Chapter 30
Part H
VOLUME 2

Environmental Management and Monitoring

Overview

Many of the potential adverse effects of the Project have been avoided or reduced through an integrated design process. Residual adverse effects are to be mitigated through careful management throughout the construction and operation of the Project.

The Project delivery framework sets out the overall framework in which the Project will be delivered through to commissioning. This identifies where management plans and other key processes (such as the submission of outline plans to KCDC) will occur.

The practices and management controls to be adopted by the Project will be set out in a series of management plans. The management plan framework adopted for the Project implements the controls (i.e. standards and limits) as set by conditions. The purpose of the management plans is to clearly show the means by which these controls will be implemented.

The overall management plan framework provides for three proposed tiers of management plans:

- An overarching CEMP. The CEMP is a high level plan intended as an 'umbrella' document containing overarching principles and an overall staging programme;
- The second tier of management plans consists of a series of topic-specific management plans, including an ESCP, an EMP, a BECLMP, a CTMP, a LP, CNVMP, and a CAQMP. These plans provide principles that are applied site-wide, setting out how design criteria and performance standards are met;
- The third tier is a series of SSEMPs. The SSEMPs provide detailed design, details of appropriate monitoring positions/locations, and environmental management measures (such as the type of sediment management device for specific areas).

The above management plans are provided as draft versions. The draft CEMP and the topic-specific draft management plans have been prepared and are contained in Volume 4. Management plans will be finalised by the contractor and provided as required by consent conditions.

Draft SSEMPs have been developed for Central Ōtaki and Mary Crest, two sensitive areas in which the Project will be constructed. SSEMPs will eventually be developed for all areas of the Project in sequence with the staging of construction.

The management plans and conditions also cover proposed environmental monitoring which will be undertaken prior to, during and following construction to monitor potential effects, and provide a mechanism through which additional measures can be implemented during construction and operation if necessary.

As a result of the extensive suite of mitigation measures put forward as part of the Project (which have already been integrated into the Project's design elements and/or are proposed to be implemented as conditions of the designations and resource consents) the potential adverse effects of the Expressway will be appropriately avoided, remedied or mitigated.

30 Environmental Management and Monitoring

30.1 Introduction

The AEE in Part G, chapters 14 to 29 and summarised in chapter 11, identifies a wide range of positive and adverse actual and potential environmental effects predicted to result from the construction and operation of the Project.

These effects require remediation and/or mitigation to ensure that they are appropriately managed. This chapter provides a discussion of the environmental management

measures proposed to be implemented before, during and after construction, in order to ensure that potential environmental effects of the Project are adequately and appropriately avoided, remedied or mitigated.

The remainder of this chapter provides the following information:

- The Project delivery framework identifying how conditions and management plans will be implemented through the further detailed design and construction phases of the Project (Section 30.2);
- The proposed management plan framework (Section 30.3); and
- A summary of the measures proposed to adequately avoid, remedy or mitigate potential adverse effects (Section 30.6).

The suite of proposed mitigation, remediation and monitoring measures summarised in Section 30.6 is formalised through the conditions of the designations and resource consents. The summary of measures provides a reference to the relevant proposed condition(s).

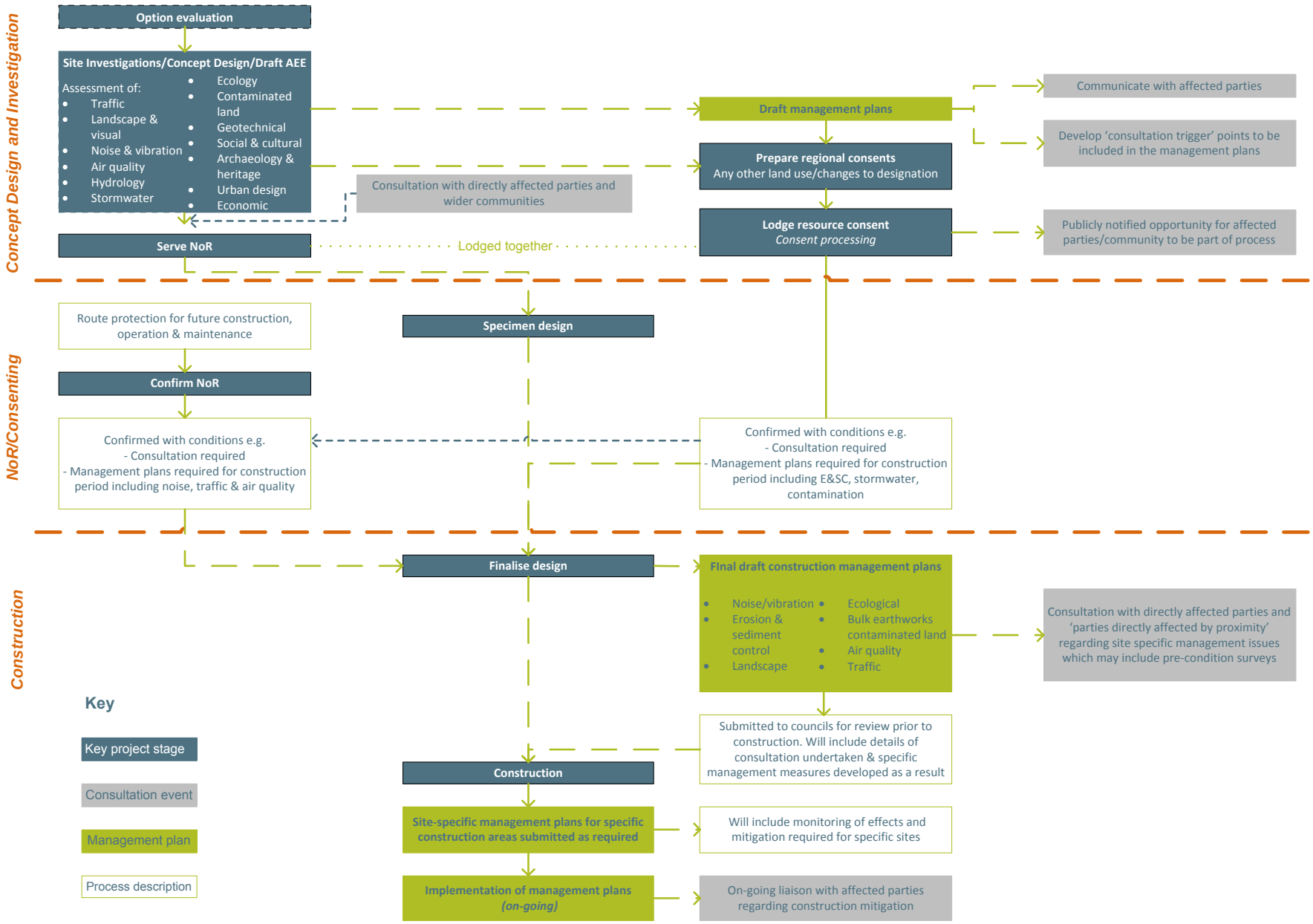
The proposed conditions of the designations are set out in Chapter 31 and the proposed conditions of the resource consents, including specific conditions for earthworks, discharges to land, wetland reclamation, and vegetation clearance, are set out in chapter 32.

30.2 Project Delivery Framework

Key to the management of effects is the development and implementation of a suite of measures that include conditions, management plans and monitoring. This is referred to as the Project delivery framework. This includes the need to provide consistency with the NZTA's and KiwiRail's environmental objectives, to manage areas of environmental sensitivity, recognise environmental risk issues, and to identify the mechanisms to avoid, remedy or mitigate actual and potential effects of the Project.

This chapter identifies the principles, methods and plans to be developed by the NZTA and KiwiRail (and its nominated contractors/consultants) at the time detailed design is finalised and construction occurs, and the associated monitoring and processes for verification. Figure 30-1 illustrates the overall process for delivery of the Project.

Figure 30-1: Overall Project Delivery Process



30.2.1 Principles for Project Delivery

The following principles form the basis for the development of the management plans and conditions for the delivery, operation and maintenance of the Project:

- All works are to be undertaken in compliance with applicable current New Zealand standards and legislation;
- The construction and operation of the Project will avoid, remedy or mitigate adverse effects to an appropriate level;
- An integrated team approach has been and will continue to be used to develop the design and the methods to avoid, remedy or mitigate actual and potential effects so that no one discipline is more important than others; and
- Each technical specialist, consultant, or contractor involved in the Project has equal responsibility to avoid, remedy or mitigate adverse effects.

In addition to these principles, the NZTA and KiwiRail will maintain on-going communication with:

- the local authorities (GWRC and KCDC) responsible for monitoring and enforcing conditions placed on the designations and resource consents;
- directly affected landowners;
- tangata whenua;
- the community; and
- other key stakeholders.

30.2.2 Methods to Avoid, Remedy or Mitigate

The following methods to avoid, remedy and mitigate actual and potential adverse effects have been employed or are proposed:

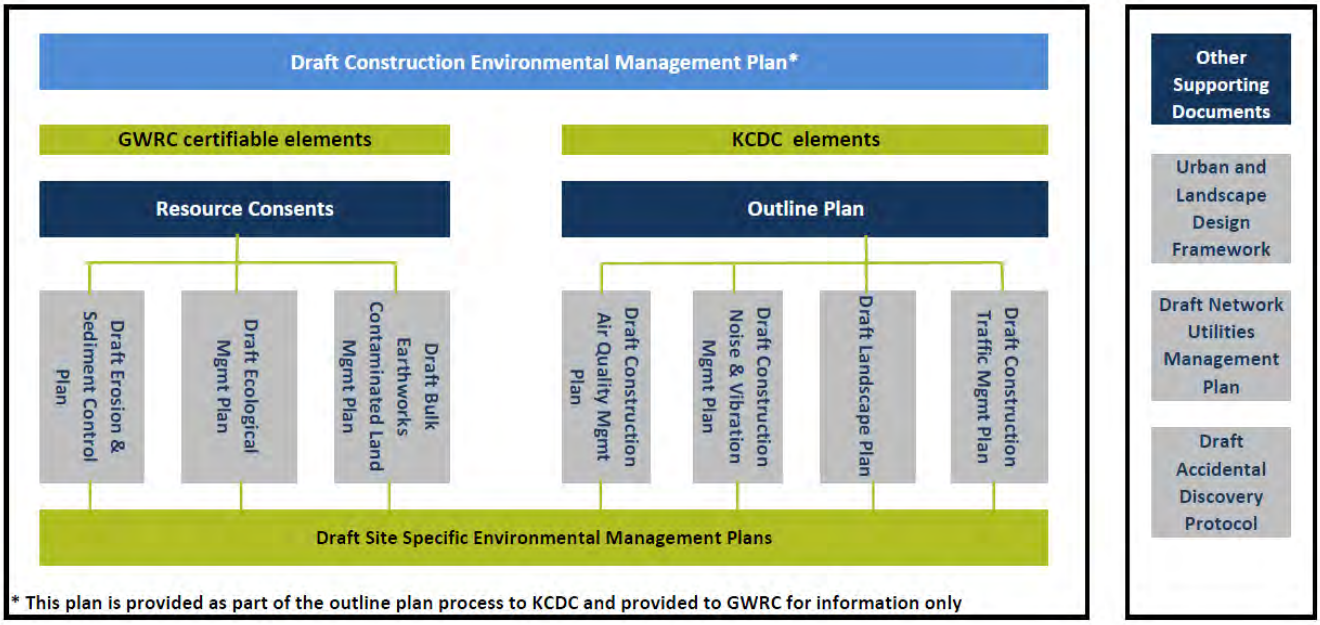
- The Project has been carefully designed to respond appropriately to the receiving environment, including the consideration of alternatives (discussed in Chapter 9 of Part E, AEE report), which involved an integrated team approach and led to significant improvements in the design, and the avoidance of various adverse effects.
- The Project's design and other mitigation measures will be implemented through proposed:
    - Designation conditions;
    - Resource consent conditions; and
    - Management plans.

Table 30-2 sets out actual and potential adverse environmental effects and the proposed methods to be used to mitigate and manage them.

30.3 Management Plan Framework

The proposed framework of management plans required to avoid, remedy and mitigate effects is shown in Figure 30-2.

Figure 30-2: Proposed Management Plan Framework



The practices and management controls to be adopted by the Project will be set out in a series of management plans. The management plan framework adopted for the Project implements the controls (i.e. standards and limits) as set by conditions. The purpose of the management plans is to clearly show the means by which these controls will be implemented.

- The first tier in the framework is the CEMP. The CEMP is a high level plan intended as an 'umbrella' document containing overarching principles and an overall staging programme, as detailed below.
- The second tier of management plans (discussed in detail below) provide principles that are applied site wide, setting out how design criteria and performance standards are met.
- The third tier, being the SSEMPs, provide detailed design, details of appropriate monitoring positions/locations, and environmental management measures (such as the type of sediment management device for specific areas). They describe how the Project will be built as discussed in detail below.

Draft management plans are in Volume 4 of this AEE report.

30.3.1 Construction Environmental Management Plan

A draft CEMP has been prepared for the Project (Volume 4). The CEMP will be finalised in conjunction with the Project contractor and provided to KCDC and GWRC prior to construction of the Project.

The contractor(s) will be required to undertake all construction activities on the site in accordance with the provisions of the CEMP and relevant management plans (and the designation / resource consent conditions as a whole) as part of their contractual arrangements.

The CEMP is an overarching strategy document. It covers all anticipated construction elements and presents a framework of principles, environmental policy, objectives and performance standards for the project execution. The other management plans generally fall under, and are Appendices to, this main plan. The CEMP sets out the methods and tools (for example; monitoring and review requirements, auditing procedures and

corrective actions) to be implemented by the construction contractors to manage, avoid, remedy and mitigate potential adverse environmental effects in order to meet the proposed resource consent and designation conditions, relevant legislation and the NZTA's environmental objectives.

The CEMP also establishes the relationship between the related topic specific environmental management plans that address specific effects, for example construction traffic and contaminated soil. It also sets out the methodology for delivering more detailed site-specific management plans immediately prior to construction.

The proposed designation and consent conditions that require preparation of a CEMP also need to provide flexibility to review and modify practices according to changing circumstances. Making sure the CEMP is current and relevant is critical to its successful implementation.

The CEMP, and the environmental topic-specific plans, may require review and amendment during the life of the Project to reflect changes to activities, risks, mitigation measures, responsibilities and management processes (known as adaptive management). The ability to make changes to the CEMP is an important aspect of continually improving the effectiveness of the CEMP.

The NZTA/KiwiRail will work with the selected contractors to develop further and finalise the CEMP once the consents and designations are obtained, as part of the process of finalising detailed design and construction methods. The process for modifications is set out in the CEMP and includes methods to involve inputs from Councils and key stakeholders.

The CEMP, and the topic-specific environmental management plans, are to be consistent with, and complement, the Project's AEE report. The many technical assessment reports contained in the AEE report inform the specific environmental management, monitoring and mitigation measures described within the second-tier plans. The contractor will implement these to manage actual and potential environmental effects during construction.

30.3.2 Site-Specific Environmental Management Plans

The SSEMPs describe in detail how the Project will be built within site-specific areas. They provide detailed design, details of appropriate monitoring positions/locations, and environmental management measures (such as the type of sediment management device) for specific areas.

Two draft SSEMPs have been prepared as part of this AEE report. These are for Central Ōtaki and Mary Crest. These focus areas were chosen as they contain potentially sensitive areas, and between them have the full range of environmental management issues likely to be encountered during the construction of the route. In total there will be at least 9 SSEMPs, but the final number will be developed in conjunction with the contractor, GWRC and KCDC.

The SSEMPs aim to:

- Provide confidence to stakeholders in the Project's design and environmental controls to be implemented during construction;
- Assist in assessing effects;
- Assist in developing mitigation strategies; and
- Assist in consultation with stakeholders regarding construction management issues.

The purposes of the SSEMPs are to:

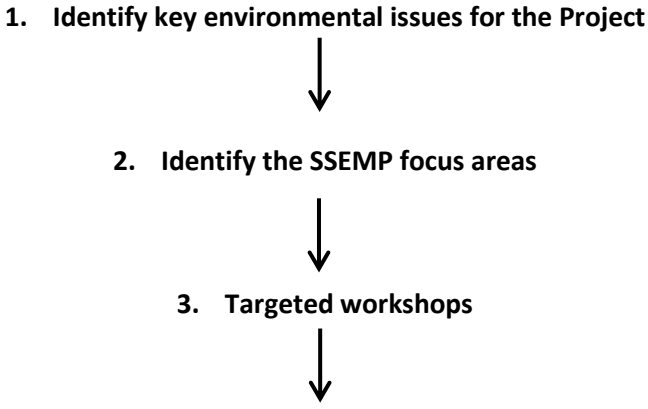
- Develop and demonstrate the environmental controls that will be applied to a specific area of the site or activity, i.e. how the CEMP and topic specific environmental management plans will be applied in practice;

- Provide more detailed design information about specific key areas along the route where there are a number of interacting discipline areas, technical challenges or particularly sensitive receiving environments;
- Prepare targeted environmental management measures to demonstrate how generic performance-based construction techniques could be applied to a specific section of the Project route; and
- Demonstrate a method for fine-tuning the design to reduce adverse environmental effects further at a later date in other areas along the Project route.

Preparing two draft SSEMPs at this stage of the process has had the added benefit of informing the development of performance-based consent and designation conditions using the technical inputs of all the relevant technical specialists. The SSEMPs, once finalised, will provide an integrated consideration of the key performance standards relevant to controlling actual and potential effects on the environment and will clearly document proposed control measures, e.g. temporary sediment controls.

Finalising/Developing the SSEMPs

The following four-step approach will be used to finalise the draft SSEMPs, and to develop SSEMPs for the balance of the Project:



Step 1 – Identify key environmental issues

The SSEMP areas (which together will cover the entire Project area) will be identified in a workshop by technical specialists through a process using the following criteria:

- **High profile (public)** – Sites that are clearly visible from public areas and that are known to be of particular interest to the public.
- **Visual and landscape** – Areas that have particular natural landscape value or which are clearly visible from public areas.
- **Social and community and urban design** – Areas where there is a significant amount of interaction with the public and where appropriate design is critical to achieve a better and more liveable outcome for people and communities.
- **Traffic management** – Areas where particular traffic management issues arise, such as at tie-ins with the existing SH1 where construction will need to occur, whilst still providing for the through movement of traffic.
- **Hydrology and flood risk** – Areas where the construction of the Project has the potential to cause particular damming and/or flooding issues.
- **Railway integration** – Areas where the NIMT railway corridor requires realignment.

Step 2 – Identify the SSEMP focus areas

In light of the above criteria, SSEMP focus areas will be selected. Together the SSEMPs will cover the entire Project area, and the boundaries between each SSEMP will be chosen taking into account the site conditions and issues arising along the Project length.

Step 3 – Targeted workshops

Workshops with KCDC / GWRC, stakeholders, and NZTA / KiwiRail personnel and consultant experts will be held in order to discuss the purpose and selection of the SSEMPs. Key construction issues for each SSEMP will be discussed in order to develop principles for managing construction activities given known environmental and construction issues.

Step 4 – Integrated approach to development

The outputs from the workshops will be integrated into the SSEMP through further sessions involving key technical experts. Contractor input in to the final SSEMP development will also be required to ensure that control measures are integrated with the proposed construction methodologies.

The final SSEMPs will be submitted to GWRC and KCDC for certification, prior to the commencement of any sector, stage or location of construction works.

SSEMP Relationship to the AEE Report and Conditions

The two draft SSEMPs (for Central Ōtaki and Mary Crest) form part of the application documentation and demonstrate a higher level of detail for two key areas of the Project, including environmental management principles that have been developed specifically for the unique issues present at the chosen sites and how these can be applied into physical controls.

Final SSEMPs developed for the Project prior to construction in a specific area will comply with the 'umbrella' CEMP, topic specific environmental management plans and the final designation and resource consent conditions.

30.3.3 Summary of Environmental Effects and Corresponding Management Plans

Table 30-1 identifies which actual and potential effects on the environment are managed in each management plan.

Table 30-1: Proposed Management of Environmental Effects via Management Plans

Environmental Effect (Construction)	Relevant Management Plan*
Designations	
Noise	CNVMP
Vibration	CNVMP
Air quality	CAQMP
Social and community effects	CEMP*, CTMP, CAQMP, Communications Strategy
Culture and heritage	Conservation Plan for Ōtaki Railway Station Conservation Plan for Clifden Conservation Plan for the relocation and conservation of the Mirek Smišek Beehive Kilns ADP
Site operation	CEMP*
Traffic	CTMP
Visual and landscape effects	LP EMP
Resource Consents	

Environmental Effect (Construction)	Relevant Management Plan*
Land	CEMP* ESCP
Water resources	
Ecology (aquatic and terrestrial)	EMP
Spill response and land contamination	BECLMP CEMP*

Note: *The CEMP applies to entire Project and is the overarching strategy document under which all of the topic specific environmental management plans sit.

30.4 Certification Process for Management Plans

The management plans are provided in draft as a number of amendments to the design are likely during design refinement for the Expressway. The appointed contractor commonly redesigns environmental management methods within the parameters guidelines set by conditions. For example, these may include reductions in exposed areas of earthworks in a particular section of the works; changing the staging of works depending on soil types and physical conditions; and amendments to erosion and sediment controls.

Each sub-management plan (topic specific environmental management plans) developed under the CEMP will be submitted to the GWRC, which has RMA functional and consenting responsibilities. The sub-plans contain Project-specific methodology for avoiding, remedying or mitigating the actual and potential adverse effects arising from the construction of the Project within the parameters set in the conditions.

GWRC will be responsible for certifying the following Management Plans:

- Erosion and Sediment Control Plan;
- Ecological Management Plan;
- Construction Air Quality Management Plan; and
- Bulk Earthworks Contaminated Land Management Plan.

As part of the Outline Plan process, the following management plans will be submitted to KCDC:

- Construction Noise & Vibration Management Plan;
- Network Utilities Management Plan;
- Landscape Plan; and
- Construction Traffic Management Plan.

It is acknowledged that aspects of some management plans will have a secondary purpose or benefit, and will be of interest to both GWRC and KCDC. Therefore it is intended that both KCDC and GWRC will be consulted during the preparation of the relevant management plan, prior to the lodgement of the management plan.

It is proposed that the final draft management plans will be lodged together to the relevant certifying authority before the commencement of work on the Project. The purpose of lodging all certifiable elements (apart from the SSEMPs) at the same time is to ensure the local authority is able to consider all plans on an integrated basis.

The SSEMPs will be lodged and certified as construction progresses, prior to commencement of the next stage of work. The methodology to be used at each construction sector will need to be consistent with the general methodology certified with the relevant sub-management plan contained within the CEMP. However, they will also need to be revised if required as construction proceeds (for example, due to weather conditions or unexpected site conditions).

30.5 Non-Certifiable Management Plans and Other Documents

In addition to the management plans that require certification as part of the CEMP, there are a number of other plans and supporting documents that form part of the overall framework for managing the final design and construction of the Project which will be provided to KCDC but will not require certification:

- Urban and Landscape Design Framework; and
- Accidental Discovery Protocol.

30.6 Summary of Mitigation, Monitoring and Other Measures to Manage Adverse Effects

The mitigation, remediation, management and monitoring measures are summarised in Table 30-2. Where relevant, a reference is provided to proposed condition(s).

Table 30-2: Proposed Mitigation and Assessment Reference for the Management of Environmental Effects

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
Traffic and Transport				
Additional Heavy Commercial Vehicle and light vehicle traffic during construction is likely to affect the safe operation of the existing SH1.	Use CTMP to control construction vehicle movements and routes and ensure safety, including: • advanced warning of turning traffic; • temporary speed limits; • controls on the routing of construction traffic; • temporary access changes; • measures to address any temporary effects on public transport users; • temporary speed limits; • measures to address any temporary effects on local traffic; and • early construction of overbridges associated with the Project	Monitoring as set out in the CTMP.	Designation • Subject to requirements of the CTMP. • Future SSEMPs required to set out detailed requirements	Assessment of Traffic & Transportation Effects Technical Report 6, Volume 3 CTMP CEMP
Geotechnical Engineering and Resilience				
Ground settlement resulting from preloading at inter-dunal areas within the Project footprint and a short distance further. Areas of potential settlement are south of Mary Crest, and north of Rahui Road.	Minor road repair to existing roads such as sealing of cracks may be required during construction and the pavement may need to be reinstated on completion of the preloading and construction. The railway line may also need to be re-	Ground settlement will be closely monitored during and after the preloading period to assess the effect to settlement of the adjacent ground, especially at SH1 and the NIMT. Any development of cracks on the seal should be recorded and monitored, to	Designation: • Monitoring of ground settlement during and immediately after construction • Settlement conditions	Geotechnical AEE Technical Report 4, Volume 3 CEMP

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
No risk to buildings.	levelled during or soon after construction.	trigger repairs as necessary.		
Consolidation of ground due to fill embankments.	Appropriate management measures.	Ground settlement monitoring as described above.	Designation: • CEMP • Settlement conditions	Geotechnical AEE Technical Report 4, Volume 3 CEMP
Consolidation of ground due to groundwater drawdown.	If this effect does occur beyond the Project extent, change the construction methodology, for example: • Lining (temporary and/or permanent) of cuts below the groundwater level; • Limit the length and drained duration of temporary excavation.	Groundwater level and pressure will be monitored during excavation and dewatering to ensure there is no unexpected water drawdown that will affect water abstraction in the vicinity.	Designation: • CEMP • Settlement conditions	Geotechnical AEE Technical Report 4, Volume 3 CEMP
Sand dune erosion due to proposed cuttings during construction.	Re-vegetation should occur as soon as practicable after formation of cut areas, and vegetation should be maintained during the early stages after construction. The type of vegetation should be carefully selected to suit the local coastal dune sand environment. Erosion protection geotextile mats should be installed on new cut slopes. Topsoil or peat should be placed on slope surfaces.	Monitoring as set out in the ESCP	Resource Consent (General Conditions): • ESCP • EMP • SSEMPs Resource Consents (Land Use Consent for Bulk Earthworks) • ESCP	Geotechnical AEE Technical Report 4, Volume 3 Erosion and Sediment Control Plan Ecological Management Plan CEMP
Geological effects of piling works during bridge foundation works	Implementation of erosion and sediment management controls during pile	Monitoring of ground settlement and implementation of ESC	Designation: • Settlement conditions	Geotechnical AEE Technical Report 4, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
including ground settlement, contaminants entering watercourses, changes to the existing aquifer system.	construction particularly adjacent to waterways to prevent spillage and contamination.	measures and SSEMP	Resource Consent (Land Use Consent for Works in Watercourse) • ESCP • EMP • SSEMP	Erosion and Sediment Control Management Plan Ecological Management Plan CEMP
Reduction in pore pressure from groundwater drawdown resulting in ground settlement and groundwater flow changes.	Any artesian water encountered should be managed through raised casing above ground level.	Groundwater monitoring	Resource Consent (Water Permit for taking and using groundwater)	Geotechnical AEE Technical Report 4, Volume 3 CEMP
Loss of water from newly created wetlands	A low embankment with weir to ensure water is retained in the newly created wetlands and surplus water can overflow through the weir during wet weather conditions.	N/A	Resource Consent (General conditions) • EMP • SSEMP	Geotechnical AEE Technical Report 4, Volume 3 CEMP
Urban Form and Function				
Effects on part of the existing Pare-o-Matangi reserve.	Provide off-set mitigation by adding land to and planting within the enhanced Pare-o-Matangi reserve, in conjunction with tangata whenua and other community input.	N/A	Designation: • Landscape Plan	Urban Design Assessment Technical Report 7. Volume 3 CEMP
Landscape and Visual				
Removal of a portion of the Northern dunescape in Northern Ōtaki	The cuts through sand dune to reflect the natural contour to mitigate the effect on this	N/A	Designation: • Landscape Plan	Landscape and Visual Assessment of Effects Technical Report 8,

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
resulting in loss of existing landform.	feature. Cut faces will be planted or grassed. Screen planting of native trees and shrubs will also be placed along the top of the eastern Expressway cut batter. Wetland riparian planting will also occur around the reconfigured Railway Wetland.			Volume 3
Moderate to high degree of change to landform from Taylors Road to Waitohu Valley Road section (Northern Gateway), from rural open pastoral landscape to a landscape containing a section of transport corridor and changes to landform south of Ōtaki Gorge Road (southern Gateway).	Bold formal planting to signal the Project's Northern Gateway zone, just south of Taylors Road and the southern Gateway zone south of Ōtaki Gorge Road.	N/A	Designation: • Landscape Plan	Landscape and Visual Assessment of Effects Technical Report 8, Volume 3.
Landscape effects resulting from three new bridges and associated approach embankments in the Ōtaki North to Rahui Road section of the Project.	Planting is proposed to mitigate effects.	N/A	Designation: • Landscape Plan	Landscape and Visual Assessment of Effects Technical Report 8, Volume 3
A reduction in the usable area of the Pare-o-Matangi reserve which will have a significant	Additional land will be added to the Pare-o-Matangi reserve, and extensive landscaping is proposed for the area, to be	N/A	Designation: • Landscape Plan	Landscape and Visual Assessment of Effects Technical Report 8, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
landscape effect.	finalised in conjunction with tangata whenua and other community input.			
Visual effect around Rahui Road where the Expressway and the realigned NIMT are constrained by heritage buildings.	Screen planting and a screen fence to mitigate visual effect on the former Rahui Milk Treatment Station building and the adjoining former social hall. Block planting along the eastern Expressway margin to integrate the Project with its surroundings and allow views towards the Ōtaki Racecourse. Dense, mass planting will also provide a buffer between road and rail and screen the Expressway from the Ōtaki Railway Station and Ōtaki Railway Retail area. Specialist tree planting will enhance the setting and amenity of the reinstated cycle/walkway from Rahui road to Ōtaki Railway Station.	N/A	Designation: • Landscape Plan	Built Heritage Assessment of Effects Technical Report 18, Volume 3 Landscape and Visual Assessment of Effects Technical Report 8, Volume 3
Loss of existing rural landform between Waerenga Road to Ōtaki Gorge Road and north of Te Hapua Road to Te Kowhai Road resulting in loss of existing rural landform.	Project earthworks areas will be rehabilitated through (in this case) grassing the side batters of the Expressway.	N/A	Designation: • Landscape Plan	Landscape and Visual Assessment of Effects Technical Report 8, Volume 3
Ōtaki River Bridge creates a cumulative	Existing vegetation on the southern river bank will be re-	N/A	Designation: • Landscape Plan	Landscape and Visual Assessment of Effects

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
effect with existing SH1 bridge and NIMT bridge.	vegetated with native species. Fill batters of the embankments will be planted with native species. Similar landscape planting will occur on the approach batters to the Ōtaki South Underpass and the adjoining Expressway ramp batters.			Technical Report 8, Volume 3
Hydrology				
The proposed crossing of the Ōtaki River will not alter the hydrology of the river. The crossing of the Ōtaki River floodplain will increase the potential for properties in areas to the east that are used for pasture to be flooded, however potential flooding of populated areas to the west of the Expressway will be no worse than in the existing situation. In extremely rare flood events the effects will be slightly greater than in the existing situation (adjusted for possible climate change effects to 2090).	Ōtaki River floodplain mitigation: • construction of a secondary flood containment bund located approximately 250m north of Chrystall's Stopbank; • installation of a 40m wide dry culvert through the Expressway embankment; and • installation of a road overflow weir section along the Expressway embankment.	N/A	Resource Consent (Land Use Consent for Works in Watercourse and Damming and Diverting Surface Water)	Hydrological AEE Technical Report 9, Volume 3
Flood levels within the	Landscaping is proposed at	N/A	N/A	Hydrological AEE

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
Pare-o-Matangi reserve will be marginally higher for some floods.	the Pare-o-Matangi reserve to form a low bund around the perimeter of the affected properties on the corner of the existing SH1 and Rahui Road			Technical Report 9, Volume 3
Effects on flood levels in the primary flood storage basin of the Mangapouri Stream due to the Expressway crossing	• Incorporate a long relief culvert under Rahui Road to the Racecourse Catchment to carry flood waters out of the Mangapouri holding basin; • Installation of an 'undersized' culvert at the Racecourse Stream under the Expressway and NIMT which will act as a 'throttle' holding floodwaters on the eastern side of the Expressway embankment; • Keeping the existing culvert at the railway embankment, maintaining the existing 'throttle' function at this location; • locally lower the level of the link road (County Road) connection that loops around under the Rahui Road overbridge adjacent to the eastern abutment; and • To compensate for the loss of storage volume in the remnant Railway Wetland,	N/A	Resource Consent (Land Use Consent for Works in Watercourse and Damming and Diverting Surface Water)	Hydrological AEE Technical Report 9, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
	make use of the "dead space" between the old NIMT railway embankment and the Expressway embankment to the south of the new local link road overbridges to form a second wetland area in series with the remnant Railway Wetland.			
Effects on flood levels in the Waitohu Stream and floodplain due to the Expressway and bridge crossing.	• Expressway constructed as a raised embankment across the 0.9 km wide floodplain. Dry culverts will be incorporated into the embankment to accommodate existing overland flow paths.	N/A	Resource Consent (Land Use Consent for Works in Watercourse and Damming and Diverting Surface Water)	Hydrological AEE Technical Report 9, Volume 3.
Effects on flood levels in the Mangaone Stream and floodplain due to the Expressway and bridge crossing.	• Construct an elevated bund upstream of the Expressway functioning as a flood detention barrier; • Installation of culverts aligned with the downstream NIMT railway and SH1 culverts on each primary watercourse; and • Installation of culverts and bridges on the local link road to convey overland floods.	N/A	Resource Consent (Land Use Consent for Works in Watercourse and Damming and Diverting Surface Water)	Hydrological AEE Technical Report 9, Volume 3.
Stormwater				
The effects of erosion and transportation of	Implement appropriate E&SC practices to limit the effects of	• Erosion and sediment control measures	Resource Consent (General conditions):	Stormwater AEE Technical Report 10,

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
sediment (including silt and sediment tracked onto roads from construction vehicles) from areas disturbed by construction can have adverse effects on downstream receiving environments.	erosion, suspended solids and potential adverse effects on the downstream receiving environment.	• Visual assessments of receiving watercourses • Weather forecasts	• CEMP • ESCP • SSEMP	Volume 3 ESCP SSEMP's
New culverts introducing or removing constrictions to surface water flow creating potential flood hazards.	Culverts have been designed so that they have minimal impact on flood levels (both upstream and downstream) and allow for fish passage.	N/A	N/A	Stormwater AEE Technical Report 10, Volume 3
Increased volume of rainwater run-off from new impervious surfaces increasing stream flow potentially increasing stream erosion and downstream flood levels in large rainfall events.	The design includes swales and basins to attenuate flood flows to reduce the need for offset storage.	Monitoring of swale/ wetland/ basin attenuation functioning as part of implementing the CEMP and SSEMP's.	Resource Consent (General conditions): • CEMP • SSEMP	Stormwater AEE Technical Report 10, Volume 3
Increased flood risk to an existing farm storage building upstream of the Gear/Settlement Heights culvert	Negotiations with the landowner may include raising or relocating the building, bunding or compensation	N/A	Resource Consent (Stormwater Discharge conditions)	Stormwater AEE Technical Report 10, Volume 3
Terrestrial Ecology				
Loss of mature trees from between Hautere Bush and Cottle's Bush, at Cottle's Bush, adjacent to Cottle's Bush.	QEII covenanting existing bush remnants or planting of indigenous habitat.	Monitoring and maintenance of newly planted vegetation as outlined in the Ecological Management Plan.	Resource Consent (General conditions): • Ecological Management Plan (EMP)	Terrestrial Ecology AEE Technical Report 11, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
Loss of approximately 0.5ha of the Ōtaki Railway Wetland.	It is proposed to create two areas of new wetland within the designation to compensate for the loss of most of the Railway Wetland. One will be the Kennedy Wetland adjacent to the existing Ōtaki Railway wetland (approximately 0.4ha) and a new area of wetland adjacent to the Mary Crest bush (approximately 0.7ha) and provision of a bund around the western edge of the Mary Crest wetland to assist in water retention. The new areas to be created will provide greater ecological value than the area that will be lost.	Monitoring and maintenance of newly planted vegetation as outlined in the Ecological Management Plan.	Resource Consent (General conditions) • EMP	Terrestrial Ecology AEE Technical Report 11, Volume 3
Loss of approximately 40 mature trees/other vegetation from various locations along the Expressway	Native trees and shrubs will be used in landscape planting for the Expressway alignment including riparian planting.	N/A	Resource Consent (General conditions) • EMP	Terrestrial Ecology AEE Technical Report 11, Volume 3
Potential for existing bush remnants to be exposed to wind throw where trees and shrubs are cleared from the edge of areas of bush.	Where mature trees are removed from the existing edges of bush, wind breaks will be planted along the edge to provide protection.	Monitoring and maintenance of newly planted vegetation as outlined in the Ecological Management Plan	Resource Consent (General conditions): • EMP	Terrestrial Ecology AEE Technical Report 11, Volume 3 Ecological Management Plan
Potential effects on population of peripatus (velvet worm) at the	The logs where peripatus were found at the Steven's Property are close to the Project	N/A	Resource Consent (General conditions): • EMP	Terrestrial Ecology AEE Technical Report 11, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
Steven's property (48 Old Hautere Road).	footprint. If the footprint is likely to directly affect these or if the logs are likely to be exposed to desiccation due to the removal of tree cover these should, with the land owner's permission, be moved further into the bush. Placement of a few logs from felled trees along the alignment to provide future habitats for peripatus.			Ecological Management Plan
Potential hydraulic effects on the existing Mary Crest bush and wetland during construction of the Expressway	The CEMP and SSEMP will specify the practices used to minimise the effects of construction activities on the existing bush and wetland area at Mary Crest	Groundwater monitoring in vicinity of Mary Crest bush and wetland	Resource Consent (Water Permit for taking and using groundwater)	Terrestrial Ecology AEE Technical Report 11, Volume 3 Ecological Management Plan CEMP & SSEMP

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
Aquatic Ecology				
Temporary effects from construction due to reduction in water quality in streams and effects on fish and invertebrate habitats due to increased sedimentation and road run-off.	The Construction Environmental Management Plan, ESCP and EMP will specify the practices and structures (e.g. silt barriers) used to minimise the effects of construction activities on water quality, habitat and biota in waterways in the Project area.	Monitoring to establish a baseline of pre-construction ecological conditions against which effects are measured (and adaptive management techniques applied as necessary). Turbidity monitoring during construction. Monitoring and maintaining ESC devices during construction. Post construction monitoring of waterways, new wetland areas and new bush habitat.	Resource Consent (General conditions): • EMP • CEMP • ESCP	Aquatic Ecology AEE Technical Report 12, Volume 3 CEMP E&SCP EMP
Impaired fish and invertebrate migration due to culverts	At each location where a native fish-bearing stream crosses the Project, fish passage will be provided. Fish passage will also be provided to streams that drain small catchments on the inland plains where these streams cross the Expressway.	Immediately following formation of diversions and livening of the new channel, an appropriately qualified ecologist will inspect and confirm that any structures within the diversion will provide fish passage for all native species currently known to occur or reasonably likely to occur within the stream. On-going monitoring and maintenance of culverts will	Resource Consent (General conditions): • EMP	Aquatic Ecology AEE Technical Report 12, Volume 3 EMP CEMP

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
		occur during the operation of the Expressway.		
Effects on road run-off on water quality and channel erosion.	Treatment of road run-off in vegetated attenuation swales and basins.	On-going monitoring and maintenance of swales and ponds will occur during the operation of the Project.	Resource Consent (General conditions): • EMP	Aquatic Ecology AEE Technical Report 12, Volume 3, CEMP
Loss and alteration of streambed and riparian habitat due to culvert construction and operation of the Project.	The loss of open-channel stream habitat is mitigated by habitat improvement and rehabilitation by implementing the following: • Installation of rip rap to reinforce banks upstream and downstream of culverts. • Riparian planting in and along streams in the Project area. • Fencing of stream channels within the Project designation to exclude stock.	On-going monitoring and maintenance of planting and fencing will occur during the operation of the Expressway.	Resource Consent (General conditions): • EMP	Aquatic Ecology AEE Technical Report 12, Volume 3
Loss of 0.5 hectares of the Railway Wetland to the Project	Construction of two new wetlands (1.1 hectares in total)	Post construction monitoring of constructed wetlands	Resource consent (General conditions): • EMP	Aquatic Ecology AEE Technical Report 12, Volume 3 EMP
Air Quality				
Construction activities including earthworks required as part of the Project have the potential to result in the generation of dust if not	A Construction Air Quality Management Plan will contain the mitigation measures required for construction activities, to include the use of water carts to suppress dust,	A dust monitoring programme is proposed, based on regular visual monitoring in all areas, monitoring of total suspended particulate matter (TSP) and monitoring of meteorological	Resource Consent (Discharge Permit to discharge dust to air): • CAQMP	Air Quality AEE Technical Report 13, Volume 3 CAQMP

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
appropriately controlled.	and low speed limits for construction traffic near sensitive receiving environments etc.	conditions.		
Noise and Vibration				
Temporary noise and vibration disturbance during construction.	The outline plans submitted to KCDC for approval will contain a detailed construction methodology. A Construction Noise and Vibration Management Plan (CNVMP) will be finalised by the Project team, and implemented by the appointed contractors.	As required by the Construction Noise and Vibration Management Plan (CNVMP), including monitoring: • Noise limits; • At locations considered to be sensitive receivers, or otherwise in response to a complaint; • Effective communication with neighbours in close proximity to the works to manage noise disturbance; • Pre and post construction building condition survey of the former Rahui Milk Treatment Station and Social Hall.	Designation: • CNVMP	Noise and Vibration AEE Technical Reports 14 and 15, Volume 3 CNVMP
Once operational the Project will create road traffic noise.	Road traffic noise was modelled and mitigation options tested. A low-noise surface, open-graded porous asphalt (or similar), will be used on the Expressway surface through Ōtaki. More specifically, proposed noise mitigation is as follows:	No monitoring required except as set out in the CNVMP.	Designation: • CNVMP • Requirement for low noise surfaces in specified locations	Noise and Vibration AEE Technical Reports 14 and 15, Volume 3 CNVMP

<table>
<tr><th>Actual or potential environmental effect identified</th><th>Mitigation recommended</th><th>Monitoring recommended</th><th>Condition proposed</th><th>Report name(s)/reference(s)</th></tr>
<tr><td></td><td><table><tr><th>Location</th><th>Currently proposed noise mitigation</th></tr><tr><td>A: North of Ōtaki Ramp</td><td>Open-graded □porous asphalt (PA-10)</td></tr><tr><td>B: 230 Main Highway, Ōtaki</td><td>Open-graded porous asphalt (PA-10)</td></tr><tr><td>C: East Ōtaki</td><td>Open□graded porous asphalt (PA-10)</td></tr><tr><td>D: Ōtaki Gorge to Te Horo (West)</td><td>Building modification for 14 Old Hautere Road</td></tr></table>
Road Noise: One PPF will be investigated for acoustic treatment to mitigate road noise.</td><td></td><td></td><td></td></tr>
<tr><td>As a result of a change to the rail alignment through Ōtaki, rail noise is predicted to exceed the nominated criteria at two Protected Premises and Facilities.</td><td>The two PPFs will be investigated for acoustic treatment to mitigate rail noise.</td><td>Monitoring as required by the Construction Noise and Vibration Management Plan</td><td>Designation:
• Monitoring as required by CNVMP</td><td>Noise and Vibration AEE Technical Reports 14 and 15, Volume 3

CNVMP</td></tr>
<tr><td colspan="5">Land Contamination</td></tr>
<tr><td>Presence of contaminants in soil and</td><td>Potential effects can be avoided through application of</td><td>A contaminated land specialist will be engaged by the Project</td><td>Resource Consents (General conditions)</td><td>Contaminated Land Assessment of Effects</td></tr>
</table>

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
their disturbance during construction may have adverse effects on human health if above human health risk based guidelines, or if above ecological risk based guideline values, adverse effects on terrestrial/aquatic life.	appropriate procedures to manage contaminated soils and materials. The BECLMP contains procedures on the identification and mitigation of contaminated materials or soil. Findings of the Phase 2 CLAs will be reviewed, and where applicable, obtain consent from KCDC for fuel system removal and soil disturbance at contaminated sites under the NES. Consents would be obtained prior to construction commencing.	team to monitor, supervise and report on works that may disturb contaminated land. Monitoring as required within the BECLMP.	• BECLMP	Technical Report 16, Volume 3 BECLMP
Archaeology				
Effects on two heritage buildings (Ōtaki Railway Station and 'Clifden) and the grounds of a third heritage building at 230 Main Road Ōtaki. Three archaeological sites that are outside the Project but effects on these sites are possible.	Clifden and the Ōtaki Railway Station will be relocated, as discussed further below. Interpretation panels and viewing areas could be incorporated to assist in providing information on the history of the area and the results of any archaeological work carried out as part of the Project. Opportunities are sought during archaeological work to provide information to the public on the work, through	Systematic investigations of discrete sections of the proposed Expressway that have high archaeological probability. The investigative work would be undertaken by a team of archaeologists and take place prior to construction.	Resource Consent (General condition) • ADP Designation: • Follow standards and guidelines of ICOMOS New Zealand Charter, Archaeological Authorities granted under the HPA 1993 and research strategy.	Archaeology Assessment of Effects Technical Report 17, Volume 3 ADP

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
	press releases, talks to local schools or public open days. On completion of the Project and any associated archaeological work, a pamphlet or small booklet will be prepared specifically for distribution in the Ōtaki district of the results of the archaeological work. Depending on the nature of archaeological material located, and in accordance with consultation with Nga Hapū o Ōtaki and the management committee of the Ōtaki Museum, if considered appropriate, an exhibition associated with the archaeological work could be developed for display at the Ōtaki Museum. Develop a Research Strategy. Archaeological authorities will be sought under Historic Places Act and an AMP developed.			
Potential for discovery of potential archaeological material during	Archaeological investigations undertaken in conjunction with monitoring during the	Systematic investigations of discrete sections of the proposed Expressway that	Resource Consent (general conditions): • ADP	Archaeology Assessment of Effects Technical Report 17,

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
construction	course of construction. Discoveries of archaeological material will be treated in accordance with the ADP to be agreed with tangata whenua.	have high archaeological probability. The investigative work would be undertaken by a team of archaeologists and take place prior to construction. Monitoring during the course of construction for the sections of the proposed Expressway that have low to moderate archaeological probability.		Volume 3
Built Heritage				
Those sites with heritage values within the Projects earthworks footprint are: • The Ōtaki Railway Station, which is to be moved to re-align it with the NIMT. • The site of the former Mirek Smišek pottery, containing two beehive kilns, a brick flue, a preparation shed and a house. • Clifden Cottage at Bridge Lodge.	Ōtaki Railway Station: movement of the building, which will include the deconstruction and rebuilding of all brick elements, will be undertaken carefully, so as to preserve heritage values, in accordance with an updated conservation management plan. Mirek Smišek pottery site: the beehive kilns and flue will carefully be relocated on the existing site, in accordance with a conservation management plan. Clifden Cottage: the cottage will be relocated to an	Implementation of the conservation management plan for Ōtaki Railway Station, and the criteria set out in the conservation plans for 'Clifden' and the beehive kilns.	Resource Consent (General condition) • ADP Designation: • Follow standards and guidelines of ICOMOS New Zealand Charter, Archaeological Authorities granted under the HPA 1993 and research strategy	Built Heritage AEE Technical Report 18, Volume 3 Conservation management plan/reports

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
	appropriate site within the district, in accordance with a conservation management plan.			
Noise/vibration, settlement and visual effects that may affect the amenity of the former Rahui Milk Treatment Station, the former Rahui Factory Social Hall and the setting of the former Te Horo Railway Station.	Planting is proposed to mitigate the effects of the Project on the amenity values of these buildings. Any noise and vibration effects that may arise during construction will be avoided or mitigated through implementation of the Construction and Environmental Management Plan.	Monitoring of planting as per landscape plan. Mitigation as recommended in the Noise and Vibration chapter 22 and as set out in the CNVMP.	Designation: • CNVMP • Settlement conditions	Built Heritage AEE Technical Report 18, Volume 3 CNVMP
Tangata Whenua and Cultural Heritage				
Adverse effects on sites, areas and features of potential significance to tangata whenua, particularly between Taylors Road. Māori-owned land at Te Horo is also affected.	An ADP is to be finalised by the NZTA in consultation with Nga Hapū o Ōtaki, which will guide the Project earthworks and dictate proper cultural protocols to be followed in the event of an archaeological site being discovered. Relationship agreements between the NZTA and Nga Hapū o Ōtaki are being progressed and it is expected that a Memorandum of Understanding will be signed with Nga Hapū o Ōtaki. Tangata whenua advice and	Active supervision by iwi representative during earthworks in sensitive areas and cultural training for contractors	Resource Consent (general conditions): • ADP	Cultural Heritage Assessment of Effects Technical Report 19, Volume 3 ADP

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
	input will be sought in a number of areas, including in relation to mitigation measures at the Pare-o-Matangi reserve.			
Social				
Economic impacts on a small number of Te Horo businesses that are reliant on bypassing traffic.	Installation of appropriate signage at exit points on the new Expressway to alert passing traffic to services and facilities at Te Horo.	N/A	Designation: • Network Integration Plan (NIP) prepared for the Project	Social Impact Assessment Technical Report 20, Volume 3
Impacts on landowners from land requirements.	Residents permanently affected by the works will be compensated in line with market valuations and assisted with the process under the PWA. For those vulnerable residents such as the elderly or disabled, NZTA will appoint a community liaison person to facilitate the process.	N/A	Designation: • Community liaison person appointed • Stakeholder Communications and Management Plan • Community Liaison Group established	Social Impact Assessment Technical Report 20, Volume 3

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
Construction impacts on houses and businesses within close proximity to the Project.	A community liaison group will be established for key sectors such as education and business (Te Horo and Ōtaki). Specific provisions should be set up in association with Te Wānanga-O-Raukawa. If during the construction phase any substantial traffic delays particularly over holiday periods and long weekends are anticipated publicity should be given to this on a regional or national basis e.g. use of national Press or national and regional radio. During the construction period and during the early stages of operation organisations such as Grey Power should be specifically informed. Residents affected by construction will be temporarily relocated in the highly unlikely event that construction activities preclude normal daily functioning. Maintain the iwi consultation protocol that has been	Establishment of a dedicated community liaison person who will be the conduit between the Project team and the community during construction. Establishment of a feedback/complaints database to established for the construction phase to ensure that community, stakeholder and individual issues are addressed and that appropriate responses are provided for all queries.	Designation: • Community Liaison person appointed • Community Liaison Group established Designation and Resource consent (General conditions) • Complaints register maintained at all times during construction works	Social Impact Assessment Technical Report 20, Volume 3 CEMP Memorandum of Understanding with iwi

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
	established as a forum to communicate information particularly during the construction phase. Establishment of a dedicated community liaison person who will be the conduit person between the project team and the community during construction.			
Social effects from the loss of part of the Pare-o-Matangi reserve.	Incorporate Ōtaki Motel land to offset loss of land at the Pare-o-Matangi reserve, and involve local iwi and the wider Ōtaki community in the re-design of the Pare-o-Matangi reserve.	N/A	Designation: • Landscape Plan	Social Impact Assessment Technical Report 20, Volume 3 Landscape Management Plan
Economic				
Potential adverse effects for a limited number of businesses at Te Horo, between Te Horo and South Ōtaki and at Ōtaki.	Appropriate signage at exit points on the new Expressway to minimise business redistribution effects.	N/A	Designation: • Prepare a Network Integration Plan	Assessment of Economic Effects Technical Report 21, volume 3
Land Acquisition and Property				
Some properties will be temporarily occupied because they are required for temporary construction purposes.	Following the consenting process the NZTA / KiwiRail will confirm which land will be required for temporary occupation, lease or land to be acquired. The designation boundaries will be reviewed and those	N/A	Designation: • Consider uplift of parts of new designation not required for the on-going operation or maintenance to the State Highway	Assessment of Land Acquisition and Property Effects Social Impact Assessment

Actual or potential environmental effect identified	Mitigation recommended	Monitoring recommended	Condition proposed	Report name(s)/reference(s)
	parts will be uplifted that are no longer required for roading/rail purposes.		or for on-going mitigation measures.	
Access to some properties, easements and other property rights will be adversely affected by the Project.	Where property rights are affected alternative arrangements for movement or replacement are proposed and developed in consultation with the landowner.	N/A	No condition (the NZTA is required under Government Roading Powers Act to provide an alternative access). Mitigation has been provided through design of the Project.	Assessment of Land Acquisition and Property Effects
Some properties within close proximity to the route have been identified as being subject to or particularly sensitive to effects including noise and landscape and visual effects.	Where noise standards are breached appropriate methods are proposed to manage noise, including the low-noise road surface on the Expressway proposed through Ōtaki. Where required adverse visual effects will be mitigated (as discussed above in relation to landscape and visual effects).	Monitoring as set out in the CNVMP and CAQMP	Designation: • CNVMP Resource Consent (Discharge Permit to discharge dust to air): • CAQMP	CNVMP CAQMP

30.7 Overview of Proposed Conditions

Based on the mitigation and monitoring measures summarised in Table 30-2, a suite of conditions is proposed to manage the effects of construction.

Some conditions will appear in both the designation and regional resource consent conditions, but for the most part the design and nuisance effects are dealt with under the designation conditions, and the other environmental, ecological, and water effects are dealt with in the regional consent conditions.

A suite of conditions is also proposed for the designation to manage the effects of operation. These mainly relate to maintenance, including maintenance of the road and associated structures, surface water run-off and maintenance of vegetation planting. The NZTA has an existing network maintenance contract and has a number of measures in place for the on-going operation and maintenance of its assets.