ROAD INCIDENT MANAGEMENT GUIDE

Auckland System Management

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1. INTRODUCTION

Road incident management in New Zealand has traditionally been undertaken by the Police, and in some circumstances by Fire and Emergency NZ, however they rely heavily on resources outside of their organisations to restore the operational capacity of the network.

A serious and prolonged road incident can have significant impact on the general population beyond the boundaries of the road corridor, including non-road related public transport providers.

It is essential that the emergency services, transportation authorities, and private sector service providers work collaboratively in road incident management to safely and efficiently clear traffic incidents and related debris and restore the network as quickly as possible to reduce the impact on the road users.

New Zealand Road Controlling Authorities are recognising their operational contribution to road restoration at traffic related incidents and taking steps to improve their incident response capabilities.

2. PURPOSE

This guide has been developed by experienced practitioners to provide road network operational staff with a hands-on approach to facilitate a co-ordinated and effective response to road incident management, vehicle recovery, and asset restoration operations.

The guide sets out the levels of management and operational requirements, the roles and responsibilities of the various responding organisations, how the response is structured, and the key relationships and communications protocols.

The guide has been prepared to ensure that, in the event of an emergency or crisis, all staff are able to respond effectively and safely under a structured operating procedure. This will assist the Road Controlling Authority (RCA) to effectively regain control of the operations, minimising the impact on the road user, the environment, and reduce reputational risk.

3. DEFINITION OF AN INCIDENT

“Any unplanned event which will, or has the potential to, cause adverse effects on the safe or efficient movement of road users and, or the customer’s journey”.

4. RELATED DOCUMENTS

The following documents have relevance and should be read in conjunction with this guide.

- RCA - Emergency Management Plan (EMP)
- RCA - Standard Operating Procedure (SOP) for Traffic Response activities
- RCA - Crash Investigation Procedures
- MOU – Highway Incident Management Protocol
- Auckland Civil Defence Emergency Management Group Plan 2016 – 2021
- National Civil Defence Emergency Management Plan
- Code of Practice for Temporary Traffic Management (COPTTM)
- New Zealand Co-ordinated Incident Management System (2nd Edition April 2014)
- Emergency Responder Safety Institute http://www.respondersafety.com/

5. ABBREVIATIONS / ACRONYMS

AC	Auckland Council
ACDEMG	Auckland Civil Defence Emergency Management Group
AELG	Auckland Engineering Lifelines Group
AHB	Auckland Harbour Bridge
AIAL	Auckland International Airport Limited
AID	Asset Information Database
ALT	Alliance Leadership Team
AM	Alliance Manager
AMT	Alliance Management Team
ASM	Auckland System Management
AT	Auckland Transport
ATMS	Advanced Traffic Management System
ATOC	Auckland Traffic Operations Centre
CC	Coordination Centre
CCTV	Closed Circuit Television
CDEM	Civil Defence Emergency Management
CIMS	Coordinated Incident Management System
CMT	Crisis Management Team
COPTTM	Code of Practice for Temporary Traffic Management
CRMS	Customer Relationship Management System
CVST	Commercial Vehicle Safety Team, Police
DE	Duty Engineer
DoC	Department of Conservation
DYNAC	An advanced traffic management system
EAC	Emergency Action Code
EAP	Employee Assistance Programme
EAT	Executive Assessment Team
ECC	Emergency Coordination Centres
EOC	Emergency Operations Centre
ERT	Emergency Response Team
FENZ	Fire and Emergency New Zealand
GIS	Geographic Information System
GPS	Global Positioning System
HPMV	High Productivity Motor Vehicles
ICP	Incident Control Point
IMT	Incident Management Team
JHT	Johnstones Hill Tunnel
MLB	Moveable Lane Barrier (on the Auckland Harbour Bridge)
MOU	Memorandum of Understanding
MWY	Motorway
NCC	National Coordination Centre
NOC	Network Outcomes Contract
NOM	Network Operations Manager
NOP	Network Operations Plan
NRA	National Recovery Alliance
OIC	Officer in Charge
ORS	Operator Rating System

RCA	Road Controlling Authority
RIM	Remote Incident Manager (Waka Kotahi)
RNO	Road Network Operator
RNOM	Road Network Operations Manager
RP	Repeater Post
SCATS	Sydney Coordinated Adaptive Traffic System
SCU	Serious Crash Unit, Police
SMCP	Stakeholder Management & Communications Plan
SOP	Standard Operating Procedure
SP	Stakeholder Profile
SQID	Stormwater Quality Improvement Device
STMS	Site Traffic Management Specialist
TAT	Tactical Assessment Team
TCAMS	Traffic Control Application Management System
TIM	Traffic Incident Manager
TLA	Territorial Local Authority
TMC	Traffic Management Coordinator
TMP	Traffic Management Plan
TMU	Traffic Management Unit
TOC	Traffic Operations Centre
TREIS	Traffic Road Event Information System
TRU	Traffic Response Unit
TTM	Temporary Traffic Management
TTT	Transport Technology and Tunnels
VHF	Very High Frequency
VMS	Variable Message Sign
Waka Kotahi	Waka Kotahi New Zealand Transport Agency
WVT	Waterview Tunnel

6. ROLES AND RESPONSIBILITIES

Civil Defence Emergency Management (CDEM)

Local authorities are responsible for civil defence emergency management in their area, and can declare a state of emergency where they act as the Control. CDEM can also support an incident where they are an Agency. CDEM typically:

- Declares a civil defence state of emergency and advises authorities and media
- Communicates with Emergency Services and other authorities, Waka Kotahi, RCAs, TLAs, TOCs, and other stakeholders
- Issues press releases
- Confirms when state of emergency is lifted

The Civil Defence Emergency Management Act 2020:

- Promotes sustainable management of hazards
- Enables communities to achieve acceptable levels of risk
- Requires co-ordination of CDEM activities
- Encourages co-ordination and integration across sectors to address interdependencies

Lifelines

Lifelines are the essential infrastructure and services that support our community – utility services such as water, wastewater and storm water, electricity, gas, telecommunications, and transportation networks including road, rail, airports, and ports.

Representatives of utilities collaborate in regional Lifeline Groups with scientists, engineers, and emergency managers to reduce vulnerabilities to regional scale emergencies.

Lifeline Group projects take an 'all-hazards' approach. The emphasis is on pre-event planning. Post-event operational roles remain the responsibility of individual utilities. This collaborative process provides a framework to support integration of asset management, risk management and emergency management by utilities.

The New Zealand Lifelines Committee fosters regional activity and provides a link to government.

Relevant national lifelines materia can be found at:

http://www.nzlifelines.org.nz/

https://www.civildefence.govt.nz/resources/publications/?OpenDocument

Ambulance Services

The key focus for the ambulance service is life preservation and first/initial response services.

St John Ambulance Service operates 24 hours a day, seven days a week and provides emergency ambulance services to nearly 90% of New Zealanders. They use ambulances, four-wheel-drive vehicles, rapid response units, motorcycles, and other specialist vehicles to ensure they can reach people at any hour of the day in almost any terrain, weather, or situation.

In New Zealand, the St John Ambulance Service treats approximately 415,000 people every year, at over 350,000 incidents. They have more than 600 operational vehicles and 205 ambulance stations. On average, their vehicles travel more than 17 million kilometres annually to attend around 330,000 emergency incidents.

The only areas where St John does not provide emergency ambulance services are Wairarapa and Wellington; these areas are serviced by Wellington Free Ambulance. However, St John does provide other services in these areas (St John First Aid Training, St John Medical Alarms, Event Medical Services and Youth programmes).

Fire and Emergency New Zealand (FENZ)

The statutory role of Fire and Emergency New Zealand (FENZ) is fire safety, fire prevention, and fire extinction. FENZ have extensive powers including the closure of a road or motorway, railway, or buildings, and instruct Police and other agencies under the Fire and Emergency Act 2017.

FENZ are responsible for rescuing people trapped in a fire, wreckage, or debris. They will prevent further escalation of the incident by extinguishing fires or undertaking protective measures to prevent them. They will deal with released chemicals, or other contaminants in order to render the incident site safe. They assist St John Ambulance with casualty handling and the Police with recovery of the deceased.

FENZ is responsible for the health and safety of personnel of all key agencies working within the inner cordon and will liaise with the Police about who should be allowed access, to ensure that they are properly equipped, adequately trained, and briefed.

Typical functions at an incident include:

- Acts as Incident Controller for fire and hazardous chemical events
- Initial scene safety (including emergency traffic management)
- Initial first aid to injured
- Extraction of trapped vehicle occupants
- Fire suppression and extinction
- Identification and control of hazardous substances - It is FENZ's responsibility to identify the chemical(s). It is the vehicle owner's responsibility to remove and make safe. The expected response time is generally within 15 minutes. FENZ will advise Police / TOC of the extent of perimeter closure required when there is a risk of chemical drift or explosion
- Environment protection – assist with the control of spills
- Provide resources to manage incident
- Provide lighting unit used to aid night-time incident response and crash investigations

For off-motorway incidents, FENZ also provides Fire Support Officers to provide support activities, including traffic control, meals, toilets, and cleaning up afterwards.

Police

The Police are responsible for managing the scene of an incident involving death or injury, threats to public order, public safety and national security, or incidents requiring significant coordination of the emergency services. The Police are the lead agency on-site in all incidents requiring the law enforcement powers and skills of a Police Officer and falling within the general responsibilities of the Police (ref. Policing Act 2008).

The Police co-ordinate all the activities of those responding at and around the scene, which must, unless a disaster has been caused by severe weather or other natural phenomena, be preserved to provide evidence for subsequent inquiries, possible criminal proceedings and any coroners inquests. Where practical the Police establish cordons to facilitate the work of the other emergency services in the saving of life. The Police process casualty information and have responsibility for identifying and arranging for the removal of the deceased. In this task, they act on behalf of the Coroner who has the legal responsibility for investigating the cause and circumstances of deaths other than from natural causes.

Typical Police activities are:

- Acts as Incident Controller
- Initial preservation of the scene
- Initial traffic control to establish inner and outer cordons, and provide traffic control at key intersections on detour routes until relieved by the RNO traffic management crews
- Initial assessments for what support will be required from the RCA
- Liaison with TOC
- Bomb/Terrorist or other security threat – advise TOC of road sections to be closed, close road

- Crime scene investigations (this could include a FENZ Report led by the Police)
- Traffic Crash Reports
- Manage the Vehicle Recovery process
- Escort specialist resources and equipment (e.g., tow trucks, cranes, surface cleaning equipment) to the site if requested
- Handover sites to the RNO on completion of their duties

Police - Serious Crash Unit (SCU)

The Serious Crash Unit (SCU) investigates the cause of the crash and the person/s responsible. The SCU investigates every fatal and serious injury road crash thoroughly and impartially to ensure all causative factors are identified. The SCU only get one opportunity to obtain all the physical evidence at any crash before traffic contaminates the scene, so lane or road closures are necessary to preserve the evidence and allow for scene examination to be undertaken safely and evidence identified and gathered accurately. Their scene is fluid and may change with evidence observed (i.e., the scene could be enlarged) or information provided by witnesses. There are no assumptions made, just a methodical collection of data.

SCU are aware of the traffic congestion effects caused by road or lane closures and the requirement to reopen roads/lanes as soon as possible and work proactively with other first responders to restore the network.

Police - Commercial Vehicle Safety Team (CVST)

The Commercial Vehicle Safety Team (CVST) monitors all areas of the commercial vehicle industry, including trucks, buses, taxis, couriers, mobile cranes, and mobile homes. CVST staff encourage commercial vehicles and drivers to operate within the safety regulations to protect the road network and all road users.

To do this, they:

- carry out vehicle inspections at compliance stations and the roadside as part of the Operator Rating System (ORS) (link is external)
- encourage compliance with road safety laws by focusing on seasonal and local risks
- work with road transport operators to make sure drivers and vehicles meet health and safety requirements
- check loads are correctly secured
- attend commercial vehicle crashes, advise and report to the investigating Police staff on the scene
- advise on and assist with dangerous goods transportation

In the context of road incident management, CVST attends commercial vehicle crashes to investigate vehicle roadworthiness prior to crash, licencing, tax, the integrity of the vehicles post-crash and whether they can be driven or need to be towed or transported. Vehicles may be transported due to the damage rendering them un-towable or when contaminated with body parts.

Road Controlling Authorities (RCAs)

The control of public access roads in New Zealand falls under four key Road Controlling Authorities:

- Waka Kotahi New Zealand Transport Agency - for State highways and motorways
- Territorial Local Authorities – for the various local council road networks
- Department of Conservation – for DOC roads
- Other Networks – There are other localised road controlling authorities that are responsible for roads within their legal boundaries, such as:
  - Airport roads, e.g., Auckland International Airport Limited
  - Port roads, e.g., Ports of Auckland

For road incident management, the respective Road Controlling Authority is responsible for:

- Liaison with emergency services
- Determining the Incident Level (1 -5), which governs the level of response resources required
- Traffic Management to protect the incident scene
- Management of the road asset restoration process
- Notification to media and affected adjacent road networks and service providers
- Liaison with NZ Civil Defence Emergency Management (for a declared State of Emergency)

For most RCAs, their responsibilities for responding to road incidents are delegated to their respective Traffic Operations Centres and Road Network Operators (Contractors).

Media Liaison

Responsibility for liaison with the media rests with the relevant RCA appointed media officer. Site personnel must not communicate directly with the media. Incident information should be provided to TOC who will update the media via the approved channels.

Traffic Operations Centre (TOC)

Traffic Operations Centres have been established by Waka Kotahi in conjunction with Territorial Local Authorities at the following locations to operate the transport network in a true multimodal, integrated, efficient, and safe manner; focussing on the whole customer journey irrespective of the transport mode.

- Auckland (ATOC) – A joint Waka Kotahi / Auckland Transport operation, responsible for managing and coordinating road incident and event management activities in Auckland for Auckland Transport (AT), as well as in the Upper North Island from Cape Reinga to Taupo for Waka Kotahi. ATOC is tasked with managing, monitoring, and optimising of the road network and keeping customers informed to enable smarter choices.
- Wellington (WTOC)
- Christchurch (CTOC)

Figure 1. TOC Operations Room

The Traffic Operations Centres, on behalf of Waka Kotahi and TLAs, manage the response to all State highway and local road traffic incidents, typically responsible for:

- Maintaining 24/7 operation of State highways and local roads monitoring
- Control operation of the digital closed-circuit television (CCTV) systems used for real-time monitoring of traffic flows and journey times, activities and incidents on the network
- Monitor weather events across the wider network and provide warning and advice on developing situations that may impact the network
- Monitor feeds from various weather stations on the network that provide alerts for wind gusts
- Notification to / Liaison with emergency services and Road Network Operator (RNO)
- Provide Incident Notifications via Multitext – a system that facilitates the creation and distribution of text messages to a large number of recipients. Used by control room managers to advise in a timely manner via PC or Smartphone
- Determines Incident Level (in conjunction with RNO) which governs the level of response resources required
- Initiates relevant TOC incident procedures
- Mobilisation of resources required to restore the network to normal operational capacity
- Emergency traffic management to protect the incident scene, including detours
- Management of traffic signals (SCATS) to facilitate traffic flows affected by the incident. The SCATS system is used in the control room to monitor and modify the performance of the region's traffic signals. The predefined plans which run automatically can be overridden if required to assist with the dispersal of traffic at specific locations
- Control of the traffic management system which is used to control ITS equipment such as lane control signals, VMS and tunnel ventilation and fire suppression systems
- Providing real-time traveller information to customers and stakeholders via VMS; recommend and influence travel choices
- Liaises with Waka Kotahi Communications Manager who provides information to media
- Notifies adjacent road networks and service providers of significant impact to their network
- Internal escalation within Waka Kotahi and TLA
- Notification to media and affected adjacent road networks and service providers
- Liaison with NZ Civil Defence Emergency Management (for a declared State of Emergency)
- DYNAC is the system used to record details of every incident reported to the TOC control room, and to control cameras and VMS
- Capture and record all relevant incident and event information

The Traffic & Road Event Information System (TREIS) is primarily used as a mechanism to provide roading information (such as roadworks and weather events) to customers. TREIS is a national system used by **Waka Kotahi's 0800 4 Highways** call centre to provide information to customers and to receive reports of incidents. Information, which is entered by TOC, Road Network Operators, and Waka Kotahi call centre, can be categorised for internal use only ('unofficial') or, when 'made official', populates Waka Kotahi's traffic information website and provides email alerts or data feeds to subscribers (via an interface called InfoConnect2).

A Police Liaison Officer (PLO) is stationed in ATOC, Monday to Friday during the day to facilitate operations.

RCA Contractor (Contractor)

For incidents on the State highways, Waka Kotahi has delegated the role of *Recovery Manager* to the RCA Contractor.

There are several key functions that are undertaken by the Contractor in the role of Recovery Manager on behalf of the Road Controlling Authority:

- Incident Management (TIM)
- Traffic Control (STMS)
- Crash Investigations (Duty Engineer)
- Structural Asset Inspections (Bridge Engineer)
- Asset Repairs (Contractor resources)
- Development of contingency plans (IMT)
- Traffic Management Co-ordinator (TMC)
- Reporting (All above)

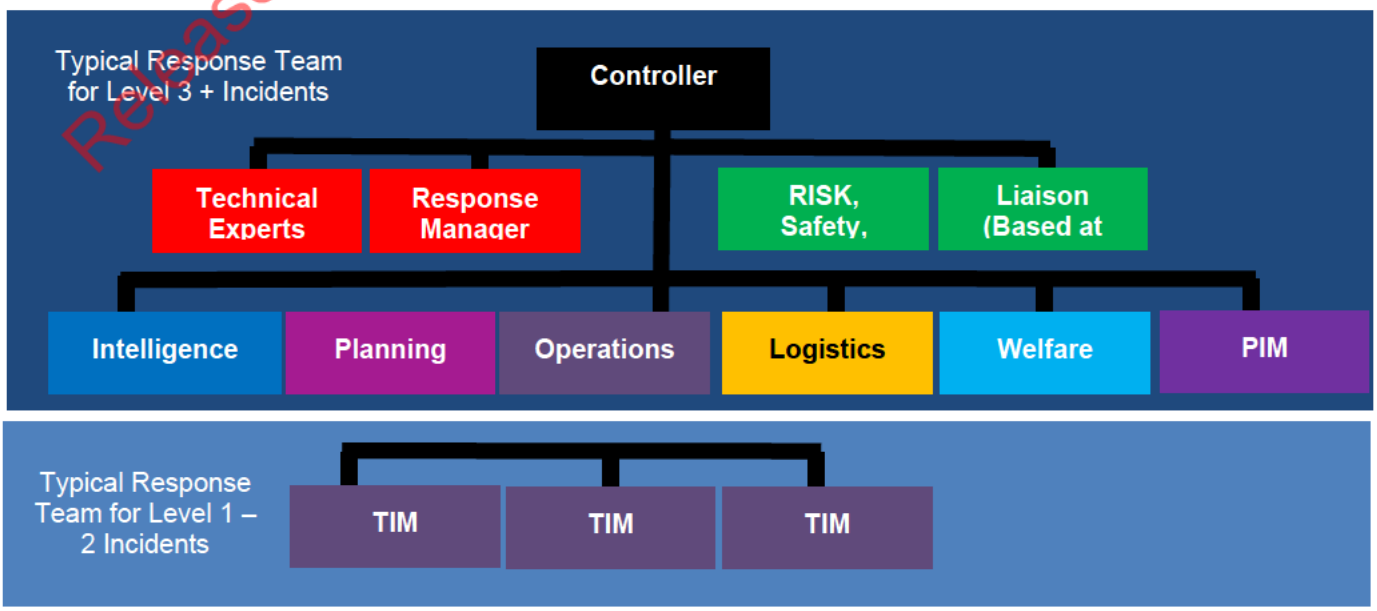
The roles associated with these functions are required to be available 24/7 to respond to events on the network. The Contractor resources have no special powers of operation on the road, other than the use of the emergency shoulder, so the actual arrival time at the incident scene will depend on the distance to the scene and the traffic conditions. Their responsibilities are described in more detail below.

Incident Management Team (IMT)

When an incident escalates in severity (3 to 4 or 5) or the duration becomes protracted resulting in significant impacts to traffic, it may become necessary to establish an IMT at the EOC. The responsibility to activate the IMT usually falls on the Duty Engineer with support from the RCA Contractor management team. The various personnel required will:

- Mobilise to the EOC
- Establish the IMT
- Liaise with TOC and Incident Controller
- Receive and act on directions / requests from the Incident Controller
- Deploy Traffic Management and Incident Response crews as required
- Source and coordinate additional resources as required
- Co-ordinate special resources e.g., Bailey Bridge

The IMT structure follows the NZ Co-ordinated Management System (CIMS). A typical IMT structure for road related incidents is below.



Duty Engineer (DE)

Upon notification from TOC of a Level 3, 4 or 5 incident, the Duty Engineer is required to respond immediately to the incident and upon arrival assumes overall responsibility of the restoration of the road on behalf of the RCA. The Duty Engineer is required to undertake crash scene investigation of road environment factors on behalf of the RCA, and provide engineering advice where the nature of asset damage requires direction from an experienced traffic engineer.

As an event escalates it may be necessary for more than one Duty Engineer to respond to a site to ensure there are adequate resources to manage the incident and undertake the investigations. During handover, the incumbent must provide a full briefing to the incoming person and the new person must inform TOC that they are now fulfilling the role.

Structures Engineer

The Structures Engineer is responsible for inspecting structural assets after an incident to assess the damage sustained, the risk to road users, and determine the serviceability (load capacity), including:

- Reporting on the nature and extent of the damage, and the protection measures required
- Impose any restrictions on use
- Supervision of emergency works
- Supervision of the movement and location of cranes and lifting gear on bridges

The Structures Engineer is required to advise the RCA (Regional Structures Engineer and Overweight Permit Officer) via email within 6 hours of incident if bridge capacity is affected, or otherwise within 24 hours

- Nature and extent of damage
- Whether bridge can be reopened with or without restrictions
- Extent of temporary repairs required
- Extent of permanent repairs required
- Estimated cost and timing of permanent repairs
- If the Incident Response Contractor is required to remain on site until weight restrictions can be posted

If a Bailey Bridge is required:

- Provide design and construction advice for the erection of any emergency Bailey Bridge Structures
- Other associated tasks are documented in the specific Response Plan for Bailey Bridges

Traffic Incident Manager (TIM)

The Traffic Incident Manager (TIM) acts on behalf of the RCA as the Recovery Manager and is responsible for the overall management of the incident, including the resources required for traffic control, detour routes, and road asset repairs. The TIM works collaboratively with the Incident Controller, TOC, and other responder agencies and organisations to ensure the network is restored to full operational capacity without unnecessary delays. The TIM is a key link for communications between the incident scene, TOC, and the IMT if established. The TIM may also complete an asset damage report and crash investigation report for the RCA (if qualified to do so). The Incident Response Supervisor typically undertakes this role for Level 1 and 2 incidents.

Figure 2. Traffic Response Units

Figure 3. TRU Equipment

Key TIM actions required are:

- Report to the Incident Controller when first arriving on site
- Ask what is needed, where and when
- Provide traffic management advice and assist the Incident Controller with the early reinstatement of traffic lanes
- If no Incident Controller on site, then secure the scene and advise TOC of the situation
- Develop a critical path to road restoration
- Oversee deployment of traffic management resources to secure the outer cordon, inner cordon, or lane closures as appropriate
- Liaise with Emergency Services, TOC, Incident Response and Traffic Management Crews to ensure that the incident is managed to minimise the duration of the closure
- Provide initial information update to TOC within 15 minutes of arrival on scene; thereafter at 30-minute intervals or when incident circumstances change
- Identify and prioritise emergency repairs, and mobilise any additional specialist personnel, plant and equipment required to restore the road asset to safe operational condition
- Ensure that the Bridge Engineer is involved when cranes and lifting gear are used on a structure
- Identify, prioritise and program any further works required
- Investigate road crash factors
- Maintain a log of key actions, events, issues, and tasks done during the incident
- Staff welfare
- Arrange relief resources if the incident continues for an extended period
- Ensure responder/public safety and infrastructure integrity prior to approving the re-opening of roads
- Provide an initial programme for the repairs within 24 hours to TOC and the Network Manager
- Provide daily/weekly updates to the Network Manager, and to TOC to allow them to maintain the relevant traveller information

Site Traffic Management Specialist (STMS)

The STMS is responsible for the initial installation of emergency traffic control at the incident scene (for partial carriageway closures) or outer cordon including detour routes (for full carriageway closures). This includes the placement of vehicles, cones, and signs to direct traffic and protect staff working within the incident scene. The STMS should liaise with the TIM (if present) as soon as practicable to confirm work methods and road restoration strategy.

RCA Contractor Resources

These include general and specialist resources that are responsible for the temporary and permanent repairs to assets and restoration of the road surface to a safe operational condition. Activities include, but are not limited to:

- Assist STMS with traffic management if required
- Public assistance
- Provide initial information update to TOC within 15 minutes of arrival on scene; thereafter at 30 minutes' intervals or as incident circumstances change
- Assist the FENZ or spill response services with minor spill response/clean-up
- Removal of crash debris and detritus
- Cleaning of road surface to restore texture and skid resistance
- Temporary and permanent repairs to road surface, roadside safety barriers, signs, street lights, etc.

Typical examples of plant and equipment that the RNO could be required to supply are:

- Asset restoration (Cranes, Hi-abs, barriers, surfacing, front end loaders, trucks)
- Road surface cleaning (Loaders, trucks, sweepers, captive water blasters, high volume pumps)

Figure 4. Incident Response Truck

Vehicle Recovery Operators

The Police have powers to remove all vehicles from the road, and they have contracts with the National Recovery Alliance for the Auckland Region, and the South Island Recovery Alliance for the South Island to provide recovery vehicle services.

Resources required to remove damaged vehicles (tow trucks and cranes) are generally mobilised and managed by the Police, however in certain circumstances when vehicles contain precious or delicate loads then they may allow the haulage company to supervise the recovery.

Under the Police Contract, the respective Recovery Alliance must comply with the relevant Health and Safety Standards. All vehicles and equipment must comply with relevant RCA Health and Safety requirements, including adhering to the Traffic Management Plan (TMP) and wearing the appropriate PPE for the tasks being undertaken.

Vehicle owners may request their own recovery operator, which can cause problems when multiple recovery operators arrive on scene; Police will need to resolve responsibility for vehicle recovery in these instances.

Environmental Response Resources

Specialist environmental resources are mobilised by the incident controller when a significant spill occurs that could affect the environment, with advice from the Environmental Manager, when an environmental incident is beyond the capacity of the primary deployment team. The specialists are responsible for providing material and services to the incident controller.

There are two types of specialist response:

1. Advisory Role; or
2. Equipment and material supply.

The advisory specialist may be a professional specialist in spill clean-up, such as a council employee or private contractor. Their role is to provide experience and advice for large spills or those that enter or are likely to affect sensitive environments or are beyond the experience of the responder. They can advise either remotely or on site.

Figure 5. Significant spills affecting surrounding environment require specialist response.

Equipment specialists are responsible for providing material assistance through the provision of equipment and similar resources, for example a captive water blaster to remove material from the site or additional absorbent materials. These suppliers will be directed by the responder in their tasks and are responsible for providing equipment that is appropriate for the collection, transportation and disposal of contaminated materials from site and providing records to the responder to confirm that the correct disposal of materials has occurred.

Utility Service Providers

Where a utility service (electricity, gas, telecommunications, water supply, wastewater, storm water) is involved and safety or the utility asset are potentially at risk, the asset owner must be contacted immediately to provide guidance to the management of the situation.

7. INCIDENT LEVELS

There are formally five levels of transport incidents that Waka Kotahi have developed as an incident management matrix (see Table 3 on next page) which can be applied to all roads nationally. These provide reference to the level of incident and how the RCA, TOC, and others respond. This incident severity level matrix is used for the purpose of categorising incidents to enable the appropriate level of response.

In the first instance, a single incident severity categorisation ensures all parties understand the nature of the incident being dealt with and can prepare to respond or support as required. Secondly, it ensures parties at all levels understand at what point they will be required to step in and participate in managing the response; be it at the tactical, operational, or strategic level.

Every incident is assessed against each of the tabled criteria. The level of severity will be based on the highest level of any individual factor (except for 'People' - Headline' which has a caveat noted in the matrix).

The matrix will not support every possible scenario for 'Headline' events. If an incident only meets a 'Headline' requirement in one of the 7 areas (Columns b - i), the TAT will need to apply a significance test and determine whether it should be escalated to the EAT.

Table 1. Definition, Purpose and Responsibilities of Teams

TAT	Tactical Assessment Team	The purpose of the Tactical Assessment Team (TAT) is to assess the risk to the RCA in order to determine the most appropriate process to manage the incident - within current TOC resources or escalate to an Incident Management Team (IMT) with additional resources called in to assist. The TAT will also conduct an initial assessment of the need to escalate to the Executive Assessment Team (EAT) for potential level 4 and 5 incidents.
EAT	Executive Assessment Team	The purpose of the Executive Assessment Team is to assess the risk to the RCA in order to determine the requirement for executive involvement in responding to / managing the impact of the incident.
IMT	Incident Management Team	The Incident Management Team (IMT) are responsible for coordinating the tactical level response to a level 3 and above incident. The IMT will normally consist of a core of TOC subject matter experts, and any other additional representatives required to manage the incident. The make-up of the group will be situationally dependent.

Table 2. Incident & Response Levels

Incident Level	Coordination and Management Response	Response Level
Level 5 – Catastrophic	Escalate to Executive level using standard procedures	IMT manage tactical response
Level 4 – Headline	Escalate to Executive level using standard procedures	Strategic input required from IMT
Level 3 – Serious	Managed by TOCs - Internal escalation process	Duty Engineer managed, IMT stands up if incident starts to escalate.
Level 2 – Significant	Managed by TOCs	TOC manage unless escalated to IMT (decision made by TAT)
Level 1 – Minor	Managed by TOCs	Tactical input only

The following should be noted from the incident matrix:

- The Incident Level is escalated up to and including Level 3 by the TOC-Operators.
- The RCA Remote Incident Manager (RIM) decides when to escalate to level 4 and 5.
- Level 5 can also be called by Civil Defence.

Table 3. Transport Incident Management Matrix

TRANSPORT INCIDENT SEVERITY CATEGORISATION								
Incident Level	**People**	**Reputation**	**Property**	**Environmental**	**Delay to Customer**		**Service Delivery**	**Accessibility**
(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**		**(h)**	**(i)**
Severity level of incident	*Level of harm to staff at work, agents/contractors on TLA/NZTA worksite and/or customers whilst using our transport network/services*	*Impact to TLA and/or NZTA reputation*	*Damage to assets owned by TLA or NZTA - Need to determine whether we want to include assets operated by TLA/NZTA or their service providers*	*Actual or potential damage to land, water or air*	*Delay in travel time for the customer (user of the transport system). These timings should take into consideration whether the incident occurs during peak or non peak. If not during peak periods then the impact to customer delays is much less significant.*		*Impact on our ability to deliver BAU services*	*Ease of access to location of incident. Constraint could be physical (tunnel, water or single access road into lcoation), or time based (2hrs to travel to rural location).*
					Urban	**Rural**		
5 (Catastrophic)	Widespread deaths	Sustained (beyond the incident) negatve media coverage Breakdown in relationships with external groups	Multiple assets impacted. Critical assets impacted.	Extensive damage to the environment requiring significant and immediate clean up effort	> 24 hrs	> 24 hrs	Services not available for > 24 hrs	Inability to access location without major civil defence support
4 (Headline)	Multiple serious injuries or deaths **Caveat:** *This people measure must combine with at least one other category (b - i) across this row to be categorised as a Headline (level 4) incident. If this is the only 'box ticked' on this row then it is deemed a level 3 incident.*	Significant negative impact on stakeholder confidence High profile community and/or area High profile group or event impacted	Significant damage making the area unusable - instant repairs and diversion required	Contained environmental damage requiring immediate clean up	3 - 24 hrs	5 - 24 hrs	Major disruption to services but likely to be fully operating within 5 - 24 hrs	Ability to access location is restricted and will cause delays of >3 hrs before appropriate response arrives on site
3 (Serious)	Serious harm or death	National media coverage Immediate relationship concerns in resolving the incident	Obvious damage and repair required. Workarounds can be put in place for immediate management.	Clean up and remediation work required in the foreseeable future	1 - 3 hrs	2 - 5 hrs	Significant disruption to services but likely to be fully operating within 2 - 5 hrs	Ability to access location is restricted and will cause delays of between 1 - 2 hrs before appropriate response arrives on site
2 (Significant)	Minor injuries	Some community complaints Isolated stakeholder relationship issues	Minimal damage (e.g. broken barrier)	Contained pollution requires clean up	30 - 60 mins	30 mins - 2 hrs	Minor impact (service still available but reduced i.e. lane reduction, delay in bus/train service, partial reduction in parking availability)	Access is restricted but response is set up to manage i.e. water based or tunnel incident but standard response capability well established
1 (Minor)	No injuries	Short term, localised media attention	No damage	Slight, short term damage to land and/or eco systems	< 30 mins	< 30 mins	Negligible impact	No access issues

Typical Examples of Incident Levels

Level 1 – Minor incidents include a minor crash, breakdown, loss of load requiring rolling block that inhibits customers from their journey. These events usually last for a short duration. The RCA Contractor may be requested to assist with traffic control.

Level 2 – Significant incidents have a moderate impact on the network and will cause disruption to customers. Examples include a crash or debris blocking multiple motorway lanes or affecting an arterial in a single direction. The impact of these events would last for less than 60 minutes during busy or peak travel times or less than 3 hours where/when traffic volumes are low. The RCA Contractor will be requested to assist with traffic control.

Level 3 – Serious incidents can result in prolonged closure of motorway lanes, State highway or arterial road. These incidents cause significant disruption to traffic and public transport services and are likely to attract the attention of local media.

Outcomes are often serious injuries or fatalities, significant structural or asset damage (e.g., barrier, bridge) for which specialised resources will be needed.

The impact of these events would normally be expected to last for less than 3 hours on the urban network or overnight (cleared before morning peak) for lower volume State highways and arterials.

There is a high likelihood the Police Serious Crash Unit will be attending and may involve other specialised resources such as heavy vehicle recovery. Depending on the assets and the nature of the damage, damage assessment will be undertaken by the Duty Engineer and / or Structural Engineer.

Temporary Traffic Management, ramp and or motorway closures with diversions could be required.

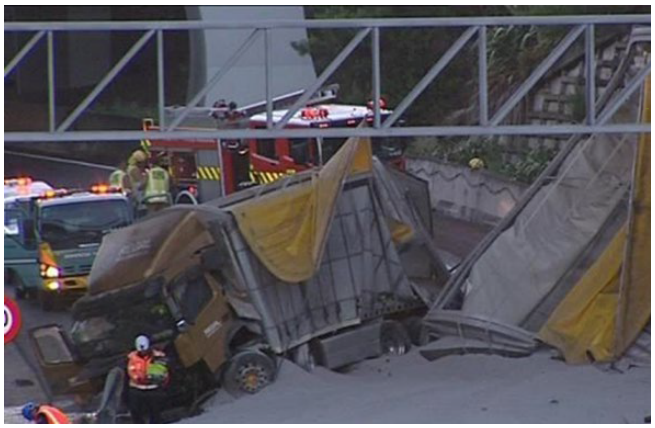
Fatal and serious crashes are typically the most disruptive incidents to happen. Roads can remain closed for extended periods to enable the injured to be cared for, deceased to be uplifted, scene examination, inspections, recovery of vehicles, temporary or permanent repairs to asset damage.

Figure XXX Extreme weather events can have a significant impact on traffic flows.

Level 4 – Headline incidents result in major disruption to traffic and/or public transport/private sector services, have regional effects and attract widespread media coverage. The result will be a prolonged closure of a motorway, State highway, arterial road or modal service corridor. Responses need to be coordinated from a control centre and will include press releases about the situation.

Incidents involving criminality such as the discharge of firearms or the use of force causing injury or death, are likely to require the use of specialist forensics teams who will establish a sterile area. These incidents are likely to last several hours and cause widespread traffic and/or service disruption.

The TOC Incident Management Team will be mobilised to deal with all facets of the response (control room, stakeholder management, communication, and media liaison).



Level 5 – Catastrophic incidents will result in massive disruption to traffic and network infrastructure. They will typically be the results of an earthquake, tsunami, volcano or other natural disaster. It is likely that CDEM will declare a state of emergency. The response will be at the highest levels in the partner agencies and be coordinated and led by CDEM. TOCs will require an experienced representative of the RCA to be stationed at the TOC Emergency Operations Centre to act in a liaison capacity and to provide the key communications link between TOC and the RCA IMT / ICPs.

8. COMMUNICATIONS

Clearly understood communication at the scene of an incident is critical. The Chain of Command must be observed, and communication protocols followed. Failure to do so can lead to misunderstood instructions resulting in incorrect actions by staff leading to unsafe work environments. All communications to and from the incident scene to TOC or EOC shall go through one person only, otherwise the person in charge at the scene can lose control.

The Traffic Incident Manager (TIM) is to maintain liaison with the TOC, which liaises with CDEM to support the response action and provide asset intelligence on the road network for Level 4 and 5 incidents.

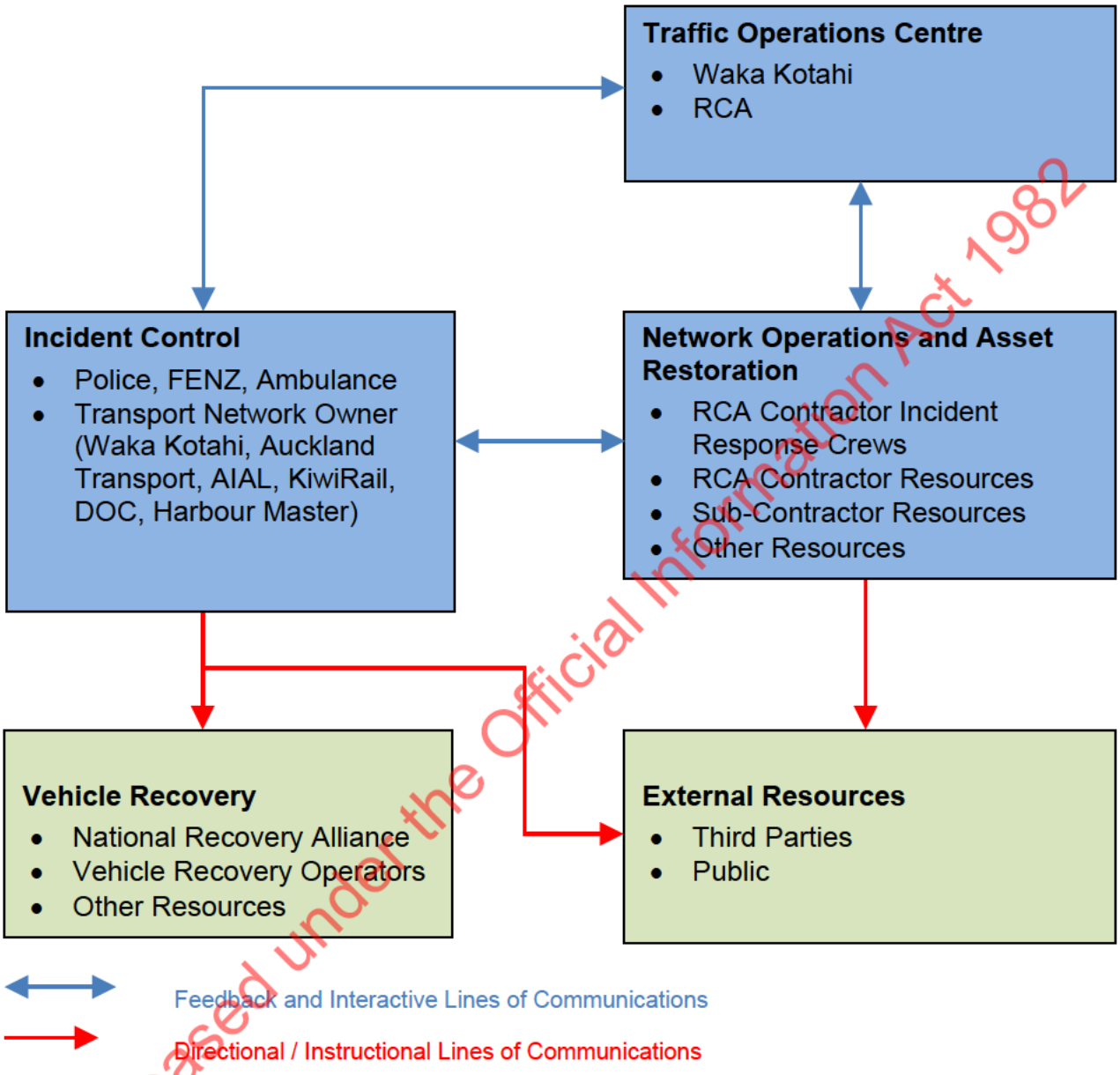
During a significant event, varying methods of communication will be utilised by internal and external key stakeholders. In the event that mainstream communication networks are disabled (e.g., mobile, landline), the RCA Contractor shall rely on VHF radio communications with the TOC, thus integration of radio communication devices with the TOC and the first responders is recommended to facilitate efficient communications.

Incident information must be provided to TOC who will update the relevant RCA appointed media officer via the approved channels. The delegated media liaison person in the RCA shall provide regular updates with factual key messages to the media. Breach of this could be deemed as serious misconduct.

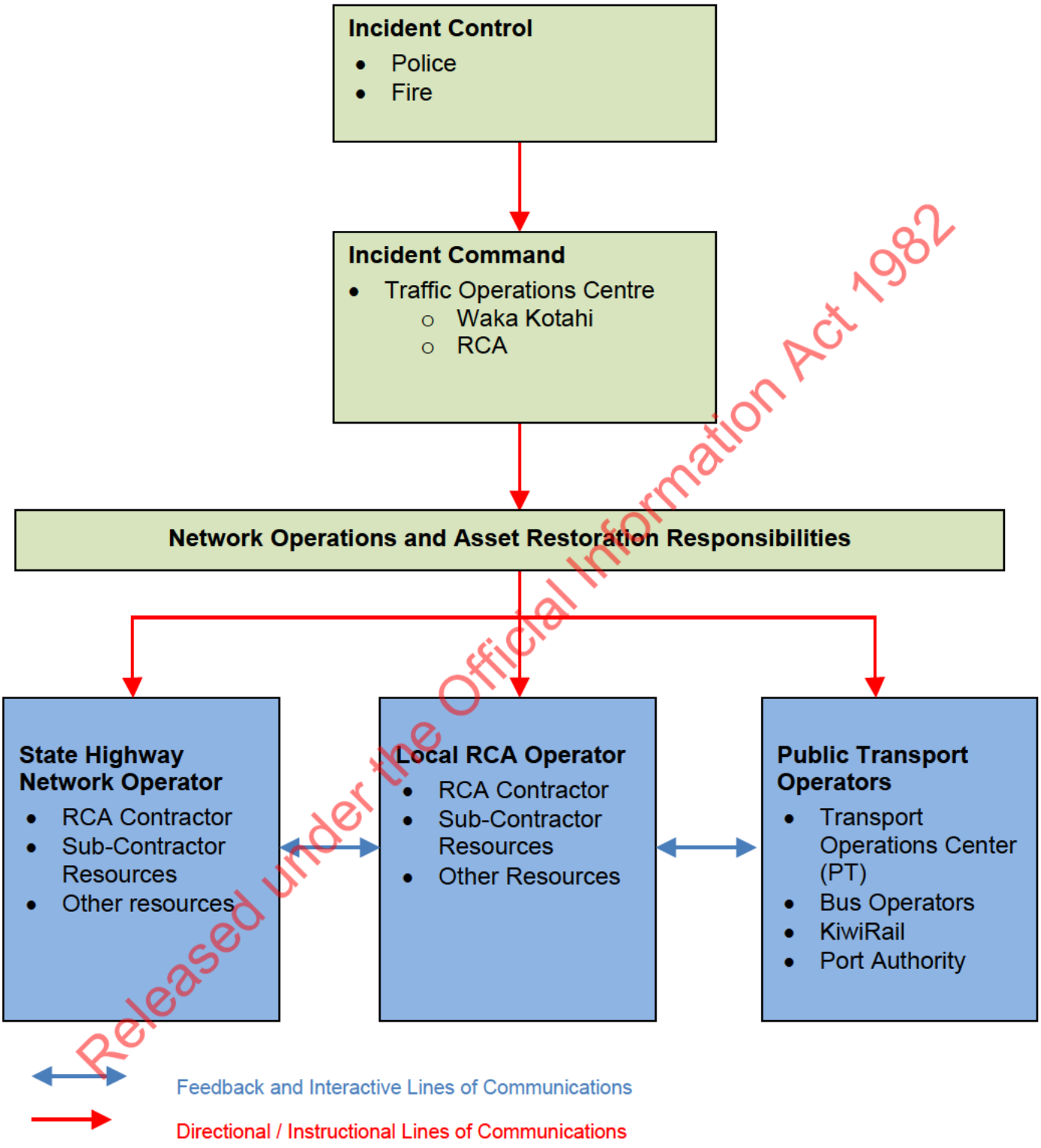
Staff must not provide comments to media (even off the record), or communicate non-official facts to external stakeholders, including external colleagues, families and friends, or utilise social media (e.g., Facebook, YouTube, etc.) to post unauthorised material.

Communications Structures

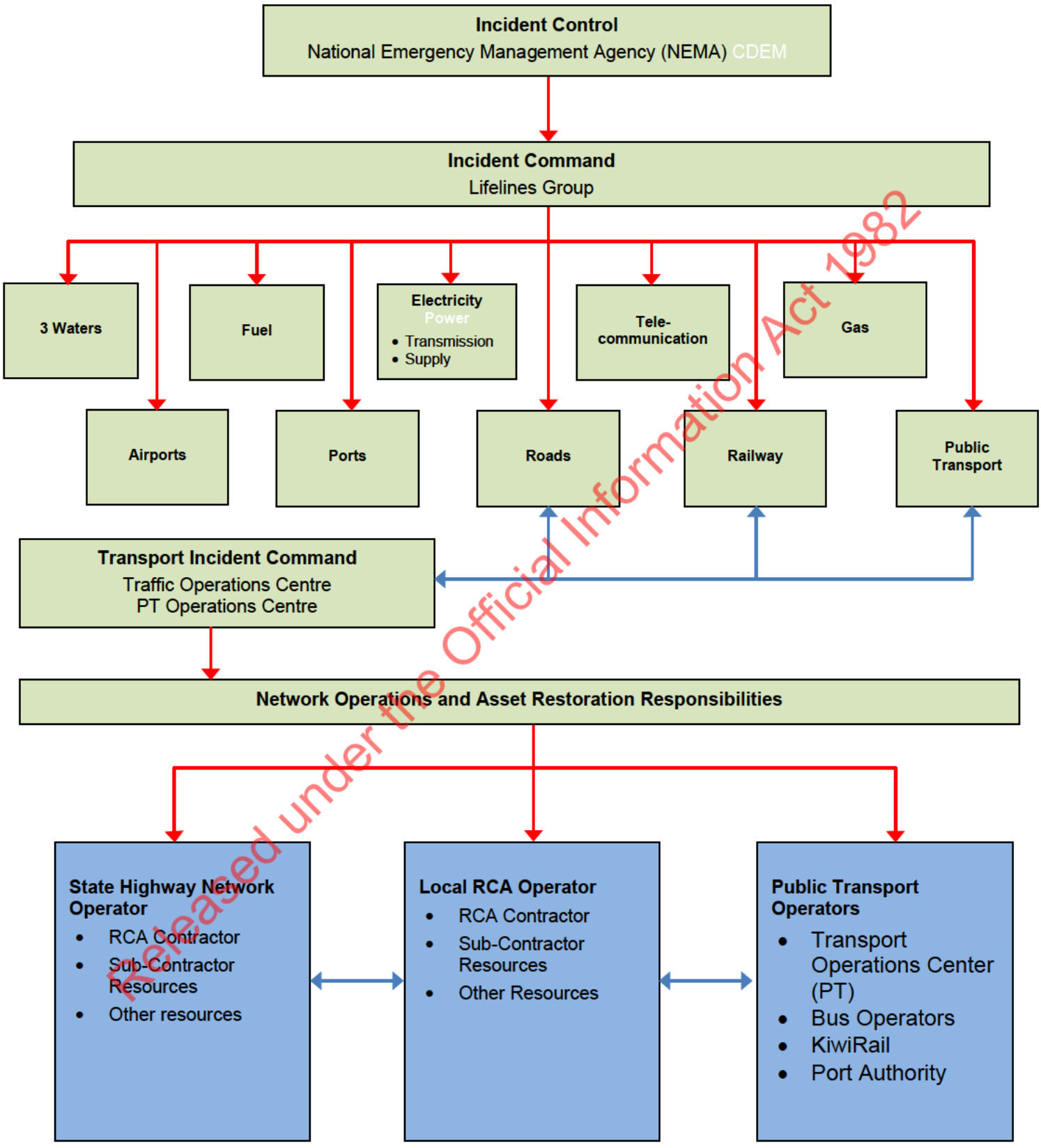
Level 1 (Minor), Level 2 (Significant), Level 3 (Serious) Incidents



Level 4 (Headline) Incident



Level 5 (Catastrophic), Civil Defence State of Emergency



9. PREPAREDNESS

Route Resilience and Vulnerability

Route resilience refers to the ability of the asset to withstand natural events and maintain its integrity and operational capability, including usage of detour routes. RCAs should ensure that their networks have been properly assessed for resilience threats, the issues prioritised, and funding applied for through the annual land transport funding programme.

Vulnerability refers to the potential for traffic flow to be affected by asset failure, crashes, crash damaged assets, poor response times due to traffic congestion blocking responders, delayed or poor decisions made on scene, lack of special resources required to restore the network. RCAs should consider the following steps to reduce network vulnerability:

- Approved Detour Routes – Development of key detour routes that also consider Overweight, Over-dimension, and High Productivity Motor Vehicles (HPMV). Permanent signage of key detour routes to enable immediate activation in an emergency
- Awareness of Asset Conditions – Having up-to-date asset condition information would help identify potential vulnerability. Increased level of monitoring at higher risk sections can improve RCA preparedness.
- Strategic Placement of Resources – Rural networks can be geographically challenging with long travel times between centres, whereas urban networks can be highly congested. Strategic placement of operational resources can greatly assist in reducing response times and thus overall restoration times.
- Stakeholder Relationships - Building relationships with key stakeholders (Police, FENZ, TOC, Recovery Operators, and adjacent RCA networks is fundamental to facilitating collaboration between parties to achieve early restoration of the network post incident.
- Training and Ability – RCA and RCA Contractor staff having appropriate training and skills enables an efficient response to minimise negative impact of asset availability to customers.

Organisational Resilience

Organisational resilience considers the key components required for the effective response to incidents:

- Staff Capabilities and Training
- Facilities
- Plant and Equipment
- GPS Fleet Management
- Operational Readiness

Staff Capabilities and Training

Staff training is the key element to successful incident management. Operational staff should be familiar with the following documents and processes/procedures:

- Road Incident Management (RIM) Guide
- RCA - Emergency Management Plan (EMP)
- RCA - Standard Operating Procedure (SOP) for Traffic Response activities
- RCA - Crash Investigation Procedures
- Code of Practice for Temporary Traffic Management (COPTTM)
- New Zealand Co-ordinated Incident Management System (2nd Edition April 2014)
- Emergency Responder Safety Institute http://www.respondersafety.com/
- State Highway Control Manual

The Emergency Management Plan (EMP) is critical to minimising the impact of an incident on the network. It addresses the Operational Structure, Communication Protocols, Roles and Responsibilities, and Emergency Procedures of the organisation. Operational staff should be familiar with the EMP and its contents.

Regular emergency simulations should be undertaken for staff to practice establishing an IMT, EOC and managing various types of incidents (road crashes, asset damage or failure, natural disasters) in order to become competent in this area.

First Responders should also be familiar with the types and operation of special plant and equipment that may be required to restore the network post incident. Special equipment is further described under the Restoration section.

Co-ordinated Incident Management System (CIMS)

Incident Management Staff should be trained in the New Zealand Coordinated Incident Management System (2nd Edition) which describes how New Zealand agencies coordinate, command, and control incident response of any scale, how the response can be structured, and the relationships between the respective CIMS functions and between the levels of response. It is the primary reference for incident management in New Zealand. CIMS provides guidance on:

- The fundamental principles of incident management
- Response functions, structures, and processes
- The different levels of incident response, from incident level up to national, and including communities
- Creating action plans before and during a response, and how to link multiple action plans together in complex incidents
- Common forms and reports
- Common terminology and glossary

The following are the Defined Roles required to be established under the CIMS Structure:

- Incident Control
- Intelligence
- Planning
- Operations
- Logistics
- Liaison
- Public Information Management
- Welfare
- Risk

Facilities (Coordination centres)

A Coordination Centre (CC) is where the Controller and IMT manage their response from. It needs to be large enough to accommodate all the personnel, equipment, and facilities required to effectively manage the Controller's response element. The CC may be as small as a single vehicle or desk, or as large as an entire building with dozens of personnel.

There are four types of CC:

- Incident Control Point (ICP) is an incident level CC. There is only one ICP at an incident level response site; separate ICPs may be established at other response sites.
- Emergency Operations Centres (EOCs) are local level CCs
- Emergency Coordination Centres (ECCs) are regional level CCs, and
- National Coordination Centres (NCCs) are national level CCs

Further information on CIMS can be found at https://www.civildefence.govt.nz/resources/new-zealand-coordinated-incident-management-system-cims-2nd-edition/

Incident Control Point (ICP)

The Incident Control Point is established at the scene of the incident. During a wide scale incident with multiple sites, each site may require its own ICP.

Incident Management Team (IMT)

To support a serious or complex incident, the RCA may establish an Incident Management Team at the Emergency Operations Centre (EOC) to provide structured coordination and management of resources to enhance its support to the road incident.

Emergency Operations Centre (EOC)

When a significant road incident or natural event occurs, responder agencies need to be able to establish an Emergency Operations Centre (EOC) without delay and be able to be operational within minutes of activation. A suitable room should be designated as the EOC and be equipped with the essential equipment, systems and facilities to support the IMT through the duration of the event.

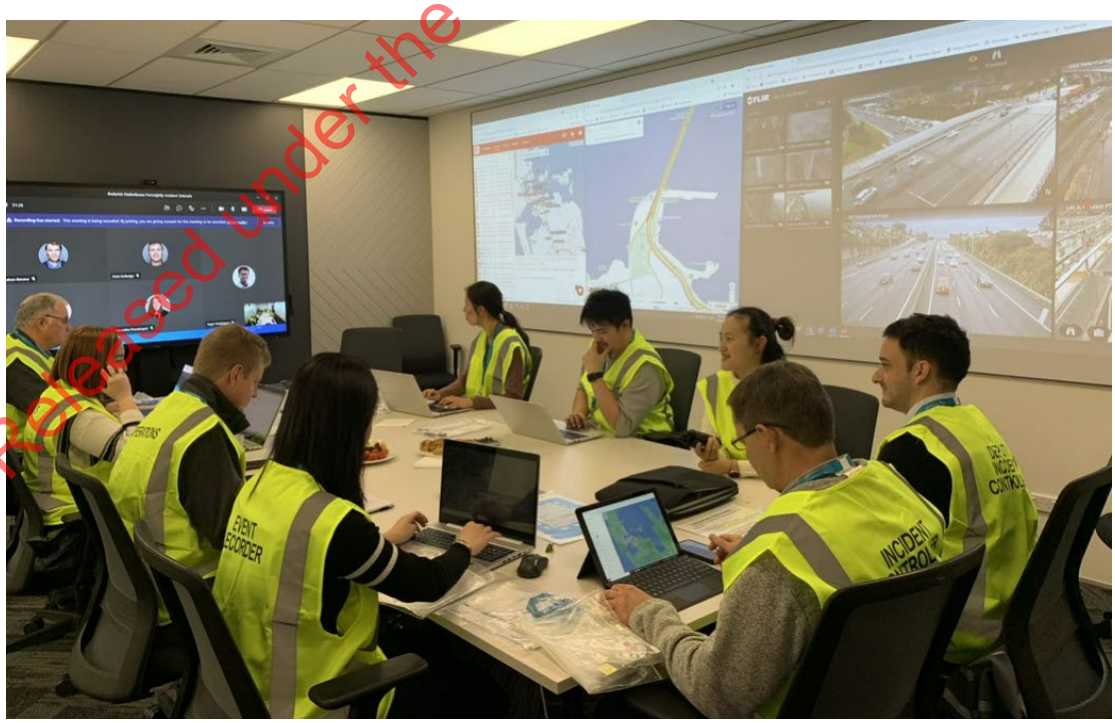


Figure 6. Emergency Operations Centre (EOC)

Communication tools are a key asset during an emergency or crisis, it is important to ensure that the EOC facilities and equipment required in an emergency are available to the IMT and kept in an operational condition at all times. This includes, but is not limited to:

- Backup Power – A generator with sufficient capacity to power the EOC
- Mobile phones and chargers
- Landlines
- VHF radios and chargers
- Satellite phone
- FM Radio (tune to channel Newstalk ZB)
- Television – to monitor CCTV feeds and media broadcasting
- Internet - web based feeds
- Torches and batteries
- Emergency documentation
- Network Maps
- 24/7 Contact information for Staff and Key Agencies
- Food and water
- Stationery
- 24/7 Contact information for plant, equipment, and materials providers
- GPS Fleet management capabilities - This is a useful tool in the deployment of resources that are closest to the incident in order to minimise response times.
- For extended operations, a person may be required in the EOC to look after the welfare of staff family members.

Emergency Operations Centre Facilities (Network Specific)

The ASM's primary Emergency Operations Centre (EOC) will be the Tamaki Room at the ASM office in Central park, Building 8, Level 3, 666 Great South Road, Ellerslie, Auckland.

This room is equipped with essential equipment to support the operation of the EOC under most emergency situations.

- The second alternative is the Fulton Hogan Depot at 4-10 Reliable Way, Mt Wellington, where the ASM has an operating base
- The third alternative is the Annex office at 14 Tennyson Street, Northcote Point

The Media Briefing Room shall be located separately from the EOC room and will be used to provide formal media briefings. It is preferable for the Media Briefing Room to be near the project site but must not be the same as the ICP for reasons of confidentiality.

A Family room may also be required to provide a private space for affected family members. Ideally it is located away from the EOC and the media.

Plant and Equipment

All personnel involved with incident management need to be conversant with the available options for accessing plant and equipment to respond to an incident. A list of suppliers for various plant and equipment to assist with incident response should be maintained by the network operator. There should be at least three suppliers for a particular type of plant and equipment to ensure availability during an incident. The list of plant and equipment may include, but is not limited to:

- Cranes
- Front end loaders
- Graders
- Trucks (Tipper/ Plant Transportation)
- Diggers (Rubber-tyred)
- Sweepers
- Captive Water Blasters
- Conveyor Belts
- Water Pumps
- Generators
- Fuel Delivery Service
- Water Tankers
- Water Cutters
- Vacuum Trucks
- Survey Equipment (for bridge strikes etc.)

GPS Fleet Management

All personnel with vehicles used for incident response should be managed using a GPS fleet management system to assist with co-ordination and deployment of resources to reduce the impact of incidents on customer journeys. Ideally, key plant and equipment should also be tracked and managed using a GPS location system. The benefits of utilising a GPS location system for incident management may include, but is not limited to:

- Optimisation of dispatch (resource availability)
- Reducing response times (deployment of closest available resources)
- Timestamping of key performance measures, e.g., mobilisation time, time arrived on scene, etc.

Operational Readiness

Alert Status

When notice is given of an impending event, such as tropical cyclone, tsunami, etc., it will be necessary for the (potentially) required resources to be identified and put-on alert. For this purpose, we have identified three alert statuses.

Green Alert	Resources identified and notified to be available if required.
Amber Alert	Resources identified, notified and standing by at suitable location within 30 minutes of the incident site; able to mobilise within 5 minutes of activation.
Red Alert	Resources identified, notified and standing by at holding point near the incident site; able to be fully operational within 2 minutes of activation.

Staff Welfare: Shift Work and Your Family Commitments

Organisations generally place significant importance on the wellbeing of their employees and understand that there are domestic obligations on everyone. There are some personnel with more domestic obligations than others (such as young children to transport and supervise). None are insurmountable with prior knowledge and planning. Incidents by their nature are not planned and their duration and requirements for resolution are hugely variable, this can add additional stress to those with key domestic responsibilities.

As a Traffic Incident Manager, Duty Engineer, STMS, or Supervisor, you should be aware of all the staff from your organisation that are involved with the incident, and whether any staff have special requirements which need addressing during the course of the event.

For those individuals on site who have 'special requirements', it is important to raise any potential issues you have sooner rather than later, so other options can be considered and implemented as required. Failure to do so can result in staff becoming dis-engaged or unreliable.

On occasions, staff respond to crash scenes where fatal or serious injuries have been sustained. They may arrive on scene before the ambulance services and be required to provide assistance to the injured. They may also arrive on scene before the deceased have been removed or the injured have been transported to hospital. These situations can sometimes be quite disturbing, and staff can be traumatically affected by what they encounter. Individuals have different tolerance levels and what may be quite tolerable to one person may have a serious effect on another. Supervisors must be aware of what their staff have seen and ensure that appropriate support and counselling is provided to those that need it. Most organisations use EAP Services who are New Zealand's leading employee assistance programme - https://www.eapservices.co.nz/

Staff are able to contact EAP Services in confidence, they are available 24/7 on 0800 735 343.

10. INCIDENT LIFE CYCLE

There are 6 key stages in the life cycle of a road incident. The Road Network Operator's involvement normally starts at the response stage, however proximity to incidents may result in earlier involvement.

Detection

The process whereby an incident is detected. Typically, the public notifies emergency services via 111 or the TOC Operators observe the incident on camera and notify emergency services.

Some assets on the network have automatic incident detection built-in, including but not limited to:

- Tunnels
- Major structures
- Over-height detection alarms
- Over-weight detection using weigh-in-motion technology

Verification

The process whereby the relevant authority (Emergency Services / TOC) ascertains sufficient information to verify that the event is genuine.

Response

The process whereby resources are mobilised to the scene to respond to the incident. There may be one or multiple first responders, dependent on the information received from the public or what is observed by the TOC.

Recovery

The process of recovering damaged vehicles and vehicle debris from the road or environment. This typically includes the utilisation of tow trucks, Hi-abs, cranes, etc. Recovery operations are usually managed by Police and/or Commercial Vehicle Safety Team (CVST).

Restoration

The process of removing vehicle load debris, road surface cleaning and asset repairs (temporary or permanent) to restore the road back to the safe and normal operating condition.

Debrief

The post incident process of reviewing the incident timeline and the various activities to identify what went well, opportunities for improvement, any systems or processes that require updating, developing, and assigning actions.

A more detailed overview of an incident timeline is shown in Figure 1 on the following page.

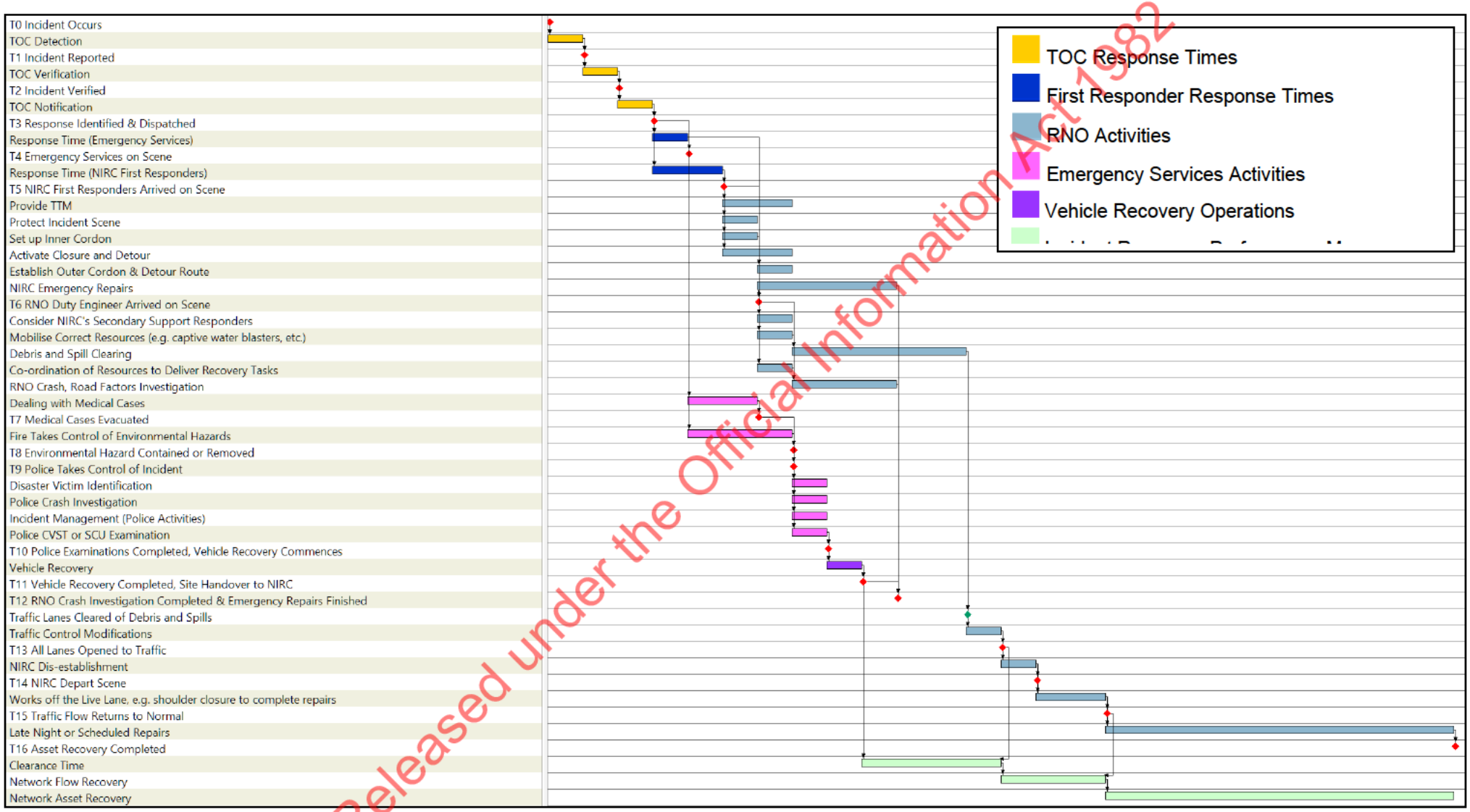


Figure 7. Anatomy of an incident

11. RESPONSE

It is imperative to establish accurate and relevant information as early as possible in order to provide the appropriate level of response.

- The road name, correct location, correct direction, other distinguishing details such as geographical features, intersecting roads, that can assist to correctly identify the location.
- The nature of the incident, how many vehicles are involved, how many people are injured and the nature of their injuries.
- Other key characteristics which should be known from the outset, such as hazardous goods, environmental contamination, nature and extent of asset damage etc., to enable mobilisation of the appropriate resources.

Effective sharing of verified information can:

- Provide direction or access options for First Responders and other parties to the incident site
- Reduce the risk of poor decisions being made under pressure
- Encourage timely/ effective decisions to be made
- Enable vehicle recovery operators to activate their response with the best possible information, e.g., how many tow trucks required and the type of tow truck required for effective operations.

The response process includes the following key activities:

- Mobilising to the incident
- Securing the scene
- Attending to the injured
- Emergency traffic control
- Preservation of the environment – intervention required to prevent or restrict damage or pollution occurring to the environment using appropriate apparatus (Fire, spillage of hazardous substances into air, land or water)
- Asset damage assessment
- Mobilisation of restoration resources
- Police Investigations (SCU, CVST, CIB)
- RCA Investigations (Road and environment factors)

When notified of an incident and receiving a request to respond, the person receiving the call must clarify the following:

- The location, direction, and nature of the incident
- What resources need to be activated right away?
- Which is the best route to take?
- Are emergency services on scene?
- What are the traffic impacts?
- The expected duration of the incident
- How long will it take incident response crews to arrive on scene – is Police escort required?
- Detours required
- Any asset damage, spillages, etc.
- What are your resources required to do?
- What other resources have been mobilised?
- The incident levels. If Level 3, 4 or 5 incident, has the Duty Engineer been mobilised?
- Do you need to establish an IMT?

Mobilising to the Incident

Responding to serious road incidents can be stressful for first responders; they are aware of the need to get to the scene quickly however they must not allow the pressure to cause them to make poor decisions while driving. First Responders (TIM, DE, STMS) are expected to arrive on network within 30 minutes (some networks may have a different level of service), but the actual time required to reach the incident scene may take longer due to traffic congestion and the geographic extent of the network.

Road Controlling Authorities should provide their Network Contractors with an appropriate Traffic Management Plan detailing how they respond to road incidents. This should cover travelling on the adjacent road network, on their road network, travelling through un-congested traffic, congested or stationary traffic, and the use of road shoulders. The TMP must provide clear guidance to first responders on what they are authorised to do. First responders should not operate outside these parameters.

Securing the Scene

In most cases, the emergency services have the incident scene under emergency traffic control by the time the RCA Contractor responders arrive, however sometimes the RCA Contractor staff may be first on scene. In either situation, the priority is to protect the incident scene from approaching traffic, as well as to prevent further vehicles from becoming involved. When installing emergency traffic control this should follow the CoPTTM guidelines as much as practically possible, address the operating speed and the risks, and include positive traffic management if possible.

The incident scene may also contain evidence that needs to be protected, so unnecessary personnel should be kept out of the scene, only those required to provide support to the injured should be allowed into the scene. The Police generally isolates, controls and contains the incident scene.

Site safety is paramount and must be maintained from the start until the finish when the last person leaves the site. The Health and Safety at Work Act 2015 requires Employers to take every precaution to ensure the safety of their employees and other parties who may be engaged in work activities. Despite a significant amount of pre-planning for road incidents, including the identification of hazards and provision of training and PPE, the nature of road incidents and response operations are extremely variable and each incident scene can present many additional hazards that need to be eliminated, reduced, or safe work methodologies implemented. All first responders are responsible for carefully assessing the scene and taking the necessary steps to ensure that people are able to work safely.

Common risks associated with incident management on site can include, but are not limited to:

- Live traffic
- Electrical hazards
- Hazardous substances (labelled or not labelled)
- Damaged vehicles and vehicle recovery operations
- Bio-hazardous materials from injuries sustained by others
- Un-attended vehicles – risk of poisonous substances inside the vehicle
- Sharp objects
- Uneven surfaces
- Unstable assets or objects
- Frustrated members of public
- Dehydration
- Darkness, Glare
- Stress – your own and others
- Complacency, Fatigue, Frustration, Rushing
- Hot/ Cold and other adverse weather conditions

Attending to the Injured

The priority for Emergency Services and First Responders is the preservation of life, including the protection of the scene from traffic, extraction of injured from vehicles, control of fire and hazardous substances.

Patients suffering serious injuries are transported to hospital as soon as they are stable enough to move. When attending incidents, first responders should remember to make allowance for the access requirements of ambulances and ambulance staff.

If you are first on scene:

- Determine what type of vehicles are involved and how badly damaged they are; whether there are any hazardous materials involved and what they are.
- Advise TOC of all the incident details, this will assist TOC with mobilising the correct responder resources and providing appropriate motorist information via VMS and media. Determine the nature and status of the injuries and how many injured; contact emergency services and confirm that they have been mobilised.
- Provide Triage[1] and first aid (if required).

Emergency Traffic Control

Safety of personnel responding to and working at road incidents is critical. The nature of unplanned incidents is so variable that no specific traffic management plan or plans can be prepared to cover all scenarios. At a typical incident site, cordons are set up to control access to the incident site.

Responding traffic control staff need to be well trained in the techniques of emergency traffic control and be able to constantly assess the changing circumstances and take the appropriate steps to ensure that the incident scene is well protected at all times and their staff are working safely.

There is a range of scenarios where emergency traffic control is required. Some examples are:

- Vehicle crash, bridge strike, debris on road, or material spill
- Vehicle fire on road or bridge (with or without hazardous cargo)
- Adjacent property fire (smoke and fumes pose a significant visibility and health risk to motorists)
- Asset failure
- Police operations
- Risk of explosion (Terrorism, bomb threat, explosive substance spill)
- Evacuation of a contaminated area
- Natural event

Road incidents can have wide reaching effects on traffic, often extending into adjacent road networks. It is important to support TOC to manage the road users' journeys as a whole and not just within the localised area or network where the incident occurs.

On motorways where traffic becomes trapped by a full closure of extended duration, it may be necessary to turn trapped vehicles around and manage a low-speed contraflow operation to allow these vehicles to exit via the closest on ramp.

At incidents where traffic queues restrict or prevent the passage of responder vehicles, it may be necessary to facilitate a contra-flow operation for the responder vehicles to progress to the incident scene. On dual carriageway roads, there is a significant risk that queued traffic may turn around on their own accord. On motorways the traffic on the applicable carriageway should be stopped completely and the responder vehicles contra-flowed on at the closest off ramp to the incident scene.

There is increased risk to staff and motorists when the operating conditions change as the incident progresses. The STMS / TIM needs to regularly re-assess the site layout to ensure it is appropriate for operating conditions. Temporary changes in the traffic control at the scene are often required for a short

period to allow for specific activities such as medical evacuation or movement of recovery vehicles and resources.

When temporary changes are required, or emergency traffic control is replaced by structured (CoPTTM compliant) traffic management, the proposed changes need to be clearly communicated to all parties and undertaken in a safe and controlled manner. Before any traffic control changes can occur, the STMS or TIM must ensure that parked vehicles, plant, and materials are not blocking or impairing proposed traffic movement. Failure to do so can result in staff being exposed to live traffic and traffic being exposed to stationary hazards.

Details of any changes to traffic control must be communicated to TOC, particularly where the changes affect the messages displayed on the VMS and provided to the media.

Inner Cordon

Inner cordons are usually initiated by the first officer on scene or the Incident Controller, using traffic cones. This is the secondary control point surrounding and protecting the Incident Scene. Access to the inner cordon is controlled by the Officer in Charge, identified with the appropriate OIC vest. The STMS may be required to reinforce the cordon.

Figure 8. Inner Cordon (Photo deliberately blurred)

Inner cordons are required when:

- Evidence needs to be protected for investigations
- Scene investigations are being undertaken
- Other hazards exist such as fire, chemicals
- Hazardous activities are being undertaken, vehicle recovery, load recovery, etc.

Do not enter the inner cordon unless you have been invited or instructed to do so. If you are allowed access to enter this area, you must follow all instructions provided to ensure that you do not disturb any evidence.

Rubber necking by passing traffic either on adjacent lanes or on the opposing carriageway can cause significant congestion and secondary crashes as drivers slow down to observe the crash scene.

Steps that can be taken to assist traffic flow past the scene include:

- Traffic control staff encouraging drivers to pass quickly by waving them on

- Turning off forward facing flashing lights when on divided carriageways
- Installation of screens to:
  - Provide privacy for the police investigations
  - Protect public from viewing the scene (injured or deceased may be visible)
  - Prevent rubber necking and the associated traffic congestion

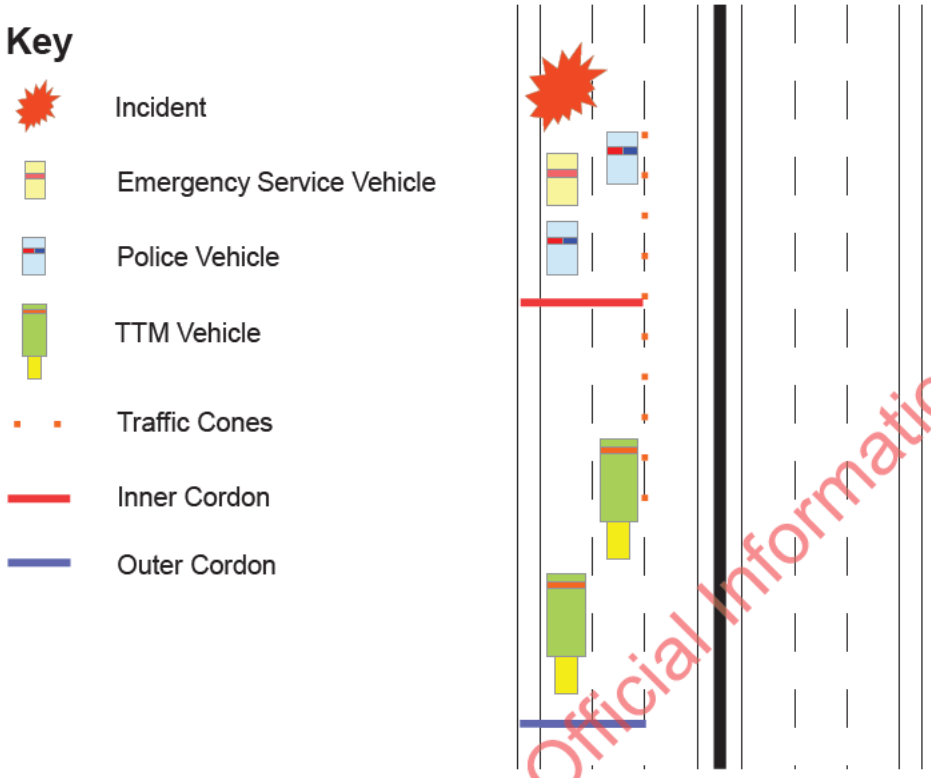


Figure 9. Schematic example of a typical emergency lane closure showing the cordons.

Outer Cordon

The Outer Cordon is the Primary Control Point for Road Closures and Traffic Control. Initial emergency traffic control measures are usually installed by Police / FENZ by using their vehicles or traffic cones. On arrival, the Incident Response STMS takes over the outer cordon and reinforces the initial traffic control with signs, cones and or attenuators to prevent unauthorised entry in order to ensure a safe working environment for the first responders on site, and to protect crash scene evidence.

All personnel shall note the following:

- Site Control & Entry procedures must be complied with, politely but firmly
- Personnel must identify themselves to the traffic control providers when seeking access and state their role
- Traffic controllers must provide advice on possible hazards which may be encountered, and advise all personnel to proceed with caution (vehicles could be coming in opposite direction)
- Unauthorised vehicles or vehicles failing to stop must be reported immediately with registration and vehicle details to the Officer in Charge
- Issues must be escalated immediately to the TIM or TOC

When an incident is expected to continue for more than 2 hours then structured traffic control compliant with the Code of Practice for Temporary Traffic Management (CoPTTM) must be installed. This may be done in a phased approach dependent on location and nature of incident, traffic volume and vehicle speeds. Clear communications with the Incident Controller are essential to ensure that all responders are aware of the proposed traffic management changes to ensure that no personnel are put at risk during the process.

There are often multiple agencies involved with the traffic cordons, and they may communicate via different radio frequencies so it is essential that when the Incident Controller advises that the road or lanes can be reopened the STMS or TIM must visually check the incident scene to confirm that the traffic lanes are clear of obstructions before preparing to uplift the traffic control. Due to the pressure to open lanes, there may still be personnel, plant, and equipment operating on the road shoulder. Under these circumstances, uplifting of closures should be done using a rolling block until vehicles are clear of the incident scene. This will keep vehicle speeds low and personnel operating on the shoulder will not be surprised by approaching traffic.

In some situations, it may be appropriate to apply traffic throttling techniques, where closures are placed to mitigate traffic impact on a specific corridor, e.g., closing the local road / State highway upstream of an incident site.

Figure 10. Outer Cordon

Emergency Detour Routes

The TOCs have divided the State highways into discrete areas for the purpose of detouring traffic in the event of partial or complete road closures. The TOC operating systems have been configured to automatically use appropriate and available VMS with predefined messages.

When roads are completely closed to vehicles, traffic control measures on the approved detour routes will need to be established by the STMS.

The RCA Contractor should be familiar with the detour routes and their requirements.

The approved detour routes and plans can be accessed at https://detours.myworksites.co.nz/

Preservation of the Environment

Do not approach, touch, or inhale any spilt materials. All unknown spilt materials must be assumed to be dangerous until formally confirmed otherwise. Hazardous materials are usually identified by FENZ. The TOC and RCA Contractor will be informed and instructed if hazardous materials are

involved. The priority for FENZ is to manage the risk to people by evacuation, containment, and removal of the dangerous substance.

Once FENZ have discharged their responsibilities, they will usually hand the scene over to the RCA Contractor to complete the clean-up operation. The RCA Contractor is required to complete and submit Spill Sheets that record any chemical and / or biohazard spilt, the relevant information and actions taken.

During the substance identification period, when the RCA Contractor is excluded from the immediate scene, the opportunity should be taken to identify sensitive receiving environments within the outer cordon and to deploy spill containment materials to prevent spilled material from entering the environment (stormwater inlets/outlets, streams, beaches, and any area where hazardous materials would end up should they escape the scene).

Hazardous Substances

Hazchem is a warning plate system used in New Zealand for vehicles transporting hazardous substances, and on storage facilities.

The top-left section of the plate gives the Emergency Action Code (EAC) advising FENZ what actions to take if there is a crash.

The middle-left section gives the UN Substance Identification Number and description.

The lower-left section gives the telephone number that should be called if special advice is needed.

The warning symbol at top-right indicates what danger the chemical presents.

The bottom-right of the plate indicates the company details.

Figure 11. Hazchem warning information plate

"Cargodecoder", a mobile device app is available that identifies the substance when the UN Identification Number is entered.

https://sites.google.com/a/strategiesinsoftware.com/site//current-projects/cargo-decoder

Non-Hazardous Material Spills

There are many materials such as cement, milk powder, paint, fertilizer that are transported by road and are considered non-hazardous to people, however they may constitute a significant hazard to life in the aquatic or marine environment. All practical steps should be taken to prevent or restrict these materials from entering waterways. Any contamination of waterways must be escalated immediately to the Council Pollution Control who will coordinate a response. The RCA Contractor's stormwater asset manager should also be contacted to provide specialist advice.

Consideration must be given to early and effective containment where two or more different substances are involved as their interaction could produce a reaction or where chemicals or other substances may damage the road surface.

Figure 12. Milk powder

Asset Damage Assessment

Detailed inspection of the assets should be undertaken by an appropriate experienced person to determine the nature and extent of the damage sustained, what emergency repairs are required before the road can be reopened, the repair methodology, the resources (plant, equipment, skilled personnel) that are required to undertake the repairs, and what repairs can be prioritised for a later date when traffic volumes are low (e.g., at night). In most situations, the objective is to enable the opening of the road to traffic as soon as possible. Therefore, effecting temporary repairs to make the road practically safe for opening and scheduling full repairs afterwards is generally the appropriate way forward.

Example

In the scene depicted in the photograph below, what do you observe / consider?

- Where is the truck driver and were there any passengers in the truck?
- Are there any vehicles or people trapped beneath the truck?
- What is the nature of injuries sustained?
- Are the spilled materials hazardous?
- Will the spilled materials become hazardous when mixed with another substance, e.g., water or diesel?
- What environmental damage has occurred?
- Have all required emergency services been notified?
- What recovery resources will be required to remove the damaged vehicles and the load?
- Where did the truck come from and what are the company details?
- What assets could have been damaged (Bridge pier, concrete barrier, road surface)
- What resources are required to restore the road to safe operating condition?
- Are specialist assets managers / inspectors required?
- Are crash Investigation and asset damage reports required?
- When are the site updates required and who will provide them (Incident Controller or TIM?
- What is the expected duration of the road closure?
- This is likely to be a long incident, has shift relief and staff welfare been addressed? (Water, toilets, food).
- Consider deployment of RCA Contractor liaison person to TOC.

Figure 13. Major Incident

Following inspection of the asset damage:

- Undertake a risk assessment to determine whether the repairs need to be done immediately or whether the road can be reopened in a safe but degraded mode, and if so for how long?
- Will the repairs be temporary or permanent?
- If circumstances permit, it is preferable to restore traffic flow as quickly as possible and return later to effect repairs when traffic volumes are low.
- For incidents that occur outside of peak traffic flows, can the asset repairs be completed before the traffic volumes increase?
- Identify what resources will be required to restore the road asset to a safe operational condition.
- Ensure that all required resources are mobilised ASAP. It is better to have the restoration resources standing by on site waiting for the opportunity to commence work than to have the site waiting for the resources to arrive.

Understanding what tasks are on the critical path, identifying tasks that can be undertaken simultaneously, and ensuring that the necessary resources are on site and ready to start work will prevent unnecessary delays.

It is possible on occasions, through collaboration with the other agencies and where the situation allows, to gain access to the incident scene while emergency services are still busy with their operations. This allows for critical path tasks to be brought forward and tasks can be undertaken conjointly to reduce the incident timeline.

The TIM must liaise with the Incident Controller and TOC to identify where traffic congestion will delay the resources required, particularly the resources with specific capabilities to undertake the various asset reinstatement tasks that are on the critical path e.g., loaders, trucks, sweeper, Hi-ab, captive water blaster, etc. Police should be requested to escort critical plant to site; this will reduce the overall closure time.

The incident scene is a Controlled Operations Area. This places restrictions on which personnel may enter the scene and when certain activities may take place. On arrival at the incident scene first responders should report to the Incident Controller, advise of the resources and capabilities they have on site or that have been mobilised, and seek instruction. When dealing with a vehicle that is transporting goods, personnel should be restricted from entering the site until the load contents have been identified, i.e., to manage the risks associated with hazardous substance.

It is important that the RCA first responders (TIM, STMS) advocate for the most efficient means of managing the incident to reduce the traffic impacts and restore the network to safe operating condition without unnecessary delays. The Emergency Services and Waka Kotahi have signed a MOU that all parties will collaborate in this regard (refer to Appendix A). If communications or collaboration on site are not progressing well then escalate immediately to the Incident Controller, TOC and up the escalation path as appropriate.

During events with multiple incident scenes, such as tropical cyclone with flooding and wind damage, resources will become stretched. Prioritisation of sites must be undertaken in liaison with TOC who may be in contact with Civil Defence and aware of the wider area priorities.

The area containing the evidence can be large and while Police investigations are in progress the RCA Contractor resources should congregate at a designated safe staging area close to the inner cordon, or as directed by the Police.

Figure 14. Scene being investigated by Police SCU.

Figure 15. Extent of evidence in a high-speed loss of control crash.

As an incident escalates or if the duration is long it may be necessary for more resources to respond to ensure there are adequate resources to manage the incident until completion. During handover, the RCA lead incumbent roles must provide a full briefing to the incoming personnel and the new lead person must inform TOC of the staff changes.

It is critical that the RCA has the appropriate resources waiting on site to restore the road network to its normal operational levels as soon as they are allowed access to the scene.

Mobilisation of Contractor Resources

The early mobilisation of the resources required to effect repairs to damaged assets is essential to ensuring that the network is restored to the normal safe operating condition without unnecessary delays. The location of road crash incidents and the nature of asset damage are not controllable and so the specialist resources required may not be immediately available resulting in extended delays to arrive on scene and complete the repairs. It is essential to identify these resources early and take all steps to facilitate their arrival on site. A Police escort should be requested to facilitate their progress to the site and the rendezvous between parties coordinated.

Incident Log

An incident log that records times, actions, events as they happen at an incident is very important, as they form the records of the RCA operations at that incident. These are used afterwards for debriefs, claims, and can be required by Police, coroners court etc. It is important they are accurate and handed to your supervisor at the end of the shift or the incident.

Key items to record:

- Time of notification of incident
- Time of mobilisation
- Time of arrival on site
- Time TTM installation commenced
- Time TTM installation completed
- Instructions and the time, given to you by the RCA, IC, Police, TOC, or other authority
- Time of significant events during the incident
- Time TTM removal commenced
- Time TTM removal completed / road opened.

Investigations

It is important that a RCA representative communicates with the Police incident controller and SCU on site as soon as practicable. This is to enable early inspection to identify asset damage, determine critical path and equipment required to restore the asset.

Police Investigations

Once the scene has been secured and the injured transported to hospital, the Police evidential investigations are on the critical path. Non-emergency services personnel are not to enter the inner cordon (incident scene) unless requested to, or authorised by the Police Serious Crash Unit. There is only one opportunity to undertake a thorough investigation before traffic or personnel contaminate the evidence.; no recovery or restoration activities can commence until all the crash evidence has been identified, photographed and surveyed.

There can be multiple investigations being undertaken at the incident scene, dependent on the injury severity, types of vehicle involved, nature and complexity of the damage to vehicles, loads involved, damage to assets, and criminal incidents.

Police investigations include:

- Crime scene investigations
- Traffic scene investigations (vehicle related)
- Other investigations as required (non-vehicle related)
- Other branches of the Police force may be present if criminality is suspected (Armed Offenders Squads, Forensic Services, drug detections, further/special investigations etc.)

When traffic is congested due to a crash incident, the Police Serious Crash Unit must be offered the opportunity to return at night or early on the following Saturday or Sunday morning to complete scene data capture under planned traffic management provided by the RCA.

It is possible to return to the scene at off peak periods to continue the investigation – BUT not in every case.

RCA Investigation of Road Environment Crash Factors

Investigation of road environment crash factors should be undertaken by an experienced traffic safety engineer (appointed by the RCA) that has been trained to undertake crash investigation and is familiar with the performance requirements and characteristics of all road assets. This investigation also fulfils the legal requirements set out in the Land Transport Management Act 2003.

The investigating engineer should approach the SCU officer and request early access to the scene to undertake their investigations so that this can be completed before the recovery of vehicles commences. Following completion of the crash investigation the engineer is required to provide the following reports to the RCA:

- Initial brief crash report via email within 24 hours.
- Full crash report for all fatal (and requested serious crashes) within one month.

In addition to the above investigations, there may be other investigations undertaken by other parties, including but not limited to:

- Civil Aviation Authority (CAA)
- Fire (FENZ) Investigation
- Maritime NZ Investigation

12. RECOVERY

The process of recovering the deceased, damaged vehicles and vehicle debris from the road or environment. This typically includes the Undertaker, recovery vehicles, cranes, Hi-abs, etc. Recovery operations are usually managed by Police and/or Commercial Vehicle Safety Team (CVST).

Once the Police have completed their scene investigations and recovered the damaged vehicles, they will usually hand the scene over to the RCA Contractor.

Body Recovery and Site Blessing

The removal of deceased persons is the Police's responsibility. The Police have undertakers who have tendered for the removal of the deceased. The Police arrange for the on-call undertaker to be dispatched.

This will occur within the inner cordon and will not involve the RCA Contractor.

Remember that the Police are acting on behalf of the coroner when dealing with sudden deaths. The Police Disaster Victim Identification (DVI) team may be involved at an incident scene to enable identification of victims.

Figure 16: Body recovery is the Police's responsibility

Site blessing is by request only and the nature of the incident and the effect on the network must be considered before approval is given[1]. Note blessings can occur after the event but the site must be washed and cleaned. They can also occur within 24 hours and can be arranged separately, as required. TOC should be involved with any subsequent planning for a site blessing.

Animal Welfare

Animal welfare[2] is the responsibility of the RCA who may use their own resources or appoint an external service provider.

Note: In Auckland the ASM has an agreement with Auckland Council for their animal control officers to respond to animal welfare on the motorways and State highways. This includes live and dead animals.

[1] Noting that if the road is to be closed for extended periods, Police Iwi officers can arrange for a site blessing, while the road is still closed.

[2] Animal management is the responsibility of the owner/ farmer. Escaped animal shall be referred to the Police if they pose a safety risk to road users.

Vehicle Recovery

The role of vehicle recovery operators and other associated equipment for vehicle salvage, towing, winching, lifting, and removal are contracted out by the Police. Vehicle recovery operators must comply with all incident site requirements including PPE and other safety matters. Only the operators mobilised by the Police are allowed to remove incident vehicles. However, larger companies who have abilities to tow their own vehicles may be requested to tow away their vehicles. This is a decision of the Police Commercial Vehicle Safety Team. Note that public can call their own recovery service provider.

Figure 17. Stray animals are hazardous to road users

Figure 18. Specialist tow operators can efficiently remove vehicles on the network.

Lane Clearance techniques

When no serious injuries have occurred, crash damaged or broken-down light motor vehicles can usually be pushed or dragged off the live lanes and traffic flow reinstated quickly. When vehicles crash off the road, are not affecting traffic flow, and pose no immediate or unacceptable risk to road users, then there is no need to recover them during high traffic volumes, they can be done at night or off-peak hours when the volumes are low. The opportunities should be discussed with the Police Officer in Charge.

Figure 19. Vehicle recovery operators have the knowledge to determine method of recovery

Load Recovery

Complexities exist around load recovery with insurance companies; however, the Police have powers to have loads removed as the situation demands. This includes vehicle and load spilt or not, transhipping[3]. Loads vary from incident to incident but as a general requirement loads are either transferred before recovery operations start or are recovered in-situ with the vehicle.

While insurance companies may be involved in load recovery, their involvement should not be allowed to increase the duration of road closure during high traffic volumes.

Heavy Lifting

Cranes are used for large or difficult recoveries and work for/with the recovery/tow company.

The Bridge Engineer must advise on structural issues if recovery is occurring on, under or near a structure.

Where cranes are involved, this usually indicates a lengthy operational time.

Recovery operations can take time and it is important for the RCA Contractor to understand the timelines to enable asset repairs to be undertaken in a timely manner.

Figure 20. Deployment of cranes on or near structures must be approved and monitored by the bridge engineer.

[3] Transfer of goods/ loads to an intermediate destination and then to yet another destination, which involves double handling.

13. RESTORATION

The RCA Contractor is responsible for the process of removing vehicle load debris, road surface cleaning and asset repairs (temporary or permanent) to restore the road back to the safe and normal operating condition.

This typically involves:

- Identifying and overseeing emergency repairs/reinstatement to road assets
- Identifying, prioritising, and mobilising any additional specialist personnel, plant and equipment required
- Ensuring that the Bridge Engineer is involved when cranes and lifting gear are used on a structure; and
- Removal of debris and other materials from the carriageway
- Cleaning the road surface
- Identifying, prioritising and programming any further works required.
- Reopening the road

Once access to the site is permitted, and it is safe to do so, the RCA Contractor can commence asset repairs, debris removal and road surface cleaning. Depending on the nature of the incident, the location, and traffic control measures, the restoration activities may commence before the emergency services have completed their tasks.

The RCA Contractor must liaise with the Incident Controller to identify any opportunities to commence restoration activities as early as possible, even while emergency services are still engaged in their tasks. The following should be considered:

- Where multiple lanes are involved, ask if Police operations can proceed one lane at a time to free up the site lane by lane for restoration activities
- If the site is large, ask if Police operations can commence on the outer parts and work inwards to allow earlier access for the restoration activities?
- If the road closure is affecting or likely to affect peak traffic, suggestions can be made to the SCU to mark out the site and come back on a later date for a full closure during low traffic volumes (at night or early on a Saturday or Sunday morning)
- Advise the Police the time the road must be opened to avoid severe congestion, seek co-operation respectfully
- If the SCU has surveyed an outer area, ask if the RCA Contractor can start cleaning up that area

Removal of Debris and other materials

Debris is deemed to be wreckage resulting from the incident. The resources required for this activity depend on the nature of the incident, the type and quantity of materials involved.

Debris removal may require a Hi-ab for the larger items, then a sweeper truck, hand brooms and blowers.

Most debris will be obvious, however smaller metal objects like nuts and bolts can blend in with the road surface and be difficult to spot. These objects constitute a significant hazard if flung into the windscreen of a following vehicle and care must be taken to identify and remove all such hazards.

There is always pressure to reopen a road, debris can be spread over a large area and there may not be sufficient time to clean up all the smaller items. Sound judgement must be made as to when the carriageway is sufficiently clean to allow reopening to traffic. Debris allowed to remain on the road should only be dry material residue and lightweight items that do not constitute a hazard to road users.

Figure 21. Debris scattered over both carriageways of motorway

Cleaning the road surface

Road surface restoration is essential before re-opening of any lane or carriageway to ensure it performs to its designed specification, especially with regard to texture and porosity that will reduce skid resistance in wet weather if not cleaned thoroughly.

There is a wide range of materials and substances that may be spilled onto the road as a result of a crash, mechanical failure, or human error. These materials can be hazardous (explosive, toxic, biohazard) or non-hazardous. Some materials are easy to remove, others require more effort and specialist equipment.

Greasy spills such as animal fats, oil, diesel etc. must be properly removed from the voids in the road surface before the road is opened. Failure to do so will result in the road surface becoming very slippery when it rains.

The resources required to clean the road surface will depend on the nature and volume of the spilled material.

Figure 22. Vehicle fluids resulting from a crash are being removed using absorbent material and sweeper truck.

Figure 23. Water blasting and sweeping in progress to remove material in OGPA.

Figure 24. Captive water blaster is used to remove material from the voids in the OGPA.

Open Graded Porous Asphalt (OGPA)

OGPA is an open graded mixture of coarse and fine aggregates, mineral filler and a bituminous based binder. It has a maximum particle size of 16 - 20 mm and is laid 30-50 mm thick.

The intention of this type of surfacing is to increase the void content of the surfacing to absorb noise and allow water to filter down to the waterproof membrane seal below and drain out via the road shoulder, which reduces vehicle spray and the risk of aquaplaning.

In the adjacent photo, the surfacing on the RHS (main line) is OGPA and on the LHS (off ramp) the surfacing is dense graded asphalt. Following heavy rain, the OGPA surface has less surface water.

The spillage of materials that can change state (i.e., liquid to solid) into the voids in OGPA can result in damage to the surfacing. The RCA Contractor should seek advice from the Pavement Asset Manager to ensure that the appropriate action is taken.

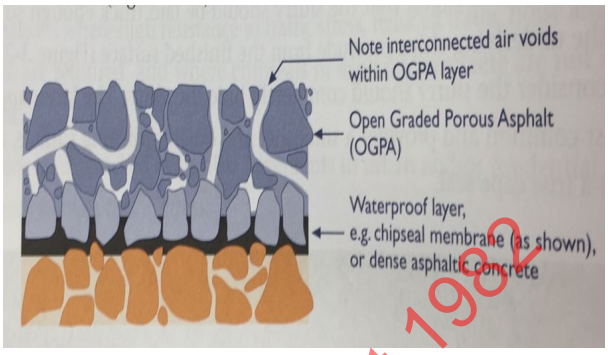


Figure 25. OGPA Structure

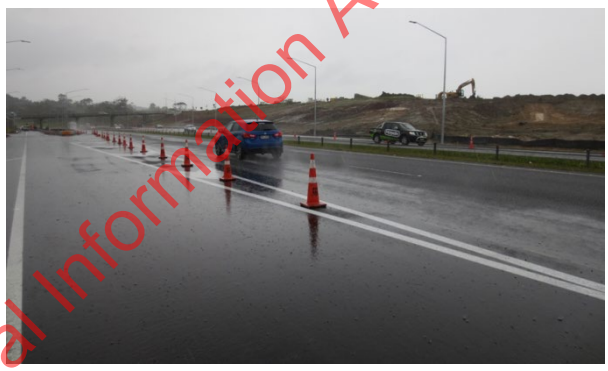


Figure 26. Superior drainage performance of OGPA (compared with dense graded asphalt).

Asset repairs

A vehicle crash or natural event can result in damage to multiple assets; these can include road assets as well as utility assets (electricity, gas, water, communications). In these circumstances all asset owners should work collaboratively together to ensure that the works are undertaken safely and as quickly as possible.

There are many factors that can influence whether emergency repairs to assets are of a temporary or permanent nature.

- Operational safety for the first responders, road crews, and road users
- Traffic congestion effects (location, time of day)
- Weather conditions (current or impending)
- Availability of resources (particularly when specialist resources are required)

Temporary Repairs

Temporary repairs are the minimum effort required to reopen the road to traffic, albeit in a degraded state. The repairs can vary in nature and be applied to any damaged asset on the network.

During incident closures it is good practice to inspect the surrounding road assets and undertake any maintenance (sweeping, litter collection, signs cleaning, etc.) while crews are waiting for the emergency services to allow access to the scene.

Figure 28. Energy Absorbing barrier terminal head temporarily mounted to protect damage guardrail.

Figure 27. Damaged median barrier delineated by traffic cones prior to opening adjacent lane under reduced speed limit

When repairs to restore the safe operational capacity of the road cannot be completed within the duration of the road closure associated with the incident, the Incident Controller and TOC should be informed of the reasons why; this may need to be explained to non-roading personnel.

Protection measures will be required; these may be in the form of warning signs, traffic cones, shoulder closures, speed restriction. It may be necessary to retain a lane closure for an extended period to effect repairs if the risk to road users is too high.

If the repairs cannot be completed immediately then the RCA Contractor must:

- Ensure the relevant RCA asset restoration manager has been advised of the works required and the timeframe to complete the repairs
- Ensure that consultant (designs) and contractor resources are arranged to undertake the asset repairs
- Provide an initial programme for the repairs within 24 hours to the RCA / TOC
- Provide daily/weekly updates, as appropriate, to the RCA / TOC to allow them to maintain the relevant traveller information.

It is important that TOC is aware of temporary repairs so that they can monitor the site and escalate permanent repairs if there are any safety concerns.

Permanent Repairs

Permanent repairs are the effort required to restore the assets to full serviceable standard. They are more likely to be undertaken after the incident has been resolved and at a later date when proper planning has been done and plant and materials are available. Road networks have a level of service for assets and response timeframes to effect permanent repairs.

Figure 29. Permanent repairs can sometimes be completed on site with minimal disruption to traffic operations.

Road Surface Repairs

Potholes, loss of surfacing, and gouges are typical forms of surface damage that can occur as a result of heavy rains and crashes. These can be hazardous to road users, particularly cyclists and motorcyclists.

Temporary repairs usually involve the application of cold asphalt to allow for the quick reopening of lanes. Permanent repairs require different repair methods and should be scheduled as soon as possible when traffic volumes are low.

Regardless of the repair method, the road surface texture must be restored to a satisfactory condition before the road is reopened.

Figure 30. Gouges and deep scrape marks must be filled prior to re-opening of road.

Reopening the Road

Responsibility for Reopening the Road

When a Police operation has been in progress and the road asset has not been affected the decision to open the road to traffic rests with the Police. Under these circumstances the RCA Contractor or TOC may not have access to, or visibility of, the scene. Once Police have advised that the site is clear, the RCA Contractor must drive through the site to confirm it is safe to open.

When road asset damage has occurred the RCA Contractor is responsible for determining when the road asset has been restored to a safe operational condition and traffic control can be uplifted.

Planning to reopen the road

When planning to open a multi lane road, consideration must be given to the length of traffic queues and congestion on the detour route. It may be better to stack traffic on the mainline for a period prior to reopening the road to reduce the impact on the detour route and thus the motorists overall travel time.

It is also necessary to check with TOC to determine if there are pedestrians on the road prior to reopening. Experience has shown that drivers and passengers that are stopped on the road for extended periods will get out of their vehicles and wait in the shade on the roadside during summer.

Re-opening of intersections, traffic lanes, carriageways and ramps may occur progressively during the incident. Clear communication between the Police Incident Controller, RCA Contractor, and TOC is essential to ensure that the changes in traffic control are undertaken in a coordinated and safe manner. If this is not done correctly then staff can suddenly be exposed to traffic travelling at high speed.

Uplifting Traffic Control

Secondary incidents can often occur when queues form and a road has been congested for a while due to an incident; these range from rear end crashes, overheating, out of fuel, and flat battery. Stationery vehicles may be encountered upstream and downstream from the incident site, so once the carriageway is cleared of debris and the surface is safe for traffic, traffic control must be uplifted, and the road reopened in a coordinated manner.

This is particularly important on roads with multiple lanes in the same direction. Motorists will be frustrated by the delay and in a rush to get to their destination; the objective is to allow traffic to have access to the road in an orderly manner to prevent traffic surges, high speeds and other unsafe driver behaviour.

Traffic behaviour can be controlled by the staged opening of lanes, motorway on-ramps, or a rolling block that slowly increases speed until normal operating speed is achieved.

Figure 31. A rolling block in progress

14. DEBRIEF

Debriefs have two industry variants, hot and cold debriefs. They occur at different times.

Hot Debrief

The Hot Debrief is undertaken immediately after the incident as soon as operational staff are able to meet at a common location. These debriefs are extremely important and must address the following:

- Gather intelligence
- Identify areas of improvement
  - Potential network enhancements
  - Potential equipment enhancements
  - Potential practice enhancements
  - Identify challenges
  - Identify things that worked well or not so well
- Determine best practice
- Supply updated situation reports
- Acknowledge the good effort by the crews.

The Personal or Critical Incident debriefing should be managed with the help of an Occupational Health Advisor and allow for the following:

- Vent thoughts and feelings
- Identify stress related reactions
- Help people to understand reactions
- Discuss ways of coping, e.g., EAP Services.

If immediately after an incident it is the view of the RCA Contractor that either improvements can be made to the RCA / Contractor / or other operational procedures then this information should be passed onto the appropriate manager and fed back to the RCA if appropriate.

Minutes must be taken for the operational debrief, clearly identifying further actions required and all relevant records (e.g., Incident Log, Spill Sheets, etc.) must be attached to the minutes.

Cold Debrief

The Cold Debrief is undertaken at a later date when all participants are in possession of the relevant information relating to the incident.

Each participating stakeholder should bring all appropriate additional evidence to the meeting such as CCTV, video, photographic records, and be prepared to contribute actively to the process.

Stakeholders should only bring information to the debrief meeting which they are willing to disclose, taking into account their responsibilities under the Privacy Act 1993, and that which does not compromise any current or intended judicial proceedings. The facilitator must ensure the process remains appropriately managed and focused.

A Cold Debrief should be considered for:

- All level 3, 4 and 5 incidents (Headline Events)
- Significant number of vehicles involved
- Road users (or others) have experienced significant disruption
- There has been multiple stakeholder involvement
- There was significant environmental impact or potential impact
- Significant damage has occurred to infrastructure

When attending a cold debrief at TOC, the RCA Contractor will be required to furnish key information from the RCA perspective, such as the time when resources arrived, who they were, when key activities occurred and what the response was to each request. Therefore, RCA representatives must take the Incident Log to the debrief.

Lesson Learnt & Dissemination of information

The meeting records should clearly identify actions, owners of actions, and provide mutually agreed timescales for any local or other actions for completion. Failure to manage actions through to closure seriously undermines the validity of the post-incident debrief process. The notes should be disseminated across respective stakeholders, TOCs, Emergency Services, RCA, and RCA Contractor (Figure 33).

The TOC will distribute minutes of the debrief with actions/notes in order to identify good/bad practice and lessons to be learned.

RCA Contractor Feedback to crews and managers

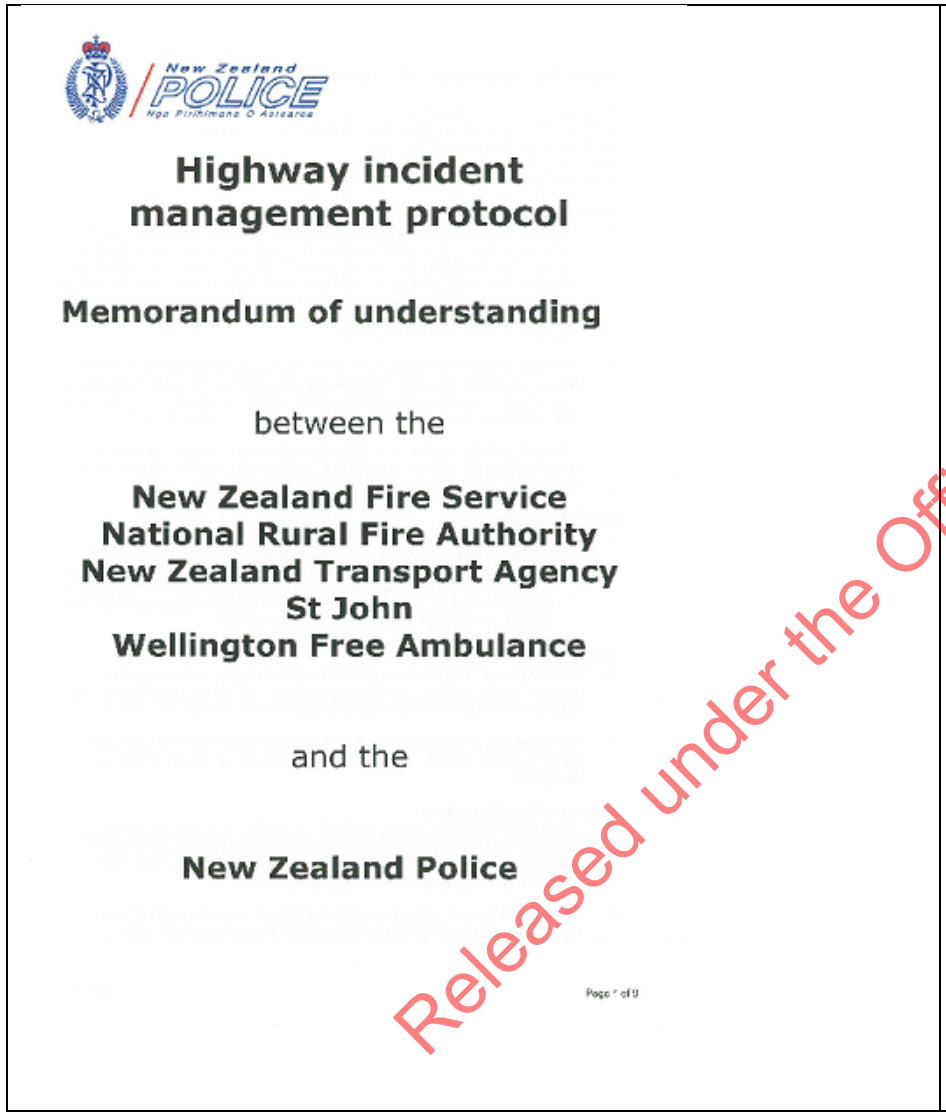
- Share learning's within teams
- What went well, what needs improvements, consider suggestions from staf
- Integrate re-training into toolbox talks

INCIDENT COLD DEBRIEF *'WALKTHROUGH'* AGENDA

Serial	Action	Comments
1	Introductions	Personalities/stakeholders
2	Objective(s)	
	Incident Details	• Description • Location – e.g. Ord. Survey Grid Ref., lane 1 • Date & Time – dd/mm/yy, 24 hr clock using colons
3	Walkthrough incident with timelines	• Incident detection (How/when?) • Incident verification (How/when?) • Incident response (How/when?) • Recovery & repair (How/when?) • Restoration (How/when?) • Other relevant inclusions
4	Review/discuss individual organisation incident logs	Agree sequence of events in chronological order
5	Formulate consolidated incident log plotted against timeline	Period from incident notification through to incident site clearance
6	Identify any problems experienced, or issues identified, by any organisation, & cause(s)	Gather all information needed to draft Incident Report and enter actions onto Actions Spreadsheet post de brief. Consider • Communications • Diversions • Resources • Sign setting • Media • Weather • Access • Egress • Welfare • Command & Control • Processes/Practice/Junctions/Network • Other
7	Identify things that went well, any Lessons to be learned, good and bad practice and lessons and agree actions, owners and timescale	
8	Identify where improvements/ research/study could be made	
9	Any additional relevant information	
10	Close debrief meeting	

Figure 32: Example of a debrief agenda

APPENDIX A: HIGHWAY INCIDENT MANAGEMENT PROTOCOL



New Zealand POLICE
Nga Pirihimana O Aotearoa

Highway incident management protocol

Memorandum of understanding

between the

New Zealand Fire Service
National Rural Fire Authority
New Zealand Transport Agency
St John
Wellington Free Ambulance

and the

New Zealand Police

Page 1 of 9

This memorandum of understanding is made

between the Chief Executive of the New Zealand Fire Service Commission
and the Chief Executive of the New Zealand Transport Agency
and the Chief Executive of St John
and the Chief Executive of Wellington Free Ambulance
and the Commissioner of the New Zealand Police.

Introduction

1. The New Zealand Fire Service is established and operates under the Fire Service Act 1975. The National Rural Fire Authority operates under the Fire Service Act 1975. The New Zealand Transport Agency is established and operates under the Land Transport Management Act 2003. St John is set up as a charitable organisation. Wellington Free Ambulance is an Incorporated Society, and New Zealand Police is established under and regulated by the Policing Act 2008.

2. The New Zealand Fire Service (NZFS), the National Rural Fire Authority (NRFA), the New Zealand Transport Agency (NZTA), St John, Wellington Free Ambulance and New Zealand Police (Police) (together referred to as '**the parties**') have a current working relationship with one another.

3. The parties wish to enter into this memorandum of understanding to formalise the operational protocols to ensure the effective and efficient management of incidents on New Zealand's Highways.

Interpretation

4. For this memorandum of understanding:
   - 'Incident' means fire, rescue, natural disaster, motor vehicle crash, terrorist act, hazardous substance emergency, highway maintenance, construction or any situation where any of the parties are required to work on or in the vicinity of any of New Zealand's Highways that may impact or distract from the natural flow of traffic.

Purpose

5. The purpose of this memorandum of understanding is to ensure the parties have a common operational protocol to deal with incidents on our highways to ensure the efficient and effective resolution of incidents.

6. The following guidance is based on the philosophy that New Zealand's state highways will not be closed or restricted for any longer than is necessary.

Open roads philosophy

7. Whenever a highway or lane is closed or partially blocked by a crash or incident, the Police, and/or New Zealand Transport Agency will have a prime focus of opening the roadway on an urgent but safe basis that does not put attending staff or the public at risk.

8. Fire and ambulance services will also give this due regard after their prime focus of the protection of life and/or property is dealt with.

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9. Responder and public safety are the highest priorities. Highways will be cleared as soon as casualties are removed, appropriate investigative needs are met and hazardous cargo is removed or stabilised.

10. Damage to property may occur as a result of clearing a roadway on an urgent basis. While all parties will make all reasonable efforts to avoid damage to property, clearing a roadway has a higher priority than preventing damage to property.

11. All incidents will be managed under the Co-ordinated Incident Management System (CIMS) model.

12. In general, Police will supply an incident controller, but in instances of fire or chemical spill, the Fire Service will supply the incident controller. The incident controller will be empowered to take whatever decisions are necessary with respect to preservation of evidence for investigations and clearance of vehicles and debris to achieve rapid re-opening of the highway.

Agency functions

Ambulance services

13. Ambulance Services, as members of Ambulance New Zealand, must:
    - provide timely, appropriate emergency care and where necessary, transport patients to a place of definitive medical care
    - conduct Emergency Ambulance activities (triage, treatment and transport and scene management facilities) in a way that does not put attending staff or the public at risk and minimises the impact on the efficient flow of traffic, and
    - appoint initially, an Ambulance Operations Manager and Triage Officer and depending on incident scale, an Ambulance Commander who will co-ordinate ambulance and medical resources, and fulfil the role of ambulance on-site representative.

New Zealand Fire Service Commission

14. Fire service must:
    - provide scene protection, extrication and stabilisation of the incident, while having due regard for the environment, the principles as set out in CIMS, and the expedient conclusion of the incident
    - provide an incident controller in cases of fire or hazardous substance incident, and until the arrival of a Police incident controller in other cases
    - understand the need for Police to investigate incidents and consult with Police on actions taken to clear the scene, and
    - conduct fire-fighting or hazardous substance stabilisation activities in a way that does not put attending staff or the public at risk and minimises the impact on the efficient flow of traffic.

National Rural Fire Authority

15. NRFA must:
    - through the audit of Rural Fire Authorities Fire Plan; check that the plans have a requirement to liaise with other emergency service providers (ESP's) in the event of any fire in their area of responsibility to ensure that the management of highway traffic is appropriate given the hazards of the incident.

New Zealand Transport Agency

16. New Zealand Transport Agency must:
    - provide Coordinated Incident Management System (CIMS) - and Site Traffic Management Supervisor (STMS)-trained response teams as rapidly as possible
    - prioritise emergency services vehicles through restricted roading, such as road works
    - provide containment equipment as required by ESP's for hazardous substances
    - provide traffic management at incident sites, and establish and maintain detour routes where available
    - provide and keep up-to-date single source contact numbers of New Zealand Transport Agency teams for each Police Communications Centre
    - ensure responder/public safety and infrastructure integrity prior to approving the reopening of roads
    - provide road clearing and cleaning equipment as necessary, and
    - carry out road works and associated activities in a way which minimises the impact on the efficient flow of traffic, and does not put workers or the public at risk.

New Zealand Police

17. Police must:
    - provide scene protection
    - provide an incident controller for most incidents. Incidents involving fire or chemical spills will normally be managed by a partner agency as appropriate
    - provide an appropriately qualified investigator to complete a thorough examination of the scene, collecting the required evidence to allow the highway to be reopened as soon as possible
    - use the most appropriate up-to-date equipment where practicable and best practice training available to collect data at the incident scene, and
    - manage crash attendance activities in a way that does not put attending staff or the public at risk and minimises the impact on the efficient flow of traffic.

All parties

18. All parties must:
    - ensure that other ESP's are immediately notified of the incident via national communications centres (**Note**: Police will notify the New Zealand Transport Agency)
    - provide up-to-date traffic /delay information (excluding ambulance services) to road users

- clear debris and contribute to making the incident site safe (Ambulance services are not subject to this requirement)
- work with the New Zealand Transport Agency to reopen roads
- attend multi-agency debriefs in a timely manner after serious incidents (which result in a fatality, serious injury, or a significant complete road closure) or where any partner agency recognises the need for improvements in future incident management
- regularly review our performance on incident management, and
- work together to ensure that the needs of motorists on our highways are being met in the most professional and efficient manner.

Effect of this memorandum of understanding

19. This memorandum of understanding confirms the relationship between the parties based on a spirit of goodwill and co-operation. The parties will work together to achieve the agreed purpose.

Amendment of the memorandum of understanding

20. The parties agree that from time to time this memorandum of understanding may need to be amended.

21. Reviews, modifications or terminations of this memorandum of understanding may be undertaken by the mutual agreement of the parties representatives listed at paragraph 34 or their delegated staff, so that the master document can be amended.

Training

22. All agencies must ensure their employees in attendance at highway incidents have received the appropriate level of training as each agency requires.

Sharing information

23. All agencies must be honest and open in their supply of information and assessment of the incident during any debrief. This ensures incident management standards are maintained and improvements can be identified.

Review of memorandum of understanding

24. The parties' representatives must meet every three years, to review this memorandum of understanding. Any subsequent amendments may be made pursuant to paragraph 21.

25. The parties' representatives are primarily responsible for ensuring that the intent of this memorandum of understanding is clear, well disseminated and followed.

Issue or dispute resolution

26. All issues, disputes and differences between the parties about the interpretation or performance of this memorandum of understanding shall, firstly, be attempted to be resolved at the earliest opportunity, locally (by local representatives or managers).

27. Only when matters remain unresolved or require further adjudication should they be referred to the parties representatives listed at paragraph 34.

28. If agreement cannot be reached within 28 days of referral under paragraph 27 above, then the matter must be referred, in writing, to the chief executives of the partner agencies and the Commissioner of Police for final resolution.

Termination

29. Any party may terminate the memorandum of understanding by giving three months notice in writing to the other parties.

Variation

30. Except as stated in this memorandum of understanding, it can only be modified by a written agreement duly signed by persons authorised to sign on behalf of the parties hereto.

Conditions

31. Nothing in this memorandum of understanding makes either party liable for the actions of the other or constitutes any legal relationship between the parties.

32. The provisions in this memorandum of understanding must be read subject to any chief executive, or Cabinet directives, and any enactment.

33. Where there are changes to Government policy which affect the purpose and functions of this memorandum of understanding, each party agrees to inform the other of those changes at the earliest possible time thereafter and agrees to meet to re-negotiate if necessary any aspects of this memorandum of understanding.

Parties' representatives

34. The parties' specified representatives, addresses, phone and facsimile numbers are:

New Zealand Fire Service

s 9(2)(a) [redacted]

New Zealand Transport Agency
s 9(2)(a)

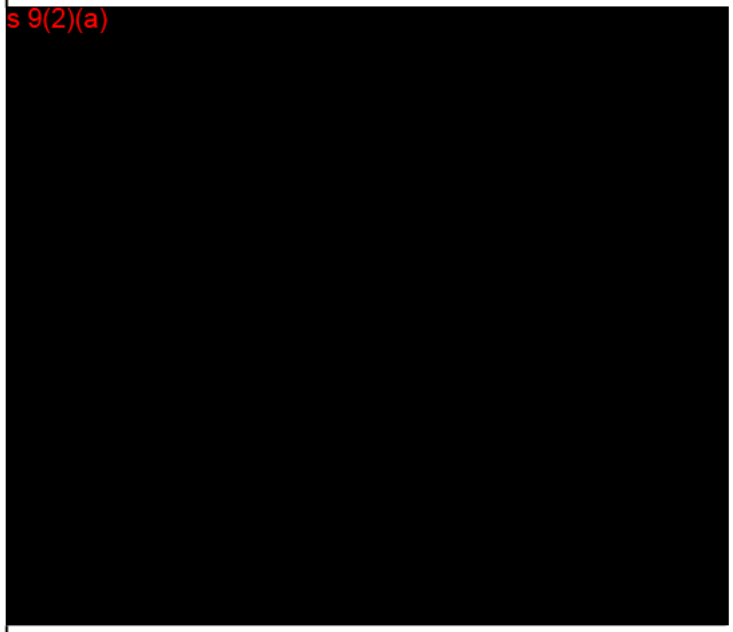
New Zealand Police
s 9(2)(a)

St John New Zealand
s 9(2)(a)

Wellington Free Ambulance Inc
s 9(2)(a)

s 9(2)(a)

s 9(2)(a)



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APPENDIX B: TRAFFIC MANAGEMENT FIELD GUIDE

Introduction

The **Incident Controller** (usually from the Police) is responsible for the co-ordination and control of the incident scene and the response activities. The initial traffic management closures are usually installed by Police or FENZ. When mobilised, the STMS establishes the outer cordon / scene protection as required.

The purpose of this appendix is to provide Site Traffic Management Specialists (STMS) and Response Crews with a hands-on approach to facilitate a co-ordinated and effective response to road incident management and recovery operations. The guide sets out the levels of management and operational requirements for the STMS on site, how the response is structured, and the key communications and relationships.

The guide has been prepared to ensure that, in the event of an emergency or crisis, all emergency response crews are able to respond effectively with an appropriate safe operating procedure. This will allow the crews to effectively regain control of the operations, limiting the impact on the travelling public, the environment and our reputation.

How to Use this Guide

This appendix should be kept inside response vehicles. Most of the information in this document is provided in a tabular or diagrammatic format in order to provide quick reference when required. Users should refer to the full RIM Guide for a more detailed understanding of the information presented in this appendix.

Acceptable Deviations from COPTTM

In general, all traffic management for incident response should comply with Mobile or Semi-Static operations as described in COPTTM when possible. However, it is considered acceptable to deviate from COPTTM during traffic incident response activities because:

- Attendance at an incident site is often subsequent to emergency services (Police or FENZ) establishing traffic control with limited or no traffic management equipment
- Operating speed of the road has generally slowed down significantly after an incident

The following COPTTM deviations are considered acceptable and can be deployed on site as and when required:

- Using large overhead VMS's to display warning messages in place of AWVMS
- The use of the fend position by incident response vehicles, particularly when one vehicle is required to close two lanes (as deemed appropriate)
- The closure of only the middle lane or lanes to reduce impact on traffic flow by allowing traffic to pass either side of the incident while operations are in place
- The closure of lanes with only one TMA unit
- Directing traffic to use the shoulder as a lane for a short period of time

Risk Assessment Procedures shown in the following section should be used when utilising the above acceptable deviations from COPTTM.

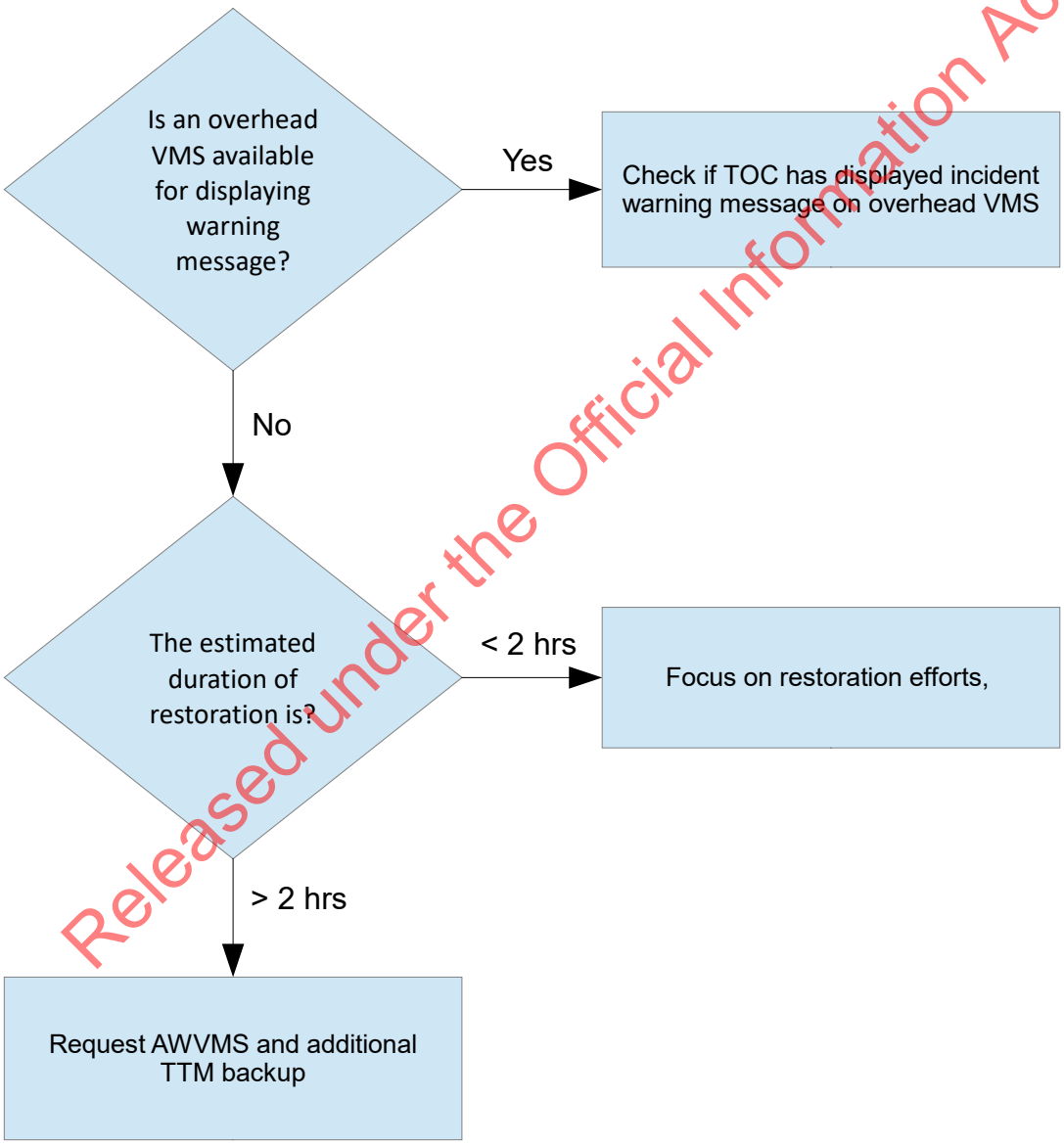
Key things to remember on Site

- Safety is the first priority
- You are responsible for your own safety, your workmates safety and the safety of road users. Do not put yourself or others at risk of harm
- You must not be fatigued or under the influence of alcohol or drugs; you are required to make important decisions on site, and you need to be fit and alert to do a good job

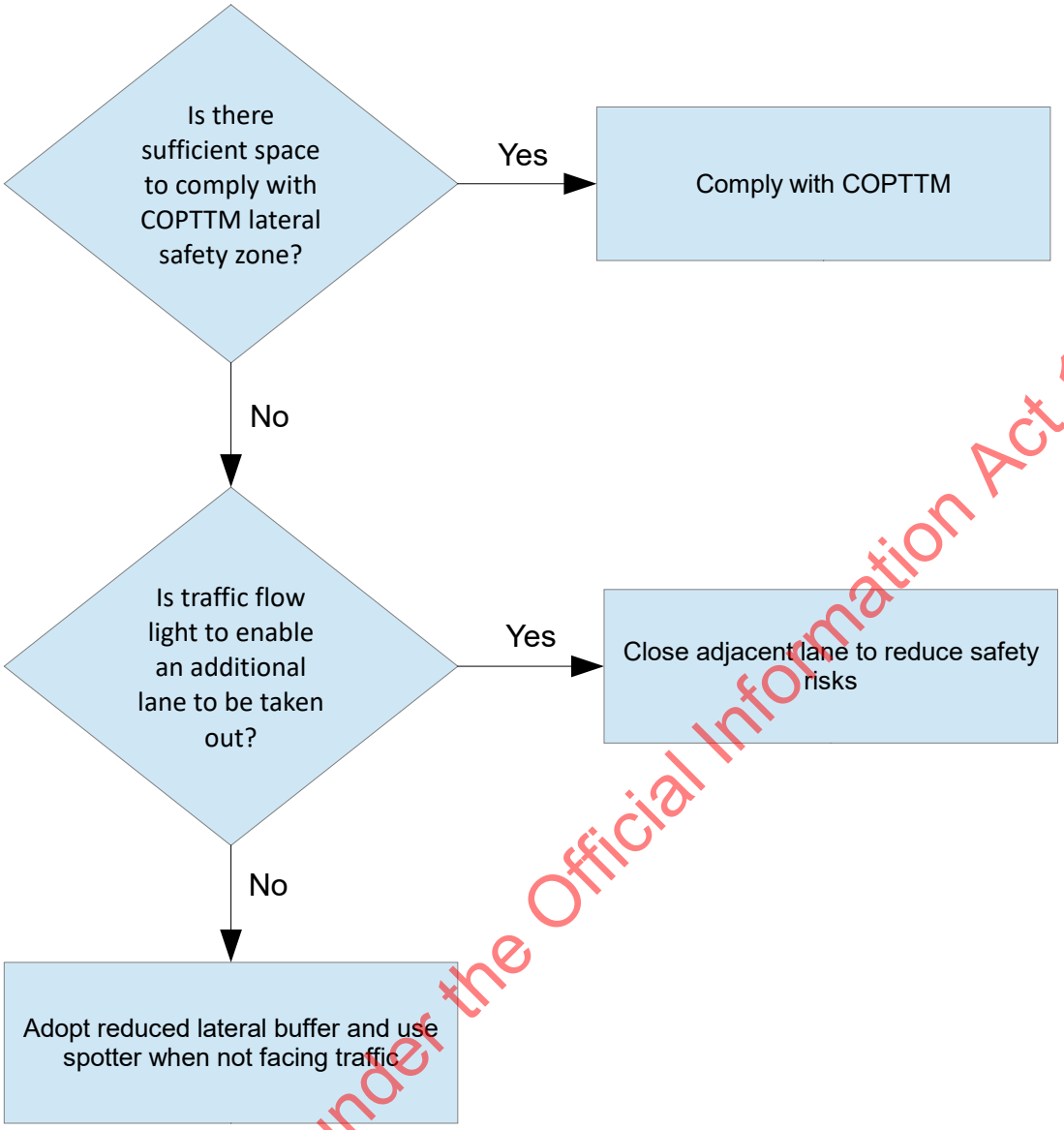
- Always treat other responders with respect (Ambulance, FENZ, Police, and Vehicle Recovery Operator). We work with others to deliver a good outcome for the public
- Do not talk to the media and be wary of microphones near the incident scene. This is to protect you, our organisation and our client
- Do not take personal incident photos and/or distribute them
- Incident Logs need to be filled out
- If you are unsure of what to do then escalate the matter to your supervisor as soon as possible, they will provide or seek further direction

Risk Assessment Procedures

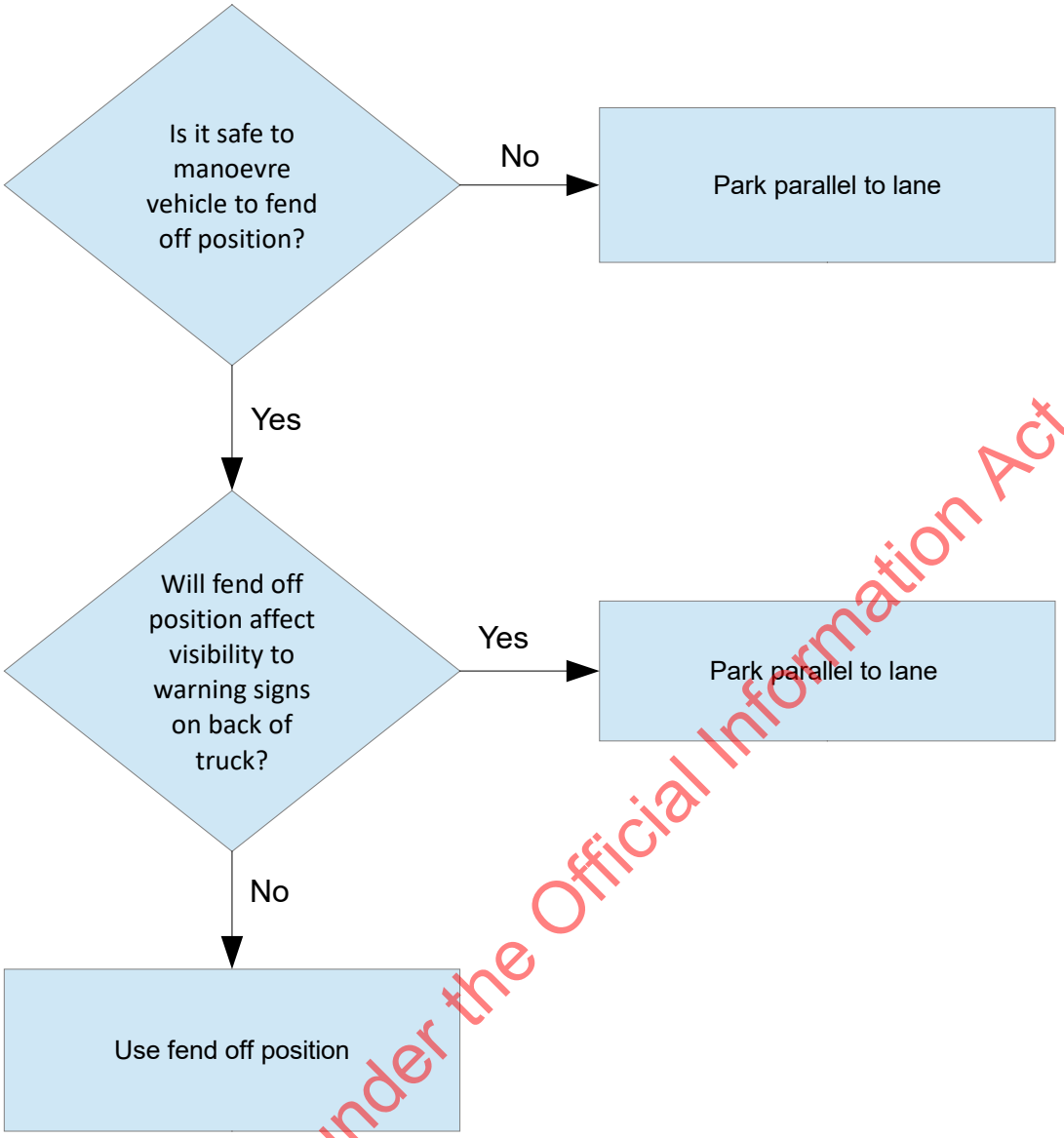
Using Overhead VMS for Advance Warning



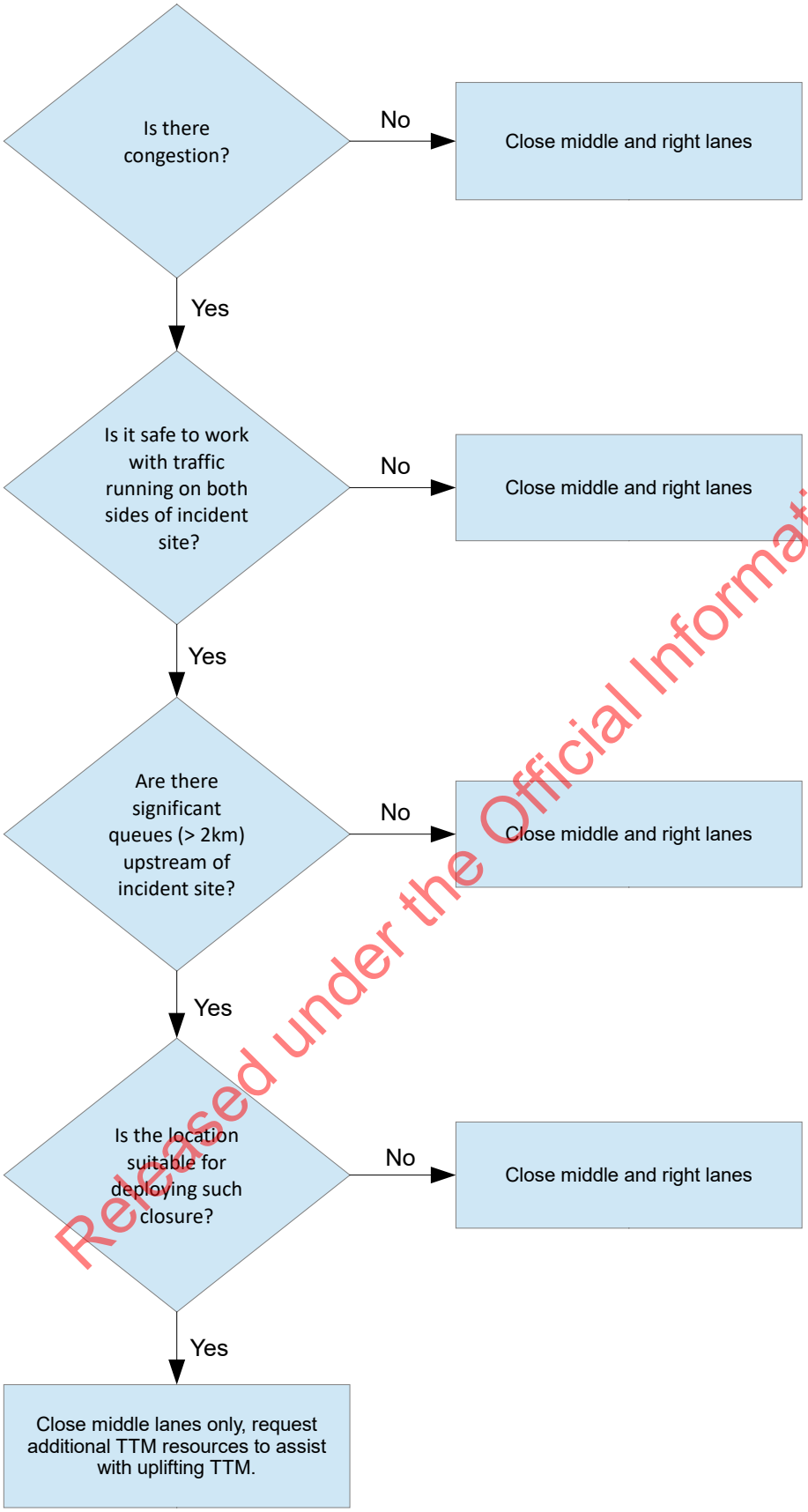
Using Reduced Lateral Buffer



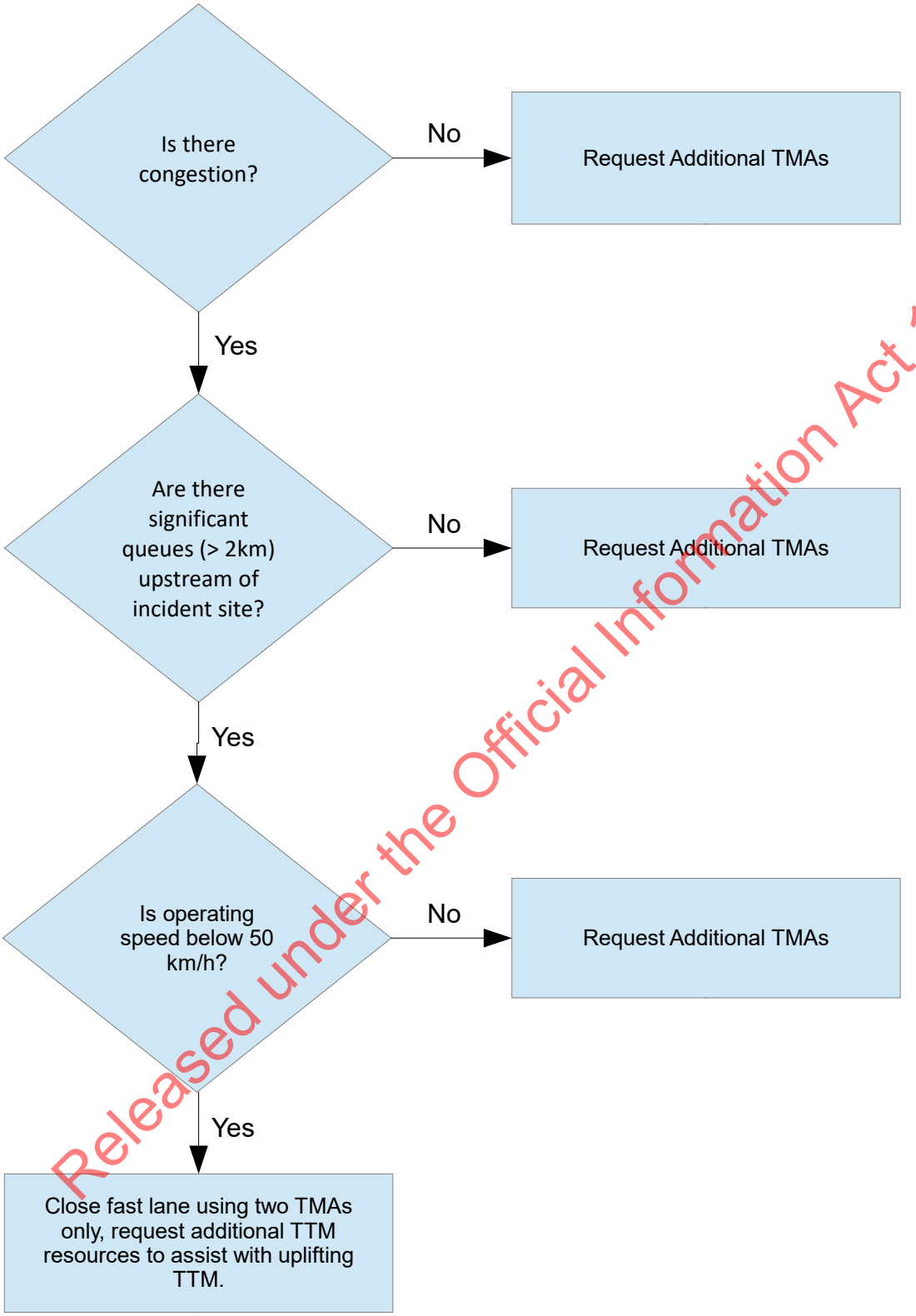
Using Fend Off Position



Closure of Interior Lanes



Deployment of Fast Lanes Closures



Important Techniques

Fend Off Position

The "Fend-Off Position" is the recommended method of positioning incident response vehicles at an incident that provides added protection to the scene from traffic. This position allows approaching motorists maximum visibility of the vehicle side indicating that the vehicle is stationary blocking lanes.

Pull as far to the right or left as possible, then turn sharply back, to position your vehicle at 20 to 30 degrees (if possible) to the lane line of the carriageway. This position may also deflect any high-speed impact that would otherwise crash into the scene.

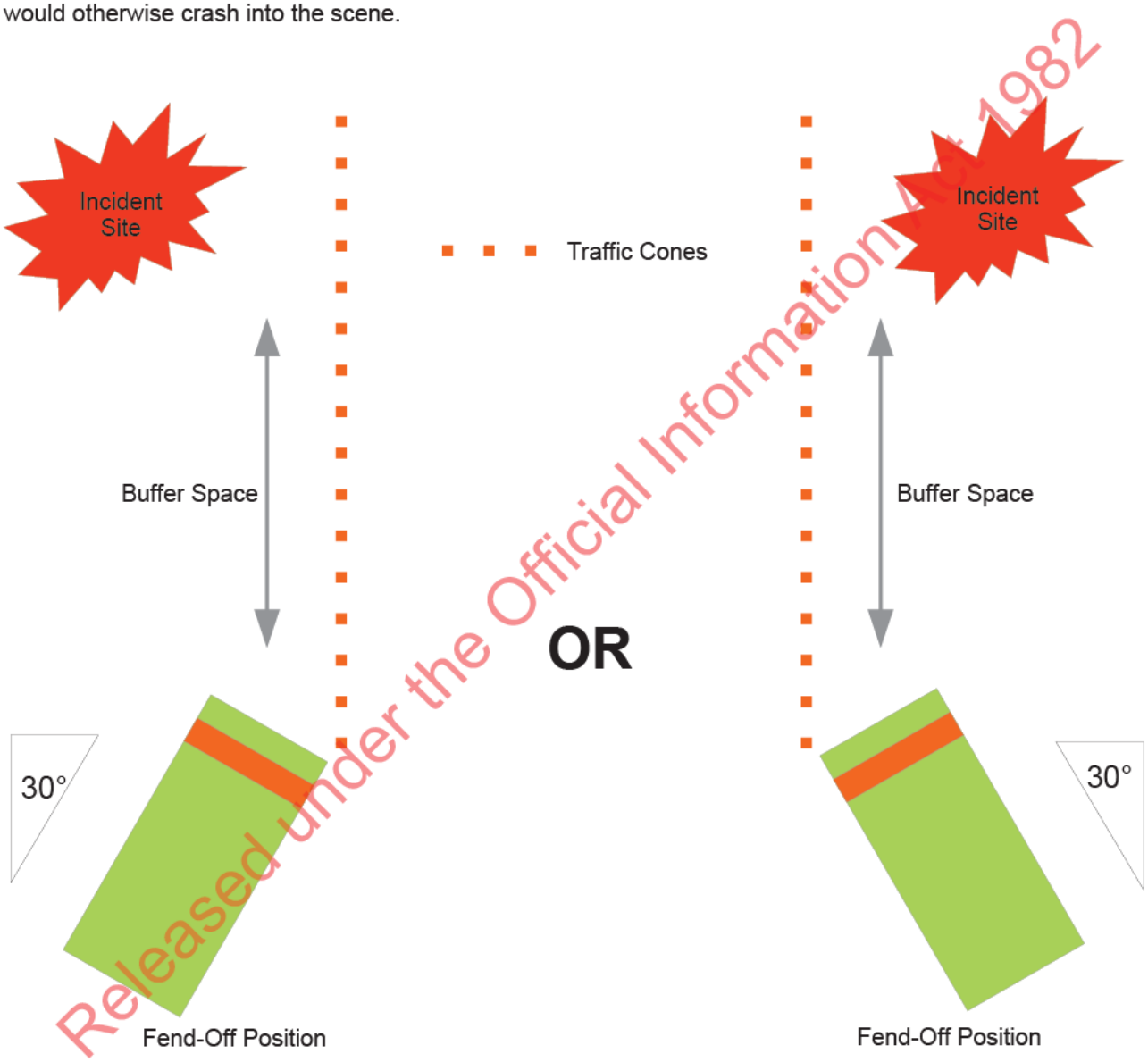
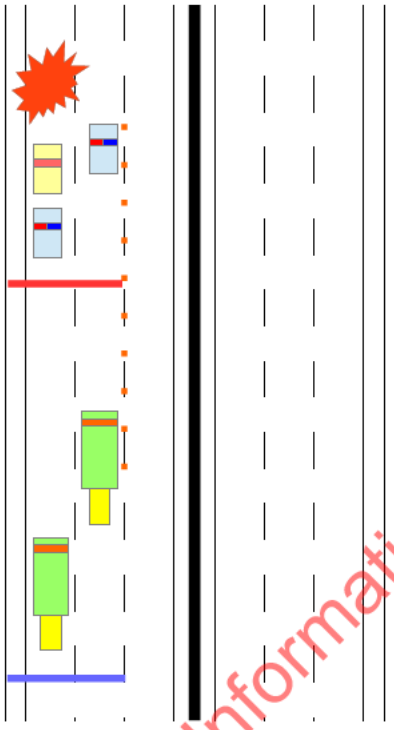
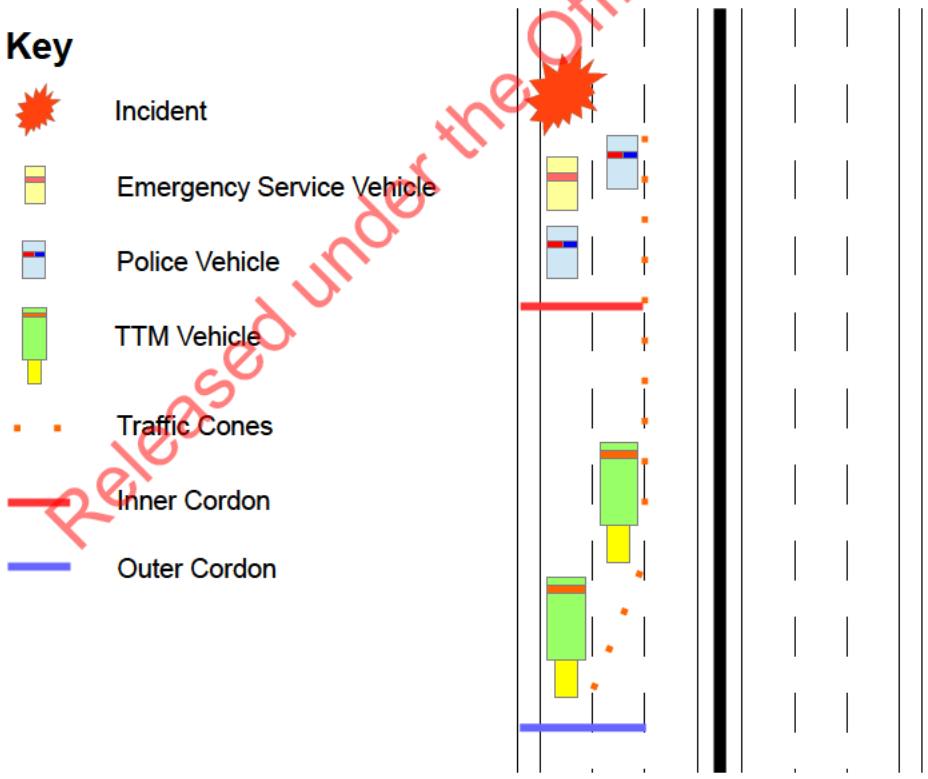


Figure C-1. Fend Position can be deployed on slow or fast lanes

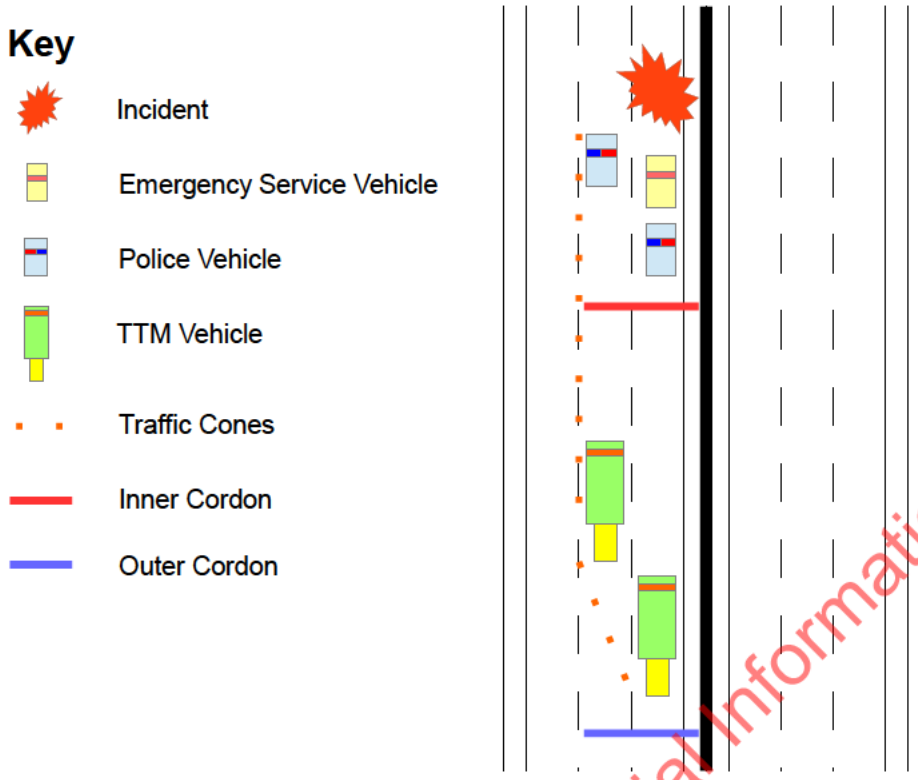
Closure of lanes 1 & 2 without Cone Taper



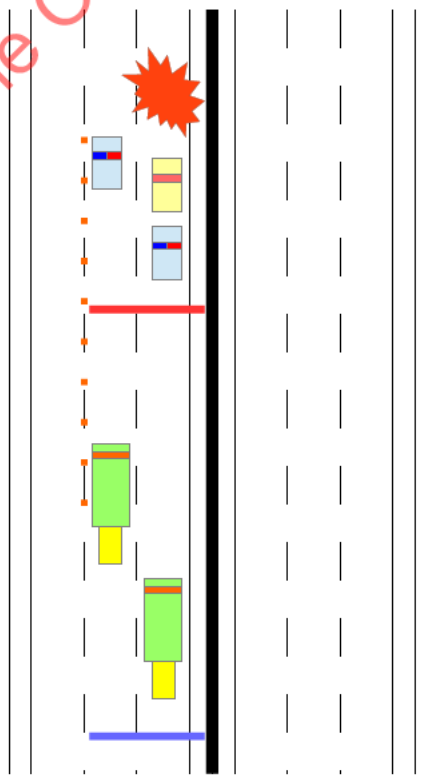
Closure of lanes 1 & 2 with Cone Taper



Closure of lanes 2 & 3 with Cone Taper



Closure of lanes 2 & 3 without Cone Taper



Closure of Interior Lane(s)

Although the closure of interior lane(s) without the left or right lane being closed is not described in COPTTM, there were overseas studies and guides that support the use of this method to increase capacity and reduce queuing on the motorway.

The STMS can choose to deploy COPTTM style multi-lane closures (from left or right lane) covering the interior lane(s) if operating speed is a concern.

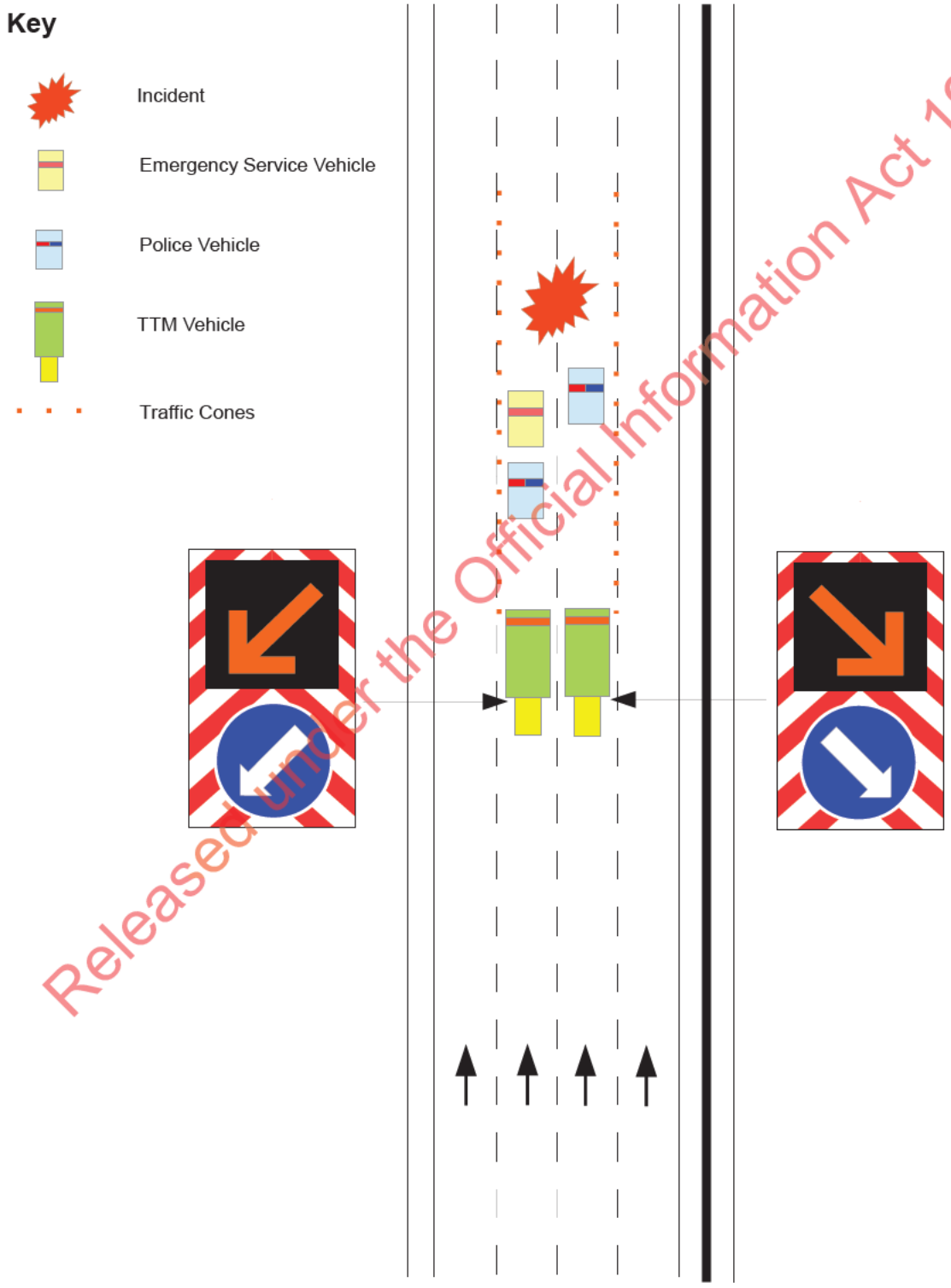


Figure C-2. Splitting Traffic, Just Closing Middle Lanes

Deployment of Fast Lanes Closure

The closure of fast lanes in both directions in accordance with COPTTM would normally require 4 TMA's, however the availability of TMA's during an incident can be limited in short notice. This approach uses one TMA in each direction to protect the incident scene.

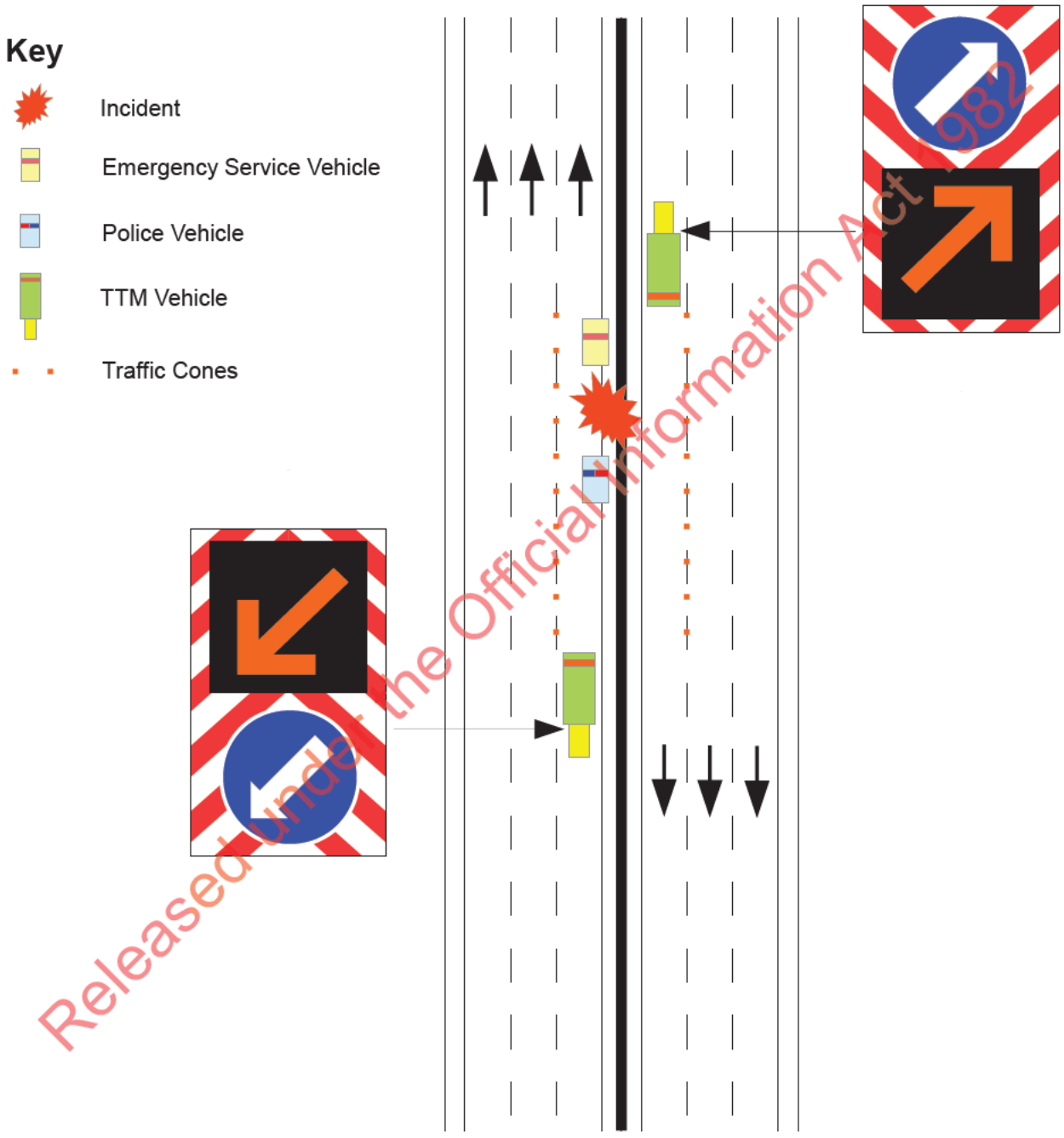


Figure C-3. Deployment of fast lanes closure to enable work

Utilisation of Shoulder as Travel Lane

Use of the road shoulder as a travel lane during a full width closure is considered acceptable if the shoulder width and condition is acceptable, the length of the incident site is short and there is no road furniture that will be damaged by road traffic. This should only be used if the shoulder run is less than 100 m and severe congestion exists.

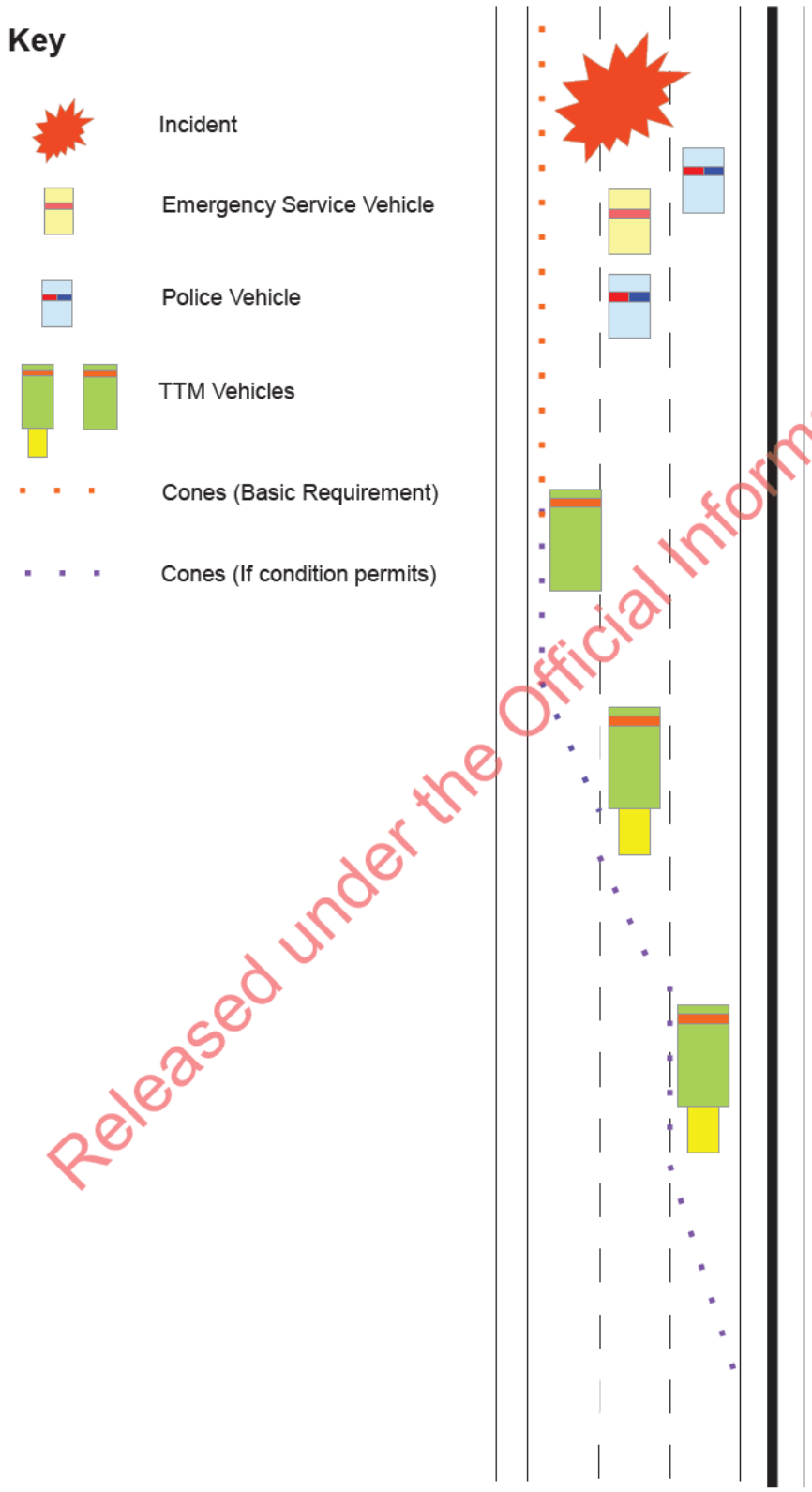


Figure C-4. Using Shoulder as Travel Lane

Avoiding Ramp Closure

This option can be used near an on-ramp if it is necessary to avoid a ramp closure.

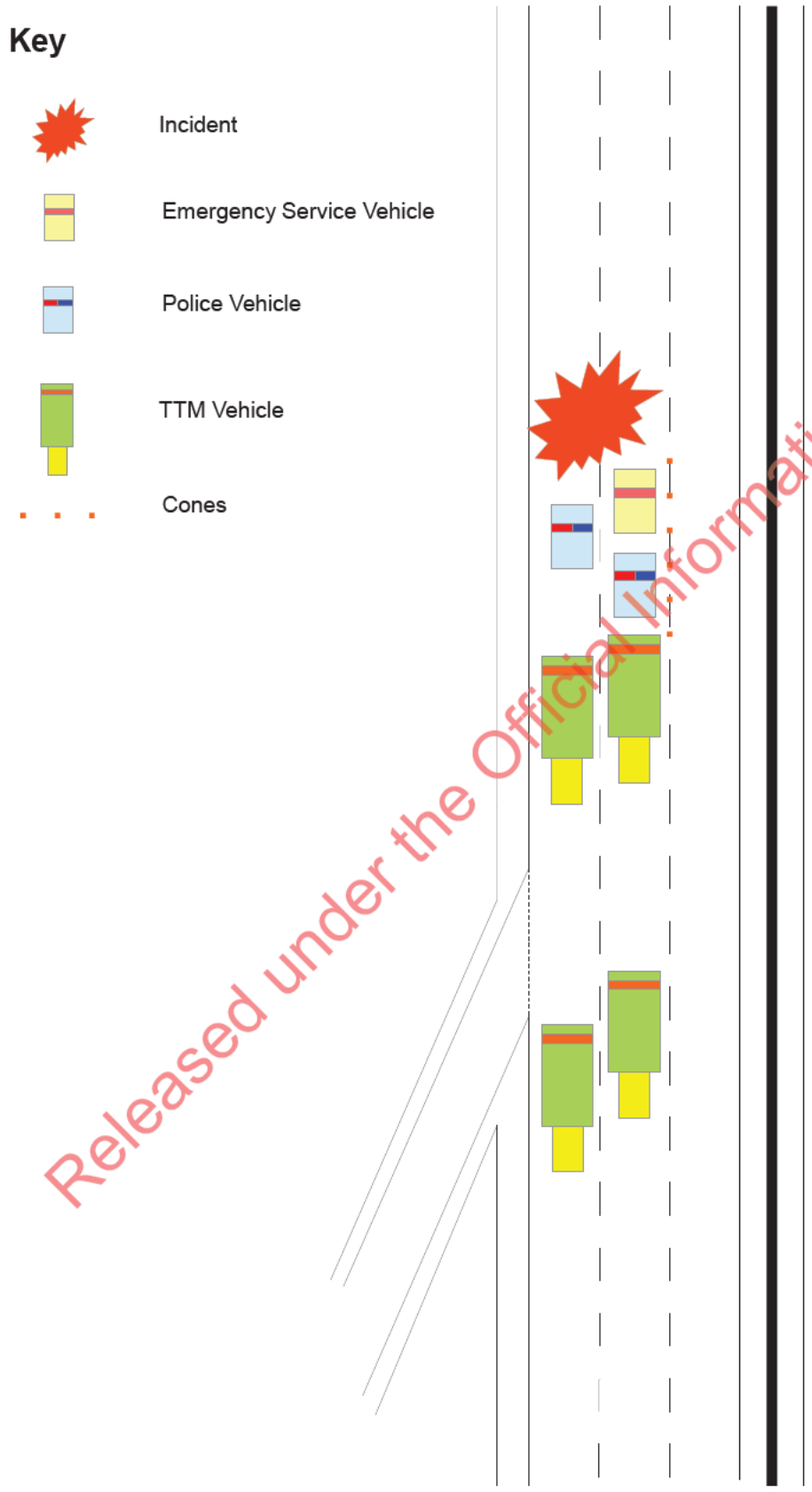


Figure C-5. Avoiding Ramp Closure

Rolling Block without Sufficient number of TTM Vehicles

Rolling block as a Standard Operation normally requires the use of one TTM vehicle per lane. For rolling block operations during an incident, a reduced number of TTM vehicles may be used if they straddle across two lanes and perform S-movements as they progress.

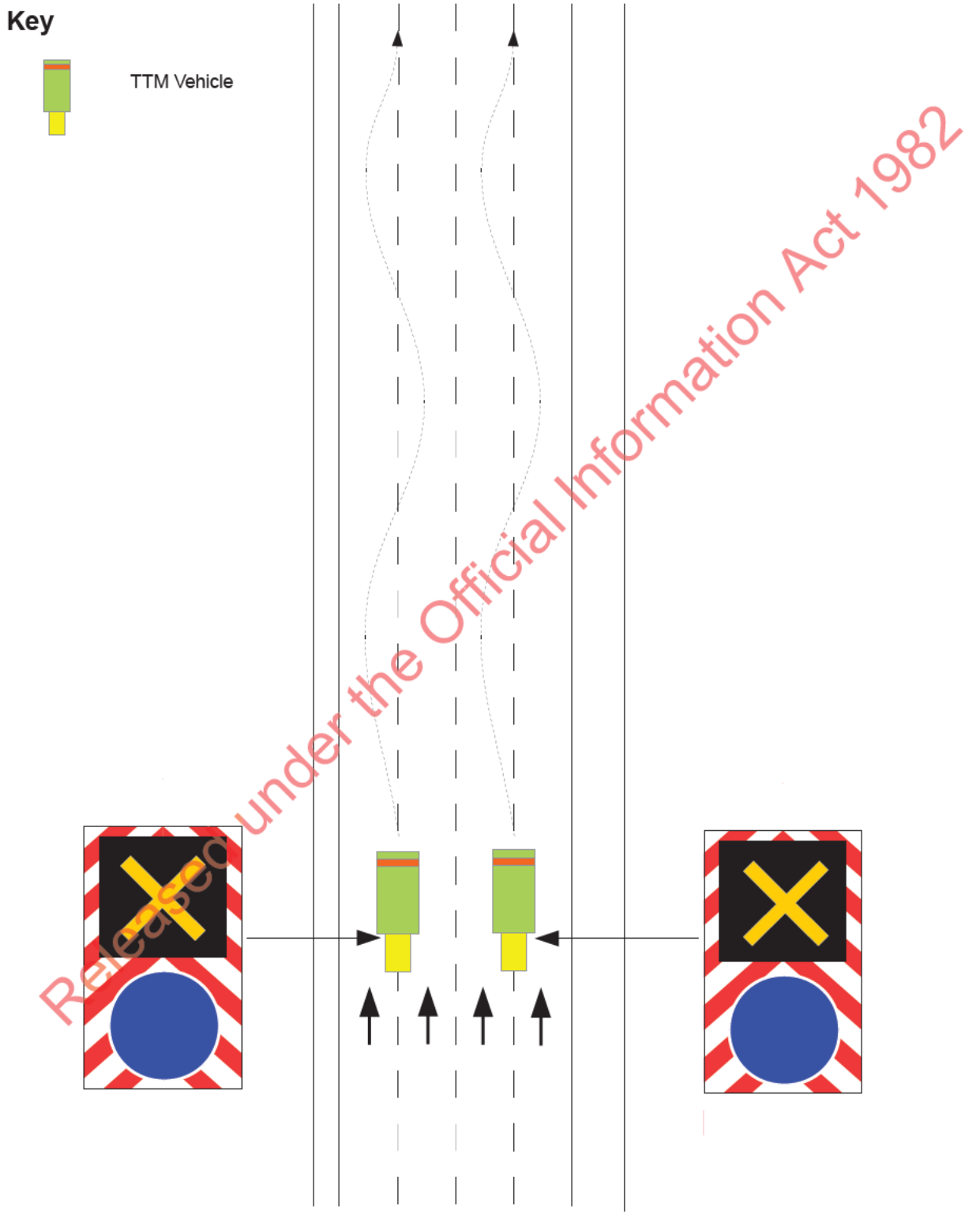
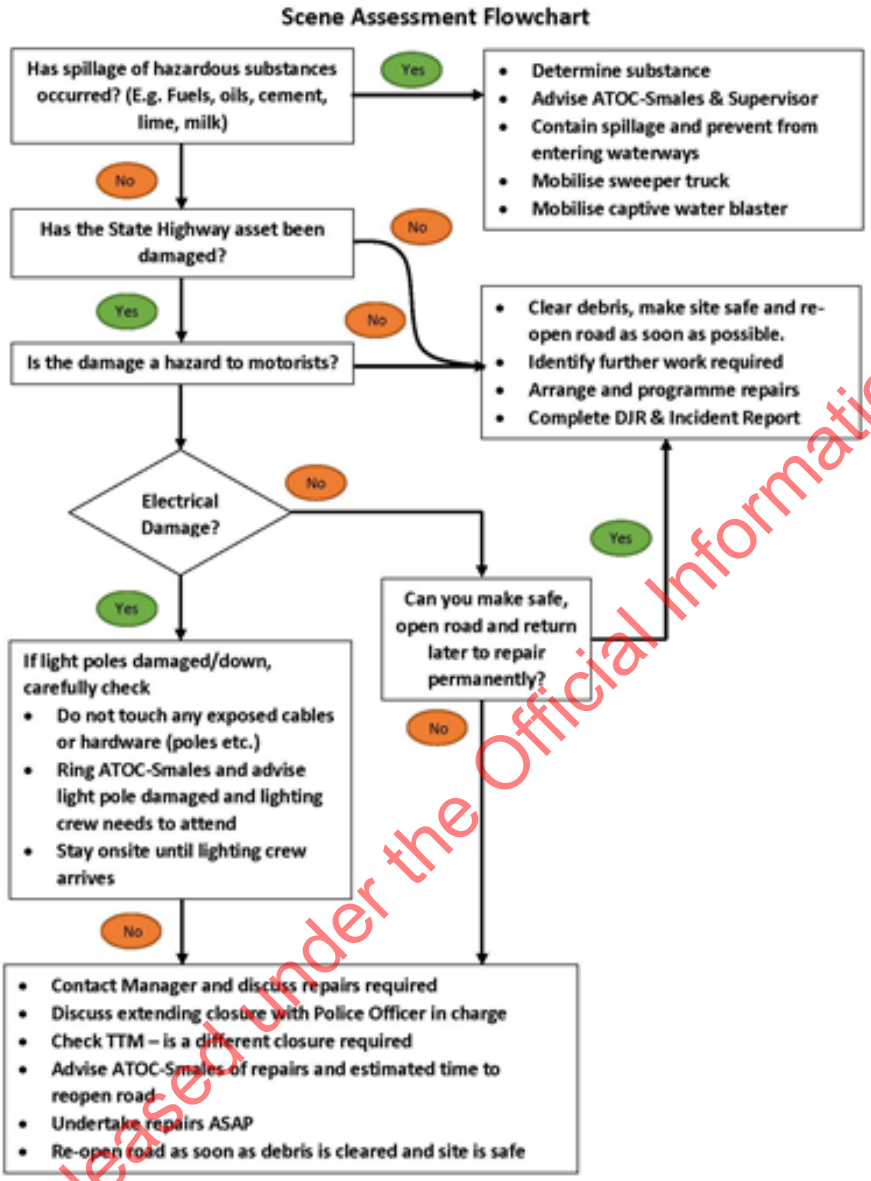


Figure C-6. Rolling Block with S movement progression

TTM vehicles with outriggers installed (see below) can reduce the number of TTM vehicles during rolling block operations and remove the need for the TTM vehicles to perform S-movements as depicted in the diagram on the previous page.

Figure C-7. TTM Truck with TMA and Outriggers installed

APPENDIX C: EMERGENCY SCENE ASSESSMENT FLOWCHART



APPENDIX D: NETWORK EXTENT

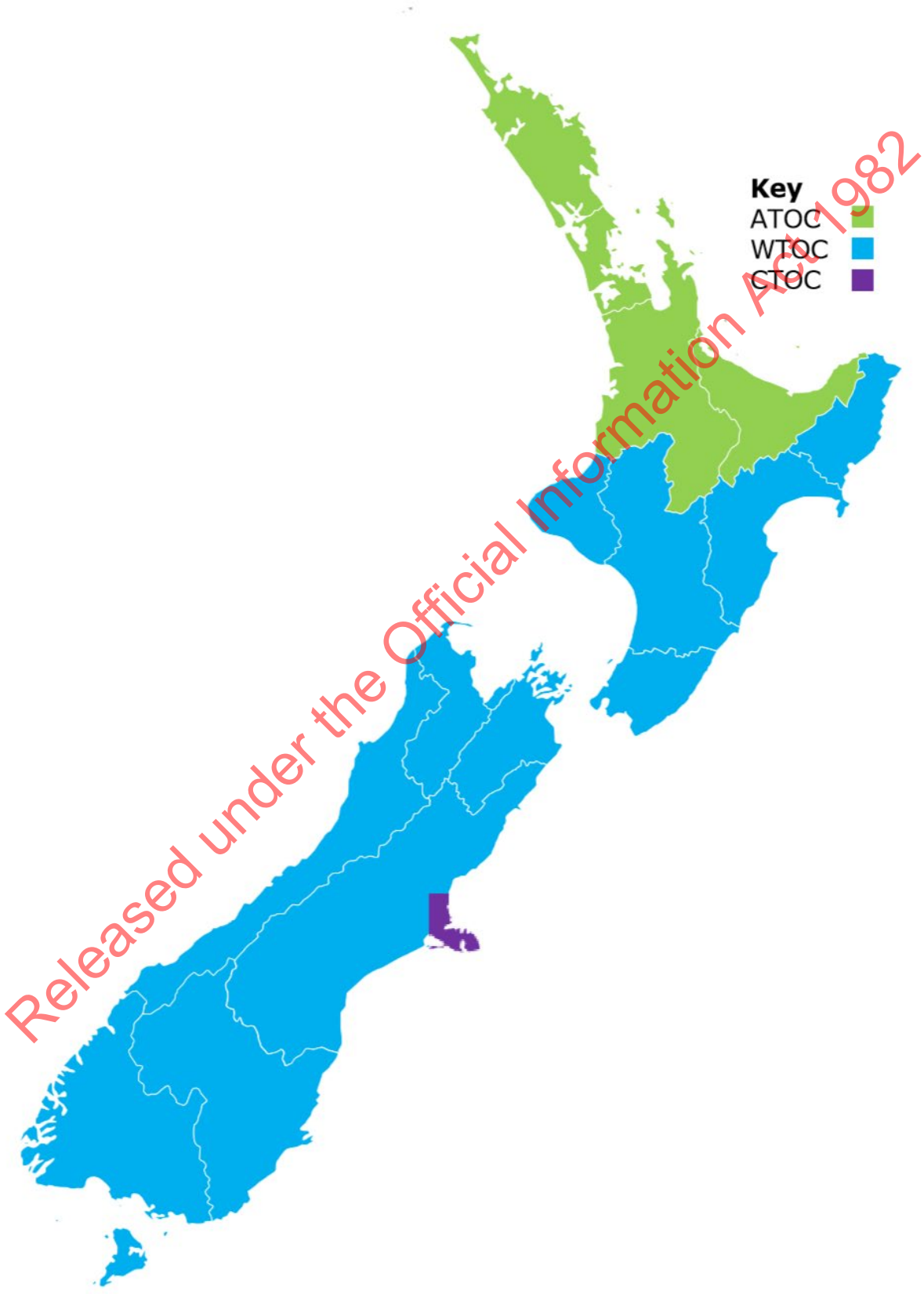


Figure B-1. Traffic Operation Centres' Geographic Coverage

Figure B-2. State Highway Network Maintenance Boundaries (North Island)

Figure B-3. State Highway Network Maintenance Boundaries (South Island)

Auckland System Management Alliance - July 2021 TOC 3

The physical extents of the Auckland System Management Alliance contract are detailed below.

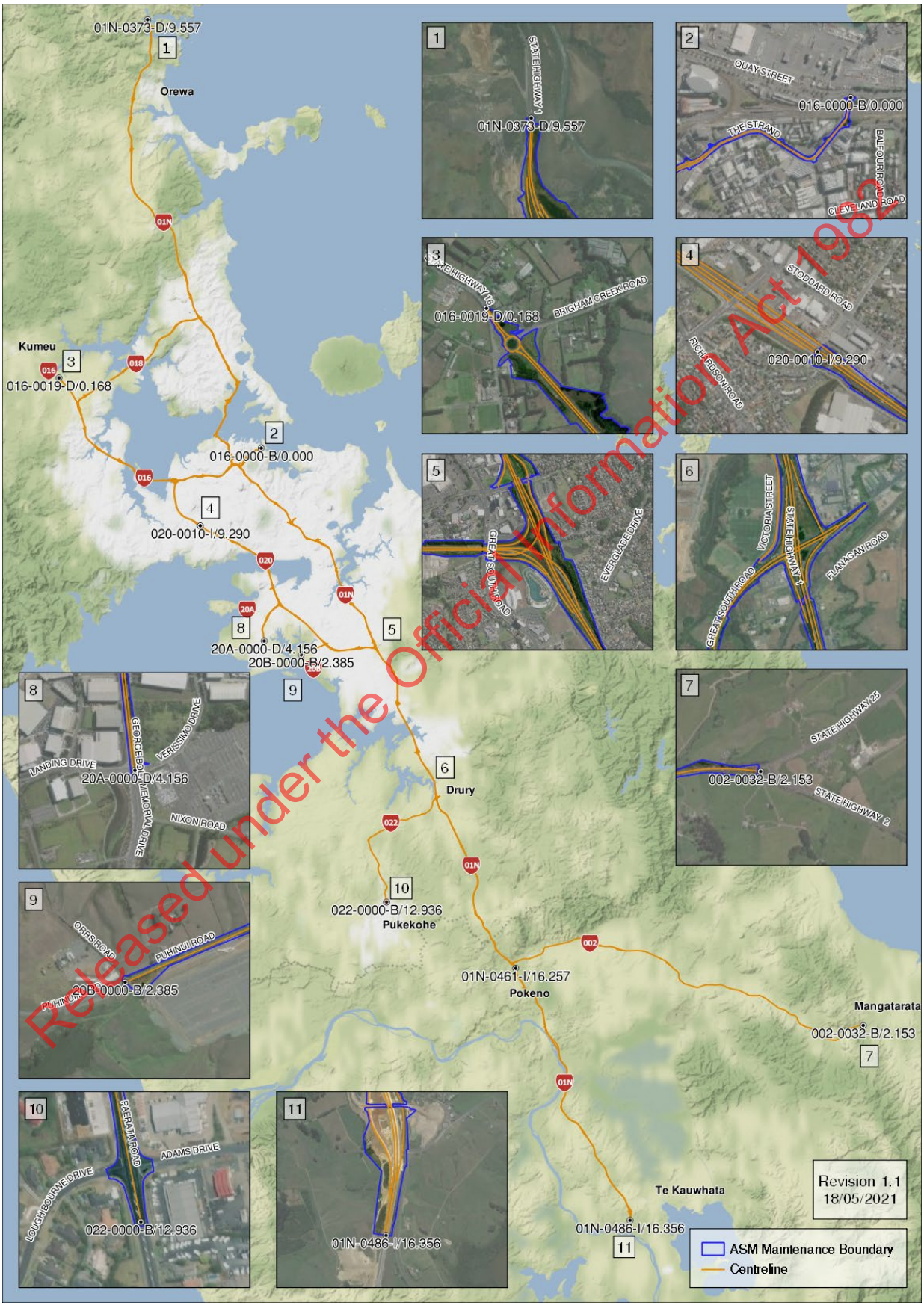


Figure B-4. Auckland Motorway Network Extent

Figure B-5. SH2

Network Extent and Scope Covered

It should be noted that, whilst the maintenance boundary is defined by this extent, emergency and network management may extend beyond this where factors affect the performance of the network within the physical extent described below. The physical extents include:

- All State highways within the Auckland region
- SH1 from 01N-0373/9557 Billing Road to 01N-0486/16350 south side of the Te Kauwhata interchange, including Auckland Harbour Bridge, Victoria Park Tunnel, Johnstone's Hill Tunnels, and the Bombay ROW extending southerly from the Mill Road Service Centre
- SH16 from Tamaki Drive 016-0000/0 to 016-0019/170 just north of Brigham Creek Road intersection
- SH18 from 018-0000/0 at SH1 / Constellation Drive to 018- 0012/1027 at SH16 / Hobsonville Road including the maintenance yard at Trig Road
- SH20 from 020-0000/0 at SH1/SH20 interchange to 020- 0010/9270
- SH20A from SH20/20A interchange up to and including Landing Road Interchange at NZTM grid projection coordinates X: 175856 Y: 5904591
- SH20B from SH20/Puhinui Rd 020B-0000/0 to 20B-0000/2384 Orrs Road
- SH22 from SH1 / Great South Road to 022-0000/12936 at Adams Drive, Pukekohe
- SH2 from SH1/SH2 Interchange 002-0000 to 02-0032/2152 SH2 and SH25 roundabout
- Waterview Connection and tunnels - existing agreed scope, predominately environmental asset maintenance, plus ATMS equipment ONLY
- The Northern Busway, excluding actual bus stations and concrete roads.
- Weigh Stations on SH1 at the Auckland Harbour Bridge, SH16 at Stanley Street, SH22 at Drury, and Neilson Street, Onehunga

Items covered in:

- Memorandum of Understanding with Auckland Transport (see Appendix 1 of ASM Level 2 scope)
- Highways Management Protocol Memorandum of Understanding (see Appendix 1 of ASM Level 2 scope)

Where assets are within land held by the Principal but maintained by the local authority, normal asset activity will be undertaken on the Principal's land bordering the asset along with inspections to ensure maintenance and safety aspects are adequately covered.

In addition to the normal road surfaces and batter slopes the sites will include sections of transverse roads that pass over or under the motorways. Where the crossing structure is part of an interchange, the site shall include the roadway under or over the motorway to points on the approaches and to outside the limits of the interchange ramps as defined. Where the crossing is over the motorway, the bridge structure shall be part of the Principal's asset, but the Local Authority shall maintain the surfacing and elements of the road across the bridge.

Waka Kotahi New Zealand Transport Agency has a Memorandum of Understanding with the local authority prescribing limits of maintenance responsibility. In the event that there is no Memorandum of Understanding, or a Memorandum of Understanding exists but does not cover a particular aspect or service, then the limits of maintenance responsibility shall be the boundary of all Crown land invested in the State highway. The extent of the corridor boundary shall be as shown on the plans or to the full extent of the legal boundary, whichever is the greatest.

Exclusions:

- Capital projects with the estimated timeframe of construction (to practical completion), to be confirmed prior to commencement

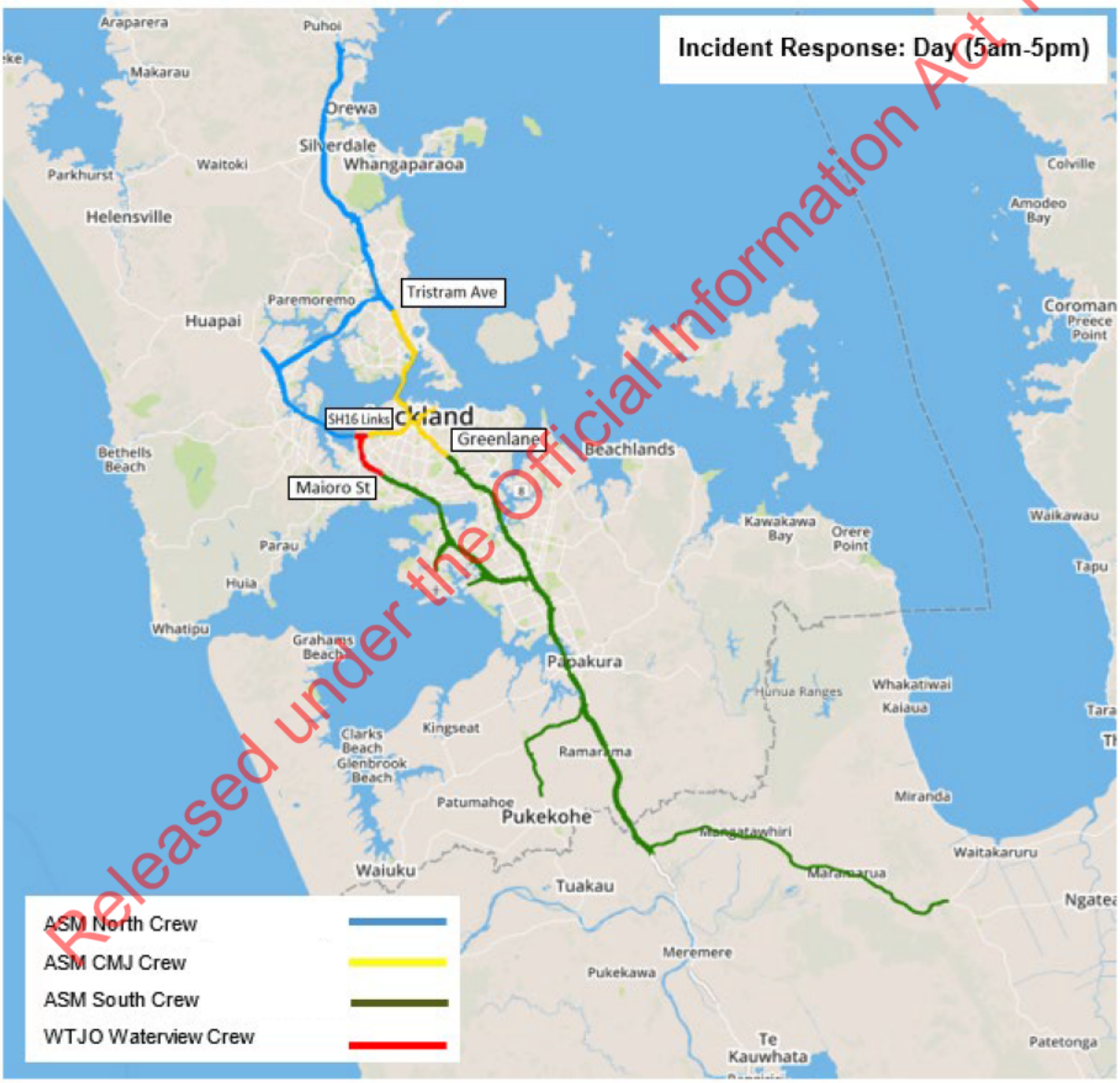
Section 4 broadly defines the assets within the Auckland System Management Contract.

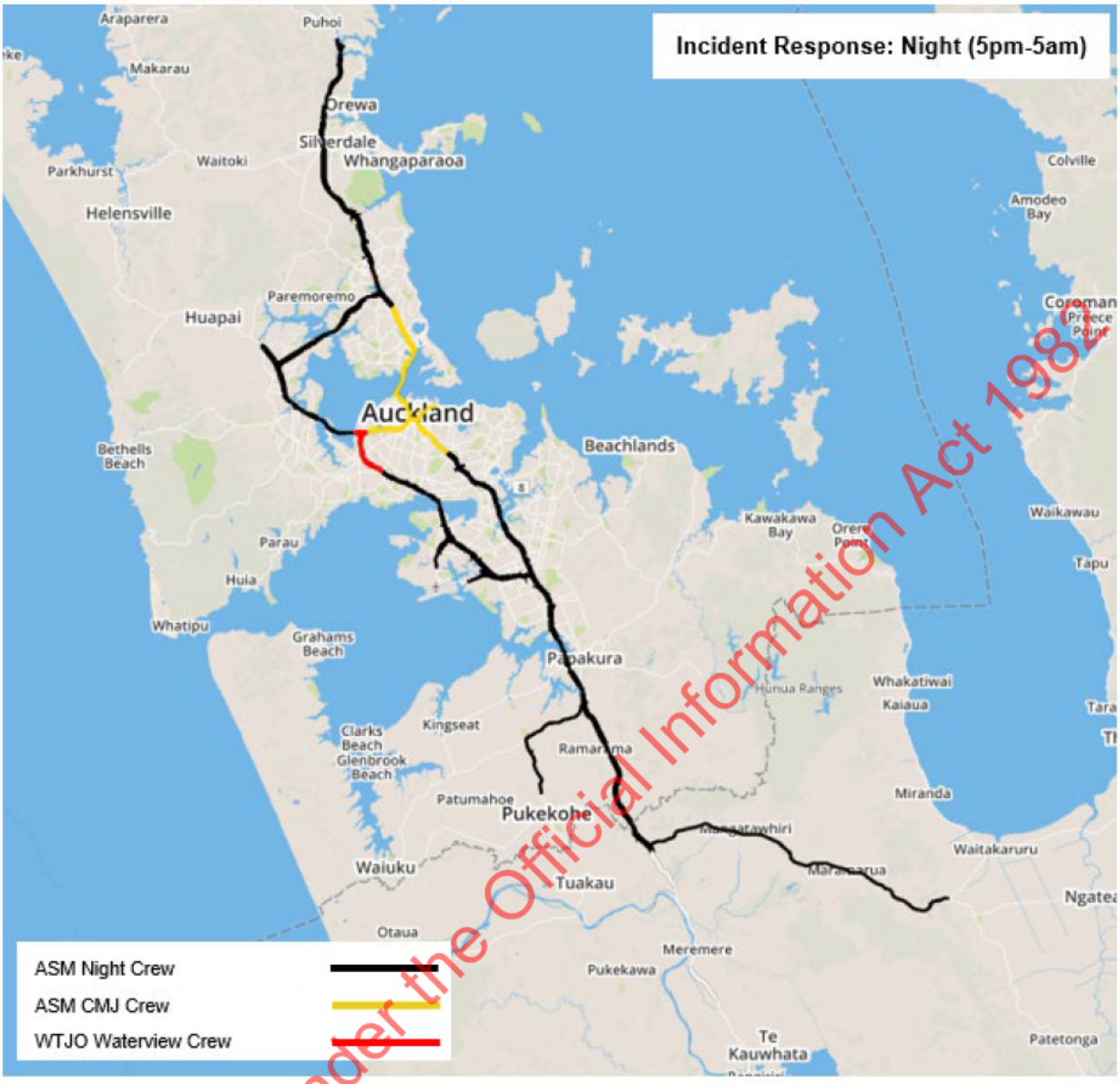
APPENDIX E: ASM INCIDENT RESPONSE CALL-OUT STRUCTURE

Date: **August 2019**

Notes:

- Designated areas are guides only. In the event of an incident, it is expected that these boundaries will be stretched to provide the best response for the network.
- The TIM role will be focused on the urban motorways, however in the event of a major incident they are expected to respond to the entire network (and occasionally off network if requested by ATOC).
- The ASM Duty Engineer role remains contactable 24/7 via the on-call number.





APPENDIX F: EOC EQUIPMENT

Check all equipment / stock is in the cupboard, up to date and operational.

Item	No	Check
IMT Vests INCIDENT CONTROLLER, DEPUTY INCIDENT CONTROLLER, OPERATIONS, LOGISTICS, PLANNING & TECHNICAL, LIAISON, INTELLIGENCE, COMMUNICATIONS, WELFARE, RISK	10	
Multi power boards on tables	2	
TOC CCTV FLIR feed to screen	1	
EOC Laptop computer	1	
Projectors, screen, computer, keyboard & mouse	1	
Landline telephone	0	
2-way radio (Base unit + Hand-held)	1	
Satellite phone and external aerial	1	
Whiteboard Markers	Set	
Blue tack (for holding maps up)	Strip	
Emergency Management Plan	1	
Road Incident Management Guide	1	
Network Maps	1	
Interchanges Maps	1	
Tsunamis Zones Maps	1	
Tsunami closures Maps	1	
LED Bat lights – Charge batteries; switch off power supply when red LED changes to green	4	
LED battery torches	12	
AAA Batteries (Minimum 2 spare packs of 20)	40	
FM radio	1	
Battery Charger	1	
Duct Tape	1 Roll	
Drinking water (Min 12 l tres)	12 L	
Canned food, Biscuits and Breakfast bars (Check they are within use-by dates)	Assorted	
**Check backup generator condition and run for 30 minutes to charge battery*		

APPENDIX G: SPECIFIC OPERATING PROCEDURES

The definition of an "incident" within the context of a road network is extensive. A crash involving a number of vehicles may have no adverse impact on the road infrastructure or disrupt the travelling public. There may be little involvement from Waka Kotahi and its consultants and contractors. Incidents where Waka Kotahi is actively involved include:

- Wrong Way Drivers
- Fatal or near fatal crashes
- Multiple car crashes
- Hazardous substance spill
- Wandering stock on motorway
- Protesters on Motorway
- Bomb threat/blast
- Bridge strike
- Vehicle/property fire impacting on roadway or bridge
- Movement and location of cranes and lifting gear on bridge
- Utility Service Failure (Electricity, Gas, Water, Communications)
- Cyclone and /or Tornado causing major flooding and/or damage
- High winds requiring closure of the Auckland Harbour Bridge
- Tidal surge inundating the motorway
- Cyclonic and severe storm event
- Volcanic eruption
- Seismic activity; and
- Tsunami.

Specific Operating Procedures have been developed to provide guidance to staff responding to these type of incidents on the key actions required by the RCA Incident Response Crews.

Note, for **Natural Events**, under the powers of the Civil Defence Emergency Management Act, 2020, Police have jurisdiction over all land transport. For Waka Kotahi staff, the *Regional Manager* will take overall control.

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G1. Incident Management Team Activation

G1.1 Establishment of IMT and EOC

Regardless of the Incident Level (1 – 5), the IMT will be activated if significant resources are required to respond to incidents which have the capacity to cause significant traffic congestion; these could be a complex single localised incident, or widespread multiple incidents, such as:

- An event involving multiple agencies and/or several incidents requiring co-ordination in a local area of the network
- A regional emergency response involving multiple agencies and/or several incidents requiring co ordination across the region or adjacent regions which impact on the network
- Uncertain conditions which could lead to an escalation of the incident or unknown extent of damage or significant risk to motorists and citizens; and
- Major congestion resulting from an event, examples of which could be:
    - Bridge strike
    - Major network flooding or tidal surge
    - Traffic incident requiring partial or full road closure
    - A breakdown of the Auckland Harbour Bridge Moveable Lane Barrier machine affecting peak traffic
    - Closure of Auckland Harbour Bridge (due to high winds, ship impact, natural disaster, terrorism).

G1.2 Responsibilities of IMT and Operation of EOC

The RAC Incident Controller will lead the IMT to provide strategic direction, support and co-ordination for the Incident Response teams.

The duties involved consist of at least the following:

- Activation of the IMT and the EOC
- Assessment of the overall situation
- Recording of decisions, actions and other activities
- Prioritisation and direction of the allocation of resources
- Appointment of assistants and delegation of tasks as required on the day
- Delegating responsibility for documenting all activities related to an incident
- Ensuring information is channelled through to the TOC
- Assessment of any local, regional and national political issues, resource constraints and similar
- Consultation with lead authorities and organisations, such as TOC, Remote Incident Manager and others (see Waka Kotahi EPM)
- Planning staff requirements
- Ensuring effective strategies are adopted
- Directing the well-being (and rotation/change-over) of the team; and
- Conducting a feedback/lessons learned session within seven days of an event.

G1.3 Stand Down of EOC

Once activated, the EOC will remain in force for the current incident until the Controller or the Network Manager (if not acting as the Controller) directs and notifies the response team to stand down.

The Controller must consider the necessity and requirements for stand down virtually from the outset of the incident.

After a protracted incident, the Controller should ensure all staff receive the instruction to stand down and that appropriate arrangements have been made to record all necessary actions taken during the incident. The Controller should also ensure an appropriate person within the Management Team has been delegated responsibility to co-ordinate reporting of the incident.

Criteria for standing down include:

- Co-ordination of activities is no longer required; and

- The emergency or incident event has been contained.

G1.4 Field Video Link (rewrite to generic + Auckland)

While there is extensive CCTV coverage of the Auckland Motorway and State highway network, there are still a number of areas that have no coverage; sometimes the incident may be obscured by vegetation or structures and ATOC-Smales is unable to view details of the incident site. In these circumstances the Duty Engineer and TIM Units have the ability to provide a video feed via portable CCTV camera mounted on top of their vehicles.

Note: Show the site and describe the details then end the video call and call back to the control room to check they have received and understood what you have shown them.

G1.5 Communications

There should be clarity in lines of communication.

- Only the IMT "Liaison" role should use the radio to communicate to DE / TIM / TOC
- IMT "Logistics" role should use mobile phone to communicate with necessary resources
- Ensure that who, what, when, why, how are answered when communicating via radio or "Microsoft Teams"
- TOC Liaison should only use "Microsoft Teams" to communicate to IMT to reduce unnecessary radio traffic.

G1.6 E-Road (rewrite to generic + Auckland)

E-Road should be used to assist with resourcing for an incident. Username and password details below:

s 9(2)(k) [redacted]

The reporting has been turned on to allow us to obtain time stamps for post incident logging.

Please note that the Captive Water Blaster is labelled as: V53001

G2. Emergency SMS to Staff

Threat to Personnel or Assets

Upon notification of any incident or potential threat to the safety of personnel or asset, particularly in high risk areas, the Duty Engineer is to immediately notify the following:

- Send a text message to All Staff (see procedure below)
- Auckland Harbour Bridge 24/7
- AHB Annex
- MLB
- Union Street

Purpose

The purpose of this messaging system is to contact and alert staff during Auckland based emergencies as outlined in the Emergency Management plan and below.

Scope

This system has been introduced to enable the IMT: Incident Management Team staff to contact all ASM staff (or specific distribution lists) in the event of an emergency.

Emergency Situations – UPDATE TO NEW SYSTEM BEING USED IN ASM

- Earthquake
- Tsunami, NOT Imminent impact
- Tsunami, Imminent impact
- Storm resulting in significant impact to network (including tornado)
- Power Failure, ASM Greenlane unable to operate under usual capacity
- Request to CIMS Trained Staff, In response to a significant incident
- Pandemic – refer to D4 in the Emergency Management plan for guidance on messaging (not set template due to the range of potential effects.

Staff Responsibilities

The SMS campaign will be prepared and distributed by CIMS trained staff (generally the Communications lead or the Duty Engineer) and will require the following information/consideration:

- Time
- Date
- Location
- Situation
- Which staff may be affected and need to be contacted (each emergency will see a different group of staff requiring communication)?
- Which SMS template is required (What is the emergency?)
- At the end of the CIMS exercise staff must confirm there is enough credit on the account for a future campaign.

Level of decision – when to send out notification?

The SMS campaign system will be used during Level 3, Level 4 and Level 5 incidents as outlined in the Emergency Management Plan.

~~Updating personal details~~

~~It is expected that every 2 weeks the People and Capability's team will update staff contact details within the BurstSMS system and CIMS folder.~~ TO BE UPDATED

G2.1 Situation Alert Template

Purpose

The purpose of this Situation Alert Template is to provide a process for the Duty Engineer to alert key staff to a potential or developing situation that may impact the network. The template should be saved as a signature on the Duty Engineers individual email profile. When a situation arises the Duty Engineer must determine the alert level, populate the template, and email it to the staff on the distribution list.

https://aucklandsystemsmanagement.sharepoint.com/:w:/r/teams/ControlledDocuments/_layouts/15/Doc.aspx?sourcedoc=%7B8F3331C2-71FC-4C69-88A0-26C6E8EC0B8A%7D&file=ASM%20-%20Alert_Template.dotx&action=default&mobileredirect=true

Templates

Earthquake: (Earthquake in Auckland Region or affecting Auckland)

Time (00:00), Date (00/00/0000) - Following the recent earthquake in X_____X, please consider risks to your current activity, turn on your radio and remember; if you are at the coast and feel an earthquake that was too hard to stand up in or lasted longer than one minute, evacuate immediately to high ground or as far inland as possible and do not return to the evacuation zones until given the all-clear.

Use your radio, TV or social media to receive updates.

These notifications are internally generated for ASM staff only.

Tsunami (Not imminent impact):

Time (00:00), Date (00/00/0000) - Civil Defence has issued an advisory warning for Tsunami, please consider your current position relative to water level.

Use your radio, TV or social media to receive updates.

Tsunami (Imminent impact):

Time (00:00), Date (00/00/0000) - Civil Defence has issued a warning for an approaching Tsunami to Auckland, evacuate immediately to high ground or as far inland as possible and do not return to the evacuation zones until given the all-clear.

Use your radio, TV or social media to receive updates.

Storm: (Resulting in significant impact to network)

Time (00:00), Date (00/00/0000) - Due to the significant storm event the ASM network has multiple incidents, consider the risk to your current activity and report to your Manager if the risk changes any planned activity.

Power Failure: (ASM Greenlane unable to operate under usual capacity)

Time (00:00), Date (00/00/0000) - The ASM Greenlane office currently has power failure, Staff are to check their email for further instructions and await contact from your manager.

Request to CIMS Trained Staff: (In response to a significant incident)

Time (00:00), Date (00/00/0000) - The ASM is responding to a significant XX_____XX event, the Incident Management Team request that CIMS trained staff indicate availability via XX_____XX system.

*** Please note: Time (00:00), Date (00/00/0000) is the Time and Date that you are sending the message – not the event, meaning if the recipient is out of signal when signal returns they will know which message is the latest update***

G3. Tsunami

Emergency Response Procedure

Civil Defence Emergency Management (CDEM) encourages public to follow the following evacuation protocol:

- If it's long and strong, head to high ground.
- If you are near the coast, do not wait for an official warning.
- Move immediately to the nearest high ground or as far inland as you can.
- Walk or bike if you can.
- Stay there until you get the all-clear signal.

If the earthquake is long and strong then all personnel must follow the CDEM advice to evacuate immediately to safe high ground.

- Permanent places of work must have the tsunami evacuation plans that identify the place of safety at the building exits and all staff must be made aware of the evacuation procedure.
- Work sites must have established the place of safety during the pre-start tailgate and all staff must be aware of the evacuation procedure.

The following web site is a useful tool to quickly find the elevation of a location on the map.
https://www.freemaptools.com/elevation-finder.htm

General Response Procedure

The level of response depends on the proximity of the earthquake generating the tsunami to New Zealand. Local, regional or distant sources can generate a tsunami, further information in this regard can be viewed on the following link:
http://www.aucklandcouncil.govt.nz/EN/environmentwaste/naturalhazardsemergencies/hazards/Pages/tsunamihazardsinauckland.aspx

A brief table of examples is provided below for reference.

Event	Description	Estimated time to tsunami impact	ASM response
Local	A significant local seismic or volcanic event situated approximately 700 - 1,200 km from Auckland, such as an earthquake felt for longer than 1 minute OR an earthquake that is difficult to stand in.	45 minutes to three hours.	Activate CIMS, notify all staff. Priority is to get staff to high ground as per Tsunami maps. Follow advice from MCDEM if available.
Regional	A significant seismic event in the vicinity of Samoa situated approximately 2,800 km from Auckland.	Three to six hours.	Activate CIMS, notify all staff. Assist the Police with traffic management to control or close motorways as directed by ATOC-S Follow advice from MCDEM.
Distant	A significant tsunami originating from Chile.	Greater than six hours.	

Upon notification of Tsunami Threat to New Zealand shores the ASM Duty Engineer will establish an Incident Management Team (IMT) who will:

- Follow instructions from ATOC-Smales and Civil Defence
- Notify ASM community:
    - AHB 24/7 number
    - Annex
    - CMJ Incident Response Crew
    - AHB MLB Crew; and
    - Wider ASM Staff, particularly Delivery managers who may have staff working at low levels.
- Monitor MCDEM website alerts at http://www.civildefence.govt.nz/ (Note that the Website does not update automatically so remember to refresh the webpage manually)
- Listen to MCDEM broadcasts via radio on News Talk ZB 89.4FM or Radio Live 100.6FM Auckland
- Assess the level of threat to our operations using the available information and determine the appropriate response based on likely path of Tsunami
- Provide regular updates to ASM Community.
- The decisions relating to route closures should be made in conjunction with ATOC-Smales.

ASM Incident Response Crews

Assist the Police with traffic management to control or close motorways as directed by ATOC-Smales.

Other Information Sources

The Auckland Civil Defence and Emergency Management Centre operates early warning public alert systems for threat of Tsunami affecting the New Zealand shoreline; these include:

- Tsunami sirens in the north and west
- North Shore tsunami notifier
- OPTn SMS system; and
- Public Alerting Platform (smartphone apps, website, SMS, social media).

Warning Signals

There are three locations where warning sirens maybe heard on or near the ASM network, these are:

- Waiwera
- Te Atatu; and
- Hobsonville Airbase.

Tsunami warning signals will be used during a tsunami event as follows:

- **Alert signal** (dash – dash – dot – dot) sounded for 15 minutes. Evacuate beaches, prepare for full evacuation and monitor the radio or television for more information
- **Evacuate signal** (dot-dot-dot) sounded in continuous burst for 15 minutes. Immediate evacuation to the nearest safe high ground and avoid using personal transport unless essential; and
- **All clear signal** (a continuous tone for five minutes). Return to premises if they have not been affected and follow directions of the emergency services if your area has been affected.

Evacuation Plans

This section contains the tsunami evaluation plans for the usual locations where ASM staff are stationed at or often visit, including:

- Annex Office behind the Motorway Police base at Northcote Point
- Auckland Harbour Bridge Office at Stokes Point
- Greenlane Office at Ascot Central
- Reliable Way Office and Yard at Mt. Wellington
- Johnstones Hill Tunnels Operation Area, Puhoi
- Curran Street Yard, Westhaven

- Pahurehure Yard, Takanini
- Trig Road Yard, Whenuapai
- Waka Kotahi Office on Queen Street, Auckland City
- ATOC, Smales Farm, Takapuna

Areas with elevation more than 20 m above mean sea level are considered to be safe for most tsunami, enabling a simple response of "20 m high in 20 minutes".

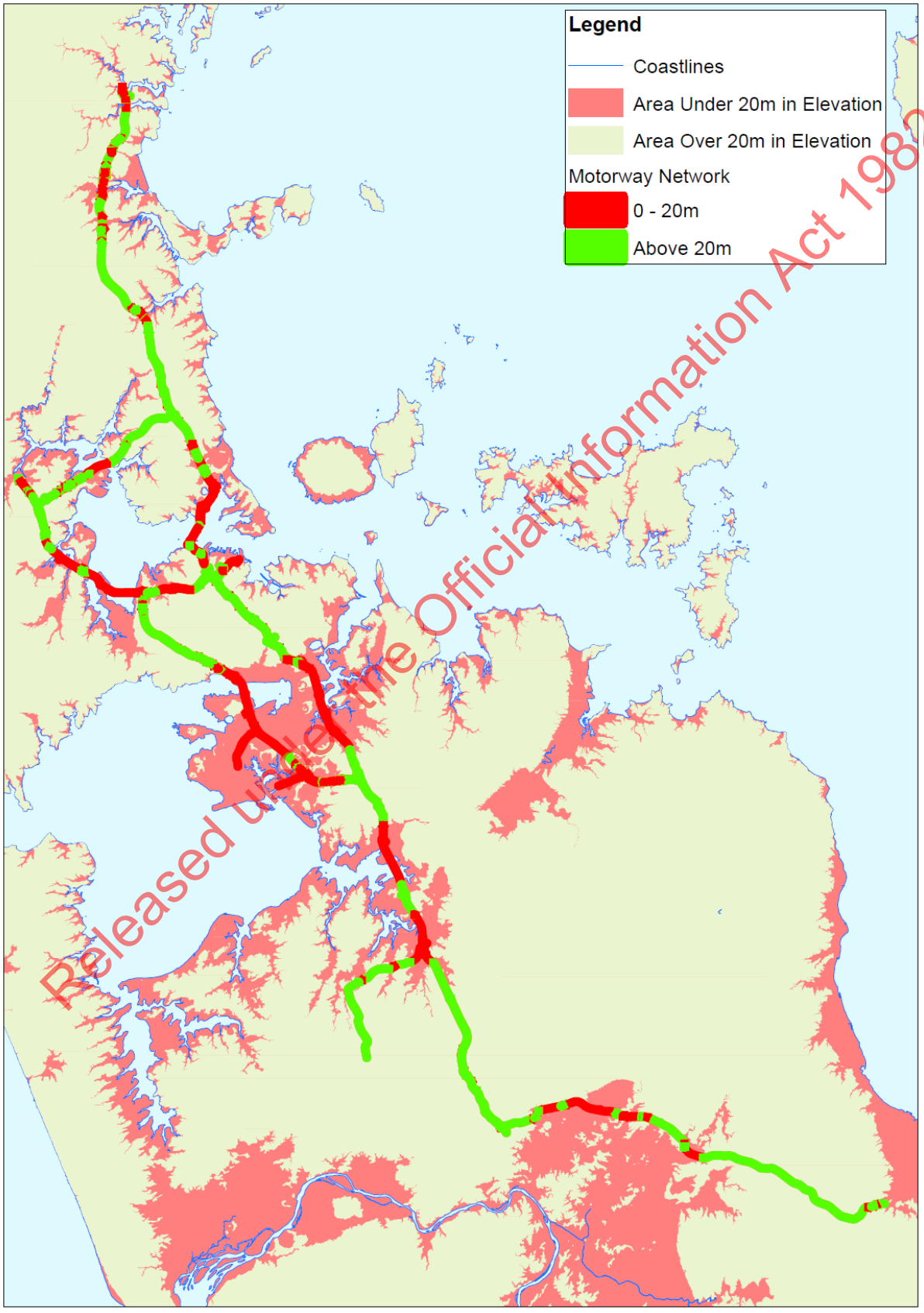
Network sections with elevation below 20 m are identified in the following table. It should be noted that although the table summarises low elevation State highway or motorway sections, the actual extent of inundation during a tsunami event may vary.

SH	Start	Finish	Remarks
1	In the vicinity of Puhoi		Potential for higher risks/ consequences
1	In the vicinity of Waiwera Viaducts		Potential for higher risks/ consequences
1	In the vicinity of Millwater Interchange		Potential for higher risks/ consequences
1	In the vicinity of Redvale		
1	Sunnynook Road	Victoria Park Viaduct	
1	SEART Off/ On Ramps	Tui/ Flat Bush Road	
1	near Jenkins Place	Quarry Road	Unlikely to be inundated due to Manukau Harbour's shallow nature
2	near Mangatawhiri		Unlikely to be inundated due to distance from sea and Waikato River
2	near MarASMrua		Unlikely to be inundated due to distance from sea and Waikato River
2	near Waitakaruru		Potential for higher risks/ consequences, if epicentre is near the Firth of Thames
16	TASMki Drive	Wellesley Street	
16	Bond Street	Hurunuru Road	
16	Northside Road	Brigham Creek Road	
18	Brigham Creek Road	Greenhithe side of Upper Harbour Bridge	
20	Seacliffe Road Footbridge	Lambie Drive	Unlikely to be inundated due to Manukau Harbour's shallow nature
22	SH1 Interchange	Jesmond Road	Unlikely to be inundated due to Manukau Harbour's shallow nature
22	near Woodlyn Drive		Unlikely to be inundated due to Manukau Harbour's shallow nature
22	near Gellert Road		Unlikely to be inundated due to Manukau Harbour's shallow nature
20A	Full Length		Unlikely to be inundated due to Manukau Harbour's shallow nature
20B	Full Length		Unlikely to be inundated due to Manukau Harbour's shallow nature

The above sections are shown in red on the map on the following page. It should be noted that the closure of these sections should **only** take place when instructed by or agreed upon with ATOC-Smales.

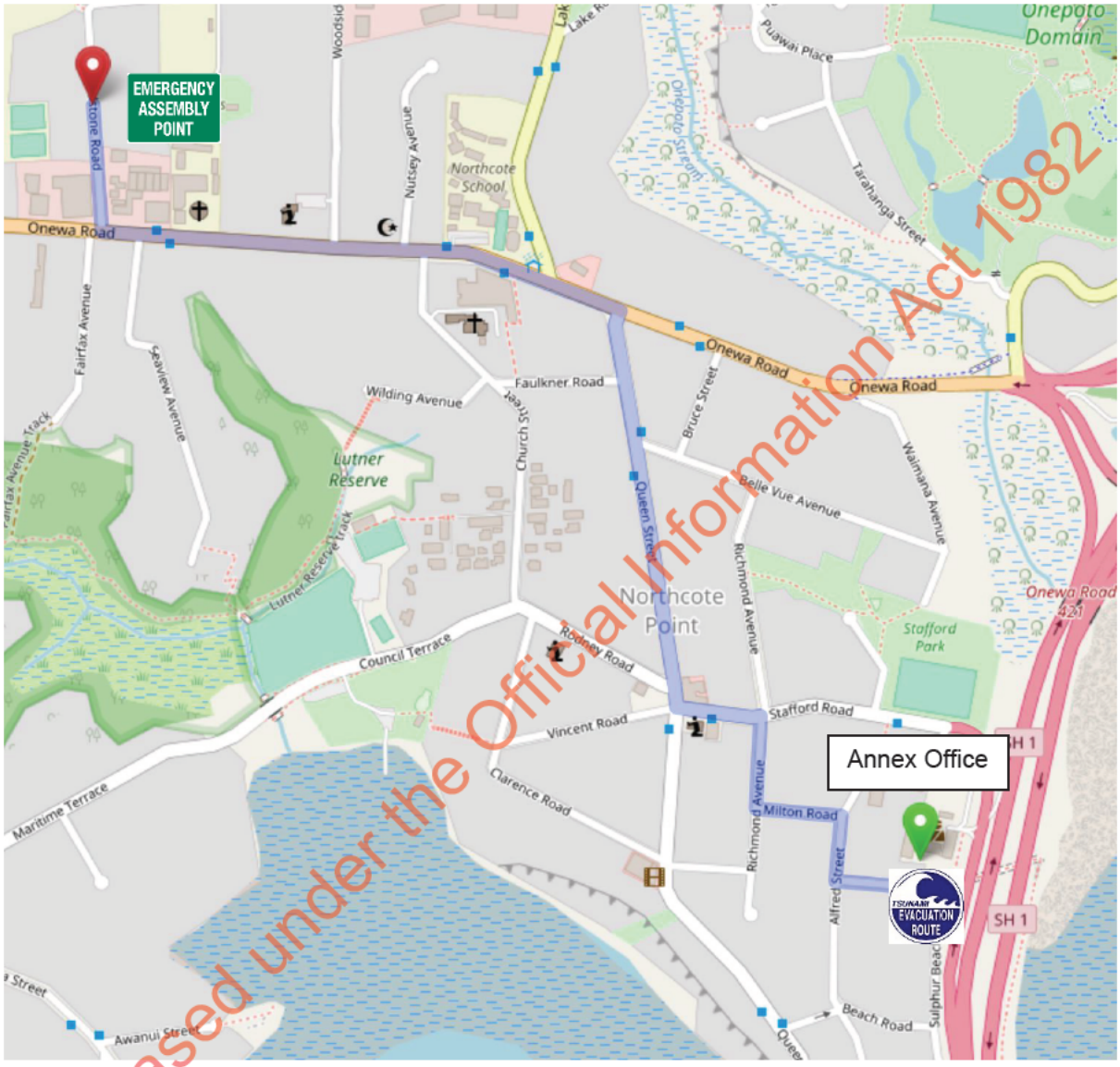
ASM Staff

All ASM staff should head to the “Green” zones identified in the following map. Staff should also leave multi-storey buildings in the “Red” zones. Although the multi-storey buildings may be higher than 20 m, their structural integrity cannot be guaranteed in the event of a severe tsunami.



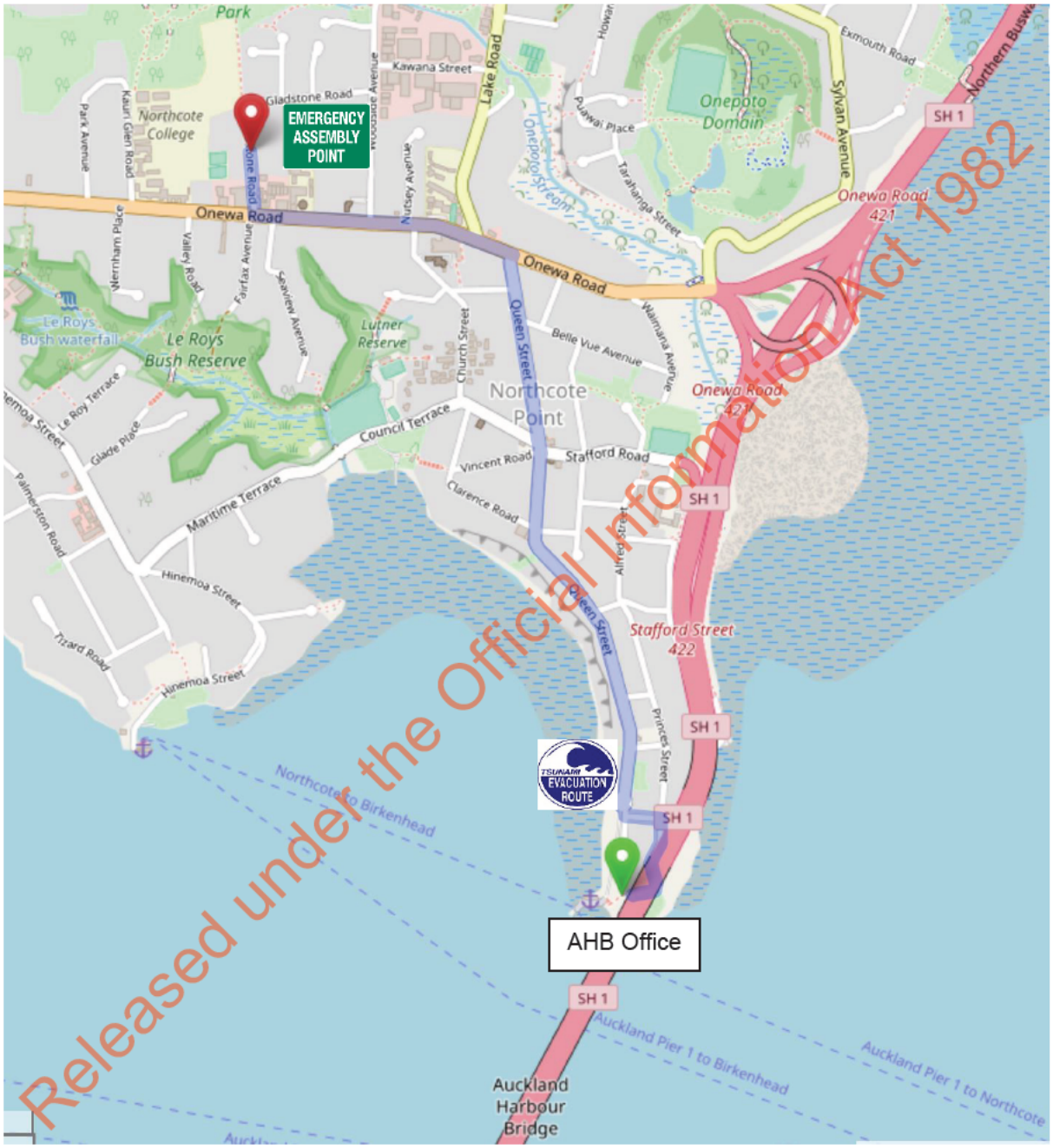
Tsunami Evacuation Plan for Annex Office behind the Motorway Police base at Northcote Point

Upon confirmed severe tsunami warning, evacuate using your vehicle, follow the route shown on the map below.



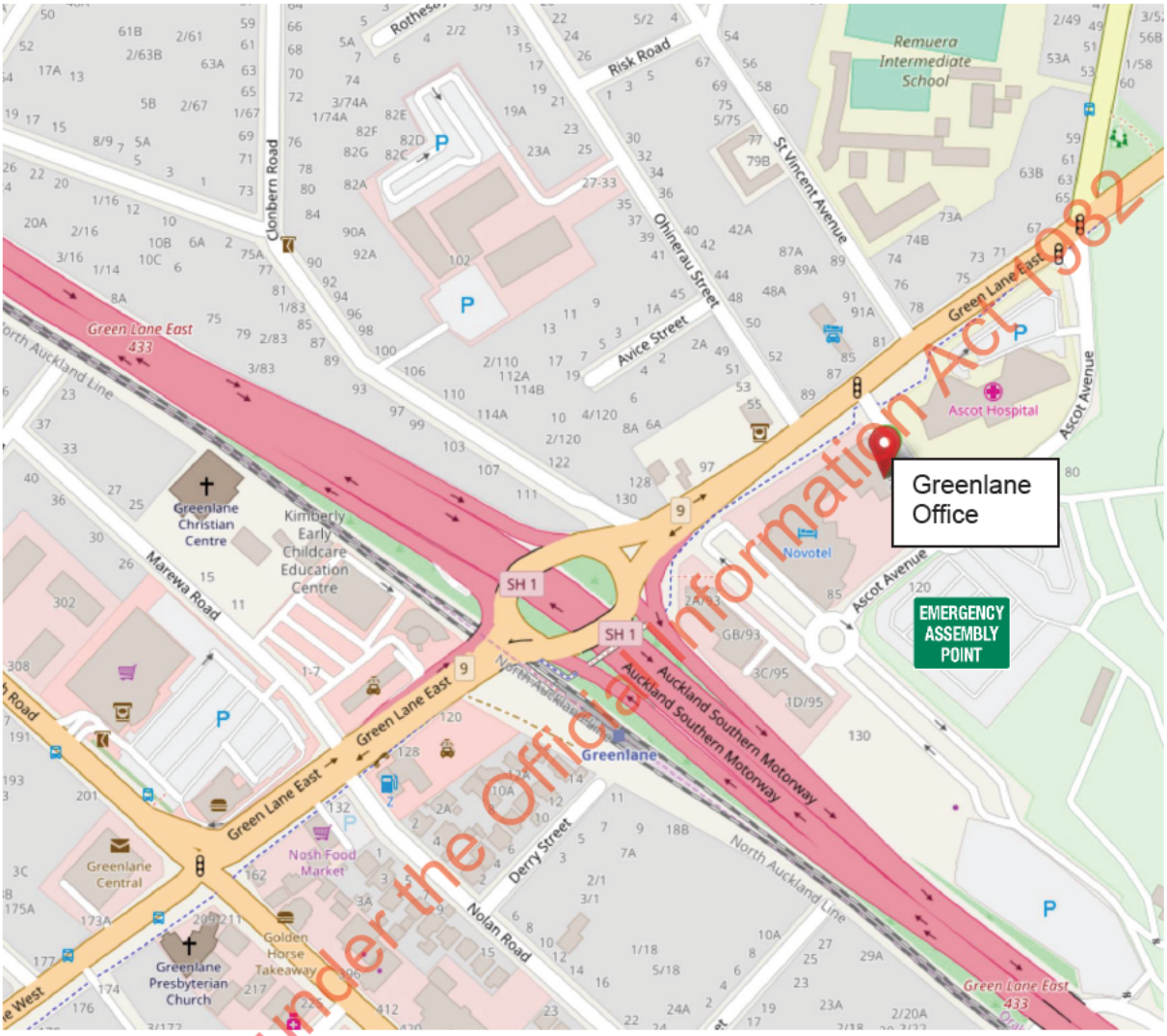
Tsunami Evacuation Plan for Auckland Harbour Bridge Office at Stokes Point

Upon confirmed severe tsunami warning, evacuate using your vehicle, follow the route shown on the map below.



Tsunami Evacuation Plan for Greenlane Office at Ascot Central

Generally, no evacuation action required.

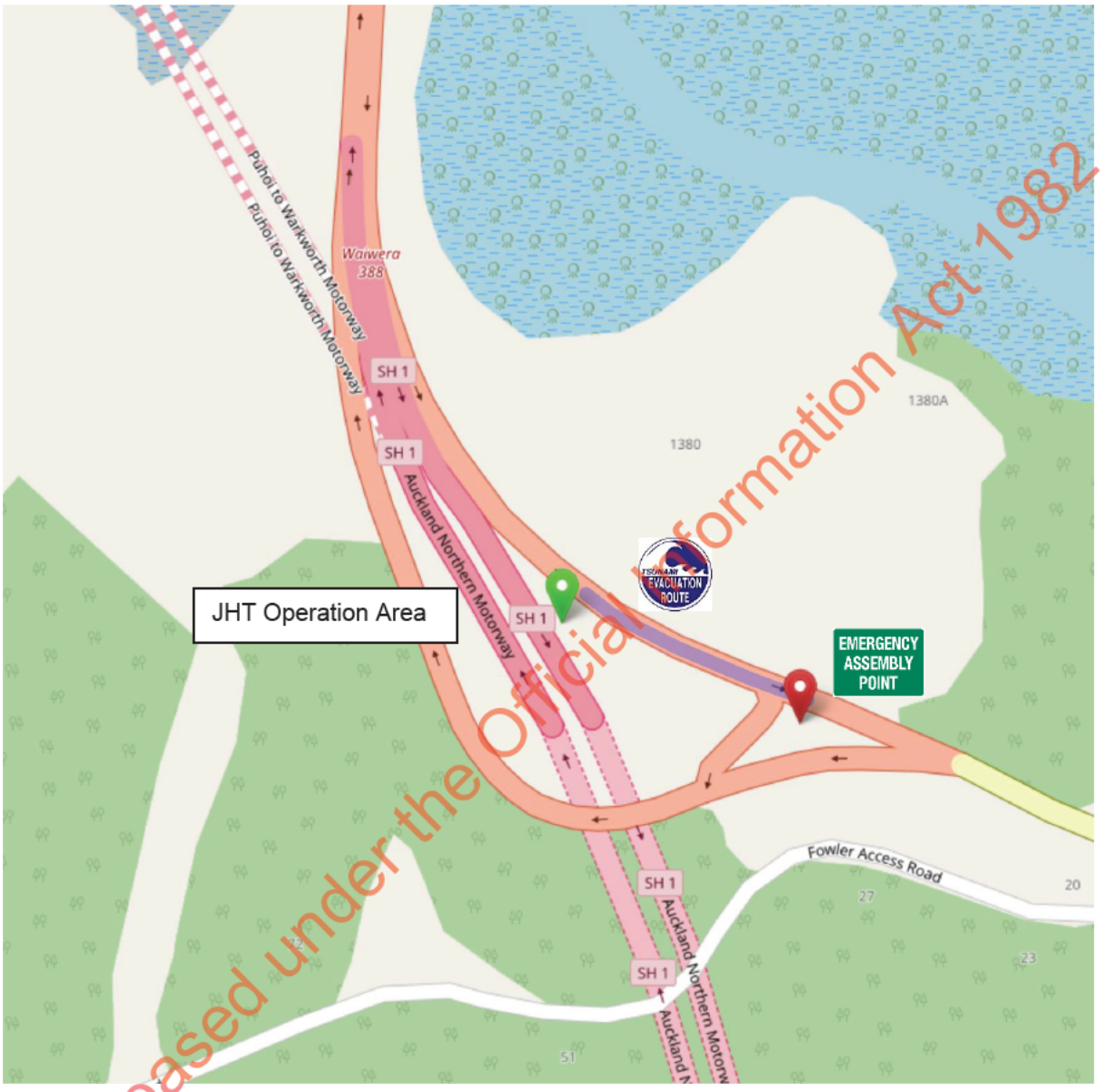


Tsunami Evacuation Plan for Reliable Way Office and Yard at Mt. Wellington

Generally, no evacuation action required.

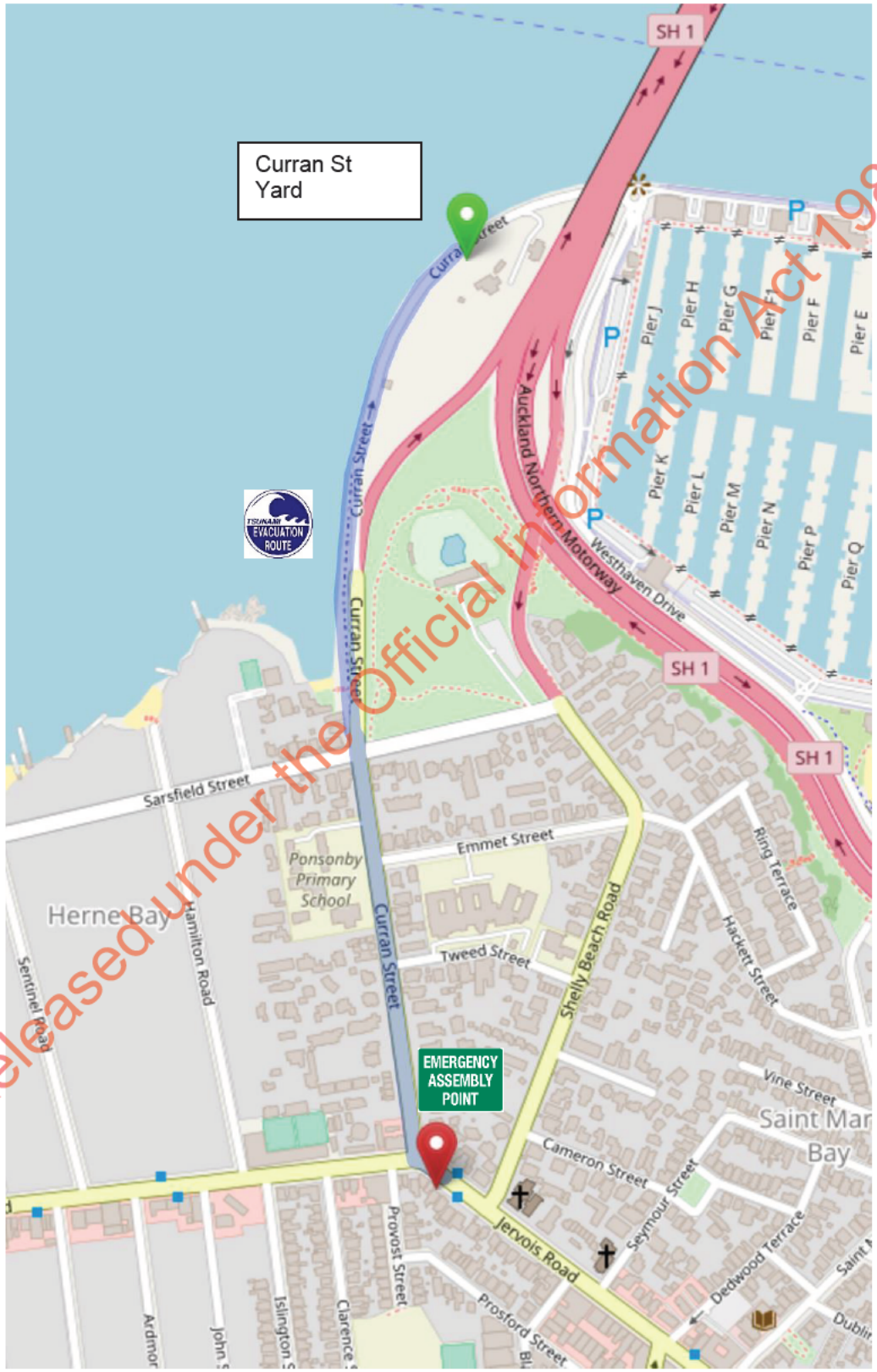
Tsunami Evacuation Plan for Johnstone Hill Tunnel Operation Area, Puhoi

Upon confirmed severe tsunami warning, evacuate **on foot**, follow the route shown on the map below.



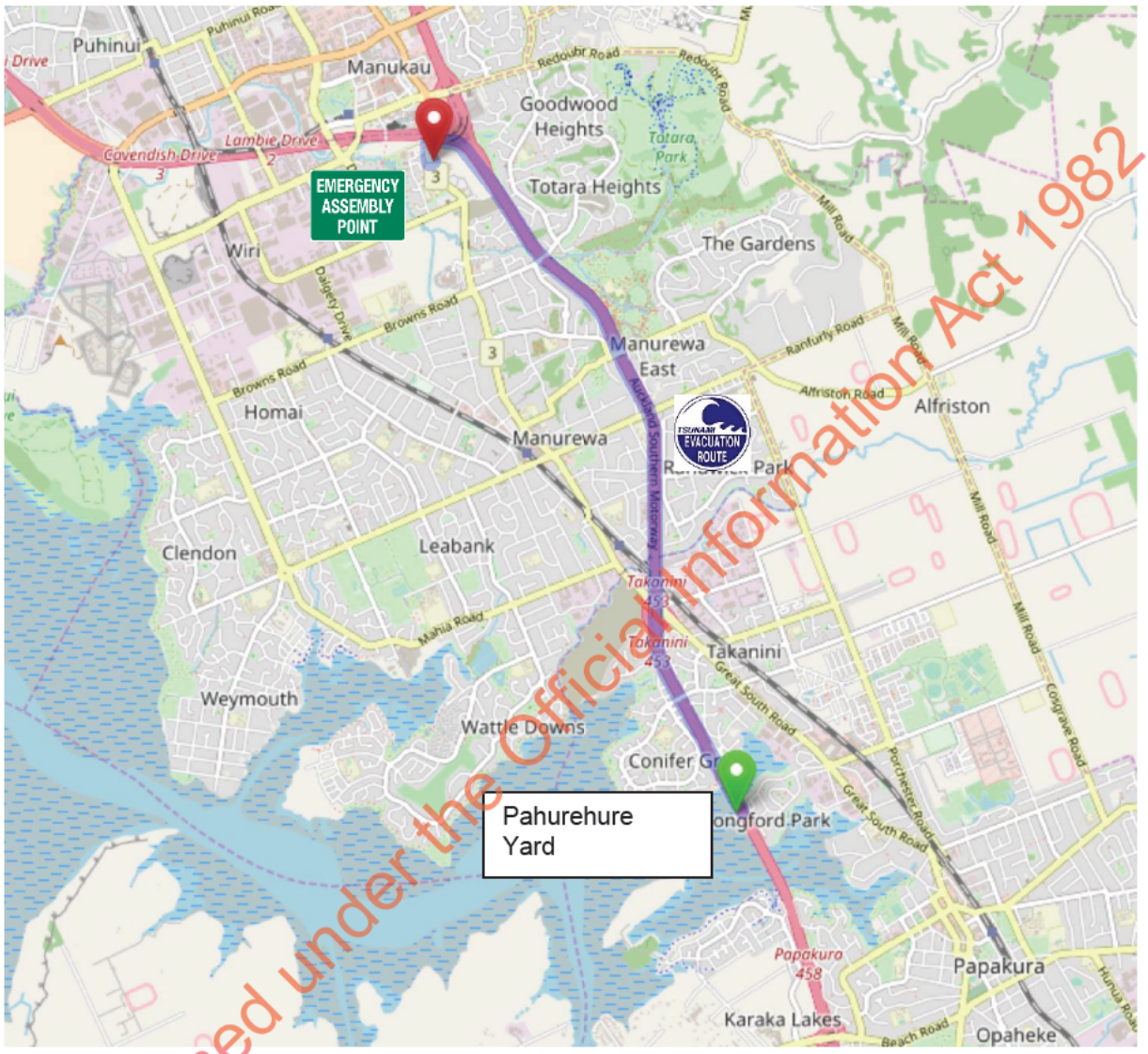
Tsunami Evacuation Plan for Curran Street Yard, Westhaven

Upon confirmed severe tsunami warning, **evacuate on foot,** follow the route shown on the map below.



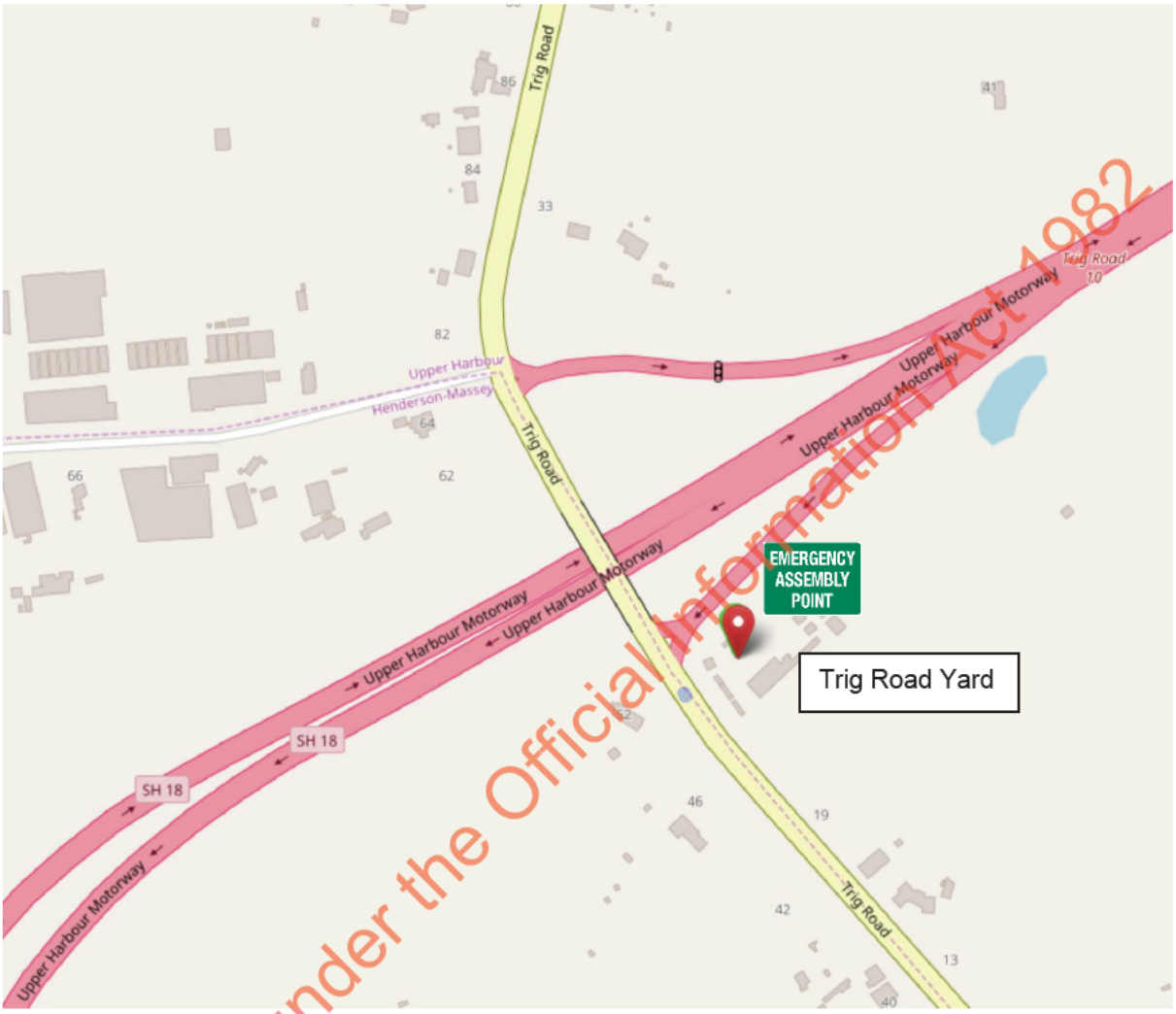
Tsunami Evacuation Plan for Pahurehure Yard, Takanini

Upon confirmed severe tsunami warning, evacuate using your vehicle, follow the route shown on the map below.



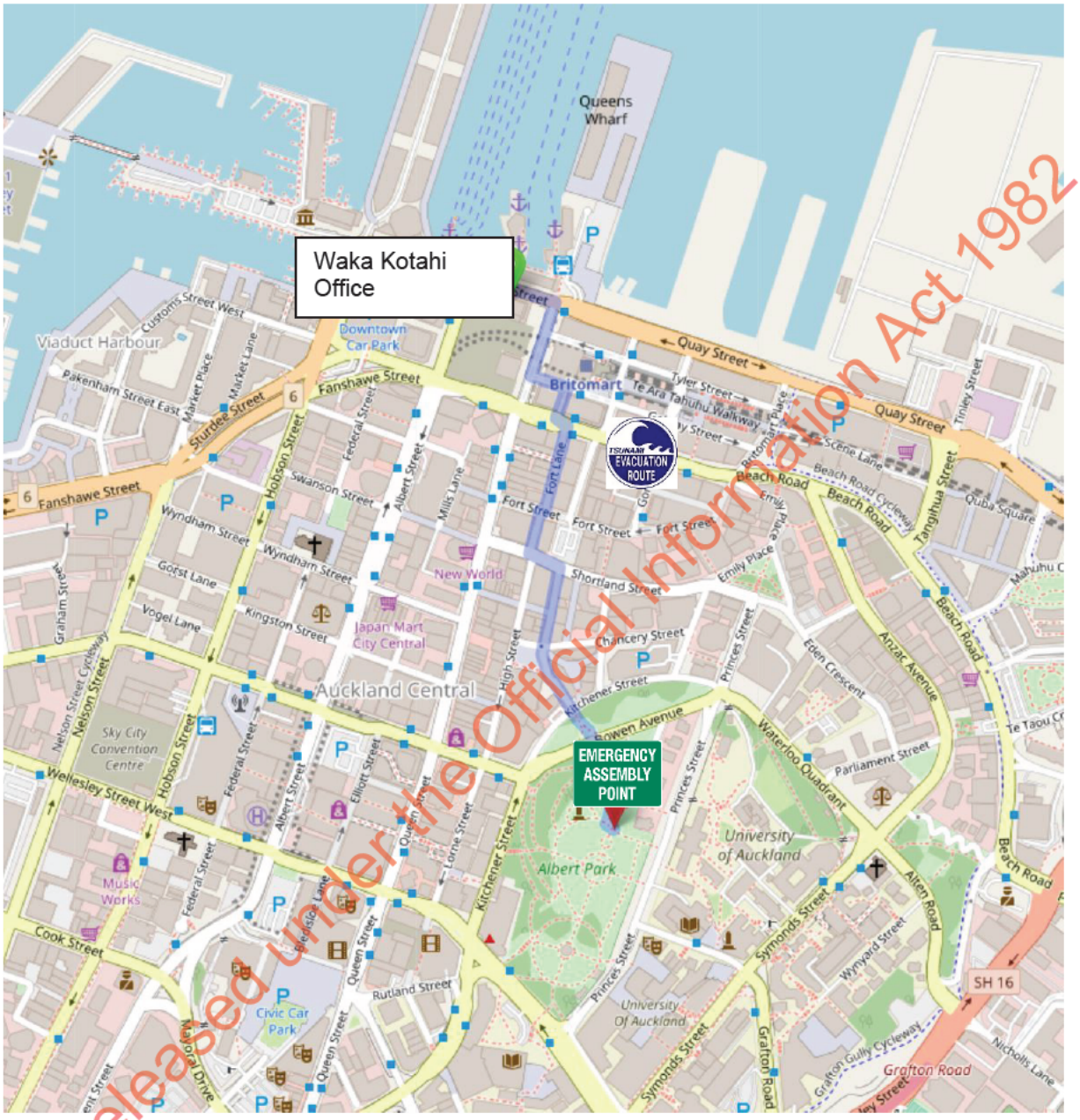
Tsunami Evacuation Plan for Trig Road Yard, Whenuapai

Generally, no evacuation action required.



Tsunami Evacuation Plan for Waka Kotahi Office on Queen Street, Auckland City

Upon confirmed severe tsunami warning, evacuate on foot, follow the route shown on the map below.



Tsunami Evacuation Plan for ATOC, Smales Farm, Takapuna

Upon confirmed severe tsunami warning, evacuate using your vehicle or on foot, follow the route shown on the map below.

G4. Volcanic Eruption

The effects of a volcanic eruption on the motorway network are likely to be:

- Poisonous gases, molten lava and flying rock
- Dense cloud and water vapour
- Ash deposit on pavements and structures; and
- Structural damage to bridges in the lava flow path.

In the event of volcanic eruption in Auckland a civil defence emergency will be declared. It is likely that the motorway will be closed to non-emergency vehicles, however at some point even the emergency vehicles may not be able to operate due to the conditions described below.

An extract from the article prepared by Geological & Nuclear Sciences Ltd (GNS) includes the following advice which should be considered by Network Operators when preparing Emergency Procedures:

"Airfall tephra can hinder visibility or cause complete darkness. Ash is very abrasive and can penetrate into electrical and motor parts causing damage to machinery and immobilising vehicles. Ash can conduct electricity causing lightning strikes or inducing short circuits in radio and telephone communication systems and in electricity supplies. Even small thicknesses of ash can cause severe damage to vegetation and affect breathing of humans and animals. Airfall tephra can contribute to erosion problems. Its removal with water can clog up drainage systems which can cause flooding. Wet ash is heavier than dry ash, so rain-soaked ash from phreatomagmatic activity has a greater potential to cause destruction through burial and often causes roofs to collapse. During an eruption airfall tephra needs to be moved from roofs and roads and stockpiled. Adequate protective clothing and personal respiratory protective devices will be required by people involved in clean-up operations close to the vent. Extra oil and air filters will be required by vehicles within ash fallout zones. There is likely to be problems with energy and water services."

The deposition of ash on the Auckland Harbour Bridge is an extreme concern due to overloading of the bridge. The AHB Structural Engineer advises that the load limit is **180mm of wet volcanic ash**, without vehicles; with an intervention level of 100mm of wet ash, the point where we need to mobilise plant to clear the deck.

Information included in several related reports including *Volcanic Impact Assessment for the Auckland Volcanic Field* (Johnston et al 1997) indicates that if a volcanic eruption occurs within 3km of the AHB then the bridge will be severely structurally damaged and ash build up would be a relatively small issue, however if the eruption occurs between 3km and 15km then the expected ash fall would be >10mm up to 100mm as a conservative estimate.

When mobilising a response to clear the AHB and the motorways for emergency vehicles post volcanic event, consideration needs to be given to the safety of personnel and operation of plant that will not damage assets, particularly with regard to:

- Personnel - operators with appropriate PPE and breathing apparatus; and
- Structural loading on the bridge decks; and
- Plant - graders and loaders are to have their cutting edges removed and replaced with soft edges so that road surfaces are not damaged; plant will be required additional air filters and engine protection to allow working under these extreme conditions. ASM has investigated purchasing a set of 4 soft blade edges for graders and loaders. These were proposed to be stored at a suitable accessible location for this type of event. Unfortunately, there is no appetite within the Agency for ownership of costs for this at present.

ASM Incident Response Crews

- Follow instructions from ATOC-Smales / Civil Defence
- Clearing ash from the AHB will have priority over the motorway and other structures
- Clearing ash from extension bridges will have priority over clearing ash from the truss bridge
- Ash will be cleared from the bridge deck and deposited into the Harbour with consideration of boats and property below the AHB
- Inspect motorway network, assess damage and report to ATOC-Smales / ASM Incident Controller

- Undertake temporary repairs to damaged bridges and roads to allow limited emergency vehicle use
- Identify sites for dumping ash removed from roadway
- Undertake ash, rock and debris removal once poisonous gases have dissipated; and
- Resources – refer to Logistics Plan for list of resources and contact information.

G5. Seismic Activity

In the event of seismic activity (i.e., an earthquake) a civil defence emergency may be declared.

The effects of seismic activity on the motorway network are likely to be:

- Damage to structural assets, pavements, underground services, etc.
- Liquefaction; and
- Slope failures.

ASM Incident Response Crews

- Follow instructions from ATOC-Smales / Civil Defence
- Inspect motorway network, assess damage and report to ATOC-Smales / ASM Incident Controller; and
- Undertake temporary repairs to damaged bridges and pavements to allow limited emergency vehicle use

G6. Bomb Threat or Blast

- Install traffic management as instructed by ATOC / Police / FENZ
- Implement appropriate emergency detour
- Drive detour route and ensure adequate signage and clear directions
- Inspect motorway network, assess damage and report to ATOC

G7. Bridge Strike / Structural Damage Incidents

Bridge strike incidents from over-height vehicles should follow a certain procedure.

The ASM Duty Engineer is responsible for ensuring:

- Immediately describe incident and seek advice from on-call structural engineer (Contact details found in Appendix H, Section B); deploy if appropriate
- Determine whether the bridge will need to be closed with guidance from ASM Structural Engineer, this will require additional TTM/temporary signage
- Set up IMT depending on severity of the incident
- Determine where the over-height vehicle can be left to rest or be taken off the State highway/motorway network
- Liaise with Structural Engineer and determine whether over-height equipment for inspection will be required and deploy
- Ensure any other equipment required for road restoration has been requested
- Assist police in decision making for removal of over-height vehicle
- Road restoration to safe standards

The ASM Bridge Engineer is responsible for:

- Visiting the site and determining if the bridge's structural integrity has been compromised
- Determining potential reduction in structural integrity of the bridge structure and whether a closure of weight limit is to be implemented
- Liaising with the Structures Delivery team to assess repair options and plan for remediation.

G8. Incidents requiring the need for temporary Bailey Bridges

Bailey Bridging is administered on behalf of all road controlling authorities by the State Highway Operations Manager, Waka Kotahi Head Office who shall be advised of all cases where Bailey Bridging is required. The

Bailey Bridge Contractor, Hooked on Rigging, manages the storage and maintenance of Bailey Bridge components.

Temporary Bailey Bridges will be utilised wherever necessary to expedite the reopening of the highway to traffic. The ASM and ATOC-Smales are responsible for managing and overseeing all emergency works in relation to the reopening of the State Highway after closure. However, where the closure is due to a bridge collapse or pavement dropout, and a Bailey Bridge is the favoured solution, the ASM Structures Engineers will manage the design and construction of the bridge.

The ASM shall respond immediately to such requirement and assign such work the highest priority for as long as it takes to reopen the highway and establish an appropriate maintenance/monitoring regime.

The ASM Bridge Engineer is responsible for:

- Immediately visiting the site and determining if a Bailey Bridge is the correct solution
- Determining the length and type of Bailey Bridge required
- Liaison with the Bailey Bridge Contractor
- Preparation of the technical design for the erection of the Bailey Bridge
- Identifying the need for any additional geotechnical testing
- Preparation of the design for specialist foundation needs (if these foundations are required)
- Preparation of specifications for the Bailey Bridge components and to co-ordinate their dispatch to site
- Personally, supervising the construction
- Ongoing monitoring of the Bailey Bridge whilst on site
- Management of Bailey Bridge stocks in storage; and
- Liaising at all times with the Transport Agency Auckland office and to report regularly on progress.

The ASM Incident Response Crews are responsible for:

- The traffic management and communications
- Transporting the Bailey Bridge components to and from site
- The preparation of foundations and bridge approaches for the Bailey Bridge structure; and
- Assisting the Bailey Bridge Contractor in the erection and dismantling of the bridge

The Incident Response Crews shall have access to at least 2 personnel experienced in the erection and dismantling of Bailey Bridges.

G9. Hazardous Substance Spill

Hazardous substance spills can create a unique set of problems that need to be overcome before a road can be reopened to traffic.

- The substance may require special clean up procedures and protective clothing for recovery crews, e.g. sulphuric acid
- Noxious gases given off from a spilled chemical requires the evacuation of a large area (not just the immediate incident site) e.g., ammonia.
- The substance may have entered the drainage network or natural watercourse; and
- The road surface may require special treatment after the substance has been removed e.g. repair surface following a diesel spill, captive water blaster to remove substance embedded in the surface.

In most instances, ATOC would have advised the Emergency Services of the nature of the event, however as soon as the First Responders become aware of the hazardous substance they should confirm with ATOC that the FENZ Hazardous Response Unit has been mobilised to the incident site, then:.

- Install traffic management as instructed by ATOC / Police / FENZ
- Implement appropriate emergency detour; drive detour route and ensure adequate signage and clear directions are provided
- Inspect motorway network, assess damage and report to ATOC

Hazardous Substance Spill on SH16 Grafton Gully (SQID)

In the event of a significant hazardous substance spill within the SH16 Grafton Gully area the substance would be expected to flow into the Storm Water Quality Improvement Device (SQID) tank located on SH16 in Grafton Gully, immediately west of the front of the ASB Tennis Centre. A photo of the SQID is shown to the right	

The following procedure is to be followed in the event of a hazardous substance spill in Grafton Gully.

- Contact NZ Fire Service on 111 and ask for Hazardous Unit - The Fire Service hazardous response team will mobilise to site and contain the spill, noting their responsibility is containment only
- Contact ATOC-Smales who will advise Police, Waka Kotahi's Remote Incident Manager, and the ASM Duty Engineer
- Secure Area - Secure perimeter to prevent unauthorised access to immediate vicinity of tank; and
- Contact the Auckland Council Pollution Hotline on 09 377 3107 - The Council is responsible for managing and coordinating the secondary response relating to collection, disposal and any remedial works.
- At any point in time:
    - Do not enter any confined space without a permit
    - Keep open flames and other ignition sources well clear of the area; and
    - Monitor Air Quality.

Utility Service Failure

(Electricity, Gas, Water, Communications)

- Follow instructions from TOC / RCA

Wandering Stock

- Notify TOC and request Council Animal Management to respond to site to secure the animals and if possible, return them to their rightful owner or arrange for transportation of the animals to a save holding place.
- Repair damage to fences and removed excrement from road surface.

Vehicle or Property Fire impacting road or bridge

There are a range of fires that may impact traffic flows on the road network:

- Vehicle fire with or without hazardous substance
- Property fire (on adjoining land) which necessitates lane closures or diversions
- Vehicle fire on bridge where there is potential for structural damage (explosion or excessive heat melting steel members, bitumen surface, or causing spalling / cracking of concrete)

Incident response crews are required to install traffic management as instructed by TOC / Police / FENZ

G10. Cyclone and/or Tornado causing major flooding and/or damage

The decision to close parts of the motorway due to a cyclone will be made by either the Transport Agency's Network Operations Manager and / or the Motorway Police Sergeant after receiving advice from their staff or if a section of the network has been deemed impassable to vehicles.

The effects of a cyclone on the motorway network are likely to be:

- High winds on exposed bridges Waiwera Bridge, Auckland Harbour Bridge, Newmarket Viaduct, Upper Harbour Crossing, and Mangere Bridge)
- Flooding due to excessive rainfall and constricted drainage features (blocked cesspits, restricted water courses)
- Tidal inundation (refer to Tidal Inundation Procedures)
- Wind-blown debris, trees blown over
- Slips above and below roadway; and
- Closure of other AT roads, leading to irregular traffic flows and movements.

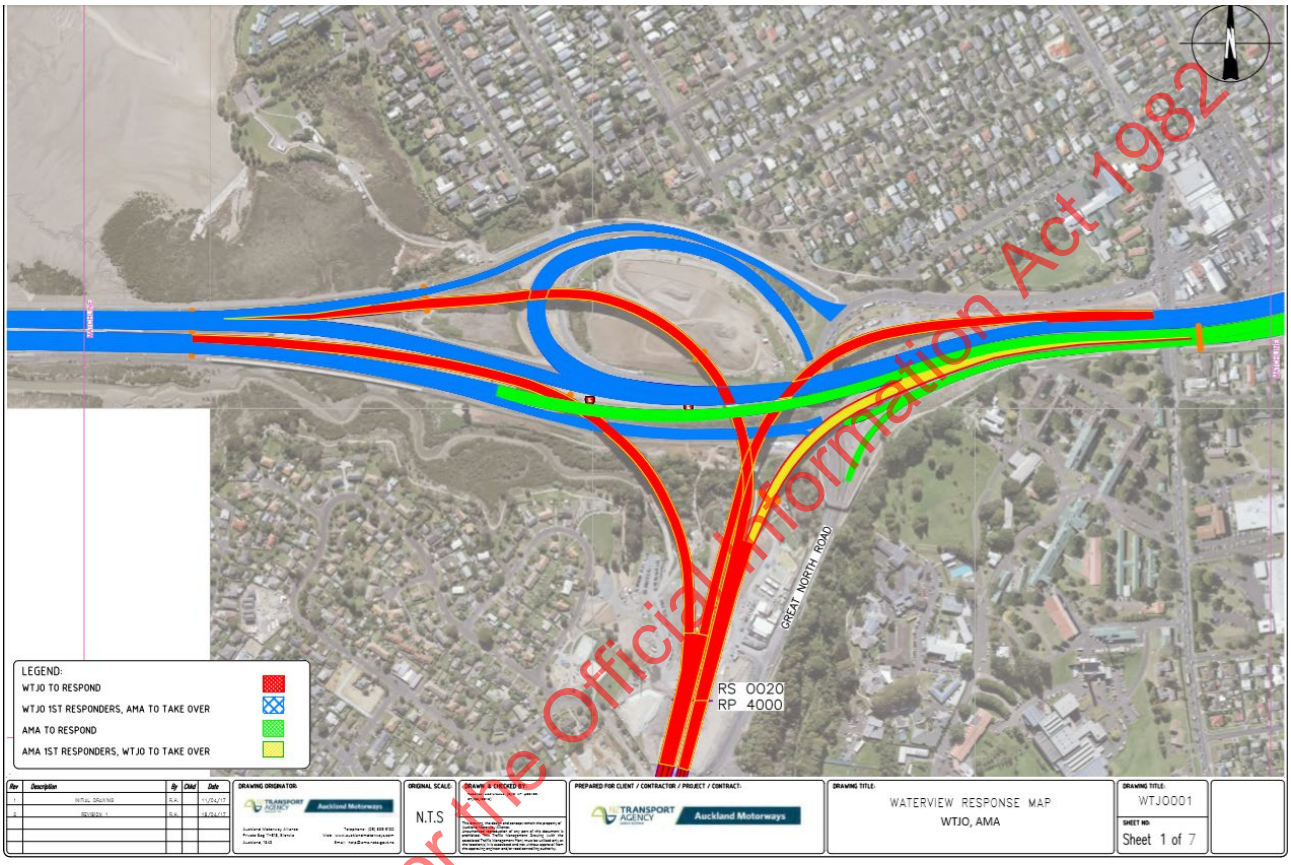
ASM Incident Response Crews:

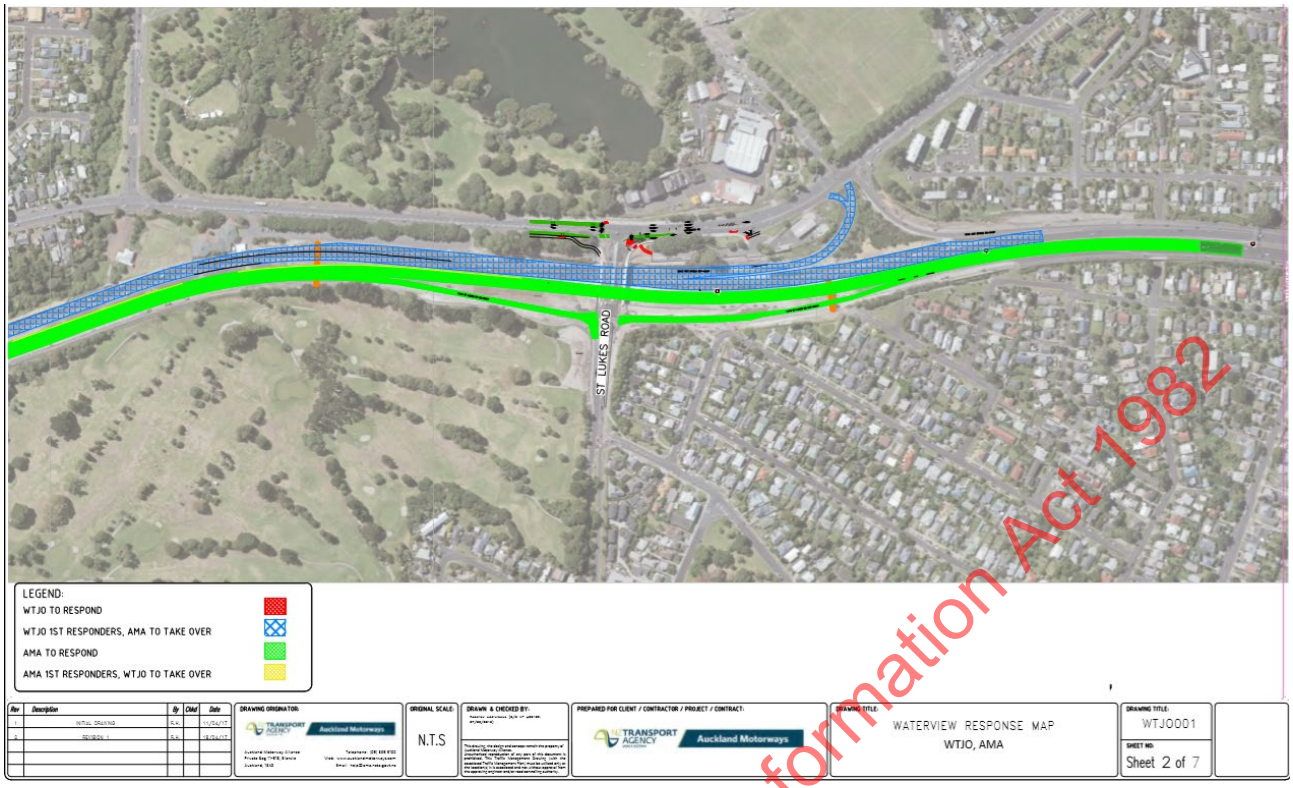
- Visit each site (if it is safe to do so), assess damage and report to ASM Incident Controller, ATOC-Smales, and RIM as appropriate
- Provide slip assessment from geotechnical engineer at each slip site
- Relieve Police and if required put in place a permanent closure
- Liaise with ATOC-Smales and implement appropriate emergency detours
- Establish detour route signage, and drive detour route to check it is clear of obstructions
- Search for and clear constricted drainage features
- Remove debris after water has receded
- Remove wind-blown debris and trees that have been blown over; and
- Undertake temporary repairs to assets as instructed by the ASM Incident Controller, ATOC-Smales.

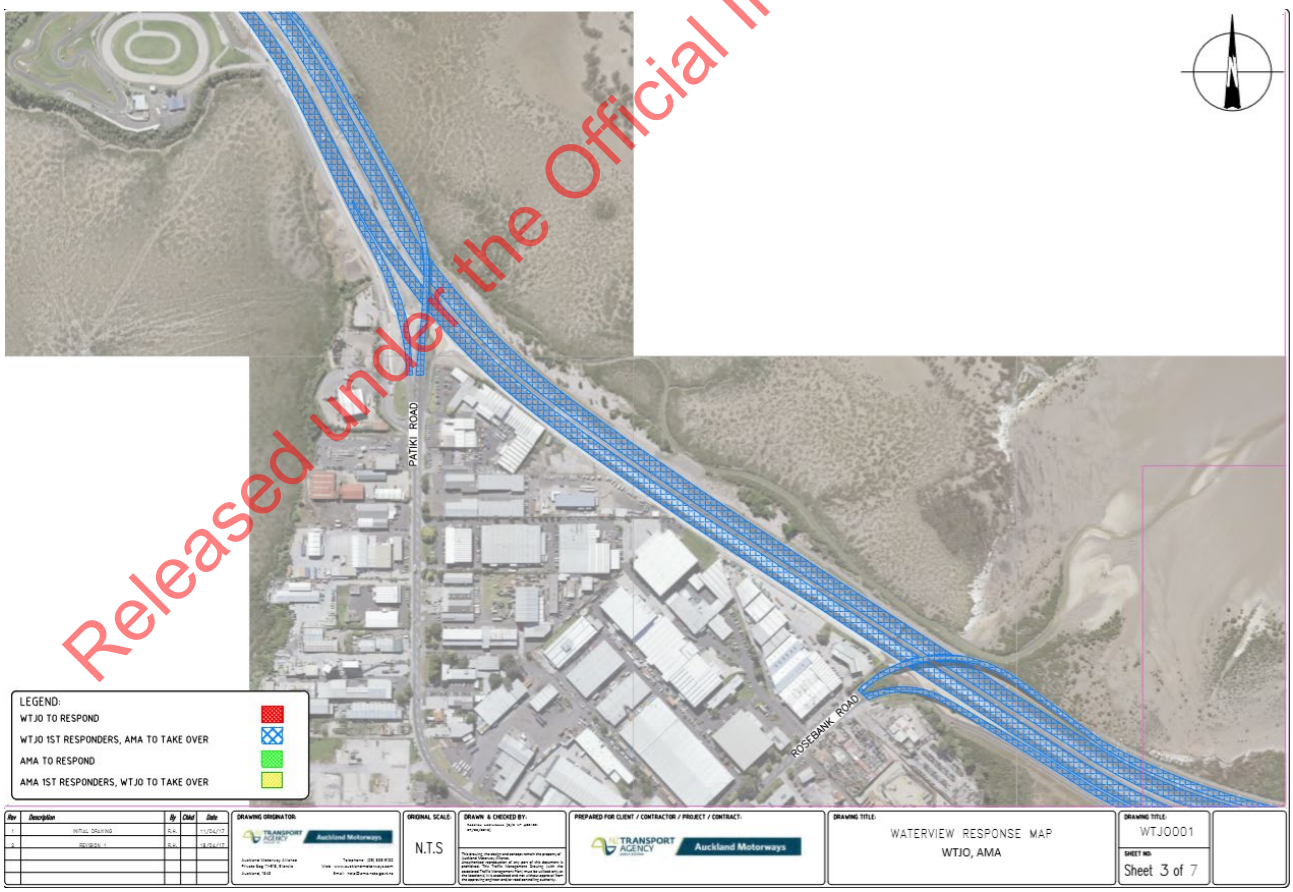
G11. Incidents at Waterview Tunnel

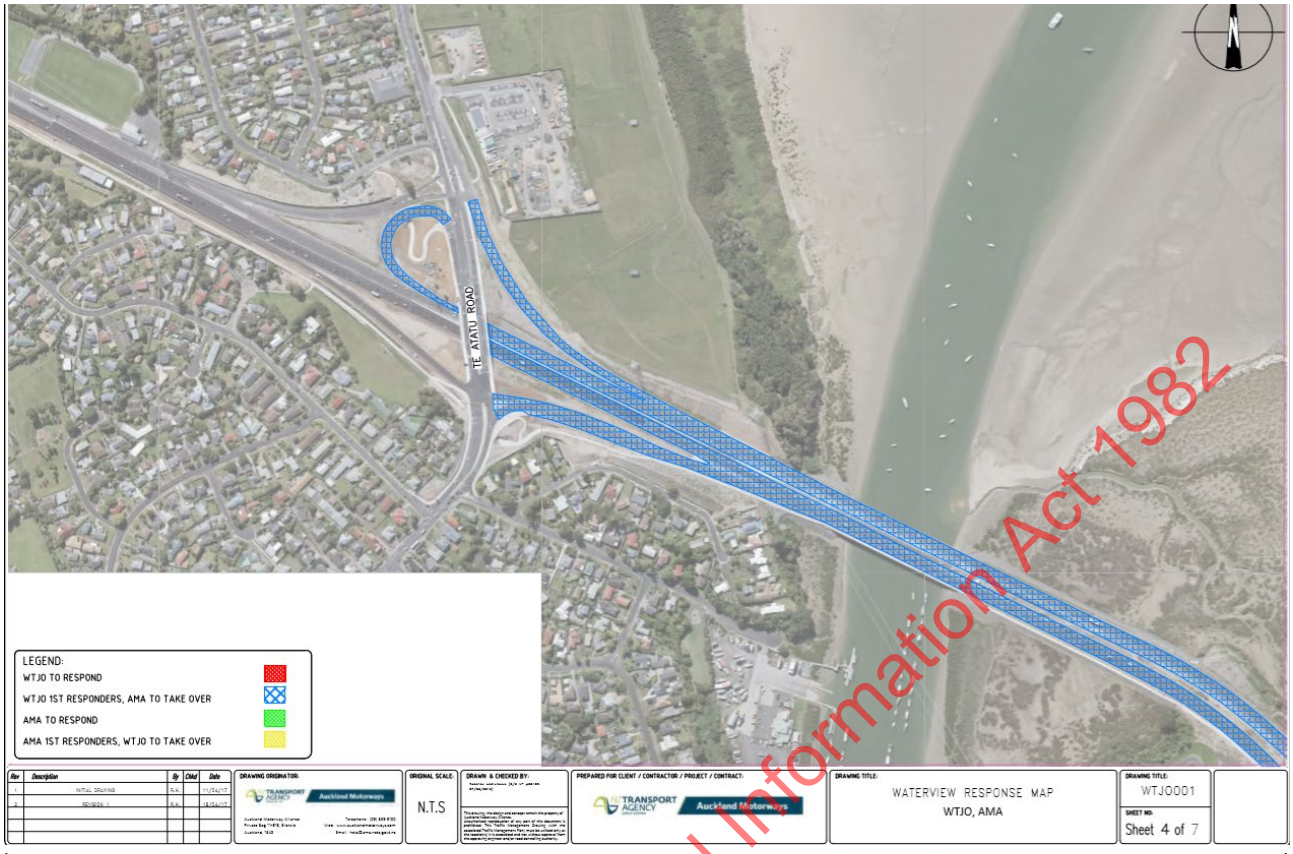
For incidents in the vicinity of Waterview Tunnel, please refer to response maps below:

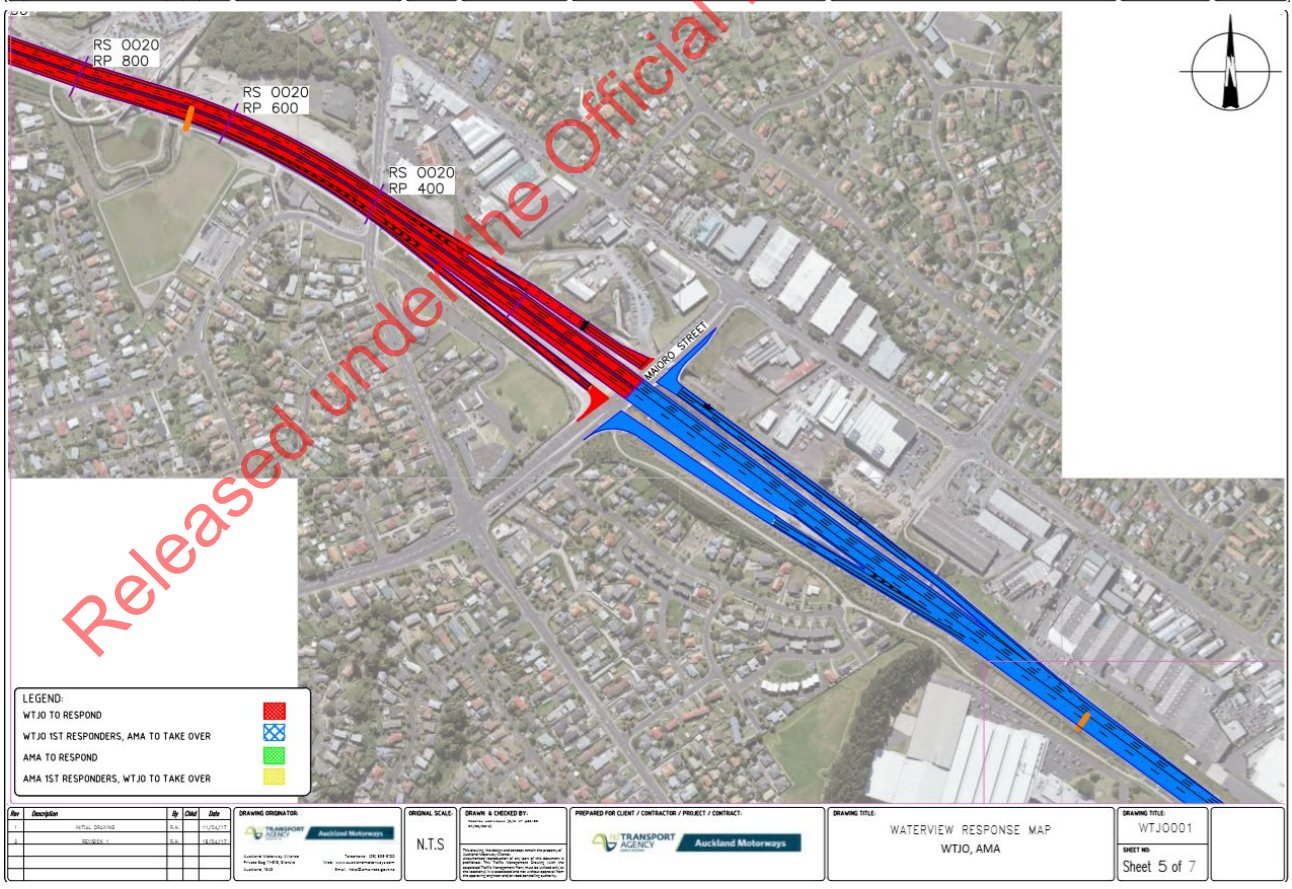
Although assets in the marked areas belong to WTJO, in some instances, ASM are the sub-contractor for works on these. For any clarification regarding incidents or assets in these areas, contact the Transport Technology and Tunnels Delivery Manager.

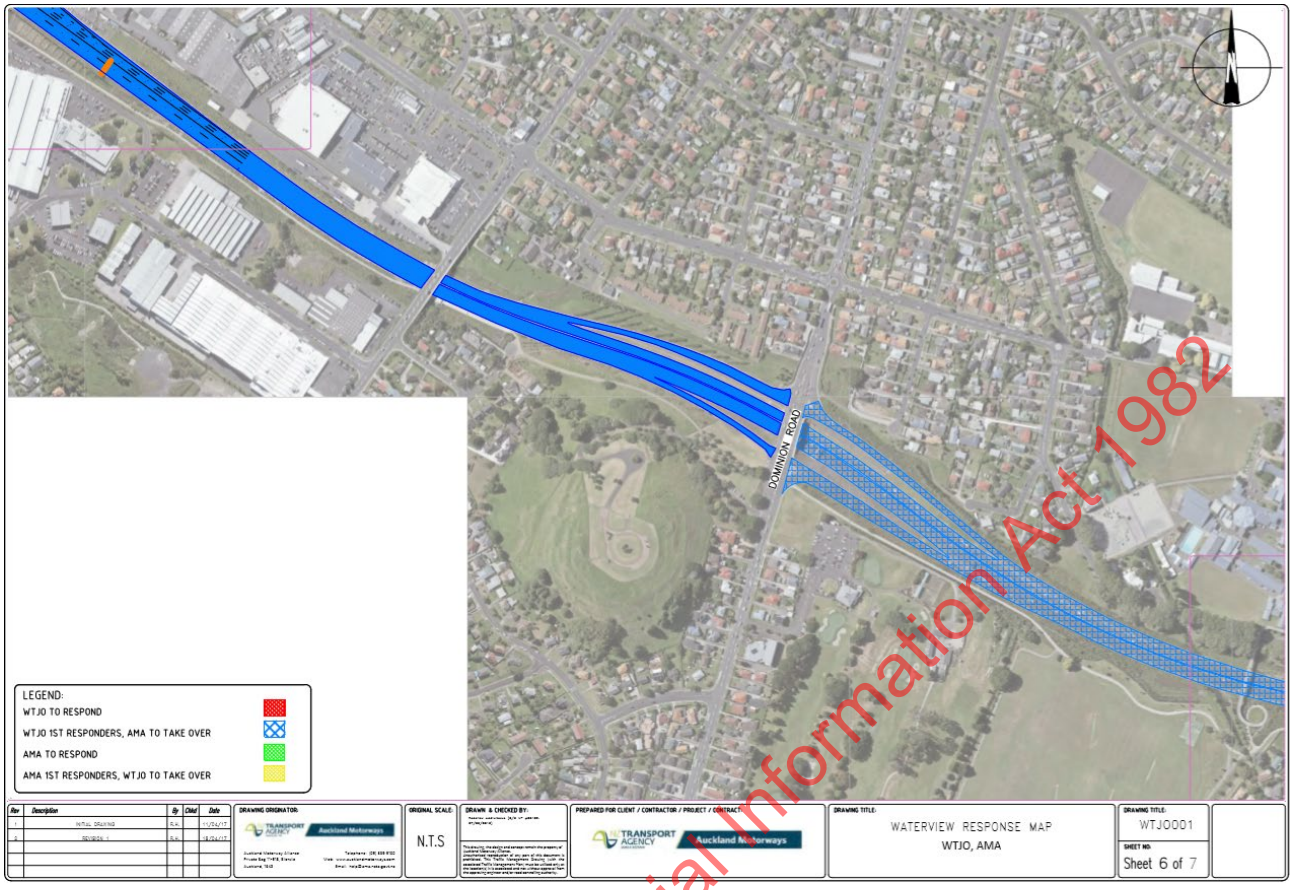


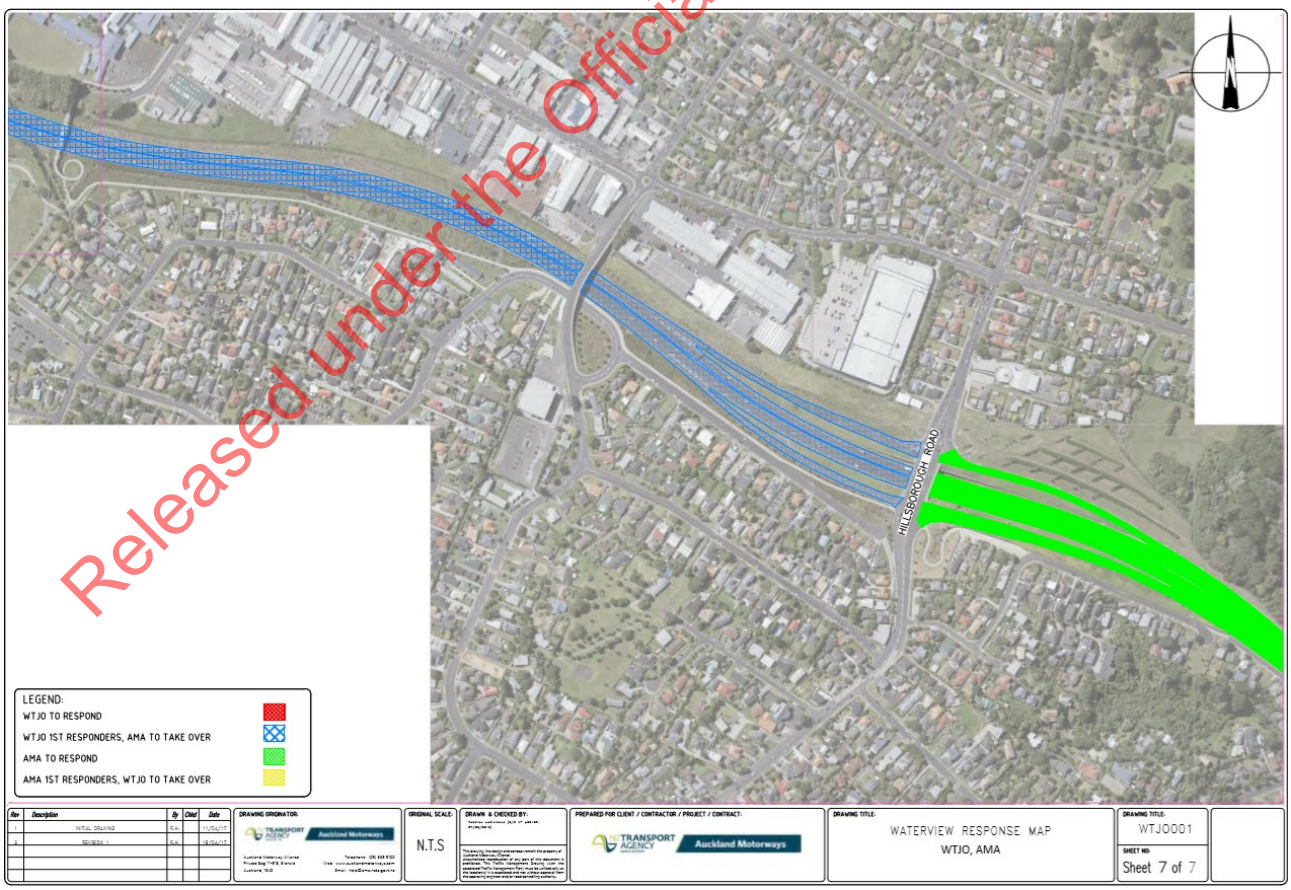












The WTJO network (Areas shown in **Red** and Yellow on map):

- The Waterview Tunnel (both directions)
- SH20 Maioro St On Ramp north bound
- SH20 Maioro St Off Ramp south bound
- SH20 Maioro St interchange to the Tunnel
- SH20 Tunnel to Maioro St interchange
- SH20 to SH16 west and east bound ramps
- SH16 west and east bound ramps to SH20

RED ZONE

The Waterview Tunnel Joint Operations incident response team shall be 1st Call by ATOC for any incident.

ASM to be on Standby/Alert and may be requested by WTJO to also provide assistance.

ATOC to notify ASM crews of any level 3 incidents

YELLOW ZONE

The ASM incident response team shall be 1st Call by ATOC for any incident if deployed from the CMJ zone.

ASM to handover lead operator to be WTJO when WTJO arrive onsite. ASM to be on Standby/Alert and may be requested by WTJO

GREEN ZONE

The ASM incident response team shall be 1st Call by ATOC for any incident.

WTJO to be on Standby/Alert and may be requested by ASM to also provide assistance.

ATOC to notify WTJO crews of an incident rated level 3, 4 or 5

BLUE ZONE

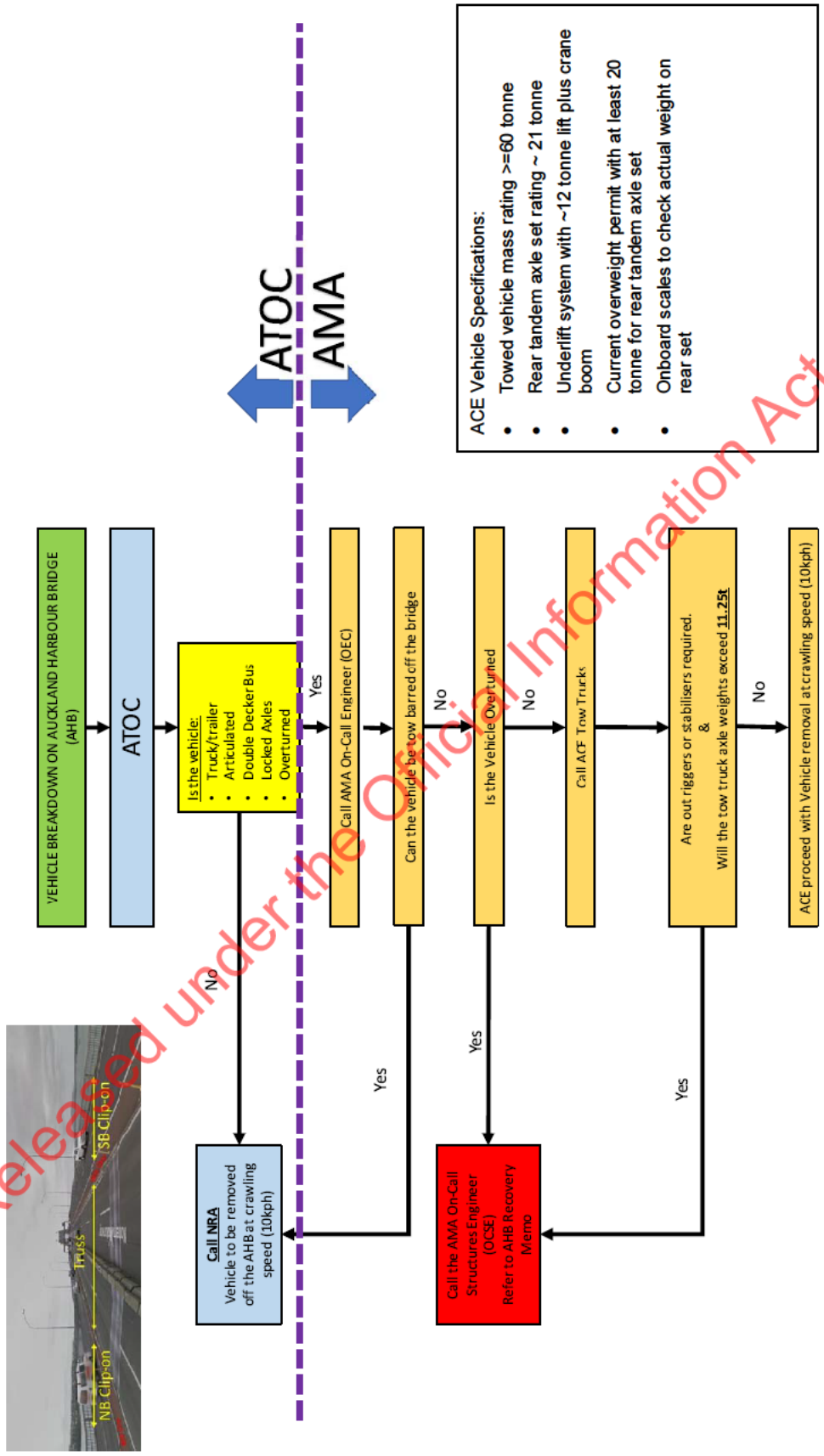
ATOC to confirm on Eroad (GPS) who is closest.

- WTJO 1st Call when:
  - Incident likely to affect the Tunnel Operation and Safety
  - WTJO
- ASM 1st Call when:
  - Incident not likely to cause an effect on the Tunnel
  - ASM crew is closer to the incident site than WTJO
  - WTJO to be on Standby/Alert and may be requested by ASM.

Blue Hashed ZONE

Estimated affected area during Peak hour, same guidelines as above.

G12. Breakdowns on Auckland Harbour Bridge



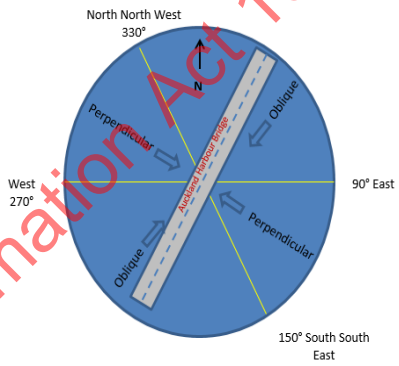
G13. Serious Incidents requiring closure of the Auckland Harbour Bridge

TOC closure recommendations

TOC-QUI-002 Auckland Harbour Bridge: High Winds Response

Select predefined DYNAC plan from weather-related -> strong winds.

Wind Speed Perpendicular	Wind Speed Oblique	Incident Level	VMS beyond Bridge approaches			VMS Fanshawe, Onewa, Esmonde	LSU	Info. (TREIS, radio, twitter)
60-80 km/h gusting	60-80 km/h gusting	1	-	-	-	HARBOUR BRIDGE: WIND GUSTS TAKE EXTRA CARE	-	-
60-80 km/h average	60-80 km/h average	2	-	Stanley Western Springs Newmarket Wairau	HARBOUR BRIDGE: MOTORCYCLES TAKE EXTRA CARE	HARBOUR BRIDGE: STRONG WIND GUSTS TAKE EXTRA CARE	70	Warn motorcyclists
80-90 km/h average	80-100 km/h average		Type D's: CBD North Shore		HARBOUR BRIDGE: MOTORCYCLES TAKE EXTRA CARE HARBOUR BRIDGE: HIGH VEHICLES TAKE EXTRA CARE	HARBOUR BRIDGE: SEVERE WIND GUSTS OBEY SPEED SIGNS	50	Publicise wind warning and warn HMVs
90-100 km/h average	100-110 km/h average	3			SEVERE WIND GUSTS MOTORCYCLISTS DETOUR VIA SH18, 16	HARBOUR BRIDGE: SEVERE WIND GUSTS OBEY SPEED SIGNS	30	As above
100-110 km/h average	110-120 km/h average				SEVERE WIND GUSTS HIGH VEHICLES DETOUR VIA SH18, 16		30 X 30 X Close Alternate Lanes	
110+ km/h	120+ km/h		above + Rosedale, Tauhinu, Sunnynook, Rosebank, Orams		HARBOUR BRIDGE CLOSED: DETOUR VIA SH18,16	HARBOUR BRIDGE CLOSED: DETOUR VIA SH18,16	X X X X Close ALL Lanes	Maximum publicity



Partial lane closures

The joint decision to close lanes on the AHB will be made by the Remote Incident Manager, the Transport Agency's Network Operations Manager and / or the Motorway Police Sergeant after receiving advice from their staff. Possible scenarios include:

- Trucks and motorcycles prohibited from eastern or western extensions (clip-ons)
- Alternate lanes closed
- AHB closed to all trucks and motorcycles
- Eastern or western extensions (clip-ons) closed
- Full closure of all lanes.

Full closure of the Auckland Harbour Bridge

The joint decision to restrict access or close the AHB will be made by either the Transport Agency's Network Operations Manager and / or the Motorway Police Sergeant after receiving advice from their staff.

Preparedness

High winds affecting the Auckland Harbour Bridge are usually predictable due to modern weather monitoring and forecasting technology and should be prepared for in advance due to the number of traffic management resources required. The following levels of alert should be used;

Green Alert	Resources identified and notified to be available if required.
Amber Alert	Resources identified, notified and standing by at central location (e.g. Reliable Way)
Red Alert	Resources identified, notified and standing by at holding point near station; able to effect closure within 2 minutes of activation.

Police

Will provide marked vehicle with active “Queues Ahead” warning sign at the tail of queues.

ASM Incident Response Crews

Follow instructions from ATOC-Smales / Police to install traffic management as per TMP below

- Close the following Southbound access points
    - Onewa Road southbound on ramp
    - Northern Motorway (adjacent Onewa Interchange)
    - Northern Motorway (Onewa southbound busway bridge)
        - Open up barrier near Northern MLB garage to allow southbound traffic to U turn into northbound lanes under Police (or AHB Crew) management
        - Direct and manage southbound traffic undertaking U turns into northbound lanes near northern MLB garage
- Close the following Northbound access points:
    - Curran Street on ramp
    - Fanshawe Street on ramp
    - Wellington Street on ramp; and
    - Westhaven Drive (if required); (not accounted for in below TMP)
    - Southern Motorway (adjacent to SH1NB-SH16WB Link)

- Establish portable VMS on Fanshawe Street warning of motorway closure.
    - If additional portable VMS are available, establish at Nelson Street off ramp
    - Implement appropriate emergency detours
    - Drive detour route and ensure adequate signage and clear directions; and
    - Have sweeper and sucker trucks on standby to remove debris from carriageways, before motorway is reopened, if required.

Suggested emergency TMP for closure of the Auckland Harbour Bridge can be found below.

AUCKLAND HARBOUR BRIDGE EMERGENCY TMP
SCENE 1 – THROTTLING TRAFFIC FLOW (SHEET 1–2)
SCENE 2 – FULL AHB CLOSURE (SHEET 1A, 2A, 3–11)

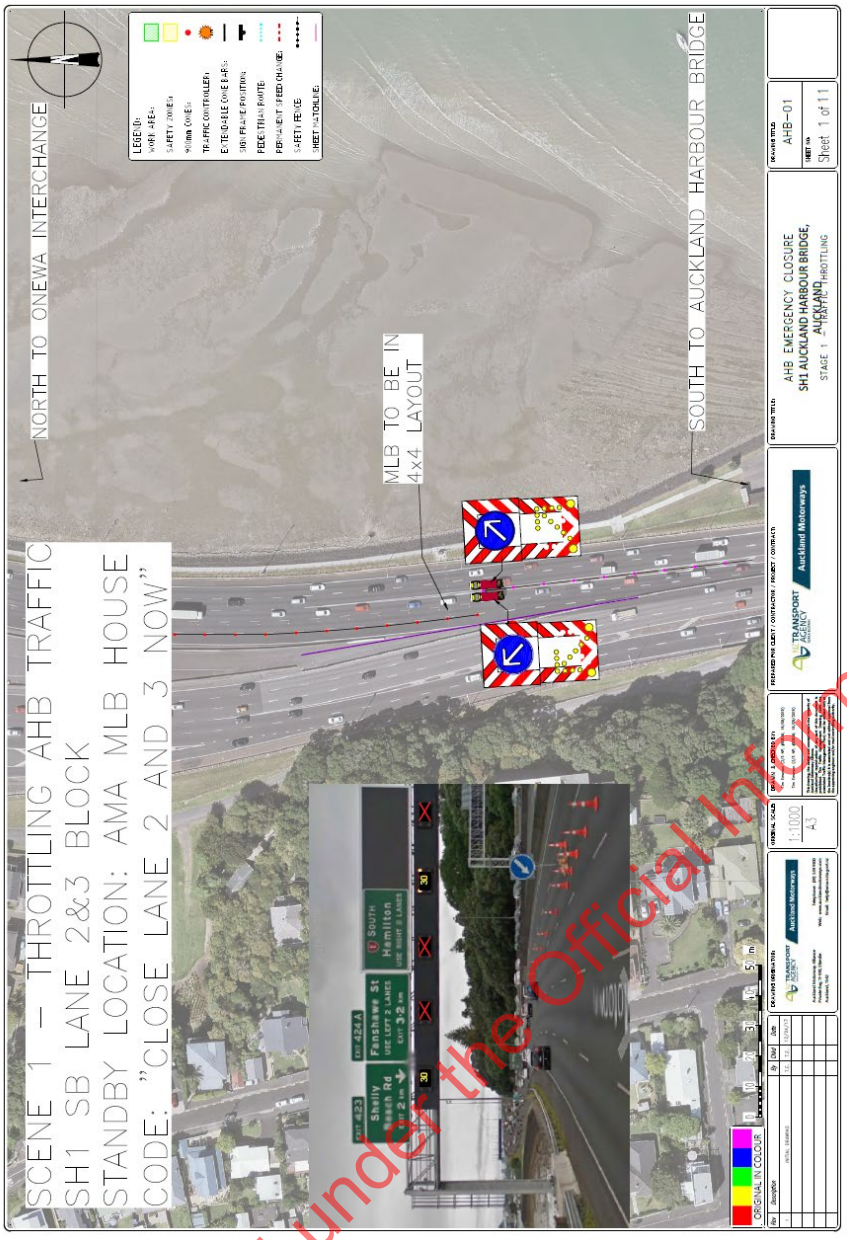
REQUIREMENT AS PER THIS TMP:
MINIMUM OF 14 TMAs AND 7 ADDITIONAL VEHICLES
(POLICE, STANDARD TRUCKS ENGINEERS VEHICLE, ETC.)

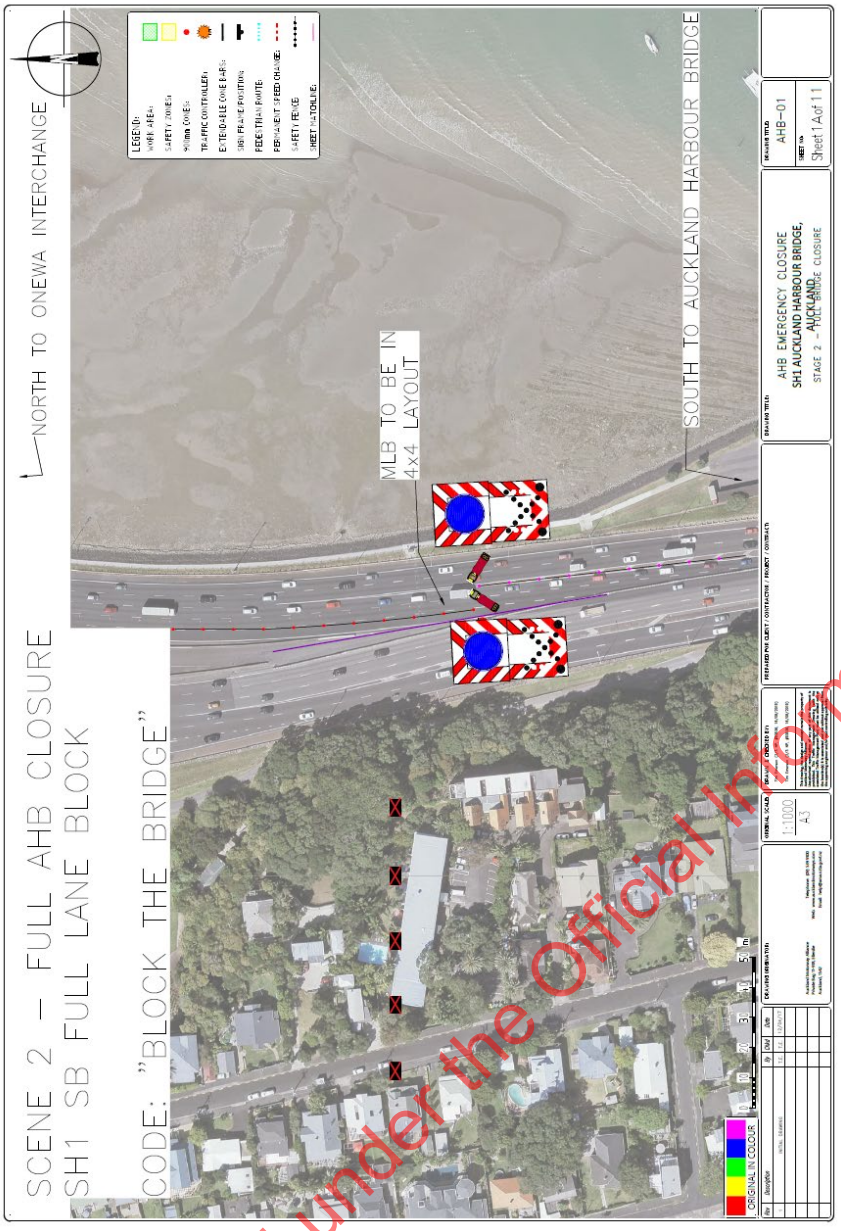
TMP ONLY TO BE USED UNDER NZTA DISCRETION
FOR ANY EMERGENCY SITUATION WHERE THE BRIDGE IS NOT
TO BE ACCESSIBLE

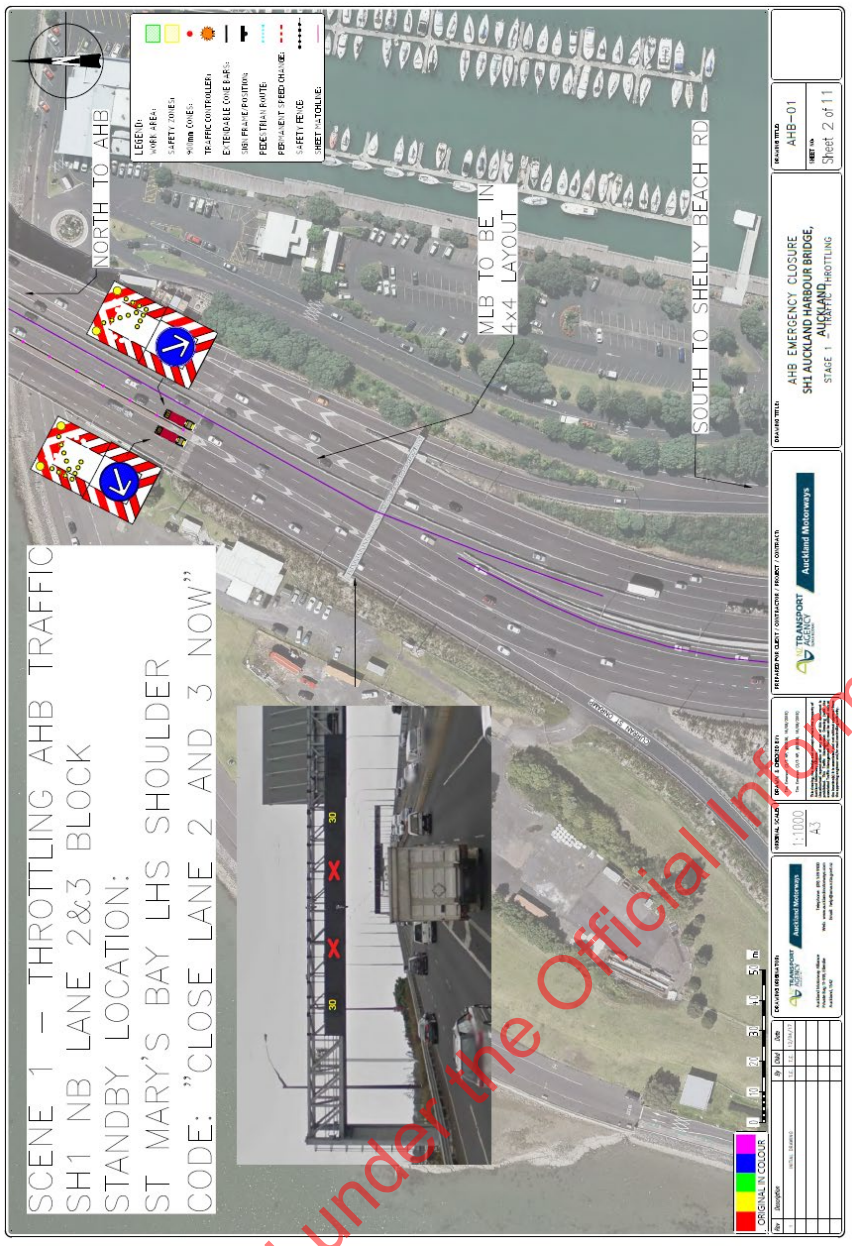
ALL UNIT MUST HAVE ACCESS TO AMA RT CHANNEL 16

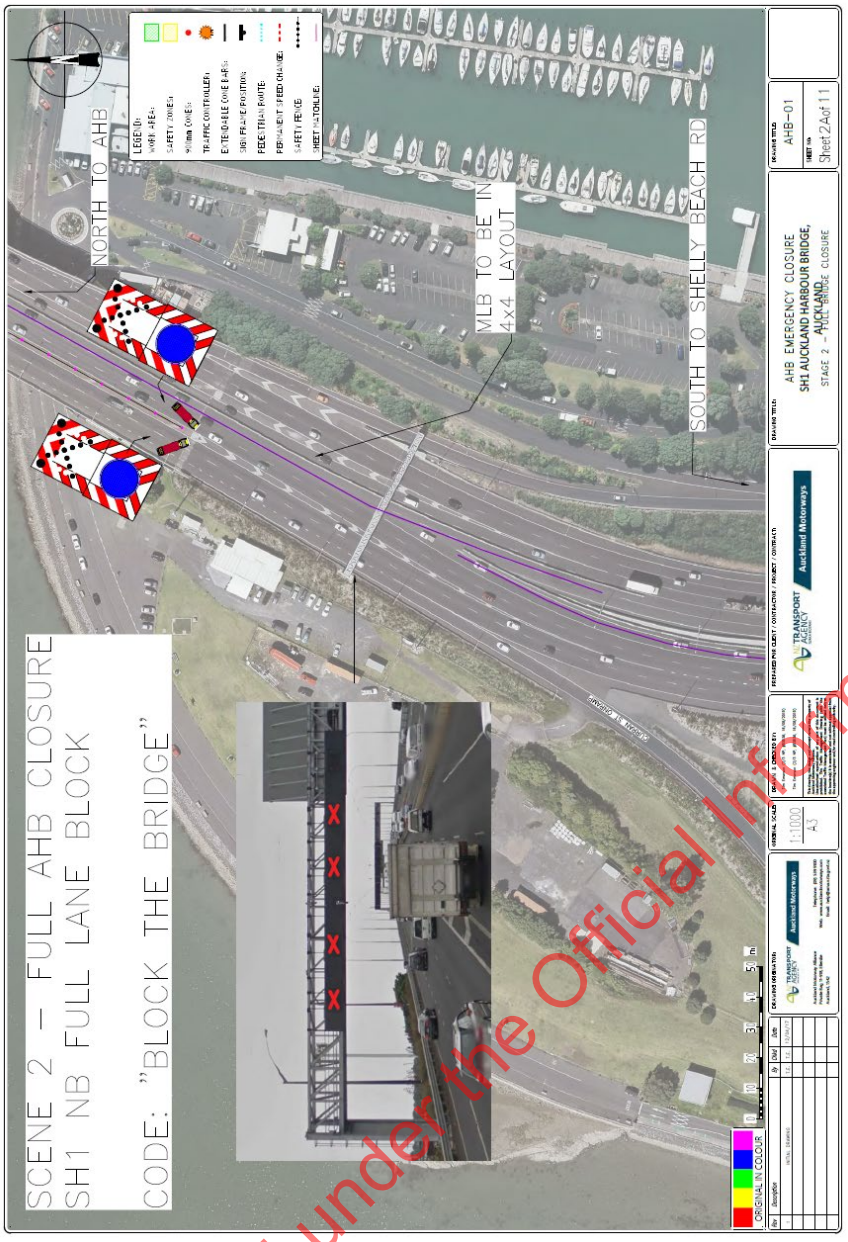
Rev	Description	By	Chkd	Date
1	INITIAL DRAWING	T.E.	T.E.	12/04/17

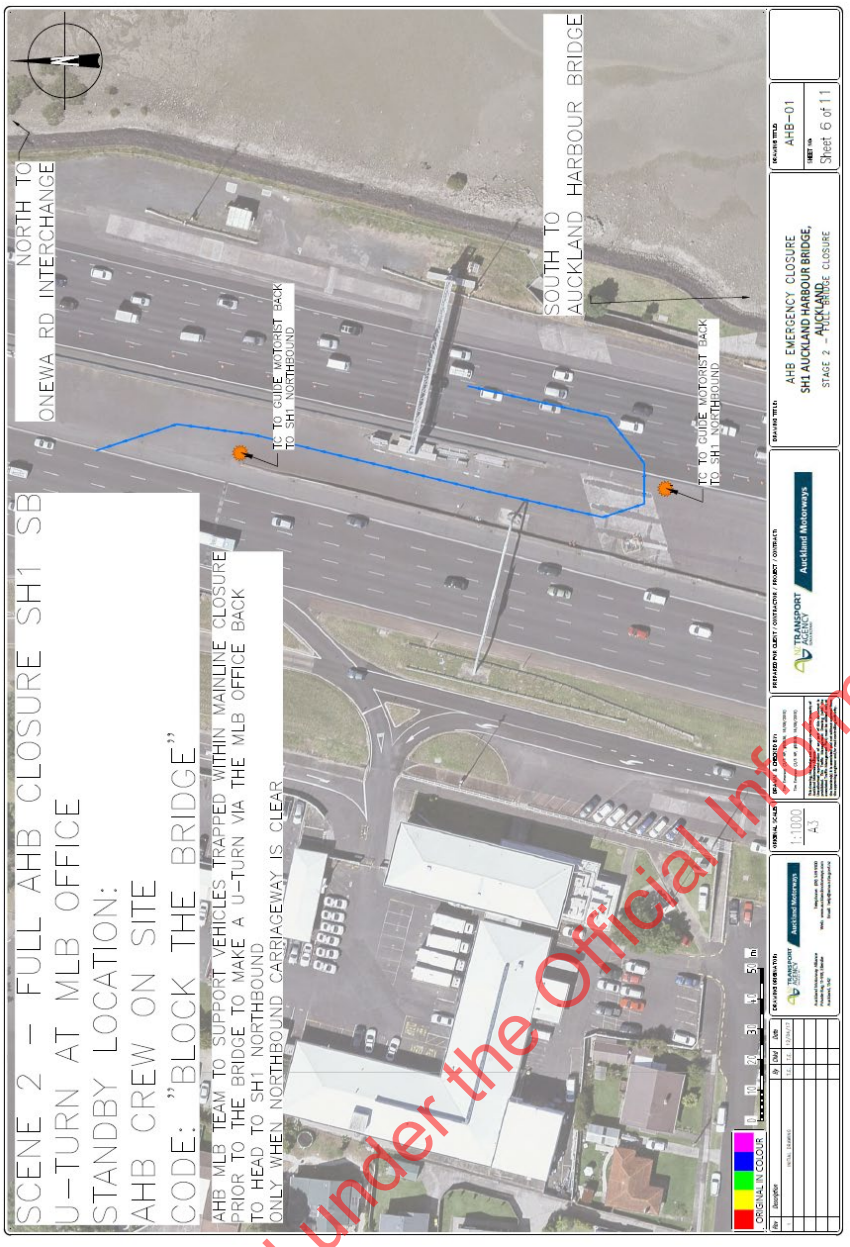
DRAWING ORIGINATOR: NZ Transport Agency / Auckland Motorways
ORIGINAL SCALE: N.T.S
PREPARED FOR CLIENT / CONTRACTOR / PROJECT / CONTRACT: NZ Transport Agency / Auckland Motorways
DRAWING TITLE: AHB EMERGENCY CLOSURE
SH1 AUCKLAND HARBOUR BRIDGE, AUCKLAND
SITE OVERVIEW & AWVMS LOCATIONS
DRAWING TITLE: AHB–01
SHEET NO: Sheet 0 of 11

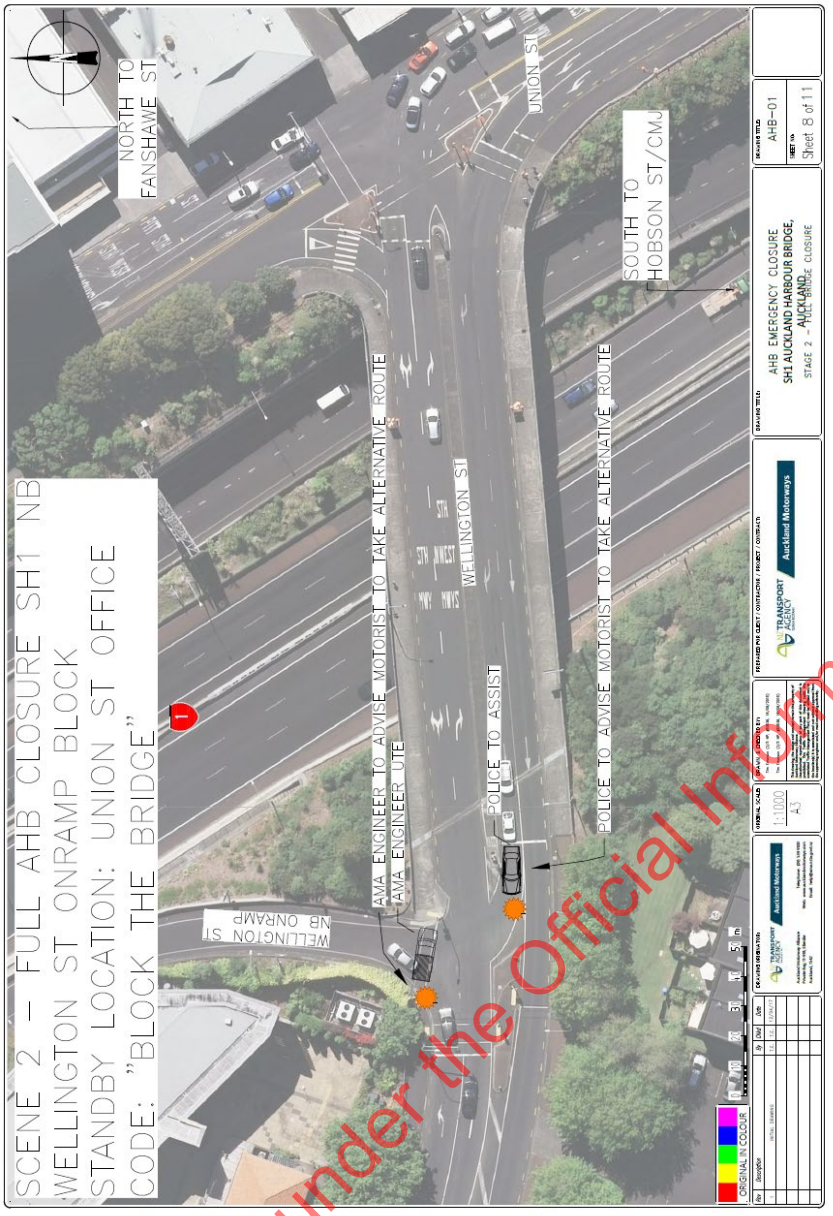


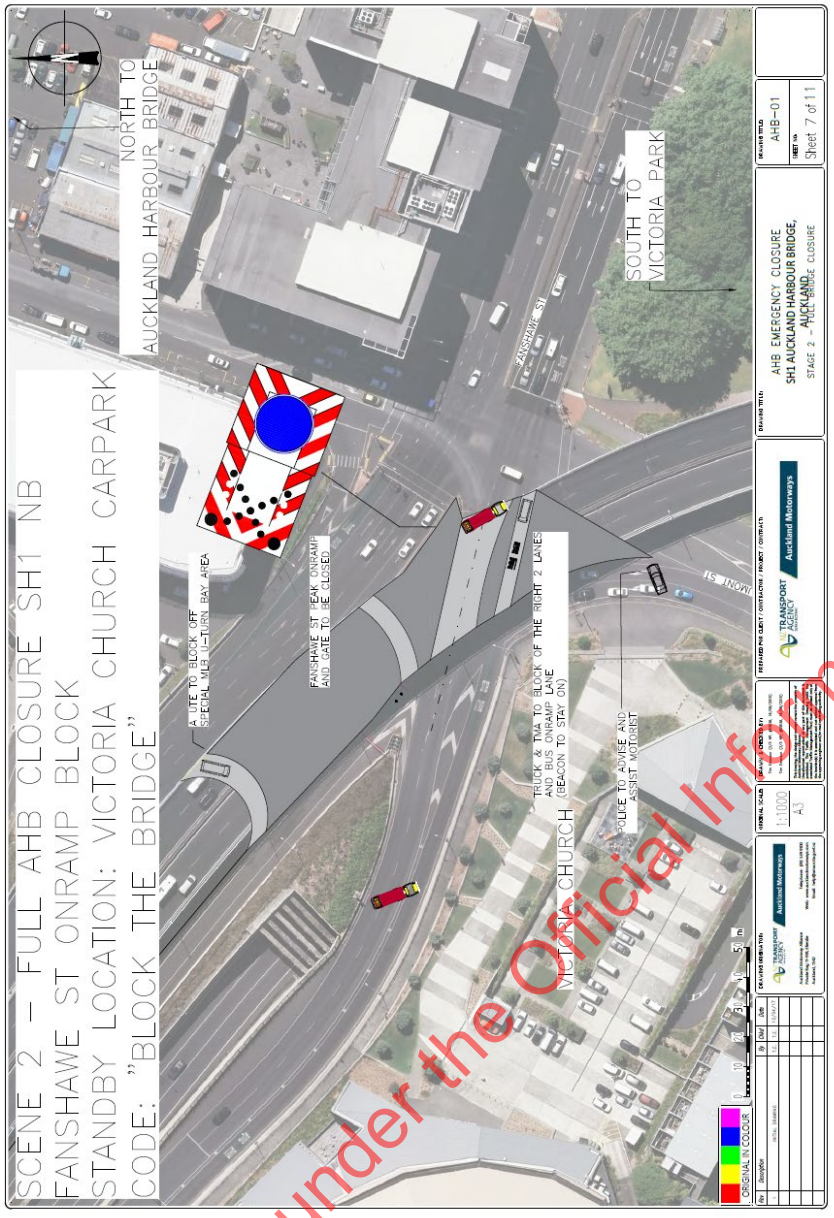


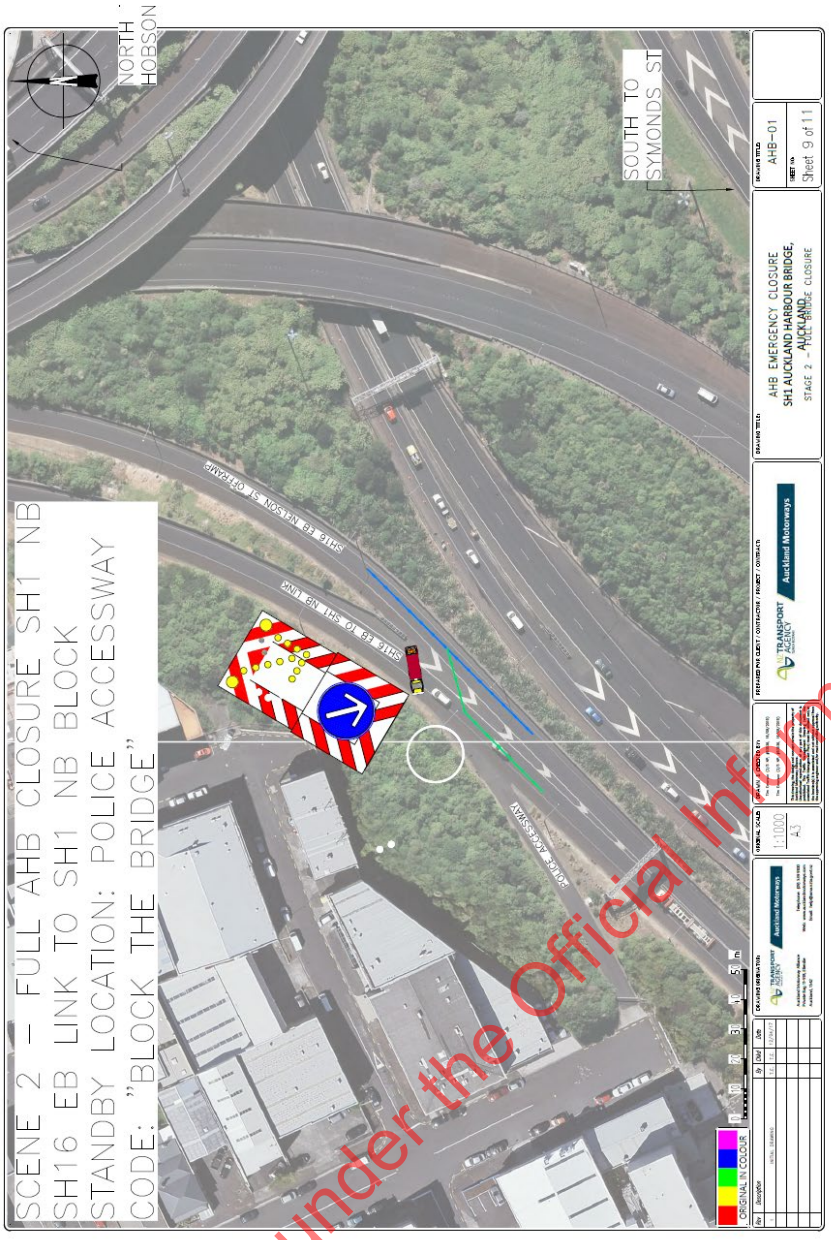


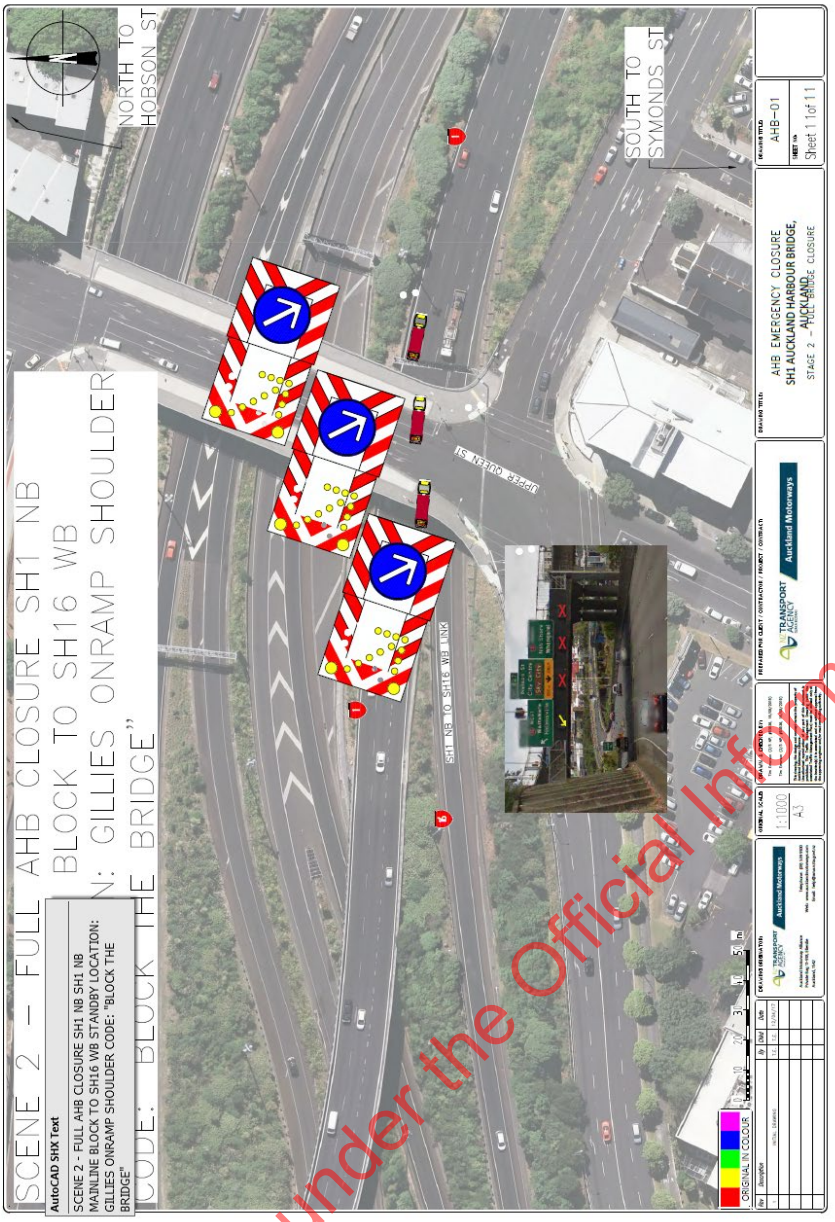


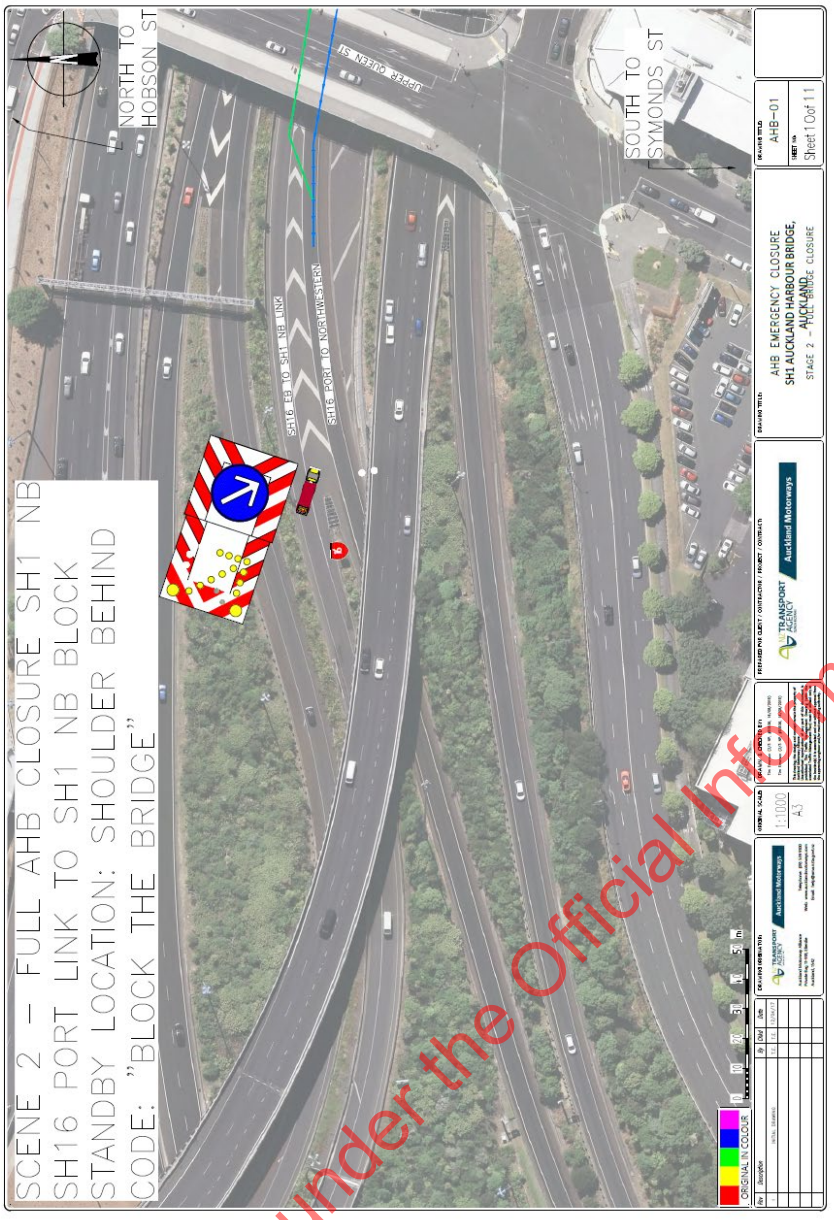












G14. Closure of motorways in the central city area

A significant event, such as political unrest with the risk of protestors entering the motorway lanes, may require closure of sections of the motorways and links within the central city area.

The joint decision to close sections of the network will be made by the Remote Incident Manager, the Transport Agency's Network Operations Manager and / or the Motorway Police Sergeant after receiving advice from their staff.

- Police will be requested to assist with closures; however the situation may draw Police resources away from the closure locations and our Traffic Management Resources will be left to manage the closures.

ASM Incident Management Team

Follow the instructions from ATOC-Smales / Police. The actual closures required will vary depending on the location of the threat, however the following on-ramps, motorway links and main line carriageways should be considered when an emergency closure is required.

SH1 Southbound

- Close southbound carriageway prior to the Victoria Park Viaducts and direct all traffic off at Fanshawe Street off-ramp

SH1 Northbound

- Close the following access points
    - Curran Street on ramp
    - Fanshawe Street on ramp
    - Wellington Street on ramp; and
    - Westhaven Drive (if required); (not accounted for in below TMP)
    - Southern Motorway (adjacent to SH1NB SH16WB Link)
    - Southern Motorway (adjacent to Nelson Street off-ramp)

SH16 Westbound

- Close the link to SH1 northbound

SH16 Eastbound

- Close the link to SH1 northbound
- Close the off-ramp to Nelson Street (to facilitate SH1 northbound traffic)

Mitigations

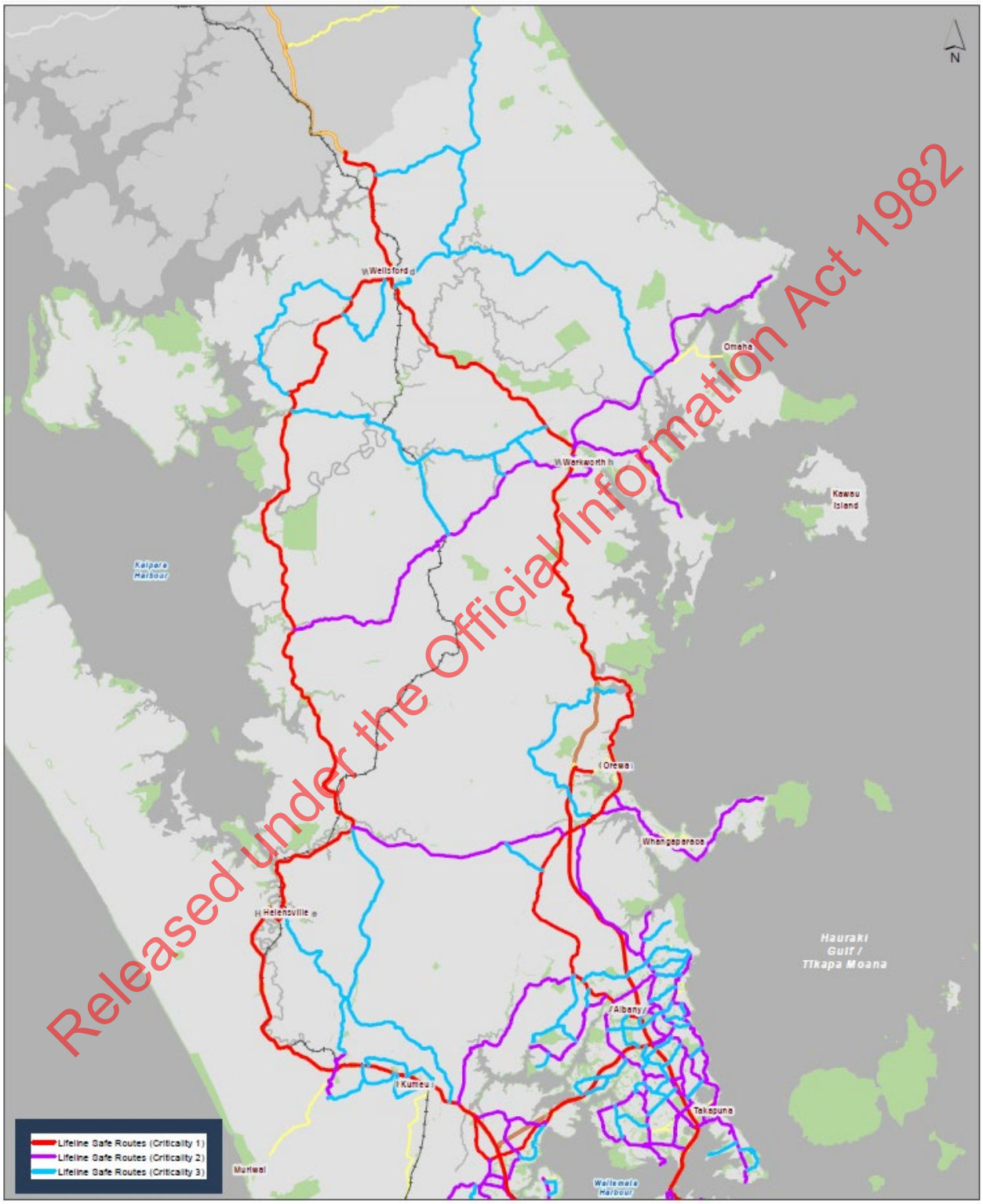
- If additional portable VMS are available, establish at Nelson Street off ramp
- Implement appropriate emergency detours
- Drive detour route and ensure adequate signage and clear directions; and
- Have sweeper and sucker trucks on standby to remove debris from carriageways, before motorway is reopened, if required.

Suggested emergency TMP for closure of the Auckland Harbour Bridge can be found in previous section.

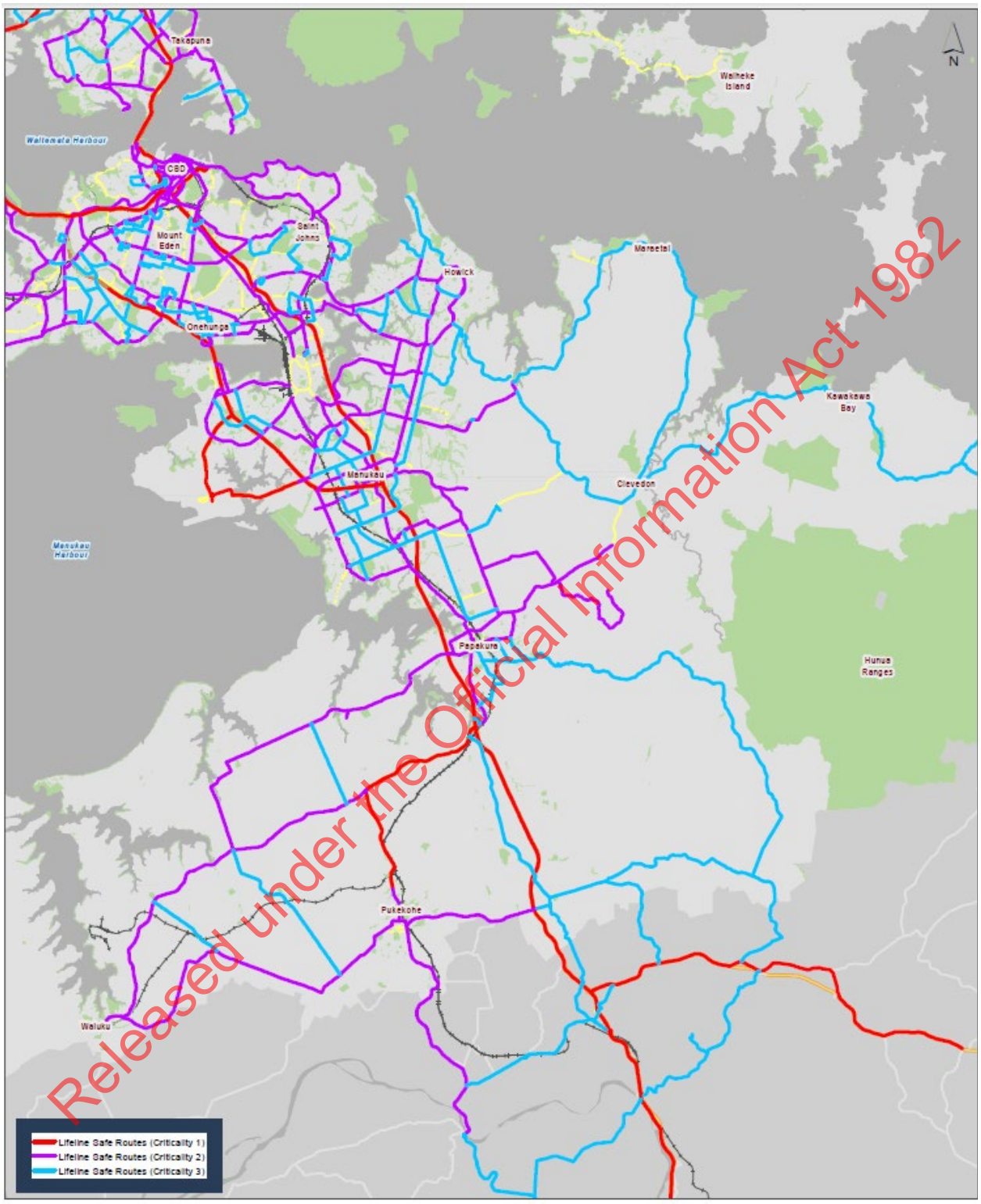
G15. Emergency Access Gates

G16. Lifeline Safe Routes

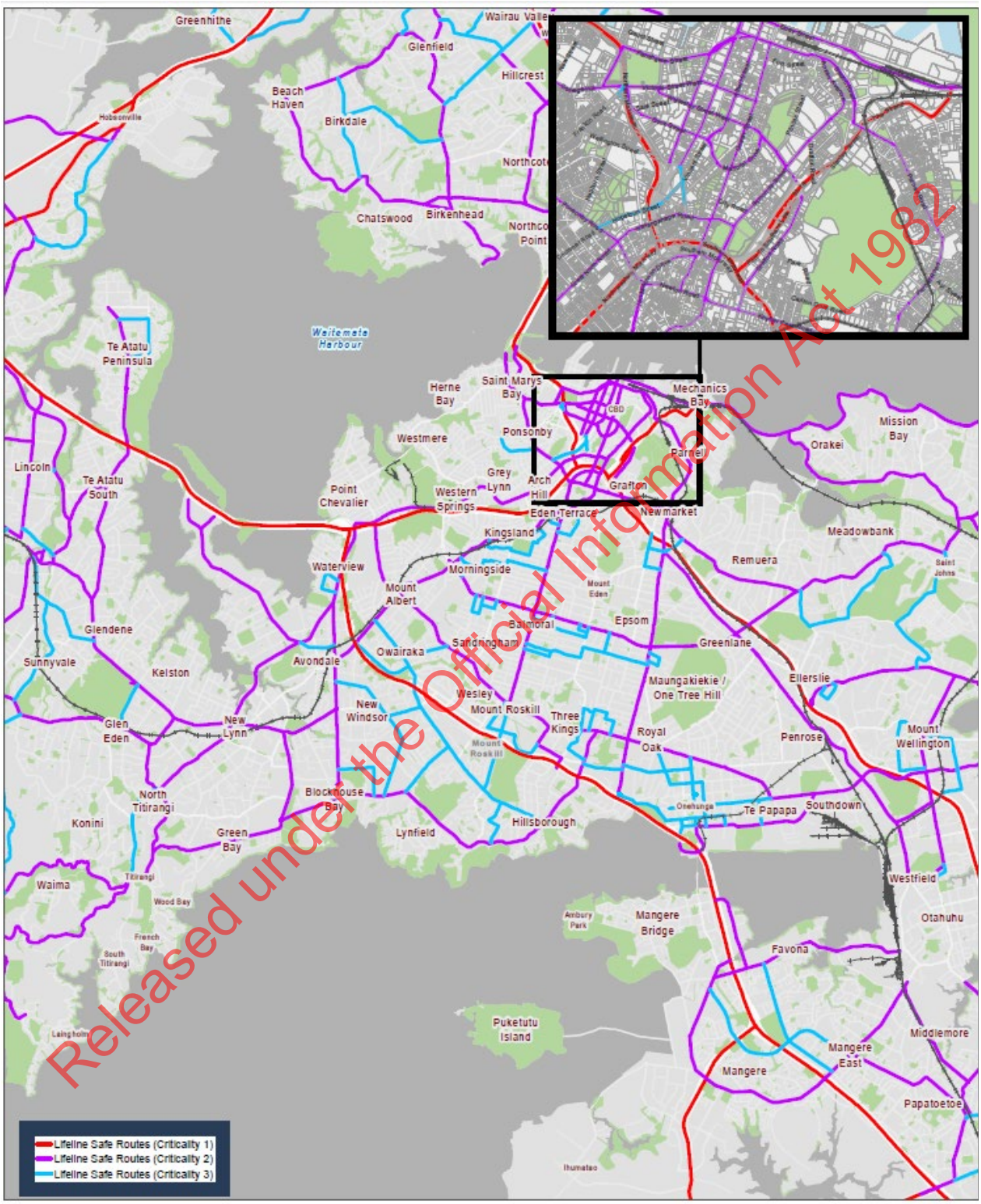
Northern Area Lifeline Safe Routes



Southern Area Lifeline Safe Routes

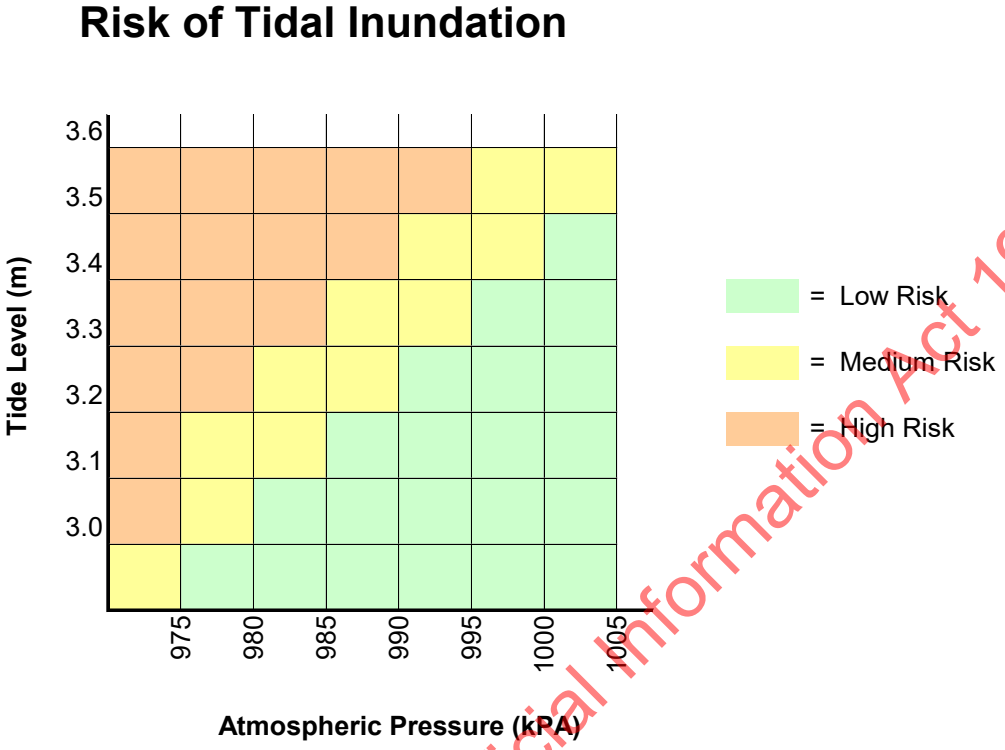


Lifelines Central Area Lifeline Safe routes



G17. Tidal Surges Inundating the Motorway

The decision to close parts of the motorway due to tidal inundation will be made by either the Transport Agency's Network Operations Manager and / or the Motorway Police Sergeant after receiving advice from their staff.



The following plan describes the response required for a full motorway inundation where no traffic can pass through. This plan can also be used in part where only one direction of the motorway is affected.

North-Western Motorway Tidal Surge Inundation of the Causeway

ASM Incident Response Crews

- Assist Police to close the following access points:
    - Waterview westbound onramp
    - Rosebank Road onramp
    - Te Atatu eastbound onramp
    - North-western motorway eastbound at Te Atatu; and
    - North-western motorway westbound at Waterview (note westbound traffic can still join the motorway at Patiki Road onramp).
- Establish portable VMS at westbound on the motorway near Bond Street warning of motorway closure.
- Implement appropriate emergency detour routes.
- Drive detour route and ensure adequate signage and clear directions.
- Have sweeper and sucker trucks on standby to remove flotsam from carriageways, before motorway is reopened, if required

Northern Motorway Tidal Surge Inundation (around the AHB)

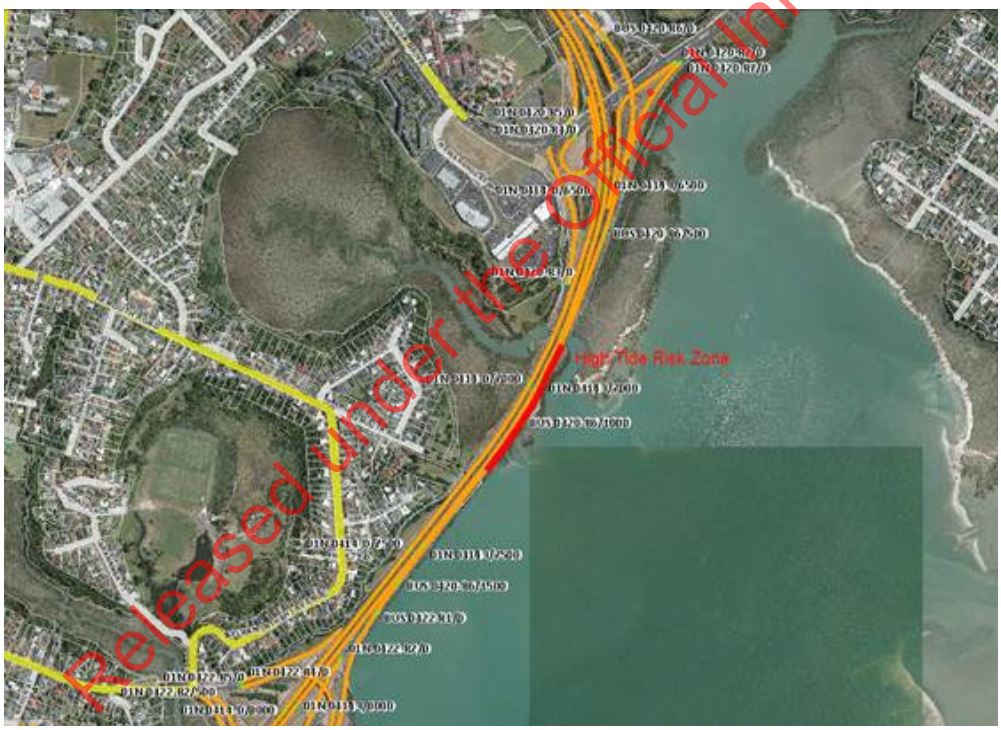
ASM Incident Response Crews

Assist the Police with traffic management to:

- Close the following Southbound access points:
    - Onewa Road southbound on ramp
    - Esmonde Road southbound on ramp

  - Northcote Road southbound on ramp; and
  - Northern Motorway (adjacent Northcote Road off ramp)
- Manage southbound traffic undertaking U turns into northbound lanes through the northern MLB yard
- Close the following Northbound sections until relieved by maintenance contractor
  - Curran Street on ramp
  - Fanshawe Street on ramp
  - Wellington Street on ramp
  - Westhaven Drive (if required); and
  - Southern Motorway (adjacent to Nelson Street off ramp)
- Relieve Police and if required put in place a permanent closure'
- Establish portable VMS on Fanshawe Street warning of motorway closure'
- If additional portable VMS are available, establish at Nelson Street off ramp'
- Implement appropriate emergency detour routes'
- Drive detour route and ensure adequate signage and clear directions; and
- Have sweeper and sucker trucks on standby to remove debris from carriageways before motorway is reopened, if required.

Known Risk Sites on our Network - SH1 SBD Tank Farm Culvert to Exmouth Street Footbridge (Esmonde to Onewa)



G18. Communications

Insert radio communications protocols

G19. Fuel Resilience

Diesel fuel is required for the weekly operations for maintenance and incident response. The table below summarises the average weekly consumption for maintenance and incident response based on data from April 2017 to May 2017.

Equipment	Average litres of diesel/day	Average litres of diesel per week
AHB MLB	43.00	301
CMJ Crew	41.26	288.82
Duty Engineers	50.87	356.09
Nightshift Truck	21.72	152.04
North Crew	63.75	446.25
South Crew	99.30	695.1
AWVMS	12.04	84.27
Grand total	**331.9L**	**2323.6L**

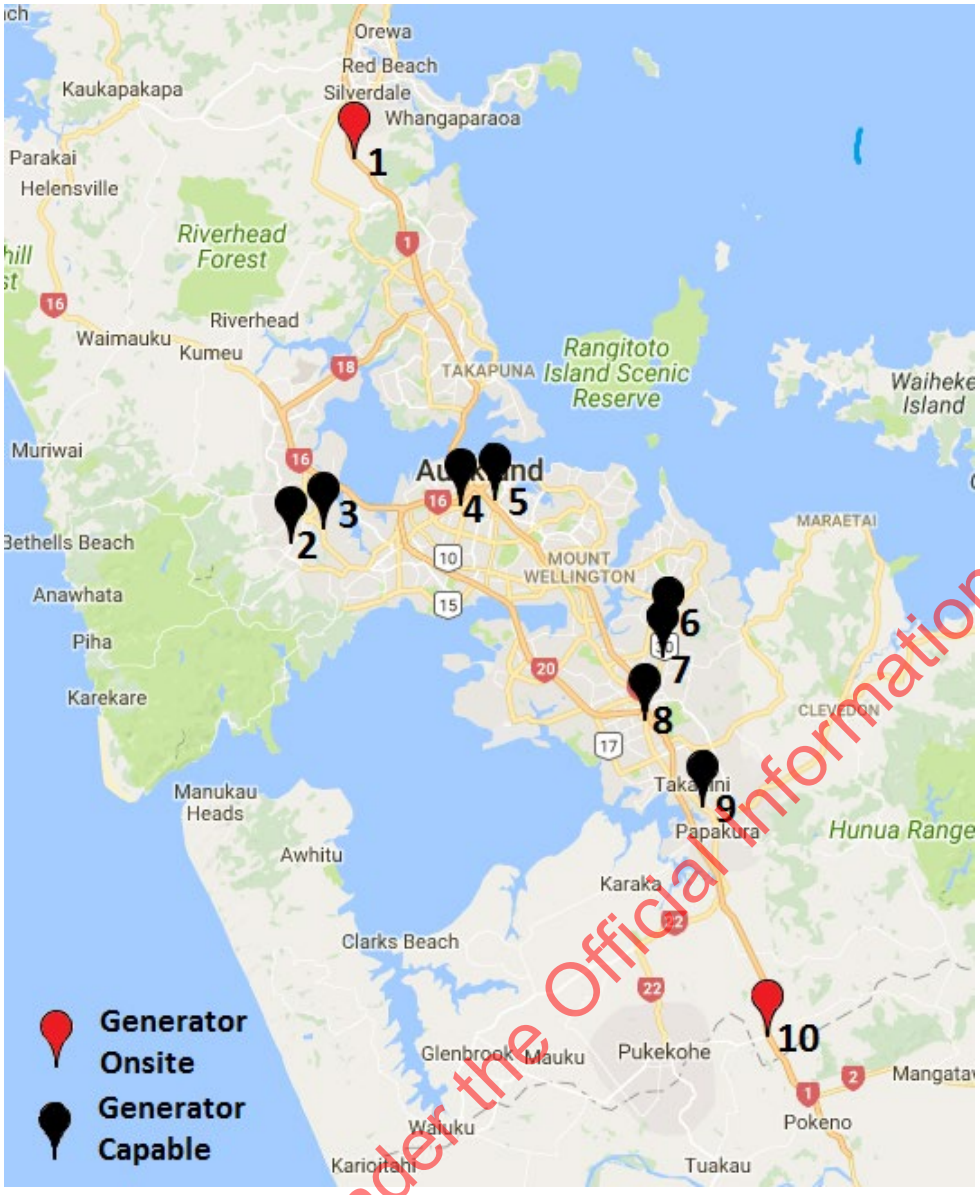
In the event of an emergency where access to fuel is compromised, routine maintenance work can be put on hold including network inspections, mowing, weed spraying, litter, etc. so that only diesel fuel for incident response is used.

Emergency Fuel Stops

Auckland has only 10 service stations wired up to provide fuel to emergency services quickly if electricity is cut in a natural disaster.

- 2 of them have back-up generators on site (the BP Services Centres at Dairy Flat and Bombay); and
- 8 others are capable of switching to auxiliary supplies when needed.

No	Service Station	Address
1	**BP Connect Dairy Flat**	SH1 Dairy Flat (Service Centre)
2	**Gull Henderson Valley**	Corner Henderson Valley & Forest Hill Roads
3	**BP Connect Glendene**	Corner Te Atatu Rd and Totoki Street
4	**Gull Kingsland**	384 New North Road
5	**BP Connect Newmarket**	433 Khyber Pass Road
6	**6 Gull Te Irirangi Drive**	457 East TASMki Road
7	**7 BP Connect Flatbush**	300 Te Irirangi Drive
8	**8 BP Connect Pacific**	Corner Great South & Kerrs Roads
9	**9 Gull Takanini**	330 Great South Road
10	**BP Connect Bombay**	Mill Road, RD1, Bombay



G20. Vehicle Dimension and Mass Network

To apply when agreeing diversion route plans

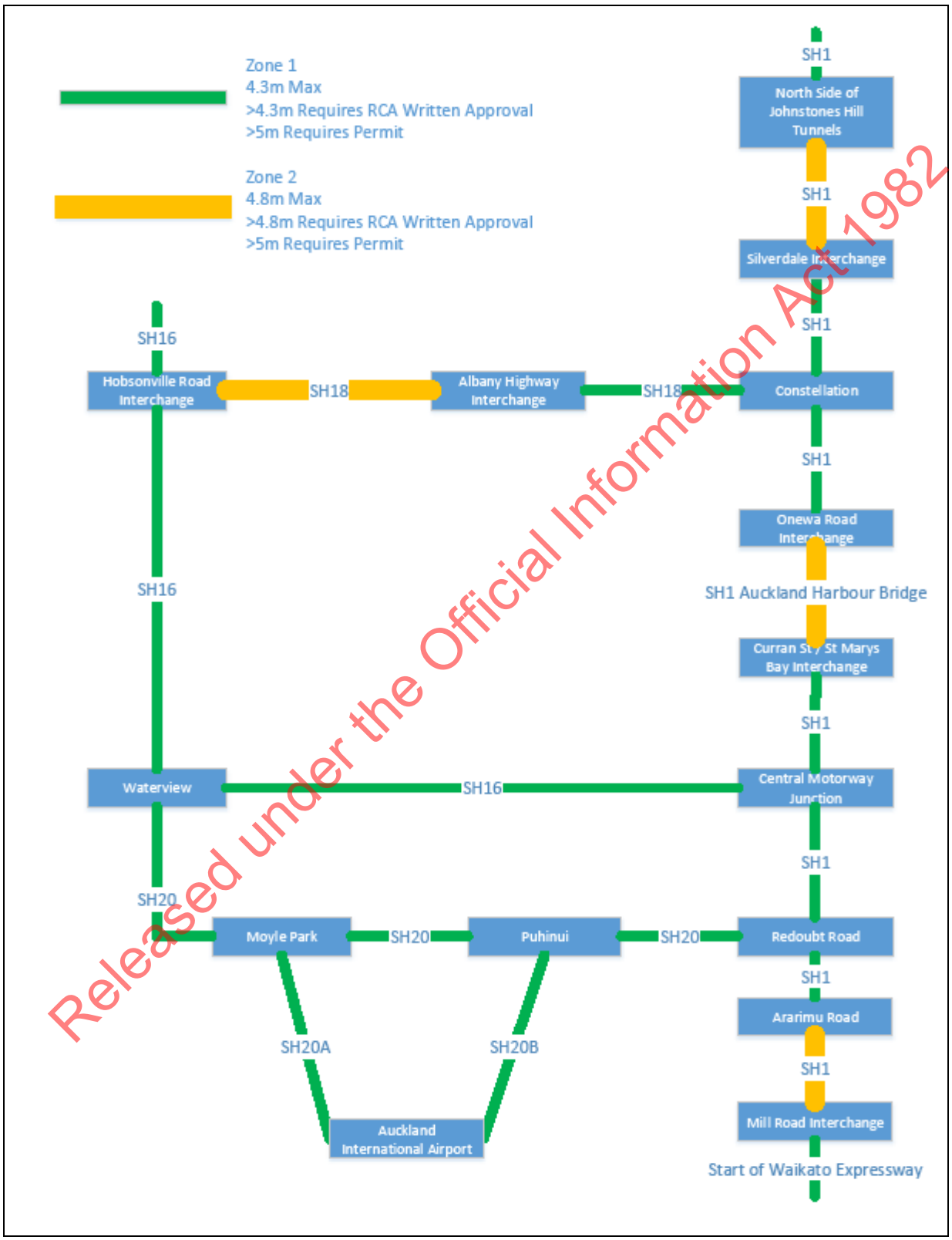


Figure G21-1. Vehicle dimension and Mass Network

Auckland Motorways

No travel on Auckland motorways if the width exceeds 3.1m or the height exceeds 4.3m except for the following:

- State Highway 1 between Ramarama Interchange (Ararimu Road Underpass) and the southern end of the Auckland Southern Motorway:
    - may be used by vehicles that exceed 3.1m in width but are less than 4.8m in height, and
    - may be used by vehicles that exceed 4.8m in height, if permission is first obtained from the Transport Agency.
- State Highway 18 between the intersection with SH16 and the Old Albany Highway:
    - may be used by vehicles that exceed 3.1m in width but are less than 4.8 m in height, and
    - may be used by vehicles that exceed 4.8m in height, if permission is first obtained from the Transport Agency.
- Auckland Northern Motorway between the Silverdale interchange and the northern end of the Northern Motorway:
    - may be used by vehicles that exceed 3.1m in width but are less than 4.8m in height, and
    - may be used by vehicles that exceed 4.8m in height if permission is first obtained from the Transport Agency.

Tunnel Routes

Both the JHT and VPT Tunnels were not designed with any additional controls or restrictions for over dimension vehicles (noting that over-height detection was included in the design and controls of JHT).

The maximum height vehicle allowed inside Waterview Tunnel is 4.6m. Any vehicle of that height or above requires a special permit to circulate on the network regardless.

Toll Routes

Loads that exceed 3.1m width or 4.3m height are not permitted to travel on any toll route unless the Agency has provided explicit authority to do so. The operator of the over-dimension vehicle must comply with any piloting or travel time restrictions required by the Transport Agency.

What are the over-dimension operating requirements for excess height?

If your vehicle or load exceeds 4.3 metres in height, you must comply with these conditions.

Height (m)	Operating conditions
Greater than 4.3 – up to and including 5	1. Written permission from the owner of an overhead obstruction that the vehicle travelling underneath cannot clear. 2. Written approval from the relevant access provider, if the vehicle travels over a level crossing that does not cross a State Highway, and the vehicle exceeds the height shown on an electrified railway safe height sign. 3. For loads exceeding 4.8 m, a vehicle with a deck height less than 1.3 m above the road must be used.
Greater than 5 – up to and including 6.5	1. Need to meet all of the above operating conditions. 2. Need a permit from OPIA. 3. A vehicle with a deck height less than 1.3 metres above the road must be used. 4. Need written permission from the owner of overhead wires or cables that the vehicle travels under
Greater than 6.5	1. Need to meet all of the above operating conditions. 2. Need written approval from the Transport Agency: Apply to OPIA.

* To contact OPIA's helpdesk phone 0800 683 774 or fax 06 953 6313.

The operator is responsible for making sure there are enough pilots to manage the excess height. This will depend on what traffic management (if any) is needed to get around overhead obstructions.

Over-dimension requirements for excess length

The operator of a vehicle that is more than 25 metres long must attain written permission from the rail service operator if the vehicle is going to travel over a level crossing.

If the over-dimension vehicle is transporting a load more than 30 metres in length, it must have a rear steering facility. If an over-dimension vehicle has an operated steering jinker or a pole trailer, the rear overhang is measured between the centre of the rear turntable load support and the rearmost part of the load.

If the vehicle combination includes a load-sharing trailer, the load -sharing trailer does not have to be included in forward distance calculations if the forward distance is 3.5 metres or less.

If the forward distance exceeds 3.5 metres, this distance must be added to the forward distance of the main trailer, less 3.5 metres.

If the vehicle combination includes an operated steering jinker, the forward distance used for determining the over-dimension operating requirements is half the distance between the two turntables supporting the load.

How can I work out the category of my vehicle?

The operating requirements for over-dimension vehicles depend on their width, length, forward distance, front overhang and rear overhang and height.

The graph below shows which category your vehicle and load fall into, based on the width and forward distance (read the factsheet 13 series if you don't know how to calculate forward distance).

G21. Dangerous and Hazardous Goods

No dangerous goods vehicles are permitted to use road tunnels in New Zealand if there is an alternative routine available to them. There is an exception with VPT Tunnel which was designed to permit transit of Dangerous and Hazardous Goods, on the same basis as are permitted on the State Highway System.

The Auckland Motorways Alliance is unaware of any specific Agency rule or bylaw restricting the type of vehicle or goods to pass through either tunnel above that is normally allowed under the Agency VDAM or the Land Transport Rule: Dangerous Goods 2005 Rules.

G22. Responding to Tunnel Incidents

TOC should be able to see the location and nature of the incident on CCTV, assuming the camera system has not been damaged by the incident.

When TOC advise of an incident in a tunnel,

1. Clarify the nature of the incident.
2. Confirm the incident location in the tunnel.
3. Confirm the location of the Incident Control Point.
4. Confirm that the *ASM Duty Engineer and the on-call ASM Tunnel technician* have been notified. *It is the ASM on call Technicians' responsibility to take initial action to support the incident and co-ordinate response and support with the ASM Duty Engineer. Depending on the nature and level of the incident ATOC Smales will also call out the Tunnels Maintenance Manager and the Tunnel Manager.)*

5. If a fire event has been advised, confirm that the Fire Technician has been notified. (***Comment ;*** *this may be a bit redundant as TOC ATMS (DYNAC) has a Preprogramed Fire Alert is sent to FENZ and Armitage Fire).*

DO NOT ENTER the tunnel:

- if a fire has been reported or evidence of smoke or fire is observed (check that the Fire Service has been mobilised).
- if a vehicle carrying hazardous substance has been involved in a crash or a spillage.
- If you are on foot – unless it is a life-threatening situation and can be done safely to assist persons requiring immediate medical attention or physical assistance to evacuate to a safe place. (Remember that we are not trained paramedics, so moving someone without knowing their injuries could cause more significant harm.)
- If you need to proceed under a contra-flow unless directed to do so by Emergency Services / TOC.

If the nature of the incident is hazardous (fire, spill, etc.) it will be under the control of FENZ; *then proceed as follows*;

1. Report to the Incident Controller (this should be at the Tunnel Utility Building / Fire Control Room)
2. Follow instructions from the Incident Controller and provide incident response assistance as requested.
3. Co-ordinate on-site activities with the Tunnels technician attending the incident.

If the nature of the incident is confirmed as non-hazardous (e.g. a simple vehicle crash) then you may enter the tunnel and proceed to the incident location to provide incident response assistance.

If at any stage the situation changes and becomes hazardous, evacuate the tunnel immediately and advise TOC.

G23. High Pressure Aviation Fuel Pipeline - Refining New Zealand

Background

Refining New Zealand are the leading supplier of refined petroleum products and is the only supplier of aviation fuel. Other products include for the New Zealand market, including petrol, diesel, kerosene, and other products. Situated at the Refinery near Whangarei, almost half of the fuel production travels via **a purpose-built 170-kilometre pipeline Marsden Point to Wiri** in South Auckland for storage and subsequent distribution by road.

Contact Details

Location Address:

Port Marsden Highway, Ruakaka, New Zealand, 0171
>View Map & Directions

Mailing Address:
Private Bag 9024, Whangarei, 0148 New Zealand

Telephone: +64 9 432 8311
Telephone: 0800 733 463 – Pipeline controller

Email: corporate@refiningnz.com

Act of Parliament – (Pipeline regulations -1999) Act
Under Section 15 of the Regulations, New Zealand Refining must inform the ASM (and others) of the hazards likely to be involved in respect to any works near the pipeline.
Vector Gas Ltd, perform this function for New Zealand Refining and advise ALL landowners/occupiers every six month about the relevant hazards that exist to high pressure pipelines.

Requirements for Working 'Close' to the Pipeline
The pipeline transport refined product, petrol, diesel, and jet fuel all in one pipe and should it leak will cause significant environmental damage.

Reporting planned work near the pipeline
Vector provide a toll free telephone number for providing a location and permit for any work 'near' the pipeline:
0800734 567 which is available on a 24/7 basis.

Pipeline relevance to the Alliance
This high-pressure pipeline crosses the Alliance network at the following points:

- SH20A between Kirkbride Road and Montgomerie Road
- SH20B at Campana Road

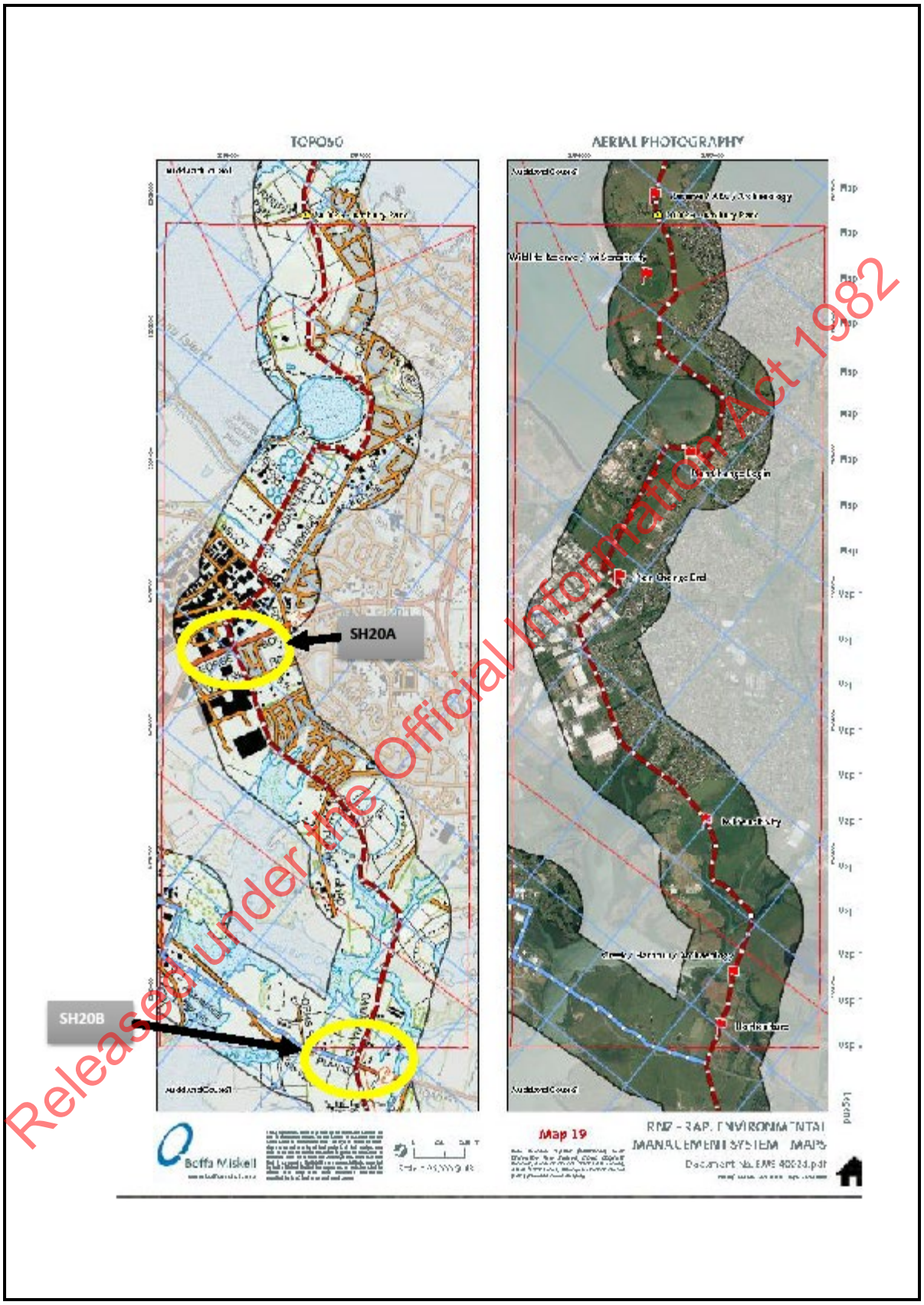


Figure G25-1. High Pressure Fuel Pipeline Location Plan and State Highway Network Interfaces

G26. Reinstating damaged Tric-Bloc Barriers

Scope

Tric-Bloc is a concrete median barrier system that sits on the road surface and deflects up to 900mm when struck. It is identified by a rounded profile and top. It can sit on short stubs allowing drainage underneath. Tric-Block segments are linked together so the system forms a continuous line that develops ribbon tension under impact. Each segment is 2m long and 770mm high, weighing 1.5 tonnes. Diagrams showing the unit construction are included at the end of this appendix.

Tric-Bloc is no longer approved by the Agency, who seek to phase it out. There are very few remaining segments that can be used for replacements, so extensive damage will require replacement with an approved barrier system, most likely F-shape rigid barrier.

Tric-Block remains on SH1 at the following median locations:

SH1 Southern Motorway

- from 170 m North of Reagan Rd UP to SH20 SB exit at Manukau, (01N-0431-I / 15220 to 01N-0431-I / 16743 = 1.523 km), shown in the image above

SH1 Waikato Expressway

- from 560 m South of Mill Road underpass to 160 m south of Nikau Road underpass (01N-0431-I / 11.010 to 01N-0431-I / 13.600 = 2.5 km)
-
- from 500 m South of Nikau SB on ramp to Pokeno (01N-0461-I / 14.250 to 01N-0461-I / 16.257 = 2 km)

System Requirements

Tric-Block segments are linked together so the system can develop ribbon tension under impact loads, similar to semi-rigid barriers. The linkage is formed by

i. a steel tube inserted vertically in the circular gap between barrier segment ends, which engages hooks near the bottom of the segments
ii. a steel plate that connects bolts recessed in a slot in the top of the barrier segment ends and holds the vertical pipe in place.

The faults that can prevent proper function are:

- Failure of the connections or missing elements
- Failure of the concrete barrier segment – breaking in half
- Excessive damage to the concrete segment – concrete pieces 50mm or larger breaking off, or concrete cracking more than 150mm
- Uneven pavement surface that prevents the barrier sliding across the surface up to 900mm laterally

Repair Procedures

1. **Emergency repairs (make safe immediately to re-open lanes)**

Make an initial assessment to ascertain the extent of damage and if there are any of the above faults present that requires segments or connection parts to be replaced.

a. If minor impact has not shifted barrier significantly (less than 200mm) and concrete condition is acceptable then check all connection parts are present and appear in good order. Check connection tubes are present by inserting a thin element such as a steel ruler into the vertical gap between segments, a little below the level of the top connecting plate (about 150 to 200mm from the top of barrier). If no connecting tube is present, log the location for replacement. Similarly check the top connecting plate is present and soundly bolted down to each segment. Log any missing parts, minor damage, or realignment that cannot be straightened on site for later remedy.

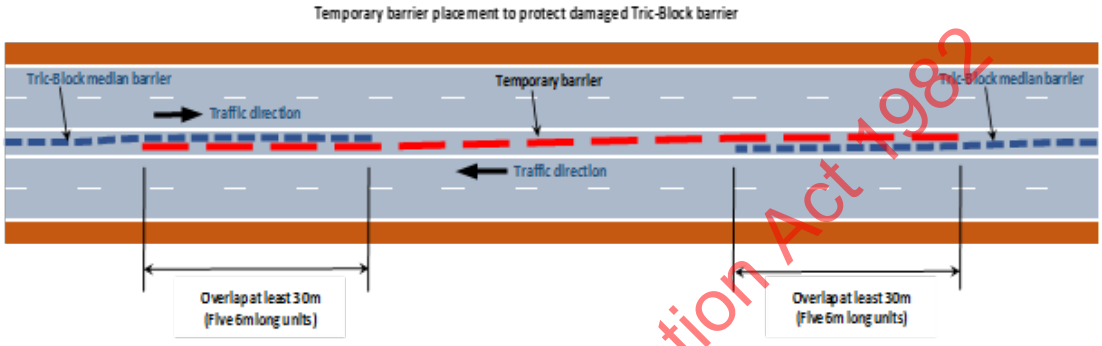
b. If significant impact has occurred that cracks the barrier string or shifts it more than 200mm, then more careful assessment of condition is required. If the barrier appears unbroken then a more detailed assessment and realignment can be delayed till overnight closures can be arranged.

c. If the barrier string is broken, then the barrier is no longer functioning. The risk is managed by either:

i. Elimination – repairing the barrier failures,
ii. Isolation – temporarily protecting the barrier failures such as by installing a temporary barrier, until permanent repairs can be made

iii. Reduction – managing traffic speeds so that the barrier failure is not critical, until permanent repairs can be made

The choice of which option is used will depend on the urgency to re-open. In peak conditions on a multi-lane road where managing speeds is difficult, isolation may require closing the adjacent shoulder or lanes with cones and/or TMAs. If practical install temporary barriers as shown in the diagram below, to protect exposed ends until permanent repairs are designed and installed.



2. **Temporary repairs (undertaken that night and for duration of a few weeks until permanent repairs can be done)**

Isolate / protect the exposed Tric-Block ends using a temporary barrier string such as J-J hooks installed through the area of the break. In a narrow median this may require shifting the remaining ends of the Tric Block string so the temporary barrier can be placed through the gap with overlaps as shown below.

3. **Permanent repairs**

It is critical that the ends of all barrier segments connect, to enable ribbon tension to be developed across joints and at the transition to the adjacent system. This may require disassembly of connections that have significant displacement (more than 200mm) or rotation. Barrier segments may need straightening to unload connecting elements so they can be disassembled. Only if all the joints are competent can the barrier be pushed back into alignment. This may be achieved with a large pry bar, or a suitable vehicle or Hiab.

Broken concrete segments may be replaced if sound replacement units are available. These must have no cracking, broken off corners larger than 50mm, or damaged connection bolts. They are usually kept in the yards at SH1 Pahurehure northbound, Ian MacKinnon Drive under Newton Rd Bridge, or FH Reliable Way. Segments are lifted using a special Hiab arm attachment that grips the upper section of barrier. McKenzie Transport have trucks with the required attachments.

WARNING:
Lifting is dangerous, as the 1½ tonne units can drop out of the grip, or the cast-in anchors can break, especially if bent/damaged. Keep everyone well clear of lifting operations in case a unit drops. All lifting must be in compliance with the appropriate approved ASM lifting plan.

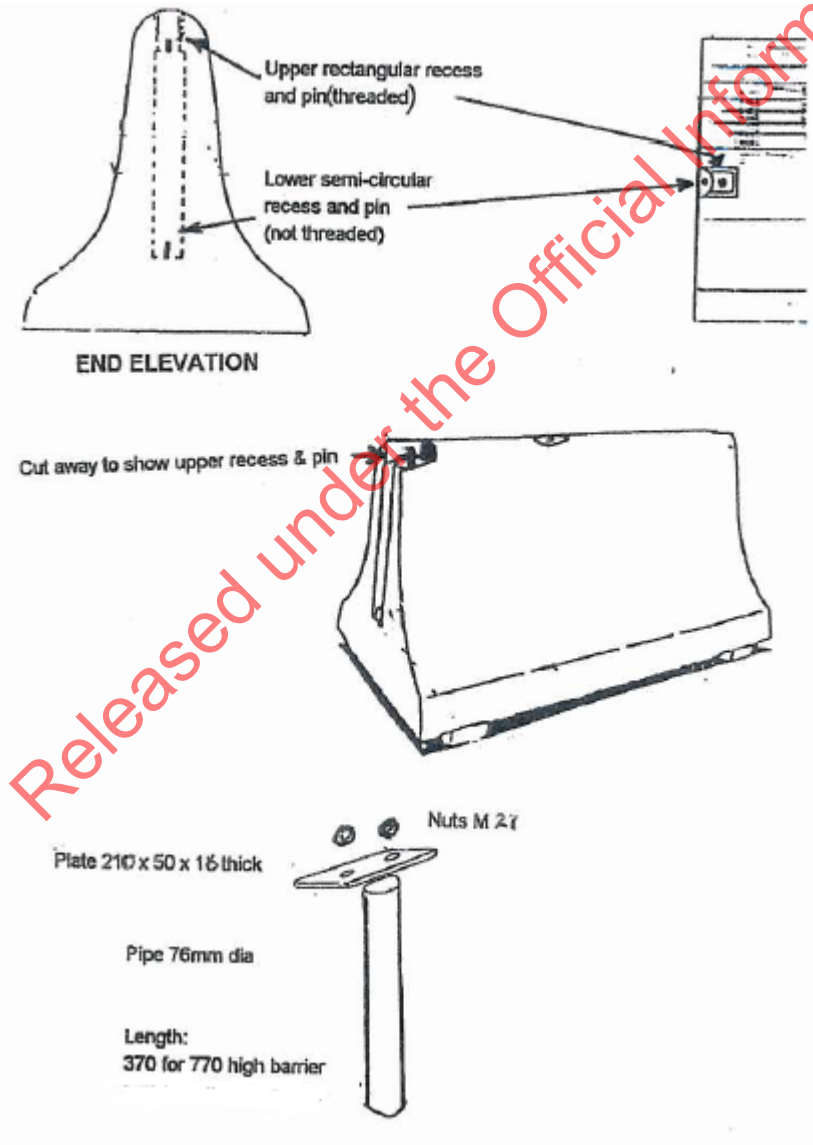
...

Broken or damaged connection pieces can be repaired with replacement parts obtained from the structures team area in the FH yard at Reliable Way.

Cut off any protruding lifting bolts on top of the barrier flush with the top surface, and any other remaining bolts protruding from exposed surfaces.

Check the barrier over for signs of previous works i.e. where w-section has been attached, and ensure that the barrier is sound (no excessive cracking) or visual evidence of being dropped, as this could indicate a compromised barrier that will not perform as designed.

If there aren't enough replacement concrete segments to make a repair, then the system will need to be partially replaced with a section of permanent barrier. This will require specialist design input from a barrier designer with appropriate Waka Kotahi qualifications. Typically it will involve installation of new F-shape barrier with integral anchorages and dowelled joints to Waka Kotahi specification M23 Appendix A. Refer this to the Traffic Safety Team and the Structures and Traffic Assets Team.



APPENDIX H: EMERGENCY CONTACT INFORMATION

H1: Various Emergency Contacts

Insert link to master version of ASM Emergency Contacts List