

Fuel Supply Vulnerability and Contingency Planning

An aerial photograph of an offshore oil rig in the middle of the ocean. The rig is a complex structure with a central tower and various platforms. The water is a deep blue-grey color, and there are some whitecaps visible. In the background, there are some landmasses or islands.

Lisa Roberts - AELG
Mark Gordon - CELG
Rob Daniel - Westland DC
Mark Constable - MCDEM

Overview

- **Auckland Fuel Contingency Plan**
- **Canterbury Petroleum Vulnerability Report**
- **West Coast Fuel Storage Study**
- **National Fuel Contingency Planning**



Auckland Engineering Lifelines Group and Auckland CDEMG

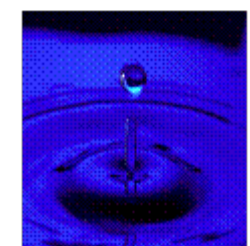
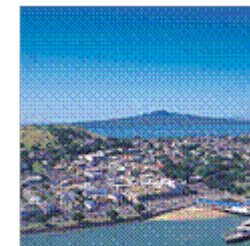
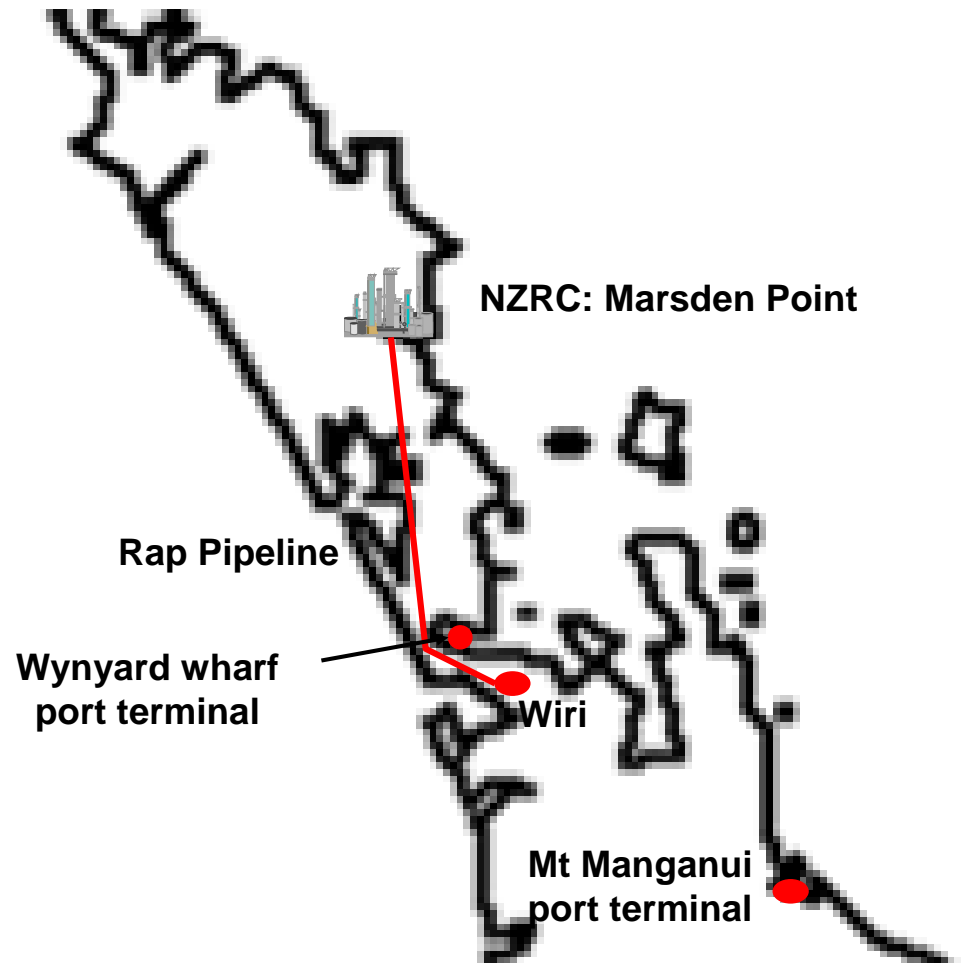


Auckland Fuel Contingency Plan

Lisa Roberts, AELG Project Manager

October 2008

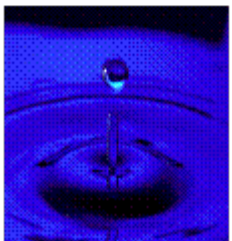
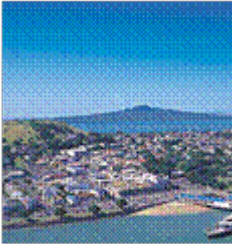
Auckland fuel supply



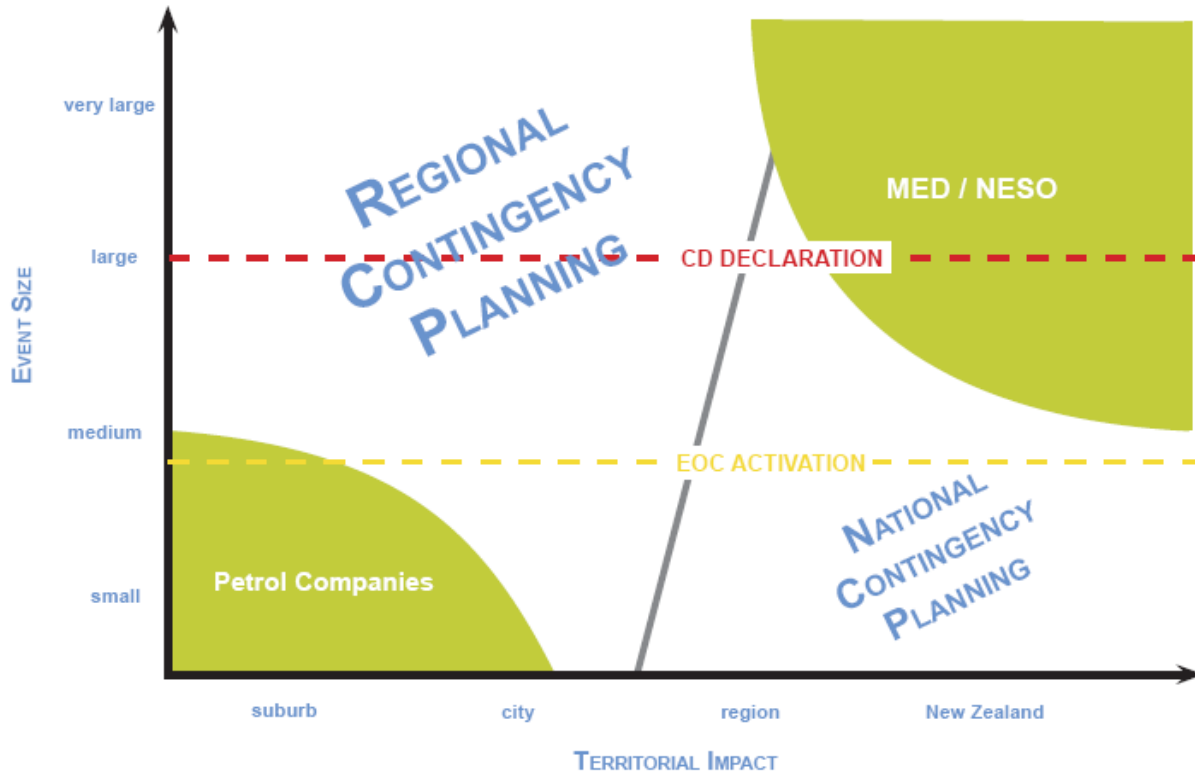
The plan assesses the risk of major supply disruption

- For example:
- A major unplanned refinery outage longer than 1-2 weeks. The oil industry could secure additional refined petroleum supplies from offshore but this is likely to take at least 6 weeks.
- Disruption to the Refinery to Auckland pipeline (RAP) or WOSL depot longer than a week. If the refinery is still operating, some stock could be supplied by trucking from outside the region, but only an estimated one third of normal demand can be met in this way.
- Widespread power outages across the region (only 2 service stations in Auckland have back-up generation).

National and regional roles



PETROLEUM CONTINGENCY PLANNING ESCALATION AND JURISDICTIONS



Auckland Engineering





Who are the 'priority customers'



As per CDEM Guideline priorities:

1. Public Health and Safety (Hospitals, Ambulance)
2. Emergency Management (Police, Fire Service, Emergency Operations Centres)
3. Lifeline Utilities (Energy, Telecommunications, Water, Transport)

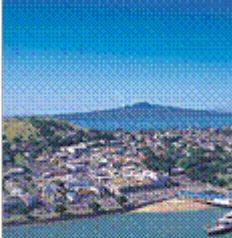


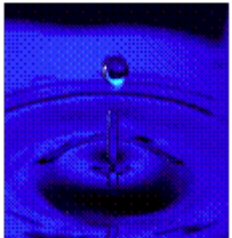


The rest will be left for 'on the day' planning.

4. Vulnerable Sectors (immobile or vulnerable groups of people such as rest homes, prisons)
5. Isolated Communities
6. Key Areas (CBD)
7. Commercial Producers
8. Residential zones

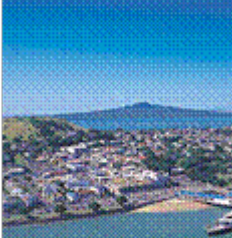


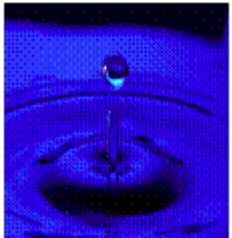


Last year's tricky questions were:

- 
- In a disruption, how will fuel companies manage restricted stocks and ensure priority customers can be identified and access fuel supply
 - To what extent will the Group Controller (or other government agency or person) need to direct specific mechanisms for directing supply to priority customers, and to what extent can this be 'left to the fuel industry' to act on priorities identified by the Group Controller (or other agency).
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Last year's tricky questions were:

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- Whose role is it to give effect to public rationing measures in a regional fuel supply disruption?
 - Can the fuel industry work together in an emergency to ensure priority customers are supplied regardless of supplier?
 - Has the fuel industry got a realistic understanding of the support that CDEM can provide and what they need to plan for?
 - Are the strategic issues surrounding Auckland's fuel supply being managed
 - Whose plan is it?
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General roles and responsibilities

- In an international supply disruption NESO shall, where appropriate, use IEAA powers to implement demand management (or supply enhancement) mechanisms;
- In a domestic shortage (or in support of NESO) MED shall, where appropriate, direct the supply or use of petroleum using powers in the Petroleum Demand Restraint Act.
- The fuel companies shall have plans and implementation processes to ensure such measures as may be required by NESO or the MED can be promptly acted on.
- The Controller shall advise petrol companies on priorities for fuel supply in a shortage; unless otherwise advised these priorities will be as per the plan.
- The fuel industry shall have adequate plans and implementation processes to ensure those priorities can be acted on, regardless of normal supplier (noting limitations expressed).
- The Controller shall liaise with MCDEM, MED and NESO to agree the role of each agency in managing the event.

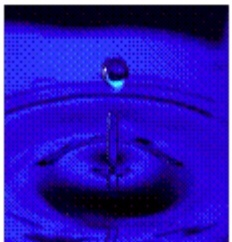
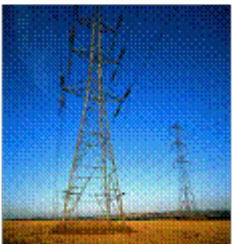
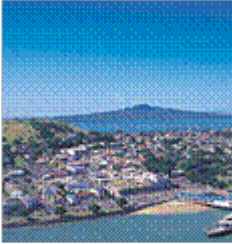
Under the ACDEM Plan, the oil is responsible for

- Ensuring they have plans and mechanisms in place to supply priority customers as advised by the Auckland Group Controller.
- Ensuring they have plans and mechanisms in place to implement supply restrictions at retail outlets.
- Providing the Group Controller with detailed information on impact assessment (eg: arising from a natural disaster), including.
 - confirmation of status of facilities, major assets and transport networks;
 - confirmation of stockholding by type and location;
 - an estimation of emergency demand levels;
 - proposed processes for implementing demand restrictions and / or ensuring continuity of supply to priority customers;
 - proposed processes for industry restoration of normal supply.

As a last resort, if the fuel industry does not work with the plan:

The Controller may take steps (if necessary) such as:

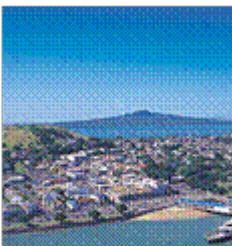


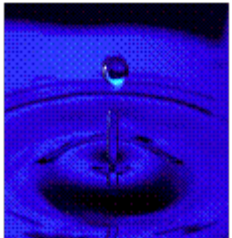
- *Requesting that fuel companies secure certain petrol stations for 'CDEM priority customers' regardless of normal supplier.*
- *Requesting that fuel companies ensure fuel is supplied as a priority to those designated stations throughout the duration of the shortages.*
- *If necessary, requisitioning supplies at these stations and at WOSL to enable this to occur.*
- *Providing CDEM personnel or police to assist with the identification of priority customers at the petrol stations.*
- *Requesting license plate information from priority customers with unbranded vehicles and communicating these to the designated petrol stations.*
- *Liaising with the police to provide traffic and security management at those designated stations if required.*

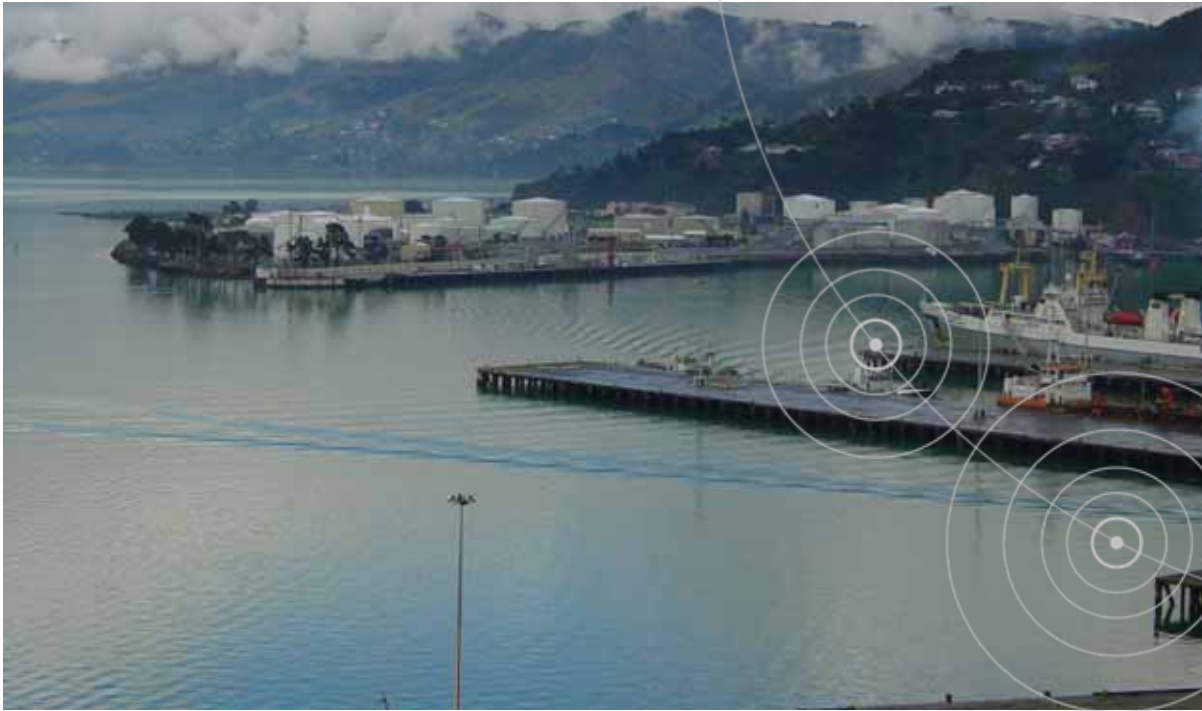


Trigger	Actions
1. Threat to Auckland's fuel supply	<ul style="list-style-type: none"> ▪Oil industry liaises with Group Controller outlining concerns and proposed actions ▪Group Controller to confirm priority groups to receive supply ▪Group Controller consults with MED or NESO to consider potential rationing needs. ▪Oil industry to liaise with priority customers to ensure that will have preferential supply at suitable locations.
2. Supply interrupted to customers.	<ul style="list-style-type: none"> ▪As above ▪Oil industry to liaise with Group Controller outlining their capacity and capability to maintain supply ▪MED/NESO implements supply/demand management measures if required ▪Group Controller to offer support if required
3. State of Emergency Declared	<ul style="list-style-type: none"> ▪As above ▪Oil industry to provide operational plans to carry out Group Controller's directions for prioritisation ▪Group Controller to provide advance information where CDEM activities may cause abnormal fuel demand loadings (eg: along planned evacuation routes).
4. Oil industry fails to operate in a manner that support the intent of the Group Controller	<ul style="list-style-type: none"> ▪Group Controller requisitions sufficient fuel to supply priority customers^[1]. ▪Group Controller designates a number of fuel stations for supply to priority customers only. ▪CDEM personnel on site to assist with identification of priority customers. ▪Police assistance with traffic and security management if required.



And we have left the following for MCDEM / MED

- 
- **Developing a national fuel contingency plan that included:**
 - Guidance on which agencies would lead fuel emergencies in specific situations and the triggers for using various legislative powers.
 - Methods for emergency rationing when emergencies result in imminent fuel shortages, and triggers for when these should be acted on.
 - Mechanisms for CDEM agencies to manage and allocate requisitioned fuel supplies (this would be a last resort).
 - **Establishing an operational fuel sector coordinating entity that would enable the industry to work cooperatively during an emergency, providing a number of benefits such as:**
 - Providing CDEM with a single point of contact with the industry to ensure that a consolidated picture of industry status, stockholding, etc, can be provided.
 - A means by which the industry can work together to ensure priority customers are supplied regardless of their normal contractual supplier.
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Canterbury Engineering Lifelines Group

Hazard Assessment for Petroleum Storage, Transportation and Supply - Update
October 2008

Stage 1 Petroleum Storage Volumes and Flows

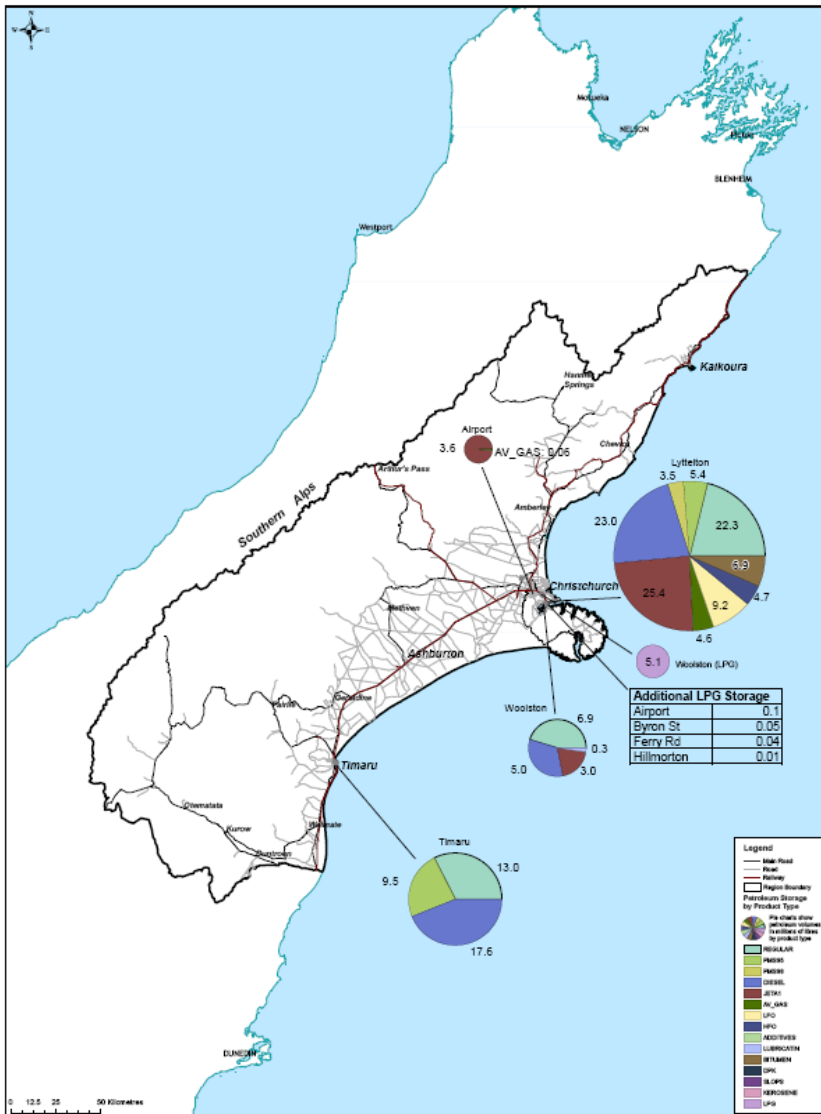


Fig. 4.3 Petroleum Storage by Product Type in the Canterbury Region

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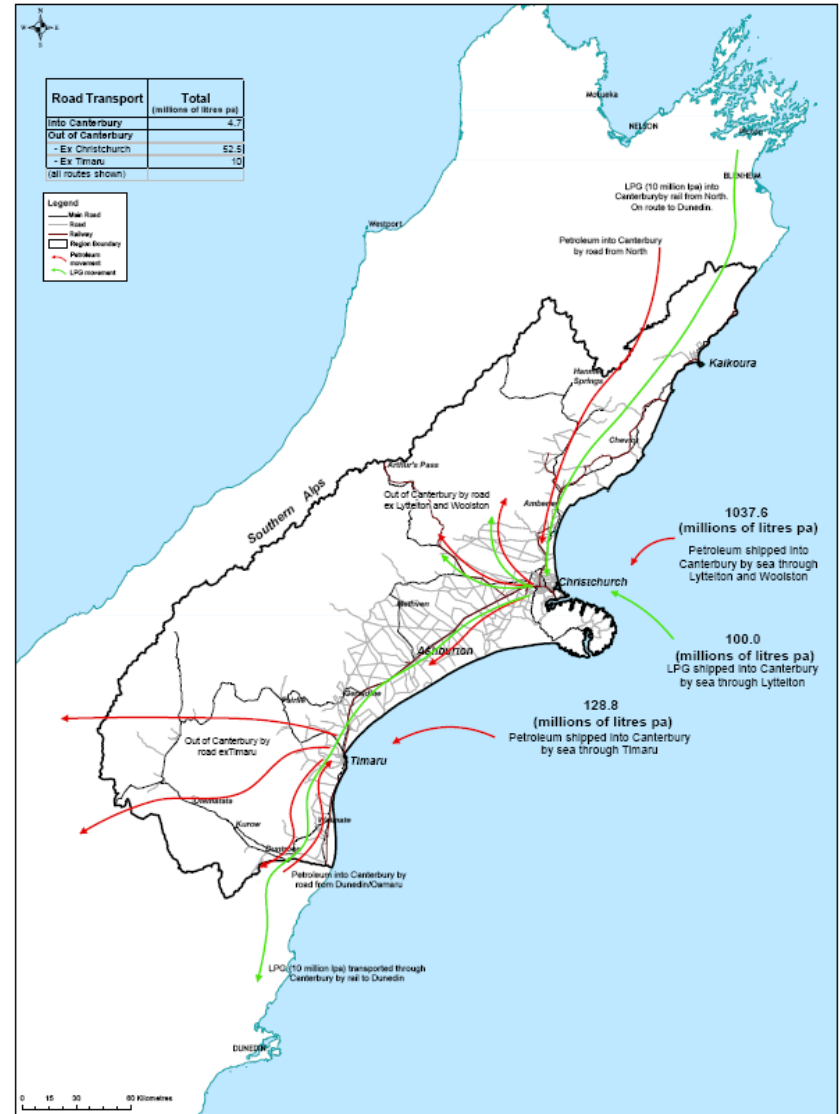
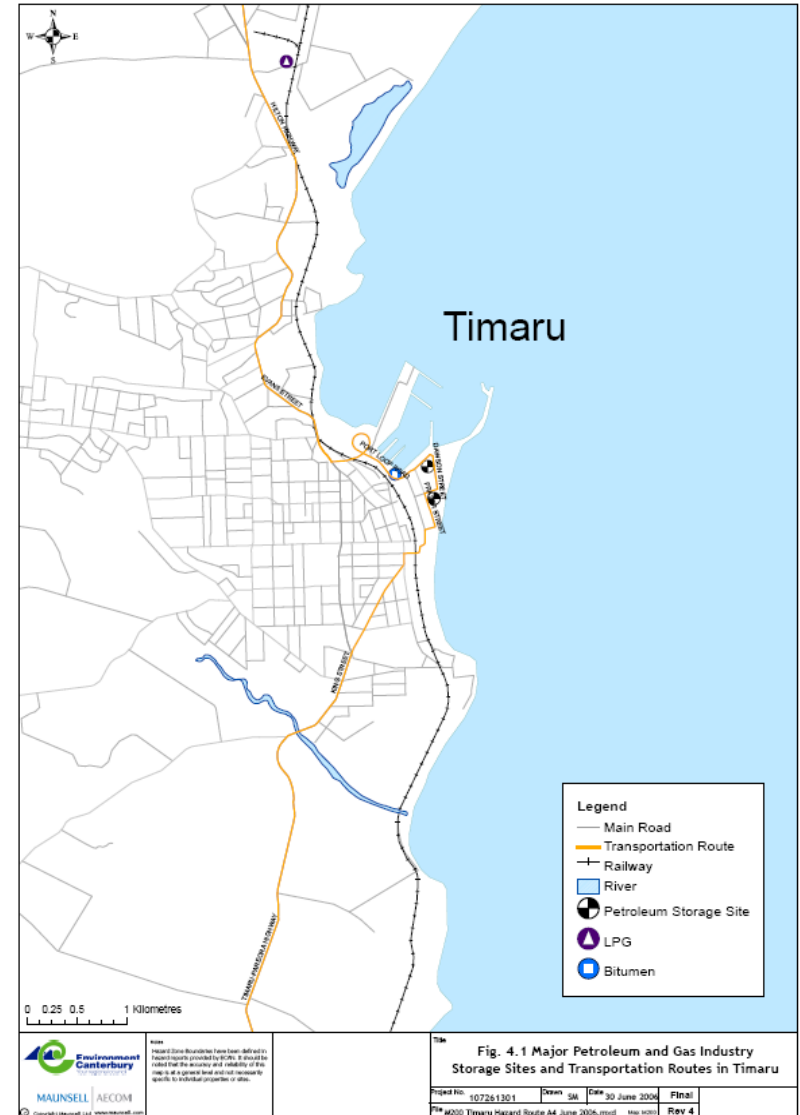


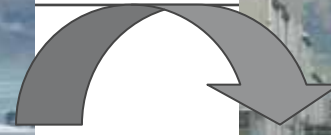
Fig. 4.5 Petroleum Movement Across the Canterbury Region

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Stage 1 Petroleum Tank Farms and Bulk Storage



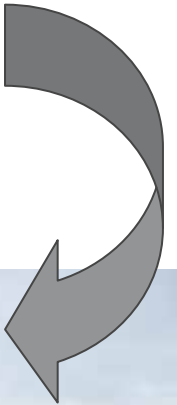
Tank Farms - Christchurch



Pumping



Pumping



Tanker trucks



Tanker trucks

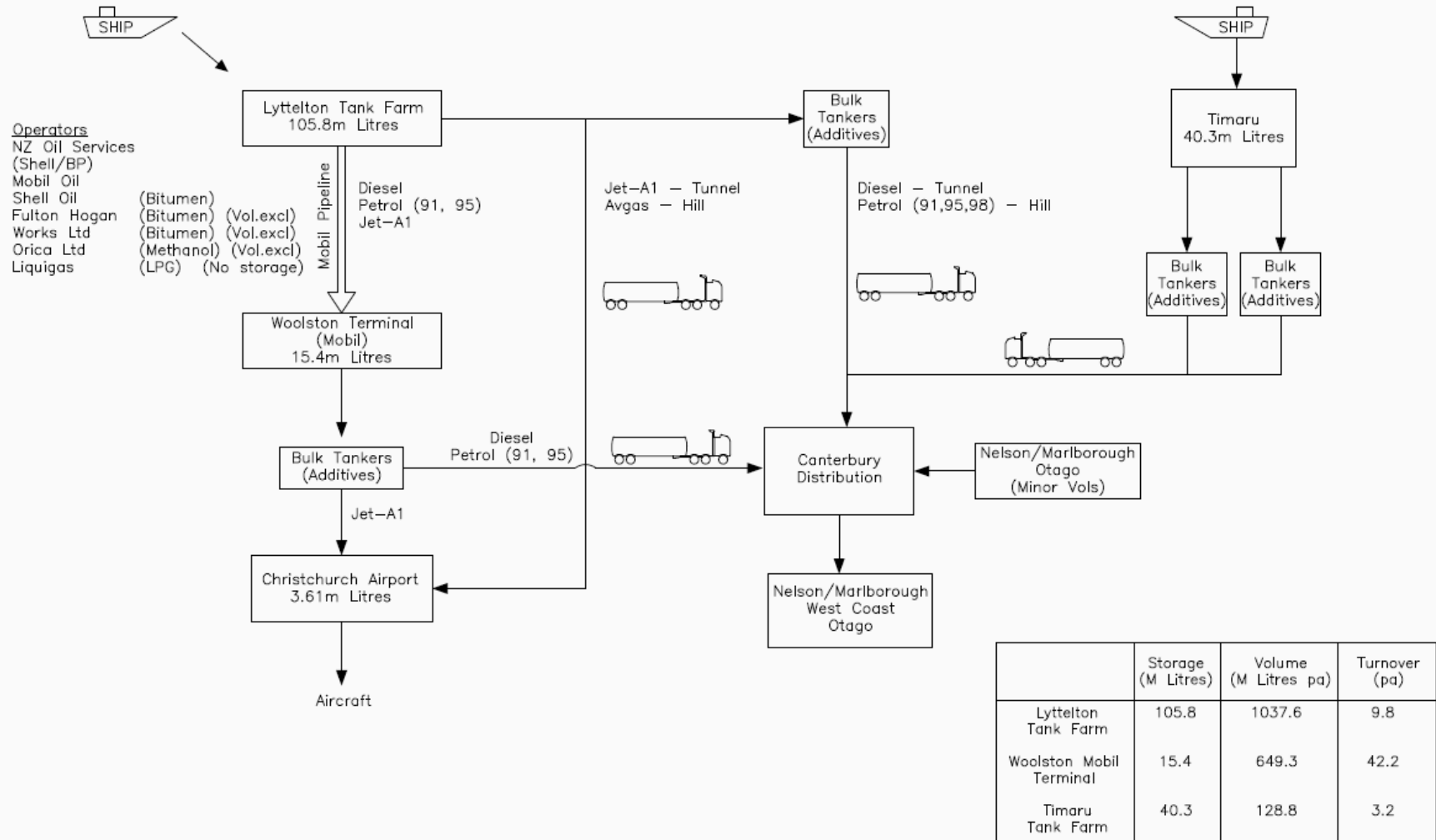


Tank Farms - Timaru



Petroleum Storage & Distribution

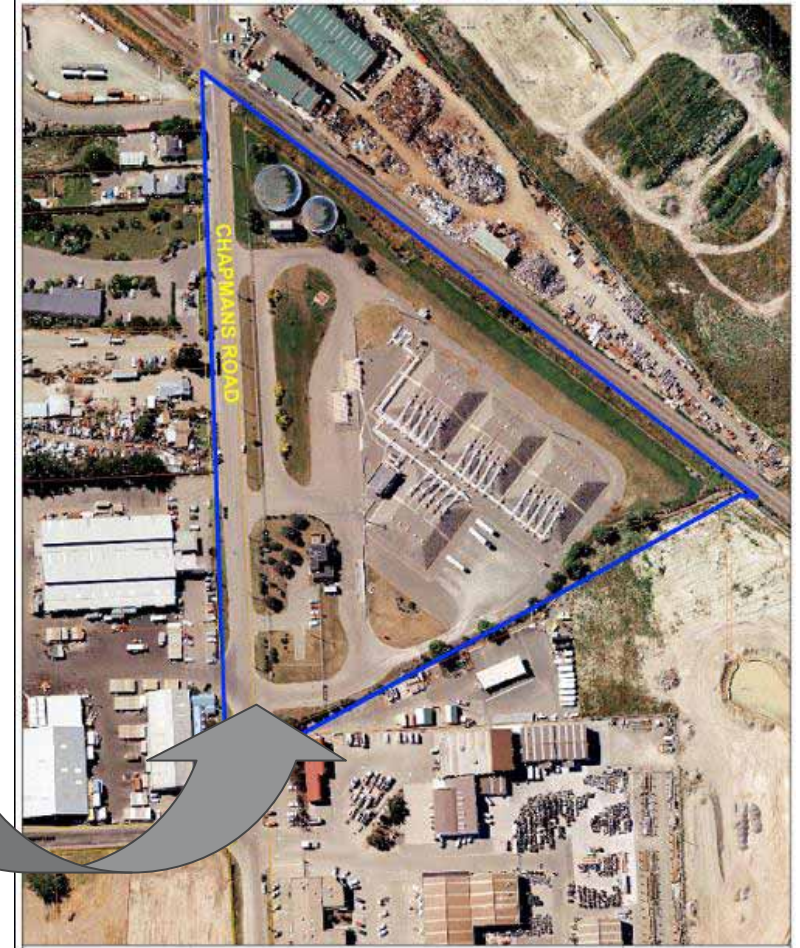
Petroleum Supply & Storage Volume



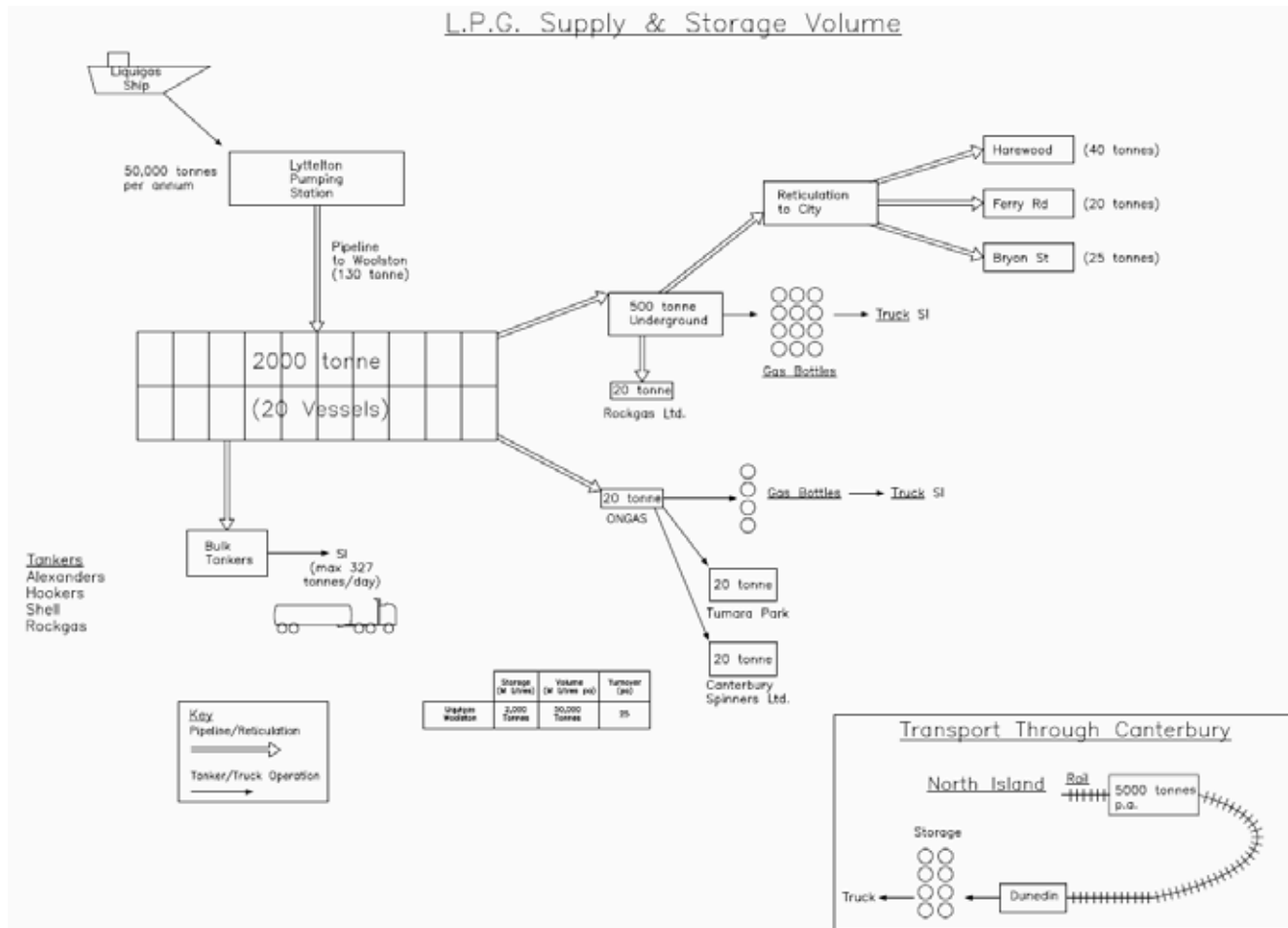
LPG



Pumped via LPG pipeline



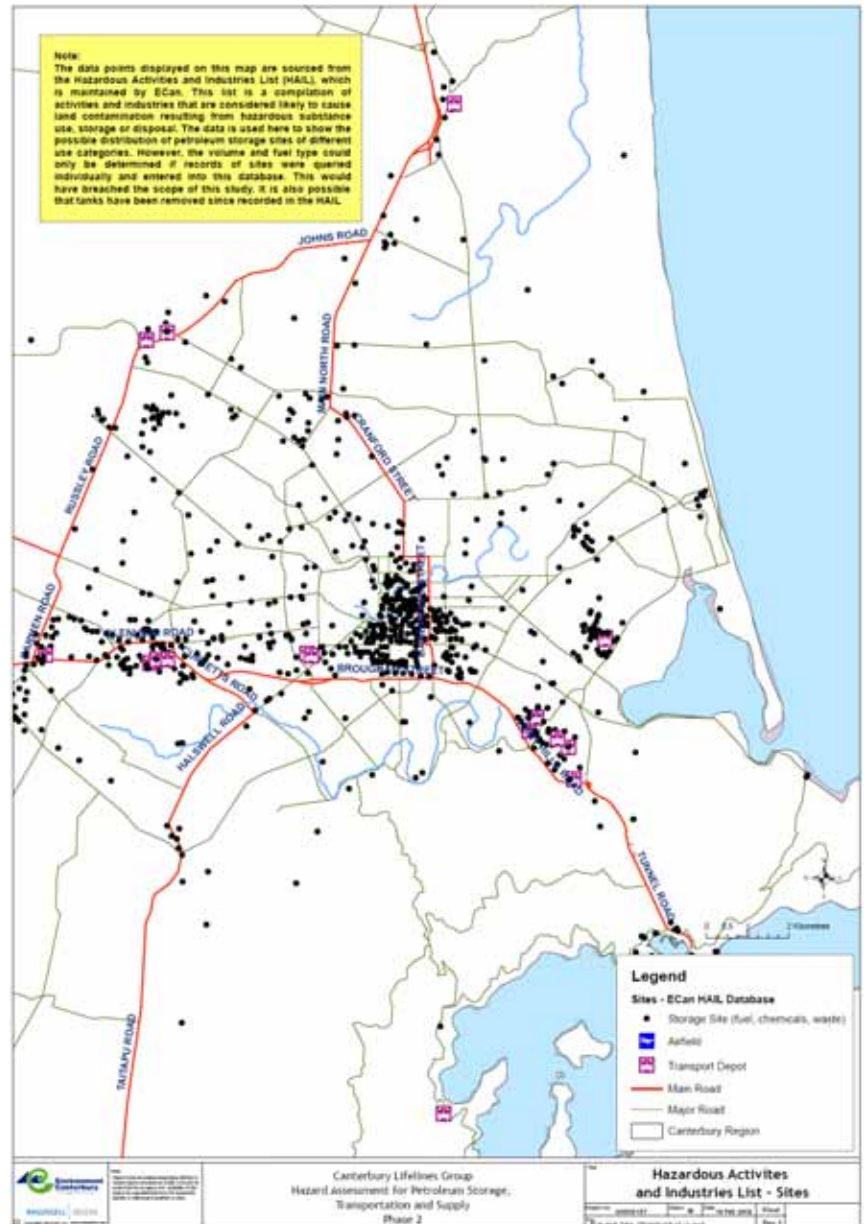
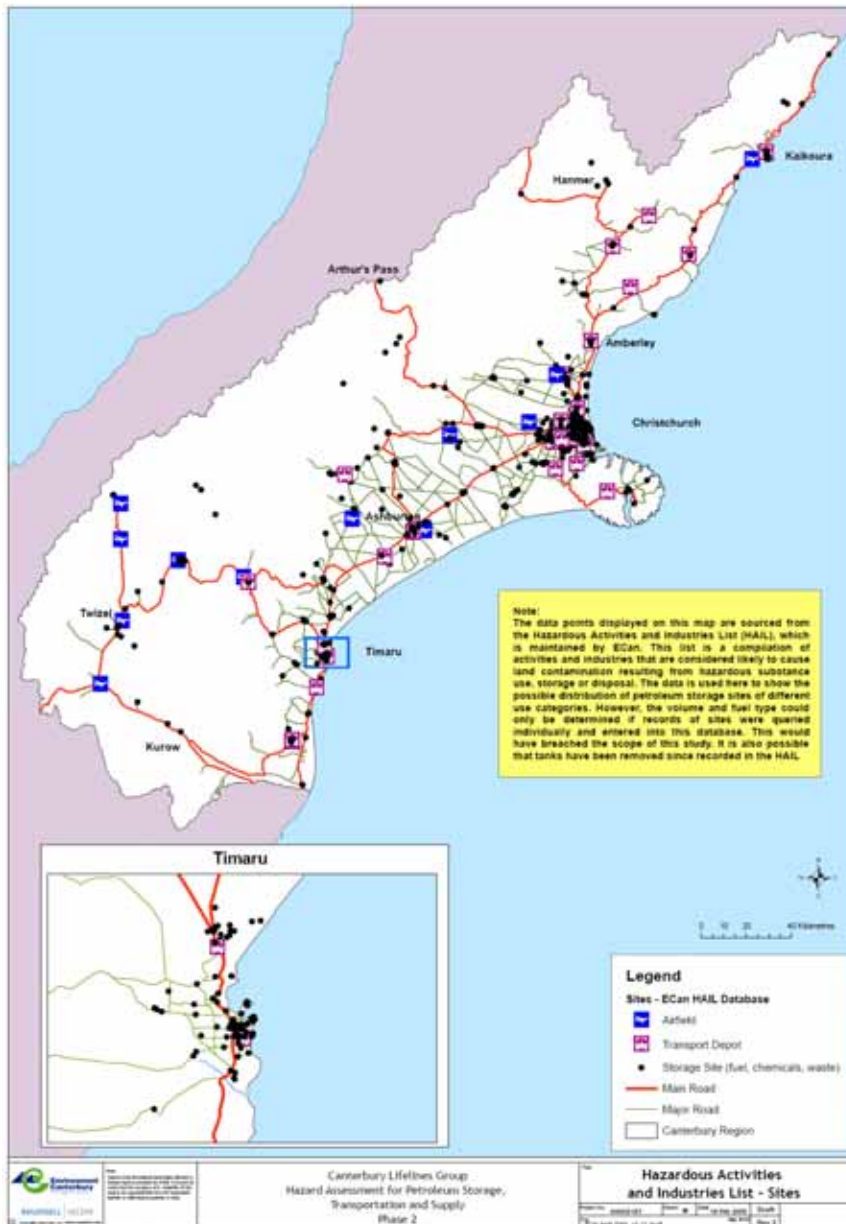
LPG Storage & Distribution System



Transportation and Dispersed Storage



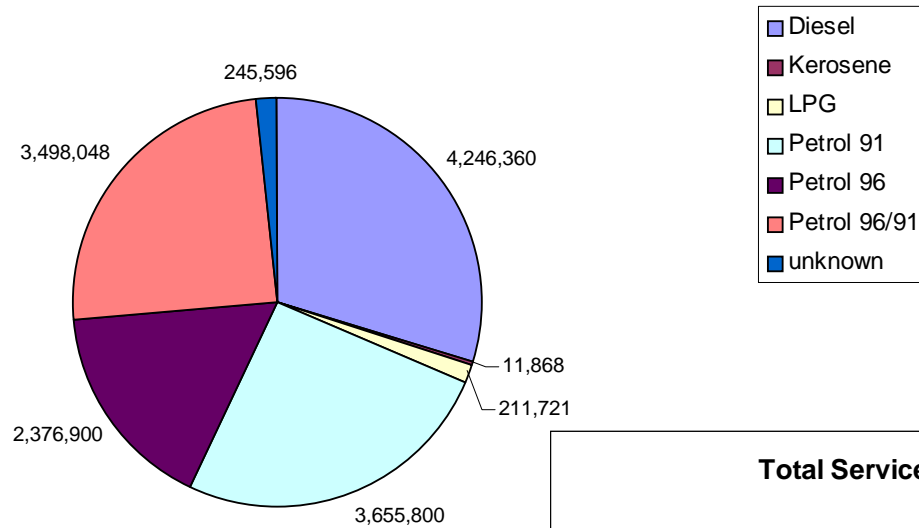
Dispersed Storage Sites – Other Tanks



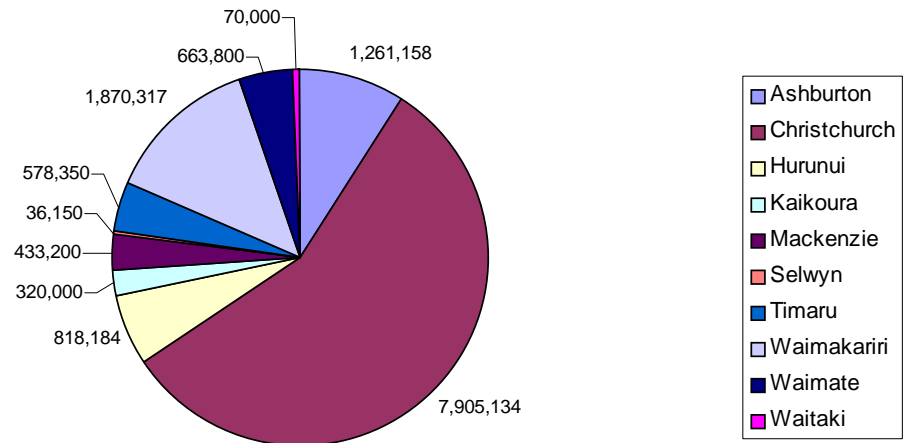
Storage Characteristics

Service Station Volume (Litres)

Total Service Station Tank Volumes By Fuel Type (Litres)



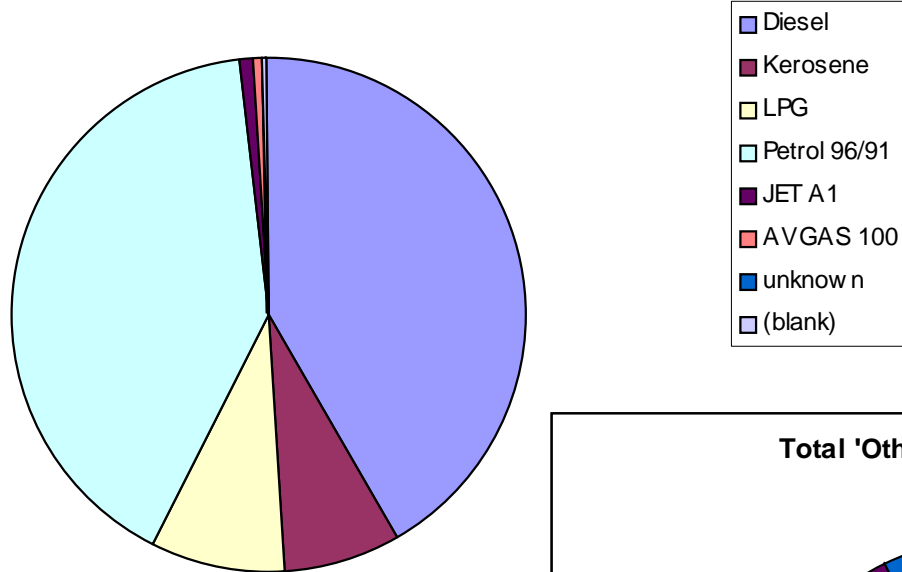
Total Service Station Volumes By District (Litres)



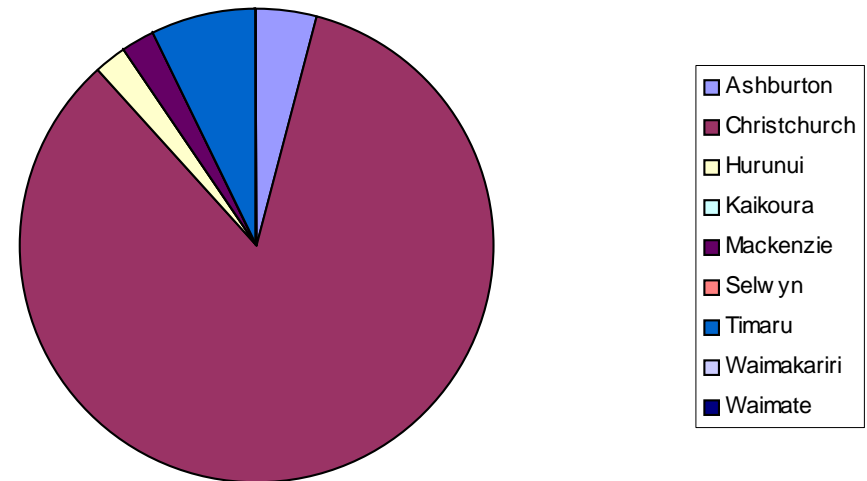
Storage Characteristics

Other Tanks Volume (Litres)

Total 'Other Tanks' Volume By Fuel Type (Litres)

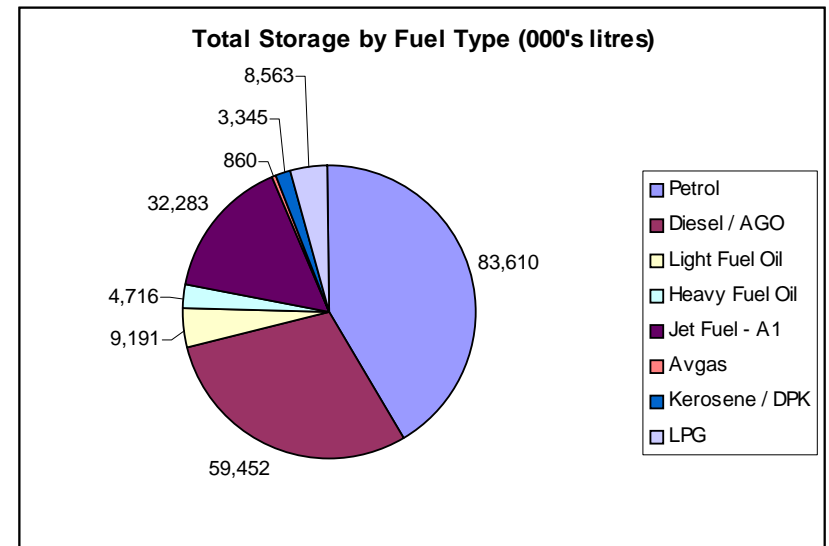
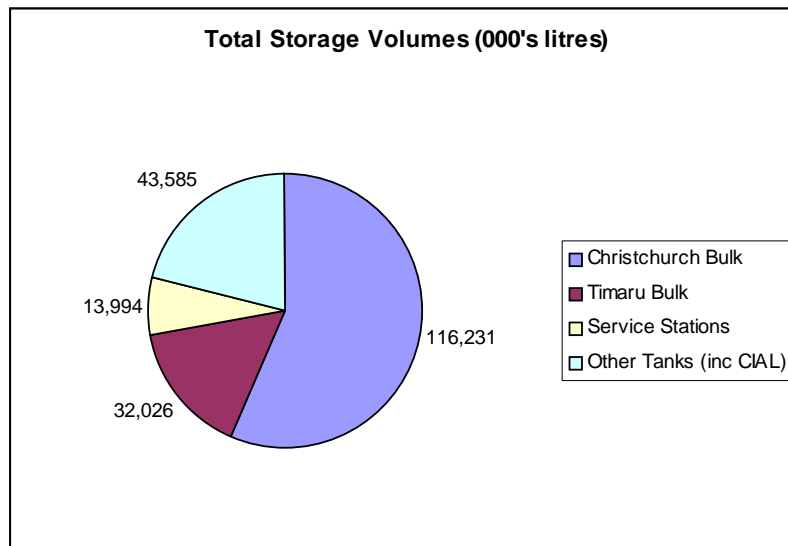


Total 'Other Tanks' Volume By District (Litres)



Storage Summary

Petroleum Product	Christchurch Bulk	Timaru Bulk	Service Stations	Other Tanks (inc CIAL)	Total Storage Capacity
	(000's litres)				
Petrol	38,077	22,526	9,531	13,476	83,610
Diesel / AGO	28,040	9,500	4,251	17,661	59,452
Light Fuel Oil	9,191	0	n/a	n/a	9,191
Heavy Fuel Oil	4,716	0	n/a	n/a	4,716
Jet Fuel - A1	25,427	0	n/a	6,856	32,283
Avgas	4,640	0	n/a	396	860
Kerosene / DPK	606	0	n/a	2,379	3,345
LPG	5,534	0	212	2,817	8,563
TOTAL	116,231	32,026	13,994	43,585	202,020



Effects of Hazards

- Transportation disruption
 - Multitude of effects
 - Snow a particular and regular issue
 - Low risk tolerance
 - Pandemic / people issues
 - Priority can be shifted – eg farm vs other deliveries
- Storage tanks
 - Seismic effects
 - No data on how well private above ground tanks are designed
 - Below ground tanks with low ductility subject to damage
 - Flooding / tsunami
 - Damage to dispensers
 - Flood level relative to height of vent pipe / quality of seals at filling points
 - Lack of stand-by power at service stations



Risk Analysis

Summary

Tank Farm Facility (Stage 1)	Flooding	Seismic / Liquifaction	Tsunami	Slope Failure	Coastal	Meteorological	Fire	Computer failure	Loss of Power	Telecommunications	Personnel / Human	Water / Wastewater	Incidents	Terrorism	Pandemic
Lyttelton Tank Farm	L	H	M	M	L	M	E	M	H	M	H	M	M	H	H
Woolston Mobil terminal	M	H	M	na	na	M	E	M	H	M	H	M	M	H	H
Mobil Pipeline	na	H	M	M	na	M	H	M	H	M	H	M	M	H	H
Woolston Liquigas terminal	M	M	L	na	na	L	M	M	M	M	H	M	M	H	H
Liquigas Pipeline	na	M	L	M	L	na	M	M	M	M	H	M	M	H	H
Rockgas Woolston	M	M	L	L	L	M	M	M	M	M	H	M	M	H	H
Christchurch Airport	M	M	na	na	na	M	M	M	M	M	H	M	M	H	H
Timaru Shell Tank Farm	L	M	M	na	L	M	M	M	M	M	H	M	M	H	H
Timaru Caltex Tank Farm	L	M	M	na	M	M	M	M	M	L	H	M	M	H	H

Risk Analysis

Summary

Risk-based Impact of Hazard Events Distribution / Transportation	District	Flooding	Seismic / Liquefaction	Tsunami	Slope Failure	Coastal	Wind	Snow	Lightning	Fire	Computer failure	Loss of Power	Telecommunications	Personnel / Human	Water / Wastewater	Incidents	Terrorism	Pandemic
	Kaikoura	M	M	M	H	M	M	M	M	M	M	M	M	M	L	M	M	H
	Hurunui	M	M	M	M	L	M	M	M	M	M	M	M	M	L	M	M	H
	Waimakariri	H	M	M	L	L	M	M	M	M	M	M	M	M	L	M	M	H
	Christchurch	M	M	M	H	M	M	M	M	M	M	M	M	M	L	M	M	H
	Selwyn	M	M	M	M	L	M	M	M	M	M	M	M	M	L	M	M	H
	Ashburton	M	M	M	M	L	M	M	M	M	M	M	M	M	L	M	M	H
	Timaru	M	M	L	M	M	M	M	M	M	M	M	M	M	L	M	M	H
	Waimate	M	M	L	M	M	M	M	M	M	M	M	M	M	L	M	M	H
	Mackenzie	M	M	L	M	L	M	M	M	M	M	M	M	M	L	M	M	H

Risk Analysis

Summary

Risk-based Impact of Hazard Events Service Stations Storage																	
District	Flooding	Seismic / Liquefaction	Tsunami	Slope Failure	Coastal	Wind	Snow	Lightning	Fire	Computer failure	Loss of Power	Telecommunications	Personnel / Human	Water / Wastewater	Incidents	Terrorism	Pandemic
Kaikoura	M	M	M	L	L	M	M	M	H	H	E	M	M	M	M	M	H
Hurunui	M	M	L	L	L	M	M	M	H	H	E	M	M	M	M	M	H
Waimakariri	H	M	M	L	L	M	M	M	H	H	E	M	M	M	M	M	H
Christchurch	M	H	M	L	L	M	M	M	H	H	E	M	M	M	M	M	H
Selwyn	M	M	L	L	L	M	M	M	H	H	E	M	M	M	M	M	H
Ashburton	M	M	L	L	L	M	M	M	H	H	E	M	M	M	M	M	H
Timaru	M	M	M	L	L	M	M	M	H	H	E	M	M	M	M	M	H
Waimate	L	M	L	L	L	M	M	M	H	H	E	M	M	M	M	M	H
Mackenzie	M	M	na	L	na	M	M	M	H	H	E	M	M	M	M	M	H

Recommendations

- Next Steps with Report
 - Sector discussions
 - Implications at TLA level
 - Summary report
- National and Local Fuel Inter-Agency Petroleum Group (FPIG)
 - Communication – national and regional
 - Promotion and implementation of improvement actions
- Canterbury Petroleum Contingency Plan
 - Follow on from Auckland plan
 - Priority customers
 - Priority service station sites, stock levels, resilience (see next page)
 - Emergency supply management
 - Keep risk register up to date

Recommendations

- Service Station Resilience
 - Resilience framework – priority sites
 - Mitigations – eg. power back-up, tank design, maintenance standards
 - Owner vs industry responsibilities
- Interdependencies Project and Lifeline Utilities
 - Include petroleum fuels supply and distribution
 - Cascade effects and impacts on lifeline utilities and others
 - Airport continuity
- Priority Routes Project and Road Controlling Authorities
 - Needs of road tankers
 - Critical sites – eg Clandeboye milk
- Geotechnical
 - Pipeline routes over Port Hills



Fuel Storage on the West Coast

Rob Daniel

West Coast Engineering Lifelines Group

Introduction

- Reasons for research
- Scope of the research
- What was found
- Future actions

Reasons for doing research

- Fuel most important resource to assist with response and recovery.
- Alpine Fault Earthquake (AFE) event expected to significantly disrupt road network.
- West Coast operates on a just in time fuel supply system.
- Extremely limited storage capacity in region.
- Local level information on fuel storage would enable alternative sources to be located and utilised if required.

Scope of Research

- Five main components to research:
 1. Fuel transportation
 2. Fuel storage
 3. Access to stored fuel resources
 4. Risk to storage facilities
 5. Arrangements at national, regional, local level

How was research done?

- Mail out – mail back survey followed up by phone calls to non-responders.
- Respondents included but not limited to:
 - Service stations
 - Contractors
 - Landcorp farmers (as a sample of farming community)
 - Mining companies
 - Sawmills
 - Helicopter operators
- 105 surveys sent out – final response rate 81% (85/105).

1. Fuel Transportation

- Fuel transported to West Coast via the following routes:

Company	Arthurs Pass	Lewis Pass	Shanandoah/Rahu	Haast Pass
A	80%	20%		
B	65%		35%	
C	80%	18%		2%
D	35%		65%	
E	20%	10%	70%	

Percentage of Fuel into the West Coast by Highway



- Arthurs Pass - 56%
- Shanandoah/Rahu – 34%
- Lewis Pass – 9.5%
- Haast Pass 0.5%

1. Alternative Transportation

- Lifelines Reports completed in June 2006 indicated restoration times following AFE scenario for road network:
 - Arthurs Pass – 7 months
 - Lewis Pass – 16 days
 - Buller Gorge – 6 days
 - Haast Pass – 3 months, but a year for route between Haast and Hokitika

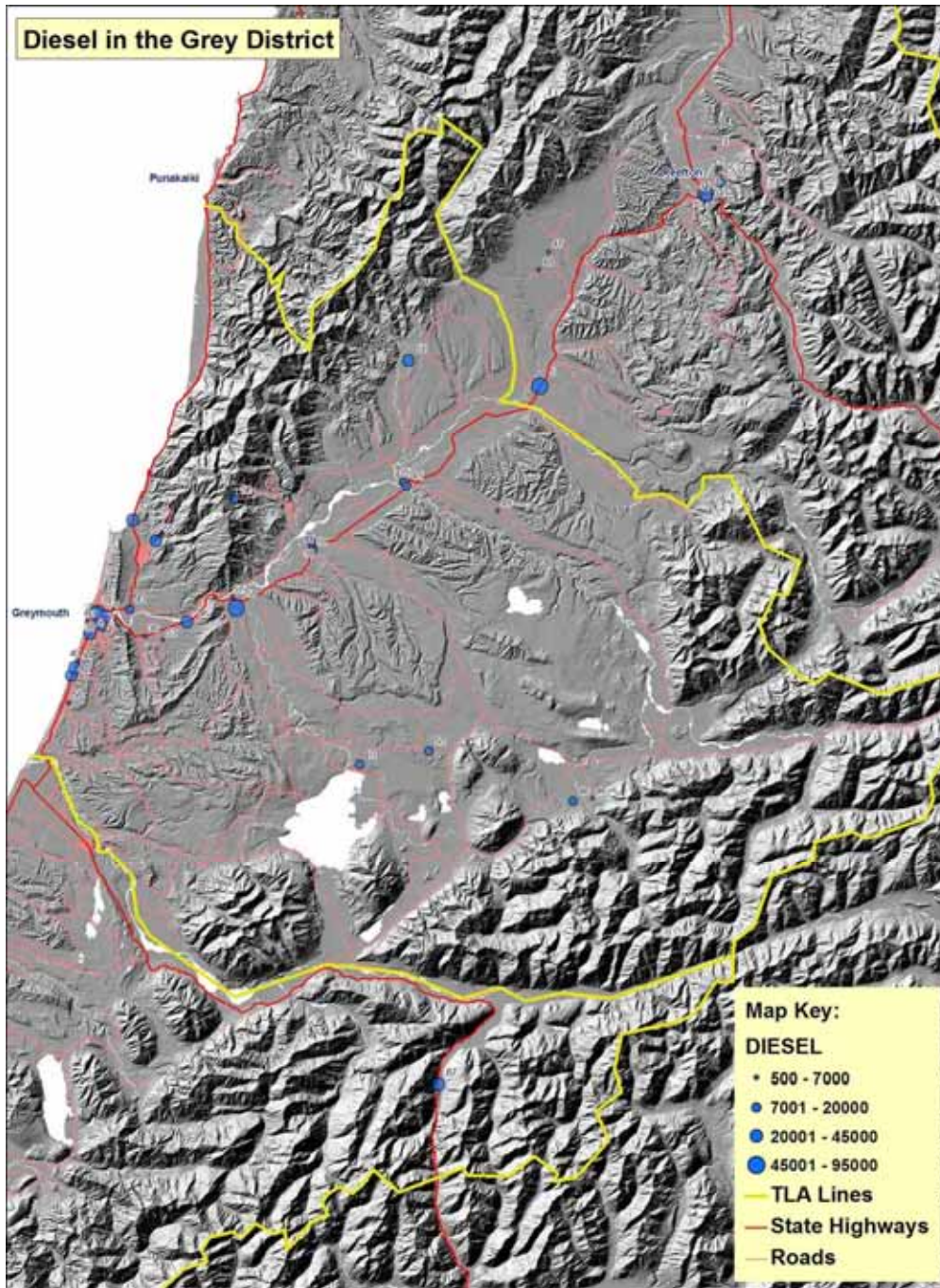
Alternative methods of transporting fuel were identified...

- Via sea through ports of Greymouth and Westport by barge, ship, fishing vessel.
 - Issues with quality of infrastructure at ports, accessing vessels who can safely navigate river mouth ports, transfer of fuel from ship to land, storage of fuel once arrived.
- Via air through use of helicopter.
 - Issues with quantity of fuel can move.

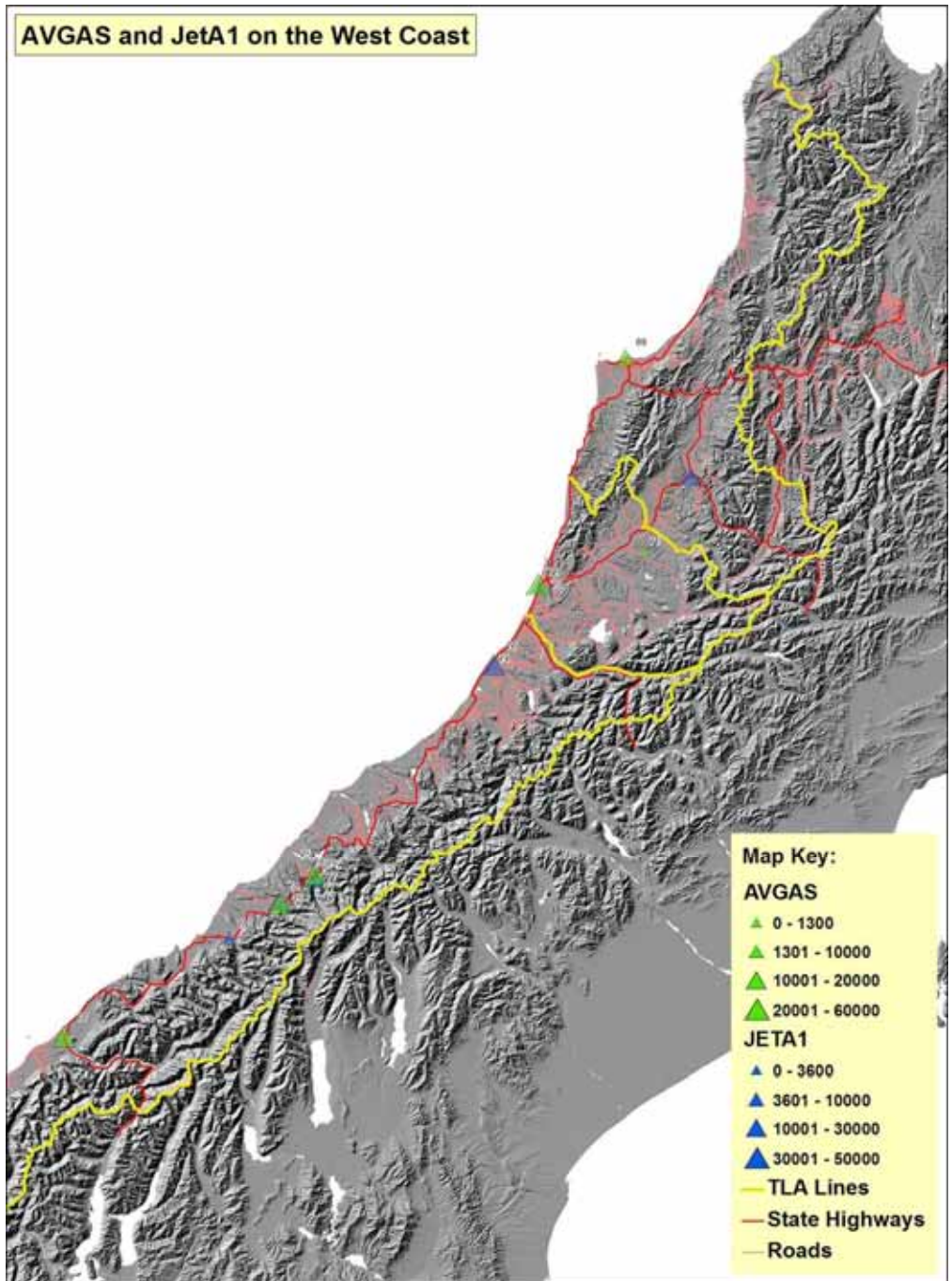
2. Fuel Storage

- Primary objective was to ascertain amount of fuel stored on West Coast by type and location.
- GIS maps created to identify for each district:
 - Diesel and petrol quantities and locations
 - AvGas and Jet A1 quantities and locations
- Comprehensive contact lists also included in Appendices

Diesel in the Grey District



AVGAS and JetA1 on the West Coast



3. Access to stored fuel resources

If in the event of long term power loss did they have the ability to access fuel from their storage tanks, or were they set up to run with a generator?

- Service stations:
 - 4 out of 19 were able to access fuel in a power outage.
 - All 4 located in remote locations e.g. Haast, Fox, Kaniere, Reefton.
- Industry:
 - 38 sites of industry respondents were able to access fuel.
 - Various means of dispensing fuel including generator, petrol or diesel engines, gravity feed, hand winder, hand pumps, 12 & 24 volt batteries.
 - Wide range of mobile fuel dispensing equipment including tankers available.

4. Risk to storage facilities

Has an assessment of the vulnerability of storage facilities to natural and technological hazards, particularly for an MMVII or greater earthquake been undertaken?

- For service stations (n = 19) only 2 had undertaken this.
- For other organisations (n = 49) only 16 had undertaken this.

When respondents (including service stations) were asked if a risk assessment was planned for the future:

- 14 respondents indicated that this was being considered.
- 38 respondents indicated no future assessments planned.

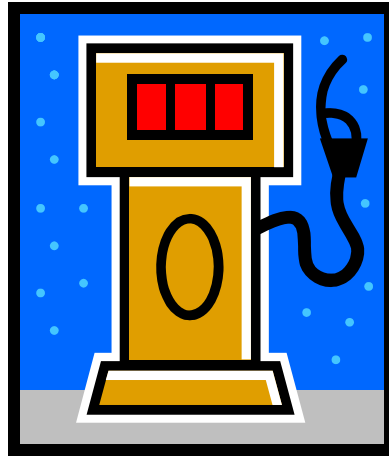
5. Arrangements

- Pre-catastrophic event agreements
 - 2 out of 19 service stations had pre-event agreements in place.
 - In remote locations:
 - Kaniere to supply police and fire
 - Haast to supply local power station with a small tanker
- National fuel companies and distributors were asked whether they had any national arrangements which could be employed in an emergency to coordinate ongoing supply of fuel to regions that may be isolated.
 - 3 out of 4 indicated they did.
 - Closer review of answers showed that no consideration besides transport via roading network undertaken, and this appeared only cursory.

Future Actions

- Develop local arrangements with fuel storage organisations, primarily service stations, for the provision of fuel to preferred response organisations in an emergency.
- Local arrangements developed to ensure that service stations have alternative means of extracting fuel from tanks in the absence of mains power, and how these are to be sourced and installed/implemented.
- Encourage standardisation of wiring and plugs for generator use at service stations.
- Develop protocols for fuel security in an emergency.
- CDEM Group to follow up on national arrangements for the provision of fuel to ensure these have been given consideration and planning through MCDEM with the national fuel companies and their distributors.
- Consider forming an emergency plan with national fuel companies for supply via the ports of Greymouth and Westport.

Questions?



A final thought:

FOOD



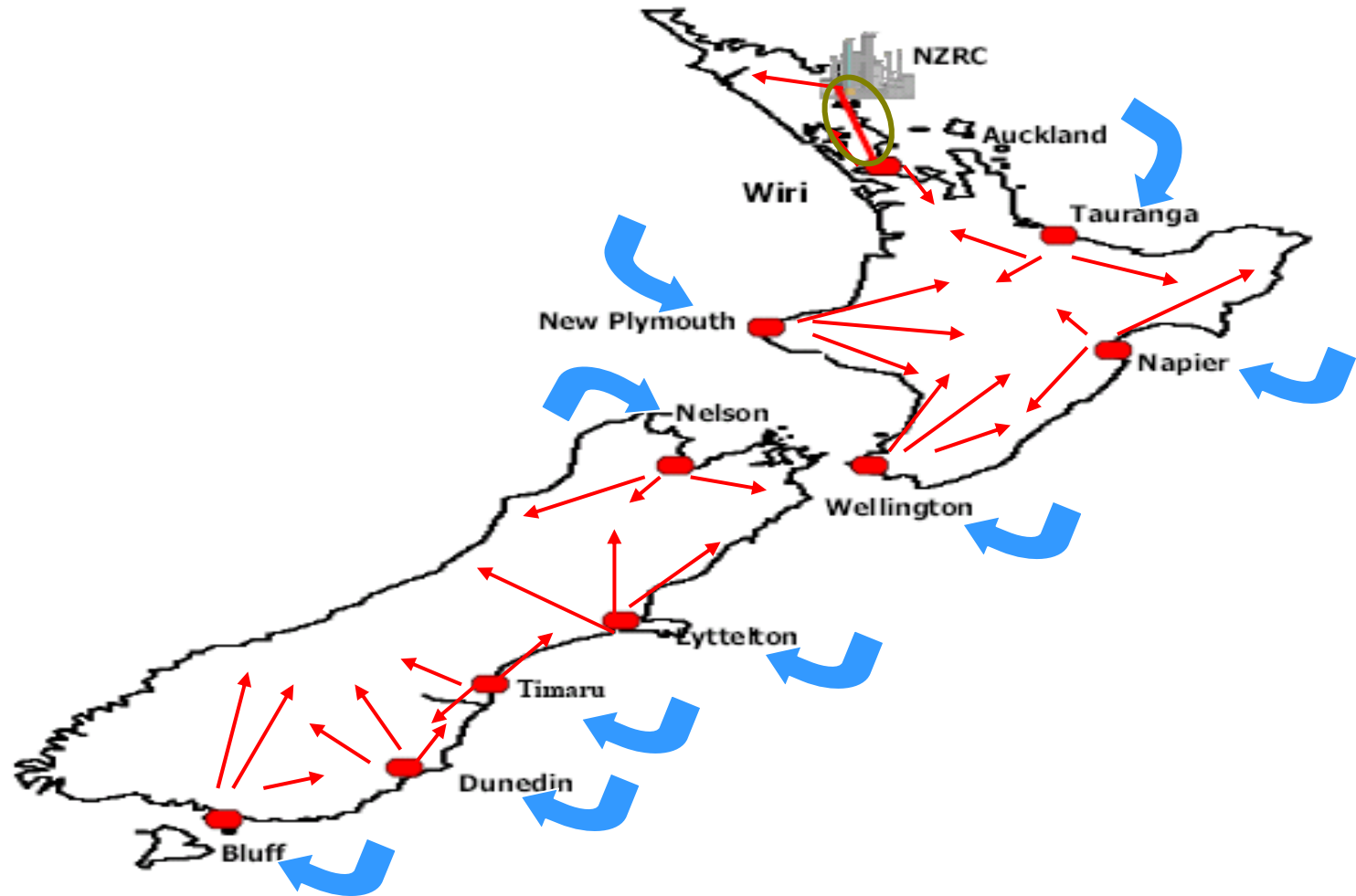
Te Rākau
Whakamarumarū

Ministry of Civil Defence
& Emergency Management

National CDEM Fuel Contingency Planning

Mark Constable
Emergency Management Advisor,
Sector Development

NFCP Focus:



Civil defence emergencies which impact on the *distribution* of petroleum products.



Planning Objectives

- Define planning requirements between CDEM and Petroleum Sectors
- Develop Petroleum Sector Coordinating Entity
- Define National level CDEM support to the Petroleum Sector
- Define roles and responsibilities
- Establish triggers for response



Planning Objectives

- Issues around 'priority customers'
- Process for accessing rationing methods
- 'Fill the gaps' between existing plans
- Producing a workable and functional plan

Exclusions

- The NFCP will not:
 - Deal with petroleum 'supply' issues into New Zealand
 - Explicitly define CDEM/Petroleum sector responses on a region-by-region basis




Why?

- Support to CDEM Groups / Lifeline Groups / Sector
- Perceived vulnerabilities in contingency planning
- Dependence and interdependence issues
- The Guide to the National CDEM Plan

Building on Current Work

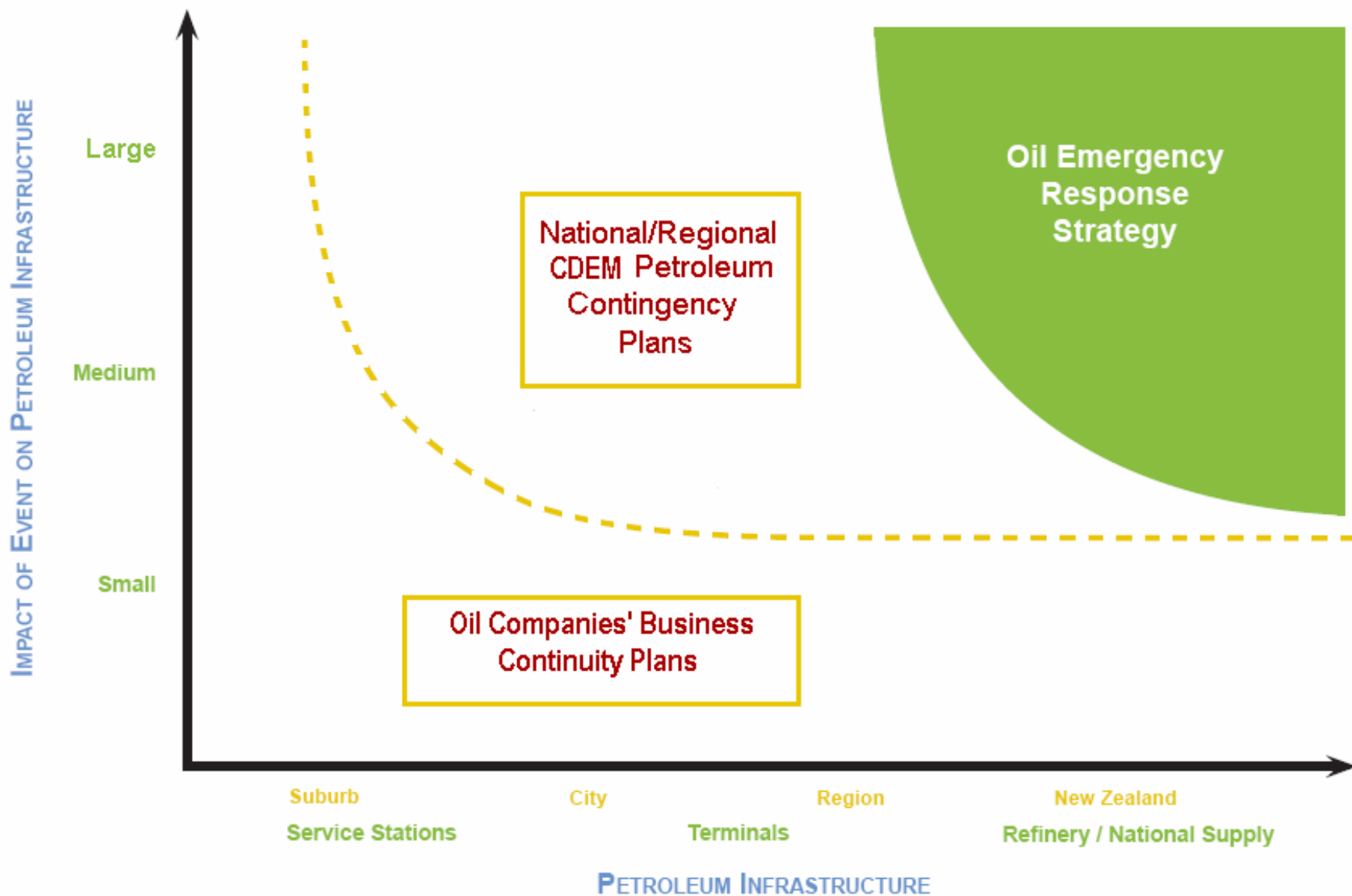
- AELG Fuel Contingency Plan
- Canterbury Petroleum Vulnerability Report
- West Coast Fuel Storage Study
- MEDs Oil Emergency Response Strategy



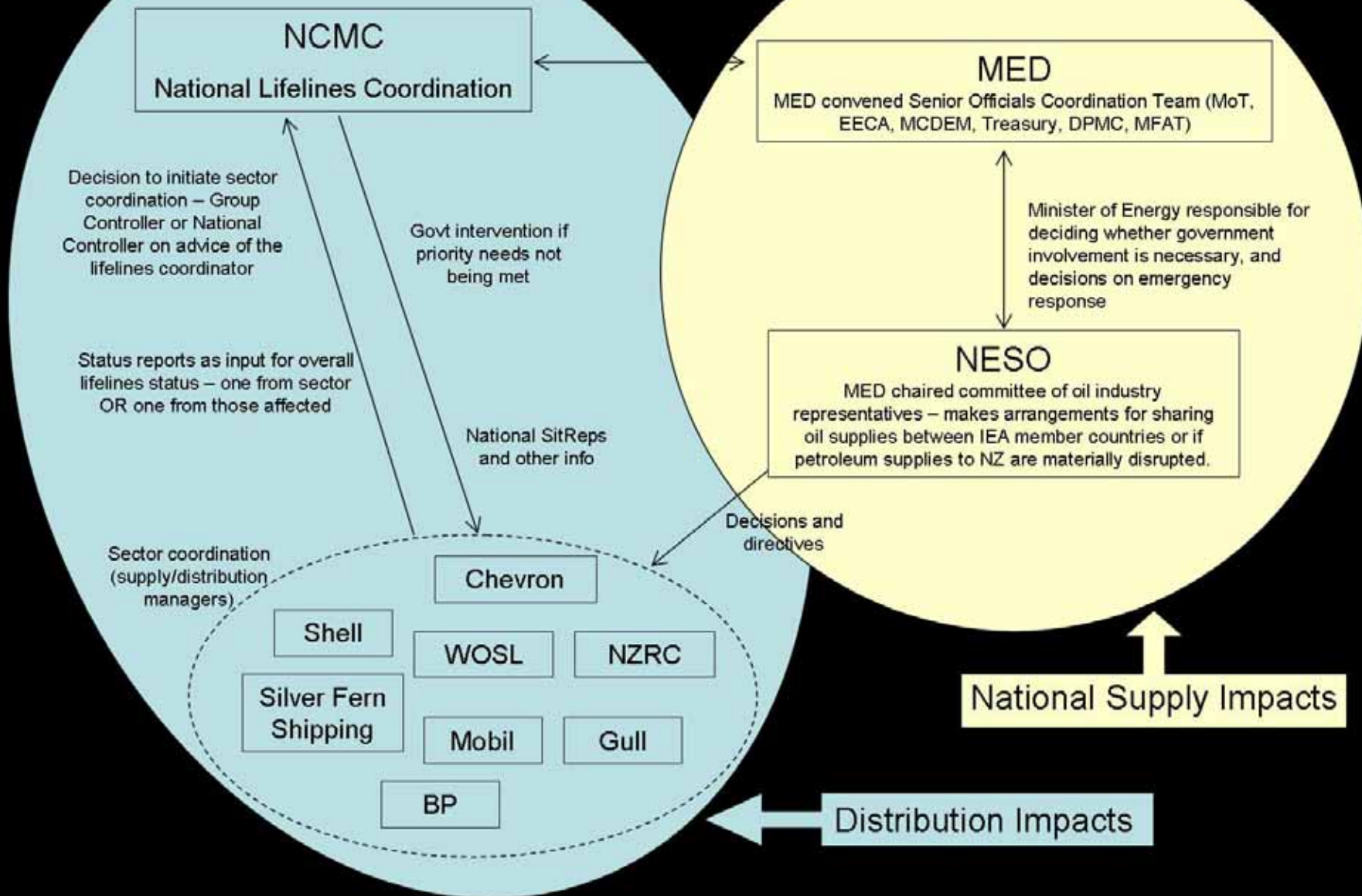
Oil Emergency Response Strategy (OERS)

- Discussion Paper published 29 September 2006
- **OERS** published 11 July 2008
 - Concerned with Supply Issues
 - Options for responding to an 'oil emergency'
 - Key measures government could use

Response Arrangements



Sector Coordination





**Te Rākau
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**Ministry of Civil Defence
& Emergency Management**

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Questions?

