CEMP Appendix O

Construction Traffic Management Plan

NZ TRANSPORT AGENCY
WAKA KOTAHI

1 MacKays to Peka Peka Expressway

Revision History

Revision Nº	Prepared By	Description	Date
A	Jamie Minchington	Draft	8-Aug-11
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Document Acceptance

Action	Name	Signed	Date
Prepared by	Jamie Minchington		22-Dec-11
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on behalf of	Beca Infrastructure Ltd		

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Executive Summary

The MacKays to Peka Peka Expressway Project forms part of the Wellington Northern Corridor, running from Wellington Airport to Levin. This corridor is one of the seven Roads of National Significance (RoNS) named in the Government Policy Statement on Land Transport Funding 2009/10-2018/19, which focuses on supporting New Zealand's productivity and economic growth.

This document outlines procedures, requirements and standards necessary for managing the traffic effects of construction arising from the MacKays to Peka Peka Expressway Project, and forms part of the suite of environmental controls within the *Construction Environmental Management Plan* (CEMP, Volume 4) for the Project.

This document provides an appraisal of the types of traffic impacts that are anticipated and how these will be managed, while a related document (the Assessment of Temporary Traffic Effects (ATTE), which forms part of the Assessment of Environmental Effects) provides an initial appraisal of the expected scope and magnitude of the impacts during construction and outlines the methodologies and procedures to mitigate these.

It is anticipated that this document will be a 'live' document and will be updated and revised as the construction methodology, regulatory environment and requirements for implementation of traffic control change over time. This reflects the fact that the construction methodology will not be finalised until a detailed design is completed and detailed construction planning commences, at which time there will be a more comprehensive understanding of the impacts of the Project. In addition, traffic patterns will continue to change between now and the commencement of construction on site. Therefore mitigation measures will be fully developed closer to construction to allow them to most effective and best meet the needs of the stakeholders, affected parties and construction activities.

To reflect this dynamic environment and uncertainty in the potential construction and traffic management methodologies, this document prescribes a process whereby Site Specific Traffic Management Plans (SSTMP) will be developed by the NZTA's Project team [1] and approved by the Road Controlling Authority (RCA). It defines how and when the NZTA's Project team will be required to consult with stakeholders and what kinds of mitigation measures will be necessary for the anticipated range of impacts.

The active governance of traffic management activities will occur through the approval process of SSTMPs by NZTA and KCDC or their representative and through on-going assessment of Key

[1] This Management Plan refers to the Project team as carrying out works on behalf of and as contracted by the NZTA. The NZTA is the requiring authority and the consent holder.

Performance Indicators. The three KPIs which are proposed for the Project are Traffic Management Auditing, SH1 Travel Times and Stakeholder Surveys.

Requirements for traffic management auditing are established in this report, which proposes a process whereby the Project will be monitored and tracked over time on the basis of audit scores weighted by Annual Average Daily Traffic (AADT) volume. This approach provides a flexible and responsive measure of the performance of implementation of traffic control on the Project. Existing highway network travel time monitoring will be monitored throughout to monitor performance of TTM on the highway, with the agreement of NZTA. The perceptions of stakeholders will be monitored through regular surveys. The survey form, interval, and target audience will be agreed with NZTA and KCDC.

1 Introduction

This Construction Traffic Management Plan (CTMP) forms part of a comprehensive suite of environmental controls within the Construction Environmental Management Plan (CEMP, Volume 4) for the construction phase of the MacKays to Peka Peka Expressway Project (the Project). The CTMP addresses the potential construction traffic effects associated with the construction of the Project.

1.1 Purpose and scope

This CTMP identifies the minimum standards necessary for management of traffic control on the Project, but it is acknowledged that at times it will not be possible to meet those standards and therefore outlines procedures to be followed where those minimum standards cannot be met. It is intended as a framework for the development of particular traffic management practices and procedures to minimise effects on health and safety and to reduce the impact on the environment.

The traffic impacts of the Project will not be fully understood until the detailed design is finalised and detailed construction planning has commenced. These items cannot be finalised before consent for the Project has been achieved, so this document does not prescribe or limit the activities that will be required for construction of the Project. Instead, it develops procedures under which traffic management will be implemented to the satisfaction of stakeholders and road controlling authorities.

It is expected that the methodologies and mitigation measures specified in this document will be refined during the Site Specific Traffic Management Plan (SSTMP) development stage, at a time closer to commencement of construction.

This report should be read in conjunction with the Assessment of Temporary Traffic Effects (ATTE) report (Technical Report 33, Volume 3), and remainder of the CEMP (Volume 4). The ATTE aims to estimate and appraise the impacts of the Project's temporary traffic management activities and the proposed mitigation measures. The CEMP provides a more detailed description of the construction activities involved in the Project and procedures for how these will be managed.

The CTMP will be updated, with the necessary approval, throughout the course of the Project to reflect material changes associated with changes to the construction methodology, regulatory environment and requirements for implementation of traffic control.

1.2 Project description

Please refer to the full Project description (Construction & Operation) within Part D, Chapters 7 and 9, Volume 2, of the AEE.

1.3 Performance standards

Temporary Traffic Management (TTM) is governed by New Zealand legislation, in particular, the Land Transport Act 1998. Land Transport Rules made pursuant to that act, which relate to TTM, include:

- Land Transport (Road User) Rule 2004
- Land Transport Rule: Traffic Control Devices 2004
- Land Transport Rule: Setting of Speed Limits 2003

NZTA's Traffic Control Devices Manual (TCD Manual) (currently under development) provides guidance on industry good practice, including, where necessary, practice mandated by law in relation to the use of traffic control devices. The TCD Manual includes and will supersede previous stand-alone documents relevant to TTM, such as the Code of Practice for Temporary Traffic Management (COPTTM) and the Manual of Traffic Signs and Markings (MOTSAM). NZTA's State Highway Geometric Design Manual (Draft) also provides design standards and procedures for the state highway work.

The primary standard (which forms part of the TCD Manual) that will be adhered to in planning, coordinating and implementing TTM for the Project is COPTTM (including the local road supplement and Road Controlling Authority (RCA) specific procedures).

Where it is not possible to adhere to this standard, the COPTTM's prescribed Engineering Exception Decision (EED) process will be followed, which will include appropriate mitigation measures agreed with the RCA.

The NZTA's Project team will liaise early with RCAs and agree on traffic management methodologies for key areas before completion of the detailed design or commencement of construction in accordance with local authority regulations. This will allow for responsive traffic management methodologies that reflect the requirements of the RCAs and the need for flexibility over timing, design and construction methodology.

It should be noted that while the TCD Manual (COPTTM) generally provides comprehensive guidance, there are likely to be circumstances where other manuals will be required for guidance on specific areas. The Austroads Guide to Traffic Management is the likely source of additional guidance. This document will be employed where design of traffic signals, road layouts, signage or other traffic engineering elements require more detailed analysis.

The relevant designation and consent conditions granted for the Project will also form part of the requirements for implementation of this CTMP.

2 Environmental Impacts Summary

This section provides a description of the expected traffic management activities for the Project and an overview of the anticipated impacts of these activities. The construction methodology will be further refined as the design phases move through to detailed design and construction. This report therefore reflects the best understanding of expected traffic management methodologies for the required construction works, and is based on similar construction activities implemented across the country.

2.1 Summary of traffic management activities

The Project comprises “green field’s” construction of a 4-lane expressway between MacKays Crossing and Peka Peka Road. Interchanges will be constructed at Poplar Ave, Kāpiti Road, Te Moana Road, and Peka Peka Road. Expressway bridges will also cross Raumati Road, the Wharemauku Stream, Mazengarb Road, Otaihanga Road, the Waikanae River, and Ngarara Road. The Project has been broken up in to 4 sectors, based on the environment and construction activities expected in each sector.

A brief description of the expected traffic management activities for each sector based on the current understanding of construction methodology that will be adopted is given below. Refer to the Assessment of Environmental Effects (Volume 2) and Construction Environmental Management Plan (CEMP, Volume 4) for a full description of the construction activities expected for the Project.

2.1.1 Sector 1 – southern end

Poplar Avenue and the existing SH1 / Poplar Avenue intersection are planned to be realigned under three phases to allow off line construction of the Poplar Avenue interchange.

The SH1 / Leinster Avenue intersection will be closed permanently.

2.1.2 Sector 2 - Paraparaumu

The construction of overbridges on Raumati Road and Mazengarb Road and the lowering of Mazengarb Road are planned to be constructed under a staged process. The Mazengarb Road lanes and shoulder are proposed to be narrowed and realigned around the construction works. Pedestrians will be diverted to the opposite footpath to the construction area. Bridge beams are planned to be lifted in place overnight under a detour.

During the Wharemauku Stream Bridge construction pedestrians and cyclist on the Wharemauku Stream trail will be temporarily diverted around the construction area.

The construction of the Kāpiti Interchange is planned to be constructed under three phases. Kāpiti Road is planned to be realigned in each phase around the construction area with narrowed lane widths.

2.1.3 Sector 3 – Otaihanga / Waikanae

The main Project office and yard are planned to be established off Otaihanga Road. The resulting high construction traffic volume on Otaihanga Road is considered to require the construction of a roundabout at the SH1/ Otaihanga Road intersection.

The construction of the SH1/ Otaihanga Road roundabout and Otaihanga Road Bridge are planned to be staged, requiring traffic lanes to be realigned around the construction works, maintaining bi-directional flow. The Otaihanga Road Bridge beams are planned to be lifted in place overnight under a detour.

The construction of the Waikanae River Bridge is expected to require the realignment of the Waikanae River trail. Pedestrian and cycle detours are expected to be required during abutment construction and bridge beam placement.

The construction of the Te Moana Road Interchange is planned to be constructed under three phases. Te Moana Road is planned to be realigned in each phase around the construction area with narrowed lanes. The Te Moana Road Bridge beams are planned to be lifted in place overnight under a detour

2.1.4 Sector 4 – Peka Peka

The Ngarara Road Overbridge and Smithfield Road Extension are planned to be constructed using a single lane flow operation. Construction vehicles will access the site along a haul route from Peka Peka Road.

The construction of the Peka Peka Interchange is planned to be constructed under three phases over a period of three years. Peka Peka Road is planned to be diverted down the proposed service road to a temporary intersection with SH1 at the location of the southern roundabout. Once the service road between Peka Peka Road and Te Kowhai Road is completed and opened, the SH1/ Te Kowhai Road will be permanently closed. The connection works and reconstruction of the existing highway will be constructed using short term traffic management measures.

2.2 Summary of Impacts

The following section provides an overview of the typical impacts that are anticipated to arise from temporary traffic management activities conducted for the Project. For a detailed appraisal of the traffic impacts arising from the construction and traffic management activities discussed above, please refer to the document ATTE.

The impacts included here are a summary of those assessed in the ATTE. Also the construction activities anticipated for the Project are routinely undertaken in the Wellington region (although not to the scale of this project) and hence the short-term traffic impacts of construction activities have become well understood. In addition, methods for managing and mitigating those impacts are well

developed and have been implemented successfully on a range of maintenance and infrastructure projects throughout the region.

The range of traffic control activities expected for the construction of the Project and identified impacts are shown in **Table 2.1** below. It has three components:

- **Traffic control activity.** This column lists the types of traffic control activities that may be implemented for construction of the Project.
- **Impacts.** This column outlines the impact of the traffic control activity on pedestrians, cyclists, residents, businesses, public transport, and general traffic.
- **Relevant Sector.** This column indicates which Sectors are expected to experience each traffic control activity.

Table 2.1 Impact of Traffic Control Activities by Sector

Traffic Control Activity	Impact	Relevant Sector			
		1	2	3	4
Footpath closure / detour	- Inconvenience to pedestrians and residents along route; - Disconnection of access to bus stops. - Increased exposure of pedestrians to traffic	✓	✓	✓	✗
Cycle lane closures / path closures/ detours	- Inconvenience to cyclists along route - Increased exposure of cyclists to traffic	✓	✓	✓	✓
Property access closures	- Inconvenience to residents and businesses along route.	✓	✓	✓	✓
Shoulder closures	- Reduced safety - No room for incident management, breakdowns etc. - Increased severity of recurrent and non-recurrent congestion	✓	✓	✓	✓
Lane closure - alternating flow operation Lane closure - contra-flow operation Lane closure - one-direction closure	- Inconvenience to road users - Reduced traffic capacity through site as a result of: - Fewer lanes than existing corridor; - Increased side-friction resulting from narrowed lanes and reduced shoulders; - Construction activities visible to motorists resulting in 'rubber necking'; - Reduced capacity across a link due to stop-go operations. - Diversion of traffic away from the closure onto inappropriate routes such as residential streets, past schools or other sensitive facilities.	✓	✓	✓	✓
Road closure / detours	- Inconvenience to road users; - Inconvenience to residents and businesses within closed road segment; - Congestion on detour routes; - Congestion on alternative routes; - Diversion of traffic away from the closure onto inappropriate routes such as residential streets, past schools or other sensitive facilities. - Disconnection of bus routes; - Disconnection of access to bus stops.	✗	✓	✓	✗

Traffic Control Activity	Impact	Relevant Sector			
		1	2	3	4
Short term closures for installation of long-term closures / traffic control measures	- Congestion through closure as discrete closures are required for installing long-term (i.e. greater than 24 hour) closures;	✓	✓	✓	✓
Site access	- Truck movements reducing traffic capacity through a closure; - Reduced traffic safety due to truck manoeuvring in or out of the closure; - Impact on capacity of access routes arising from higher proportion of trucks - Increased traffic on access routes resulting in congestion and increased travel times	✓	✓	✓	✓
Temporary speed limit	- Inconvenience to road users; - Slower operating speeds; - Potential non-compliance with speed limit.	✓	✓	✓	✓

2.3 Summary of Mitigation Measures

Traffic management measures will be planned and implemented to a level appropriate for the activity or work site. In accordance with COPTTM, traffic management measures will be implemented in order to fully consider the safety and level of service provided as the travelling public approaches, passes through and continue beyond the Project area.

The following sets out broadly the proposed mitigation measures and the procedures which should be adopted to manage the impacts identified in Section 2.2 above.

The range of traffic control mitigation measures expected to be implemented are summarised in **Table 2.2** below. It has three components:

- **Traffic control activity**. This column lists the types of traffic control activities that may be implemented for construction of the Project.
- **Impacts**. This column outlines the impact of the traffic control activity on pedestrians, cyclists, residents, businesses, public transport, and general traffic.
- **Typical mitigation measures**. This column outlines the types of measures that will be considered in development of SSTMPs and management of the Project.

Table 2.2 Impact and Mitigation of Traffic Control Activities

Traffic Control Activity	Impact	Typical Mitigation Measures
Footpath closure / detour	- Inconvenience to pedestrians and residents along route; - Disconnection of access to bus stops. - Increased exposure of pedestrians to traffic.	- Letter drops to affected residents in advance of works in the area; - Provision of warning and advisory signage prior to and during the closure; - Provision of pedestrian crossings and refuges or controlled crossing points; - Project team to advise interested parties/ stakeholders of closures in heavily trafficked areas; - Provision of convenient pedestrian detour routes well in advance of the closure to provide safe and convenient crossing; - Provision of temporary pedestrian access to property within the construction corridor.
Cycle lane closures / path closures/ detours	- Inconvenience to cyclists along route - Increased exposure of cyclists to traffic	- Letter drops to affected residents in advance of works in the area; - Provision of convenient detour routes well in advance of the closure to provide safe and convenient cycle routes; - Install signage adjacent the cycle lane prior to construction commencing to allow cyclists to alter their travel patterns; - Install warning signage in advance of shoulder closures to alert motorists of cyclists; - Install a temporary speed limit.
Property access closures	- Inconvenience to residents and businesses along route.	- Personal visit by Project team to advise and discuss impacts of the closure with affected residents and businesses; - Letter drops to affected residents and businesses in advance of works in the area; - Provision of temporary car parking in an area within the length of the traffic control site; - Provision of metal-plate crossings into properties where feasible and safe; - Scheduling of works during holiday or low-demand periods of the year.
Shoulder closures	- Reduced safety - No room for incident management, breakdowns etc. - Increased severity of recurrent and non-recurrent congestion	- Install a temporary speed limit
Lane closure - alternating flow operation	- Inconvenience to road users; - Reduced traffic capacity through site as a result of:	- Public notification in local (Kāpiti Observer) and regional publications (Dominion Post) where necessary; - Letter drops to residents and / or businesses (where necessary), which are located: ▪ within the closure length;

Traffic Control Activity	Impact	Typical Mitigation Measures
Lane closure - contra-flow operation Lane closure - one-direction closure	- Fewer lanes than existing corridor; - Increased side-friction resulting from narrowed lanes and reduced shoulders; - Construction activities visible to motorists resulting in 'rubber necking'; - Reduced capacity across a link due to stop-go operations. - Diversion of traffic away from the closure onto inappropriate routes such as residential streets, past schools or other sensitive facilities.	▪ along detour routes; ▪ along approaches to the corridor that may experience congestion or queues. - Installation of concrete / water-filled barriers along site to isolate the site from public; - Installation of sight screens to reduce 'rubber necking'; - Installation of secondary detour routes where necessary; - Review and optimisation of traffic signals on detour and alternative routes where necessary; - Use of Variable Message Signs (VMS) for recommending alternative routes. Where possible, alternative routes will be recommended at a cordon around the closure, well in advance, in such a way to avoid traffic following the prescribed detour route where an alternative is a more convenient route to their intended destination. Install such signage in advance of the closure (i.e. a month prior, to inform road users). - Provision of access via a temporary corridor or narrow lane within the closure for residents and businesses within construction corridor, where possible.
Road closure / detours	- Inconvenience to road users; - Inconvenience to residents and businesses within closed road segment; - Congestion on detour routes; - Congestion on alternative routes; - Diversion of traffic away from the closure onto inappropriate routes such as residential streets, past schools or other sensitive facilities. - Disconnection of bus routes; - Disconnection of access to bus stops.	- Personal visit by Project team to advise and discuss impacts of the closure with affected residents and businesses; - Public notification in local (Kāpiti Observer) and regional publications (Dominion Post) where necessary; - Advertising on radio or through internet where necessary; - Letter drops to residents and / or businesses (where necessary), which are located: ▪ within the closure length; ▪ along detour routes; ▪ along approaches to the corridor that may experience congestion or queues. - Installation of secondary detour routes where necessary; - Use of VMS for recommending alternative routes. Where possible, alternative routes will be recommended at a cordon around the closure, well in advance, in such a way to avoid traffic following the prescribed detour route where an alternative is a more convenient route to their intended destination. Install such signage in advance of the closure (ie a month prior, to inform road users). - Scheduling of works during holiday or low-demand periods of the year; - Staging of works to require night time or weekend full-closures only; - Consultation with NZTA / KCDC to develop detour routes and minimise bottle-necks on detours;

Traffic Control Activity	Impact	Typical Mitigation Measures
		- Provision of barricades on the approaches to the closure to prevent public access and visibility to activities within the site; - Extension of closures to intersections with arterial routes with access to residents only on the approaches to the works. - Provision of access via a temporary corridor or narrow lane within the closure for residents and businesses within construction corridor, where possible.
Short term closures for installation of long-term closures / traffic control measures	- Congestion through closure as discrete closures are required for installing long-term (i.e. greater than 24 hour) closures;	- Installation of long term work sites that require temporary barriers etc to occur during night time or off-peak periods.
Site access	- Truck movements reducing traffic capacity through a closure; - Reduced traffic safety due to truck manoeuvring in or out of the closure; - Impact on capacity of access routes arising from higher proportion of trucks - Increased traffic on access routes resulting in congestion and increased travel times	- Provision of site accesses at the end of the closure only; - Development and distribution of site access plans which specify permitted access movements, times and procedures; - Limiting site access movements / plant deliveries to off-peak periods or night time; - Consultation with NZTA and KCDC to agree HCV routes and operation procedures; - Avoid peak traffic flow periods where possible;
Temporary speed limit	- Inconvenience to road users; - Slower operating speeds; - Potential non-compliance with speed limit.	- Public notification in local (Kāpiti Observer) and regional publications (Dominion Post) where necessary; - Monitor and review use of Temporary Speed Limits to ensure the speed limit is appropriate for the environment. - Speed controlling measures may be put in place, such as: lane narrowing or introduction of horizontal curves. The NZTA's Project team will liaise with the Police and work towards temporary speed limits which can be enforced.

3 Implementation and Operation

Section 3 sets out the general operational procedures for Temporary Traffic Management activities for the entire Project.

3.1 Operation / management procedures

Traffic Management impacts will typically be mitigated through the measures described above in Section 2.3. The mitigation measures will be governed by this document (reviewed and approved by a key stakeholders group) and implemented through the Traffic Management Plan (TMP) process.

The complete Traffic Management procedure is illustrated in **Diagram 3.1** below.

3.1.1 Traffic management procedure governance

This CTMP is envisaged to remain a working document throughout the Project and inform all associated traffic management activities. As part of that on-going improvement, key stakeholders will be consulted on a regular basis on the requirements prescribed, and appropriate amendments will be undertaken where necessary. The key stakeholders are expected to include NZTA, NZTA's representatives, KCDC, GWRC, the Police, and/ or any other representative.

The active governance of traffic management activities will occur through the approval process of SSTMPs by NZTA and KCDC or their representative and through on-going monitoring and assessment of Key Performance Indicators.

Planning for effective traffic management must begin during the initial stages of construction planning. Following programming of construction tasks, associated traffic management requirements will need to be identified for each task.

The process will allow for a 'no-surprises' approach to traffic management planning where temporary traffic management requirements feed back into the construction planning process at an early stage. Where possible, a collaborative approach with key stakeholders will be adopted.

3.1.2 Site specific traffic management plans

SSTMPs are documents that outline the procedures and measures to be implemented so that safety is maintained for road users and Project staff throughout every activity associated with the Project. Each SSTMP will therefore outline the measures to be implemented so that road users may negotiate the site safely, and it will also outline the procedures required to be followed by construction or road workers in order to maximise the safety of the site.

The relevant SSTMP must be identified at the construction planning stage for implementation along with work site mobilisation. If a SSTMP has not been developed previously, the need will be

flagged for development and the programme of works adjusted accordingly. The process employed for development and approval of SSTMPs is outlined in Section 3.2.

A SSTMP will be prepared so that every construction activity which impacts the road network is conducted using an approved methodology, with the agreed mitigation measures in place and to the correct standard. Every construction method plan which impacts on the road network will have an appended SSTMP.

Each SSTMP will be given a unique identifying number for ease of reference. A 'live' register of SSTMPs will be kept to monitor and report on the progress of each SSTMP.

3.2 SSTMP development

Preparation and implementation of SSTMPs will be conducted so that a consistent approach is taken where practicable, and that adjacent activities are adequately planned and integrated in order to mitigate concurrent effects.

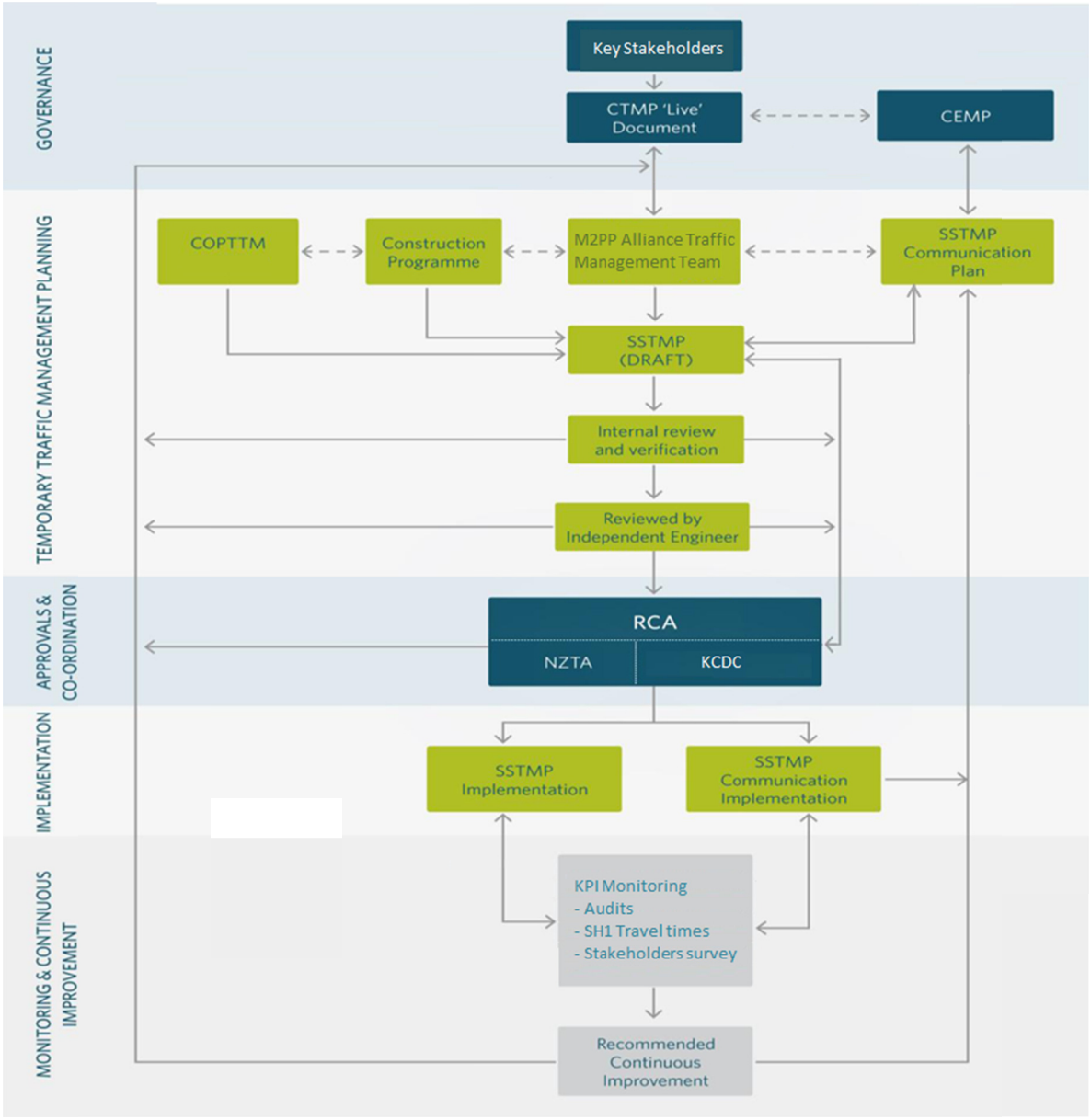
Each SSTMP will comply with each of the relevant standards outlined in Section 1.3. Care will be taken in identifying the safety requirements of both road users and construction workers.

Each of the impacts and mitigation measures noted in the ATTE must be considered in development and documentation of each SSTMP. The SSTMPs will also be developed with consideration given to the typical impacts and proposed mitigation measures and procedures set out in this report. The acceptability of the proposed traffic management methodology will be determined by the relevant RCA (NZTA, KCDC, or both).

At the completion of works under discrete traffic management closures the site must be made safe for the travelling public once all traffic control measures are lifted from the site, so that no hazard has been introduced or left behind as a result of the work. This philosophy does not explicitly limit the type of activity that may be conducted under either form of closure, however it limits the construction methodologies such that the safety and level of service provided to the travelling public is maintained at all times.

The TMP process is illustrated in Diagram 3.1 below.

Diagram 3.1 Traffic Management Plan (TMP) Process



The following sets out the general operational procedures for Temporary Traffic Management activities for the Project.

3.2.1 Sstmp structure

Each SSTMP will include:

- SSTMP Proforma. This is the text of the document, which outlines the requirements, methodologies and standards required in observing the SSTMP and the required approvals required/ obtained. Details included in each SSTMP Proforma will vary depending on the activity requiring traffic control;
- Engineering Exception Decisions. All EEDs applicable will be appended to the SSTMP.
- CAD drawings. CAD (or similar computer-generated) drawings will be employed for illustrating the closures defined by the proforma, and will include all relevant road features that require consideration in managing the impacts of construction.
- Communications strategy. The communications strategy will outline the proposed strategy for informing the public of the works. This may include public notifications in local newspapers, advertisements, radio communications, flyer or posters, Variable Message Signs (VMS) strategies, information boards or driver information signage installed.

3.2.2 Specific requirements

a. Network capacity

The main indicator of the impact of traffic management on the road network is the delay caused by the activity. COPTTM states that delays are not permitted to be greater than 5 minutes. This applies to both the traffic passing through the closure and delays caused along diversion routes. The delays experienced by vehicles passing through or directly affected by the construction of the Project or the associated traffic management will be considered.

Lane closures resulting in alternating flow will be avoided, where possible. If a lane closure is required, justification as to why this TTM method is necessary will be provided in each SSTMP. Any necessary restrictions and anticipated delays will also be specified in each SSTMP. Single lane operations will generally be used outside of peak flows on road with relatively low traffic volumes to set up long term temporary arrangements.

The impacts of construction activities or TTM measures on road network traffic capacity will be mitigated where possible.

The impact of traffic management will be considered in each SSTMP, with queue modelling, delay estimates or traffic modelling conducted where appropriate in order to satisfy the relevant RCA that the impacts are well understood and will be mitigated where possible. Information necessary to satisfy the RCA that impacts will be satisfactorily mitigated will be agreed on a case by case basis.

Works may also be programmed for holiday periods during which traffic demands are reduced and there is a higher proportion of discretionary trips on the network. Such opportunities will be investigated on a case by case basis, with an approach agreed with the relevant RCAs prior to the proposed activity. However, in accordance with general NZTA practice the start and end of holiday periods will be avoided.

b. Peak Hour Capacity

The effect of construction activities or TTM measures on traffic flows during peak hours will be mitigated where possible. Activities that may impact on the capacity of the adjacent carriageway (as outlined above) will be restricted depending on the type of activity and the level and traffic characteristics of the affected carriageway.

Activities that impinge upon capacity for a brief period (less than 5 minutes) will be considered on a case-by-case and only conducted under an approved SSTMP.

The restrictions will be outlined in each SSTMP, which will be agreed with the RCA on a case-by-case basis.

c. Lane Delineation

Each SSTMP will specify how traffic lanes will be delineated for each traffic management activity which affects the road alignment. In accordance with COPTTM, traffic lanes will be delineated using temporary signs and cones for short term traffic management activities which are generally only in place for a day. Long term closures on high volume roads which are in place for a number of weeks will be delineated by remarking the existing lanes and installing safety barriers where appropriate. Remarking of lanes will be in accordance with MOTSAM and generally replicate the original arrangement.

Temporary lane and shoulder widths will be specified in each SSTMP.

d. Site Access

Site access will be subject to the same restrictions as activities that impact upon the capacity of the network and peak hour activities. Each site access will be required to have an approved SSTMP (or be noted in the appropriate SSTMP covering the work site) which will outline the systems and procedures required for safe operation.

Site access points will be installed as detailed on the SSTMP drawing. The site specific requirements for installation and use of site accesses will be outlined in the SSTMP, which may include the following:

- Required signage and delineation;
- Permitted entry / exit movements to / from the site access;
- Permitted hours of use;

- Entry / exit escort procedures to be implemented;
- Types of vehicles allowed, and any procedures relating to particular classes of vehicles (articulated trucks or oversized vehicles);
- Requirements for wheel washes (refer Sediment Control Plan); and
- Provision for manned accesses where required.

Entry and exit will be operated in a manner that will minimise disruption to road users. Accordingly, all drivers of vehicles using the access points will be specifically briefed.

e. Construction Traffic Movements

A significant amount of construction vehicle movements will be required, particularly truck movements to transport fill, aggregate and concrete to site during construction of the Project. The construction traffic movements are expected to reduce the available capacity of some roads and intersections. Some movements may require active traffic management, particularly for over dimensioned vehicle movements and movements on geometrically constrained roads.

Construction vehicles are expected to use SH1 and major roads, and avoid using residential streets where possible. Normal operation hours for construction vehicles will be between 7:00am and 7:00pm. The appropriate analysis of swept paths and vehicle weight will be carried out in accordance with each RCA's requirements. The frequency of these truck movements, their routes and any operational requirements will be outlined and appropriate mitigation measures agreed with the RCA in the appropriate SSTMP.

All site based personnel, truck drivers in particular, will be made aware of the sensitive areas around the Project, as identified in the ATTE. Drivers will be required to take extra care while passing these areas and be extra vigilant of children or mobility impaired persons. This requirement will be included in safety briefings once detailed planning is underway.

An overdimension permit will be obtained from the Overdimension Permit Issuing Agency (OPIA) for any over dimensioned vehicle movements related to the Project.

f. Traffic Detours

All full closures and associated detour routes will be implemented under an approved SSTMP. The RCA with roads affected by a detour will be consulted prior to finalisation of the SSTMP. Detour routes will follow major roads where possible, so that impacts on residential streets are minimised.

Where necessary, steps will be taken in order to improve the capacity of the detour route, by implementation of the following:

- Traffic modelling to determine the maximum theoretical capacity of intersection(s) along the detour route;

- Traffic management measures installed at the critical intersection to provide greater capacity; and / or
- Splitting of the detour routes depending on approach to the closure.

Pre-conditioning of road users will also be considered and where deemed necessary it will be implemented through a communications campaign via VMS boards, project information signs or advertising. This will attempt to reduce the demands on the road network so that delays are reduced. Alternative routes will be recommended at a cordon around the closure well in advance of the closure and in such a way to allow traffic to avoid following the prescribed detour route where an alternative route is a more convenient route to their intended destination.

The SSTMP will include measures that will be implemented to avoid, remedy or mitigate effects on access to and from businesses and other organisations in the area.

Details of any analysis, modelling, mitigation measures or communications will be appended to the SSTMP for approval by the affected RCAs.

g. Passenger Transport Services

The effect of construction activities or TTM measures on passenger transport services will be mitigated where possible.

Activities that will impact upon passenger transport services will be identified at the construction planning stage, such as traffic management measures impinging upon bus stops. This will allow for the maximum possible available time to arrange for changes to be made to services, or for methodologies to be developed that minimise impacts.

Consultation with affected parties will determine the best way forward to mitigate impacts. This consultation will be undertaken as part of the SSTMP development process, with the following parties:

- Kāpiti Coast District Council (KCDC);
- NZTA;
- Greater Wellington Regional Council (GWRC);
- NZTA's representatives;
- ONTRACK; and
- Public transport operators.

Any impacts, mitigation or communications relating to passenger transport services will be outlined in the SSTMP for approval by the relevant RCA.

h. Property Access, Existing On-Site Parking and Manoeuvring Areas

The impact of construction activities or TTM measures on property access, existing on-site parking or manoeuvring areas will be mitigated where possible. Communications with the affected residences or businesses will be undertaken as part of the SSTMP process.

The impacts of such activities will be mitigated where possible, through the use of:

- Temporary access ways using metal plates or other methods;
- Construction methodologies that allow access during critical time periods; and / or
- Provision of alternative access ways, parking or manoeuvring areas for the duration of the works.

Activities that may impact on access and their associated mitigation measures will be outlined in the SSTMP for approval by the relevant RCA.

i. Pedestrian, Mobility and Cycling Access

Pedestrian facilities will be maintained on each side of a road where current facilities exist, where possible. Where access is impeded as a result of construction works, safe and clearly identifiable alternative access arrangements will be implemented, such as:

- Temporary access in accordance with COPTTM;
- Temporary diversions;
- Safety fences for restricted access zones;
- Hoarding for long term work sites with excavations or other hazardous environments;
- Pedestrian bridges across uneven surfaces; and / or
- Pedestrian protection barriers for protection from traffic.

If the facilities are required to be combined on one side of a road, justification as to why this is the case will be provided. Mitigation for combining pedestrian facilities on one side of a road may include pedestrian ramps pedestrian refuges, traffic calming, assisted crossing for school children, and/or temporary controlled/zebra crossings.

Long term closures or closures of significant pedestrian, mobility or cycling facilities will result in communications with the public, consideration of public events, school or stakeholder time tables.

Existing cycle lanes or shoulders used by cyclists will be maintained, where possible. If cycle lanes or shoulders are required to be reduced or cyclists are detoured, justification as to why this is the case will be provided. Cycle access will be mitigated by either maintaining the existing traffic lanes through the construction area where cyclists are using the existing road or a temporary cycle route will be established where an existing cycle route cannot be maintained. Where lane widths impact on cyclists' safety, signage will be installed in advance of the area to enhance driver awareness.

Any impacts upon pedestrian, mobility or cycling access and associated mitigation will be outlined in the SSTMP for approval by the relevant RCA.

j. Traffic Management Communications

It is expected that communication campaigns will be undertaken for a wide variety of traffic management activities throughout construction of the Project. The overall strategy for communication management is outlined in the Stakeholder and Communication Management plan, which form part of the AEE documentation.

Communication associated with traffic management activities will be undertaken on a case-by-case basis depending on the location and impact of the construction and traffic management activities. Communication may include some or all of the following, as part of a project communication plan:

- Personal visit by a Project team member to advise and discuss impacts of the closure with affected residents and businesses;
- Letter drops to affected residents and / or businesses which are located:
  - within or adjacent to the construction zone;
  - along detour routes;
  - along approaches to the corridor that may experience congestion or queues.
- Communication for changes to passenger transport services such as signage in buses, at bus stops or letter drops to residents;
- Flier drops to cars parked in affected areas in advance of works in the area;
- Use of VMS for recommending alternative routes during detours;
- Use of project signage or information boards where necessary;
- Public notification in local (Kāpiti Observer) and regional publications (Dominion Post) where necessary; and / or
- Advertising on radio or through internet where necessary.

k. Emergency Action Plan

An emergency action plan will be produced prior to implementation of any traffic control activities associated with the Project.

The emergency action plan will outline the procedures, requirements and responsibilities of the Project team in the case of emergency, and will conform to the principles of CIMS (Coordinated Incident Management System) and related road network incident response plans identified by the RCA. In addition to the emergency action plan, each SSTMP will address site specific requirements in the case of emergency. The SSTMP will outline the following key issues, where applicable:

- Diversion routes in the case of delayed works;

- Secondary diversion routes in the case of incidents on diversion routes used under full closure SSTMPs; and / or
- Methodologies for reducing the risk of construction over-run, where applicable.

The emergency action plan will be used in the case of an emergency within the site, and will include procedures for co-ordination with the KCDC, NZTA's representatives, NZ Police, NZ Fire Service, Ambulance Services, and Civil Defence. NZTA's Project team will liaise early with each of these organisations when developing the emergency action plan. Events that may require implementation of the emergency action plan include:

- Traffic accidents;
- Emergency services requiring access to or through the site;
- Natural disasters;
- Unplanned construction events;
- Emergency works;
- Significant traffic congestion on KCDC roads or State Highways; and / or
- Inclement weather.

In the event of an accident the Project will provide immediate assistance and where necessary contact the relevant emergency services. Full support to those organisations will be provided to manage traffic whilst the incident is being brought under control. An incident report will be completed for each incident or near-miss. Significant incidents will require input from a variety of Project team members and may involve reporting to emergency services or other external parties.

In an emergency event the STMS must ensure the traffic management staff protect their personal safety, the safety for continuing public access through the site then notify the necessary authority and then attend to the situation.

3.2.3 Sstmp approval process

The NZTA's Project team will liaise early with both RCAs and agree on traffic management methodologies for key areas before completion of the detailed design or commencement of construction in accordance with local authority regulations.

The impact of specific traffic management measures on the road network will be assessed on a case-by-case basis, and the relevant RCA will be contacted for approval of the SSTMP.

An Engineer who is independent of the preparation of the SSTMP (as included or delegated within the contract of engagement for construction of the Project) will be appointed by the Project team, and will review the SSTMPs prior to submission to the relevant RCA.

An SSTMP for traffic management activities affecting Kāpiti Coast District Council roads will be sent to the Kāpiti Coast District Council traffic management coordinator (TMC) or their delegated network

management consultant for their approval. Where traffic management activities encroach upon state highways, the SSTMP will go to the NZTA traffic management coordinator (TMC) team for their approval. SSTMPs shall be provided to the relevant RCA's Traffic Management Coordinator(s) at least 10 working days prior to each traffic management activity commencing.

It is possible that some activities associated with construction or maintenance of the Project will affect both RCA's roads. Where this is the case, the affected RCAs will be consulted in advance of submission of the SSTMP to confirm with each RCA whose road is affected directly by the works and what approvals are required. Activities that will require consultation include:

- Traffic detours onto adjacent RCA roads;
- Lane or full road closures that may have a significant impact on the operation of an adjacent RCA road; and / or
- Activities that require installation of VMS boards or other communications (such as information signage, overhead VMS signage etc) on adjacent RCA roads.

3.3 Monitoring

In accordance with COPTTM the STMS (assisted by other project staff) will be responsible for the day to day monitoring of TTM measures. The site layout, queues and delays will be monitored at each active site which is governed by an approved SSTMP.

In addition, the effectiveness of the mitigation measures described in the above section should be monitored by the development and on-going assessment of Key Performance Indicators (KPIs). The three KPIs which are proposed for the Project are Traffic Management Auditing, SH1 Travel Times and Stakeholder Surveys. These KPIs are discussed below. The KPIs proposed in this section are a minimum requirement, and it is expected that further KPIs and organisational monitoring instruments will be implemented.

3.3.1 Traffic management auditing

It is anticipated that traffic control measures will be subject to a random audit every two months by a party external to the preparation of SSTMPs and implementation of traffic control. Additional audits will be carried out following major control changes. Regular internal audits will also be carried out by the NZTA's Project team.

The procedure for carrying out an audit of traffic management activities is prescribed in COPTTM. COPTTM audit scores (the site condition rating) will be generated for a number of sites, which will then be weighted by the AADT of the road affected by TTM. The AADT weighting system will draw attention to the higher volume roads (the State Highway) where safety is more of a concern and quality and consistency of traffic control is more critical.

The audit team will generally be a two-person team, however may be expanded as appropriate to include road safety auditors, independent auditors or other external parties. The auditors will be

required to provide their report to the Project team within one week of the site inspection. The audit scores will be made available to each RCA.

3.3.2 SH1 Travel Times

The efficiency and safety of the road network during road construction is a key objective of the Project. Efficiency and safety can be measured by monitoring of travel times through the site.

Travel times are currently being measured by NZTA along SH1 between Levin and Wellington, twice a year during November and March. With the agreement of NZTA, these results can be supplied to KCDC and the NZTA's Project team to monitor performance of TTM on the highway.

Journey times will also be monitored on Raumati Road, Kāpiti Road, Mazengarb Road, and Te Moana Road. The base journey time will be measured on these roads before the commencement of construction. The KPI is proposed to be based around the base journey time plus some reasonable delay expected for construction works. The surveys will be undertaken every two months while the roads are being affected and one week after the TTM is altered on these roads.

3.3.3 Stakeholders Survey

The perceptions of those affected by the traffic management activities will also be monitored during construction. This will take the form of a stakeholder survey to be carried out at regular intervals. The survey will assess the performance of the Project's traffic management in the areas of: perceived delay, safety, communication, comfort, coherency, and overall standard. The targeted stakeholders are expected to include the general public, local residents, the Police, and community groups.

The perceptions of key stakeholders will also be monitored through surveys. The key stakeholders' survey will additionally assess the performance in the areas of perceived; compliance and responsiveness.

The survey form, interval, and target audience will be agreed with NZTA and KCDC.

3.4 Reporting

Reporting will be conducted in conjunction with the monitoring requirements described above.

3.4.1 Reporting by the NZTA's Project Team to rcas

The NZTA's Project team shall inform the NZTA, KCDC and/or the appointed representative of the following:

- Any problems they foresee with traffic management on site and any problems they have regarding the management of traffic on other contractor's sites;

- Any instances where the requirements or limits imposed by this CTMP or SSTMPs are breached or exceeded, probable causes and actions required to be taken to mitigate, remedy or isolate the impact arising from the non-compliance;
- The traffic management KPI monitoring results and improvement initiatives on a quarterly basis;
- Any complaints received during the previous period regarding traffic and the remedial actions taken; and
- Provide the road controlling or regulatory authorities a copy of the CTMP if any significant revisions of the CTMP are made.

3.4.2 Reporting by the rcas to NZTA's Project Team

The NZTA, KCDC and/or the appointed representative shall inform the NZTA's Project team of the following:

- Any complaints received regarding traffic as soon as practical after receipt of the complaint.

3.5 Training

All personnel involved in Traffic Management activities will undergo NZTA's Traffic Controller (TC) training, as a minimum. Any personnel in control of traffic management operations on site will have undergone the NZTA training and be qualified as a Level 2/ Level 3 Site Traffic Management Supervisor (STMS). Any personnel involved in planning or monitoring traffic management operations on site will have undergone the NZTA training and be qualified as a Level 2/ Level 3 Site Traffic Management Supervisor (STMS) – Non Practicing (NP).

All site personnel will be briefed on their requirements to comply with the COPTTM relating to site personnel, in particular;

- Wearing of orange high visibility garments;
- The requirements of SSTMPs for each construction site; and
- The authority of the appointed STMS.

3.6 Complaints

Complaints will be managed through the process included in the CEMP.

Any complaints received relating to traffic management activities will be reported to NZTA and KCDC or their appointed representative. Responses may involve any one or combination of the following:

- Adjustment of traffic management equipment or road furniture on site;
- Revision of an SSTMP; and/ or
- Revision of the CTMP.

4 Roles and Responsibilities

This section provides guidelines on the expected roles and responsibilities, however these shall be formally agreed between the NZTA, KCDC, the NZTA's Project team and other parties as part of the procurement process, either as specified in the Project agreement or CEMP's Requirements.

In general however, the NZTA's Project team shall be responsible for ensuring that planning and implementation of traffic management is conducted in accordance with this CTMP.

Each SSTMP will be approved by either KCDC, NZTA, or both depending on which RCA's network is affected by the scope of the SSTMP.

The RCAs will have the opportunity to comment on whether the construction and traffic management activities are being conducted in accordance with this CTMP through the stake-holders survey.

The NZTA's Project team shall be responsible for documentation of traffic management activities and their compliance with this CTMP, which will be available to NZTA or the appointed representative upon request. All traffic management activities shall be documented as required by this CTMP in an appropriate SSTMP which will be available upon request by NZTA or KCDC.

Traffic management auditing shall be undertaken by an independent party and the results of these audits shall be provided to NZTA and KCDC or their appointed representative immediately following the audit or following rectification of 'needs improvement' or 'dangerous scores' as required by COPTTM.

Monitoring of the impacts arising from construction and traffic management methodologies shall be undertaken by the NZTA's Project team in accordance with this CTMP, and the results of this KPI monitoring shall be shared with NZTA and KCDC or their appointed representative as appropriate.

5 Post-Construction Transition Phase

Once the majority of construction work has been completed on the Project and practical completion has been awarded, temporary traffic management procedures will return back to each RCA's original traffic management requirements.

6 Review of the Construction Traffic Management Plan

The CTMP is expected to require review over the duration of the Project. The review of the CTMP will be reported to the Key Stakeholders group and any required changes agreed. The foreseen events which may trigger a review of the CTMP are as follows:

- The issue of a change/ update to the NZTA Code of Temporary Traffic Management (COPTTM). COPTTM is currently under review as part of changes to the traffic control devices manual and

as such changes to the CTMP may be necessary to maintain consistency between the Project TTM procedures and traffic control regulations and guidelines.

- Changes to other Key Stakeholders. Any major change to NZTA, the TMC, GWRC, or WCDC may give rise to new specifications or requirements.

This CTMP will be reviewed by the NZTA's Project team and NZTA Project Manager or the appointed representative prior to commencement of construction and at regular defined intervals. The NZTA's Project team will record decisions made and reasons for them and will make subsequent changes to CTMP in agreement with the NZTA Project Manager. The Project team will be informed of any changes to this CTMP through the regular project communications processes. The review will consider the following:

- any significant changes to traffic management processes;
- key changes to roles and responsibilities within the Project and the implementation of this Plan;
- changes in industry best practice standards;
- changes in legal or other requirements (social and environmental legal requirements, NZTA objectives and relevant policies, plans, standards, specifications and guidelines;
- results of: inspection and maintenance programmes, and logs of incidents, corrective actions, internal or external assessments; and
- public complaints.

Reasons for making changes to the CTMP will be documented. A copy of the original CTMP document and subsequent versions will be kept for the Project records, and marked as obsolete. Each new/updated version of the CTMP documentation will be issued with a version number and date to eliminate obsolete CTMP documentation being used.