeks to maintain a level of rural amenity which is anticipated in rural areas. The Landscape Assessment Report concludes that:
 - With Project Kea, a level of rural amenity would be maintained that is consistent with the range of activities anticipated in the Rural Zone.
 - Project Kea will not create unacceptably unpleasant living or working condition for the District's residents and visitors.
 - Project Kea will not result in a significant deterioration of the quality of the rural environment.
 - The amenity and character of the wider environment in which Project Kea is to be located would be substantially maintained, with adverse effects largely confined to the area immediately around the main powerhouse building and the stack.
- In alignment with Objective 7, Project Kea proposes to enhance the Whitney's Creek environments.
- In alignment with Objective 8, Project Kea proposes to mitigate the effects of flooding on the Project Kea site via earthworks design.
- In alignment with Objective 13, Project Kea avoids adverse effects on the National Grid infrastructure.
- Policy 6I recognises that the "Rural Zone may be the most appropriate environment for some utility, industrial, service or commercial uses to establish, provided the amenity and character of the rural area is maintained". The resource consent application includes a range of supporting reports, which collectively reach the conclusion that with the establishment of Project Kea, the amenity and character of the rural environment will be maintained.

Section 7 - Signs

- The scale of the proposed signs on the building façade are commensurate with the scale of the building and will not dominate with regard to visual appearance of the building. Building façade signs of this size are common in rural New Zealand environments to identify large industrial buildings (such as dairy factories) as for easy site identification.
- Aligned with Policy 1A, the signs will be located within the Project Kea site, and will not adversely affect traffic safety or obstruct views of the motorists.

- Aligned with Policy 1B, the proposed signs are site identification and directional signs (ie. to identify the site access locations) and will not be commercial in nature. The signs will not display variable images and will not affect traffic safety.
- The free-standing signs on the site entrances will contribute to the health and safety of the site users.

Section 9 – Transportation

- In alignment with Objective 1, the proposed number of vehicle and bicycle parking spaces are sufficient to meet the anticipated demands of the Project Kea site.
- In alignment with Policy 1A – the on-site parking, loading, manoeuvring and access are designed to meet the needs of the Project Kea facility, while maintaining the efficiency, safety and amenity of the road hierarchy in the District.
- In alignment with Objective 3, Project Kea proposes a number of roading upgrades to ensure that the road network is safe for all road users in the proximity of the Project Kea site.

Section 12 – Hazardous substances

- In alignment with Objective 1 and the associated policies, the storage and use of hazardous substances on the Project Kea site will use the best practicable option, with first priority being to avoid accidental spillage; and second priority being to ensure that where there is a residual risk of discharge (including accidental spillage), it is contained on-site and is not discharged into the environment (such as not entering surface water bodies, groundwater or stormwater systems).

9 ASSESSMENT OF OTHER MATTERS

Section 104(1)(c) of the RMA states that subject to Part 2, regard must be had to any other matters the consent authority considers relevant and reasonably necessary to determine the application. In respect of the application, the following matters are also of relevance:

9.1 Section 70A of the RMA – consideration of climate change matters

Section 70A of the RMA sets out the application to climate change of rules relating to the discharge of greenhouse gases. It states that a regional council must not have regard to the effects of discharge into air on climate change, except to the extent that the use and development of renewable energy enables a reduction in the discharge of greenhouse gases.

Section 104E of the RMA, states that when considering an application for a discharge permit relating to the discharge of air of greenhouse gases, a consent authority must not have regard to the effects of such a discharge on climate change, except to the extent that the use and development of renewable energy enables a reduction in the discharge into air of greenhouse gases.

The Resource Management Amendment Act 2020 repeals sections 70A and 104E from 31 December 2021. The Cabinet has approved a delay in the enactment of climate change amendments to the RMA by Order in Council, from 31 December 2021 to 30 November 2022. The amendments will repeal sections 70A, 70B, 104E and 104F of the RMA that limit the circumstances in which:

- Regional councils may have regard to the effects of discharges to air of greenhouse gases on climate change in making rules to control the discharges of greenhouse gases
- Consent authorities may have regard to the effects of discharges of air of greenhouse gases on climate change in considering an application for a discharge permit or coastal permit.

For the reasons set out above, on the date of the lodgement of resource consent application for Project Kea, under sections 70A and 104E, a consent authority must not have regard to the effects of discharge of greenhouse gases into air on climate change in considering an application for an air discharge consent.

Life Cycle Analysis Report

While consent authorities must not have regard to the effects of discharge of greenhouse gases into air on climate change, for informational purposes only, a Life Cycle Analysis Report (“**LCA Report**”) (Technical

Report 9) has been prepared in accordance with the international standards to assess the global warming potential of Project Kea. The objective of the LCA is to compare the global warming potential associated with the development of an EfW Plant facility against the current baseline (assumed to be landfill disposal of MSW and construction waste). Modelling was carried out using the UK Environmental Agency's life cycle assessment tool WRATE.

The following scenarios were modelled:

- Scenario 1 – Baseline/Counterfactual (baseline waste management and landfill disposal of MSW and Commercial Waste).
- Scenario 2 – EfW Plant based on an incineration process in an electricity only mode for electricity generation. All waste would be transported to the EfW facility by road (100%). Both vitrified fly ash and bottom ash (excluding metals recovered at grate) would be recycled as aggregate.
- Scenario 3 – EfW Plant based on an incineration process in a combined heat and power mode for electricity and heat generation. All waste would be transported to the EfW facility by road (100%). Both vitrified fly ash and bottom ash (excluding metals recovered at grate) would be recycled as aggregate.
- Scenario 4 – EfW Plant based on an incineration process in an electricity only mode for electricity generation. All waste would be transported to the EfW facility by road (50%) and rail (50%). Both vitrified fly ash and bottom ash (excluding metals recovered at grate) would be recycled as aggregate.
- Scenario 5 – EfW Plant based on an incineration process in an electricity only mode for electricity generation. All waste would be transported to the EfW facility by road (100%). Both vitrified fly ash and bottom ash (excluding metals recovered at grate) would be disposed in landfill.

The results of the modelling demonstrate the following:

- Project Kea would deliver overall environmental benefits for global warming potential impact category assessed over the baseline scenario (landfill disposal).
- Among all scenarios with EfW Plant, highest avoided total carbon burden would be expected in the EfW Plant with combined heat and power mode, however all electricity only mode scenarios deliver global warming potential benefits. For the EfW Plant combined heat and power mode scenario (Scenario 3), additional environmental benefits are as a result of recycling of material recovered at the

facility, avoided burdens through diversion of MSW from landfill and avoided burdens through offsetting existing fossil fuel generated steam and electricity.

- The results show that treatment and recovery (i.e., incineration) of materials has a significant benefit on all EfW scenarios considered.
- Sensitivity analysis has shown how the net environmental benefit would be higher should the transportation includes both road and rail (instead of road only).
- Ash recycling has significant carbon benefit compared to the ash disposal in landfill resulting from metals recovery and recycling of bottom ash.
- Treatment of MSW at the EfW Plant would contribute to the generation of additional renewable energy in the form of heat (if the plant is operated in combined heat and power mode) and electricity for nearby industrial users, thus utilising domestic resources to produce energy for local demand and increasing energy security.

The LCR Report concludes that:

“EfW Plant with electricity only mode would deliver significant environmental benefits over landfill disposal based on the global warming potential impact category assessed, with a net avoided carbon burden of 75.3 kt CO₂-eq (i.e., 26 + 49.3 kt CO₂-eq). If the facility could be operated in CHP mode, the carbon impact benefits would be even greater, with a net avoided burden of 129.1 kt CO₂-eq.”

In accordance with the ISO Standards governing Life Cycle Assessments (ISO series 14040/14044) an independent peer review has been undertaken which endorses the assessment and is included as part of Technical Report 9.

9.2 Broader policy framework for waste management and minimisation in New Zealand

New Zealand’s broader policy framework for waste management and minimisation is set out in the Waste Minimisation Act 2008 and the New Zealand Waste Strategy Reducing Harm, Improving Efficiency 2010 (“**NZ Waste Strategy**”).

The purpose of the Waste Minimisation Act to encourage waste minimisation and a decrease in waste disposal in order to protect the environment from harm; and provide environmental, social, economic and cultural benefits. The Waste Minimisation Act puts responsibility on local government to promote effective and efficient waste management and minimisation in their districts. It required territorial authorities to prepare Waste Management and Minimisation Plans.

The NZ Waste Strategy sets out the Government's long-term priorities and guides the use of tools for waste management and minimisation. The NZ Waste Strategy identifies the following two goals to provide direction to government, businesses (including the waste industry), and communities on where to focus their efforts to deliver environmental, social and economic benefits to all New Zealanders:

“Goal 1: Reducing the harmful effects of waste

When planning waste management and minimisation activities, local government, businesses and communities should assess the risk of harm to the environment and human health from waste to identify and take action on those wastes of greatest concern

Goal 2: Improving the efficiency of resource use

When planning waste management and minimisation activities, local government, business and communities should improve the efficiency of resource use to reduce the impact on the environment and human health and capitalise on potential economic benefits.”

The Government has proposed a new national waste strategy, New Aotearoa New Zealand Waste Strategy, to outline the proposed vision and aspirations for a low-waste Aotearoa to 2050. The consultation on the proposed waste strategy closed on 10 December 2021. The Government proposal is to shift from a “linear economy” concept to a “circular economy” concept to manage waste. The New Aotearoa New Zealand Waste Strategy also promotes the concept of a waste hierarchy.

With respect to EfW technology, the New Aotearoa New Zealand Waste Strategy acknowledges that EfW technology is evolving and with careful consideration, this technology can play an important role in waste management in New Zealand. It further states that:

“The most strategic consideration is whether deploying waste-to-energy technologies will support or undermine the waste hierarchy and circular economy principles. The best use of waste to energy involves converting genuinely residual waste – waste that’s unavoidable and

for which there is no potential for reuse or recycling. We need to carefully consider the forms of waste to energy that feed off useful materials or that could entrench a level of demand for waste materials”.

The Waste Minimisation Act requires territorial authorities to prepare Waste Management and Minimisation Plans. With respect to EfW technology, the Christchurch City Council and Dunedin City Council state the following in their waste management and minimisation plans:

- Christchurch City Council – 2020 Waste Management and Minimisation Plan:

In 2017, Christchurch City Council commissioned a waste to energy study aimed at

- Considering potential alternatives to landfill, including waste to energy technology.
- Providing a better understanding of the market response to the changing recycling market.
- Exploring future opportunities for managing Canterbury’s waste and recycling.

With respect to next steps, on its website, Christchurch City Council states that:

“The estimated investment required for the recommended programme is dependent on the type of waste-to-energy process selected for Christchurch. Further, the detailed business case will identify the delivery options; including partnerships with industry, which could be used to manage our financial and risk exposure”.

- Dunedin City Council - Waste Management and Minimisation Plan 2020:

With respect to waste to energy solutions, the concept is noted under the strategic framework umbrella, as part of the Economic Wellbeing:

“Economic Wellbeing: in building local capability of our resource recovery sector to achieve greater material diversion and in support of businesses adopting resource efficiency programmes. Also, in support of design innovation that will reduce or eliminate waste, Waste Minimisation Innovation and Development Grants (commercial sector), supporting Energy Plan in the beneficial use of landfill gas, or waste to energy solutions and availability of contestable funds”. (underlined for emphasis)

Having regard to the above, it is considered that Project Kea aligns and fits into the broader policies of waste management and minimisation, as explained in Section 2 of this Planning Report.

10 CONSULTATION

The applicant acknowledges that the Project Kea proposal represents a change to the status-quo for managing waste in the South Island. While EfW technology has been used overseas for many decades, it is a relatively new concept in New Zealand. Implementing good neighbour and corporate citizen principles, the applicant has requested public notification of the application to enable the community to be informed of the project and participate in the consenting process, so that their views and concerns can be heard. The community consultation undertaken with the key stakeholder groups is set out in the Consultation Summary Report (Technical Report 18).

11 CONCLUSION

This Planning Report has been prepared on behalf of SIRRL to accompany a resource consent application to enable the construction and operation of an EfW Plant, known as Project Kea.

Overall, this Planning Report concludes that:

- Project Kea will be consistent with Part 2 of the RMA.
- The actual and potential effects of Project Kea on the environment will be “minor”.
- Project Kea will not be contrary to the objectives and policies of the relevant statutory documents.
- Project Kea will be part of a holistic waste management solution and aligns with the circular economy concept by assisting in minimising the amount of permanent disposal of residual waste that that is required to be disposed of (such as to a landfill) under the 6th and last tier in the waste hierarchy (as a last resort).

Project Kea will enable the development and operation of an environmentally sound and sustainable EfW Plant for the energy recovery and disposal of non-recyclable MSW.

APPLICABILITY AND LIMITATIONS

Restrictions of Intended Purpose

This report has been prepared solely for the benefit of South Island Resource Recovery Limited as our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such party's sole risk.

Legal Interpretation

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards, and should not be construed as legal opinions. Where opinions or judgements are to be relied on they should be independently verified with appropriate legal advice.

Maps and Images

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