

Appendix E: Open Day Material



1 Peka Peka to Ōtaki

Peka Peka to Ōtaki Section of the Kāpiti Expressway

Welcome to the Project Open Day

This open day is an opportunity for you to find out more about the proposals and tell us what you think so we can continue developing measures to mitigate the environmental effects of the project.

Members of the project team are available to discuss the proposals and to answer any questions you may have.

The consultation period runs from 8am Saturday 16 June to 5pm Friday 13 July.

With Specific Open days on:

- 10am-4pm, Saturday 16 June at the Ōtaki Memorial Hall
- 2-8pm, Wednesday 20 June at the Te Horo Community Hall

You can find feedback forms on the desk at the entrance. Provide us with your comments on the mitigation proposals for the project presented on the display boards. You can leave it with us or post it back to us. You can also have your say by filling in a comments form online at www.nzta.govt.nz/pp2oproject.

Benefits for our community

The four lane Peka Peka to Ōtaki section of the Kāpiti expressway will:

- Enable the community to travel safer and with less congestion
- Once completed, the Wellington Northern Corridor, which Peka Peka to Ōtaki is part of, will save motorists 25 to 45 minutes travel time from Levin to Wellington International Airport at peak times and 20 to 25 minutes at off peak times
- Provide improved interchanges, bridges, connections and new local roads which will make it quicker and safer for locals to get on and off the expressway from their communities.



Thanks for your feedback so far

In 2009 and 2011, we engaged the community to get its thoughts on the proposed transportation improvements while taking account of the local community, environment, history, culture and landscape. We have considered the community's feedback and decisions have been made to deliver the following:

- **Proposal B at Te Horo** - following considerable public support, we have confirmed our plan to build a link road between Te Horo Beach Road and School Road to the north, with a bridge crossing over the current state highway, the expressway and the railway, and a separate crossing at the Mangaone Stream.
- **Proposal A at South Ōtaki** - we're proposing to build a new interchange to provide access to Ōtaki from the south. It will be located south of the Ōtaki River, with the local road crossing over the railway and expressway close to the existing Ōtaki Gorge Road railway bridge. This received strong local support at our last community engagement period.
- **Proposal A at North Ōtaki** - Coming into Ōtaki from the north, vehicles will use the existing state highway approach to town via a new bridge over the expressway and railway. Heading north from Ōtaki, access to the expressway will be via a new on-ramp which will provide a safe merge with through traffic. This proposal received strong local support.
- **Rahui Road** has now accommodated a bridge (for vehicles, walkers and cyclists) to go over the expressway and the railway. This is to maintain the connectivity between the east and the west of Ōtaki.

What is the timeline from here on:

8am Saturday 16 June to 5pm Friday 13 July: Public engagement

2012: Complete preparation of RMA applications

2013: Lodge application with the EPA

2014 onwards: detailed design

2016 onwards: potential construction





Peka Peka to Ōtaki



Peka Peka to Ōtaki Section of the Kāpiti Expressway

Roads of National Significance

The Peka Peka to Ōtaki expressway is a section of the Wellington Northern Corridor, roads of national significance programme.

The government has identified seven roads of national significance across New Zealand. These are essential state highways projects that are linked to New Zealand's economic prosperity.

The roads of national significance programme represents one of New Zealand's biggest ever infrastructure investments.

The seven roads of national significance projects are based around New Zealand's five largest population centres as shown on the map. The focus is on moving people and freight between and within these centres more safely and efficiently.



Roads of national significance - Wellington Northern Corridor

The Wellington Northern Corridor road of national significance has been identified as having a key role to play in supporting economic transformation by improving the connections that enable the flow of people, goods and services throughout New Zealand.

Completing the Wellington Northern Corridor will unlock economic growth potential regionally and nationally, and deliver a range of benefits including:

- Support for a growing population: the regional population is expected to increase by 65,000 over the next 20 years, mainly in Wellington City and Kāpiti
- Support for increasing freight volumes in the region: there will be a 50% increase between 2007 and 2017, with the vast majority of movements by truck
- Improved access to Wellington's port, CBD, airport and hospital
- Relief from severe congestion on the state highways and local road networks
- Improved safety
- Improved journey time reliability.

The Wellington Northern Corridor is made up of the following eight sections as shown on the map.



1 Peka Peka to Ōtaki

Mary Crest

The alignment at Mary Crest crosses through an area of cultural and ecological sensitivity, including significant bush remnants and cultural sites. The alignment brings the new local road close to the expressway, which means there will be less earthworks through the nearby dunes and avoids the main bush remnants, which reduces the overall footprint of the expressway and the local road.



Mary Crest - indicative mitigation shown

At Mary Crest our approach for...

1. Urban design, landscape and visual outcomes is

- Good architectural design of the Mary Crest railway overpass bridge
- To shape and integrate the earthworks required to form the expressway with adjoining landforms (e.g. through the dunes)
- Use plant species or plant types that will thrive in the local environmental conditions
- Recreating shelter belt patterns where appropriate.

2. Ecological outcomes is

- Avoiding bush (containing 200-300 year old trees) and wetland of ecological value through an altered alignment
- Creating an increase in potential ecological values through planting and an improved wetland area
- Increasing the protection around the existing ecological areas where possible.

3. Cultural and heritage outcomes is

- Altered alignment to reduce cultural impacts
- Implementing an accidental discovery protocol to appropriately manage anything uncovered during construction.



View looking south on existing State Highway 1, indicative mitigation shown.

1 Peka Peka to Ōtaki

Te Horo

The bridge connection to the north of Te Horo will provide a local link road between Te Horo Beach Road and School Road, over the expressway, railway and existing SH1. A new section of local road will be built to link Gear and School Roads.

Specific access for emergency services is proposed between the expressway and Gear and School Roads.



Te Horo - indicative mitigation shown

Legend

- | | |
|--|---|
|  Waterways |  Proposed bridge over railway, expressway and local road |
|  Proposed native planting of varying heights |  Simulation perspective - see graphic below |
|  Proposed grass |  Existing railway |
|  Proposed low-growing amenity planting and median treatment |  Existing state highway |
|  Proposed swale |  Proposed expressway |
|  Riparian planting |  Mangaone Stream |
|  Proposed bunding | |

At Te Horo our approach for...

1. Urban design, landscape and visual outcomes is

- Good architectural design of the Te Horo overbridge
- Bunding and native planting between the expressway and the new section of Gear Road to provide visual separation
- Providing for pedestrians and cyclists across the local bridge with a path on the south side on the bridge and new section of local road
- Re-establish shelterbelt patterns where appropriate.

2. Ecological outcomes is

- Riparian planting along streams where the expressway crosses the various waterways in Te Horo.

3. Mangaone stream and flooding outcomes is

- Ensuring bridges and culverts will be designed for a 100-year return period (1-in-100 year) flood*

- Designing the expressway to ensure that where it crosses the floodplain it incorporates culverts that maintain existing flow paths past the current railway and road network
- Potential flood containment bund to protect School Road from flooding.

* A 100-year return period flood is an event that is predicted to happen (or be exceeded) on average once in 100 years. This does not mean that if such a flood occurs it will not re-occur for another 100 years. It means that it has a 1% chance (1 in 100) of happening in any one year. The greater the number of years identified, the more intense the flood.



View looking north on existing state highway - indicative mitigation shown

1 Peka Peka to Ōtaki

South Ōtaki

The interchange at South Ōtaki will enable access to the expressway heading south and from the expressway when heading north into Ōtaki. The interchange is accessed from Ōtaki via the existing State Highway 1 Ōtaki river bridge.

The main expressway has been re-aligned slightly closer to the railway and the interchange now includes a new road linking Old Hautere Road with Ōtaki Gorge Road. Kāpiti Coast District Council and the NZTA will explore opportunities to manage concerns about potential speed and treatment of the new link is likely to be similar to Rata Road in Raumati.



South Ōtaki interchange - indicative mitigation shown

At South Ōtaki our approach for...

1. Urban design, landscape and visual outcomes is

- Good architectural design of the South Ōtaki interchange bridges
- Planting native vegetation on the side of the expressway in places where glare from the headlights of opposing traffic may be a distraction to road users, such as the Old Hautere Link Road
- Providing appropriate planting and advance signage to improve legibility of access into Ōtaki
- Building the expressway lower between Ōtaki Gorge Road and Old Hautere Road, in order to reduce the visual impact of the expressway and interchange on the surrounding landscape (see image to the right)
- Mimicking the local landscape by planting shelter belts where appropriate
- Providing a new access for vehicles to the southern bank recreation area of the Ōtaki River, off the proposed roundabout
- Providing for walking and cycling across the South Ōtaki interchange bridge (on the north side) to connect with Ōtaki Gorge Road and a new walking/ cycling path along the Old Hautere Road link



Old Hautere Road link cross section - indicative mitigation shown



Aerial view looking north - indicative mitigation shown

1 Peka Peka to Ōtaki

Ōtaki River

We're proposing to build two new bridge structures over the Ōtaki River, which will carry two lanes each and be slightly separated. The bridges will be located approximately 120 metres upstream of the existing railway bridge. The placement and design of the expressway bridges have been carefully considered to ensure Ōtaki's flood defences are maintained.



View looking southwest from existing Chrystalls Bend walkway - indicative mitigation shown



View of the existing Ōtaki River Bridge



Same view as simulation above

At Ōtaki River our approach for ...

1. Urban design, landscape and visual outcomes is

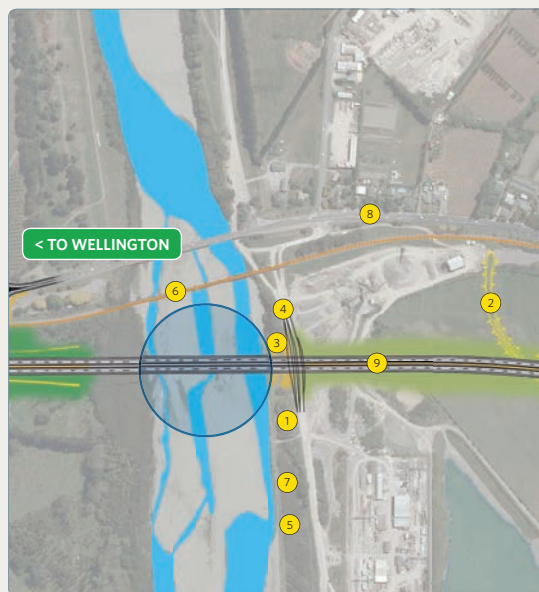
- Good architectural design of the Ōtaki river bridges
- Keeping existing public walking and cycling facilities below the bridge to Chrystalls Bend Walkway
- Maintaining access to properties and businesses such as Stresscrete near the river by providing access roads below the bridge
- Ensuring there is adequate light below the bridges by building two separated structures carrying two lanes of traffic each.

2. Ecological outcomes is

- Planting native vegetation alongside the river in the vicinity of the crossing
- The development of a robust, sensitive and adaptable construction methodology.

3. Flooding outcomes is

- The key design considerations are:
 - Appropriate pier spacing, length and height of the bridges
 - The bridges tie into the stopbank system to maintain the existing flood management system in Ōtaki
 - Maintaining the secondary overland flow paths in the event of stopbank failure.



Legend

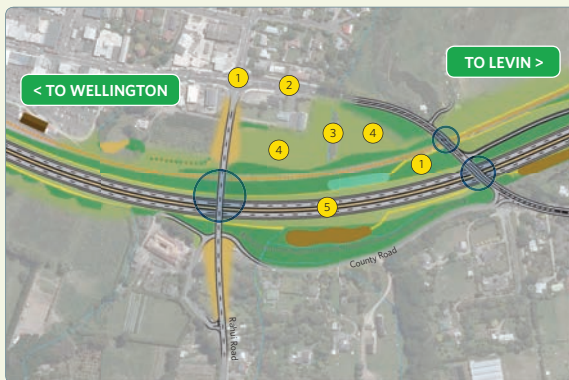
- Waterways
- Proposed native planting of varying heights
- Proposed grass
- Proposed low-growing amenity planting and median treatment
- Proposed swale
- Proposed bridges
- 1 Existing Chrystalls Bend Walkway
- 2 Existing Chrystalls stopbank
- 3 Proposed low-growing native planting
- 4 Access under expressway bridge
- 5 Existing river walkway
- 6 Existing railway
- 7 Simulation perspective - see graphic above
- 8 Existing state highway
- 9 Proposed expressway

1 Peka Peka to Ōtaki










Rahui Road, Ōtaki

We propose to build a road bridge with cycling and pedestrian facilities connecting Rahui Road across the expressway. The Rahui Road bridge maintains an east-west connection, provides route security and allows County Road to maintain its existing function. The existing County Road intersection at State Highway 1 will be upgraded and the connection to Rahui Road will pass around and under the Rahui Road bridge.

To accommodate the expressway, the North Island Main Trunk railway line at this location will be realigned.



Legend

- | | |
|--|---|
|  Waterways |  Simulation perspective - see graphics below |
|  Proposed stormwater basins |  Existing state highway |
|  Proposed combined stormwater basin and wetland |  Existing vegetation to be retained |
|  Proposed native planting of varying heights |  Proposed Pare-o-Matangi reserve |
|  Proposed grass |  Proposed expressway |
|  Proposed low-growing amenity planting and median treatment | |
|  Proposed swale | |
|  Proposed bunding | |
|  Proposed bridges | |

At Rahui Road our approach for...

1. Urban design, landscape and visual outcomes is

- Good architectural design of the Rahui Road bridge
- Create a public space to off-set the changes to Pare-o-Matangi Reserve
- Provide pedestrian and cycle links where the local road crosses over the expressway (path on both sides)
- A new pedestrian link between Ōtaki Railway Station and Pare-o-Matangi Reserve, under the proposed Rahui Road Bridge
- Modify the Rahui Road bridge approach on the eastern side to reduce the visual impact on the 'dairy factory', improve gradients, and provide open space and planting

- Where possible retain and plant native screening plants on the existing railway bund, in order to screen the views of County Road, and provide visual separation between County Road and the expressway.

2. Cultural and heritage outcomes is

- Rotate Ōtaki Railway Station building to retain its existing relationship to the railway.

3. Ecological outcomes is

- Plant native species in the residual pockets of landlocked space, to create a green corridor which will provide ecological benefit
- Potential integration of stormwater and wetland between County Road and the expressway.

4. Flood and stormwater outcomes is

- Create swales, ponds, and where possible wetlands, to capture stormwater and manage the risk of flooding
- Keep the existing Mangapouri flood management system on County Road to protect downtown Ōtaki.

5. Noise outcomes is

- Manage the effects of road and rail noise on the adjoining properties through the use of quiet road surfacing on the expressway and noise fencing/retrofitting of buildings at specific locations.



View looking south - indicative mitigation shown



View looking east - indicative mitigation shown

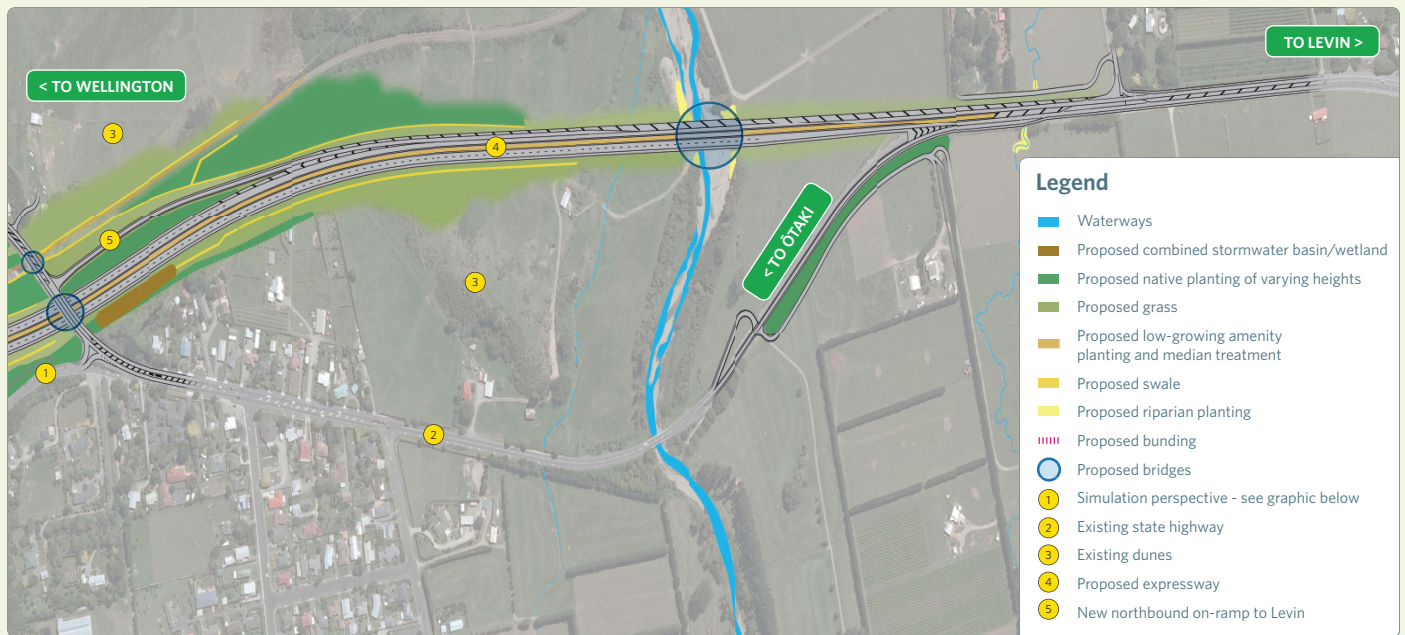
1 Peka Peka to Ōtaki

North Ōtaki

The interchange at North Ōtaki will enable access to and from Ōtaki to the expressway. Access from the north to Ōtaki is via a southbound off-ramp that uses the existing State Highway 1 and bridge at the Waitohu Stream. Access to the expressway from Ōtaki will be from a new on-ramp as illustrated below.

At Taylor's Road intersection:

- The expressway reduces to a single-lane in each direction before reaching Taylor's Road
- The median is maintained past Taylor's Road and will include turning bays for those using Taylor's Road
- The south-bound passing lane north of Taylor's Road will be closed.



North Ōtaki proposed plan - indicative mitigation shown



View looking northwest from County Road - indicative mitigation shown

At North Ōtaki our approach for...

1. Urban design, landscape and visual outcomes is:

- Good architectural design of the North Ōtaki interchange bridges
- Planting native vegetation on the side of the expressway in places where glare from the headlights of opposing traffic may be a distraction to road users, such as at County Road and private accesses near the southbound off-ramp
- Providing appropriate planting and advance signage to improve legibility of access into Ōtaki
- Riparian planting alongside streams where the expressway crosses watercourses, such

as the Waitohu Stream and Greenwood Stream

- Providing for walking and cycling at the new bridges crossing the expressway and railway with a path on the south side.

2. Cultural and heritage outcomes is:

- Creating two new wetlands in other locations to mitigate for the loss of a culturally important wetland north of the 'ramp' bridge in Ōtaki
- The design process has reduced the impact on the dunes by bringing the north-bound on-ramp closer to the expressway. This retains a large part of the area's dunescape,

while recognising that the expressway will still remove three dune hills

- Preparation and implementation of an Accidental Discovery Protocol, which recognises the cultural importance of this area.

3. Ecological outcomes is

- Establishing two new wetlands to provide wetland habitat for native flora and fauna and mitigating the loss of wetlands
- Ensuring that any impact on Waitohu Stream is kept to a minimum given it hosts at least four different fish species.

4. Waitohui stream and flooding outcomes is

- Ensuring bridges will be designed for a 100-year return period (1-in-100 year) flood*
- Designing the expressway to ensure that where it crosses the floodplains, there are raised embankments and appropriately sized culverts to maintain secondary flow paths past the embankments.

* A 100-year return period flood is an event that is predicted to happen (or be exceeded) on average once in 100 years. This does not mean that if such a flood occurs it will not re-occur for another 100 years. It means that it has a 1% chance (1 in 100) of happening in any one year. The greater the number of years identified, the more intense the flood.

1 Peka Peka to Ōtaki

Natural environment – freshwater and terrestrial ecology

The existing ecological environment within the project area contains a number of different types of species and habitats. Below are some examples of the community's natural environment and its characteristics:

Vegetation



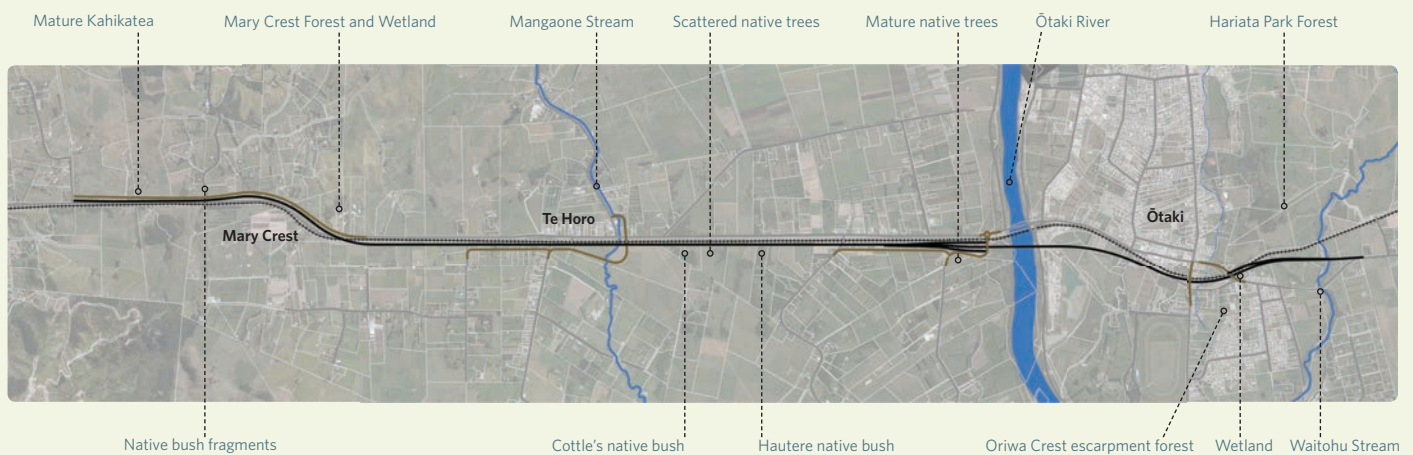
Wetlands



Rivers and streams



Insects (velvet worms)



Our approach to ecology is

Where possible, we have avoided significant ecosystems such as the native bush at Mary Crest. Where we have been unable to avoid smaller ecological areas, we are proposing to create new habitats or enhance existing ones. We will aim to replace these habitats with at least the same area of land and similar type of habitat where practical.

We are also proposing to use native plants in the landscape planting wherever we can. Some of this planting will connect areas of existing vegetation along the corridor and thereby help reduce landscape and habitat fragmentation. This will help provide connecting habitats for fauna such as lizards and invertebrates.

We will continue to look for opportunities to enhance the local ecology as we work through the project.

Mitigation developed to date includes:

- One significant wetland in Ōtaki will be lost with the project. The most likely option to mitigate this effect will be to create a new wetland habitat of a similar size, which contains similar species and plant life. Created wetlands as shown in the photo

opposite develop rapidly (2-5 years) and can provide significant ecological values. Although this is our preferred option to mitigate the loss of the existing wetland, alternatives may also be considered, in particular the protection and enhancement of existing wetland habitat elsewhere along the corridor.

- A species of velvet worm called *Peripatus* was found in one bush remnant along the alignment. The footprint of the expressway has been designed to minimise the loss of bush habitat in this location, and key habitat features for the velvet worm such as rotting logs will be moved off the alignment to preserve these.
- Where culverts are installed on watercourses supporting native fish, these will be designed to ensure that fish can move freely up and down stream.
- Stormwater from the road surface will pass through stormwater retention devices, such as swales. This will ensure a high standard of water quality is discharged to local watercourses, protecting the aquatic life.



Example of a successful wetland replacement

1 Peka Peka to Ōtaki

Culture and Heritage

The Peka Peka to Ōtaki area is rich with evidence of Māori and early European settlement. There are a range of archaeological sites within the district that reflect the area's early occupation, such as shell middens, living terraces and pa sites. Along with these visible remains of early Māori occupation in Ōtaki, there are a number of identified waahi tapu or sites of cultural significance to Māori, some of which have been identified close to or within the expressway. The Mūaupoko iwi, one of the earliest inhabitants of the Kāpiti Coast, along with other iwi as tangata whenua have maintained occupation in this district.

There also remain within the Ōtaki district a number of buildings from the early period of European settlement, which have been recognised as significant by the Ōtaki community, the NZ Historic Places Trust and Kāpiti Coast District Council.

Within the project area the following buildings have been identified as having heritage values:

Historic Sites / Buildings that are unaffected:

- Rahui (Former) Milk Treatment Station: the alignment at Rahui Road has been changed and there is an improved buffer distance next to the Milk Treatment Station
- Te Horo (Former) Railway Station
- Former workers cottage (former Smisek property)
- 230 Ōtaki Main Road (former house of Hema Te Ao)

Historic Sites / Buildings affected by our current proposal:

- Beehive kilns (former Smisek property) which require removal
- Ōtaki Railway Station, a Category II listed building under the Historic Places Act, which will stay in the same location but be rotated to suit the new railway alignment



View of pa site and bush above Mary Crest



Two beehive kilns on the former Mirek Smisek property

Our approach to cultural and heritage values is to ...

- Avoid areas that have significant cultural and heritage values where possible
- Where it is not possible to avoid sites or areas with heritage and cultural values, we will consider options to best to mitigate such effects through;
 - Relocating and reorienting structures
 - Develop protocols to assist with the management of archaeological sites that may be uncovered during works
 - Further study and recording of sites that cannot be avoided as a result of the expressway.
- Work with community interest groups and the NZ Historic Places Trust to share knowledge and develop a process to assist with the management of cultural and heritage resources
- Prepare a Cultural Impact Assessment, which provides a detailed look at the area's cultural and heritage sites.



Ōtaki Railway Station by Frederick George, 1863-1923 Radcliffe (photographer) ca February/March 1911



Ōtaki Railway Station (2012)



Peka Peka to Ōtaki

Landscape

The land in the Peka Peka to Ōtaki area is used for a range of purposes, including rural, lifestyle, residential, open space, industrial and commercial. These different land use areas, along with relatively subtle changes in landform, inform the character of areas along the route. We appreciate that the expressway route and any mitigation must take into consideration how the land is currently used, and the character of the area.



Landscape features

Natural features such as dunes, wetlands, waterways, and vegetation are distinctive elements along the route and combine to contribute to the local ecology, character, and sense of place.

Our approach to landscape includes:

- Avoid natural features where possible
- Retain the driver experience through the different character areas
- Where appropriate, provide planted buffers between the expressway and the surrounding landscape to maintain local amenity values
- Shape and integrate earthworks with adjoining landforms
- Create a landscape that contributes to improving ecological value and biodiversity
- Use plant species that will thrive in the local environmental conditions
- Maintain connections to recreational areas, including Ōtaki River and the coast
- Integrate the stormwater swales and basins into the landscape.

Mitigation developed to date includes:

- Where appropriate, re-establishing shelterbelt patterns in areas such as Old Hautere Rd, Te Horo, and Mary Crest;
- Bunding and native planting to provide separation between the expressway and local road, along the new sections of Gear Rd and Old Hautere Rd
- Planting on existing railway bund at County Rd
- Creating gateway zones at the northern and southern entrances to Ōtaki, to make it easy for expressway motorists to visit Ōtaki. Gateway treatments could include formal planting and appropriate signage
- Native screening planting where appropriate, to mitigate headlight glare between local roads and the expressway
- Maintaining access to recreational areas including Chrystalls Bend Walkway and Pare-o-Matangi Reserve
- Planting alongside rivers and streams where the expressway crosses waterways
- Stormwater swales and basins to be planted with native species where appropriate, to provide ecological and amenity benefits.

1 Peka Peka to Ōtaki

Stormwater

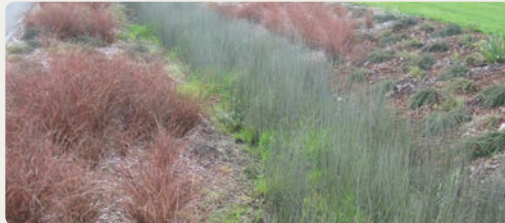
Water that runs off the road surface, along with streams that run under the expressway, need to be carefully managed to protect the environment. We are committed to managing stormwater as part of designing the expressway.

Our approach to stormwater management includes ...

- Recognising the significance of natural systems, characteristics and landforms
- Complying with best practice and the requirements of the NZTA, KCDC and GWRC
- Controlling the rate and quality of stormwater discharge to streams
- Road Surface run-off to flow directly into the ground where possible, or via an appropriate treatment process such as:
 - swales and/or:
 - stormwater/wetland attenuation basins, which store and hold back stormwater and slowly release it to prevent flooding
- Ensure fish passage is provided where appropriate.

Stormwater management tools

A number of different stormwater management tools are to be implemented along the expressway as a means of managing water quality and quantity. The volumes of stormwater required to be accommodated and the surrounding environment influences the stormwater management tool used. The two key stormwater management tools we are proposing to use are swales and basins.



Swales



Dry basins and wetlands

Over the majority of the expressway's length, we have found that the most appropriate stormwater management approach is the use of swales. Two examples are:



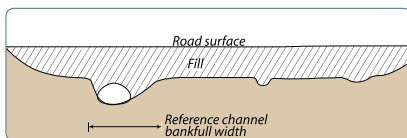
Example of a grassed swale



Example of a vegetated swale

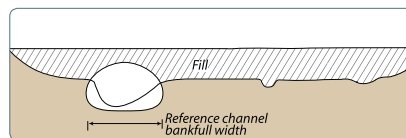
Options for maintenance of fish passage:

To achieve the design philosophy, there are options able to be implemented in relation to fish passage at various locations along the expressway. These are outlined below.

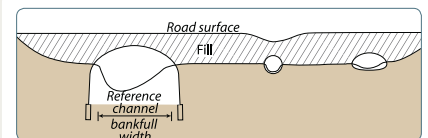


Example Concept

Round culvert with concrete embedded blocks which create resting pools for fish. The concrete blocks make the normal flows both deeper and slower.



Box culvert with gravel bed and low flow channel. Gravel bed held in place by concrete sills. Concrete blocks make the normal flows both deeper and slower.



Arch culvert or simple slab/bridge with concrete strip foundations. Culvert width at stream bed level is wider than the natural stream width. This allows natural movement of stream bed material. Stream bed is less disturbed during construction.

1 Peka Peka to Ōtaki

Flooding

The route crosses a coastal plain and floodplains for the following watercourses:

- The Mangaone Stream at Te Horo
- The Ōtaki River and floodplain
- The Mangapouri Stream through Ōtaki
- The Waitohu Stream to the north of Ōtaki.

Except for the Ōtaki River which has a stopbank preventing floods from flowing through the Ōtaki Township, large floods can naturally break out over the floodplains of these watercourses.

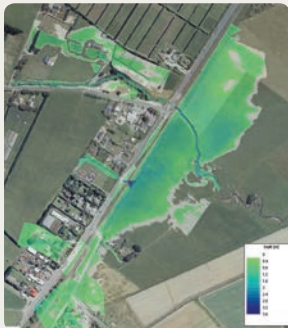
The proposed expressway is required to be built so that it remains passable during a significant flood event. At the same time as remaining passable, the proposed expressway is required to not make the existing flood hazards any worse.



Existing State Highway 1 and North Island Main Trunk Railway crossings of Mangaone Stream at Te Horo following 28 October 1998 flood (photo courtesy of Greater Wellington Regional Council)

Our approach to flood mitigation includes ...

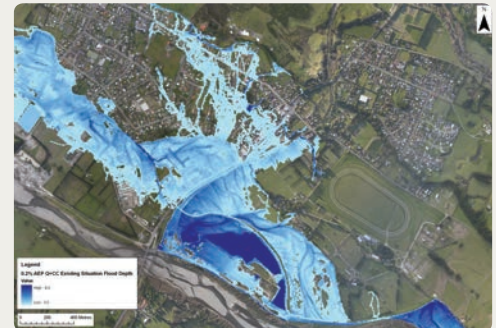
- Elevating the expressway above predicted floodplain flood levels
- Sizing bridges and culverts at primary watercourse crossings to have adequate flood capacity
- Using the expressway embankment as a flood detention barrier in some areas
- Providing adequate capacity for any secondary flow paths
- Ensuring flood flows are directed away from residential properties in some areas.



Flood map of existing situation for a 100-year return period (1-in-100 year)* flood in Mangaone Stream.



Flood map of existing situation for a 100-year return period (1-in-100 year)* flood upstream of State Highway 1 in the Mangapouri Stream.



Flood map of existing situation for a 500-year return period (1-in-500 year)* flood with overtopping at Chrystall's Bend extended stopbank.

Mangaone Stream:

Currently significant floods can break out across the floodplain of this stream. They approach the existing North Island Main Trunk railway line which acts as a flood detention barrier (refer to the inundation map on the left).

The proposed expressway will take over the flood detention barrier function of the railway line. This will require:

- The expressway and local link road to be elevated above floodplain flood levels
- Bridges and culverts to be sized to have adequate flood capacity
- Provision of adequate capacity for all secondary flow paths
- Construction of a low flood bank to contain flood overflows from School Road drain.

Mangapouri Stream:

The existing capacity of the Mangapouri Stream is severely constrained through Ōtaki Township. The result of this is that flooding currently occurs in moderate rainfall events.

Currently, there are undersized culverts at the railway embankment and County Road to restrict downstream flood flows. This causes flood waters to pond upstream of the railway embankment as shown in the inundation map above.

We propose to keep the existing culverts in place to assist in the continuing management of downstream flood risks.

Ōtaki River and Floodplain:

Ōtaki Township is currently protected from floods of the Ōtaki River by stopbanks. These are designed for a 100-year return period (1-in-100 year)* flood.

The proposed expressway will cross the Ōtaki River on two parallel multi-span bridges. The bridges will be designed to accommodate a 500-year return period (1-in-500 year)* flood.

In the case of a major event where stopbanks may be overtopped, the expressway will act as a barrier to secondary flood flows. It's important that we aim to maintain existing secondary flood paths and the mitigation we are exploring to achieve this includes the provision of large culverts under the expressway.

Note: Waitohu Stream is discussed on the Ōtaki North Story Board.

* A 100-year return period flood is an event that is predicted to happen (or be exceeded) on average once in 100 years. This does not mean that if such a flood occurs it will not re-occur for another 100 years. It means that it has a 1% chance (1 in 100) of happening in any one year. The greater the number of years identified, the more intense the flood.

1 Peka Peka to Ōtaki

Noise and Vibration

We understand that noise and vibration are major concerns for people living near to the proposed expressway. Given this, we have gathered information and developed solutions for managing noise and vibration in the area.

Monitoring and predictions

To understand the existing noise environment, we undertook noise monitoring at a number of locations.

We built a noise model using the road geometry and traffic data, as well as the local terrain information. This model was used to predict future noise levels with the expressway in place. This informed the development of noise mitigation options.

The railway will be realigned within Ōtaki to accommodate the expressway, and where the railway has moved closer to properties, rail noise is also being assessed. The level crossing at Rahui Road will be removed, which will eliminate the need for trains to sound their warning horn.



Standards: All noise-sensitive receivers such as residential buildings and schools near the proposed expressway have been assessed using the New Zealand Standard 6806:2010 Acoustics — Road Traffic Noise.



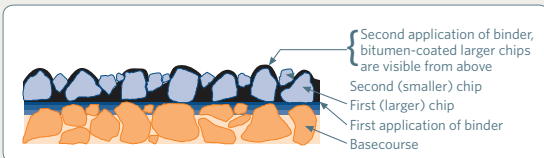
A snapshot of our noise modelling.

Our approach to noise mitigation is...

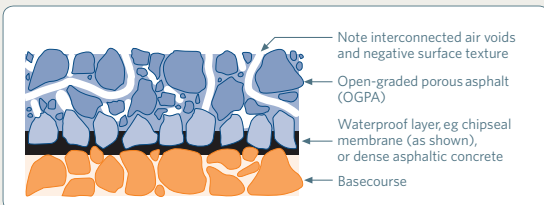
We are considering the best ways to reduce the impact of noise on the surrounding environment. Noise mitigation needs to be tailored to the specific site.

At Ōtaki, we propose to reduce the impact of road noise by using a low-noise road surface such as 'open-graded porous asphalt'. This has a relatively smooth top surface but with small holes in it which allow air to escape underneath tyres. This reduces the noise generated from vehicles using the road. The figures below compare the construction of a traditional chip seal (top) with the porous asphalt (bottom).

At a small number of properties immediately adjacent to the expressway and railway, noise fences and/or noise treatment of buildings may be offered. Further investigations and discussions with individual landowners will occur prior to the finalisation of the mitigation design to be adopted at relevant properties.



Road surface design – two-coat seal



Road surface design – open-graded porous asphalt

Vibration:

Vibration can be felt from trains at locations near the railway. However this decreases quickly with distance from the track. The level of vibration also depends on the condition of the track and rolling stock, as well as the type of ground. The realigned railway will benefit from welded rails and newly laid ballast. While the realigned railway will be closer to some properties, rail vibration has been assessed as being at an acceptable level.

Heavy vehicles on the expressway can also produce vibration, however at a significantly lower level than trains. The vibration is caused by imperfections in the road surface. The expressway will be constructed to tight design tolerances, and maintained by the NZTA consistent with other expressways which will minimise the risk of adverse vibration effects on nearby properties



Realignment of Ōtaki Railway Station is proposed as part of the expressway project

Management of Construction Effects

Construction of the expressway will include activities such as ground improvements at structures, earthworks and drainage works, railway relocation works, bridge construction, and pavement and surfacing activities. In completing these works there are potential environmental effects from construction activities that will need to be managed. These include:

- Construction noise – most construction activities can be completed during normal working hours, as there is limited interaction with existing roads. Noise levels from the contractor's equipment will be measured and used to assess different activities. Mitigation measures may include selecting machines and construction methods with low noise generation, and further limiting hours of operation. Noise monitoring will be performed to confirm predicted noise levels. The community will be informed on when construction activities will occur, and any potential disturbances.
- Construction vibration – effects will be limited to properties in close proximity of the expressway. Monitoring will confirm the vibration levels from vibratory compaction and any other significant sources. Where buildings may be affected, building condition surveys will be performed before and after construction to identify if any cosmetic damage (i.e., minor cracking) occurs, which would then be repaired by the NZTA.
- Dust – will be mitigated through good site practices such as dampening down surfaces and applying stabilising materials such as straw to any exposed sand faces through dune areas.
- Siltation – by using catchment basins or silt traps to catch construction stormwater runoff before it enters waterways and managing the extent of open construction.
- Traffic – construction traffic will be mostly confined to the Existing SH1 and expressway corridor to minimise the use of local roads.

A Draft Construction Management Plan will be prepared as part of the EPA Application for the expressway which will describe how the above effects will be avoided or mitigated during construction.