

## 5.5 Economic Development impacts of scenarios

Consideration of the regional economic development impacts of the scenarios has been undertaken at a high level with the following principles:

- ▶ There is no additional ongoing employment as a direct result of any scenario. This is because:
  - Port investment is likely to continue to focus on high-productivity solutions through automation. All scenarios assume an acceleration of automation through the investment in new port capacity
  - While automation leads to a reduction in port employment, most scenarios require additional steps in the logistics and supply chain (e.g. new inland ports and more rail). It is assumed that any employment reductions through automation at ports, is offset by employment increases in the wider supply chain. Both are, however, at the margins.
- ▶ Alternate land use at the Ports of Auckland site in terms of commercial activity will lead to an intra-regional relocation of employment in Auckland. We are expecting this to be a stepped change whereby the larger corporates would continue their relocation from the mid-town parts of Auckland to newly available land at the waterfront, which in turn leads to movement into mid-town from CBD fringe, and others such as the University of Auckland and AUT, continuing their progressive expansion
- ▶ While first-order impacts on employment are neutral, the location of employment will change in each scenario in terms of logistics and supply chain jobs. It is assumed that the majority of jobs, including rail and road, will relocate over time to the area of focus in the scenario.
  - This assumption is made on the basis that employees will locate closest to the area that they will start and finish their day, and wherever possible, take advantage of lower costs of living associated with regional New Zealand.
  - The only potential risk to this assumption is whether there are sufficient opportunities for spouses of employees
- ▶ The impact of the relocation of employment is assessed on the basis of the percentage change in the size of the regional economy as a result of the quantum of the move. As an example, the relocation of 500 employees from Auckland will have a negligible impact on the economic shape and size of Auckland, while those same 500 employees will have a material impact on the size of the Northland economy
- ▶ Flow-on impacts from this spatial reallocation of employment into the focus regions is considered, and again, is a function of the relative sizes of the economy. Any reduction in Auckland is highly unlikely to result in a reduction in the need for services associated with the change. However, a material first-order increase in employment in a smaller area such as Whangarei will result in the need for additional services in areas such as education, health etc.
- ▶ Small positive impacts from land use change in Auckland are assumed. This is associated with an increase in economies of scale and move to more productive jobs associated with agglomeration impacts of greater density and focus in the CBD

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## 6. Results

Evaluation of the scenarios has been focussed on a mixed approach of qualitative and quantitative analysis. The qualitative analysis has been focussed on a best-practice Multicriteria Analysis (MCA), which contributed to the shortlisting of the scenarios, but also enabled discussion of qualitative aspects of the scenarios, not adequately captured by the monetizable benefit cost analysis.

A benefit cost analysis has been undertaken to assess the quantitative impacts of the scenarios.

This is in accordance with the NZ Transport Agency Economic Evaluation Manual, which enables the analysis to be integrated with other critical and complementary analysis, in particular the recent business case for the North Auckland Line.

In addition to the above approach, the flow on economic development impacts, with a focus on the regions (with offsetting urban impacts) is also included

Examples of the considerations to be explored within Cost Benefit Analysis:

	Category	Form of Assessment	Scenario
Direct Impacts	Benefits	Quantitative	Port revenues
	Costs	Quantitative	Port operating costs
Indirect Impacts	Transport infrastructure	Quantitative	Costs of additional road and rail infrastructure
	Freight operators	Quantitative	Cost to freight operators of meeting the additional trade task
	Transport users	Quantitative	The impact of congestion from additional trucks on the road
	Land use benefits	Quantitative	Land value of the old port site in highest and best use
	Land use costs	Quantitative and Qualitative	The impact of intensified port operations on surrounding residential areas; opportunity cost of land at Port (alternate land use)
	Wider economic benefits (WEBs)	Quantitative	Agglomeration impacts - the impact of economic density at new port site and from redevelopment at previous port site
	Environment	Quantitative and Qualitative	The impact on the environment of port operations
	Social Impacts	Qualitative	Impact on liveability, employment, public access, recreational use, and community health and wellbeing at both new port site and existing port site, as a result of port moving to a new location

A critical feature of the Benefit Cost Analysis is the deployment of the new procedure around Dynamic Wider Economic Benefits, and in particular, the land value uplift from alternative land use at the Port of Auckland site.

### 6.1 Benefit Cost Analysis

The results of the benefit cost analysis that assessed all Scenarios are as follows:

## Summary Results

Relative to Base Case, Net Present Value, \$ million nominal terms

	Scenario 2.1 - Full move to Northport	Scenario 2.2 - Full move to Tauranga	Scenario 2.3 - Full move to Firth of Thames	Scenario 2.4 - Full move to Northport & Tauranga
Total Costs	1,776	3,526	3,417	3,370
Total Benefits	3,611	509	701	1,336
Net Benefits	1,835	-3,017	-2,717	-2,034
<b>Benefit Cost Ratio</b>	<b>2.0</b>	<b>0.1</b>	<b>0.2</b>	<b>0.4</b>

The analysis summarises a set of complex interactions. In essence:

- A lengthening of the logistics and supply chain applies to all options. This is reflected in increased transport costs for users and consumers of products. This is combined with environmental impacts and the capital costs of additional infrastructure.
  - All scenarios increase transport costs and environmental impacts relative to the status quo
- These costs are offset by two critical dynamics that are mutually inclusive:
  - The deferral or elimination of infrastructure costs associated with ensuring the medium to long-term operability of a logistics and supply chain that relies on a central Auckland location. This is both land-side investments and port investments.
  - The application of a different land use to the parts of the Ports of Auckland footprint that are made available.

As such, these outcomes highly dependent on freight forwarder port preference, mode choice and alternative land use

The scenarios are premised on providing infrastructure to support alternative freight movements and the modelling critically assumes that the majority of freight will follow the enabling investment.

Neither the consultant team, nor the Working Group have assumed the ability to “direct” freight forwarder preferences for ports.

The modelling is extremely sensitive to mode choice. In particular, it is assumed that 70% of the “Full Move to Northland” freight task is covered by rail. This substantially drops the economic impact of the significant lengthening of the logistics and supply chain.

The Working Group took a pragmatic approach towards determine the mode split. In particular the working assumption is the same amount of Vehicle Kilometres from the trucking sector will apply. However, the key freight and logistics hubs are further away, so fewer (but longer) truck trips are made compared to the status quo. The working assumption is that road will continue to handle the most time-sensitive goods, but with a fixed number of trucks able to undertake fewer journeys, rail’s net timeliness significantly improves, and will manage the majority of the key trips to the main inland hubs.

Lastly, the scenarios are reliant on the ability of the alternate land use for the POAL site to deliver value to the ratepayer and the city. This will be a function of the commercial strategy adopted in terms of any port move, the release of land, the decisions made on how the land will be development, and the market demand at the time.

The Partial Move scenarios also delivered benefit cost ratios above 1 at 6.8 (Northport) and 4.1 (Tauranga) respectively. A Partial Move scenario demonstrates a value as a potential interim approach to a Full Move scenario. It could have also been considered, should a Full Move scenario not deliver a viable benefit cost ratio (which Scenario 2.1 does).

## 6.2 Technical outcomes

At a high level the assessment showed that development of significant capacity increases at Port of Tauranga (above already forecasted growth) would be difficult. The scenario where it is assumed that all the freight currently coming through POAL was instead assumed to come through NorthPort appeared more promising. The expected volumes compared to planned capacity (assuming investment) are shown in the figure below.



It is estimated that the cost to develop NorthPort to this extent would be in the order of \$1.35B over the next 30 years. Based on benchmarking similar developments around Australasia, the development required could be undertaken within the next 15 years if desired, and in fact depending on the time for approvals the work could be complete within 7 years, as shown in the figure below.



Taking the above into account, and considering the strategic direction being developed by the Working Group, the following are drawn:

- It should be recognised that a hard constraint will be reached in the ability to move freight by road or rail to and from POAL, and therefore its 'capacity' will be reached, and freight will have to go elsewhere.
- Given the above, any investment in improving productivity inside POAL should be carefully scrutinised against the probable longevity of the port operations.
- If it was decided that the strategy (among other things) was to develop Northport and the associated land transport networks to connect it to Auckland and the rest of the country, then it would be prudent to develop Northport at a scale and in a timeframe that would avoid the estimated \$500M to be spent prior to 2026 to implement automation at POAL.

- It would be possible to transition in stages, by closing POAL to cars first, and then gradually implementing changes for containers and bulk commodities. A detailed transition plan would need to be developed.

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### 6.3 Other Non Monetisable Impacts

It is considered that the multicriteria analysis provides a sound proxy for the non monetisable benefits in particular the impact of the options is as follows:

Description	Economic	Environmental	Social	Cultural
<b>Base Case</b>				
<ul style="list-style-type: none"> <li>▶ The Base Case allows for POAL to increase capacity and efficiency in its current area through technological advances, but does not allow for any expansion via land reclamation other than the reclamation that has already been consented.</li> </ul>	<ul style="list-style-type: none"> <li>▶ A significant additional port investment, with supporting land-side infrastructure, outside of the current POAL footprint will need to be made to take all of Auckland's marginal freight growth over and above any capacity cap.</li> <li>▶ As freight continues to grow (in line with the growth trends outlined in the National Freight Demand Study), Auckland's share of the total freight task will diminish and other UNI ports will grow.</li> <li>▶ There are growing impacts on local transport network, particularly road congestion</li> </ul>	<ul style="list-style-type: none"> <li>▶ No change to coastal processes as port maintains the same footprint.</li> <li>▶ Impact on Auckland Harbour traffic will remain the same, albeit with an increased number of vessels.</li> <li>▶ No additional impact on marine ecology</li> <li>▶ As throughput increases, a steady increase in carbon footprint over time is anticipated.</li> <li>▶ Increased noise effects may occur in line with throughput increases and in particular additional machinery, equipment and truck movements.</li> </ul>	<ul style="list-style-type: none"> <li>▶ No opportunities for enhanced public access to the waterfront and local recreation.</li> <li>▶ There will be a negative impact on the quality of urban form and design for Auckland as a growing city that has emphasis around its waterfront. As a result, Auckland's reputation as the "most liveable city in the world" is negatively impacted.</li> </ul>	<ul style="list-style-type: none"> <li>▶ There remain outstanding Treaty of Waitangi questions concerning title, foreshore and harbour management and the appropriate recognition of rights and responsibilities stemming from the interests and relationships held by mana whenua iwi. Resolving these questions are extant matters for consideration as part of the Waitematā harbour settlements.</li> </ul>
<b>Scenario 1.1 &amp; 1.2 - Partial Move (Cars Only) - Northport and Tauranga Respectively</b>				

- ▶ A Partial move involves consideration of the movement of the car imports in a short- to medium term horizon to either the Northport or Port of Tauranga. These scenarios involve investment in Northport and / or Taranga transport infrastructure in order to support a new supply chain model for the UNI, in line with design principles.
- ▶ Tauranga already has major congestion issues, this may worsen with this partial move of cars to POT as it involves more freight travel (due to distance) and road congestion (due to mode share). In comparison to POT, Northport has less freight travel and road congestion.
- ▶ Marginal improved effects on biodiversity for both Northport and POT.
- ▶ Moving from Auckland to Northland will be desirable for workers involved in moving cars as house prices in Northland are more affordable.
- ▶ No Cultural impact for both Northport and POT.

### Scenario 2.1 – Northport, full move

- ▶ A full move to Northport entails moving the entire operations from POAL to Northport (except cruise ships)
- ▶ Northport has the potential to be a catalyst for economic development across Northland, delivering direct and indirect benefits to the local area, industries and communities. Available industrial land near the new Northport site could be used to develop industrial parks and production facilities, stimulating additional economic growth in the local area.
- ▶ An upgraded North Auckland Line means that local businesses within the region have easier and faster access to regional, inter-regional, and international markets.
- ▶ There are costs implications involved with the full move to Northport with regards to the
- ▶ Externality of transport, such as GHG emissions are decreased by reducing the proportion of existing and future heavy trucks from Northland to Auckland roads onto rail.
- ▶ Given the rural nature of Northland, benefits arising from noise pollution would be minimal, this is a significant improvement in comparison to POAL which is currently located in downtown Auckland which can tend to have more negative urban environmental impacts.
- ▶ Noise pollution of rail is considered to be less intrusive than road and rail freight can be consolidated to operate less frequently (due to higher per trip capacity).
- ▶ The Northport expansion has a positive social impact as the jobs created from this will lead to an uplift in employment which flow through to additional demands for employment to service the expansion in the economy, in areas such as education and health. As a result, this will lower the levels of deprivation within the region.
- ▶ There is an opportunity to look at rail to bring Cruise ship passengers further inland on day trips to see attractions, improve their experience and in doing so spend more money in Northland. A well-run rail offering, including an upgraded rail link to Northport, could help facilitate this as it does in other places like Dunedin.
- ▶ A full move to Northport means that's the port's expansion could provide economic growth within the various sectors of the Northland. This in turn will have a positive cultural impact as Māori own a significant asset base across these key sectors comprised of the assets of trusts, incorporations, and businesses. In particular, this will help Māori enterprises make strong economic contributions to forestry, agriculture and fishing sectors, health and community services and property and business services. This results in a strong Māori economy in Northland provides better

expansion of the port and the surrounding transport infrastructure (particularly rail).

- ▶ Additionally there are also benefits with regards to reduced freight costs and heavy vehicle externalities (congestion and safety)

prosperity for local iwi groups within the region.

Description	Economic	Environmental	Social	Cultural
<b>Scenario 2.2 – Port of Tauranga, full move</b>				
<ul style="list-style-type: none"> <li>▶ A full move to Northport entails moving the entire operations from POAL to POT (except cruise ships)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Investment is required in the land side infrastructure to address the significantly increased freight volumes through the Bay of Plenty, Waikato and South Auckland.</li> <li>▶ Promote employment opportunities for the POT where there will be demand for a skilled logistics workforce.</li> <li>▶ Tauranga already has major congestion issues, this is more likely worsen under this full move to POT as it involves</li> </ul>	<ul style="list-style-type: none"> <li>▶ Operations movement to POT will result in increased vehicle transport through the region and hence increased congestion and pollution.</li> <li>▶ Increased freight movement will result in increased dredging activities and hence adverse impact on the biodiversity environment.</li> </ul>	<ul style="list-style-type: none"> <li>▶ The movement of full operation to POT will result in an increased stress to the existing social infrastructures of Tauranga such as hospitals, housing etc. and therefore this may result in an unplanned expansion of the city;</li> </ul>	<ul style="list-style-type: none"> <li>▶ The three tribes' iwi of Tauranga Moana (Tauranga Harbour): Ngāti Ranginui, Ngāi Te Rangi and Ngāti Pūkenga may have concerns around the full move to POT which could have possible implications to treaty settlements within the area.</li> <li>▶ There has been ongoing issues since the 1970s with regards to the construction of the Kaimai Tunnel having negative cultural impacts on the Ngāti Hinerangi iwi tribe.</li> </ul>



more freight travel (due to distance) and road congestion (due to mode share).

The Kaimai tunnel is in close proximity to Māori land which is of great cultural significance to Ngati Hinerangi. A full move to POT could possibly result in an upgrade to the Kaimai Tunnel. This upgrade of the Kaimai Tunnel is likely to cause further distress for the iwi and hapū of the Ngati Hinerangi.

Description	Economic	Environmental	Social	Cultural
<b>Scenario 2.3 - Northport &amp; Tauranga, full move</b>				
<ul style="list-style-type: none"> <li>▶ A full move of entire operations from POAL and distributing it across Northport and POT (except cruise ships)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Respective qualitative impacts noted above in scenario 2.1 &amp; scenario 2.2</li> </ul>	<ul style="list-style-type: none"> <li>▶ Respective qualitative impacts noted above in scenario 2.1 &amp; scenario 2.2</li> </ul>	<ul style="list-style-type: none"> <li>▶ Respective qualitative impacts noted above in scenario 2.1 &amp; scenario 2.2</li> </ul>	<ul style="list-style-type: none"> <li>▶ Respective qualitative impacts noted above in scenario 2.1 &amp; scenario 2.2</li> </ul>
<b>Scenario 2.4: Build a super new port in a new location – Firth of Thames</b>				
<ul style="list-style-type: none"> <li>▶ A Super-Port scenario is considered assuming none of the existing ports in the UNI region could not deliver on the requirements for the logistics and supply chain in the Upper North Island</li> </ul>	<ul style="list-style-type: none"> <li>▶ A new Super-Port in the Firth of Thames might have different future land use benefits. The Firth of Thames location site for the new Super-Port would create transport links that could open up land that is relatively close to Auckland for development. However these benefits will be outweighed by the capital costs and land side road &amp; rail link costs associated with a brand new port which are significantly higher than all alternative scenarios.</li> </ul>	<ul style="list-style-type: none"> <li>▶ There are likely to be challenges around gaining resource consent to develop a new port in the Firth of Thames. Any development would require a coastal permit, with consideration of the impacts of reclaiming part of the foreshore or seabed, constructing a structure in, on, under, or over any foreshore or seabed, disturbing the seabed (e.g. by excavation or dredging) and the occupation of part of the common marine and coastal area.</li> </ul>	<ul style="list-style-type: none"> <li>▶ The social impacts of a new port within the Firth of Thames would need to be comprehensively assessed as part of a Social Impact Assessment, should this option be carried forward for further evaluation. The effect on amenity of communities that overlook the proposed site and those who are affected by the rail and road access corridors through the Clevedon valley would need to be a key focus of any assessment.</li> <li>▶ This assessment should also include the impact on</li> </ul>	<ul style="list-style-type: none"> <li>▶ There are a number of mana whenua iwi who hold interests in the Hauraki Gulf and would consider themselves affected by a new port being built in the Firth of Thames including the members of the Marutuahu confederation of iwi and Waikato Tainui.</li> <li>▶ The Hauraki Gulf area holds significant historical, cultural and spiritual meaning for tangata whenua within the area. The proposed Firth of Thames sites will have an impact on the tangata whenua relationship to the Hauraki Gulf.</li> </ul>

- ▶ A new Port in the Firth of Thames would potentially result in an increased carbon footprint. Whilst accessible to SH1 and the south and east of the North Island, the travel distance from SH1 to the ports landside activities increases emissions from heavy vehicle travel.
- ▶ There are a number of residences along the coastline that may be impacted by the change in noise environment, subject to the location of the port and the landside activities
- ▶ The existing night time environment would also change with the presence of a 24 hour operating port, associated landside activities and causeway all creating a potential night time illumination into the sky and adjacent viewpoints.

recreational opportunities within the harbour and how the ports location might impact existing access to and use of the coast. In addition, community aspirations around the use and protection of the Firth of Thames and the Clevedon Valley, both coastal and landside and community and stakeholder values associated with the area of impact would need to be defined and considered. The area of social impact is expected to be relatively stretched given the length of the new access corridor and the communities located along the route.

This impact will require consideration.

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## 6.4 Financial offset of dividends from the Ports of Auckland

The benefit cost analysis, as noted above, includes a full net economic impact of the alternative land use for the Ports of Auckland site. This is focussed on a benchmark annual rate of return expected for the mixed use commercial and residential gross floor area. This economic analysis subsumes the impact of rates and leasehold income from the POAL site.

A critical consideration in terms of any move is, however, the potential financial impact on the owners of the Ports of Auckland, and whether any alternative land use leaves the Auckland Council, and Auckland ratepayers better, or worse off as a result of decreased dividends from the POAL.

A first consideration is that under all scenarios, POAL continues to operate, but it transitions its focus to the cruise industry and associated servicing. As such, there is still the potential for POAL to provide a financially sustainable, albeit smaller operation on the Waitemata. A secondary consideration is that POAL's shareholding in Marsden Maritime Holdings, their landholdings around Northport, and their ownership of the Northport tug operation, position them to offset lost income at the POAL site on scenarios that expand Northport.

A forecast of these ongoing income streams, relative to the current POAL dividend has not been undertaken.

What has been assessed is the potential for Council income through rates and leases as a result of more intensive commercial and residential activity on the POAL site to offset the POAL dividend.

It is assumed that Auckland Council would take a similar approach to the POAL site as they have with the Wynyard Quarter, namely maintaining the land in public ownership, but operating 120 year leases. The results are as follows:

	Current dividend	Alternative Rates income	Alternative leasehold income	Net annual financial benefit/(loss) to ratepayers
Interim Move	\$50m	\$7m	\$13m	N/A <sup>37</sup>
Full move	\$50m	\$42m	\$56m	<b>\$48m</b>

## 6.5 Regional Economic Development

The Regional Economic Development impacts are discussed in the Scenario section in terms of the approach.

The potential wider economic impact of reorienting the logistics and supply chain is derived principally from additional investment in land-side freight handling (e.g. new inland ports and warehousing). As we note in previous sections, changes in employment at the ports themselves are unlikely to be material, given the long-term shift towards automation.

The wider economic impacts also include with the net economic impact of a minor relocation of existing employment, where the differential impact on a smaller economy such as Northland is greater than the corresponding offset in a much larger economy such as Auckland.

An input-output analysis of the potential changes finds that reorientation of the logistics and supply chain that involves a refocusing on Northland results in an additional \$200m to the Northland economy over 30 years (discounted NPV) in direct, indirect and induced economic impacts. This results in around 2,000 additional sustained jobs (i.e. not employment associated with the construction of the required infrastructure).

Scenarios that involve a full move to Tauranga, or the shared move have materially lower wider economic impacts, in part due to the relative size of the Bay of Plenty economy where indirect and induced economic activity from the move is likely to be significantly less.

<sup>37</sup> Proportionate reduction in dividend income from a partial move has not been calculated due to the large number of variables and commercial information required from POAL to enable this assessment.

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## 7. Appendices

These will include full MCA analysis and scoring, as well as Advisian and W&M technical inputs.

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**From:** Wayne Brown <biznewz@xtra.co.nz>  
**Sent:** Tuesday, 9 July 2019 1:32 AM  
**To:** Chris Money  
**Cc:** Shane Vuletich; Greg Miller; Susan Krumdieck; Vaughan Wilkinson; Dan Jenkins; Stephanie Dorne  
**Subject:** Re: Uniscs Report

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Well that's a good long read and at least comes up with a sensible result

Chris, you are right, there are a few typos including titling the full move to Tauranga as a full move to Northland towards the end but generally good stuff

Dan, we need to start the overview, we probably need to say it is still a work in progress and we look forward to feed back

Withheld under section 9(2)(g)(i) of the Official Information Act 1982

Team, please share your points of view for consideration

Regards

Wayne

Sent from my iPad

On 8/07/2019, at 9:59 AM, Chris Money <[Chris.Money@nz.ey.com](mailto:Chris.Money@nz.ey.com)> wrote:

Hi all

Please find attached a comment-ready draft.

A couple of outstanding items we will be working through in advance of receiving comments:

1. There are a number of outputs in this report that are absolutely critical to the analysis (avoided POAL development costs, freight costs and mode share and leasehold/rates income to Auckland Council from alternative land use). I am asking my team to triple check and confirm with me that they are happy with each of these and are willing to stand by them. The analysis is very sensitive to changes in these key assumptions and I am confirming that these are based on each team member's industry leading knowledge.
2. I will go through a process of reconciling all the Working Group's comments over the last few weeks to make sure we have them covered off. There are some work-ons in this regard:
  - a. While we reference the Colmar Brunton work as underpinning the MCA work and the WG's scoring, we've not included the detailed findings. Suggest we either leave as is or put in an appendix
  - b. We've got the qualitative and non monetised impacts in there, but really keen to test whether they are seen as sufficient (Vaughn's view critical here). I'd suggest that with a strong benefit cost ratio (2.0 for Northport), the multicriteria analysis, plus the wider economic impacts, and the Warren and Mahoney visuals, there is enough in there.
  - c. The "interim step", plus the 5/15 year strategy is not reflected strongly enough. You'll note much of the analysis still references 30 years – which is appropriate to define the key issues, but we then need to reconcile back to the 5/15 year approach – clearly stating that the key issues are actually addressed by a rapid move – namely a large part of the value is driven by removing the need to invest in POAL, and then moving progressively to an alternate land use.
3. Appendices to be added – these will be detail and not material to your commentary. You will note we do not have the detailed MCA scoring in the body of the report. I will include this in the appendix, along with other detail.
4. We need to do a final check reconciling the numbers in every table. The core BCR is correct, but at least one table still mentions NAL as part of the base case (which it's not). I've deliberately not included the Total numbers in the scenario summary tables until this final line by line reconciliation is done.
5. Some formatting (consistent color scheme) and spelling and grammar, and correct footnoting an figure references (done it several times already but still not satisfied).

Dan – the more I look at the freight story in here, the more I'd like the update of the NFDS to be incorporated, as I feel it would be a shame not to have 2019 NFDS figures in preference to 2014. It won't change the conclusions, but as you note, there are some changes, and some areas where the Ministry has a view (e.g. Cars – Ministry vs POAL projections).

Chris

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<UNI Ports Report - DRAFT MASTER to Working Group Monday 8 July.docx>

**From:** Dan Jenkins  
**Sent:** Tuesday, 9 July 2019 11:06 AM  
**To:** Chris Money  
**Subject:** RE: Uniscs Report  
**Attachments:** UNI Ports Report - DRAFT MASTER to Working Group Monday 8 July DAN.docx

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Chris,

Some thoughts on the exec summary – I'll try to go through the rest of the report later today.

D

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**From:** Chris Money <Chris.Money@nz.ey.com>  
**Sent:** Monday, 8 July 2019 9:00 PM  
**To:** Wayne Brown <biznewz@xtra.co.nz>; Shane Vuletich <shane@freshinfo.co.nz>; Greg Miller <Greg.Miller@kiwirail.co.nz>; 'Susan Krumdieck' <susan.krumdieck@canterbury.ac.nz>; Vaughan Wilkinson [REDACTED]  
**Cc:** Dan Jenkins <D.Jenkins@transport.govt.nz>; Stephanie Dorne <S.Dorne@transport.govt.nz>  
**Subject:** RE: Uniscs Report

Hi all

Please find attached a comment-ready draft.

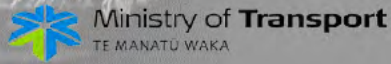
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  - c. The "interim step", plus the 5/15 year strategy is not reflected strongly enough. You'll note much of the analysis still references 30 years – which is appropriate to define the key issues, but we then need to reconcile back to the 5/15 year approach – clearly stating that the key issues are actually addressed by a rapid move – namely a large part of the value is driven by removing the need to invest in POAL, and then moving progressively to an alternate land use.
3. Appendices to be added – these will be detail and not material to your commentary. You will note we do not have the detailed MCA scoring in the body of the report. I will include this in the appendix, along with other detail.
4. We need to do a final check reconciling the numbers in every table. The core BCR is correct, but at least one table still mentions NAL as part of the base case (which it's not). I've deliberately not included the Total numbers in the scenario summary tables until this final line by line reconciliation is done.
5. Some formatting (consistent color scheme) and spelling and grammar, and correct footnoting an figure references (done it several times already but still not satisfied).

Dan – the more I look at the freight story in here, the more I'd like the update of the NFDS to be incorporated, as I feel it would be a shame not to have 2019 NFDS figures in preference to 2014. It won't change the conclusions, but as you note, there are some changes, and some areas where the Ministry has a view (e.g. Cars – Ministry vs POAL projections).

Chris

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# Economic Analysis of Upper North Island Supply Chain Scenarios

DRAFT

8 July 2019

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**Transmittal letter**

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**Executive Summary**

***This report investigates the economic, social and environmental impact of a range of Upper North Island Supply Chain Scenarios***

In May 2019 the Ministry of Transport appointed a consortium led by Ernst & Young Limited (EY)<sup>1</sup> to perform an economic evaluation of potential Upper North Island (UNI) supply chain configurations. This report examines a range of potential scenarios for land side and port investment, taking account of regional development impacts as well as transport outcomes.

***It is part of a wider investigation by the Government into the optimal configuration and strategy for delivering improved freight performance for the UNI region***

In September 2018, Cabinet appointed a Working Group to review the freight and logistics sector in the Upper North Island (UNI), and to develop a Supply Chain Strategy for the region. This review is formally known as the 'Upper North Island Supply Chain Strategy' (UNISCS). The Working Group can either be referred to as the "UNISCS Working Group" or the "Working Group".

The Working Group is entrusted with the responsibility of developing a plan for an efficient freight network (ports, land and rail and road networks) for the UNI region that will deliver the best long-term outcomes for New Zealand. The planning will focus on designing an efficient supply chain network to ensure smooth movement of cargo and containers across the regions. Additionally, the Working Group is tasked with assessing the existing landside network infrastructure (rail, roads, and inland freight terminals), potential upgrades and new infrastructure requirements as well as optimising land use to ensure greater returns to all the stakeholders, particularly the government and the community.

~~In pursuit of its objectives, the Working Group has come up with a three-stage approach, at the end of which the Working Group intends to submit a comprehensive recommendation to the government for a holistic development of the UNI supply chain network; this also includes the socio-economic impact of the UNI region. This report is one sub-part of one stage of the three-stage approach where the Working Group seeks to assess the development of UNI supply chain (UNISC) scenarios as well as undertake an economic evaluation of those supply chain scenarios.~~

~~Under the direction of the Working Group this report outlines the results of an economic, performance and regional analysis of a range of scenarios relating to the UNI supply chain.~~

***A range of scenarios have been investigated using best practice economic evaluation techniques....***

This report uses a conventional economic assessment, using a combination of multi-criteria analysis (to help shortlist options and identify non-monetisable impacts) and benefit cost analysis. The approach uses the standard NZ Transport Agency approach to benefit cost analysis as its base, ~~but then adds and augments this through~~ emerging best practice analysis around valuations of alternate land use.

The approach uses a combination of a bespoke model built for this study, and EY's existing multimodal freight model, which has been used regularly by the Ministry of Transport, NZTA and KiwiRail in the last few years.

***The scenarios are wide-ranging and consider a number of different infrastructure configurations***

~~Taking a strategic and investment based approach the Working Group developed. Scenarios have been developed looking at a combination of different investment future scenarios for the UNI supply chain profiles.~~ While the focus of this work is the entire Upper North Island logistics and supply chain, the scenarios are necessarily "port-centric" as ports represent the one of the most critical and fixed origins and destinations for freight in the region.

The use of scenarios, as distinct from options, is also critical. The purpose of this study is to evaluate the potential different outcomes that could be achieved for the UNI supply chain. While the scenarios are specified in sufficient detail to allow meaningful strategic evaluation, they are representative of a range of different

<sup>1</sup> The consortium includes Advisian, Warren&Mahoney and WT Partnership

approaches and would require ~~significant additional development work to develop a detailed business case which explores options for implementation, construction phasing and financing the point where they could be considered “investment ready” options~~

~~The Working Group’s Terms of Reference require them to consider options for moving the Ports of Auckland (POAL). Scenarios were developed that offer offering a mix of:~~

- ▶ Ports: Consideration have been given to Northport, Port of Tauranga, a combination of both and potentially a “Super Port” independent of the existing 3 ports
- ▶ Freight types: The impact of both a full and partial move-
- ▶ Time: The speed at which any move could be undertaken

~~This has resulted in the initial development of T~~two headline scenarios of a Partial Move and a Full Move of the freight of the Ports of Auckland were developed. Note, in all scenarios, it is assumed that POAL itself would not close but a footprint would remain, providing services to the cruise ship industry. Within each of these headline scenarios, different locations for the freight were considered, as shown in the diagram below:

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## BASE CASE

### NO INTERVENTION

- Establish maximum capacity and growth
- Establish ongoing costs
- Managing POA's growth elsewhere

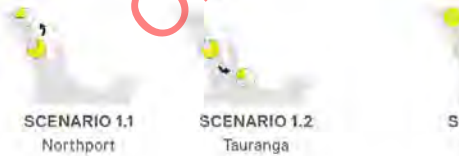


BASE CASE  
Auckland

## SCENARIO 1

### PARTIAL INTERVENTION

- Establish Container terminal at Northport
- Partial removal of port functions (probably at western end)
- Phased POA land development at Western end



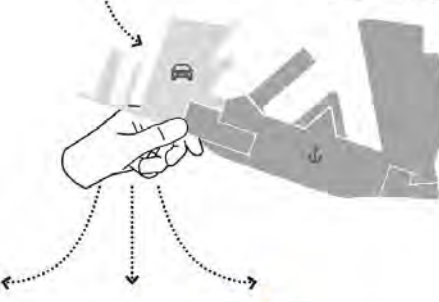
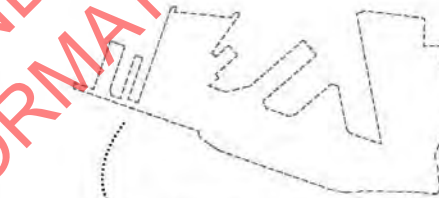
SCENARIO 1.1  
Northport

SCENARIO 1.2  
Tauranga

## SCENARIO 2

### FULL INTERVENTION (EXCEPT CRUISE FACILITY)

- Simultaneous development of Northport, decommissioning of POA and POA land development



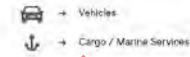
SCENARIO 2.1  
Northport



SCENARIO 2.2  
Tauranga



SCENARIO 2.3  
Northport & Tauranga



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*The analysis concludes that the UNI supply chain is complex and cannot be optimised by focusing on a single region.....*

Analysis of freight flows, and investment needs concluded that scenarios ~~that moved towards involving~~ reliance on a single port, with the supporting logistics and supply chain, produced the worst outcomes. This includes the consideration of the Port of Tauranga undertaking the majority of the UNI port tasks, and the development of a new Super Port, separate from the three current ports.

These scenarios produced the highest costs, and reduced the resilience of the UNI supply chain. Both scenarios also involved the highest proportion of investment in new assets and failed to leverage the capacity of the northern Auckland and Northland region.

*.....but the long term, better outcomes can be achieved by building a more integrated logistics and supply chain with a reduced focus on the Auckland CBD.....*

Over the long term, the analysis of a range of potential scenarios demonstrates that a UNI logistics supply chain that is supported by two ports: Port of Tauranga, which maintains its current and future freight task and a greater reliance on Northland-Northport, developed to a capacity to enable it to take the full freight task of the Ports of Auckland, produces positive net benefits.

However, a full move scenario is only economically viable should the costs of infrastructure and the economic impact (~~monetisable~~ monetised time/freight cost, emissions, congestion etc) of any lengthening of the logistics and supply chain be materially less than the benefits gained through a reduced reliance on a central Auckland location.

*....which is enabled through investment in Northport, Auckland to Northland rail and supporting infrastructure in Auckland and Northland.*

The scenario modelling of a "Full move" to Northport, with associated land side investment results in a benefit cost ratio of 2.0. The "Full Move" scenarios shared between Tauranga and Northport does not generate net economic benefits, mainly due to the much higher land-side infrastructure requirements in the Bay of Plenty. This is shown in the table below:

### Summary Results

Relative to Base Case, Net Present Value, \$ million nominal terms

	Scenario 2.1 - Full move to Northport	Scenario 2.2 - Full move to Tauranga	Scenario 2.3 - Full move to Firth of Thames	Scenario 2.4 - Full move to Northport & Tauranga
Total Costs	1,776	3,526	3,417	3,370
Total Benefits	3,611	509	701	1,336
Net Benefits	1,835	-3,017	-2,717	-2,034
Benefit Cost Ratio	2.0	0.1	0.2	0.4

Commented [A1]: Font?

*A progressive transition as part of a full move scenario also produces high value interim improvements*

Two "Partial Move" scenarios were ~~looked at~~ examined, both as a stand-alone transition scenarios and as part of a full move transition. Economic benefits in the short term from the scenarios are derived from three key features:

- Leveraging latent capacity in both land-side and port side through a number of comparatively low-cost investments
- The ability to defer major investment in port capacity at the Ports of Auckland, and the supporting land-side infrastructure that connects the port to the wider UNI logistics and supply chain
- The resultant freeing up of a part of the Ports of Auckland footprint to alternative, significantly higher value land use

The benefit cost ratios of these scenarios, compared to the status-quo scenario is 6.8 if the interim move is directed to Northport, and 4.1 if directed to Tauranga

Commented [A2]: I wonder if we need / want to highlight this in the exec sum?

Implementation of a move of the POAL will necessitate a partial transition of freight from the POAL over time. The Working Group will consider the phasing and implementation of a potential transition in their final report. The analysis of one aspect of a fuller move is presented to highlight the potential benefits in moving some of the freight task from the POAL.

### Diversification of the logistics and supply chain results in improved outcomes for Auckland....

Auckland benefits from a full move in a number of ways

Firstly, Auckland Council and ratepayers benefit from the switch of the Port to an alternate land use. Presently, POAL delivers a dividend to the Auckland Council of around \$50 million per annum. Analysis shows, an alternative land use for the port footprint has the potential to generate rates and leasehold income in excess of the current POAL dividend, both rates income for the council. In addition, if waterfront land is leasehold, as it is with the majority of the Auckland CBD waterfront (Viaduct and Wynyard Quarter), significant leasehold income could also be expected to accrue to Auckland Council.

The analysis has considered two potential masterplan scenarios (one full, one partial/interim) for an alternate land use (one full, one partial/interim). Each that looks scenario examine at a mix of commercial, residential and recreational land use. The table below shows the potential returns to the Auckland ratepayer from an alternate land use:

Commented [A3]: Do we need to call it a masterplan?

	Current dividend	Alternative Rates income	Alternative leasehold income	Net annual financial benefit/(loss) to ratepayers
Interim Move	\$50m	\$7m	\$13m	N/A <sup>2</sup>
Full move	\$50m	\$42m	\$56m	\$48m

The quantification of additional income does not include the potential value uplifts of the areas surrounding the port from the alternative land use.

Additionally, as noted above, no scenario involves the closure of the Ports of Auckland. Most notably, POAL will still service the rapidly growing cruise industry, which is an important part of Auckland's tourist economy. POAL would still provide tugs, berth space, and ship servicing to this industry, and a range of other maritime users. As such, it is possible that POAL will continue to provide a dividend to Council albeit reduced in magnitude.

POAL's shareholdings in Marsden Maritime Holdings (Northport's parent company) and North Tugz, (based at Northport) as well as their holdings in inland ports would all also benefit from a full move scenario to Northport.

The city and people of Auckland would also benefit from the alternative land use on the POAL footprint. The hypothetical masterplan plan includes significant recreational spaces for the people of Auckland, as well as a

<sup>2</sup> Assuming that the waterfront land is leasehold, as it is with the majority of the Auckland CBD waterfront (Viaduct and Wynyard Quarter).

<sup>3</sup> Proportionate reduction in dividend income from a partial move has not been calculated due to the large number of variables and commercial information required from POAL to enable this assessment.

material net increase in Auckland's developable land supply for both commercial and residential use, which could be expected to cascade into the wider ~~Auckland~~ region

The scenario analysis is based on the traditional freight hubs of South Auckland maintaining a critical role in the logistics and supply chain, but also envisages additional employment and investment in Auckland's Northwest with the development of a major freight hub in that area

Direct employment impacts at the port are ~~expected to be~~ minor ~~This is~~ because the port is already moving to automate many of its functions, and other functions such as tug operations will ~~still~~ remain. Some relocation of employment to target regions, particularly in the land-side freight and logistics sector is expected

#### *...and Northland.....*

Northland benefits materially from modelled scenarios that place a greater reliance on Northland for meeting the UNI freight task. While port employment is expected to be at the margins (due to the likely investment in high efficiency handling options as part of any expansion), wider employment opportunities ~~are~~ could be significant – given the relative size of the Northland economy

First-order employment comes through additional investment in logistics, warehousing and distribution hubs. ~~It is also expected that a~~ proportion of those who work in the sector (e.g. some truck drivers) would ~~potentially~~ relocate from Auckland to the Northland region. While this relocation impact is minor for Auckland (due to the size of the Auckland economy, it has a disproportionate impact on the Northland economy

This employment dynamic is also likely to flow through to additional demands for employment, to service the expansion in the economy, in areas such as education and health. Overall, an additional economic impact to the Northland economy drive an additional 2,000 jobs and a net economic benefit over 30 years of \$200 million.

#### *.....and Tauranga.*

Tauranga benefits ~~from~~ in all scenarios. ~~This is firstly because~~ While the scenarios discuss "full moves", they are designed, not based on a prediction of where freight will go, but on providing enabling infrastructure. As such, under all scenarios, Tauranga can expect an uplift in ~~in~~ expected freight demand.

Employment impacts are expected to be less than Northland moves. While nominal changes may be broadly the same, the direct and flow-on impacts to the Bay of Plenty economy are less, because of the relative size of the economy.

#### *Outcomes are, however, highly dependent on freight forwarder port preference.....*

As noted above, the scenarios are premised on providing infrastructure to support alternative freight movements and the modelling ~~critically~~ assumes that the majority of freight will follow the enabling investment.

Neither the consultant team, nor the Working Group have assumed the ability to "direct" freight forwarder preferences for ports.

#### *..... and mode choice....*

A pragmatic approach has been taken in determining mode split for freight transport. In particular the working assumption is the same amount of vehicle Kilometres from the trucking sector will apply. However, the key freight and logistics hubs are further away, so fewer (but longer) truck trips are made compared to the status quo. It is also assumed that 70% of the "Full Move to Northland" freight task is covered by rail. This substantially drops the economic impact of the lengthening of the logistics and supply chain. It is assumed that "final mile" distribution within Auckland, serviced from North-West and Southern in-land freight hubs, and time-sensitive freight will in general terms be transported by road.

~~The modelling is extremely sensitive to mode choice. In particular, it is assumed that 70% of the "Full Move to Northland" freight task is covered by rail. This substantially drops the economic impact of the lengthening of the logistics and supply chain.~~

#### *....and alternative land use.*

Lastly, the scenarios benefits are reliant on the ability of the alternate land use for the POAL site to deliver value to the ratepayer and the city. This will be a function of the commercial strategy adopted in terms of any port move, the release of land, the decisions made on how the land will be development, and the market demand at the time.

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	◦ All scenarios increase transport costs and environmental impacts relative to the status quo.	8384
	• These costs are offset by two critical dynamics that are mutually inclusive:	8384
	◦ The deferral or elimination of infrastructure costs associated with ensuring the medium to long-term operability of a logistics and supply chain that relies on a central Auckland location. This is both land-side investments and port investments.	8384
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## 1. Introduction

### 1.1 National Context - Significance of the Logistics and Supply Chain to New Zealand Economy

New Zealand is a small country in the South Pacific that is heavily reliant on trade. The New Zealand economy is predominantly service-based with the majority of exports being agricultural in which animal, food, vegetable and wood products represent over 70% of export value.

Freight is a key enabler of domestic and international trade and New Zealand relies on an efficient logistics and supply chain to connect its goods to the world as well as to access the many manufactured commodities it does not produce domestically. New Zealand's freight volumes are expected to grow significantly over the medium and long term which is going to have a drastic impact across the supply chain. Understanding the drivers of, and uncertainties around, future freight and logistics demand is critical to ensure that New Zealand's supply chain is fit for purpose in the longer-term.

Ports allow local producers to reach larger markets overseas, and local consumers to access imported goods. The presence or absence of a port has a significant effect on the cost of doing business and the cost of living within a region. Furthermore, ports also act as a vital source of employment which adds significant value to New Zealand regions and communities.

### 1.2 Background to this Report

In September 2018, Cabinet appointed a Working Group to review the freight and logistics sector in the Upper North Island (UNI), and to develop a Supply Chain Strategy for the region. This review is formally known as the 'Upper North Island Supply Chain Strategy' (UNISCS). The Working Group can either be referred to as the "UNISCS Working Group" or the "Working Group".

The Working Group is entrusted with developing a plan for an efficient freight network (ports, land and rail and road networks) for the UNI region that will deliver the best long-term outcomes for New Zealand. The planning will focus on designing an efficient supply chain network to ensure smooth movement of cargo and containers across the regions. Additionally, the Working Group is tasked with assessing the existing landside network infrastructure (rail, roads, and inland freight terminals), potential upgrades and new infrastructure requirements as well as optimising land use to ensure greater returns to all the stakeholders, particularly the government and the community.

In pursuit of its objectives, the Working Group has come up with a staged approach, at the end of which the Working Group intends to submit a comprehensive recommendation to the government for a holistic development of the UNI supply chain network. This includes the socio-economic impact of the UNI region. This report is one part of the staged approach where the Working Group seeks to assess the development of UNI supply chain (UNISC) scenarios as well as undertake an economic evaluation of those supply chain scenarios.

### 1.3 UNISCS Working Group and Review

#### 1.3.1 Members and Expertise

The members of the Working Group have expertise in the following areas: economics and business development; and regional development transport and logistics, including freight infrastructure management, investment and planning<sup>4</sup>.

#### 1.3.2 Scope of review

The review will consider actions that contribute towards national and regional economic development results and transport priorities. It will set out the independent Working Group's joint view of<sup>5</sup>:

<sup>4</sup> <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/upper-north-island-supply-chain-strategy/questions-and-answers/>

<sup>5</sup> <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/upper-north-island-supply-chain-strategy/questions-and-answers/>

- ▶ The current and future drivers of freight and logistics demand, including the impact of technological change
- ▶ A potential future location or locations for Ports of Auckland, with serious consideration to be given to Northport
- ▶ Supporting priorities for other transport infrastructure, across road, rail and other modes and corridors such as coastal shipping
- ▶ Potential priorities for transport-related infrastructure investment from a national economic and regional development perspective
- ▶ The optimal regulatory settings, and planning and investment frameworks across government to give effect to the findings of the review

The review will also identify future challenges for which government and industry will need to work together, and will set out any key actions to be taken over the next five years

### 1.3.3 Approach for Working Group’s review

The Working Group is approaching this review in three stages. Each stage will involve preliminary reports and the final strategy recommendations will be communicated to Ministers, stakeholders, media and public<sup>6</sup>

#### Stage 1 – Review the history and current UNISC issues and opportunities

- ▶ Fact finding and gaining a practical understanding of the supply chain
- ▶ Stakeholder engagement
- ▶ State of the UNISC
- ▶ Interrelationships – land use, urban form, regional economic development

#### Stage 2 – Practicalities, Costs and Benefits

- ▶ Options development – developing a strategic vision, articulating a case for change, exploring scenarios for development and the effects on freight efficiency, land use, resilience, capacity and wellbeing for all New Zealanders
- ▶ Strategy and recommendations – articulating the findings on the strategy and reasons for recommendations
- ▶ Implementation of chosen scenarios

### 1.3.4 Key Findings to Date

The Working Group have been provided with a terms of reference<sup>7</sup> which guides them in reviewing New Zealand’s freight and logistics sector, and in the development and delivery of a freight and logistics (supply chain) strategy for the UNI region. It also asks the Working Group to consider the feasibility of moving the Auckland Port, with serious consideration given to Northport, and to advise on priorities for investment in rail, roads and other supporting infrastructure. It asks the Working Group to consider a range of impacts including transport, land use and urban planning, as well as national and regional economic growth.

To date, the Working Group has been in a discovery phase. During this time, the Working Group has been gaining a practical understanding of the current system through site visits and discussion with relevant supply chain sectors. This practical understanding has been supported by initial analysis of available freight and economic data, reading background materials and reports, and further stakeholder engagement.

The Working Group published Stage 1 of the review on 27 April 2019. This interim report highlighted that there was unanimous support given to rail infrastructure to support the UNI ports connectivity, to work in conjunction with other transport mechanisms. In addition to this, the working group fundamentally believes that there is no

<sup>6</sup> UNISCS Working Group Interim Report

<sup>7</sup> [https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/cc9d34704a/UNI-Cabinet-Paper-and-Terms-of-Reference\\_no-redactions.pdf](https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/cc9d34704a/UNI-Cabinet-Paper-and-Terms-of-Reference_no-redactions.pdf)


point making further investment in Northport without investment in, and development of an upgraded train line from Northland to Auckland

The working group engaged with stakeholders and key interest groups, including representatives from the three UNI ports, port company shareholders, the road freight industry, the shipping industry, commercial interests, cargo interests and other interested parties. These stakeholders provided feedback on the strengths and weaknesses of the UNI's current three-port freight system, as well as the main opportunities and threats over the next 10, 25 and 50 years. There was feedback on the ownership structures of the three ports as well and the extent to which the three ports are influencing freight outcomes for the UNISC.

The stakeholders had a range of views on the scope of what should be considered, from ensuring that Waikato is included when thinking about the UNI region to thinking about the North Island or even New Zealand as a whole when making decisions about ports, roads and rail in the upper

North Island. Their overall view was that the impacts were far-reaching and so should be grounded in robust evidence. The stakeholders also made it clear that the behaviours and types of freight handlers and logistics organisations have equally important influence on the effectiveness and outcomes of the supply chain. It was indicated that cost is a big driver of behaviour and there was a universal interest in the cost of moving freight.

The different considerations emerging from stakeholder meetings were categorised under five main themes as illustrated in the diagram below:

Figure 1 - 



Commented [A5]: Figure 1  
Typo in the Optimal land use box: sp International

The interim report went to cabinet who agreed with the Working Group on the following key points:

- The Working Group continue its work on the UNISCS, taking a strategic and investment based approach supported by analysis of the supply chain.
- The Working Group to deliver a report in June 2019 to provide the results of the evaluation of different port locations (including Northport as an alternative location for the Ports of Auckland), freight flows and infrastructure options and scenarios; and a final report in September 2019 containing the Working Group's conclusions.

### 1.4 Purpose of this Report

In May 2019 the Ministry of Transport has appointed a consortium led by Ernst & Young Limited (EY)<sup>8</sup> to perform an economic evaluation of potential UNI logistics and supply chain. This report examines a range of potential scenarios for supply chain investment, taking account of regional development impacts as well as transport outcomes, in line with the Working Group's Terms of Reference.

<sup>8</sup> The consortium includes professional services consultancy Advisian, architects, Warren and Mahoney and Quantity Surveyors WT Partnership.

## 1.5 Structure of this Report

This report has been written on the basis that it is an input into the wider deliberations of the Working Group. As such the document has been ordered in line with answering the key questions of evaluating the potential supply chain scenarios. Background information such as a description of the regions, the context in which the ports operate and the freight flows that underpin the analysis are all included as Appendices. The report is structured as follows:

- 1 Approach to the Analysis
- 2 An overview of the Upper North Island Logistics and Supply Chain, and future trends
- 3 The Base Case and Understanding the Pressure for Change
- 4 Scenario Description
- 5 Results

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## 2. Approach to Analysis

The approach to the analysis is based on evaluating scenarios as per a number of principles outlined by the Working Group. These principles consist of the following:

- ▶ Resilience of the supply chain
- ▶ Cost efficiency in moving freight
- ▶ Maintaining, if not enhancing, levels of competition in the UNISC
- ▶ Reducing 'friction' between freight and other modes/areas
- ▶ Contributing to overall government objectives

The principles stated above are further explained in section 3. In addition to this, two timing scenarios have also been taken into consideration as this has allowed the Working Group to understand the impact of time and scope of a partial move and provide a more sophisticated understanding of the key scenarios. Additional modelling runs were conducted after the report was completed to enable optimisation any given scenario.

This report uses a conventional economic assessment, using a combination of multicriteria analysis (to help shortlist options and identify non-monetisable impacts) and benefit cost analysis. The approach uses the standard NZ Transport Agency approach to benefit cost analysis as its base, but then adds emerging best practice analysis around valuations of alternate land use.

The key features over and above the standard economic evaluation approach include:

### 1. The use of a high level economic impact adjustment in conjunction with a benefit cost analysis

This analysis takes into consideration conventional development economics where a dollar spent in the regions has more stimulus value than that same dollar spent in an urban environment.

### 2. The deployment of the new dynamic land use approach

A procedure for valuing alternate land use was developed for the Working Group's options generated. This alternative land use value was the single biggest component that was ironed out technical land-side value of time issues associated with a potential lengthening of the logistics and supply chain for some of the goods imported or exported from Northport.

### 3. The deployment of an externalities model

The Value of Rail model developed by the EY in 2017 was fully utilised in this economic assessment. It provided analysis on how benefits can be maximised and costs minimised through different mode splits in the logistics and supply chain, including congestion, emissions, maintenance and safety. Additionally, the model is also taken into consideration full land-side freight analysis. The model itself fully reviewed and accepted by Treasury, MoT and NZTA.

### 4. Use of the new Resilience assessment framework

Until recently, there has been limited ways through which resilience could be factored into project analysis. In 2016, EY was commissioned by NZTA to undertake a year-long study into how this could be better done. The new resilience analysis approach was taken into account for this analysis which had a material impact on the effects of watch of the scenarios.

### 3. The Upper North Island Logistics and Supply Chain – Current and Future

#### 3.1 Country Overview

The freight sector in New Zealand is wide ranging, and impacts a number of complementary sectors including retail, manufacturing, agriculture, forestry, etc. The freight sector plays a different role across various industries. For example, approximately 20% of all inputs into the petroleum and coal manufacturing sector consist of freight 'costs', compared with life insurance representing 1%. All sectors and supply chains are mutually inclusive of freight, which fundamentally enables producers and consumers alike to access the goods and markets they need.<sup>9</sup>

On a global scale, New Zealand has the 57<sup>th</sup> largest, and 41<sup>st</sup> most complex economy according to the Economic Complexity Index (ECI). In 2017, New Zealand exported US\$37.3 billion and imported US\$36.3 billion, resulting in a positive trade balance of US\$988 million.

The top exports of New Zealand are Concentrated Milk (US\$5.34 billion), Sheep and Goat Meat (US\$2.36B), Butter (US\$2.33 billion), Rough Wood (US\$2 billion) and Frozen Bovine Meat (US\$1.79 billion), using the 1992 revision of the HS (Harmonised System) classification. Its top imports are Cars (US\$3.81 billion), Crude Petroleum (US\$1.95 billion), Refined Petroleum (US\$1.4 billion), Delivery Trucks (US\$1.35 billion) and Broadcasting Equipment (US\$1.02 billion).<sup>10</sup>

##### 3.1.1 Commodities

The primary sector is New Zealand's key generator of domestic freight, much of which is destined for export. Flows are from source (e.g. farm gate or plantation forest) either directly to ports (e.g. logs), or via an intermediate processing industry (e.g. dairy factories) for both domestic consumption and/or export.

Forestry has grown as a result of favourable export conditions and a buoyant construction sector. Dairy exceeds the tonnage of all other agricultural commodities, including livestock, meat, wool, horticulture, grains, and fish.

Non-foodstuff exports are concentrated in a few key regions. Coal resources are located and extracted from the West Coast and Waikato, and petroleum is imported and refined in Taranaki or Northland. Construction materials are produced (in relatively high volumes) close to domestic markets (i.e. low tonne-kms) due to their bulk and relatively low unit value. Manufactured retail goods are usually smaller and of greater unit value, and so are more feasibly transported over longer distances. This is true for both domestically made and imported goods.

<sup>9</sup> *Identifying freight performance and contextual indicators*, NZ Transport Agency research report 651 (December 2018)

<sup>10</sup> The Observatory of Economic Complexity 2017: <https://atlas.media.mit.edu/en/profile/country/nzl/>



Figure 2 New Zealand Freight Generated by Commodity

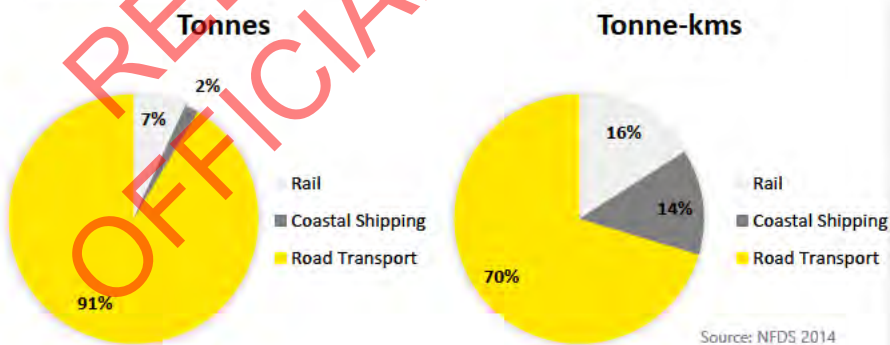


### 3.1.2 National Freight Task

The freight task in New Zealand is substantial, and moves the equivalent of 50 tonnes per capita each year. A number of factors affect the freight task, some of which are a result of the domestic market, and some are driven by the international market:

- ▶ Increasing population
- ▶ E-commerce
- ▶ Automation
- ▶ Video analytics
- ▶ Improved data/information systems
- ▶ Congested urban roads
- ▶ Environmental impacts
- ▶ Driverless/autonomous vehicles
- ▶ Increased demand for agricultural and dairy products

Figure 3 Overview of Freight Task by Mode



## Imports

**\$20.1b**  
China, Japan, Thailand

**\$6.89b**  
Germany, U.K., Italy

**\$4.6b**  
Australia

**\$4.06**  
U.S., Canada, Mexico

**\$0.47b**  
Argentina, Brazil, Chile

**\$0.21b**  
South Africa, Ghana,  
Morocco

## Exports

**\$19.9b**  
China, Japan, South Korea

**\$4.42b**  
Germany, U.K., Italy

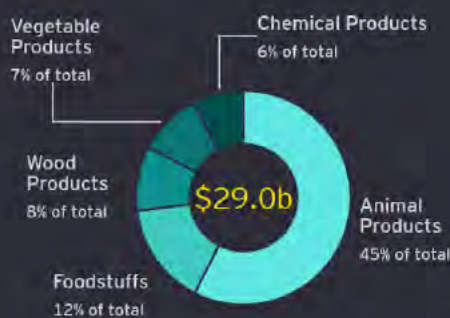
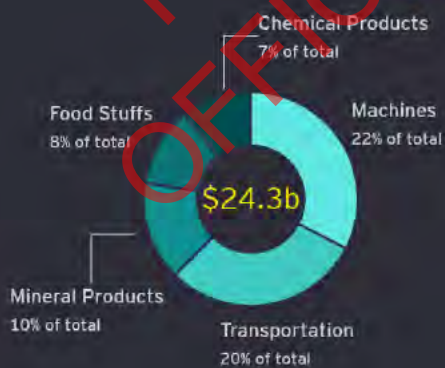
**\$6.59b**  
Australia, Fiji

**\$4.63b**  
U.S., Canada, Mexico

**\$0.37b**  
Chile, Peru, Brazil

**\$1.4b**  
Algeria, Nigeria, South Africa

## Key Products



2017 USD values sourced from the OEC

All amounts in USD

Source: The Observatory of Economic Complexity 2017

### 3.2 Regional Freight Flows<sup>11</sup>

#### 3.2.1 Regional Freight Generation

Population is a significant driver of both consumption and manufacturing activity. The UNI region accounts for over 45% of all freight tonnage produced in New Zealand. The most dominant freight generator in the South Island is Canterbury, which produces 15% of the national freight task<sup>12</sup>.

Figure 4 Commodities by Region



The primary sector is largely located in the Waikato, Taranaki, Manawatu, and Southland regions due to their favourable climate, topography, and soil. These regions are well-suited to dairy production which accounts for 20% of freight within these regions. This is similar for forestry, which has a substantial presence in Northland, Waikato, Bay of Plenty, Gisborne, Hawke's Bay, and Tasman/Marlborough/Nelson due to the warm climates and lower value land. Forestry accounts for over 35% of freight in these regions (excluding Waikato at 16% and Northland at 26%).

Crude oil flows are directly exported from Taranaki or imported to the Marsden Point refinery. Domestic petroleum product transport is primarily from the Northland refinery to coastal distribution, and then by truck to the nation's service stations.

Coal production on the West Coast is principally exported from Lyttelton, whereas Waikato coal production serves the domestic market in the UNI. However, the low cost and environmental impact is leading to decreased demand for coal.

Northland and the West Coast both have cement manufacturing plant that distribute cement via coastal shipping and then road and rail. However, the West Coast plant is being superseded by direct import. The Tiwai Point Aluminium Smelter in the South Island (Southland) accounts for approximately 10% of the region's total freight flows, while largely generating direct import/export flows.

<sup>11</sup> Information from this section is largely based on the Deloitte New Zealand Ports and Freight Yearbook 2016

<sup>12</sup> Information from this section is largely based on the Deloitte New Zealand Ports and Freight Yearbook 2016

### 3.2.2 Modal Share

Road is the most dominant mode of transport for both inter- and intra-regional freight transport. In most regions, road has over 95% of the market share for intra-regional freight flows. The Bay of Plenty region is an exception at 83% given logs are transported to Tauranga for export via rail. Roads hold a 68% market share (by tonnage) of inter-regional freight flows, with rail accounting for 21%, and coastal shipping accounting for the remaining 11%<sup>13</sup>

Modal share competition is more pronounced over longer distances, as can be seen in the inter-regional freight flows (see Figure 6 and Figure 6). Despite this, road remains the most dominant form of transport. This could be attributed to the ease of use of road transport. Road services offer greater flexibility and can be requested on demand. New Zealand's roading network is also more expansive than the country's rail and port options. As such, road can service greater areas. Rail and coastal shipping offer greater environmental benefit, however, and greater align with strategic objectives to reduce adverse environmental impact outlined in the Government Policy Statement (GPS). Rail and coastal shipping also offer cost advantages as distance increases, and may be more suitable for the transportation of long-haul or repetitive freight tasks.

Figure 7 Inter- and Intra-Regional Freight Flows



<sup>13</sup> Deloitte Ports and Freight Yearbook, 2016

### 3.2.3 New Zealand Ports as a contributor to the logistics and supply chain

New Zealand has had over 150 ports in operation throughout history, but only a handful were able to adapt to evolving shipping requirements and demand changes. Presently, New Zealand's ports provide a vital link for 99.5% of the country's trade with international markets. Merchandise exports are 21% of New Zealand's GDP<sup>14</sup>—the majority of which passes through ports. In general, New Zealand's ports have become more efficient and disciplined, allowing trade volumes to remain steady over time.

New Zealand's three leading ports are Tauranga, Auckland, and Lyttelton, with Wellington, Napier, and Otago also performing highly. Combined, POAL and POT handle 62% of New Zealand's total TEU (full and empty container inclusive). While POT is New Zealand's largest port by volume, POAL accounts for 35% of total import TEU. However, POAL's export volumes are relatively low at only 6% of New Zealand's total exports in the year ended June 2018.<sup>15</sup> An overview of container handling for the six most significant New Zealand ports has been provided below.

Figure 8 New Zealand Ports

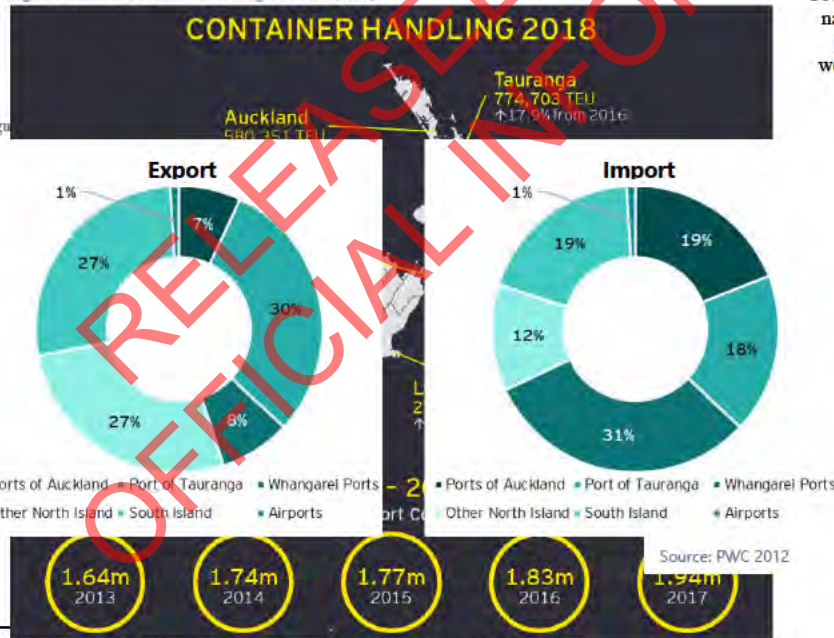


#### 3.2.3.1 The Role of the UNI Supply Chain<sup>16</sup>

In 2014, the three UNI supply chain accounted for 45% of New Zealand's total freight export weights. POT alone shipped 30% of national export weights.

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Figure 9 Annual Container Handling Statistics (2017)



POT alone shipped 30% of national export weights. More

<sup>14</sup> <https://www.transport.govt.nz/mot-resources/research-papers/containerproductivitynzports/> Source: Champion Freight

<sup>15</sup> Working Group Interim Report

<sup>16</sup> The following sections are based on the 2014 National Freight Demand Study. This Study is presently being updated.

significantly, the three UNI ports handled 68% of total national import weights in 2012, and Whangarei's ports (including Marsden Point refinery's oil terminal) accounted for 31% of the import weights. Only 1% of import and export weights are transported by air—the majority of which moves through Auckland International Airport. As such, it is evident ports are critical to New Zealand's economy and prosperity.

### 3.3 Northland

#### 3.3.1 Current situation

Northland has a diverse economy with manufacturing being the largest industry followed by agriculture, forestry and fishing, then business and property services. The Northland economy is underpinned by sectors that harness natural advantages based around land, water, climate and cultural assets.

Horticulture and Fruit Growing industry in Northland creates approximately \$200m in exports and constitutes 8.1% of the total exports share of the region. Dairy production is increasing, with 30,000 containers being transported every year. Northland is responsible for about 7% of national road freight, much of which is generated by its primary industries. According to the 2014 National Freight Demand Study, freight in the region is forecast to increase by almost 40% in the region over by 2042, around 1.1% per annum.

Northland has a forest cover of high quality pine which is suitable for a wide range of end uses. With over 190,000 hectares of planted forest, Northland has one of the largest pine resources available in New Zealand for processing. Northland's exotic timber harvest grew from 2.6 million m<sup>3</sup> in 2011 to 4.2 million m<sup>3</sup> in 2015. This growth is expected to continue before levelling out at about 3 million m<sup>3</sup> in 2023.

The boom in horticulture in Northland, such as growth in the production of gold kiwifruit, and manuka honey, means that the local economy has benefited significantly. In Northland 3.6 million trays of green and gold kiwifruit are grown annually. Another major exporting crop is avocado, of which 45% is being exported globally. With over 40 vineyards producing award-winning wines and Northland being the largest area in New Zealand for kumara growing,

Figure 1 shows the freight volume by route from Northland to other UNI Regions.

Figure 11 Northland Freight Volume by route



Annually, 8 million tonnes of inbound and 10 million tonnes of outbound freight movement happens between Northland and other major UNI regions as shown in the data figures below –

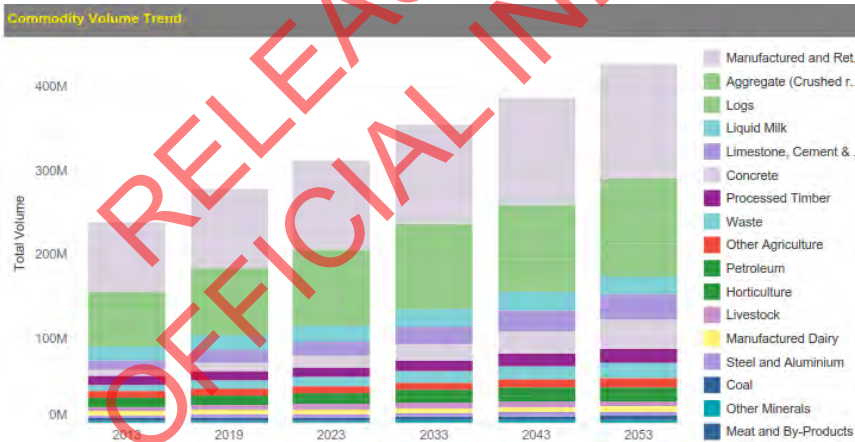
Inbound Volume	Outbound Volume	Total Volume
8M T	10M T	18M T

Volume Summary Between Northland and Listed Location			
Location	Total Volume	Inbound Volume	Outbound Volume
Northland	13,174,526	6,587,263	6,587,263
Auckland	3,470,238	2,464,354	1,005,883
Bay of Plenty	1,111,715	933,200	178,516
Waikato	263,493	121,817	141,676
Gisborne	2,995	1,519	1,476

### 3.3.2 Future Trends - Northland

The chart below indicates the potential growth in freight between 2013 and 2053. As forestry is a major driver of exports at Northport, forecasts for 2019 to 2049 were therefore updated using the latest data to reflect the harvest cycle of Northland Forests<sup>17</sup>. At present, 33% of logs are processed locally and there is economic potential in the areas of wood processing and manufacturing finished products, including logging, saw-milling, wood-chipping, veneer and plywood manufacture. Lower land costs (\$6,004 per hectare compared to New Zealand national average of \$6,744 per hectare) coupled with reliable availability of skilled labour in Northland, presents a case for potential economic development going forward.



### 3.3.3 Impact on the mode of transport in Northland

<sup>17</sup> Northport Wood Availability Forecast, 2018

According to the 2014 National Freight Demand Study, freight in the region is forecast to increase by almost 40% in the region over the 30 years between 2012 and 2042, around 1.1% per annum. In response to the growing needs for heavy freight transport in the area, the NZTA developed proposals to invest in the upgrading of required structures.

The increased demand in freight to Northland has resulted in existing roads in the region becoming congested and damaged due to heavy vehicle movements. Road transport remains the main means of moving freight and people.

The alternative is to develop the rail infrastructure connecting to Auckland and rest of New Zealand. At present, there is no connectivity between Northport and the rest of the rail network. With the closure of Port Whāngārei there has been a reduction in the rail freight from other regions to Northland. While there was around 1 million tonnes of rail freight transported in the year 2000, the number has reduced to approximately 20,000 tonnes in 2013 as per the National Freight Demand Study. The absence of rail network is one of the biggest challenges which, if addressed, will have material impact on the development of Northport and Northland region as well as helping maintain other transport infrastructure, especially roads.

The Northland region does have an existing rail network (the North Auckland Line—NAL); however, it has been under maintained, and has seen no significant investment in the last 50 years. Consequently, the line is no longer fit for purpose and cannot meet modern requirements for transportation of freight and passengers. Restricted tunnel heights prevent Northland exporters from utilising rail to move modern high-cube containers to and from Auckland. Furthermore, lack of maintenance and the aging of structures and tracks has forced speed reductions. Additionally, older, less reliable trains and equipment have to be used on the line due to weight restrictions, further lengthening transport timeframes and increasing inefficiencies. In 2002, the network lost port connectivity when operations were moved to Marsden Point. Northport is now one of the only ports in New Zealand without a rail connection.

These conditions and restrictions have necessitated the transference of over a million tonnes of freight to road transport per annum. Rail is currently an infeasible option for businesses to move freight in or out of Northland. Investment and renewal of the North Auckland Line (NAL) and Northport connective link has the potential to substantially alter freight flows within the UNI, support a portion of the trade from international markets to and from Auckland, and bolster the nation's international trade growth.

## 3.4 Auckland

### 3.4.1 Current Situation

The Auckland region accounts for 35% of the New Zealand population, POAL has a correspondingly significant imports volume. Conversely, export volumes are relatively low and account for only 6% of New Zealand's total export volumes (as at 30 June 2018). POAL largely handles containers, and bulk and break-bulk volumes (including cars), and is the largest container importer in New Zealand. Additionally, Auckland is the point of entry for over 67% of New Zealand's vehicle imports (a 43% increase from 2014 to 2018), and serves 37% of national import demand. Increasing import volumes are straining POAL resources and placing pressures on other port operations.<sup>18</sup>

POAL is import dominant, in large part due to their proximity to New Zealand's largest consumer market, Auckland. All of POAL's freight hubs are strategically located next to rail and are at the centre of current and planned freight generation and consumption areas.

POAL purchased 33ha of industrial land at Northgate Business Park in February 2016 to develop the Waikato Freight Hub which will form a key connection in their national supply chain network. The Northgate Business Park has attracted a number of import/export customers due to its outstanding road and rail access. The Waikato Freight Hub is due to open in the first half of 2019 once the OCD facility and a new road connection have been built. When fully complete, the freight hub is expected to generate around 300 jobs directly and facilitate many thousands more by acting as an economic catalyst.

Figure 2 shows the freight volume by route from Auckland to other UNI Regions.

<sup>18</sup> UNISCS Working Group Interim Report



Figure 12 Auckland Freight Volume by route



Annually, 33 million tonnes of inbound and 30 million tonnes of outbound freight movement happens between BOP and other major UNI regions as shown in the data figures below –

Inbound Volume	Outbound Volume	Total Volume
33M T	30M T	64M T

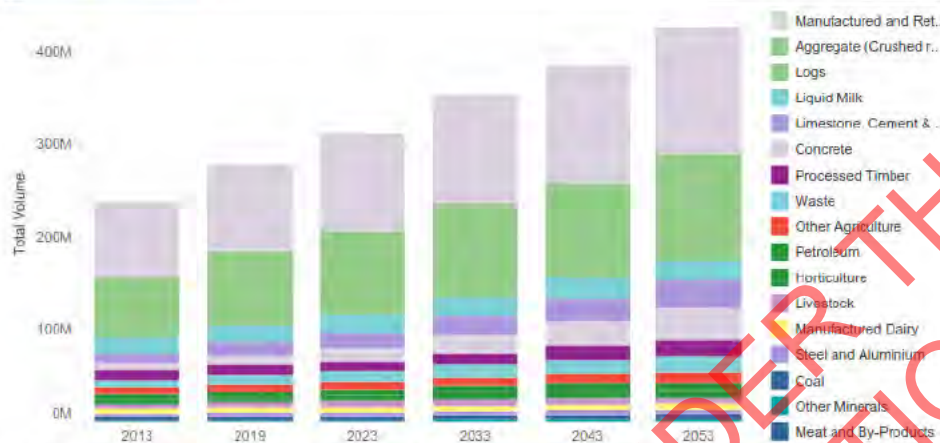
Volume Summary Between Auckland and Listed Location			
Location	Total Volume	Inbound Volume	Outbound Volume
Auckland	46,169,090	23,084,545	23,084,545
Waikato	7,971,997	2,802,156	5,169,841
Bay of Plenty	5,846,685	3,326,473	2,520,213
Northland	3,470,238	1,005,883	2,464,354
Gisborne	238,000	155,735	82,865

### 3.4.2 Future trends - Auckland

The chart below indicates the potential growth in the sector wise growth scenario between 2013 and 2053. The Manufacturing sector will remain the primary contributor to the economy.

Dairy exports are forecast to continue to decline as the Port of Tauranga has an agreement with Kotahi, the logistics company owned by Fonterra Cooperative Group and Silver Ferns Farms to export dairy products.

### Commodity Volume Trend



TEU throughput is expected to increase to a total of between 1.7 million and 2.2 million in the next 30 years. Imports will make up the majority of total throughput, which is forecast to increase to between 1.2 million and 1.6 million TEU in the same period, an increase of between 104 to 168 per cent from 2018. Exported TEU will increase by between 77 and 132 per cent in next 30 years in comparison to 2018. This equates to between 471,000 and 619,000 in expected TEU exports in 2049.

Bulk imports will increase by 79 to 96 per cent by 2049 in comparison to 2018. This equates to between 3.8 million and 4.1 million tonnes for the 2049 year. Bulk exports will increase by 79 to 96 per cent in comparison to 2018 numbers. This equates to between 2.4 million tonnes to 2.6 million tonnes of bulk exports in 2049, significantly less than imports.

The number of cars imported to the Ports of Auckland are projected to increase between 59 and 109 per cent by 2049 in comparison to 2018. Car imports are forecast to be between 472,000 and 621,000 cars in 2049.<sup>19</sup>

### 3.4.3 Impact on the mode of transport in Auckland

The combination of increased freight activity within Auckland and significant growth in population (10% between 2014 and 2018) has led to congestion problems in Auckland where there has been a rapid increase in the demand for travel. It has been observed that over 700 additional cars are being registered in Auckland every week, the city has also witnessed a record growth in the public transport use as well, with annual public transport boarding increasing by almost 30 per cent over the last four years between 2014 and 2018.<sup>20</sup>

The majority of POAL trade volumes are distributed via the road network (see Figure 3). PWC's 2012 report for the Strategic Alliance<sup>21</sup> projected a modest increase in port traffic through Grafton Gully by 2041. However, the same report indicated non-port traffic would increase significantly. Grafton Gully is unlikely to have capacity to support this increase, and the resulting congestion and diversions from upgrades would directly impact freight movement, leading to material delays and cost increases.

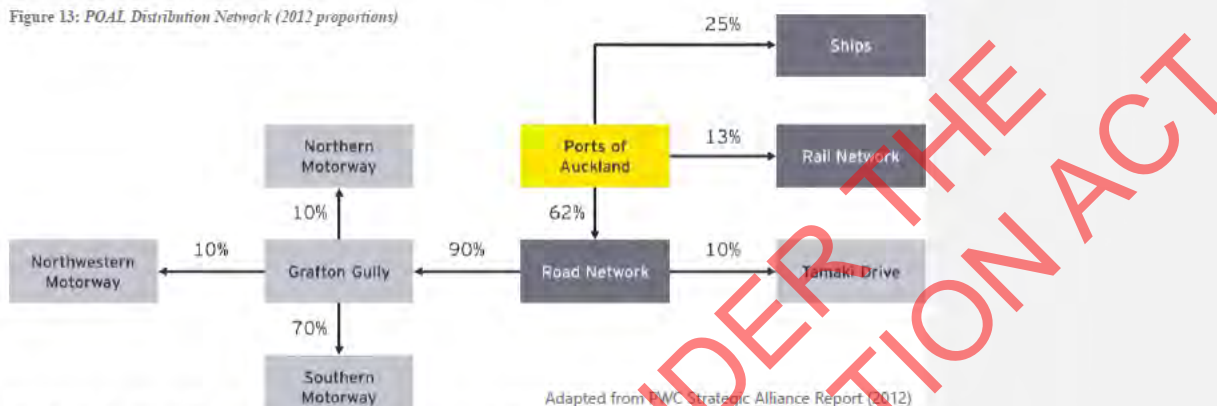
<sup>19</sup> Note that these projected figures use Ports of Auckland 2018 Annual Report figures and therefore will not align with the import tonnage, as Ports of Auckland and the Ministry of Transport, Statistics New Zealand data.

<sup>20</sup> <https://www.transport.govt.nz/land/auckland/the-congestion-question/>

<sup>21</sup> *How Can We Meet Increasing Demand for Ports in the Upper North Island*, A report for the Upper North Island Strategic Alliance, PWC 2012.

Similarly, rail traffic from POAL is projected to increase between 78% to 94%<sup>53</sup> by 2041. Future demand for passenger services is also projected to increase substantially. The Eastern Line should be able to accommodate the anticipated increase; however, it runs on a “tight” schedule. Even minor delays to freight trains could therefore have considerable consequences for train passengers.

Figure 13: POAL Distribution Network (2012 proportions)



The South Auckland Wiri to Westfield (W2W) section of the North Island Main Trunk provides a critical passenger link, and is a major conduit for the movement of goods across New Zealand. The twin track configuration has reached its maximum operational capacity and is a significant bottleneck. The 3<sup>rd</sup> Main Line Project has been proposed to increase capacity along this line.<sup>22</sup> However, as the line will support both passenger and freight operations, friction issues are still likely. Freight trains are much longer and slower than the electric passenger rail units, and will cause considerable knock on effects for passengers.

As signalling headways are also reaching capacity, freight may be required to move to off-peak periods or overnight. The impact this could have on POAL operations is uncertain, but there is an increasingly unfavourable public opinion towards increasing freight rail traffic throughout Auckland’s eastern suburbs. Changes in freight scheduling may conflict with residential amenity or liveability along freight corridors and result in public backlash.

The state highways that carry freight into and out of the Auckland Region are 1, 16, 20 and 20A. The Auckland Harbour Bridge (part of State Highway 1) is not classified as a ‘high performance motor vehicle’ capable route.<sup>23</sup> Currently clip-on lanes are open to 50-tonne maximum heavy vehicles. Heavier vehicles are only able to use the truss bridge lanes.<sup>24</sup>

Congestion in Auckland is a pressing issue in terms of the road network and efficiency of freight movements. A 2012 study, *City Centre Future Access Study*, notes that by 2041 average vehicle speeds will drop to 5kph during the morning peak period which is the equivalent to walk pace.<sup>25</sup>

Significant road investments include the 20Connect project, improving access to freight hubs around the airport and Onehunga. This project is expected to be completed in 2021. The Waikato Expressway (along with various Southern Corridor Improvement projects) will also reduce travel time, congestions and increase capacity between Auckland and Waikato. The Waikato Expressway projects will cost over \$500 million in total and should be completed in 2021. The Western Ring Project along State Highway 16, to be completed this year, will also improve reliability and travel times to freight hubs in Auckland.

<sup>22</sup> *Wiri to Westfield, The Case for Investment*, WSP & Parsons Brinckerhoff, December 2016

<sup>23</sup> <https://www.nzta.govt.nz/commercial-driving/high-productivity/full-hpmv-network-map/>

<sup>24</sup> <https://www.newstalkzb.co.nz/news/national/auckland-harbour-bridge-strengthened-against-risk-of-catastrophic-failure/>

<sup>25</sup> Page 12

### 3.5 Bay of Plenty Supply Chain

#### 3.5.1 Current Situation

Port of Tauranga, located in the Bay of Plenty, is New Zealand's fastest growing and most productive port, rated as one of the 10 most efficient ports in the world. Between 2016 and 2017 its exports and imports increased by 8.0% and 13.7% respectively, however POT has an import-export imbalance where its import volumes are less than two thirds of its export volumes. As a result, POT has a significant empty container generation.<sup>26</sup>

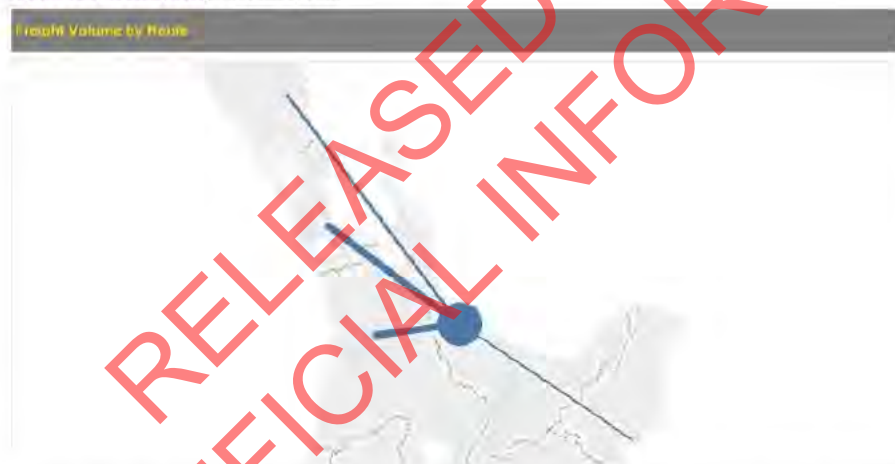
Just over half of all cargo volumes are either transhipped (transferred from one ship to another), transported by rail or carried via pipeline. Nearly 45% of all forestry exports arrive at the port by rail. Road traffic congestion is nevertheless a city-wide problem in Tauranga, and the forecast growth in both passenger and freight travel is likely to exacerbate this issue over time.

POT's fast growing productivity is contributing to the Bay of Plenty's strong economic growth and is estimated to be associated with 43% of the region's Gross Domestic Product (GDP). Exports grew 8.0% in volume to 14.2 million tonnes and imports increased 13.7% in volume to 8.0 million tonnes. Much of the increase is attributable to the large increase in total TEUs handled, from 954,006 in 2016 to 1,085,987 in the 2017 financial year.<sup>27</sup> This large increase in total TEU's handled was mainly driven by a surge in log and forestry exports.<sup>28</sup>

The Port has guaranteed freight load for 10 years from Kotahi, the Fonterra-Silver Fern Farms-owned freight venture, and its harbour dredging, taking it to a consented low-water draught of 14.5m. This means it can accommodate the Aotea Maersk, the biggest container ship ever to visit New Zealand, with a capacity of 9500 containers. POT also welcomed the SBI Maia, an ultramax class bulk carrier that collected the biggest ever log and lumber shipment from New Zealand at 53,000 JASM (Japanese Agricultural Standard cubic metres).<sup>29</sup>

Figure 4 shows the freight volume by route from Bay of Plenty to other UNI Regions

Figure 14 Bay of Plenty Freight Volume by route



Annually, 21 million tonnes of inbound and 18 million tonnes of outbound freight movement happens between BOP and other major UNI regions as shown in the data figures below –

<sup>26</sup> UNISCS Working Group Interim Report

<sup>27</sup> Port of Tauranga Annual Report 2017 [Online] 2017 <https://www.port-tauranga.co.nz/download/mPaul31b8dTk3/>

<sup>28</sup> <https://www.port-tauranga.co.nz/about-port-of-tauranga/commodities/>

<sup>29</sup> <https://www.noted.co.nz/money/economy/tauranga-boom-times-in-the-bay/>

Inbound Volume	Outbound Volume	Total Volume
21M T	18M T	39M T

Volume Summary Between Bay of Plenty and Listed Location			
Location	Total Volume	Inbound Volume	Outbound Volume
Bay of Plenty	25,004,947	12,502,474	12,502,474
Waikato	6,323,050	2,473,815	3,849,235
Auckland	5,846,685	2,520,213	3,326,473
Northland	1,111,715	178,516	933,200
Gisborne	300,800	129,159	171,641

### 3.5.2 Future trends - Bay of Plenty

Dairy is a major driver of exports in Tauranga, growth in dairy is expected to remain relatively flat over the forecast period because much of the available land for dairy has already been converted and further productivity growth for the sector is likely to be low

In 2025, imports into the Ports of Tauranga are likely to decrease as Genesis energy has pledged to stop using coal to generate electricity at Huntly power station (in extreme circumstances by 2025, and completely by 2030)<sup>30</sup> Advisian has assumed that imports of coal will cease in 2025, which results in a 500 thousand tonne decrease<sup>31</sup> in bulk imports into Tauranga from 2025

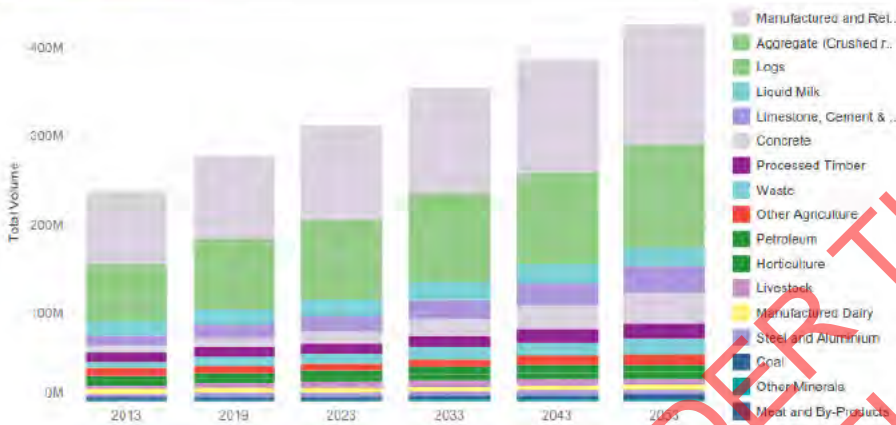
The stacked chart below indicates the potential growth in the sector wise growth scenario between 2013 and 2053 indicating that manufacturing sector will still be having a major proportion to the contribution of the BOP economy

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<sup>30</sup> <https://www.rnz.co.nz/news/national/350390/genesis-energy-to-phase-out-huntly-coal-use>

<sup>31</sup> Average coal imports 2013-2018, accessible from <https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/coal-statistics/>

Summary Volume Trends



### 3.5.3 Impact on the mode of transport in the Bay of Plenty

POT in comparison to POAL and Northport a high volume of freight entering and exiting the port via rail, at nearly 50 percent. This can be accounted for by a rail link from Metroport (Auckland freight hub) and the East Coast Main Trunk Line which carries imports and exports to and from the Port.

There are 4,460 kilometres of roads in the region, most of which are sealed. Meanwhile, the rail network totals 229 kilometres, linking the port to the Waikato and Auckland and the major forestry centres to the east and south. New data shows congestion on Bay of Plenty roads is worsening faster than most other North Island regions. Contributing to this, the region has started to experience port driven road congestion issues. POT has seen a significant increase in traffic relating with regards to moving goods around the Tauranga (traffic flows in Tauranga City increased 5.7% in 2018) and the wider Bay of Plenty region.

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## 4. The Current Situation and Understanding the Pressure for Change

The Government has indicated a strong interest in the future direction of New Zealand's ports, freight services and coastal shipping. The Government recognises these networks are critical to lifting the economic wellbeing of New Zealanders. In the context of the UNI region, the Working Group has developed three primary investment objectives:

- ▶ Developing efficient and effective transport and logistics infrastructure that works in the national interest
- ▶ Promoting opportunities for regional development and employment
- ▶ Ensuring the best use of scarce resources such as land, especially in metropolitan areas

The Working Group have identified four key barriers to investment objectives:

- ▶ Differing port ownership models impacting on a coherent Upper North Island logistics and supply chain strategy
- ▶ Material capacity limitations of the land side transport infrastructure to support the Ports of Auckland and future growth
- ▶ High-value metropolitan land use
- ▶ A lack of rail infrastructure and port connectivity in Northland

### 4.1 Developing the Base Case

Ahead of assessing the change scenarios, a fundamental requirement is to provide a comparator of what might be expected in the absence of introduction of any different overall strategy or central decisions about the priorities or roles of different parts of the supply chain.

The base case sets out potential outcomes relating to levels of growth of the freight task through different parts of the supply chain, infrastructure investment to respond to that growth, and the likely impacts of the changes/increases in freight patterns.

#### 4.1.1 Base Case Road and Rail Investments

In order to meet the freight demands as identified in Section 3 above, the following investment have been assumed. These are based on current Region Transport Plans, approved investments and clearly indicated commitments from either local or central government.

These use a 15 and 30 year timeframe.

Base case 2034

BASE CASE 2034		
RAIL		
Significant investments/developments	Costs (\$M)	Comment
Spur line to Marsden Pt	\$329	From NAL Business Case
Limited NAL upgrade	\$225	Assumed half of the line upgrade cost from the NAL business case
Auckland upgrades - 3rd main Wiri-Westfield, Upgrade Westfield Junction, Quay Park Junction, Electrification Papakura - Pukekohe, Various resilience and level crossing projects	\$940	From ATAP
Passing loops on East Coast Main Trunk Line	\$40	Simple loops requiring one train to stop. Assumed \$10M each
<b>TOTAL</b>	<b>\$ 1,534</b>	
ROAD		
Significant investments/programmes	Costs (\$M)	Comment
No significant capacity increases to SH1 between Central Motorway Junction and Puhoi		
Completion of Puhoi to Warkworth		Costs already expended
Various planned safety improvements SH1 - Wellsford-Warkworth, Brynderwyn Hills, Whangarei (6 minor projects)	\$ 135	From NZTA Whangarei to Auckland programme Business Case
Allowance for further safety improvements on SH1 North Auckland that are not current programmed	\$ 200	Assume \$20M/yr for 10 years for entire corridor
Completion of Waikato Expressway		Already committed
Manukau - Papakura Widening		Already committed
Papakura - Bombay Widening	\$ 450	Estimate - approximately 20km of widening
Mill Road Stage 1	\$ 500	Estimate - approximately 9km, multi-modal corridor. Will take pressure of SH1
No significant improvements SH2 Auckland - Tauranga or SH 27		
SH29 Corridor, early stages of Tauriko Network Plan	\$ 200	Estimate - approx 30% off total planned \$650M spend over 30 years from NZTA Programme
Allowance for limited safety improvements SH29	\$ 200	Assume \$20M/yr for 10 years for corridor
<b>TOTAL</b>	<b>\$ 1,685</b>	

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Base case 2049

BASE CASE 2049		
RAIL		
Significant investments/developments	Costs (\$M)	Comment
Balance of NAL full rail connected port	\$650	Estimate based on total estimated spend of \$1.2B, less \$550M spent to 2034
Auckland upgrades - 4th main between Westfield and Wiri, 3rd and 4th main Wiri-Papakura, 3rd main Papakura-Pukekohe	\$800	Figure from ATAP
Futher ECMT upgrades	\$120	Estimate - upgrade crossing loops to eliminate need to stop. Broad estimate of 4
Additional Waitemata Harbour Crossing - recent update favours LRT crossing, with road pricing implemented	\$3,000	Very high level estimate
<b>TOTAL</b>	<b>\$ 4,570</b>	
ROAD		
Significant investments/programmes	Costs (\$M)	Comment
No significant upgrades expected in/around the Port		ATAP notes the sensitivity of the area and likely high costs
Various ATAP Future Priorities - Upgrade to SH16/SH18 interchange, Capacity upgrades on outer part of the motorway network, New strategic roads to Kumeu and Pukekohe (investigations to be undertaken to protect corridors – no costs available), Mill Road (Phase 2)	\$ 2,000	Cost estimates, if available at all, are very high level. Very high level estimate
East West Link	\$ 800	While not programmed, likely to come at end of period. Cost estimate for 'reduced scope' option from ATAP
Various upgrades SH1 North Auckland/Northland, in particular Brynderwyn western bypass, improvements to Te Hana, Toetoe-Oakleigh	\$ 1,200	Estimate of \$880M - \$1.43B from NZTA programme business case
Estimated SH29 upgrades - mainly alignment improvements over Kaimais and improvements of intersections with SHs 24, 27 and 28	\$ 400	Estimate from SH29 Piarere to Tauriko Programme Business Case, with programme of \$325-\$530M over 30 years
Balance of Tauriko Upgrade Package	\$ 450	Balance from Tauriko Network Programme Business Case
<b>TOTAL</b>	<b>\$ 4,850</b>	

## 4.1.2 Base Case Port Development

### 4.1.2.1 Northland

24 percent of Northland region businesses are categorised as agriculture, forestry and fishing<sup>32</sup>. This is reflected at Northport, where exports mostly consist of bulk logs. Log exports are likely to remain unchanged over the next 30 years as recently harvest trees are replanted.

Horticulture is increasing in Northland with the number of hectares of avocado orchards consistently increasing over the past few years<sup>33</sup>. Northport has also begun expanding port operations to include containerised kiwifruit exports. This expansion provides a cheaper alternative to transporting local kiwifruit south to Port of Tauranga via rail or road<sup>34</sup>.

#### Freight volumes through Northport

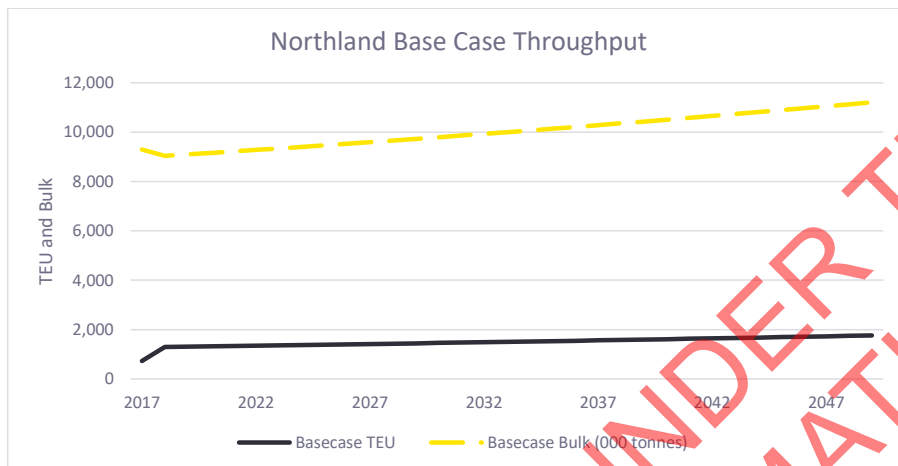
Both imported and exported TEU throughput is forecast to increase by 17% in 2034 relative to 2018 figures. This 17% increase equates to an estimated 780 exported and 740 imported TEU in 2034 (note that Northport reported 7,000 TEU in 2018 – the reason for the difference is that for reasons of consistency we have used FIGs data throughout the study). Nevertheless this will be a relatively low container throughput in comparison to Ports of Auckland and Port of Tauranga.

<sup>32</sup> <https://ecoprofile.infometrics.co.nz/Northland%2bRegion/Businesses>

<sup>33</sup> [Stats NZ reference](#)

<sup>34</sup> [https://www.nzherald.co.nz/the-country/news/article-cfm?c\\_id=16&objectid=12093844](https://www.nzherald.co.nz/the-country/news/article-cfm?c_id=16&objectid=12093844)

Bulk exports at Northport are forecast to remain relatively flat (increase of 0.1 per cent) between 2019 and 2034. This is because exports at Northport are driven predominantly by logs and the availability of harvested logs over the period decreases slightly. Imports are forecast to increase by approximately 17 per cent over the 15-year period.



#### Port side investments

In the base case for Northland, given forecasted throughput at Northport, no significant investments or modifications to the port are required through to 2049.

#### 2025 investments:

- **Containers:** Due to minimal forecasted container growth to 1,456 TEU, no additional land or wharf space is required.
- **Logs:** Due to the additional 10 Ha currently being constructed, no additional land is required.
- Due to minimal forecasted reduction of logs from 2,572 Mt to 2,48 Mt, no additional berth space is required.
- **Woodchips:** Due to no forecasted woodchip growth, no additional land or wharf space is required.
- **Cars:** Northport in the base case are not expected to import cars.
- **Liquids and other bulk:** Minor growth forecasted to 271,000 t as coal plants are planned on being ramped down, future of liquids imports currently unknown.

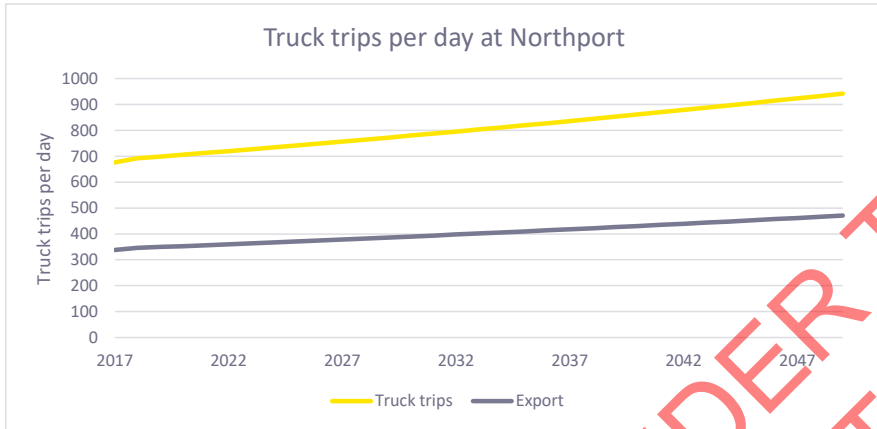
#### 2049 investments:

- **Containers:** Due to minimal forecasted container growth to 1,677 TEU, no additional land or wharf space is required.
- **Logs:** Due to minimal forecasted reduction of logs from 2,48 million tonnes to 2,4 million tonnes. No additional berth space or hardstand are required.
- **Woodchips:** Due to no forecasted woodchip growth of 198,000 t, no additional land or wharf space is required.
- **Cars:** Northport in the base case are not expected to import cars.
- **Liquids and other bulk:** Minor growth forecasted to 273,000 t, future of liquids imports currently unknown.

#### The road and rail network

Truck trips are expected to increase over the next 15 and 30 forecasted periods. Whilst the North Auckland Train Line is assumed to be upgraded to national standard, without a shift in what the ports are handling, we have

assumed that the road network will still handle the vast majority of imports and exports travelling between the Northland and Auckland region



#### 4.1.2.2 Auckland

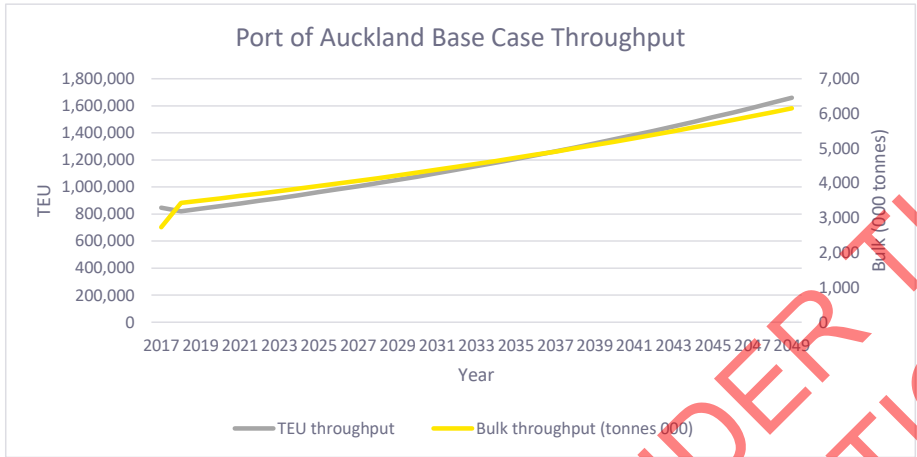
The logistics and supply chain in Auckland is dominated by a port located in the CBD, and major freight hubs to the south of the city. The North-South strategic transport network comprises State Highway 1, State Highway 20 and 16, the North Island Main Trunk railway line and the North Auckland Railway Line. This land-side network is supported by a number of key East-West routes and strategic connections.

From a ports perspective, POAL primarily imports various goods for distribution within the Auckland region. POAL is also the central importer of cars in the North Island, importing 297,678 cars in the 2018. Also of note is the cruise industry, benefiting from the CBD location of the Port. 2018 saw 108 ships with 272,060 visitors arrive at the Port.<sup>35</sup>

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<sup>35</sup> POAL Annual Report page 28

Freight volumes



Port investments

- Below plot shows the forecast container growth with the terminal limitations highlighted
- This shows that there is sufficient terminal area (shown in blue above) to cope with the volumes if the mode of operations changes to ASC
- Based off the 30,000 TEU/Ha metric, POAL will reach maximum capacity at 2026, therefore implementation of ASC should occur prior to then, or cargo relocated elsewhere
- From the POAL masterplan website, POAL appear to have invested in Automated straddles which can stack containers 4 high as opposed to 3 high. This will increase the container density in the yard, however no further information could be gathered, therefore the 30,000 TEU/Ha assumption was still utilised
- Note: Fourth berth capacity does not take into account operational inefficiencies associated with a split terminal

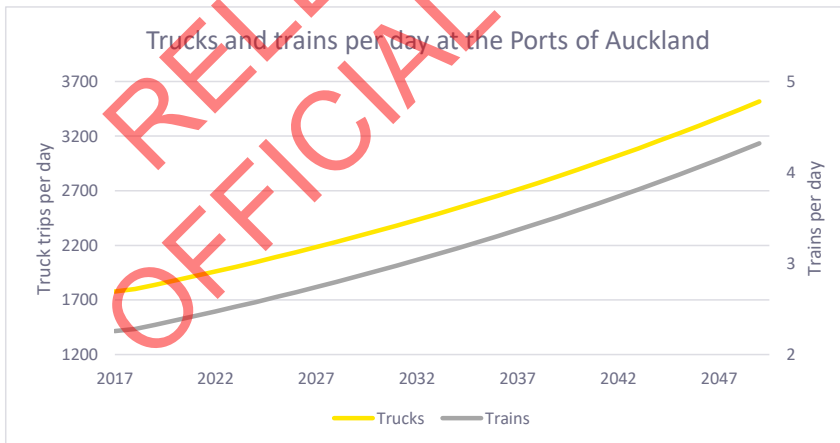


Cost estimates for port development

Ports of Auckland Base Case 2034				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	-	\$ -
	Reclamation	m3	0	\$ -
	Quay Wall	m	-	\$ -
	Rail		0	\$ -
Container Facilities	Pavement and utilities	Ha	23.1	\$ 133,209,251.98
	Quay Cranes	ea	4	\$ 90,720,000
	ASC	ea	14	\$ 296,940,000
	AutoStrad	ea	0	\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
			Total	\$ 520,869,252

Ports of Auckland Base Case 2049				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3		\$ -
	Reclamation	m3	0	\$ -
	Quay Wall	m	300	\$ 29,925,000
Container Facilities	Pavement and utilities	Ha	9.5	\$ 55,048,441
	Quay Cranes	ea	4	\$ 90,720,000
	ASC	ea	6	\$ 127,260,000
	AutoStrad	ea	0	\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
			Total	\$ 302,953,441

The road and rail network



### 4.1.2.3 Tauranga and the Western Bay of Plenty

Tauranga in comparison to Auckland and Whangarei has a comparatively high volume of freight entering and exiting the region (and port) via rail, at nearly 50 percent in terms of port entry. This can be accounted for by a rail link from Metroport (Auckland freight hub) and the East Coast Main Trunk Line which carries imports and exports to and from the Port.

Tauranga may in future face freight-driven congestion problems similar to that of Auckland. The following map from the 2013 Tauranga Urban Network Study projects future areas of congestion.



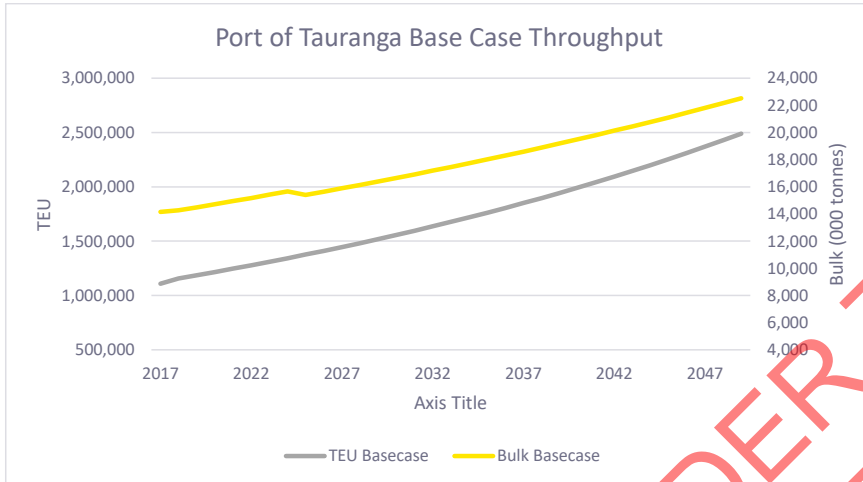
Figure 4-9: Links reaching severe congestion on the TUNS network

The central state highway corridors for Port of Tauranga freight movements are 1, 2, 26, 27, 29 and 29A. Planned improvements on these state highways include the Tauriko Network Plan. The Business Case plans to maintain a freight travel time of 10 minutes on State Highway 29 to Omanawa Road to 2030.

Port of Tauranga (POT) has locations in both Mount Maunganui and Tauranga. Port of Tauranga handles the highest volume of freight of all New Zealand ports. Port of Tauranga is driven by exports, with a high volume of logs and dairy leaving the port. The Port has seen an increase in dairy exports after making a deal with Kotahi, the logistics company owned by Fonterra Cooperative Group and Silver Ferns Farms<sup>36</sup>. Now the Port handles most of the North Island's dairy exports.

Freight volumes

<sup>36</sup> <https://www.nbr.co.nz/article/port-tauranga-ties-97-north-island-dairy-exports-after-coda-deal-b-177636>



**Port investments**

- The figure below shows the forecast container growth with the terminal limitations highlighted
- This shows that terminal is operating close to maximum throughput (excluding any efficiencies gained by intermodal terminals) and that investment in automation should already be occurring
- Even with the mode of operations changed to ASC, the forecasted throughput will still exceed available land, therefore either further efficiencies are required as mentioned in 2034, or additional land is required (shown in orange in above image)
- The construction of the Northern Breakwater wharf provides a larger throughput due to the available length allowing for multiple vessels to berth. However, there is a possibility even construction of this wharf may not provide enough throughput capacity by 2049

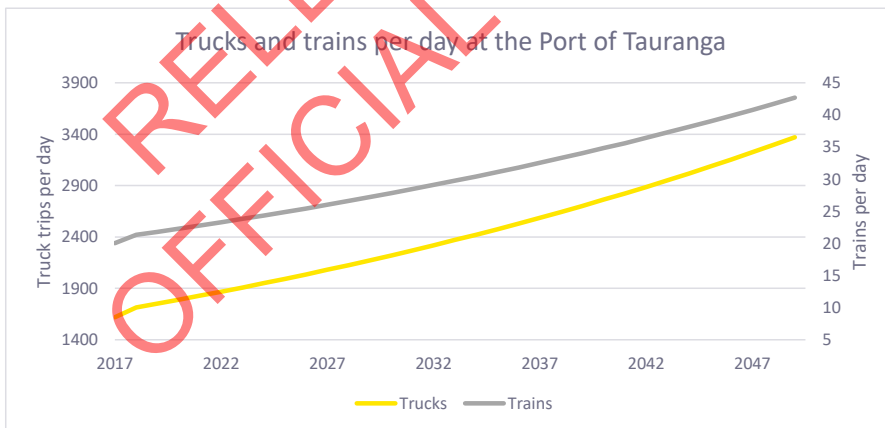


**Cost estimates for port development**

Tauranga Base Case 2034				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	334,400	\$ 8,778,000
	Reclamation	m3	0	\$ -
	Quay Wall	m	380	\$ 36,645,000
	Rail		0	\$ -
Container Facilities	Pavement and utilities	Ha	32.3	\$ 186,656,790
	Quay Cranes	ea	6	\$ 136,080,000
	ASC	ea	20	\$ 424,200,000
	AutoStrad	ea	0	\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
			Total	\$ 792,359,790

Tauranga Base Case 2049				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	750,000	\$ 19,687,500
	Reclamation	m3	0	\$ -
	Quay Wall	m	460	\$ 43,365,000
Container Facilities	Pavement and utilities	Ha	14.5	\$ 83,677,905
	Quay Cranes	ea	6	\$ 136,080,000
	ASC	ea	9	\$ 190,890,000
	AutoStrad	ea	0	\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
			Total	\$ 473,700,405

The road and rail network





## 4.2 Conclusion from Base Case

The Base Case critically hinges on the assessment of whether critical parts of the logistics and supply chain, in any part of the Upper North Island region will reach capacity, either on the port side, land side or a combination of both. Should this be the case then the Base Case effectively delivers the following scenario:

- 1 Ports can remain on their current footprints but may have their total handling capacity capped
- 2 A significant additional port investment, with supporting land-side infrastructure, outside of a constrained location will need to be made to take marginal freight growth over and above any capacity cap
- 3 As freight continues to grow (in line with the growth trends outlined in the National Freight Demand Study), the affected locations share of the total freight task will diminish and other UNI ports will grow
- 4 Opportunity costs will be material:
  - a The base case entails all ports remain on their current sites, so no potential value uplift from alternative land use will occur
  - b Investment in the land-side transport network to support the growth of freight up to the cap would continue to be required

The assumption around capacity is demonstrably material to the outcome of the analysis around the scenarios. Effectively a constrained Base Case results in all the costs of a land side and port development, without any offsetting benefits. An unconstrained base case would require the value of the any offsetting benefits in the modelled Scenarios to be greater than the costs of a lengthening of the logistics chain and the additional infrastructure investment.

The analysis undertaken shows that the main (in some cases sole) driver of the need for capacity to deal with growth at the UNI ports is growth in containers.

For Auckland, the analysis shows that there is sufficient terminal area (shown in blue in the figure below) to cope with growth in the study period if the mode of operations changes to ASC (automation).

Based off the 30,000 TEU/Ha metric, POAL will reach maximum capacity at 2026, therefore implementation of ASC should occur prior to then<sup>37</sup>. It is estimated that POAL would need to spend circa \$500M to upgrade to the level of automation required to cope with the TEU growth, prior to 2026. Our estimate is that a total spend of more than \$800M at POAL over the next 30 years would be required to deal with growth.

<sup>37</sup> From the POAL masterplan website, POAL appear to have invested in Automated straddles which can stack containers 4 high as opposed to 3 high. This will increase the container density in the yard, however no further information could be gathered, therefore the 30,000 TEU/Ha assumption was still utilised. Note: Fourth berth capacity does not take into account operational inefficiencies associated with a split terminal.



However, the major constraint with in Auckland is landside. The increase in volumes through the port (more than doubling truck trips over the next 30 years) will have land-side transport impacts on a part of the network that is already congested, becoming more congested, and increasingly subject to plans and designs to create routes that favour pedestrians, cyclists and public transport.

Even in 2034, the growth equates to 2.6 truck trips per minute, or one every 23 seconds (one every 16 seconds in 2049). Notwithstanding the difficulties in getting all these vehicles in and out of the Port gates, and assuming that the heavy haul industry is prepared to work through the night, these are unrealistic volumes on networks that are only becoming more congested. While the role of rail at POAL could be increased, given the relatively conservative assumptions made around the ratios between freight volumes and trips, it is clear that certainly in the second 15 years, if not prior to 2034, through no fault of its own the Port of Auckland will hit a hard capacity constraint on movement of freight to and from the port.

It is highly unlikely that the land connections to the Port of Auckland can be upgraded sufficiently in order to keep up with the productivity improvements at the Port.

The Port of Tauranga is already operating close to theoretical maximum throughput (excluding any efficiencies gained by intermodal terminals) and investment in automation is becoming an imminent necessity. The summary diagram below shows that even with the mode of operations changed to ASC, the forecasted throughput will still exceed available land, therefore either further efficiencies are required, or additional land is required (shown in orange in below image).



The construction of the Northern Breakwater wharf provides a larger throughput due to the available length allowing for multiple vessels to berth. We estimate that the Port of Tauranga will need to spend more than \$1.2B over the next 30 years to keep up with forecast growth.

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## 5. Scenario Descriptions

Scenarios have been developed to test a range of potential economic, social and environmental impacts for alternative logistics and supply chains in the Upper North Island. It is important to stress that these scenarios are materially distinct from what would traditionally be referred to as an “Option” in that they are representative of a range of possible permutations in what is a complex and responsive freight, transport and land use environment where there are a range of owners, investors, users and stakeholders.

The Working Group have outlined a number of principles to be taken into account in designing the Scenarios. The main principle is that the role of the Working Group is not to ‘decide where the freight goes’, but instead to provide guidance on the development of infrastructure and organisational frameworks that would enable the freight to move differently than it does now. ‘Success’ will be a strategy for investment in and development of UNISC infrastructure that improves freight outcomes as well as social, cultural and economic outcomes.

In this context, the following priorities have guided the development of the Scenarios:

- ▶ Resilience of the supply chain: The strategy must provide confidence that the UNI supply chain has a built-in ability to continue to move freight as required in the event of a natural disaster or other event that impacts one or more areas in the UNI.
- ▶ Cost efficiency in moving freight: NZ’s economy is highly dependent on moving freight both internally and externally, and as such the strategy must create an environment that over time seeks to keep the costs of moving that freight as low as possible (while ensuring that all costs are covered).
- ▶ Maintaining, if not enhancing, levels of competition in the UNISC: One of the best drivers of innovation and cost effectiveness is a competitive market, and the Working Group is conscious that appropriate levels of competition between different providers in the supply chain need to be preserved – but also note that this needs to be balanced against the risk of over-provision of costly infrastructure in our relatively small country.
- ▶ Reducing ‘friction’ between freight and other modes/areas: For reasons of both amenity and efficiency, the strategy will where possible favour the provision of infrastructure that removes freight traffic from impacting on public areas and reduces the interaction between freight vehicles and private vehicles.
- ▶ Contributing to overall government objectives, with a particular focus on priority for the development of rail, improving road safety outcomes, contributing to achievement of the net zero greenhouse emissions reduction targets and economic development of the regions, and in particular Northland (in line with the Terms of Reference).
- ▶ The potential to increase the efficiency of capital for the owners of port and land side infrastructure through optimisation of both the supply chain and land use.

### 5.1 Long list scenario development

Within these principles, Scenarios were developed that offer a mix of:

- ▶ Ports: While this assessment is about the entire logistics and supply chain, the scenarios have used a port-centric approach as an organising principle. Consideration has been given to Northport, Port of Tauranga, a combination of both and potentially a “Super Port” independent of the existing 3 ports.
- ▶ Freight types: The impact of both a full and partial move.
- ▶ Time: The speed at which any move could be undertaken.

This has resulted in the development of two headline scenarios of a Partial Move and a Full Move of the Ports of Auckland.

A Partial Move involves consideration of the movement of the car imports in a short- to medium term horizon to either the Northport or Port of Tauranga.

The Full Move scenarios mirror this approach, but also include a combination of the Ports, as well as a new Super Port. While a full move is discussed, a critical assumption is the Ports of Auckland will continue to exist and Auckland will continue to have a working waterfront. The activities of POAL would be focussed on servicing the cruise industry and potentially a range of other maritime activities.

Due to the base case conclusion, the scenarios were investigated and modelled on the basis of a rapid response of 5 and 15 years.

Within each of these headline scenarios, different locations were considered, as shown in the diagram below:

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### BASE CASE

#### NO INTERVENTION

- Establish maximum capacity and growth
- Establish ongoing costs
- Managing POA's growth elsewhere



BASE CASE  
Auckland

### SCENARIO 1

#### PARTIAL INTERVENTION

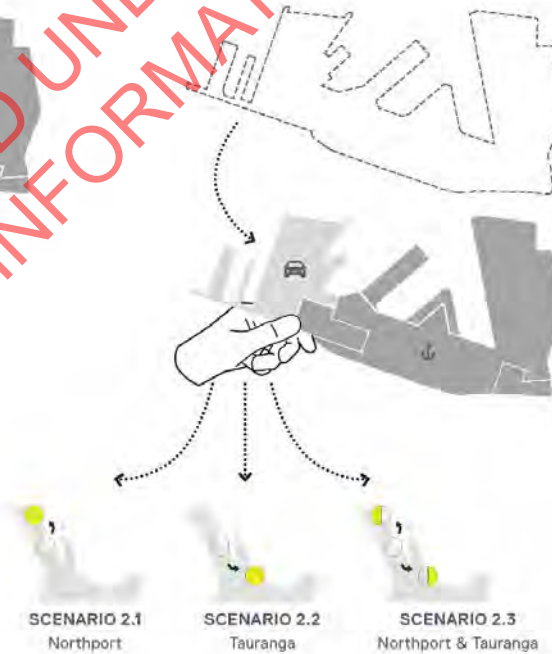
- Establish Container terminal at Northport
- Partial removal of port functions (probably at western end)
- Phased POA land development at Western end



### SCENARIO 2

#### FULL INTERVENTION (EXCEPT CRUISE FACILITY)

- Simultaneous development of Northport, decommissioning of POA and POA land development



- Vehicles
- Cargo / Marine Services

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## 5.2 Long list to short list of scenarios

In considering the long list a combination of multicriteria analysis and intervention logic were deployed. The intention of this process is to take the long list of scenarios down to a smaller number for a fully monetised assessment.

### 5.2.1 Multicriteria Analysis

The Working Group performed Multi-Criteria Analysis (MCA) on the scenarios above, examining the economic, social, cultural and environmental impacts of each. The use of MCA is a standard tool for shortlisting from a long list to a short list. This MCA included consideration of contemporary research, including the results of a Colmar Brunton survey commissioned by the Working Group earlier this year. Scores were given for the impact of each scenario on:

- ▶ Employment opportunities
- ▶ Investment returns
- ▶ Congestion, reliability and friction between modes
- ▶ Supply chain resilience
- ▶ Public amenity and friction between infrastructure users
- ▶ Attractiveness for visitors, residents and workers
- ▶ Quality of urban form and design
- ▶ Support for iwi, hapu and other cultural values
- ▶ Consistency with the Principles of the Treaty of Waitangi
- ▶ Contribution to Treaty Settlements (current and future)
- ▶ Marine and land pollution
- ▶ Noise and visual pollution
- ▶ Contribution to climate change objectives (e.g. Greenhouse Gas Emissions)
- ▶ Sensitive environmental areas (e.g. protected biodiversity)

This qualitative analysis was complemented by a high-level assessment of capital cost, highlighting significant differences in the fiscal impacts of each scenario.

This qualitative exercise made clear that some scenarios were much more desirable than others. Sensitivity testing confirmed that this result was robust to a number of assumptions, including different weightings across factors and two different time horizons. The results, as presented below, were the results of the Working Group's feedback, but the sensitivity testings have confirmed that while the quantum of the scoring can change, the relativities between the options do not from a qualitative perspective.

A key finding was that the 'Base Case' of POAL continuing to operate freight, cars and cruise facilities at its current site performed worse than most of other alternative scenarios considered. Significant capital investment will be required under this approach, both to maintain downtown Auckland, and to develop other Auckland sites should POAL reach capacity.

	Base Case	Scenario 1.1 - Northport, cars Only	Scenario 1.2 - Tauranga, cars only	Scenario 2.1 - Northport, full move	Scenario 2.2 - Tauranga, full move	Scenario 2.3 - Northport & Tauranga, full move	Scenario 2.4 - New Port in Firth of Thames
Multi-Criteria Analysis Score: Weighted							
Multi-Criteria Analysis Score: Unweighted							
Estimated capital cost: Total (\$m)		65	68	1,776	3,526	3,417	3,370

The full scoring of the Multicriteria analysis is included in Appendix 1.

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## 5.2.2 Applying an Investment Logic to Shortlist Scenarios

Following this MCA the options were shortlisted using a simple investment logic:

- 1 Can the scenario realistically deliver a workable alternative logistics and supply chain from both the port side and land side perspective?
- 2 Can the scenario deliver such an alternative within an acceptable time period?
- 3 Is the scenario able to deliver the alternative at a capital cost that represents better value for money than other scenarios?

On this logic, the “Full Move - Tauranga Only” and the Super Port scenarios were not taken forward to a short list

### Full Move - Tauranga Only

The Tauranga Only scenario effectively entailed an increased reliance on a logistics and supply chain focussed on meeting the Upper North Island’s needs through an almost exclusively Sothern solution. This reduced resilience in the UNI Supply Chain, compared to the current situation, and was materially more expensive than options that diversified the supply chain. This was due to the need to invest in the land side infrastructure to address the significantly increased freight volumes through the Bay of Plenty, Waikato and South Auckland.

### Super Port Scenario


The Super Port scenario was discounted from detailed consideration and further development for the following reasons:

- ▶ A Super Port would only be required if it was considered that the combination of existing, established ports could not deliver on the requirements for the logistics and supply chain in the Upper North Island. There is no evidence to suggest that the combination of existing ports could not meet the supply chain needs.
- ▶ The costs of development of a brand new port serviced by a land side logistics and supply chain are significantly higher than all alternative scenarios. The high capital costs apply to both the development of a new port (\$5+ billion) and new land-side road and rail links (\$2+ billion).
- ▶ There are likely to be challenges around gaining resource consent to develop a new port in the Firth of Thames. Any development would require a coastal permit, with consideration of the impacts of reclaiming part of the foreshore or seabed, constructing a structure in, on, under, or over any foreshore or seabed, disturbing the seabed (e.g. by excavation or dredging) and the occupation of part of the common marine and coastal area. Consent for up to 50km of new road and rail corridor (some of which would traverse the Tapapakanga Regional Park) would be required, along with careful consideration of iwi cultural values and concerns relating to the site (although there would potentially be trade-offs with the potential freeing up of the current Waitemata Harbour site, which is of high significance). Also of strong concern would be shipping impacts on established (and growing) marine farm developments in the Hauraki Gulf and Firth of Thames. This consideration would take place in an environment in which alternatives such as developing NorthPort or expanding the Port of Tauranga exist, potentially at lower cost than developing a new port. Whether or not consent would be attainable is uncertain, but what is certain is that the process would be long and costly.

The non-progression of this scenario is not a discounting of this as an option. Ownership structures mean that a decision to advance a Super Port could be made by port owners. It has been discounted as a scenario to be modelled as it is felt that other scenarios are sufficient to understand whether there is the potential to deliver an economically better-performing logistics and supply chain (with associated economic development impacts) approaches.

### 5.3 Shortlisted Scenario Analysis Overview

#### Scenario 1.1: Partial move to Northport



	Infrastructure	Costs (\$000,000, non-discounted)	
<p>Port Infrastructure and Logistics hubs/Distribution Centres</p> 	<ul style="list-style-type: none"> <li>▶ Limited investment to provide yard space for cars at NorthPort</li> <li>▶ Assume that all cars go on rail</li> </ul> <p>Constraints:</p> <ul style="list-style-type: none"> <li>▶ Will have to develop wharf to accommodate RoRo vessel and vehicle operations</li> <li>▶ Develop dedicated road access from wharf to vehicle staging area (doubtful use of public roads will be possible due to customs, security and congestion)                             <ul style="list-style-type: none"> <li>▶ Will require shuttle to transport stevedores back to vessel</li> </ul> </li> <li>▶ Have assumed new car hardstand is required to reduce interference with existing port operations</li> </ul>	<p>Construction of car hardstand at Northport</p>	<p>\$28.8M (estimate)</p>

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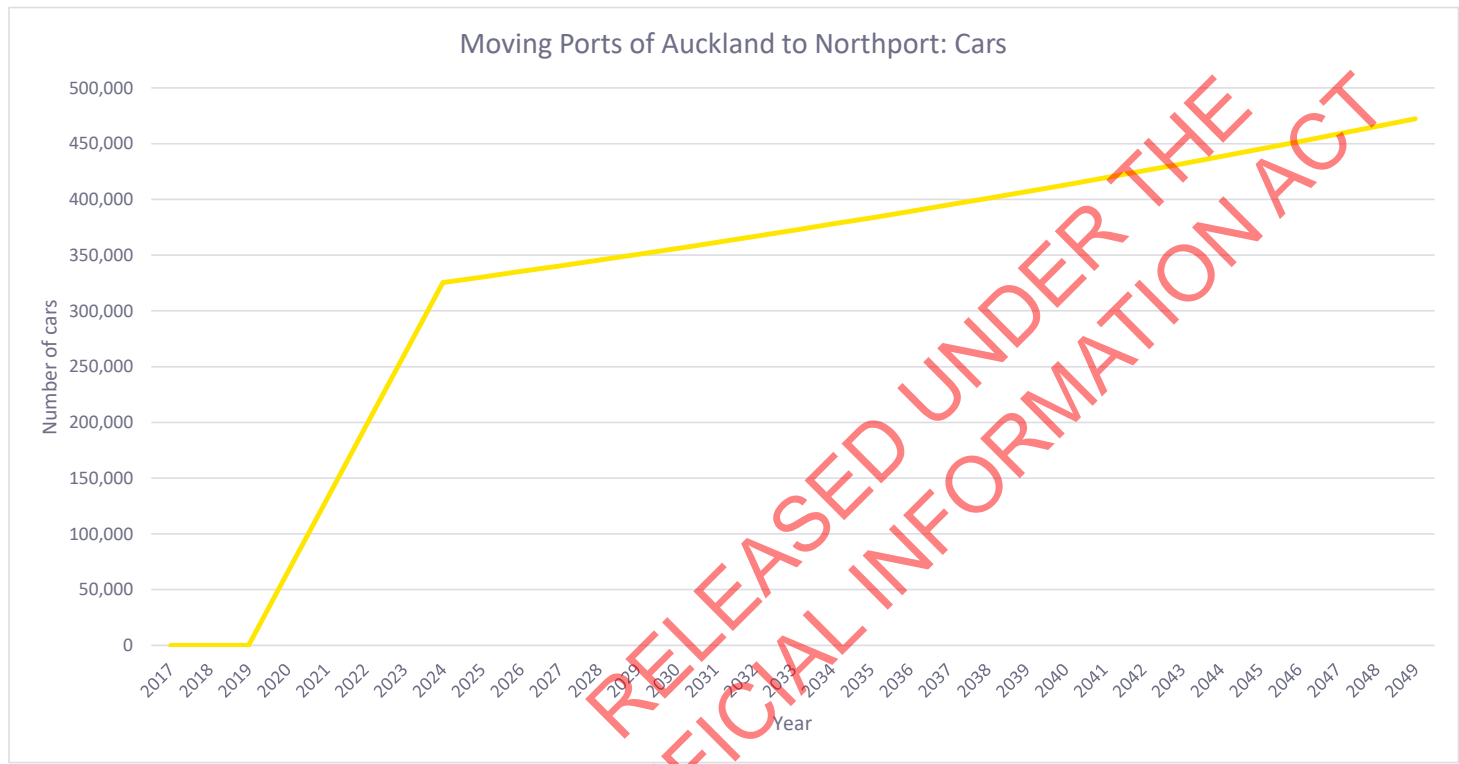
Infrastructure				Costs (\$000,000, non-discounted)	
<b>Moving cars to Northport 2034</b>					
		Base case		Costs of moving cars to Northport	
	Unit	Amount	Total cost	Amount	Total cost
<b>Port</b>					
Dredging	m3	0 \$	-	0 \$	-
Reclamation	m3	0 \$	-	0 \$	-
Quay Wall	m	0 \$	-	0 \$	-
<b>Container Facilities</b>					
Pavement and utilities	Ha	0 \$	-	0 \$	-
Quay Cranes	ea	0 \$	-	0 \$	-
ASC	ea	0 \$	-	0 \$	-
AutoStrad	ea	0 \$	-	0 \$	-
<b>Log Facilities</b>					
Pavement	Ha	0 \$	-	0 \$	-
<b>Car Facilities</b>					
Pavement	Ha	0 \$	-	5.3	28,770,000
<b>Total cost</b>		\$	-	\$	28,770,000
<b>Marginal cost</b>				\$	28,770,000
<b>Moving cars to Northport 2049</b>					
		Base case		Costs of moving cars to Northport	
	Unit	Amount	Total cost	Amount	Total cost
<b>Port</b>					
Dredging	m3	0 \$	-	0 \$	-
Reclamation	m3	0 \$	-	0 \$	-
Quay Wall	m	0 \$	-	0 \$	-
<b>Container Facilities</b>					
Pavement and utilities	Ha	0 \$	-	0 \$	-
Quay Cranes	ea	0 \$	-	0 \$	-
ASC	ea	0 \$	-	0 \$	-
AutoStrad	ea	0 \$	-	0 \$	-
<b>Log Facilities</b>					
Pavement	Ha	0 \$	-	0 \$	-
<b>Car Facilities</b>					
Pavement	Ha	0 \$	-	1.8	9,770,000
<b>Total cost</b>		\$	-	\$	9,770,000
<b>Marginal cost</b>				\$	9,770,000

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	Infrastructure	Costs (\$000,000, non-discounted)	
<b>Rail Infrastructure</b> 	▶ No additional investment (assume that rail spur and some (limited) level of investment to upgrade the NAL is undertaken in the period in the base case)		
<b>Road Infrastructure</b> 	▶ Assume no additional costs to base case		
<b>TOTAL COST</b>			<b>\$28.8M</b>

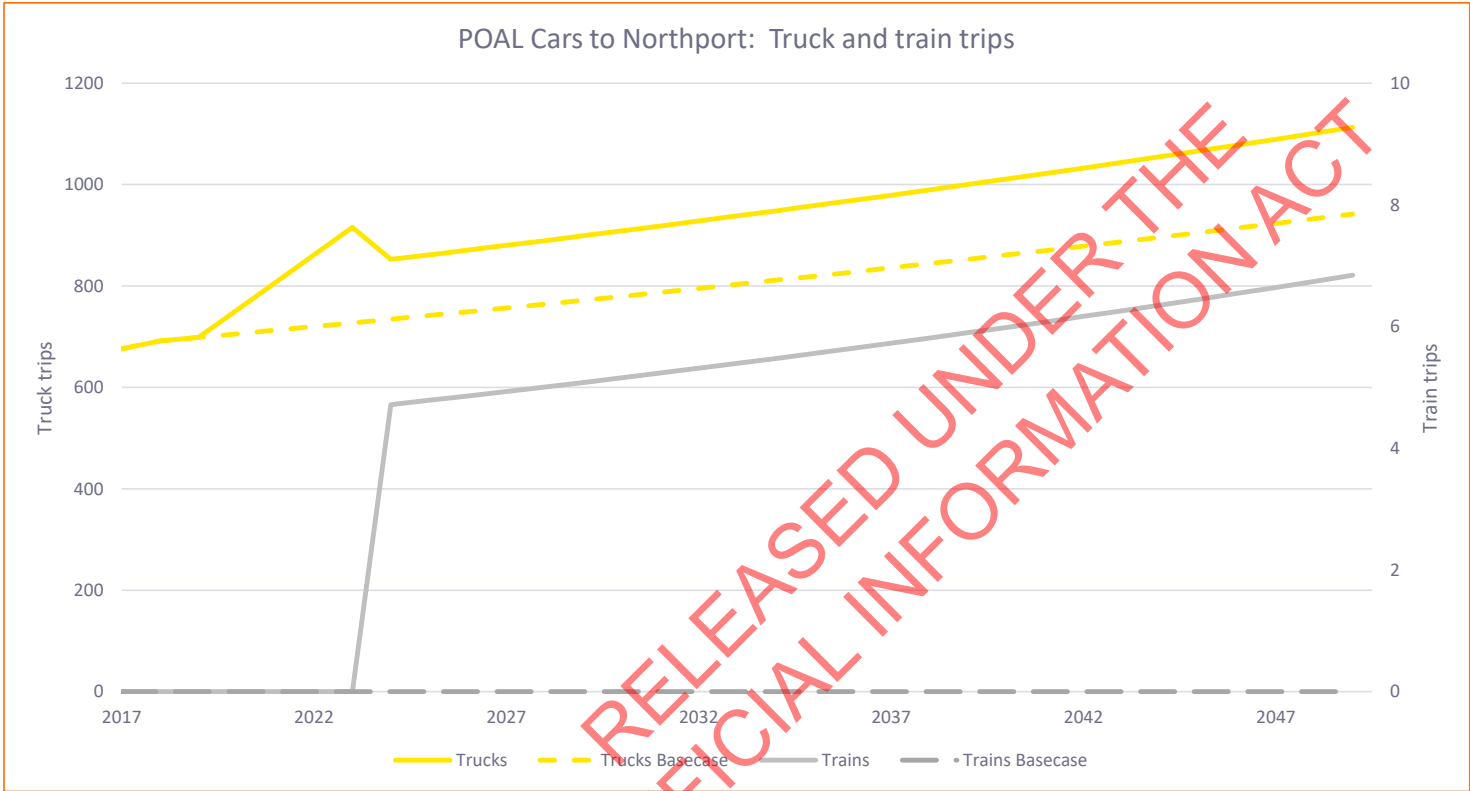
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Northport car throughput




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Truck and train trips to/from the port



**Scenario 1.2: Partial move to Tauranga**

	Infrastructure	Costs (\$000,000, non-discounted)	
<p>Port Infrastructure and Logistics hubs/Distribution Centres </p>	<ul style="list-style-type: none"> <li>▶ Port Annual Report highlights 40 hectares of available space. Only very limited cost expected</li> <li>▶ Will require 5.3Ha of land to stockpile the cars</li> <li>▶ Some limited expansion and reorganisation at MetroPort to provide for cars</li> <li>▶ Assume new cars on trucks, used cars on rail</li> </ul> <p><b>Constraints:</b></p> <ul style="list-style-type: none"> <li>▶ Potential of limited berth and staging availability on general bulk berths due to existing operations and cruise vessels                             <ul style="list-style-type: none"> <li>▶ Therefore, have assumed that the car hardstand will not be located on the general bulk hardstands but offsite which will require a new pavement. However, have not costed land acquisition or demolition of existing structures</li> </ul> </li> <li>▶ Will have to develop wharf to accommodate RoRo vessel and vehicle operations</li> <li>▶ Develop dedicated road access from wharf to vehicle staging area (doubtful use of public roads will be possible due to customs, security and congestion)                             <ul style="list-style-type: none"> <li>▶ Will require shuttle to transport stevedores back to vessel</li> </ul> </li> </ul>	Yard re-organisation at POT	\$28.8M 2034 (estimate)
		Limited expansion at MetroPort to provide for cars, and possibly longer trains	\$2.5M (estimate)

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Infrastructure					Costs (\$000,000, non-discounted)				
<b>Moving cars to Port of Tauranga 2034</b>									
			Base case		Costs of moving cars to Port of Tauranga				
	Unit	Amount	Total cost	Amount	Total cost	Amount	Total cost		
<b>Port</b>									
Dredging	m3	334,400	\$ 13,960,000	334,400	\$ 13,960,000				
Reclamation	m3	0		0	\$ -				
Quay Wall	m	380	\$ 126,920,000	380	\$ 126,920,000				
<b>Container Facilities</b>									
Pavement and utilities	Ha	32.3	\$ 215,760,000	32.3	\$ 215,760,000				
Quay Cranes	ea	6	\$ 158,400,000	6	\$ 158,400,000				
ASC	ea	20	\$ 528,000,000	20	\$ 528,000,000				
AutoStrad	ea	0	\$ -	0	\$ -				
<b>Log Facilities</b>									
Pavement	Ha	0	\$ -	0	\$ -				
<b>Car Facilities</b>									
Pavement	Ha	0	\$ -	5.3	\$ 28,770,000				
<b>Total cost</b>			<b>\$ 1,043,040,000</b>		<b>\$ 1,071,810,000</b>				
<b>Marginal cost</b>			<b>\$ -</b>		<b>\$ 28,770,000</b>				
<b>Moving cars to Port of Tauranga 2049</b>									
			Base case		Costs of moving cars to Port of Tauranga				
	Unit	Amount	Total cost	Amount	Total cost	Amount	Total cost		
<b>Port</b>									
Dredging	m3	750,000	\$ 31,310,000	750,000	\$ 31,310,000				
Reclamation	m3	0		0	\$ -				
Quay Wall	m	460	\$ 153,640,000	460	\$ 153,640,000				
<b>Container Facilities</b>									
Pavement and utilities	Ha	14.5	\$ 96,860,000	14.5	\$ 96,860,000				
Quay Cranes	ea	6	\$ 158,400,000	6	\$ 158,400,000				
ASC	ea	9	\$ 237,600,000	9	\$ 237,600,000				
AutoStrad	ea	0	\$ -	0	\$ -				
<b>Log Facilities</b>									
Pavement	Ha	0	\$ -	0	\$ -				
<b>Car Facilities</b>									
Pavement	Ha	0	\$ -	1.8	\$ 9,770,000				
<b>Total cost</b>			<b>\$ 677,810,000</b>		<b>\$ 687,580,000</b>				
<b>Marginal cost</b>			<b>\$ -</b>		<b>\$ 9,770,000</b>				

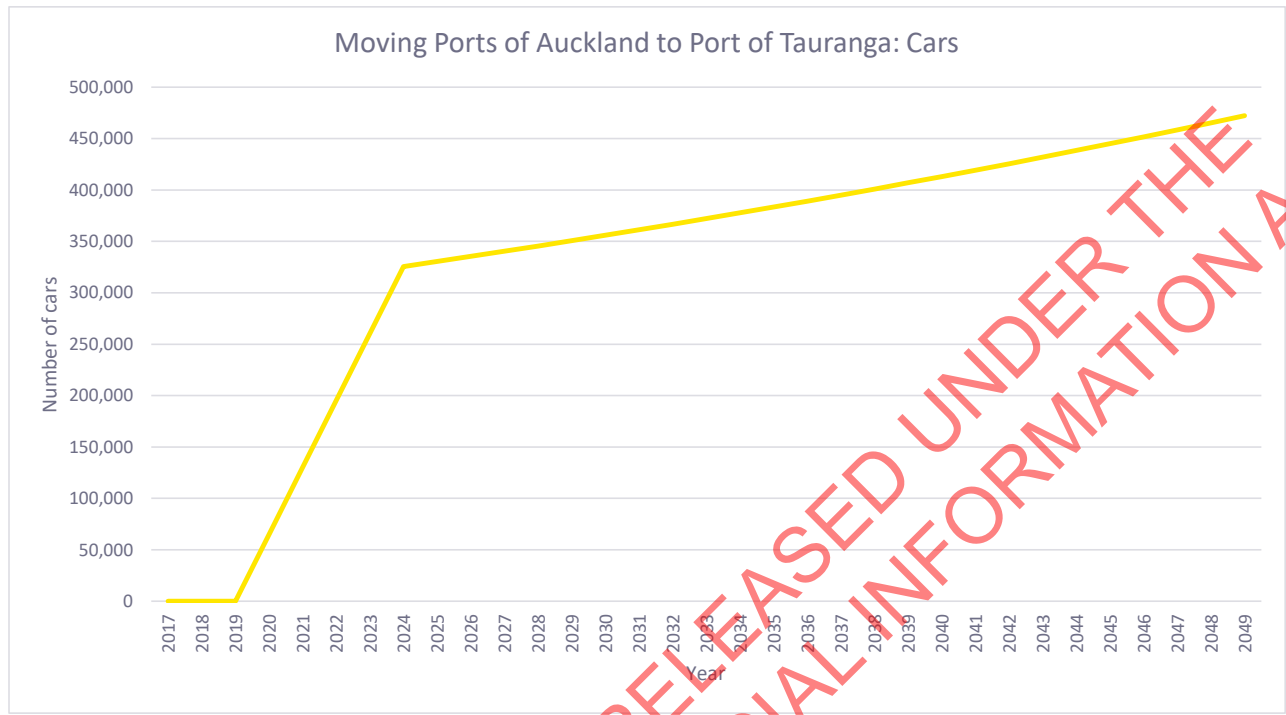
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	Infrastructure	Costs (\$000,000, non-discounted)	
<b>Rail Infrastructure</b> 	<ul style="list-style-type: none"> <li>No additional (associated with this option) upgrade assumed, expect that passing loop development on ECMT will be sufficient for additional/length of trains</li> <li>Rail used cars to West Auckland MetroPort and then distribution, on dedicated rolling stock.</li> </ul> 	By 2034, 90 specifically - tailored railcars at \$500k each (could be as low as \$300k each)	\$45M (estimate from Advisian Australian experience)
<b>Road Infrastructure</b> 	<ul style="list-style-type: none"> <li>There will be some impacts on already congested networks close to the Port, but an additional 60 per day is assumed to be manageable</li> </ul>		
<b>TOTAL COST</b>			<b>\$76.3M</b>

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Port of Tauranga car throughput



Port of Tauranga truck and train trips to/from the port

TO BE FILLED

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## Scenario 2.1: Full Move (Except Cruise) to Northport

SCENARIO 2.1  
FULL INTERVENTION TO NORTHPORT ONLY



ESTIMATED SUPPS	COST \$M
7 MARPODS UPGRADES	
7 BYPASS	\$ \$
3 BRIDGES	\$ \$ \$
7 NEW COCKLE TREATMENT	\$ \$ \$
7 NEW TUNNEL	\$ \$ \$
10 RAIL INFRASTRUCTURE	\$ \$
4 AIRPORTS FROM AUCKLAND	\$ \$ \$ \$
EXPORTS FROM AUCKLAND TO NLD	\$ \$ \$ \$
1300 NEW MTR	\$ \$ \$ \$ \$
70 NEW RAIL FROM THE LANDSIDE	\$ \$ \$ \$ \$

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Infrastructure	Costs (\$000,000, non-discounted)	
<ul style="list-style-type: none"> <li>▶ Significant increase at Northport.</li> <li>▶ NorthPort from POAL volumes - NorthPort has very little growth of the current volumes</li> <li>▶ Will have to cater for Postpanamax vessels (+9,000 TEU) to be future proof</li> <li>▶ Significant investment in infrastructure required for 2034 volumes:                             <ul style="list-style-type: none"> <li>▶ Require 3 container berths, 1 log berth, and 1 car/bulk berth                                     <ul style="list-style-type: none"> <li>▶ Similar berth length as identified in masterplan</li> <li>▶ Require 23.1ha of hardstand for containers, and 5.3ha of pavement for cars</li> <li>▶ Existing sufficient storage for logs, woodchips and other bulk (Inc. liquids, coal imports would have reduced)</li> </ul> </li> </ul> </li> </ul>	<p>Northport upgrade to full 1.4km berth length</p>	<p>\$1.602B (2034) detailed costs shown below</p>
<ul style="list-style-type: none"> <li>▶ By 2049 (cargo and infrastructure increased from 2034 numbers):                             <ul style="list-style-type: none"> <li>▶ Minor reduction in log exports of 75,000 t therefore no change in berths or land area</li> <li>▶ Increase of containers by 507,000 TEU to 1.735M TEU                                     <ul style="list-style-type: none"> <li>▶ Requires an additional 9.5Ha of land and 1 additional berth</li> </ul> </li> <li>▶ Increase of cars by 136,000 to 542,000 cars                                     <ul style="list-style-type: none"> <li>▶ Requires an additional 1.7Ha of land and no additional berth</li> </ul> </li> <li>▶ Increase of other bulk and liquids of 210,000 t to 1.025M t</li> </ul> </li> </ul>	<p>Logistics hub northwest of Auckland</p>	
<ul style="list-style-type: none"> <li>▶ Assume existing facilities are adequate as woodchips remain constant</li> <li>▶ Development of Road/Rail hubs around upgraded rail lines in Northland</li> <li>▶ Expect the need for development of an inland multi-modal hub in North/West of Auckland                             <ul style="list-style-type: none"> <li>▶ Construct "on-dock" intermodal terminal similar to DPW London Gateway to reduce the requirement for trucks (not costed)</li> </ul> </li> <li>▶ Costs:                             <ul style="list-style-type: none"> <li>▶ Key assumptions:                                     <ul style="list-style-type: none"> <li>▶ The mode of operation is ASC (this is the cost shown below)</li> <li>▶ All existing hardstand is to be replaced</li> </ul> </li> <li>▶ Below are the raw costs, no contingency, engineering and PM allowances have been included.</li> </ul> </li> </ul>	<p>Development of small hubs around upgraded rail lines in Northland (5 x)</p>	<p>\$5M</p>



Infrastructure				Costs (\$000,000, non-discounted)			
<b>Moving Ports of Auckland to Northport 2034</b>							
		Base case		Costs of moving cars to Port			
	Unit	Amount	Total cost	Amount	Total cost		
<b>Port</b>							
Dredging	m3	0 \$	-	2,150,000	\$ 89,760,000		
Reclamation	m3	0 \$	-	2,150,000	\$ 178,000,000		
Quay Wall	m	0 \$	-	900	\$ 300,600,000		
<b>Container Facilities</b>							
Pavement and utilities	Ha	0 \$	-	28.0	\$ 187,040,000		
Quay Cranes	ea	0 \$	-	9	\$ 237,600,000		
ASC	ea	0 \$	-	14	\$ 369,600,000		
AutoStrad	ea	0 \$	-	28	\$ 73,920,000		
<b>Log Facilities</b>							
Pavement	Ha	0 \$	-	9.6	\$ 52,100,000		
<b>Car Facilities</b>							
Pavement	Ha	0 \$	-	7.0	\$ 37,990,000		
<b>Other</b>							
Service/admin/worksh op buildings/sundry structures	m2	0 \$	-	10,000	\$ 75,000,000		
<b>Total cost</b>			\$ -		\$ 1,601,610,000		
<b>Marginal cost</b>			\$ -		\$ 1,601,610,000		
<b>Moving Ports of Auckland to Northport 2049</b>							
		Base case		Costs of moving cars to Port			
	Unit	Amount	Total cost	Amount	Total cost		
<b>Port</b>							
Dredging	m3	0 \$	-	542,000	\$ 22,630,000		
Reclamation	m3	0 \$	-	542,000	\$ 58,500,000		
Quay Wall	m	0 \$	-	300	\$ 100,200,000		
<b>Container Facilities</b>							
Pavement and utilities	Ha	0 \$	-	5.4	\$ 36,070,000		
Quay Cranes	ea	0 \$	-	4	\$ 105,600,000		
ASC	ea	0 \$	-	6	\$ 158,400,000		
AutoStrad	ea	0 \$	-	12	\$ 31,680,000		
<b>Log Facilities</b>							
Pavement	Ha	0 \$	-	0	\$ -		
<b>Car Facilities</b>							
Pavement	Ha	0 \$	-	1.8	\$ 9,770,000		
<b>Other</b>							
Service/admin/worksh op buildings/sundry structures	m2	0 \$	-	4,000	\$ 30,000,000		
<b>Total cost</b>			\$ -		\$ 552,850,000		
<b>Marginal cost</b>			\$ -		\$ 552,850,000		


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Rail Infrastructure



Infrastructure	Costs (\$000,000, non-discounted)	
<ul style="list-style-type: none"> <li>▶ Bring forward (assume immediate start on design and construction) the completion of the upgrade to the North Auckland Line (and spur to Northport)</li> <li>▶ The likelihood is that the freight task for South/East Auckland and further south will continue to be distributed from the MetroPort/Wiri inland hubs, so the expectation is that the Avondale-Southdown rail link would need to be developed to avoid long truck trips from the northwest hub. The mix of investment (scale of the hub in the northwest vs expenditure required to reach and enhance the existing southern hubs needs more detailed analysis.</li> <li>▶ It is also like that the Swanson - Newmarket route will need to be upgraded to reduce conflict between freight and passenger rail (especially when CRL volumes increase). Detailed assessment not undertaken.</li> </ul>	Rolling stock for cars (150 units)	\$75M
	Spur line to Marsden Point	\$329M
	Limited NAL upgrade	\$225M
	Avondale - Southdown	\$1B (KiwiRail response to OIA request from 2017)
	Swanson to Avondale upgrade?	Detailed assessment

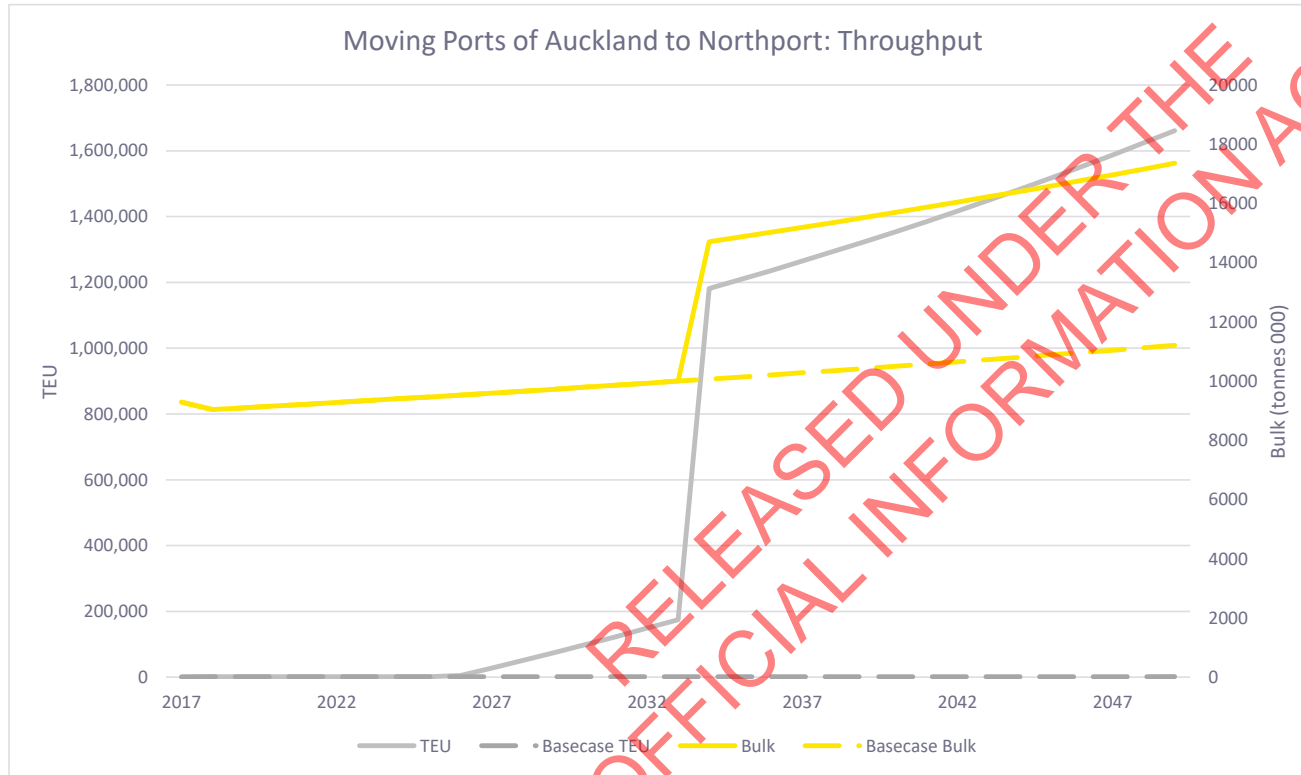
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Road Infrastructure 

Infrastructure	Costs (\$000,000, non-discounted)	
<ul style="list-style-type: none"> <li>▶ Widening/signal upgrades to provide for increased traffic around the projected multi-modal hub in the northwest of Auckland would be required to provide for the truck traffic necessary for distribution of the freight coming on the rail from Northport</li> <li>▶ Similar to the 'Tauranga' scenario, the reality is that not all freight will be carried on rail, and there will be a requirement to complete the 4 laning on SH1 to the north, ahead of schedule.</li> </ul>	Localised upgrades around new hub in NW Auckland	TBC
	Completion of 4 laning from Whangārei to Auckland	TBC
	various upgrades SH1 North Auckland/Northland, in particular Brynderwyn western bypass, improvements to Te Hana, Toetoe-Oakleigh	\$1.2B
	Bring forward the SH16-18 upgrades noted as part of the list of ATAP future priorities	\$1B
<b>TOTAL COST</b>		<b>\$5.436B</b>

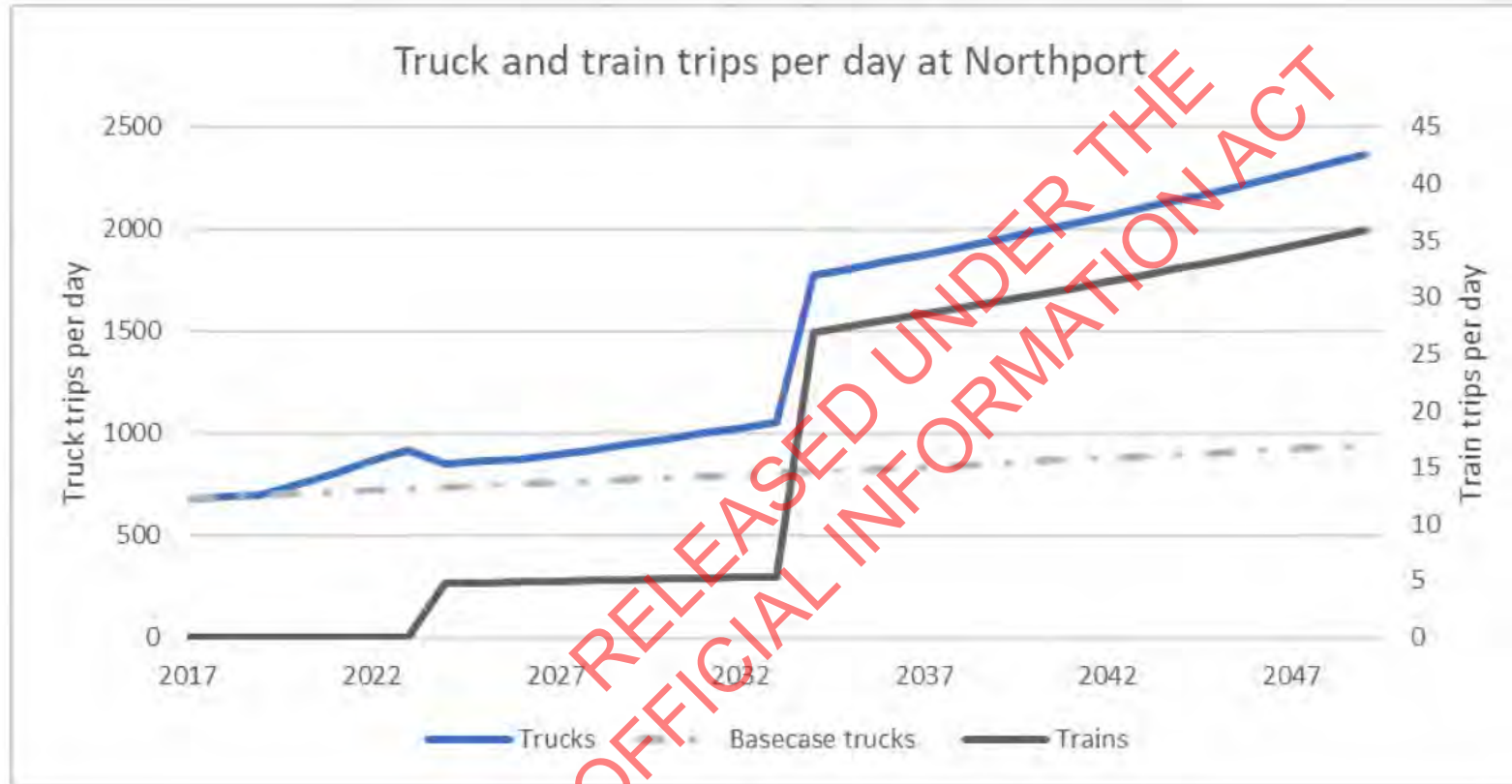
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Northport Throughput



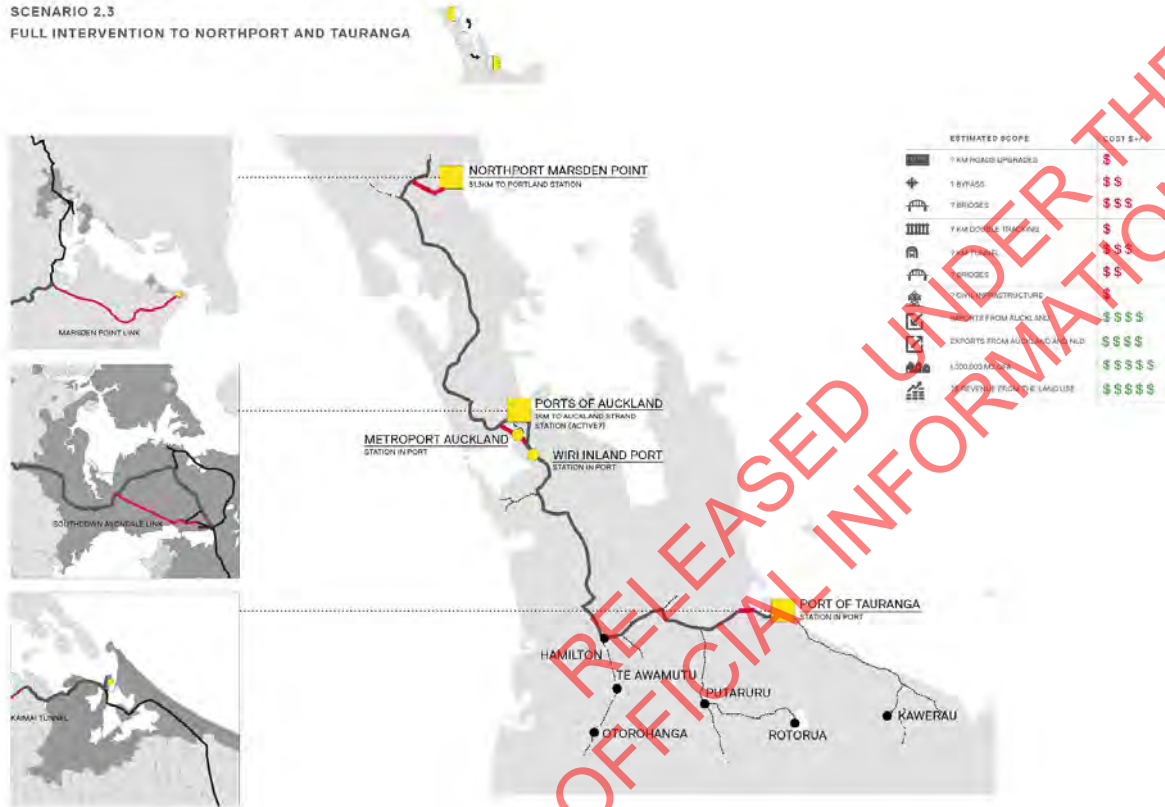


The number of truck and train trips to/from Northport



### Scenario 2.3: Full Move (Except Cruise) to Northport and Tauranga

SCENARIO 2.3  
FULL INTERVENTION TO NORTHPORT AND TAURANGA



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Infrastructure	Costs (\$000,000, non-discounted)	
<ul style="list-style-type: none"> <li>▶ Significant investment required at both Ports. Detailed plan to split cargoes and timeframes for deployment to be developed</li> <li>▶ Insufficient capacity at Tauranga to accommodate additional cargo from POAL (reasons stated above in Section 3.5)</li> <li>▶ Sufficient area at NorthPort</li> <li>▶ Cost estimate below indicates required infrastructure (similar level of investment required as above options)</li> <li>▶ Costs:                             <ul style="list-style-type: none"> <li>▶ Key assumptions:                                     <ul style="list-style-type: none"> <li>▶ The mode of operation is ASC (this is the cost shown below)</li> <li>▶ All existing hardstand is to be replaced for containers and cars</li> <li>▶ Below are the raw costs, no contingency, engineering and PM allowances have been included.</li> <li>▶ Please note that these costs have not been compared to a concept port plan, therefore may not reflect future estimates, as Tauranga will exceed available land and wharf capacity with POAL cargo</li> </ul> </li> </ul> </li> </ul>	Various required port investments at Northport and Port of Tauranga	\$1,336B (2034 estimate excluding base case costs)

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Port Infrastructure  
and Logistics  
hubs/Distribution  
Centres

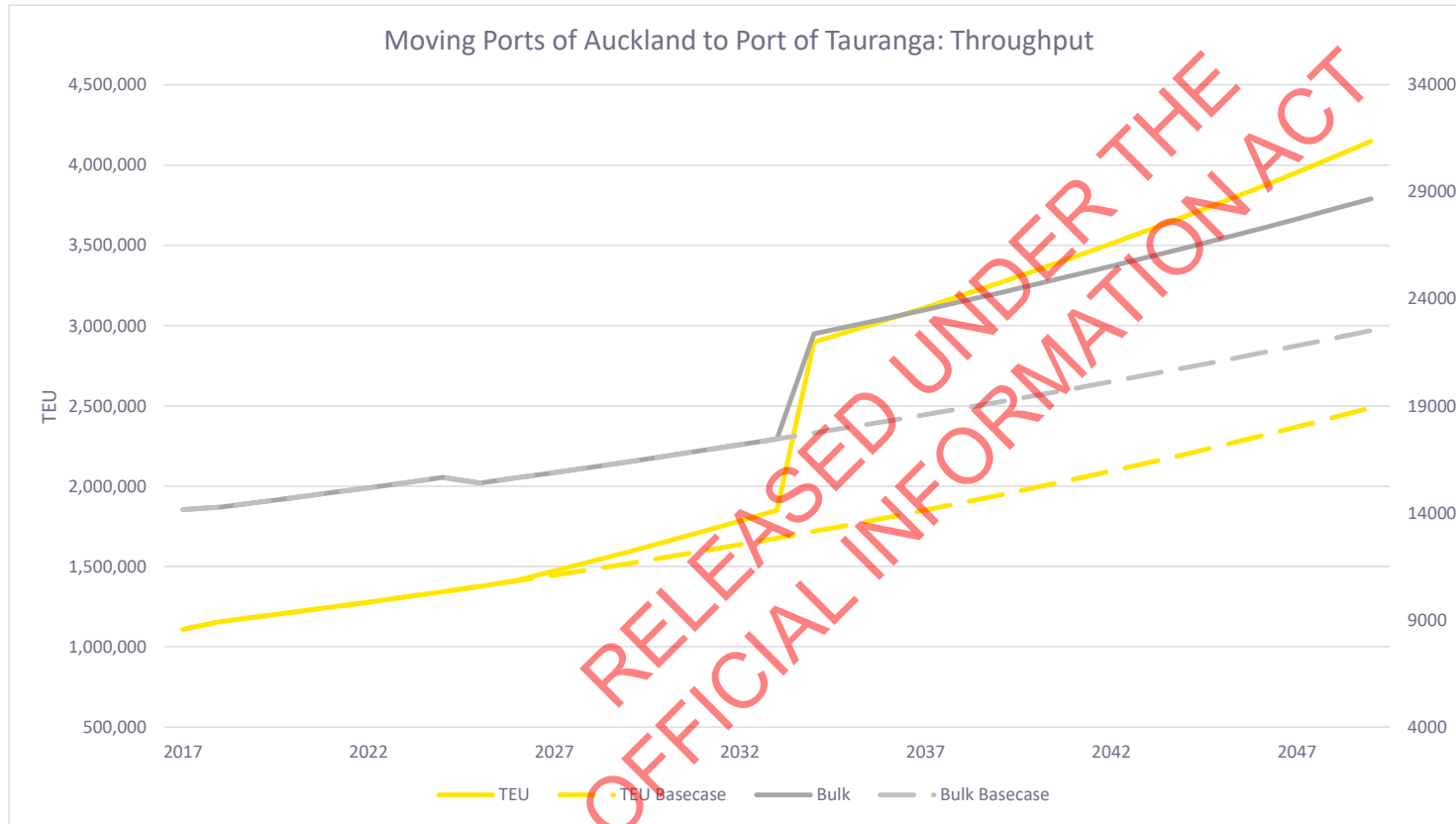


Infrastructure										Costs (\$'000,000, non-discounted)	
<b>Moving Ports of Auckland to Northport and Port of Tauranga 2034</b>											
<b>Northport</b>				<b>Port of Tauranga</b>							
		Base case		Costs of moving part of Ports of Auckland to Northport				Base case		Cost of moving part of Ports of Auckland to Port of Tauranga	
	Unit	Amount	Total cost	Amount	Total cost	Unit	Amount	Total cost	Amount	Total cost	
<b>Port</b>											
	Dredging	m3	0 \$	1,400,000	58,450,000	Dredging	334,400	13,960,000	1,443,200	31,310,000	
	Reclamation	m3	0 \$	1,400,000	99,000,000	Reclamation	0	-	0	0	
	Quay Wall	m	0 \$	410	136,940,000	Quay Wall	380	126,920,000	790	263,860,000	
<b>Container Facilities</b>											
	Pavement and utilities	Ha	0 \$	11.6	77,490,000	Pavement and utilities	12.3	215,760,000	13.9	293,250,000	
	Quay Cranes	ea	0 \$	5	132,000,000	Quay Cranes	5	138,400,000	11	290,400,000	
	ASC	ea	0 \$	7	104,800,000	ASC	20	528,000,000	26	686,400,000	
	AutoStrad	ea	0 \$	14	36,960,000	AutoStrad	0	-	0	-	
<b>Log Facilities</b>											
	Pavement	Ha	0 \$	0	-	Pavement	0	-	0	-	
<b>Car Facilities</b>											
	Pavement	Ha	0 \$	2.6	14,110,000	Pavement	0	-	2.6	14,110,000	
<b>Other</b>											
	Service/admin/worksh op buildings/sundry structures	m2	0 \$	4,000	30,000,000	Service/admin/worksh op buildings/sundry structures	0	-	4,000	30,000,000	
<b>Total cost</b>			\$ -	\$ 769,750,000	<b>Total cost</b>		\$ 1,043,040,000	<b>Total cost</b>	\$ 1,609,330,000		
<b>Marginal cost</b>			\$ -	\$ 769,750,000	<b>Marginal cost</b>		\$ -	<b>Marginal cost</b>	\$ 566,290,000		
<b>Moving Ports of Auckland to Northport and Port of Tauranga 2049</b>											
<b>Northport</b>				<b>Port of Tauranga</b>							
		Base case		Costs of moving part of Ports of Auckland to				Base case		Costs of moving part of Ports of Auckland to Port of	
	Unit	Amount	Total cost	Amount	Total cost	Unit	Amount	Total cost	Amount	Total cost	
<b>Port</b>											
	Dredging	m3	0 \$	750,000	31,310,000	Dredging	750,000	31,310,000	0	-	
	Reclamation	m3	0 \$	750,000	56,500,000	Reclamation	0	-	0	-	
	Quay Wall	m	0 \$	340	119,560,000	Quay Wall	460	153,640,000	690	230,460,000	
<b>Container Facilities</b>											
	Pavement and utilities	Ha	0 \$	4.8	32,060,000	Pavement and utilities	14.5	96,860,000	19.3	128,920,000	
	Quay Cranes	ea	0 \$	2	52,800,000	Quay Cranes	6	158,400,000	8	211,200,000	
	ASC	ea	0 \$	3	79,200,000	ASC	9	237,600,000	12	316,800,000	
	AutoStrad	ea	0 \$	6	15,840,000	AutoStrad	0	-	0	-	
<b>Log Facilities</b>											
	Pavement	Ha	0 \$	0	-	Pavement	0	-	0	-	
<b>Car Facilities</b>											
	Pavement	Ha	0 \$	0.9	4,880,000	Pavement	0	-	0.9	4,880,000	
<b>Other</b>											
	Service/admin/worksh op buildings/sundry structures	m2	0 \$	1,350	10,000,000	Service/admin/worksh op buildings/sundry structures			1,350	10,000,000	
<b>Total cost</b>			\$ -	\$ 396,150,000	<b>Total cost</b>		\$ 677,810,000	<b>Total cost</b>	\$ 902,260,000		
<b>Marginal cost</b>			\$ -	\$ 396,150,000	<b>Marginal cost</b>		\$ -	<b>Marginal cost</b>	\$ 224,450,000		

	Infrastructure	Costs (\$000,000, non-discounted)	
<b>Rail Infrastructure</b> 		Avondale - Southdown	\$1,000M
		3rd and 4th Main Wiri-Papakura	\$85M
		3rd and 4th Main Wiri-Papakura	\$85M
		ECMT upgrades, including urban Tauranga	\$500M
<b>Road Infrastructure</b> 		East West Link	\$800M
		Estimated SH29 upgrades - mainly alignment improvements over Kaimai's and improvements of intersections with SHs 24, 27 and 28	\$500M
		Balance of Tauriko Upgrade Package	\$450M
		Additional Tauranga Urban upgrades adjacent to Port	\$400M
		Various upgrades SH1 North Auckland/Northland, in particular Brynderwyn western bypass, improvements to Te Hana, Toetoe-Oakleigh	\$1,200M
		Bring forward the SH16-18 upgrades noted as part of the list of ATAP future priorities	\$1,000M
<b>TOTAL COST</b>			<b>\$7.326B</b>

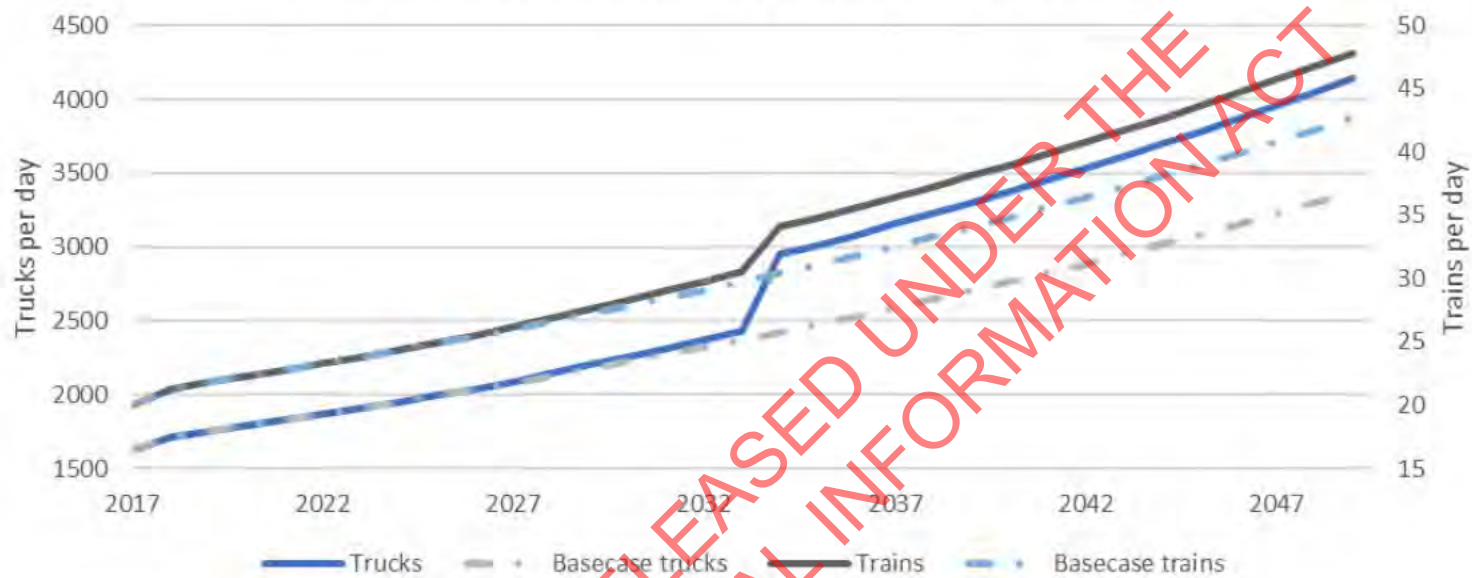
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Port of Tauranga throughput



The number of truck and train trips to/from Port of Tauranga

Train and truck trips per day at the Port of Tauranga



## 5.4 POAL Alternative Land Use Masterplan

A critical part of the scenarios involves consideration of whether a higher and more desirable use (for both the NZ economy and the owners of the Ports of Auckland) could be achieved through an alternative use of the port land. Architects, Warren and Mahoney have developed a hypothetical masterplan to enable analysis of the potential economic and financial benefits to Auckland Council and the Auckland region as a whole from any potential change in use of the port land.

The current configuration of the port is shown below:

Figure 15 Source: <http://POAL.maps.arcgis.com/apps/View/index.html>

VEHICLES CARRIER 130,000M<sup>2</sup>    MARINE SERVICES 320,000M<sup>2</sup>    CONTAINERS 330,000M<sup>2</sup>



- |   |                                       |
|---|---------------------------------------|
| 1 Employment Agency/ wharf office           | 6 Total Marine                        |
| 2 Mainfreight Port Operations               | 7 Rail & Shuttle                      |
| 3 Auckland Electricity Power Board Building | 8 Multi cargo                         |
| 4 Holcim / Silo                             | 9 Engineering / offices and workshops |
| 5 Security                                  | 10 Golden Bay Cement-Silo             |
|   | 11 Ports of Auckland buildings        |



The current POAL is a significant area occupying approximately 18% of the Central Auckland region and is comparable internationally in scale and context (refer to diagrams xxx below) It also suggests the opportunity for alternative land use for POAL at this scale is feasible and potentially appropriate

Figure 16 Source of area shown below: [https://en.wikipedia.org/wiki/Auckland\\_CBD](https://en.wikipedia.org/wiki/Auckland_CBD), <https://www.ccr.org.nz/history-structure>

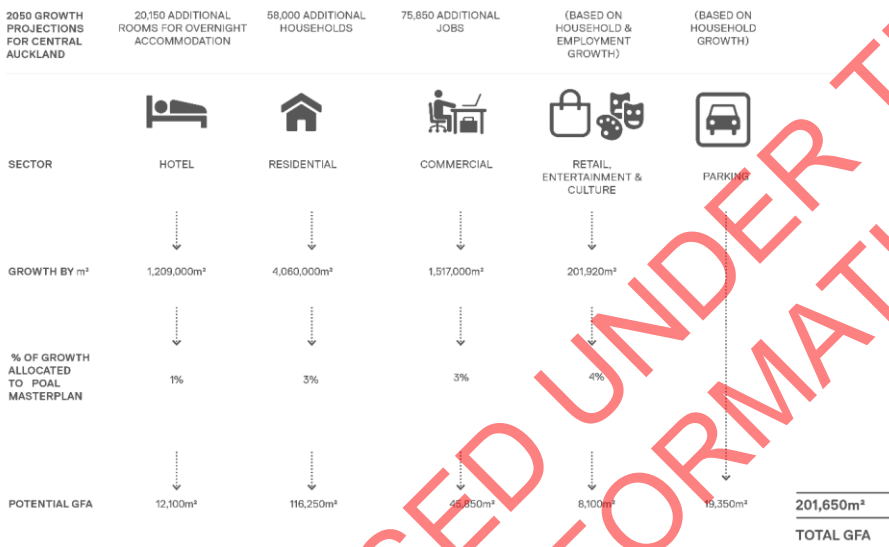


Figure 17 Local context scale comparison (Source: Wynyard Quarter - Urban Design Framework – June 2007)



Two POAL Masterplan options (considering partially and fully decommissioned POAL) have been coordinated with the anticipated growth of Auckland over a thirty-year period and the related accommodation demands for core sectors. The following diagrams summarise the projected growth for central Auckland and the estimated proportion of that growth allocated to the POAL Masterplan. The GFA totals in tables below show GFA yield of 200,000m<sup>2</sup> and 1,300,000m<sup>2</sup> for Option 1 and 2 respectively.

Figure 18 Scenario 1: Partially decommissioned POAL, GFA 200,000m<sup>2</sup>



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Figure 19 Scenario 2: Fully decommissioned POAL, GFA 1,300,000m<sup>2</sup>



The Masterplan has been conceived to complement the wider urban vision for the Auckland Waterfront and the long-term ambition of creating an accessible city for all



The diagrams presented below illustrate the key concepts which underpin the Masterplan framework and its narrative. The initial step for the POAL Masterplan draws an idea of 'declamation' where selected areas of the port are 'declaimed' or restored to the harbour. The diagram directly below shows the geometric overlays of the reclamation areas over a 100-year period and these historic configurations are alluded to in the form of the 'declaimed' areas of the proposed Masterplan.

Figure 20 showing the history of reclamation along Auckland Waterfront (Source: The Auckland Waterfront Heritage Study – Port Development – 22 July 2011)



The two illustrated Masterplans shown below combines the six concepts coordinated with a set of broad urban design principles namely:

- ▶ An estimated spatial allocation for streets/laneways, public/open spaces, and building plots based on successful waterfront developments of similar scale
- ▶ Primary development controls determined by the Museum view shaft and floor area ratios based on anticipating future growth
- ▶ Pedestrian scaled blocks and building plots sizes framed by a street network and a hierarchy of varying widths

Figure 21 Masterplan Option 1) Port function is partially decommissioned and phased land development occurs at Western end of POAL site



Figure 22 Masterplan Option 2) Port function is fully decommissioned



## 5.5 Economic Development impacts of scenarios

Consideration of the regional economic development impacts of the scenarios has been undertaken at a high level with the following principles:

- ▶ There is no additional ongoing employment as a direct result of any scenario. This is because:
  - Port investment is likely to continue to focus on high-productivity solutions through automation. All scenarios assume an acceleration of automation through the investment in new port capacity.
  - While automation leads to a reduction in port employment, most scenarios require additional steps in the logistics and supply chain (e.g. new inland ports and more rail). It is assumed that any employment reductions through automation at ports, is offset by employment increases in the wider supply chain. Both are, however, at the margins.
- ▶ Alternate land use at the Ports of Auckland site in terms of commercial activity will lead to an intra-regional relocation of employment in Auckland. We are expecting this to be a stepped change whereby the larger corporates would continue their relocation from the mid-town parts of Auckland to newly available land at the waterfront, which in turn leads to movement into mid-town from CBD fringe, and others such as the University of Auckland and AUT, continuing their progressive expansion.
- ▶ While first-order impacts on employment are neutral, the location of employment will change in each scenario in terms of logistics and supply chain jobs. It is assumed that the majority of jobs, including rail and road, will relocate over time to the area of focus in the scenario.
  - This assumption is made on the basis that employees will locate closest to the area that they will start and finish their day, and wherever possible, take advantage of lower costs of living associated with regional New Zealand.
  - The only potential risk to this assumption is whether there are sufficient opportunities for spouses of employees.
- ▶ The impact of the relocation of employment is assessed on the basis of the percentage change in the size of the regional economy as a result of the quantum of the move. As an example, the relocation of 500 employees from Auckland will have a negligible impact on the economic shape and size of Auckland, while those same 500 employees will have a material impact on the size of the Northland economy.
- ▶ Flow-on impacts from this spatial reallocation of employment into the focus regions is considered, and again, is a function of the relative sizes of the economy. Any reduction in Auckland is highly unlikely to result in a reduction in the need for services associated with the change. However, a material first-order increase in employment in a smaller area such as Whangarei will result in the need for additional services in areas such as education, health etc.
- ▶ Small positive impacts from land use change in Auckland are assumed. This is associated with an increase in economies of scale and move to more productive jobs associated with agglomeration impacts of greater density and focus in the CBD.



## 6. Results

Evaluation of the scenarios has been focussed on a mixed approach of qualitative and quantitative analysis. The qualitative analysis has been focussed on a best-practice Multicriteria Analysis (MCA), which contributed to the shortlisting of the scenarios, but also enabled discussion of qualitative aspects of the scenarios, not adequately captured by the monetizable benefit cost analysis.

A benefit cost analysis has been undertaken to assess the quantitative impacts of the scenarios.

This is in accordance with the NZ Transport Agency Economic Evaluation Manual, which enables the analysis to be integrated with other critical and complementary analysis, in particular the recent business case for the North Auckland Line.

In addition to the above approach, the flow on economic development impacts, with a focus on the regions (with offsetting urban impacts) is also included.

Examples of the considerations to be explored within Cost Benefit Analysis:

	Category	Form of Assessment	Scenario
Direct Impacts	Benefits	Quantitative	Port revenues
	Costs	Quantitative	Port operating costs
Indirect Impacts	Transport infrastructure	Quantitative	Costs of additional road and rail infrastructure
	Freight operators	Quantitative	Cost to freight operators of meeting the additional trade task
	Transport users	Quantitative	The impact of congestion from additional trucks on the road
	Land use benefits	Quantitative	Land value of the old port site in highest and best use
	Land use costs	Quantitative and Qualitative	The impact of intensified port operations on surrounding residential areas; opportunity cost of land at Port (alternate land use)
	Wider economic benefits (WEBs)	Quantitative	Agglomeration impacts - the impact of economic density at new port site and from redevelopment at previous port site
	Environment	Quantitative and Qualitative	The impact on the environment of port operations
	Social Impacts	Qualitative	Impact on liveability, employment, public access, recreational use, and community health and wellbeing at both new port site and existing port site, as a result of port moving to a new location

A critical feature of the Benefit Cost Analysis is the deployment of the new procedure around Dynamic Wider Economic Benefits, and in particular, the land value uplift from alternative land use at the Port of Auckland site.

## 6.1 Benefit Cost Analysis

The results of the benefit cost analysis that assessed all Scenarios are as follows:

### Summary Results

Relative to Base Case, Net Present Value, \$ million nominal terms

	Scenario 2.1 - Full move to Northport	Scenario 2.2 - Full move to Tauranga	Scenario 2.3 - Full move to Firth of Thames	Scenario 2.4 - Full move to Northport & Tauranga
Total Costs	1,776	3,526	3,417	3,370
Total Benefits	3,611	509	701	1,336
Net Benefits	1,835	-3,017	-2,717	-2,034
Benefit Cost Ratio	2.0	0.1	0.2	0.4

The analysis summarises a set of complex interactions. In essence:

- A lengthening of the logistics and supply chain applies to all options. This is reflected in increased transport costs for users and consumers of products. This is combined with environmental impacts and the capital costs of additional infrastructure.
  - All scenarios increase transport costs and environmental impacts relative to the status quo.
- These costs are offset by two critical dynamics that are mutually inclusive:
  - The deferral or elimination of infrastructure costs associated with ensuring the medium to long-term operability of a logistics and supply chain that relies on a central Auckland location. This is both land-side investments and port investments.
  - The application of a different land use to the parts of the Ports of Auckland footprint that are made available.

As such, these outcomes highly dependent on freight forwarder port preference, mode choice and alternative land use.

The scenarios are premised on providing infrastructure to support alternative freight movements and the modelling critically assumes that the majority of freight will follow the enabling investment.

Neither the consultant team, nor the Working Group have assumed the ability to “direct” freight forwarder preferences for ports.

The modelling is extremely sensitive to mode choice. In particular, it is assumed that 70% of the “Full Move to Northland” freight task is covered by rail. This substantially drops the economic impact of the significant lengthening of the logistics and supply chain.

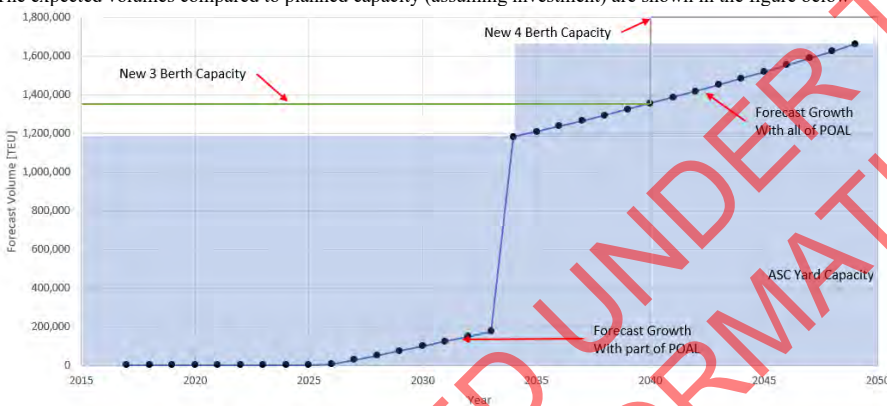
The Working Group took a pragmatic approach towards determine the mode split. In particular the working assumption is the same amount of Vehicle Kilometres from the trucking sector will apply. However, the key freight and logistics hubs are further away, so fewer (but longer) truck trips are made compared to the status quo. The working assumption is that road will continue to handle the most time-sensitive goods, but with a fixed number of trucks able to undertake fewer journeys, rail’s net timeliness significantly improves, and will manage the majority of the key trips to the main inland hubs.

Lastly, the scenarios are reliant on the ability of the alternate land use for the POAL site to deliver value to the ratepayer and the city. This will be a function of the commercial strategy adopted in terms of any port move, the release of land, the decisions made on how the land will be development, and the market demand at the time.

The Partial Move scenarios also delivered benefit cost ratios above 1 at 6.8 (Northport) and 4.1 (Tauranga) respectively. A Partial Move scenario demonstrates a value as a potential interim approach to a Full Move scenario. It could have also been considered, should a Full Move scenario not deliver a viable benefit cost ratio (which Scenario 2.1 does).

## 6.2 Technical outcomes

At a high level the assessment showed that development of significant capacity increases at Port of Tauranga (above already forecasted growth) would be difficult. The scenario where it is assumed that all the freight currently coming through POAL was instead assumed to come through NorthPort appeared more promising. The expected volumes compared to planned capacity (assuming investment) are shown in the figure below.



It is estimated that the cost to develop NorthPort to this extent would be in the order of \$1.35B over the next 30 years. Based on benchmarking similar developments around Australasia, the development required could be undertaken within the next 15 years if desired, and in fact depending on the time for approvals the work could be complete within 7 years, as shown in the figure below.



Taking the above into account, and considering the strategic direction being developed by the Working Group, the following are drawn:

- It should be recognised that a hard constraint will be reached in the ability to move freight by road or rail to and from POAL, and therefore its 'capacity' will be reached, and freight will have to go elsewhere.

- Given the above, any investment in improving productivity inside POAL should be carefully scrutinised against the probable longevity of the port operations
- If it was decided that the strategy (among other things) was to develop Northport and the associated land transport networks to connect it to Auckland and the rest of the country, then it would be prudent to develop Northport at a scale and in a timeframe that would avoid the estimated \$500M to be spent prior to 2026 to implement automation at POAL
- It would be possible to transition in stages, by closing POAL to cars first, and then gradually implementing changes for containers and bulk commodities. A detailed transition plan would need to be developed

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### 6.3 Other Non Monetisable Impacts

It is considered that the multicriteria analysis provides a sound proxy for the non monetisable benefits in particular the impact of the options is as follows:

Description	Economic	Environmental	Social	Cultural
<b>Base Case</b>				
<ul style="list-style-type: none"> <li>▶ The Base Case allows for POAL to increase capacity and efficiency in its current area through technological advances, but does not allow for any expansion via land reclamation other than the reclamation that has already been consented.</li> </ul>	<ul style="list-style-type: none"> <li>▶ A significant additional port investment, with supporting land-side infrastructure, outside of the current POAL footprint will need to be made to take all of Auckland's marginal freight growth over and above any capacity cap.</li> <li>▶ As freight continues to grow (in line with the growth trends outlined in the National Freight Demand Study), Auckland's share of the total freight task will diminish and other UNI ports will grow.</li> <li>▶ There are growing impacts on local transport network particularly road congestion</li> </ul>	<ul style="list-style-type: none"> <li>▶ No change to coastal processes as port maintains the same footprint.</li> <li>▶ Impact on Auckland Harbour traffic will remain the same, albeit with an increased number of vessels.</li> <li>▶ No additional impact on marine ecology.</li> <li>▶ As throughput increases, a steady increase in carbon footprint over time is anticipated.</li> <li>▶ Increased noise effects may occur in line with throughput increases and in particular additional machinery, equipment and truck movements.</li> </ul>	<ul style="list-style-type: none"> <li>▶ No opportunities for enhanced public access to the waterfront and local recreation.</li> <li>▶ There will be a negative impact on the quality of urban form and design for Auckland as a growing city that has emphasis around its waterfront. As a result, Auckland's reputation as the "most liveable city in the world" is negatively impacted.</li> </ul>	<ul style="list-style-type: none"> <li>▶ There remain outstanding Treaty of Waitangi questions concerning title, foreshore and harbour management and the appropriate recognition of rights and responsibilities stemming from the interests and relationships held by mana whenua iwi. Resolving these questions are extant matters for consideration as part of the Waitematā harbour settlements.</li> </ul>
<b>Scenario 1.1 &amp; 1.2 - Partial Move (Cars Only) - Northport and Tauranga Respectively</b>				

- ▶ A Partial move involves consideration of the movement of the car imports in a short- to medium term horizon to either the Northport or Port of Tauranga. These scenarios involve investment in Northport and / or Taranga transport infrastructure in order to support a new supply chain model for the UNI, in line with design principles.
- ▶ Tauranga already has major congestion issues, this may worsen with this partial move of cars to POT as it involves more freight travel (due to distance) and road congestion (due to mode share). In comparison to POT, Northport has less freight travel and road congestion.
- ▶ Marginal improved effects on biodiversity for both Northport and POT.
- ▶ Moving from Auckland to Northland will be desirable for workers involved in moving cars as house prices in Northland are more affordable.
- ▶ No Cultural impact for both Northport and POT.

#### Scenario 2.1 – Northport, full move

- ▶ A full move to Northport entails moving the entire operations from POAL to Northport (except cruise ships)
- ▶ Northport has the potential to be a catalyst for economic development across Northland, delivering direct and indirect benefits to the local area, industries and communities. Available industrial land near the new Northport site could be used to develop industrial parks and production facilities, stimulating additional economic growth in the local area.
- ▶ An upgraded North Auckland Line means that local businesses within the region have easier and faster access to regional,
- ▶ Externality of transport, such as GHG emissions are decreased by reducing the proportion of existing and future heavy trucks from Northland to Auckland roads onto rail.
- ▶ Given the rural nature of Northland, benefits arising from noise pollution would be minimal, this is a significant improvement in comparison to POAL which is currently located in downtown Auckland which can tend to have more negative urban environmental impacts.
- ▶ Noise pollution of rail is considered to be less intrusive than road and rail
- ▶ The Northport expansion has a positive social impact as the jobs created from this will lead to an uplift in employment which flow through to additional demands for employment to service the expansion in the economy, in areas such as education and health. As a result, this will lower the levels of deprivation within the region.
- ▶ There is an opportunity to look at rail to bring Cruise ship passengers further inland on day trips to see attractions, improve their experience and in doing so spend more money in Northland. A well-run rail
- ▶ A full move to Northport means that's the port's expansion could provide economic growth within the various sectors of the Northland. This in turn will have a positive cultural impact as Māori own a significant asset base across these key sectors comprised of the assets of trusts, incorporations, and businesses. In particular, this will help Māori enterprises make strong economic contributions to forestry, agriculture and fishing sectors, health and community services and property and business services. This results in a

- inter-regional, and international markets.
- ▶ There are costs implications involved with the full move to Northport with regards to the expansion of the port and the surrounding transport infrastructure (particularly rail).
  - ▶ Additionally there are also benefits with regards to reduced freight costs and heavy vehicle externalities (congestion and safety)

freight can be consolidated to operate less frequently (due to higher per trip capacity).

offering, including an upgraded rail link to Northport, could help facilitate this as it does in other places like Dunedin.

strong Māori economy in Northland provides better prosperity for local iwi groups within the region.

Description	Economic	Environmental	Social	Cultural
<b>Scenario 2.2 – Port of Tauranga, full move</b>				
▶ A full move to <b>Northport Port of Tauranaga</b> entails moving the entire operations from POAL to POT (except cruise ships)	▶ Investment is required in the land side infrastructure to address the significantly increased freight volumes through the Bay of Plenty, Waikato and South Auckland.	▶ Operations movement to POT will result in increased vehicle transport through the region and hence increased congestion and pollution. ▶ Increased freight movement will result in increased dredging activities and	▶ The movement of full operation to POT will result in an increased stress to the existing social infrastructures of Tauranga such as hospitals, housing etc. and therefore this may	▶ The three tribes' iwi of Tauranga Moana (Tauranga Harbour): Ngāti Ranginui, Ngāi Te Rangi and Ngāti Pūkenga may have concerns around the full move to POT which could have possible implications

- ▶ Promote employment opportunities for the POT where there will be demand for a skilled logistics workforce.
- ▶ Tauranga already has major congestion issues, this is more likely worsen under this full move to POT as it involves more freight travel (due to distance) and road congestion (due to mode share).

hence adverse impact on the biodiversity environment.

result in an unplanned expansion of the city;

- ▶ to treaty settlements within the area.
- ▶ There has been ongoing issues since the 1970s with regards to the construction of the Kaimai Tunnel having negative cultural impacts on the Ngati Hinerangi iwi tribe. The Kaimai tunnel is in close proximity to Māori land which is of great cultural significant to Ngati Hinerangi. A full move to POT could possibly result in an upgrade to the Kaimai Tunnel. This upgrade of the Kaimai Tunnel is likely to cause further distress for the iwi and hapū of the Ngati Hinerangi.

Description	Economic	Environmental	Social	Cultural
<b>Scenario 2.3 - Northport &amp; Tauranga, full move</b>				
▶ A full move of entire operations from POAL and distributing it across Northport and POT (except cruise ships)	▶ Respective qualitative impacts noted above in scenario 2.1 & scenario 2.2	▶ Respective qualitative impacts noted above in scenario 2.1 & scenario 2.2	▶ Respective qualitative impacts noted above in scenario 2.1 & scenario 2.2	▶ Respective qualitative impacts noted above in scenario 2.1 & scenario 2.2
<b>Scenario 2.4: Build a super new port in a new location – Firth of Thames</b>				
▶ A Super-Port scenario is considered assuming none of the existing ports in the UNI region could not deliver on the requirements for the logistics and supply	▶ A new Super-Port in the Firth of Thames might have different future land use benefits. The Firth of Thames location site for the new Super-Port would	▶ There are likely to be challenges around gaining resource consent to develop a new port in the Firth of Thames. Any development would require a coastal	▶ The social impacts of a new port within the Firth of Thames would need to be comprehensively assessed as part of a Social Impact Assessment, should this	▶ There are a number of mana whenua iwi who hold interests in the Hauraki Gulf and would consider themselves affected by a new port being built in the



chain in the Upper North Island

create transport links that could open up land that is relatively close to Auckland for development. However these benefits will be outweighed by the capital costs and land side road & rail link costs associated with a brand new port which are significantly higher than all alternative scenarios.

permit, with consideration of the impacts of reclaiming part of the foreshore or seabed, constructing a structure in, on, under, or over any foreshore or seabed, disturbing the seabed (e.g. by excavation or dredging) and the occupation of part of the common marine and coastal area.

- ▶ A new Port in the Firth of Thames would potentially result in an increased carbon footprint. Whilst accessible to SH1 and the south and east of the North Island, the travel distance from SH1 to the ports landside activities increases emissions from heavy vehicle travel.
- ▶ There are a number of residences along the coastline that may be impacted by the change in noise environment, subject to the location of the port and the landside activities
  - ▶ The existing night time environment would also change with the presence of a 24 hour operating port, associated landside activities and causeway all creating a potential night time illumination into the

option be carried forward for further evaluation. The effect on amenity of communities that overlook the proposed site and those who are affected by the rail and road access corridors through the Clevedon valley would need to be a key focus of any assessment.

- ▶ This assessment should also include the impact on recreational opportunities within the harbour and how the ports location might impact existing access to and use of the coast. In addition, community aspirations around the use and protection of the Firth of Thames and the Clevedon Valley, both coastal and landside and community and stakeholder values associated with the area of impact would need to be defined and considered. The area of social impact is expected to be relatively stretched given the length of the new access corridor and the communities located along the route.

Firth of Thames including the members of the Marutuahu confederation of iwi and Waikato Tainui.  
▶ The Hauraki Gulf area holds significant historical, cultural and spiritual meaning for tangata whenua within the area. The proposed Firth of Thames sites will have an impact on the tangata whenua relationship to the Hauraki Gulf. This impact will require consideration.

sky and adjacent  
viewpoints.

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## 6.4 Financial offset of dividends from the Ports of Auckland

The benefit cost analysis, as noted above, includes a full net economic impact of the alternative land use for the Ports of Auckland site. This is focussed on a benchmark annual rate of return expected for the mixed use commercial and residential gross floor area. This economic analysis subsumes the impact of rates and leasehold income from the POAL site.

A critical consideration in terms of any move is, however, the potential financial impact on the owners of the Ports of Auckland, and whether any alternative land use leaves the Auckland Council, and Auckland ratepayers better, or worse off as a result of decreased dividends from the POAL.

A first consideration is that under all scenarios, POAL continues to operate, but it transitions its focus to the cruise industry and associated servicing. As such, there is still the potential for POAL to provide a financially sustainable, albeit smaller operation on the Waitemata. A secondary consideration is that POAL's shareholding in Marsden Maritime Holdings, their landholdings around Northport, and their ownership of the Northport tug operation, position them to offset lost income at the POAL site on scenarios that expand Northport.

A forecast of these ongoing income streams, relative to the current POAL dividend has not been undertaken.

What has been assessed is the potential for Council income through rates and leases as a result of more intensive commercial and residential activity on the POAL site to offset the POAL dividend.

It is assumed that Auckland Council would take a similar approach to the POAL site as they have with the Wynyard Quarter, namely maintaining the land in public ownership, but operating 120 year leases. The results are as follows:

	Current dividend	Alternative Rates income	Alternative leasehold income	Net annual financial benefit/(loss) to ratepayers
Interim Move	\$50m	\$7m	\$13m	N/A <sup>38</sup>
Full move	\$50m	\$42m	\$56m	\$48m

## 6.5 Regional Economic Development

The Regional Economic Development impacts are discussed in the Scenario section in terms of the approach.

The potential wider economic impact of reorienting the logistics and supply chain is derived principally from additional investment in land-side freight handling (e.g. new inland ports and warehousing). As we note in previous sections, changes in employment at the ports themselves are unlikely to be material, given the long-term shift towards automation.

The wider economic impacts also include with the net economic impact of a minor relocation of existing employment, where the differential impact on a smaller economy such as Northland is greater than the corresponding offset in a much larger economy such as Auckland.

An input-output analysis of the potential changes finds that reorientation of the logistics and supply chain that involves a refocusing on Northland results in an additional \$200m to the Northland economy over 30 years (discounted NPV) in direct, indirect and induced economic impacts. This results in around 2,000 additional sustained jobs (i.e. not employment associated with the construction of the required infrastructure).

<sup>38</sup> Proportionate reduction in dividend income from a partial move has not been calculated due to the large number of variables and commercial information required from POAL to enable this assessment.

Scenarios that involve a full move to Tauranga, or the shared move have materially lower wider economic impacts, in part due to the relative size of the Bay of Plenty economy where indirect and induced economic activity from the move is likely to be significantly less

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## 7. Appendices

These will include full MCA analysis and scoring, as well as Advisian and W&M technical inputs

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**From:** Susan Krumdieck <susan.krumdieck@canterbury.ac.nz>  
**Sent:** Thursday, 11 July 2019 12:41 AM  
**To:** Chris Money; Wayne Brown; Shane Vuletich; Greg Miller; Vaughan Wilkinson  
**Cc:** Dan Jenkins; Stephanie Dorne  
**Subject:** RE: Uniscs Report  
**Attachments:** UNI Susan Comments - DRAFT MASTER to Working Group Monday 8 July.docx

**Follow Up Flag:** Flag for follow up  
**Flag Status:** Flagged

Hi,

I am sending my comments on the executive summary (most important part) from Munich Airport – about to board. I'll try to read through the rest on the few hours coming up.

Susan

---

**From:** Chris Money <Chris.Money@nz.ey.com>  
**Date:** Monday, 8 July 2019 at 9:04 PM  
**To:** Wayne Brown <biznewz@xtra.co.nz>, Shane Vuletich <shane@freshinfo.co.nz>, Greg Miller <Greg.Miller@kiwirail.co.nz>, Susan Krumdieck <susan.krumdieck@canterbury.ac.nz>, Vaughan Wilkinson [REDACTED]  
**Cc:** Dan Jenkins <d.jenkins@transport.govt.nz>, "s.dorne@transport.govt.nz" <s.dorne@transport.govt.nz>  
**Subject:** [SPAM: 11.000] RE: Uniscs Report

Hi all

Please find attached a comment-ready draft.

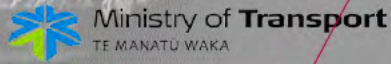
A couple of outstanding items we will be working through in advance of receiving comments:

1. There are a number of outputs in this report that are absolutely critical to the analysis (avoided POAL development costs, freight costs and mode share and leasehold/rates income to Auckland Council from alternative land use). I am asking my team to triple check and confirm with me that they are happy with each of these and are willing to stand by them. The analysis is very sensitive to changes in these key assumptions and I am confirming that these are based on each team member's industry leading knowledge.
2. I will go through a process of reconciling all the Working Group's comments over the last few weeks to make sure we have them covered off. There are some work-ons in this regard:
  - a. While we reference the Colmar Brunton work as underpinning the MCA work and the WG's scoring, we've not included the detailed findings. Suggest we either leave as is or put in an appendix
  - b. We've got the qualitative and non monetised impacts in there, but really keen to test whether they are seen as sufficient (Vaughn's view critical here). I'd suggest that with a strong benefit cost ratio (2.0 for Northport), the multicriteria analysis, plus the wider economic impacts, and the Warren and Mahoney visuals, there is enough in there.
  - c. The "interim step", plus the 5/15 year strategy is not reflected strongly enough. You'll note much of the analysis still references 30 years – which is appropriate to define the key issues, but we then need to reconcile back to the 5/15 year approach – clearly stating that the key issues are actually addressed by a rapid move – namely a large part of the value is driven by removing the need to invest in POAL, and then moving progressively to an alternate land use.
3. Appendices to be added – these will be detail and not material to your commentary. You will note we do not have the detailed MCA scoring in the body of the report. I will include this in the appendix, along with other detail.
4. We need to do a final check reconciling the numbers in every table. The core BCR is correct, but at least one table still mentions NAL as part of the base case (which it's not). I've deliberately not included the Total numbers in the scenario summary tables until this final line by line reconciliation is done.
5. Some formatting (consistent color scheme) and spelling and grammar, and correct footnoting an figure references (done it several times already but still not satisfied).

Dan – the more I look at the freight story in here, the more I'd like the update of the NFDS to be incorporated, as I feel it would be a shame not to have 2019 NFDS figures in preference to 2014. It won't change the conclusions, but as you note, there are some changes, and some areas where the Ministry has a view (e.g. Cars – Ministry vs POAL projections).

Chris

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# Economic Analysis of Upper North Island Supply Chain Scenarios

DRAFT

8 July 2019

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**Transmittal letter**

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**Executive Summary**



***This report investigates the economic, social and environmental impact of a range of Upper North Island Supply Chain Scenarios***

In May 2019 the Ministry of Transport appointed a consortium led by Ernst & Young Limited (EY)<sup>1</sup> to perform an economic evaluation of potential Upper North Island (UNI) supply chain configurations. This report examines a range of potential scenarios for land side and port investment, taking account of regional development impacts as well as transport outcomes.

***It is part of a wider investigation by the Government into the optimal configuration and strategy for delivering improved freight performance and economic development and environmental outcomes for the UNI region***

In September 2018, Cabinet appointed a Working Group to review the freight and logistics sector in the Upper North Island (UNI), and to develop a Supply Chain Strategy for the region. This review is formally known as the 'Upper North Island Supply Chain Strategy' (UNISCS). The Working Group can either be referred to as the "UNISCS Working Group" or the "Working Group".

The Working Group is entrusted with the responsibility of developing a plan for an efficient freight network (ports, land and rail and road networks) for the UNI region that will deliver the best long-term outcomes for New Zealand. The planning will focus on designing an efficient supply chain network to ensure smooth movement of cargo and containers across the regions over the long term. Additionally, the Working Group is tasked with assessing the existing landside network infrastructure (rail, roads, and inland freight terminals), potential upgrades and new infrastructure requirements as well as optimising land use to ensure greater returns to all the stakeholders, particularly the government and the community.

In pursuit of its objectives, the Working Group has come up with a three-stage approach, at the end of which the Working Group intends to submit a comprehensive recommendation to the government for a holistic development strategy of the UNI supply chain network, this also includes the socio-economic and environmental objectives/impact of the UNI region. This report is one sub-part of one stage of the three-stage approach where the Working Group seeks to assess the development of UNI supply chain (UNISC) scenarios as well as undertake an economic evaluation of those supply chain scenarios.

***A range of scenarios have been investigated using best practice economic evaluation techniques....***

This report uses ~~a conventional economic assessment, using~~ a combination of multicriteria analysis ~~(to help shortlist options and identify non-monetisable impacts)~~ and benefit cost analysis. The approach uses the standard NZ Transport Agency approach to benefit cost analysis as its base, but then adds emerging best practice analysis around valuations of alternate land use.

The ~~approach used at transportation analysis is~~ a combination of a bespoke model built for this study, and EY's existing multimodal freight model, which has been used ~~regularly recently~~ by the Ministry of Transport, NZTA and KiwiRail, ~~in the last few years~~.

***The scenarios are wide-ranging and consider a number of different infrastructure configurations***

~~Scenarios have been developed looking at a~~ ***The Working Group has developed strategic scenarios based on*** combination of different investment profiles. While the focus of this work is the entire Upper North Island logistics and supply chain, the scenarios are necessarily "port-centric" as ports represent the one of the most critical and fixed origins and destinations for freight in the region.

~~The use of scenarios, as distinct from options, is also critical. The~~ purpose of this study is to evaluate the potential different outcomes that could be achieved for the UNI supply chain. ~~While the scenarios are specified in sufficient detail to allow meaningful evaluation, they are~~ ***Each scenario is*** representative of a range of ~~different approaches investment and operational decisions by UNI actors, and would require significant~~

Commented [A2]: The reader will not appreciate this statement, and it is not explained in context so leave out here

<sup>1</sup> The consortium includes Advisian, Warren&Mahoney and WT Partnership

additional development to the point where they could be considered “investment ready” options. The results of the analysis of the scenarios will inform the Working Group’s recommended strategy.

Scenarios were developed that offer a mix of:

- ▶ Ports: Consideration has ~~ve~~ been given to Northport, Ports of Auckland, Ports of Tauranga, different a combination of both combinations and potentially a “Super Port” independent of the existing 3 ports
- ▶ Freight types: The impact of both a full and partial move of operations from Auckland to Northport or Tauranga
- ▶ Time: The speed at potential timings which any move could be undertaken for undertaking changes

The scenarios are represented in the diagram below: Within each of these headline scenarios, different locations were considered, as shown in the diagram below:

This has resulted in the initial development of two headline scenarios of a Partial Move and a Full Move of the Ports of Auckland. Within each of these headline scenarios, different locations were considered, as shown in the diagram below:

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### BASE CASE

#### NO INTERVENTION

- Establish maximum capacity and growth
- Establish ongoing costs
- Managing POA's growth elsewhere



BASE CASE  
Auckland

### SCENARIO 1

#### PARTIAL INTERVENTION

- Establish Container terminal at Northport
- Partial removal of port functions (probably at western end)
- Phased POA land development at Western end



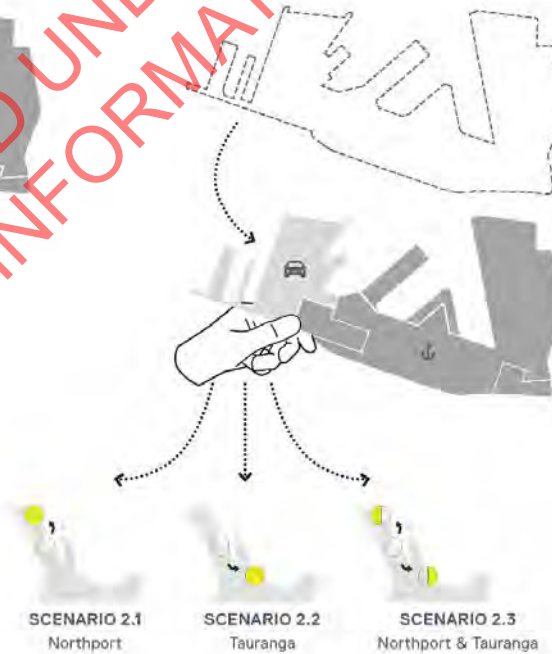
SCENARIO 1.1  
Northport

SCENARIO 1.2  
Tauranga

### SCENARIO 2

#### FULL INTERVENTION (EXCEPT CRUISE FACILITY)

- Simultaneous development of Northport, decommissioning of POA and POA land development



SCENARIO 2.1  
Northport

SCENARIO 2.2  
Tauranga

SCENARIO 2.3  
Northport & Tauranga

- Vehicles
- Cargo / Marine Services

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***One scenario stands out with the highest economic and social benefit: a Rapid and Full Move of the freight operations of Ports of Auckland to Northport.***

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~~The analysis concludes that the UNI supply chain is complex and cannot be optimised by focusing on a single region.~~

Analysis of freight flows, and investment needs concluded that scenarios that moved towards reliance on a single port, with the supporting logistics and supply chain, produced the worst outcomes. This includes the consideration of the Port of Tauranga undertaking the majority of the UNI port tasks, and the development of a Super Port, separate from the three current ports.

These scenarios produced the highest costs, and reduced the resilience of the UNI supply chain. Both scenarios also involved the highest proportion of investment in new assets and failed to leverage the capacity of the northern Auckland and Northland region.

~~.....but the~~ ***In the long term, better outcomes can be achieved by building a more integrated logistics and supply chain with a reduced focus on freight crossing the Auckland CBD.***

Over the long term, the analysis of a range of potential scenarios demonstrates that a logistics chain that is supported by a greater reliance on Northland produces positive net benefits. ~~The Rapid Full Move scenario requires infrastructure investment and cooperative governance on a bold scale, particularly in rail and inland ports. However, these major investments provide not only economic benefits equal to the costs, but in the long term are absolutely essential to social and cultural development of the entire region.~~

~~However, a full move scenario is only economically viable should the costs of infrastructure and the economic impact (monetisable time/freight cost, emissions, congestion etc) of any lengthening of the logistics and supply chain be materially less than the benefits gained through a reduced reliance on a central Auckland location.~~

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Commented [A3]: I don't know about this. It doesn't sound right. No, I don't agree with it. It is partly repeated from above and will be able to be pulled out of context so say that the Rapid Full Move is not economically viable.

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~~.....which is~~ ***The greatest near and long-term outcomes are enabled through investment in Northport, Auckland to Northland rail and supporting infrastructure in Auckland and Northland.***

The scenario modelling of a "Full move" to Northport, with associated land side investment results in a benefit cost ratio of 2.0. The "Full Move from Auckland" scenarios ~~shared with split in freight~~ between Tauranga and Northport does not generate net economic benefits, mainly due to the much higher land-side infrastructure requirements. This is shown in the table below:

### Summary Results

Relative to Base Case, Net Present Value, \$ million nominal terms

	Scenario 2.1 - Rapid Full move to Northport	Scenario 2.2 - Full move to Tauranga	Scenario 2.3 - Full move to Firth of Thames	Scenario 2.4 - Full move to Northport & Tauranga
Total Costs	1,776	3,526	3,417	3,370
Total Benefits	3,611	509	701	1,336
Net Benefits	1,835	-3,017	-2,717	-2,034
Benefit Cost Ratio	2.0	0.1	0.2	0.4

**A progressive transition as part of a full move scenario also produces high value interim improvements**

Two "Partial Move" scenarios were looked at, both as stand-alone scenarios and as part of a full move transition. Economic benefits in the short term from the scenarios are derived from three key features:

- Leveraging latent capacity in both land-side and port-side through a number of comparatively low-cost investments
- The ability to defer major investment in port capacity at the Ports of Auckland, and the supporting land-side infrastructure that connects the port to the wider UNI logistics and supply chain
- The resultant freeing up of a part of the Ports of Auckland footprint to alternative, significantly higher value land use

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The benefit-cost ratios of these scenarios, compared to the status quo scenario is 6.8 if the interim move is directed to Northport, and 4.1 if directed to Tauranga

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**Diversification of the logistics and supply chain results in improved outcomes for Auckland....**

Auckland benefits from a full move in a number of ways

Firstly, Auckland Council and ratepayers benefit from the switch-redevelopment of the Port to a range of alternative land uses. Presently, POAL delivers a dividend to the Auckland Council of around \$50 million per annum. An alternative land use for the port footprint has the potential to generate both rates income for the council. In addition, if waterfront land is leasehold, as it is with the majority of the Auckland CBD waterfront (Viaduct and Wynyard Quarter), significant leasehold income could also be expected to accrue to Auckland Council.

The analysis has considered two potential masterplan scenarios for the POAL redevelopment (one full, one partial/interim) for an alternate land use that looks at with a mix of commercial, residential and recreational land use. The hypothetical masterplan includes significant recreational spaces for the people of Auckland, as well as a material net increase in Auckland's developable land supply for both commercial and residential use, which could be expected to cascade into the wider Auckland region.

Commented [A4]: What does this mean?

The table below shows the potential returns to the Auckland ratepayer from an alternate land use:

	Current dividend	Alternative Rates income	Alternative leasehold income	Net annual financial benefit/(loss) to ratepayers
Interim Move Scenario 1 – Car import operations move	\$50m	\$7m	\$13m	N/A <sup>2</sup>
Full move	\$50m	\$42m	\$56m	\$48m

The quantification of additional income does not include the potential value uplifts of the areas surrounding the port from the alternative land use waterfront redevelopment.

Additionally, no scenario involves the closure of the Ports of Auckland. Most notably, POAL will still service the rapidly growing cruise industry, which is an important part of Auckland's tourist economy. POAL would still provide tugs, berth space, and ship servicing to this industry, and a range of other maritime users. As such, it is possible that POAL will continue to provide a dividend to Council.

<sup>2</sup> Proportionate reduction in dividend income from a partial move has not been calculated due to the large number of variables and commercial information required from POAL to enable this assessment.

~~POAL's shareholdings in Marsden Maritime Holdings and North Tug, as well as their holdings in inland ports would all also benefit from a full move scenario to Northport.~~

Direct employment impacts at the port are expected to be minor. This is because the port is already moving to automate many of its functions, and other functions such as tug operations will still remain. Some relocation of employment to target regions, particularly in the land-side freight and logistics sector is expected.

#### ~~...and Northland....~~

Northland benefits materially from modelled scenarios that place a greater reliance on Northland for meeting the UNI freight task. While port employment is expected to be at the margins (due to the likely investment in high efficiency handling options as part of any expansion), wider employment opportunities are significant – given the relative size of the Northland economy. Port, maritime and logistics operations that are always positioned around ports will likely move to Tauranga.

~~First-order employment comes through additional investment in logistics, warehousing and distribution hubs. It is also expected that a proportion of those who work in the sector (e.g. some truck drivers) would be expected to relocate from Auckland to the Northland region. While this relocation impact is minor for Auckland (due to the size of the Auckland economy, it has a disproportionate ly positive impact on the Northland economy.~~

Commented [A6]: What is the meaning?

This employment dynamic is also likely to flow through to additional demands for employment to service the expansion in the economy, in areas such as education and health. Overall, an additional economic impact to the Northland economy drives an additional 2,000 jobs and a net economic benefit over 30 years of \$200 million.

#### ~~.....and Tauranga.~~

Tauranga benefits from all scenarios. ~~This is firstly because while the scenarios discuss "full moves", they are designed, not Full Move scenarios based on a prediction of where freight will go, but on result in providing high efficiency enabling infrastructure. As such, under all scenarios, Tauranga can expect an uplift in freight demand due to its continued focus on efficient port operation and land-side connection via rail to the North Island and coastal shipping to the rest of New Zealand. The Full Move to Northport does not affect the continued employment and economic activity trajectory of Tauranga along its historical path.~~

~~Employment impacts are expected to be less than Northland moves. While nominal changes may be broadly the same, the direct and flow-on impacts to the Bay of Plenty economy are less, because of the relative size of the economy.~~

As noted above, the scenarios are premised on providing infrastructure to support ~~alternative-efficient~~ freight movements and the modelling critically assumes that the majority of freight will follow the enabling investment.

#### ~~..... and mode choice....~~

The modelling is extremely sensitive to mode choice. In particular, it is assumed that 70% of the "Full Move to Northland" freight task is covered by rail. ~~The rail mode is substantially drops the improves the economic impact of the lengthening of the logistics and supply chain. Rail has experienced declining mode share over the past decades. However, the working group has heard evidence from stakeholders across the sector, that with modern logistics operations management and data systems, the cargo will be able to take full advantage of the new and improved rail capacity at the earliest opportunity.~~

The Working Group took a pragmatic approach towards determining the mode split. ~~In particular the working The assumption is the same amount of Vehicle Kilometres from the trucking sector will are assumed apply. However the key freight and logistics hubs are further away, so fewer (but longer) truck trips are made compared to the status quo. The working assumption is that road will continue to handle the most time-sensitive goods, but with a fixed number of trucks able to undertake fewer journeys, rail's net timeliness significantly improves, and will manage the majority of the key trips to the main inland hubs.~~

#### ~~.....and alternative land use-~~

Commented [A7]: I moved the discussion of partial moves, to the end because it was confusing. The full move is highlighted as the result, then talking about part moves, then back to full move again.

*A progressive transition as part of a full move scenario also produces high value interim improvements*

Two "Partial Move" scenarios were looked at, both as stand-alone scenarios and as part of a full move transition. Economic benefits in the short term from the scenarios are derived from three key features:

- Leveraging latent capacity in both land-side and port side through a number of comparatively low-cost investments
- The ability to defer major investment in port capacity at the Ports of Auckland,
- The supporting land-side infrastructure that connects the port to the wider UNI logistics and supply chain provides for growth in more efficient regional export and new opportunities for industrial and housing locations along the rail corridors
- The resultant freeing up of a part of the Ports of Auckland footprint to alternative, significantly higher value land use provides property development and cultural advancement opportunities

The benefit cost ratios of these scenarios, compared to the status quo scenario is 6.8 if the interim move is directed to Northport, and 4.1 if directed to Tauranga

Lastly, the scenarios are reliant on the ability of the alternate land use for the POAL site to deliver value to the ratepayer and the city. This will be a function of the commercial strategy adopted in terms of any port move, the release of land, the decisions made on how the land will be developed, and the market demand at the time.

**Commented [A8]:** I've listened to a lot of submissions, and I don't know what major investment in POA capacity you are talking about? Do you mean that POA is nearing its current capacity? My understanding was that it would be pretty nonsensical to imagine that POA could be expanded or have increased capacity beyond the current crane automation projects. So should this read "ability to handle anticipated UNI freight task growth"?

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	• A lengthening of the logistics and supply chain applies to all options. This is reflected in increased transport costs for users and consumers of products. This is combined with environmental impacts and the capital costs of additional infrastructure.	8384
	○ All scenarios increase transport costs and environmental impacts relative to the status quo.	8384
	• These costs are offset by two critical dynamics that are mutually inclusive:	8384
	○ The deferral or elimination of infrastructure costs associated with ensuring the medium to long-term operability of a logistics and supply chain that relies on a central Auckland location. This is both land-side investments and port investments.	8384
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## 1. Introduction

### 1.1 National Context - Significance of the Logistics and Supply Chain to New Zealand Economy

New Zealand is a small country in the South Pacific that is heavily reliant on trade. The New Zealand economy is predominantly service-based with the majority of exports being agricultural in which animal, food, vegetable and wood products represent over 70% of export value.

Freight is a key enabler of domestic and international trade and New Zealand relies on an efficient logistics and supply chain to connect its goods to the world as well as to access the many manufactured commodities it does not produce domestically. New Zealand's freight volumes are expected to grow significantly over the medium and long term<sup>3</sup>, which would out-strip the current capacity which is going to have a drastic impact across the supply chain. Understanding the drivers of, and uncertainties around, future freight and logistics demand is critical to ensure that New Zealand's supply chain is fit for purpose in the longer-term.

Ports allow local producers to reach larger markets overseas, and local consumers to access imported goods. The presence or absence of a port has a significant effect on the cost of doing business and the cost of living within a region. Furthermore, ports also act as a vital source of employment which adds significant value to New Zealand regions and communities.

### 1.2 Background to this Report

In September 2018, Cabinet appointed a Working Group to review the freight and logistics sector in the Upper North Island (UNI), and to develop a Supply Chain Strategy for the region. This review is formally known as the 'Upper North Island Supply Chain Strategy' (UNISCS). The Working Group can either be referred to as the "UNISCS Working Group" or the "Working Group".

The Working Group is entrusted with developing a plan for an efficient freight network (ports, land and rail and road networks) for the UNI region that will deliver the best long-term outcomes for New Zealand. The planning will focus on designing an efficient supply chain network to ensure smooth movement of cargo and containers across the regions. Additionally, the Working Group is tasked with assessing the existing landside network infrastructure (rail, roads, and inland freight terminals), potential upgrades and new infrastructure requirements as well as optimising land use to ensure greater returns to all the stakeholders, particularly the government and the community.

In pursuit of its objectives, the Working Group has come up with a staged approach, at the end of which the Working Group intends to submit a comprehensive recommendation to the government for a holistic development of the UNI supply chain network. This includes the socio-economic impact of the UNI region. This report is one part of the staged approach where the Working Group seeks to assess the development of UNI supply chain (UNISC) scenarios as well as undertake an economic evaluation of those supply chain scenarios.

### 1.3 UNISCS Working Group and Review

#### 1.3.1 Members and Expertise

The members of the Working Group have expertise in the following areas: economics and business development; and regional development transport and logistics, including freight infrastructure management, investment and planning<sup>4</sup>.

<sup>3</sup> Reference to some govt document that predicts this "significant" growth, gives the reasons why and the numbers.

<sup>4</sup> <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/upper-north-island-supply-chain-strategy/questions-and-answers/>

### 1.3.2 Scope of review

The review will consider actions that contribute towards national and regional economic development results and transport priorities. It will set out the independent Working Group's joint view of<sup>5</sup>:

- ▶ The current and future drivers of freight and logistics demand, including the impact of technological change
- ▶ A potential future location or locations for Ports of Auckland, with serious consideration to be given to Northport
- ▶ Supporting priorities for other transport infrastructure, across road, rail and other modes and corridors such as coastal shipping
- ▶ Potential priorities for transport-related infrastructure investment from a national economic and regional development perspective
- ▶ The optimal regulatory settings, and planning and investment frameworks across government to give effect to the findings of the review

The review will also identify future challenges for which government and industry will need to work together, and will set out any key actions to be taken over the next five years

### 1.3.3 Approach for Working Group's review

The Working Group is approaching this review in three stages. Each stage will involve preliminary reports and the final strategy recommendations will be communicated to Ministers, stakeholders, media and public<sup>6</sup>.

#### Stage 1 – Review the history and current UNISC issues and opportunities

- ▶ Fact finding and gaining a practical understanding of the supply chain
- ▶ Stakeholder engagement
- ▶ State of the UNISC
- ▶ Interrelationships – land use, urban form, regional economic development

#### Stage 2 – Practicalities, Costs and Benefits

- ▶ Options development – developing a strategic vision, articulating a case for change, exploring scenarios for development and the effects on freight efficiency, land use, resilience, capacity and wellbeing for all New Zealanders
- ▶ Strategy and recommendations – articulating the findings on the strategy and reasons for recommendations
- ▶ Implementation of chosen scenarios

### 1.3.4 Key Findings to Date

The Working Group have been provided with a terms of reference<sup>7</sup> which guides them in reviewing New Zealand's freight and logistics sector, and in the development and delivery of a freight and logistics (supply chain) strategy for the UNI region. It also asks the Working Group to consider the feasibility of moving the Auckland Port, with serious consideration given to Northport, and to advise on priorities for investment in rail, roads and other supporting infrastructure. It asks the Working Group to consider a range of impacts including transport, land use and urban planning, as well as national and regional economic growth.

To date, the Working Group has been in a discovery phase. During this time, the Working Group has been gaining a practical understanding of the current system through site visits and discussion with relevant supply chain

<sup>5</sup> <https://www.transport.govt.nz/multi-modal/keystrategiesandplans/upper-north-island-supply-chain-strategy/questions-and-answers/>

<sup>6</sup> UNISCS Working Group Interim Report

<sup>7</sup> [https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/cc9d34704a/UNI-Cabinet-Paper-and-Terms-of-Reference\\_no-redactions.pdf](https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/cc9d34704a/UNI-Cabinet-Paper-and-Terms-of-Reference_no-redactions.pdf)

sectors. This practical understanding has been supported by initial analysis of available freight and economic data, reading background materials and reports, and further stakeholder engagement.

The Working Group published Stage 1 of the review on 27 April 2019. This interim report highlighted that there was unanimous support given to rail infrastructure to support the UNI ports connectivity, to work in conjunction with other transport mechanisms. In addition to this, the working group fundamentally believes that there is no point making further investment in Northport without investment in, and development of an upgraded train line from Northland to Auckland.

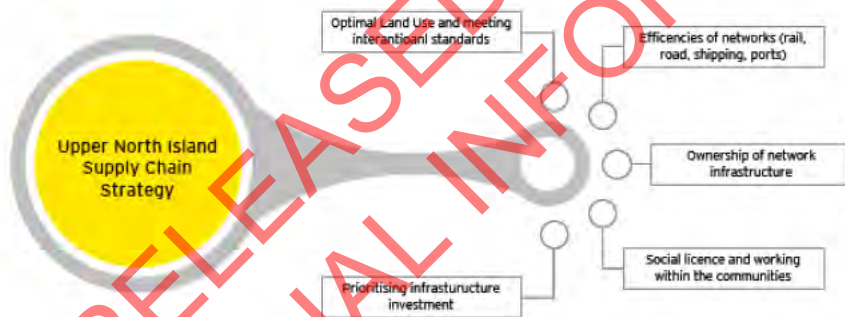
The working group engaged with stakeholders and key interest groups, including representatives from the three UNI ports, port company shareholders, the road freight industry, the shipping industry, commercial interests, cargo interests and other interested parties. These stakeholders provided feedback on the strengths and weaknesses of the UNI's current three-port freight system, as well as the main opportunities and threats over the next 10, 25 and 50 years. There was feedback on the ownership structures of the three ports as well and the extent to which the three ports are influencing freight outcomes for the UNISC.

The stakeholders had a range of views on the scope of what should be considered, from ensuring that Waikato is included when thinking about the UNI region to think about the North Island or even New Zealand as a whole when making decisions about ports, roads and rail in the upper

North Island. Their overall view was that the impacts were far-reaching and so should be grounded in robust evidence. The stakeholders also made it clear that the behaviours and types of freight handlers and logistics organisations have equally important influence on the effectiveness and outcomes of the supply chain. It was indicated that cost is a big driver of behaviour and there was a universal interest in the cost of moving freight.

The different considerations emerging from stakeholder meetings were categorised under five main themes as illustrated in the diagram below:

Figure 1 - xxx



The interim report went to cabinet who agreed with the Working Group on the following key points:

- ▶ The Working Group continue its work on the UNISCs, taking a strategic and investment based approach supported by analysis of the supply chain
- ▶ The Working Group to deliver a report in June 2019 to provide the results of the evaluation of different port locations (including Northport as an alternative location for the Ports of Auckland), freight flows and infrastructure options and scenarios; and a final report in September 2019 containing the Working Group's conclusions

## 1.4 Purpose of this Report

In May 2019 the Ministry of Transport has appointed a consortium led by Ernst & Young Limited (EY)<sup>8</sup> to perform an economic evaluation of potential UNI logistics and supply chain. This report examines a range of potential scenarios for supply chain investment, taking account of regional development impacts as well as transport outcomes, in line with the Working Group's Terms of Reference.

## 1.5 Structure of this Report

This report has been written on the basis that it is an input into the wider deliberations of the Working Group. As such the document has been ordered in line with answering the key questions of evaluating the potential supply chain scenarios. Background information such as a description of the regions, the context in which the ports operate and the freight flows that underpin the analysis are all included as Appendices. The report is structured as follows:

- 1 Approach to the Analysis
- 2 An overview of the Upper North Island Logistics and Supply Chain, and future trends
- 3 The Base Case and Understanding the Pressure for Change
- 4 Scenario Description
- 5 Results

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<sup>8</sup> The consortium includes professional services consultancy Advisian, architects, Warren and Mahoney and Quantity Surveyors WT Partnership.

## 2. Approach to Analysis

The approach to the analysis is based on evaluating scenarios as per a number of principles outlined by the Working Group. These principles consist of the following:

- ▶ Resilience of the supply chain
- ▶ Cost efficiency in moving freight
- ▶ Maintaining, if not enhancing, levels of competition in the UNISC
- ▶ Reducing 'friction' between freight and other modes/areas
- ▶ Contributing to overall government objectives

The principles stated above are further explained in section 3. In addition to this, two timing scenarios have also been taken into consideration as this has allowed the Working Group to understand the impact of time and scope of a partial move and provide a more sophisticated understanding of the key scenarios. Additional modelling runs were conducted after the report was completed to enable optimisation any given scenario.

This report uses a conventional economic assessment, using a combination of multicriteria analysis (to help shortlist options and identify non-monetisable impacts) and benefit cost analysis. The approach uses the standard NZ Transport Agency approach to benefit cost analysis as its base, but then adds emerging best practice analysis around valuations of alternate land use.

The key features over and above the standard economic evaluation approach include:

### 1. The use of a high level economic impact adjustment in conjunction with a benefit cost analysis

This analysis takes into consideration conventional development economics where a dollar spent in the regions has more stimulus value than that same dollar spent in an urban environment.

### 2. The deployment of the new dynamic land use approach

A procedure for valuing alternate land use was developed for the Working Group's options generated. This alternative land use value was the single biggest component that was ironed out technical land-side value of time issues associated with a potential lengthening of the logistics and supply chain for some of the goods imported or exported from Northport.

### 3. The deployment of an externalities model

The Value of Rail model developed by the EY in 2017 was fully utilised in this economic assessment. It provided analysis on how benefits can be maximised and costs minimised through different mode splits in the logistics and supply chain, including congestion, emissions, maintenance and safety. Additionally, the model is also taken into consideration full land-side freight analysis. The model itself fully reviewed and accepted by Treasury, MoT and NZTA.

### 4. Use of the new Resilience assessment framework

Until recently, there has been limited ways through which resilience could be factored into project analysis. In 2016, EY was commissioned by NZTA to undertake a year-long study into how this could be better done. The new resilience analysis approach was taken into account for this analysis which had a material impact on the effects of watch of the scenarios.

### 3. The Upper North Island Logistics and Supply Chain – Current and Future

#### 3.1 Country Overview

The freight sector in New Zealand is wide ranging, and impacts a number of complementary sectors including retail, manufacturing, agriculture, forestry, etc. The freight sector plays a different role across various industries. For example, approximately 20% of all inputs into the petroleum and coal manufacturing sector consist of freight 'costs', compared with life insurance representing 1%. All sectors and supply chains are mutually inclusive of freight, which fundamentally enables producers and consumers alike to access the goods and markets they need.<sup>9</sup>

On a global scale, New Zealand has the 57<sup>th</sup> largest, and 41<sup>st</sup> most complex economy according to the Economic Complexity Index (ECI). In 2017, New Zealand exported US\$37.3 billion and imported US\$36.3 billion, resulting in a positive trade balance of US\$988 million.

The top exports of New Zealand are Concentrated Milk (US\$5.34 billion), Sheep and Goat Meat (US\$2.36B), Butter (US\$2.33 billion), Rough Wood (US\$2 billion) and Frozen Bovine Meat (US\$1.79 billion), using the 1992 revision of the HS (Harmonised System) classification. Its top imports are Cars (US\$3.81 billion), Crude Petroleum (US\$1.95 billion), Refined Petroleum (US\$1.4 billion), Delivery Trucks (US\$1.35 billion) and Broadcasting Equipment (US\$1.02 billion).<sup>10</sup>

##### 3.1.1 Commodities

The primary sector is New Zealand's key generator of domestic freight, much of which is destined for export. Flows are from source (e.g. farm gate or plantation forest) either directly to ports (e.g. logs), or via an intermediate processing industry (e.g. dairy factories) for both domestic consumption and/or export.

Forestry has grown as a result of favourable export conditions and a buoyant construction sector. Dairy exceeds the tonnage of all other agricultural commodities, including livestock, meat, wool, horticulture, grains, and fish.

Non-foodstuff exports are concentrated in a few key regions. Coal resources are located and extracted from the West Coast and Waikato, and petroleum is imported and refined in Taranaki or Northland. Construction materials are produced (in relatively high volumes) close to domestic markets (i.e. low tonne-kms) due to their bulk and relatively low unit value. Manufactured retail goods are usually smaller and of greater unit value, and so are more feasibly transported over longer distances. This is true for both domestically made and imported goods.

<sup>9</sup> *Identifying freight performance and contextual indicators*, NZ Transport Agency research report 651 (December 2018)

<sup>10</sup> The Observatory of Economic Complexity 2017: <https://atlas.media.mit.edu/en/profile/country/nzl/>

Figure 2 New Zealand Freight Generated by Commodity

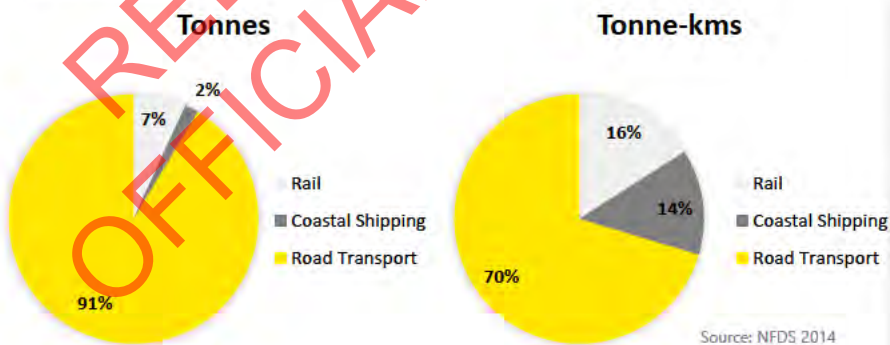


### 3.1.2 National Freight Task

The freight task in New Zealand is substantial, and moves the equivalent of 50 tonnes per capita each year. A number of factors affect the freight task, some of which are a result of the domestic market, and some are driven by the international market:

- ▶ Increasing population
- ▶ E-commerce
- ▶ Automation
- ▶ Video analytics
- ▶ Improved data/information systems
- ▶ Congested urban roads
- ▶ Environmental impacts
- ▶ Driverless/autonomous vehicles
- ▶ Increased demand for agricultural and dairy products

Figure 3 Overview of Freight Task by Mode





## Imports

**\$20.1b**  
China, Japan, Thailand

**\$6.89b**  
Germany, U.K., Italy

**\$4.6b**  
Australia

**\$4.06**  
U.S., Canada, Mexico

**\$0.47b**  
Argentina, Brazil, Chile

**\$0.21b**  
South Africa, Ghana,  
Morocco

## Exports

**\$19.9b**  
China, Japan, South Korea

**\$4.42b**  
Germany, U.K., Italy

**\$6.59b**  
Australia, Fiji

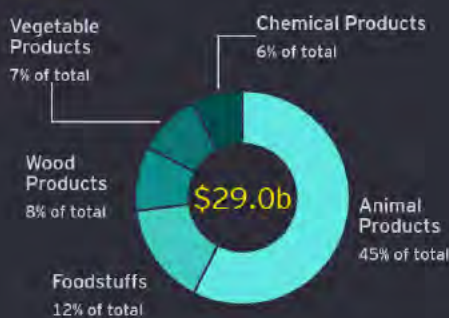
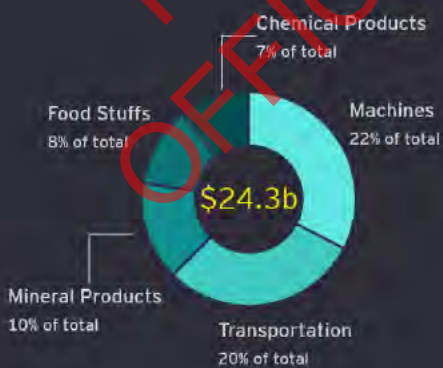
**\$4.63b**  
U.S., Canada, Mexico

**\$0.37b**  
Chile, Peru, Brazil

**\$1.4b**  
Algeria, Nigeria, South Africa

2017 USD values sourced from the OEC

## Key Products



All amounts in USD

Source: The Observatory of Economic Complexity 2017

### 3.2 Regional Freight Flows<sup>11</sup>

#### 3.2.1 Regional Freight Generation

Population is a significant driver of both consumption and manufacturing activity. The UNI region accounts for over 45% of all freight tonnage produced in New Zealand. The most dominant freight generator in the South Island is Canterbury, which produces 15% of the national freight task<sup>12</sup>.

Figure 4 Commodities by Region



The primary sector is largely located in the Waikato, Taranaki, Manawatu, and Southland regions due to their favourable climate, topography, and soil. These regions are well-suited to dairy production which accounts for 20% of freight within these regions. This is similar for forestry, which has a substantial presence in Northland, Waikato, Bay of Plenty, Gisborne, Hawke's Bay, and Tasman/Marlborough/Nelson due to the warm climates and lower value land. Forestry accounts for over 35% of freight in these regions (excluding Waikato at 16% and Northland at 26%).

Crude oil flows are directly exported from Taranaki or imported to the Marsden Point refinery. Domestic petroleum product transport is primarily from the Northland refinery to coastal distribution, and then by truck to the nation's service stations.

Coal production on the West Coast is principally exported from Lyttelton, whereas Waikato coal production serves the domestic market in the UNI. However, the low cost and environmental impact is leading to decreased demand for coal.

Northland and the West Coast both have cement manufacturing plant that distribute cement via coastal shipping and then road and rail. However, the West Coast plant is being superseded by direct import. The Tiwai Point Aluminium Smelter in the South Island (Southland) accounts for approximately 10% of the region's total freight flows, while largely generating direct import/export flows.

<sup>11</sup> Information from this section is largely based on the Deloitte New Zealand Ports and Freight Yearbook 2016

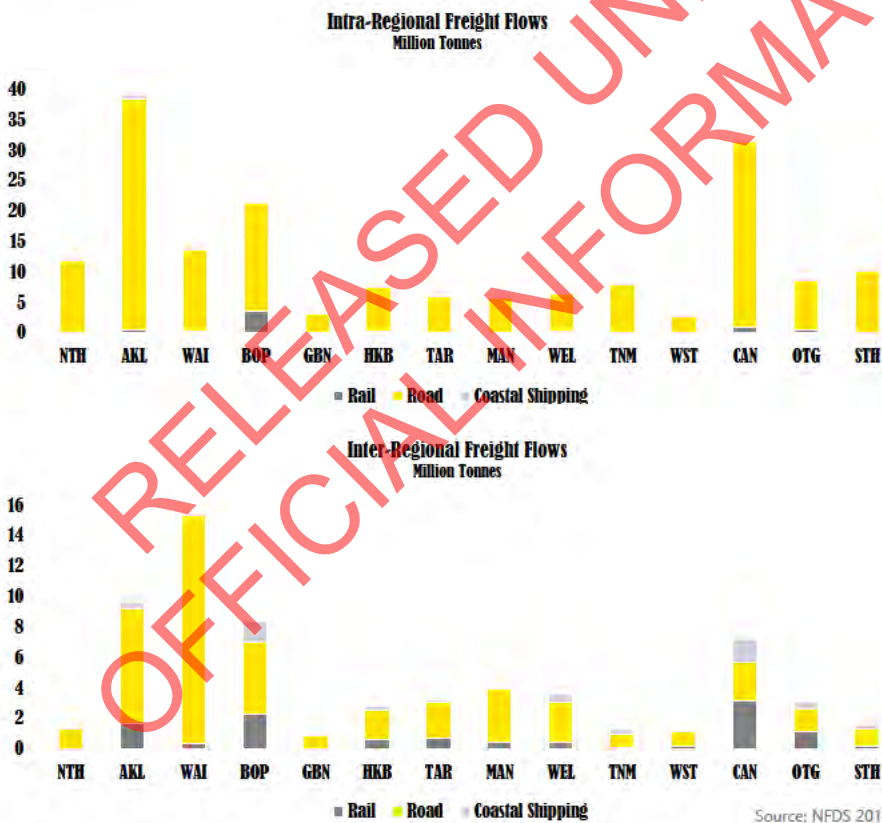
<sup>12</sup> Information from this section is largely based on the Deloitte New Zealand Ports and Freight Yearbook 2016

### 3.2.2 Modal Share

Road is the most dominant mode of transport for both inter- and intra-regional freight transport. In most regions, road has over 95% of the market share for intra-regional freight flows. The Bay of Plenty region is an exception at 83% given logs are transported to Tauranga for export via rail. Roads hold a 68% market share (by tonnage) of inter-regional freight flows, with rail accounting for 21%, and coastal shipping accounting for the remaining 11%<sup>13</sup>

Modal share competition is more pronounced over longer distances, as can be seen in the inter-regional freight flows (see Figure 6 and Figure 6). Despite this, road remains the most dominant form of transport. This could be attributed to the ease of use of road transport. Road services offer greater flexibility and can be requested on demand. New Zealand's roading network is also more expansive than the country's rail and port options. As such, road can service greater areas. Rail and coastal shipping offer greater environmental benefit, however, and greater align with strategic objectives to reduce adverse environmental impact outlined in the Government Policy Statement (GPS). Rail and coastal shipping also offer cost advantages as distance increases, and may be more suitable for the transportation of long-haul or repetitive freight tasks.

Figure 7 Inter- and Intra-Regional Freight Flows



<sup>13</sup> Deloitte Ports and Freight Yearbook, 2016

### 3.2.3 New Zealand Ports as a contributor to the logistics and supply chain

New Zealand has had over 150 ports in operation throughout history, but only a handful were able to adapt to evolving shipping requirements and demand changes. Presently, New Zealand's ports provide a vital link for 99.5% of the country's trade with international markets. Merchandise exports are 21% of New Zealand's GDP<sup>14</sup>—the majority of which passes through ports. In general, New Zealand's ports have become more efficient and disciplined, allowing trade volumes to remain steady over time.

New Zealand's three leading ports are Tauranga, Auckland, and Lyttelton, with Wellington, Napier, and Otago also performing highly. Combined, POAL and POT handle 62% of New Zealand's total TEU (full and empty container inclusive). While POT is New Zealand's largest port by volume, POAL accounts for 35% of total import TEU. However, POAL's export volumes are relatively low at only 6% of New Zealand's total exports in the year ended June 2018.<sup>15</sup> An overview of container handling for the six most significant New Zealand ports has been provided below.

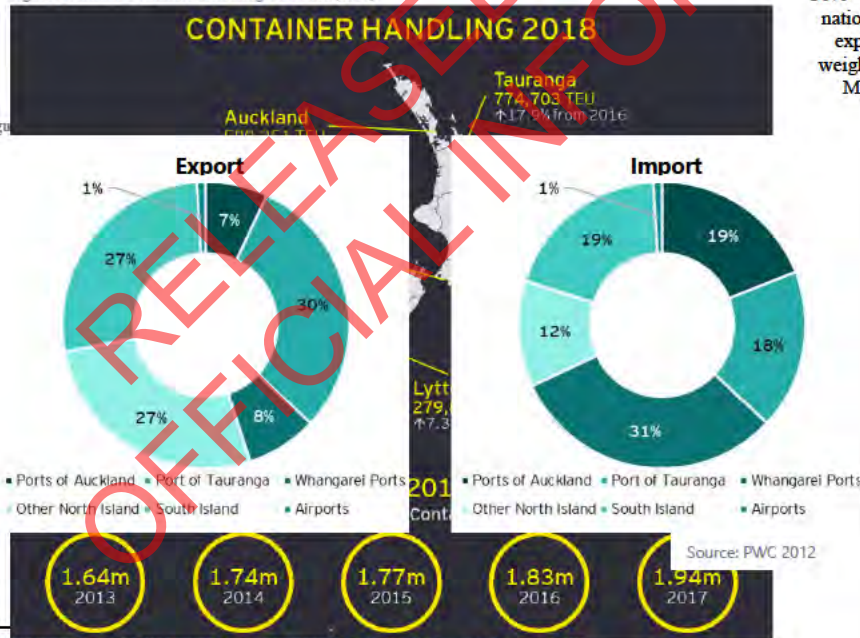
Figure 8 New Zealand Ports



#### 3.2.3.1 The Role of the UNI Supply Chain<sup>16</sup>

In 2014, the three UNI supply chain accounted for 45% of New Zealand's total freight export weights. POT alone shipped 30% of national export weights. More

Figure 9 Annual Container Handling Statistics (2017)



<sup>14</sup> <https://www.transport.govt.nz/mot-resources/research-papers/containerproductivitynzports/> Source: Champion Freight

<sup>15</sup> Working Group Interim Report

<sup>16</sup> The following sections are based on the 2014 National Freight Demand Study. This Study is presently being updated.

significantly, the three UNI ports handled 68% of total national import weights in 2012, and Whangarei's ports (including Marsden Point refinery's oil terminal) accounted for 31% of the import weights. Only 1% of import and export weights are transported by air—the majority of which moves through Auckland International Airport. As such, it is evident ports are critical to New Zealand's economy and prosperity.

### 3.3 Northland

#### 3.3.1 Current situation

Northland has a diverse economy with manufacturing being the largest industry followed by agriculture, forestry and fishing, then business and property services. The Northland economy is underpinned by sectors that harness natural advantages based around land, water, climate and cultural assets.

Horticulture and Fruit Growing industry in Northland creates approximately \$200m in exports and constitutes 8.1% of the total exports share of the region. Dairy production is increasing, with 30,000 containers being transported every year. Northland is responsible for about 7% of national road freight, much of which is generated by its primary industries. According to the 2014 National Freight Demand Study, freight in the region is forecast to increase by almost 40% in the region over by 2042, around 1.1% per annum.

Northland has a forest cover of high quality pine which is suitable for a wide range of end uses. With over 190,000 hectares of planted forest, Northland has one of the largest pine resources available in New Zealand for processing. Northland's exotic timber harvest grew from 2.6 million m<sup>3</sup> in 2011 to 4.2 million m<sup>3</sup> in 2015. This growth is expected to continue before levelling out at about 3 million m<sup>3</sup> in 2023.

The boom in horticulture in Northland, such as growth in the production of gold kiwifruit, and manuka honey, means that the local economy has benefited significantly. In Northland 3.6 million trays of green and gold kiwifruit are grown annually. Another major exporting crop is avocado, of which 45% is being exported globally. With over 40 vineyards producing award-winning wines and Northland being the largest area in New Zealand for kumara growing,

Figure 1 shows the freight volume by route from Northland to other UNI Regions.

Figure 11 Northland Freight Volume by route



Annually, 8 million tonnes of inbound and 10 million tonnes of outbound freight movement happens between Northland and other major UNI regions as shown in the data figures below –

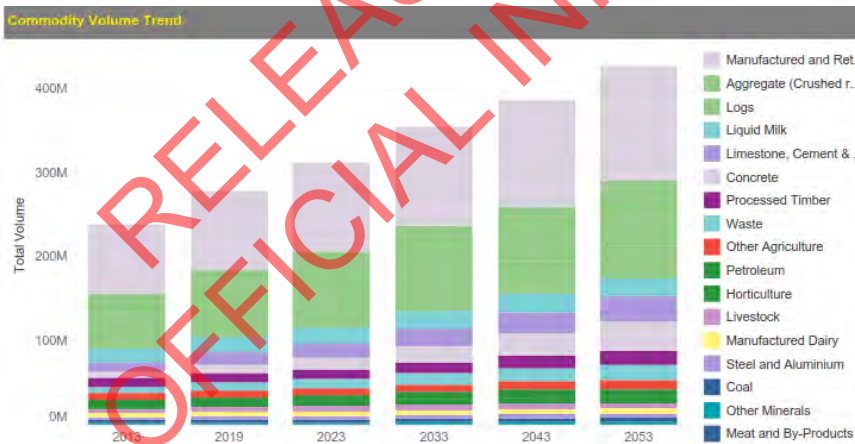
Inbound Volume	Outbound Volume	Total Volume
8M T	10M T	18M T

Volume Summary Between Northland and Listed Location			
Location	Total Volume	Inbound Volume	Outbound Volume
Northland	13,174,526	6,587,263	6,587,263
Auckland	3,470,238	2,464,354	1,005,883
Bay of Plenty	1,111,715	933,200	178,516
Waikato	263,493	121,817	141,676
Gisborne	2,995	1,519	1,476

### 3.3.2 Future Trends - Northland

The chart below indicates the potential growth in freight between 2013 and 2053. As forestry is a major driver of exports at Northport, forecasts for 2019 to 2049 were therefore updated using the latest data to reflect the harvest cycle of Northland Forests<sup>17</sup>. At present, 33% of logs are processed locally and there is economic potential in the areas of wood processing and manufacturing finished products, including logging, saw-milling, wood-chipping, veneer and plywood manufacture. Lower land costs (\$6,004 per hectare compared to New Zealand national average of \$6,744 per hectare) coupled with reliable availability of skilled labour in Northland, presents a case for potential economic development going forward.



### 3.3.3 Impact on the mode of transport in Northland

<sup>17</sup> Northport Wood Availability Forecast, 2018

According to the 2014 National Freight Demand Study, freight in the region is forecast to increase by almost 40% in the region over the 30 years between 2012 and 2042, around 1.1% per annum. In response to the growing needs for heavy freight transport in the area, the NZTA developed proposals to invest in the upgrading of required structures.

The increased demand in freight to Northland has resulted in existing roads in the region becoming congested and damaged due to heavy vehicle movements. Road transport remains the main means of moving freight and people.

The alternative is to develop the rail infrastructure connecting to Auckland and rest of New Zealand. At present, there is no connectivity between Northport and the rest of the rail network. With the closure of Port Whāngārei, there has been a reduction in the rail freight from other regions to Northland. While there was around 1 million tonnes of rail freight transported in the year 2000, the number has reduced to approximately 20,000 tonnes in 2013 as per the National Freight Demand Study. The absence of rail network is one of the biggest challenges which, if addressed, will have material impact on the development of Northport and Northland region as well as helping maintain other transport infrastructure, especially roads.

The Northland region does have an existing rail network (the North Auckland Line—NAL); however, it has been under maintained, and has seen no significant investment in the last 50 years. Consequently, the line is no longer fit for purpose and cannot meet modern requirements for transportation of freight and passengers. Restricted tunnel heights prevent Northland exporters from utilising rail to move modern high-cube containers to and from Auckland. Furthermore, lack of maintenance and the aging of structures and tracks has forced speed reductions. Additionally, older, less reliable trains and equipment have to be used on the line due to weight restrictions, further lengthening transport timeframes and increasing inefficiencies. In 2002, the network lost port connectivity when operations were moved to Marsden Point. Northport is now one of the only ports in New Zealand without a rail connection.

These conditions and restrictions have necessitated the transference of over a million tonnes of freight to road transport per annum. Rail is currently an infeasible option for businesses to move freight in or out of Northland. Investment and renewal of the North Auckland Line (NAL) and Northport connective link has the potential to substantially alter freight flows within the UNI, support a portion of the trade from international markets to and from Auckland, and bolster the nation's international trade growth.

## 3.4 Auckland

### 3.4.1 Current Situation

The Auckland region accounts for 35% of the New Zealand population, POAL has a correspondingly significant imports volume. Conversely, export volumes are relatively low and account for only 6% of New Zealand's total export volumes (as at 30 June 2018). POAL largely handles containers, and bulk and break-bulk volumes (including cars), and is the largest container importer in New Zealand. Additionally, Auckland is the point of entry for over 67% of New Zealand's vehicle imports (a 43% increase from 2014 to 2018), and serves 37% of national import demand. Increasing import volumes are straining POAL resources and placing pressures on other port operations.<sup>18</sup>

POAL is import dominant, in large part due to their proximity to New Zealand's largest consumer market, Auckland. All of POAL's freight hubs are strategically located next to rail and are at the centre of current and planned freight generation and consumption areas.

POAL purchased 33ha of industrial land at Northgate Business Park in February 2016 to develop the Waikato Freight Hub which will form a key connection in their national supply chain network. The Northgate Business Park has attracted a number of import/export customers due to its outstanding road and rail access. The Waikato Freight Hub is due to open in the first half of 2019 once the OCD facility and a new road connection have been built. When fully complete, the freight hub is expected to generate around 300 jobs directly and facilitate many thousands more by acting as an economic catalyst.

Figure 2 shows the freight volume by route from Auckland to other UNI Regions.

<sup>18</sup> UNISCS Working Group Interim Report

Figure 12 Auckland Freight Volume by route



Annually, 33 million tonnes of inbound and 30 million tonnes of outbound freight movement happens between BOP and other major UNI regions as shown in the data figures below –

Inbound Volume	Outbound Volume	Total Volume
33M T	30M T	64M T

Volume Summary Between Auckland and Listed Location			
Location	Total Volume	Inbound Volume	Outbound Volume
Auckland	46,169,090	23,084,545	23,084,545
Waikato	7,971,997	2,802,156	5,169,841
Bay of Plenty	5,846,685	3,326,473	2,520,213
Northland	3,470,238	1,005,883	2,464,354
Gisborne	238,000	155,735	82,865

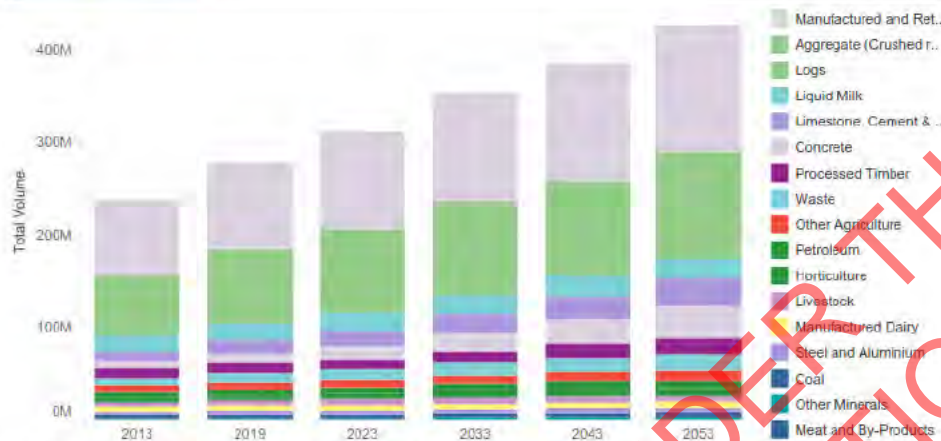
### 3.4.2 Future trends - Auckland

The chart below indicates the potential growth in the sector wise growth scenario between 2013 and 2053. The Manufacturing sector will remain the primary contributor to the economy.

Dairy exports are forecast to continue to decline as the Port of Tauranga has an agreement with Kotahi, the logistics company owned by Fonterra Cooperative Group and Silver Ferns Farms to export dairy products.



### Commodity Volume Trend



TEU throughput is expected to increase to a total of between 1.7 million and 2.2 million in the next 30 years. Imports will make up the majority of total throughput, which is forecast to increase to between 1.2 million and 1.6 million TEU in the same period, an increase of between 104 to 168 per cent from 2018. Exported TEU will increase by between 77 and 132 per cent in next 30 years in comparison to 2018. This equates to between 471,000 and 619,000 in expected TEU exports in 2049.

Bulk imports will increase by 79 to 96 per cent by 2049 in comparison to 2018. This equates to between 3.8 million and 4.1 million tonnes for the 2049 year. Bulk exports will increase by 79 to 96 per cent in comparison to 2018 numbers. This equates to between 2.4 million tonnes to 2.6 million tonnes of bulk exports in 2049, significantly less than imports.

The number of cars imported to the Ports of Auckland are projected to increase between 59 and 109 per cent by 2049 in comparison to 2018. Car imports are forecast to be between 472,000 and 621,000 cars in 2049.<sup>19</sup>

### 3.4.3 Impact on the mode of transport in Auckland

The combination of increased freight activity within Auckland and significant growth in population (10% between 2014 and 2018) has led to congestion problems in Auckland where there has been a rapid increase in the demand for travel. It has been observed that over 700 additional cars are being registered in Auckland every week, the city has also witnessed a record growth in the public transport use as well, with annual public transport boarding increasing by almost 30 per cent over the last four years between 2014 and 2018.<sup>20</sup>

The majority of POAL trade volumes are distributed via the road network (see Figure 3). PWC's 2012 report for the Strategic Alliance<sup>21</sup> projected a modest increase in port traffic through Grafton Gully by 2041. However, the same report indicated non-port traffic would increase significantly. Grafton Gully is unlikely to have capacity to support this increase, and the resulting congestion and diversions from upgrades would directly impact freight movement, leading to material delays and cost increases.

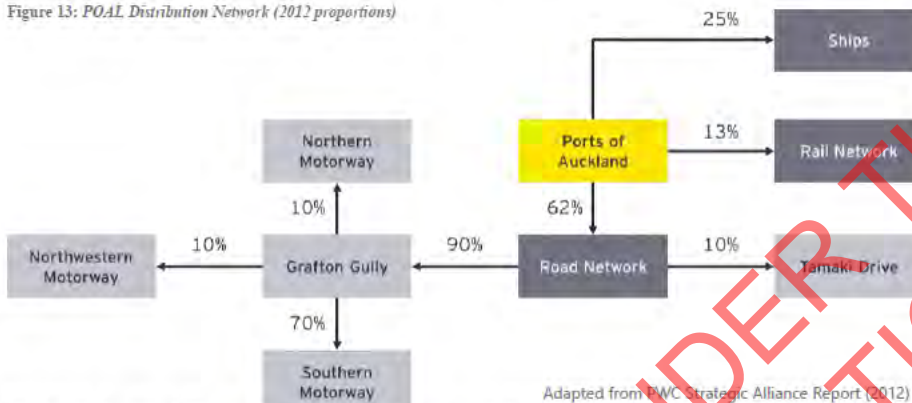
<sup>19</sup> Note that these projected figures use Ports of Auckland 2018 Annual Report figures and therefore will not align with the import tonnage, as Ports of Auckland and the Ministry of Transport, Statistics New Zealand data.

<sup>20</sup> <https://www.transport.govt.nz/land/auckland/the-congestion-question/>

<sup>21</sup> *How Can We Meet Increasing Demand for Ports in the Upper North Island*, A report for the Upper North Island Strategic Alliance, PWC 2012.

Similarly, rail traffic from POAL is projected to increase between 78% to 94%<sup>53</sup> by 2041. Future demand for passenger services is also projected to increase substantially. The Eastern Line should be able to accommodate the anticipated increase; however, it runs on a “tight” schedule. Even minor delays to freight trains could therefore have considerable consequences for train passengers.

Figure 13: POAL Distribution Network (2012 proportions)



The South Auckland Wiri to Westfield (W2W) section of the North Island Main Trunk provides a critical passenger link, and is a major conduit for the movement of goods across New Zealand. The twin track configuration has reached its maximum operational capacity and is a significant bottleneck. The 3<sup>rd</sup> Main Line Project has been proposed to increase capacity along this line.<sup>22</sup> However, as the line will support both passenger and freight operations, friction issues are still likely. Freight trains are much longer and slower than the electric passenger rail units, and will cause considerable knock on effects for passengers.

As signalling headways are also reaching capacity, freight may be required to move to off-peak periods or overnight. The impact this could have on POAL operations is uncertain, but there is an increasingly unfavourable public opinion towards increasing freight rail traffic throughout Auckland's eastern suburbs. Changes in freight scheduling may conflict with residential amenity or liveability along freight corridors and result in public backlash.

The state highways that carry freight into and out of the Auckland Region are 1, 16, 20 and 20A. The Auckland Harbour Bridge (part of State Highway 1) is not classified as a 'high performance motor vehicle' capable route.<sup>23</sup> Currently clip-on lanes are open to 50-tonne maximum heavy vehicles. Heavier vehicles are only able to use the truss bridge lanes.<sup>24</sup>

Congestion in Auckland is a pressing issue in terms of the road network and efficiency of freight movements. A 2012 study, *City Centre Future Access Study*, notes that by 2041 average vehicle speeds will drop to 5kph during the morning peak period which is the equivalent to walk pace.<sup>25</sup>

Significant road investments include the 20Connect project, improving access to freight hubs around the airport and Onehunga. This project is expected to be completed in 2021. The Waikato Expressway (along with various Southern Corridor Improvement projects) will also reduce travel time, congestions and increase capacity between Auckland and Waikato. The Waikato Expressway projects will cost over \$500 million in total and should be completed in 2021. The Western Ring Project along State Highway 16, to be completed this year, will also improve reliability and travel times to freight hubs in Auckland.

<sup>22</sup> *Wiri to Westfield, The Case for Investment*, WSP & Parsons Brinckerhoff, December 2016

<sup>23</sup> <https://www.nzta.govt.nz/commercial-driving/high-productivity/full-hpmv-network-map/>

<sup>24</sup> <https://www.newstalkzb.co.nz/news/national/auckland-harbour-bridge-strengthened-against-risk-of-catastrophic-failure/>

<sup>25</sup> Page 12

### 3.5 Bay of Plenty Supply Chain

#### 3.5.1 Current Situation

Port of Tauranga, located in the Bay of Plenty, is New Zealand's fastest growing and most productive port, rated as one of the 10 most efficient ports in the world. Between 2016 and 2017 its exports and imports increased by 8.0% and 13.7% respectively, however POT has an import-export imbalance where its import volumes are less than two thirds of its export volumes. As a result, POT has a significant empty container generation.<sup>26</sup>

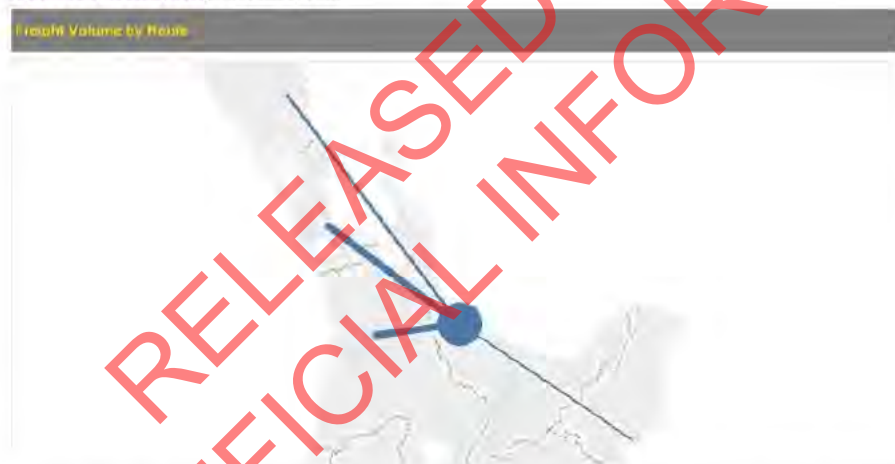
Just over half of all cargo volumes are either transhipped (transferred from one ship to another), transported by rail or carried via pipeline. Nearly 45% of all forestry exports arrive at the port by rail. Road traffic congestion is nevertheless a city-wide problem in Tauranga, and the forecast growth in both passenger and freight travel is likely to exacerbate this issue over time.

POT's fast growing productivity is contributing to the Bay of Plenty's strong economic growth and is estimated to be associated with 43% of the region's Gross Domestic Product (GDP). Exports grew 8.0% in volume to 14.2 million tonnes and imports increased 13.7% in volume to 8.0 million tonnes. Much of the increase is attributable to the large increase in total TEUs handled, from 954,006 in 2016 to 1,085,987 in the 2017 financial year.<sup>27</sup> This large increase in total TEU's handled was mainly driven by a surge in log and forestry exports.<sup>28</sup>

The Port has guaranteed freight load for 10 years from Kotahi, the Fonterra-Silver Fern Farms-owned freight venture, and its harbour dredging, taking it to a consented low-water draught of 14.5m. This means it can accommodate the Aotea Maersk, the biggest container ship ever to visit New Zealand, with a capacity of 9500 containers. POT also welcomed the SBI Maia, an ultramax class bulk carrier that collected the biggest ever log and lumber shipment from New Zealand at 53,000 JASM (Japanese Agricultural Standard cubic metres).<sup>29</sup>

Figure 4 shows the freight volume by route from Bay of Plenty to other UNI Regions

Figure 14 Bay of Plenty Freight Volume by route



Annually, 21 million tonnes of inbound and 18 million tonnes of outbound freight movement happens between BOP and other major UNI regions as shown in the data figures below –

<sup>26</sup> UNISCS Working Group Interim Report

<sup>27</sup> Port of Tauranga Annual Report 2017 [Online] 2017 <https://www.port-tauranga.co.nz/download/mPaul31b8dTk3/>

<sup>28</sup> <https://www.port-tauranga.co.nz/about-port-of-tauranga/commodities/>

<sup>29</sup> <https://www.noted.co.nz/money/economy/tauranga-boom-times-in-the-bay/>

Inbound Volume	Outbound Volume	Total Volume
21M T	18M T	39M T

Volume Summary Between Bay of Plenty and Listed Location			
Location	Total Volume	Inbound Volume	Outbound Volume
Bay of Plenty	25,004,947	12,502,474	12,502,474
Waikato	6,323,050	2,473,815	3,849,235
Auckland	5,846,685	2,520,213	3,326,473
Northland	1,111,715	178,516	933,200
Gisborne	300,800	129,159	171,641

### 3.5.2 Future trends - Bay of Plenty

Dairy is a major driver of exports in Tauranga, growth in dairy is expected to remain relatively flat over the forecast period because much of the available land for dairy has already been converted and further productivity growth for the sector is likely to be low

In 2025, imports into the Ports of Tauranga are likely to decrease as Genesis energy has pledged to stop using coal to generate electricity at Huntly power station (in extreme circumstances by 2025, and completely by 2030)<sup>30</sup> Advisian has assumed that imports of coal will cease in 2025, which results in a 500 thousand tonne decrease<sup>31</sup> in bulk imports into Tauranga from 2025

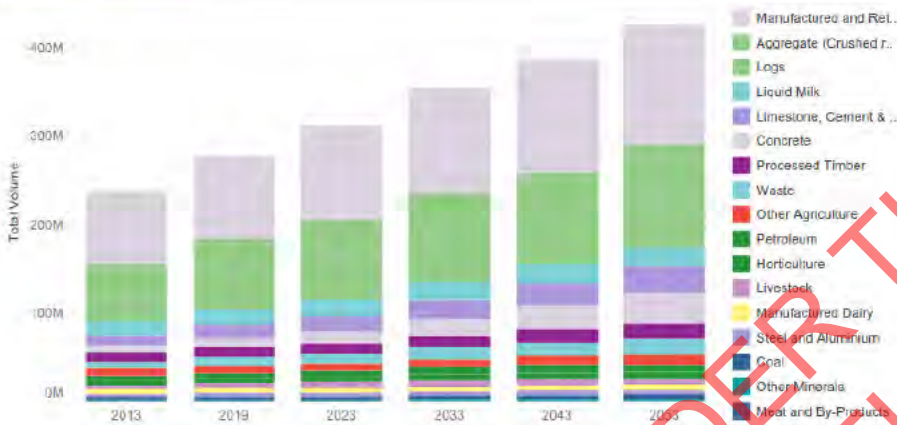
The stacked chart below indicates the potential growth in the sector wise growth scenario between 2013 and 2053 indicating that manufacturing sector will still be having a major proportion to the contribution of the BOP economy

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<sup>30</sup> <https://www.rnz.co.nz/news/national/350390/genesis-energy-to-phase-out-huntly-coal-use>

<sup>31</sup> Average coal imports 2013-2018, accessible from <https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/coal-statistics/>

Summary Volume Trends



### 3.5.3 Impact on the mode of transport in the Bay of Plenty

POT in comparison to POAL and Northport a high volume of freight entering and exiting the port via rail, at nearly 50 percent. This can be accounted for by a rail link from Metroport (Auckland freight hub) and the East Coast Main Trunk Line which carries imports and exports to and from the Port.

There are 4,460 kilometres of roads in the region, most of which are sealed. Meanwhile, the rail network totals 229 kilometres, linking the port to the Waikato and Auckland and the major forestry centres to the east and south. New data shows congestion on Bay of Plenty roads is worsening faster than most other North Island regions. Contributing to this, the region has started to experience port driven road congestion issues. POT has seen a significant increase in traffic relating with regards to moving goods around the Tauranga (traffic flows in Tauranga City increased 5.7% in 2018) and the wider Bay of Plenty region.

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## 4. The Current Situation and Understanding the Pressure for Change

The Government has indicated a strong interest in the future direction of New Zealand's ports, freight services and coastal shipping. The Government recognises these networks are critical to lifting the economic wellbeing of New Zealanders. In the context of the UNI region, the Working Group has developed three primary investment objectives:

- ▶ Developing efficient and effective transport and logistics infrastructure that works in the national interest
- ▶ Promoting opportunities for regional development and employment
- ▶ Ensuring the best use of scarce resources such as land, especially in metropolitan areas

The Working Group have identified four key barriers to investment objectives:

- ▶ Differing port ownership models impacting on a coherent Upper North Island logistics and supply chain strategy
- ▶ Material capacity limitations of the land side transport infrastructure to support the Ports of Auckland and future growth
- ▶ High-value metropolitan land use
- ▶ A lack of rail infrastructure and port connectivity in Northland

### 4.1 Developing the Base Case

Ahead of assessing the change scenarios, a fundamental requirement is to provide a comparator of what might be expected in the absence of introduction of any different overall strategy or central decisions about the priorities or roles of different parts of the supply chain.

The base case sets out potential outcomes relating to levels of growth of the freight task through different parts of the supply chain, infrastructure investment to respond to that growth, and the likely impacts of the changes/increases in freight patterns.

#### 4.1.1 Base Case Road and Rail Investments

In order to meet the freight demands as identified in Section 3 above, the following investment have been assumed. These are based on current Region Transport Plans, approved investments and clearly indicated commitments from either local or central government.

These use a 15 and 30 year timeframe.

Base case 2034

BASE CASE 2034		
RAIL		
Significant investments/developments	Costs (\$M)	Comment
Spur line to Marsden Pt	\$329	From NAL Business Case
Limited NAL upgrade	\$225	Assumed half of the line upgrade cost from the NAL business case
Auckland upgrades - 3rd main Wiri-Westfield, Upgrade Westfield Junction, Quay Park Junction, Electrification Papakura - Pukekohe, Various resilience and level crossing projects	\$940	From ATAP
Passing loops on East Coast Main Trunk Line	\$40	Simple loops requiring one train to stop. Assumed \$10M each
<b>TOTAL</b>	<b>\$ 1,534</b>	
ROAD		
Significant investments/programmes	Costs (\$M)	Comment
No significant capacity increases to SH1 between Central Motorway Junction and Puhoi		
Completion of Puhoi to Warkworth		Costs already expended
Various planned safety improvements SH1 - Wellsford-Warkworth, Brynderwyn Hills, Whangarei (6 minor projects)	\$ 135	From NZTA Whangarei to Auckland programme Business Case
Allowance for further safety improvements on SH1 North Auckland that are not current programmed	\$ 200	Assume \$20M/yr for 10 years for entire corridor
Completion of Waikato Expressway		Already committed
Manukau - Papakura Widening		Already committed
Papakura - Bombay Widening	\$ 450	Estimate - approximately 20km of widening
Mill Road Stage 1	\$ 500	Estimate - approximately 9km, multi-modal corridor. Will take pressure of SH1
No significant improvements SH2 Auckland - Tauranga or SH 27		
SH29 Corridor, early stages of Tauriko Network Plan	\$ 200	Estimate - approx 30% off total planned \$650M spend over 30 years from NZTA Programme
Allowance for limited safety improvements SH29	\$ 200	Assume \$20M/yr for 10 years for corridor
<b>TOTAL</b>	<b>\$ 1,685</b>	

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Base case 2049

BASE CASE 2049		
RAIL		
Significant investments/developments	Costs (\$M)	Comment
Balance of NAL full rail connected port	\$650	Estimate based on total estimated spend of \$1.2B, less \$550M spent to 2034
Auckland upgrades - 4th main between Westfield and Wiri, 3rd and 4th main Wiri-Papakura, 3rd main Papakura-Pukekohe	\$800	Figure from ATAP
Futher ECMT upgrades	\$120	Estimate - upgrade crossing loops to eliminate need to stop. Broad estimate of 4
Additional Waitemata Harbour Crossing - recent update favours LRT crossing, with road pricing implemented	\$3,000	Very high level estimate
<b>TOTAL</b>	<b>\$ 4,570</b>	
ROAD		
Significant investments/programmes	Costs (\$M)	Comment
No significant upgrades expected in/around the Port		ATAP notes the sensitivity of the area and likely high costs
Various ATAP Future Priorities - Upgrade to SH16/SH18 interchange, Capacity upgrades on outer part of the motorway network, New strategic roads to Kumeu and Pukekohe (investigations to be undertaken to protect corridors – no costs available), Mill Road (Phase 2)	\$ 2,000	Cost estimates, if available at all, are very high level. Very high level estimate
East West Link	\$ 800	While not programmed, likely to come at end of period. Cost estimate for 'reduced scope' option from ATAP
Various upgrades SH1 North Auckland/Northland, in particular Brynderwyn western bypass, improvements to Te Hana, Toetoe-Oakleigh	\$ 1,200	Estimate of \$880M - \$1.43B from NZTA programme business case
Estimated SH29 upgrades - mainly alignment improvements over Kaimais and improvements of intersections with SHs 24, 27 and 28	\$ 400	Estimate from SH29 Piarere to Tauriko Programme Business Case, with programme of \$325-\$530M over 30 years
Balance of Tauriko Upgrade Package	\$ 450	Balance from Tauriko Network Programme Business Case
<b>TOTAL</b>	<b>\$ 4,850</b>	

## 4.1.2 Base Case Port Development

### 4.1.2.1 Northland

24 percent of Northland region businesses are categorised as agriculture, forestry and fishing<sup>32</sup>. This is reflected at Northport, where exports mostly consist of bulk logs. Log exports are likely to remain unchanged over the next 30 years as recently harvest trees are replanted.

Horticulture is increasing in Northland with the number of hectares of avocado orchards consistently increasing over the past few years<sup>33</sup>. Northport has also begun expanding port operations to include containerised kiwifruit exports. This expansion provides a cheaper alternative to transporting local kiwifruit south to Port of Tauranga via rail or road<sup>34</sup>.

#### Freight volumes through Northport

Both imported and exported TEU throughput is forecast to increase by 17% in 2034 relative to 2018 figures. This 17% increase equates to an estimated 780 exported and 740 imported TEU in 2034 (note that Northport reported 7,000 TEU in 2018 – the reason for the difference is that for reasons of consistency we have used FIGs data throughout the study). Nevertheless this will be a relatively low container throughput in comparison to Ports of Auckland and Port of Tauranga.

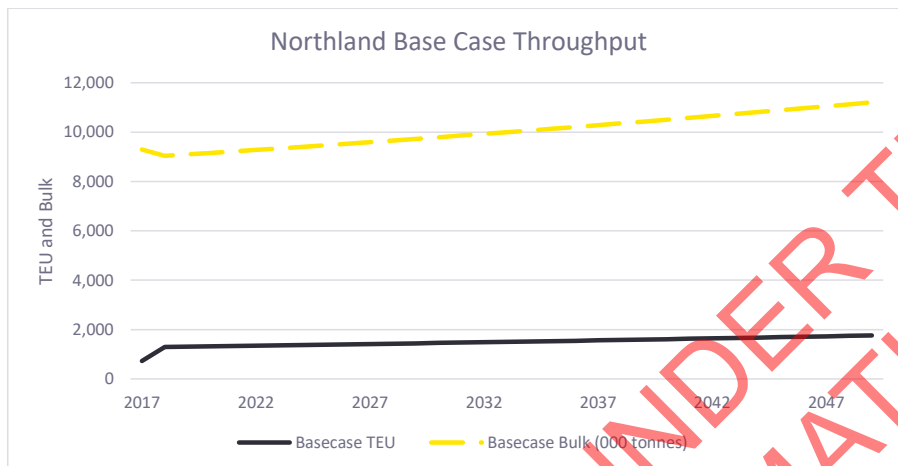
<sup>32</sup> <https://ecoprofile.infometrics.co.nz/Northland%2bRegion/Businesses>

<sup>33</sup> [Stats NZ reference](#)

<sup>34</sup> [https://www.nzherald.co.nz/the-country/news/article-cfm?c\\_id=16&objectid=12093844](https://www.nzherald.co.nz/the-country/news/article-cfm?c_id=16&objectid=12093844)



Bulk exports at Northport are forecast to remain relatively flat (increase of 0.1 per cent) between 2019 and 2034. This is because exports at Northport are driven predominantly by logs and the availability of harvested logs over the period decreases slightly. Imports are forecast to increase by approximately 17 per cent over the 15-year period.



#### Port side investments

In the base case for Northland, given forecasted throughput at Northport, no significant investments or modifications to the port are required through to 2049.

#### 2025 investments:

- **Containers:** Due to minimal forecasted container growth to 1,456 TEU, no additional land or wharf space is required.
- **Logs:** Due to the additional 10 Ha currently being constructed, no additional land is required.
- Due to minimal forecasted reduction of logs from 2,572 M t to 2,48 M t, no additional berth space is required.
- **Woodchips:** Due to no forecasted woodchip growth, no additional land or wharf space is required.
- **Cars:** Northport in the base case are not expected to import cars.
- **Liquids and other bulk:** Minor growth forecasted to 271,000 t as coal plants are planned on being ramped down, future of liquids imports currently unknown.

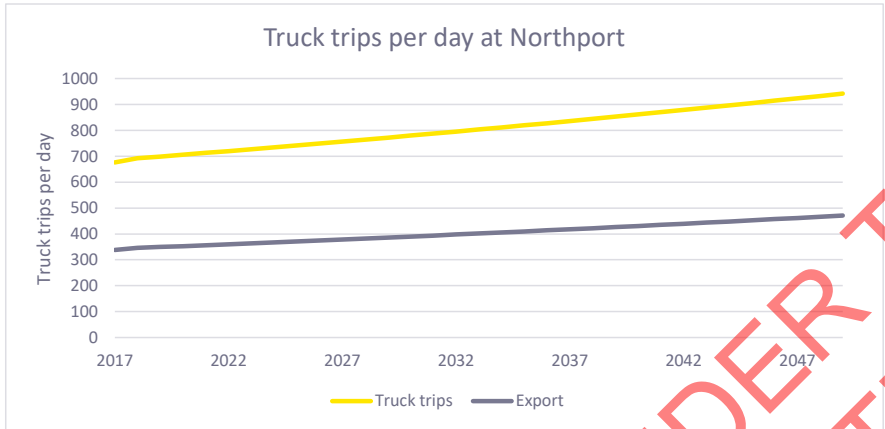
#### 2049 investments:

- **Containers:** Due to minimal forecasted container growth to 1,677 TEU, no additional land or wharf space is required.
- **Logs:** Due to minimal forecasted reduction of logs from 2,48 million tonnes to 2,4 million tonnes. No additional berth space or hardstand are required.
- **Woodchips:** Due to no forecasted woodchip growth of 198,000 t, no additional land or wharf space is required.
- **Cars:** Northport in the base case are not expected to import cars.
- **Liquids and other bulk:** Minor growth forecasted to 273,000 t, future of liquids imports currently unknown.

#### The road and rail network

Truck trips are expected to increase over the next 15 and 30 forecasted periods. Whilst the North Auckland Train Line is assumed to be upgraded to national standard, without a shift in what the ports are handling, we have

assumed that the road network will still handle the vast majority of imports and exports travelling between the Northland and Auckland region



#### 4.1.2.2 Auckland

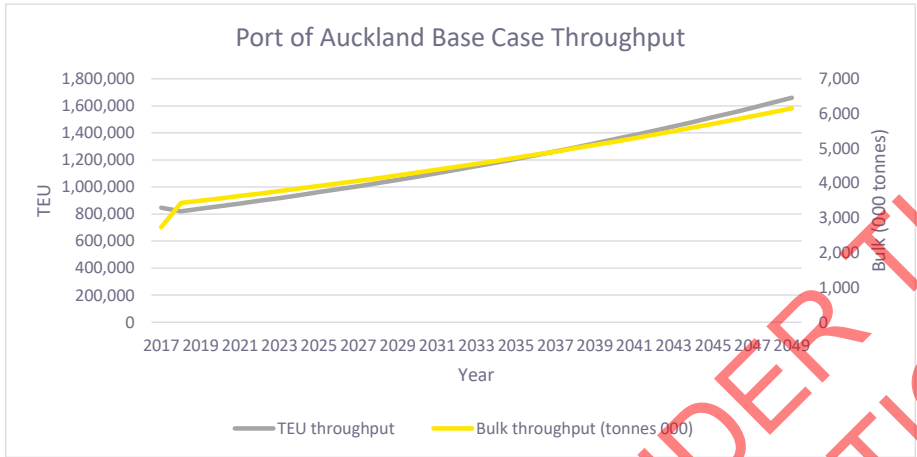
The logistics and supply chain in Auckland is dominated by a port located in the CBD, and major freight hubs to the south of the city. The North-South strategic transport network comprises State Highway 1, State Highway 20 and 16, the North Island Main Trunk railway line and the North Auckland Railway Line. This land-side network is supported by a number of key East-West routes and strategic connections.

From a ports perspective, POAL primarily imports various goods for distribution within the Auckland region. POAL is also the central importer of cars in the North Island, importing 297,678 cars in the 2018. Also of note is the cruise industry, benefiting from the CBD location of the Port. 2018 saw 108 ships with 272,060 visitors arrive at the Port.<sup>35</sup>

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<sup>35</sup> POAL Annual Report page 28

Freight volumes



Port investments

- Below plot shows the forecast container growth with the terminal limitations highlighted
- This shows that there is sufficient terminal area (shown in blue above) to cope with the volumes if the mode of operations changes to ASC
- Based off the 30,000 TEU/Ha metric, POAL will reach maximum capacity at 2026, therefore implementation of ASC should occur prior to then, or cargo relocated elsewhere
- From the POAL masterplan website, POAL appear to have invested in Automated straddles which can stack containers 4 high as opposed to 3 high. This will increase the container density in the yard, however no further information could be gathered, therefore the 30,000 TEU/Ha assumption was still utilised
- Note: Fourth berth capacity does not take into account operational inefficiencies associated with a split terminal

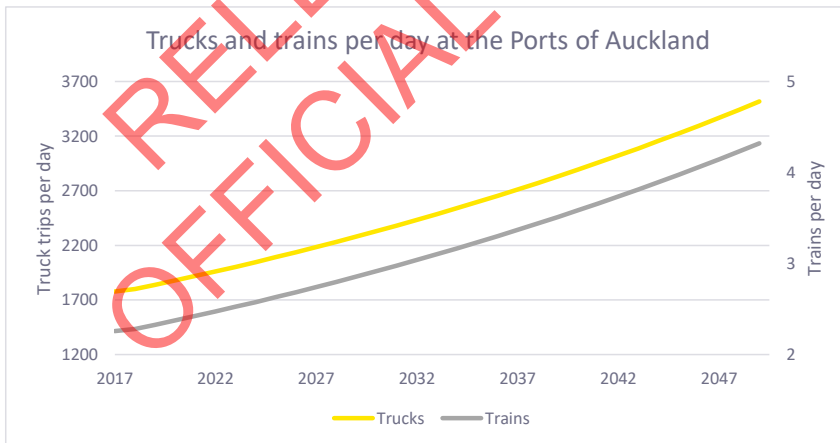


Cost estimates for port development

Ports of Auckland Base Case 2034				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	-	\$ -
	Reclamation	m3	0	\$ -
	Quay Wall	m	-	\$ -
	Rail		0	\$ -
Container Facilities	Pavement and utilities	Ha	23.1	\$ 133,209,251.98
	Quay Cranes	ea	4	\$ 90,720,000
	ASC	ea	14	\$ 296,940,000
	AutoStrad	ea	0	\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
			Total	\$ 520,869,252

Ports of Auckland Base Case 2049				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3		\$ -
	Reclamation	m3	0	\$ -
	Quay Wall	m	300	\$ 29,925,000
Container Facilities	Pavement and utilities	Ha	9.5	\$ 55,048,441
	Quay Cranes	ea	4	\$ 90,720,000
	ASC	ea	6	\$ 127,260,000
	AutoStrad	ea	0	\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
			Total	\$ 302,953,441

The road and rail network



### 4.1.2.3 Tauranga and the Western Bay of Plenty

Tauranga in comparison to Auckland and Whangarei has a comparatively high volume of freight entering and exiting the region (and port) via rail, at nearly 50 percent in terms of port entry. This can be accounted for by a rail link from Metroport (Auckland freight hub) and the East Coast Main Trunk Line which carries imports and exports to and from the Port.

Tauranga may in future face freight-driven congestion problems similar to that of Auckland. The following map from the 2013 Tauranga Urban Network Study projects future areas of congestion.

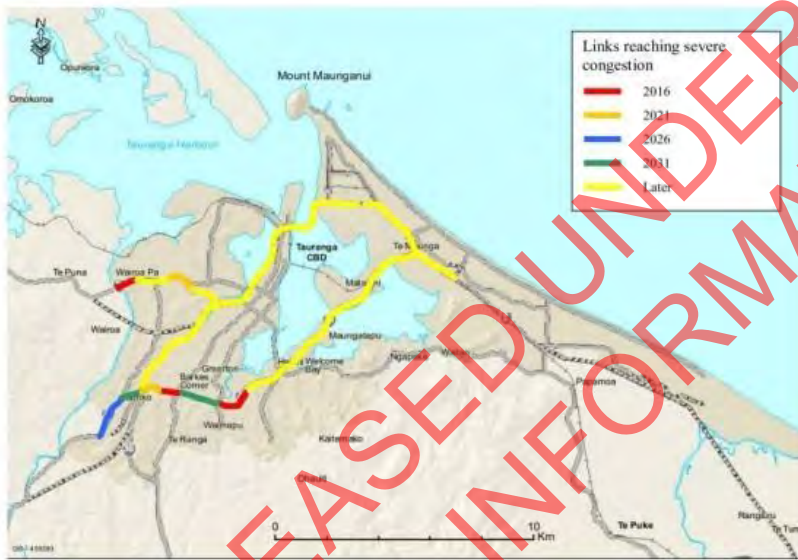


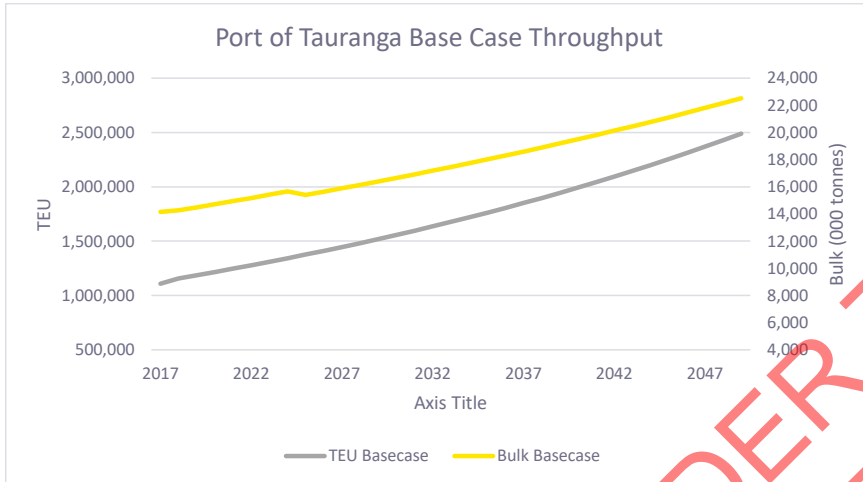
Figure 4-9: Links reaching severe congestion on the TUNS network

The central state highway corridors for Port of Tauranga freight movements are 1, 2, 26, 27, 29 and 29A. Planned improvements on these state highways include the Tauriko Network Plan. The Business Case plans to maintain a freight travel time of 10 minutes on State Highway 29 to Omanawa Road to 2030.

Port of Tauranga (POT) has locations in both Mount Maunganui and Tauranga. Port of Tauranga handles the highest volume of freight of all New Zealand ports. Port of Tauranga is driven by exports, with a high volume of logs and dairy leaving the port. The Port has seen an increase in dairy exports after making a deal with Kotahi, the logistics company owned by Fonterra Cooperative Group and Silver Ferns Farms<sup>36</sup>. Now the Port handles most of the North Island's dairy exports.

Freight volumes

<sup>36</sup> <https://www.nbr.co.nz/article/port-tauranga-ties-97-north-island-dairy-exports-after-coda-deal-b-177636>



**Port investments**

- The figure below shows the forecast container growth with the terminal limitations highlighted
- This shows that terminal is operating close to maximum throughput (excluding any efficiencies gained by intermodal terminals) and that investment in automation should already be occurring
- Even with the mode of operations changed to ASC, the forecasted throughput will still exceed available land, therefore either further efficiencies are required as mentioned in 2034, or additional land is required (shown in orange in above image)
- The construction of the Northern Breakwater wharf provides a larger throughput due to the available length allowing for multiple vessels to berth. However, there is a possibility even construction of this wharf may not provide enough throughput capacity by 2049

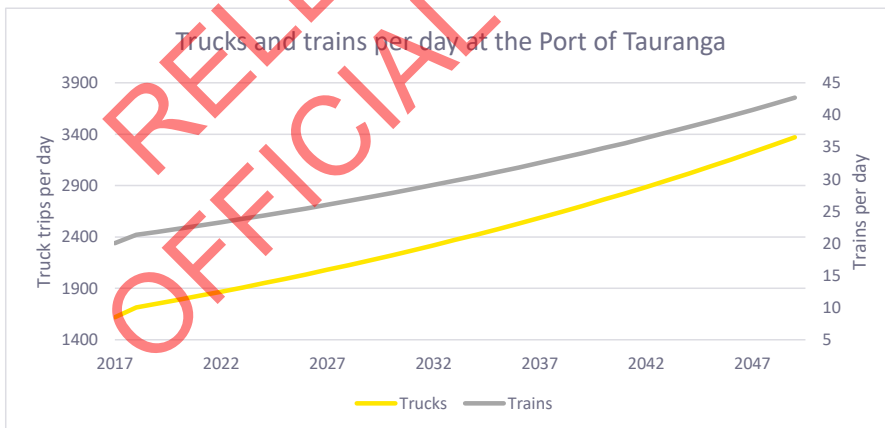


**Cost estimates for port development**

Tauranga Base Case 2034				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	334,400	\$ 8,778,000
	Reclamation	m3	0	\$ -
	Quay Wall	m	380	\$ 36,645,000
	Rail		0	\$ -
Container Facilities	Pavement and utilities	Ha	32.3	\$ 186,656,790
	Quay Cranes	ea	6	\$ 136,080,000
	ASC	ea	20	\$ 424,200,000
	AutoStrad	ea	0	\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
			Total	\$ 792,359,790

Tauranga Base Case 2049				
	Item	Unit	Amount	Total (NZD)
Port	Dredging	m3	750,000	\$ 19,687,500
	Reclamation	m3	0	\$ -
	Quay Wall	m	460	\$ 43,365,000
Container Facilities	Pavement and utilities	Ha	14.5	\$ 83,677,905
	Quay Cranes	ea	6	\$ 136,080,000
	ASC	ea	9	\$ 190,890,000
	AutoStrad	ea	0	\$ -
Log Facilities	Pavement	Ha	0	\$ -
				\$ -
Car Facilities	Pavement	Ha	-	\$ -
				\$ -
			Total	\$ 473,700,405

The road and rail network



## 4.2 Conclusion from Base Case

The Base Case critically hinges on the assessment of whether critical parts of the logistics and supply chain, in any part of the Upper North Island region will reach capacity, either on the port side, land side or a combination of both. Should this be the case then the Base Case effectively delivers the following scenario:

- 1 Ports can remain on their current footprints but may have their total handling capacity capped
- 2 A significant additional port investment, with supporting land-side infrastructure, outside of a constrained location will need to be made to take marginal freight growth over and above any capacity cap
- 3 As freight continues to grow (in line with the growth trends outlined in the National Freight Demand Study), the affected locations share of the total freight task will diminish and other UNI ports will grow
- 4 Opportunity costs will be material:
  - a The base case entails all ports remain on their current sites, so no potential value uplift from alternative land use will occur
  - b Investment in the land-side transport network to support the growth of freight up to the cap would continue to be required

The assumption around capacity is demonstrably material to the outcome of the analysis around the scenarios. Effectively a constrained Base Case results in all the costs of a land side and port development, without any offsetting benefits. An unconstrained base case would require the value of the any offsetting benefits in the modelled Scenarios to be greater than the costs of a lengthening of the logistics chain and the additional infrastructure investment.

The analysis undertaken shows that the main (in some cases sole) driver of the need for capacity to deal with growth at the UNI ports is growth in containers.

For Auckland, the analysis shows that there is sufficient terminal area (shown in blue in the figure below) to cope with growth in the study period if the mode of operations changes to ASC (automation).

Based off the 30,000 TEU/Ha metric, POAL will reach maximum capacity at 2026, therefore implementation of ASC should occur prior to then<sup>37</sup>. It is estimated that POAL would need to spend circa \$500M to upgrade to the level of automation required to cope with the TEU growth, prior to 2026. Our estimate is that a total spend of more than \$800M at POAL over the next 30 years would be required to deal with growth.

<sup>37</sup> From the POAL masterplan website, POAL appear to have invested in Automated straddles which can stack containers 4 high as opposed to 3 high. This will increase the container density in the yard, however no further information could be gathered, therefore the 30,000 TEU/Ha assumption was still utilised. Note: Fourth berth capacity does not take into account operational inefficiencies associated with a split terminal.





However, the major constraint with in Auckland is landside. The increase in volumes through the port (more than doubling truck trips over the next 30 years) will have land-side transport impacts on a part of the network that is already congested, becoming more congested, and increasingly subject to plans and designs to create routes that favour pedestrians, cyclists and public transport.

Even in 2034, the growth equates to 2.6 truck trips per minute, or one every 23 seconds (one every 16 seconds in 2049). Notwithstanding the difficulties in getting all these vehicles in and out of the Port gates, and assuming that the heavy haul industry is prepared to work through the night, these are unrealistic volumes on networks that are only becoming more congested. While the role of rail at POAL could be increased, given the relatively conservative assumptions made around the ratios between freight volumes and trips, it is clear that certainly in the second 15 years, if not prior to 2034, through no fault of its own the Port of Auckland will hit a hard capacity constraint on movement of freight to and from the port.

It is highly unlikely that the land connections to the Port of Auckland can be upgraded sufficiently in order to keep up with the productivity improvements at the Port.

The Port of Tauranga is already operating close to theoretical maximum throughput (excluding any efficiencies gained by intermodal terminals) and investment in automation is becoming an imminent necessity. The summary diagram below shows that even with the mode of operations changed to ASC, the forecasted throughput will still exceed available land, therefore either further efficiencies are required, or additional land is required (shown in orange in below image).



The construction of the Northern Breakwater wharf provides a larger throughput due to the available length allowing for multiple vessels to berth. We estimate that the Port of Tauranga will need to spend more than \$1.2B over the next 30 years to keep up with forecast growth.

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## 5. Scenario Descriptions

Scenarios have been developed to test a range of potential economic, social and environmental impacts for alternative logistics and supply chains in the Upper North Island. It is important to stress that these scenarios are materially distinct from what would traditionally be referred to as an “Option” in that they are representative of a range of possible permutations in what is a complex and responsive freight, transport and land use environment where there are a range of owners, investors, users and stakeholders.

The Working Group have outlined a number of principles to be taken into account in designing the Scenarios. The main principle is that the role of the Working Group is not to ‘decide where the freight goes’, but instead to provide guidance on the development of infrastructure and organisational frameworks that would enable the freight to move differently than it does now. ‘Success’ will be a strategy for investment in and development of UNISC infrastructure that improves freight outcomes as well as social, cultural and economic outcomes.

In this context, the following priorities have guided the development of the Scenarios:

- ▶ Resilience of the supply chain: The strategy must provide confidence that the UNI supply chain has a built-in ability to continue to move freight as required in the event of a natural disaster or other event that impacts one or more areas in the UNI.
- ▶ Cost efficiency in moving freight: NZ’s economy is highly dependent on moving freight both internally and externally, and as such the strategy must create an environment that over time seeks to keep the costs of moving that freight as low as possible (while ensuring that all costs are covered).
- ▶ Maintaining, if not enhancing, levels of competition in the UNISC: One of the best drivers of innovation and cost effectiveness is a competitive market, and the Working Group is conscious that appropriate levels of competition between different providers in the supply chain need to be preserved – but also note that this needs to be balanced against the risk of over-provision of costly infrastructure in our relatively small country.
- ▶ Reducing ‘friction’ between freight and other modes/areas: For reasons of both amenity and efficiency, the strategy will where possible favour the provision of infrastructure that removes freight traffic from impacting on public areas and reduces the interaction between freight vehicles and private vehicles.
- ▶ Contributing to overall government objectives, with a particular focus on priority for the development of rail, improving road safety outcomes, contributing to achievement of the net zero greenhouse emissions reduction targets and economic development of the regions, and in particular Northland (in line with the Terms of Reference).
- ▶ The potential to increase the efficiency of capital for the owners of port and land side infrastructure through optimisation of both the supply chain and land use.

### 5.1 Long list scenario development

Within these principles, Scenarios were developed that offer a mix of:

- ▶ Ports: While this assessment is about the entire logistics and supply chain, the scenarios have used a port-centric approach as an organising principle. Consideration has been given to Northport, Port of Tauranga, a combination of both and potentially a “Super Port” independent of the existing 3 ports.
- ▶ Freight types: The impact of both a full and partial move.
- ▶ Time: The speed at which any move could be undertaken.

This has resulted in the development of two headline scenarios of a Partial Move and a Full Move of the Ports of Auckland.

A Partial Move involves consideration of the movement of the car imports in a short- to medium term horizon to either the Northport or Port of Tauranga.

The Full Move scenarios mirror this approach, but also include a combination of the Ports, as well as a new Super Port. While a full move is discussed, a critical assumption is the Ports of Auckland will continue to exist and Auckland will continue to have a working waterfront. The activities of POAL would be focussed on servicing the cruise industry and potentially a range of other maritime activities.

Due to the base case conclusion, the scenarios were investigated and modelled on the basis of a rapid response of 5 and 15 years.

Within each of these headline scenarios, different locations were considered, as shown in the diagram below:

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### BASE CASE

#### NO INTERVENTION

- Establish maximum capacity and growth
- Establish ongoing costs
- Managing POA's growth elsewhere



### SCENARIO 1

#### PARTIAL INTERVENTION

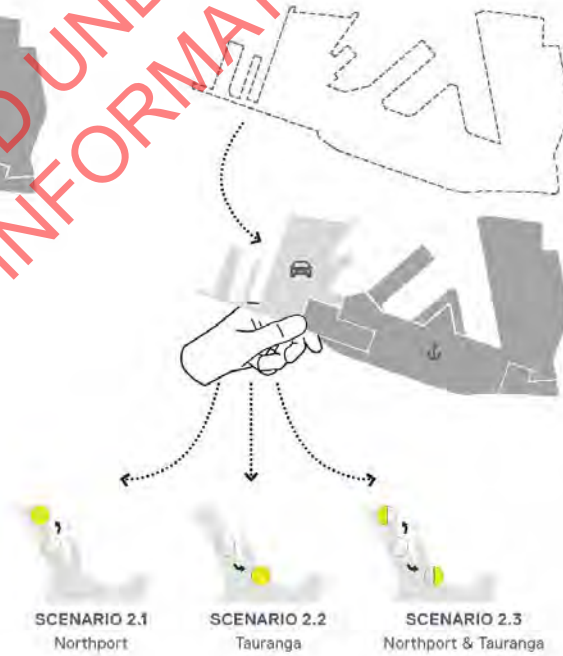
- Establish Container terminal at Northport
- Partial removal of port functions (probably at western end)
- Phased POA land development at Western end



### SCENARIO 2

#### FULL INTERVENTION (EXCEPT CRUISE FACILITY)

- Simultaneous development of Northport, decommissioning of POA and POA land development



- Vehicles
- Cargo / Marine Services

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## 5.2 Long list to short list of scenarios

In considering the long list a combination of multicriteria analysis and intervention logic were deployed. The intention of this process is to take the long list of scenarios down to a smaller number for a fully monetised assessment.

### 5.2.1 Multicriteria Analysis

The Working Group performed Multi-Criteria Analysis (MCA) on the scenarios above, examining the economic, social, cultural and environmental impacts of each. The use of MCA is a standard tool for shortlisting from a long list to a short list. This MCA included consideration of contemporary research, including the results of a Colmar Brunton survey commissioned by the Working Group earlier this year. Scores were given for the impact of each scenario on:

- ▶ Employment opportunities
- ▶ Investment returns
- ▶ Congestion, reliability and friction between modes
- ▶ Supply chain resilience
- ▶ Public amenity and friction between infrastructure users
- ▶ Attractiveness for visitors, residents and workers
- ▶ Quality of urban form and design
- ▶ Support for iwi, hapu and other cultural values
- ▶ Consistency with the Principles of the Treaty of Waitangi
- ▶ Contribution to Treaty Settlements (current and future)
- ▶ Marine and land pollution
- ▶ Noise and visual pollution
- ▶ Contribution to climate change objectives (e.g. Greenhouse Gas Emissions)
- ▶ Sensitive environmental areas (e.g. protected biodiversity)

This qualitative analysis was complemented by a high-level assessment of capital cost, highlighting significant differences in the fiscal impacts of each scenario.

This qualitative exercise made clear that some scenarios were much more desirable than others. Sensitivity testing confirmed that this result was robust to a number of assumptions, including different weightings across factors and two different time horizons. The results, as presented below, were the results of the Working Group's feedback, but the sensitivity testings have confirmed that while the quantum of the scoring can change, the relativities between the options do not from a qualitative perspective.

A key finding was that the 'Base Case' of POAL continuing to operate freight, cars and cruise facilities at its current site performed worse than most of other alternative scenarios considered. Significant capital investment will be required under this approach, both to maintain downtown Auckland, and to develop other Auckland sites should POAL reach capacity.

	Base Case	Scenario 1.1 - Northport, cars Only	Scenario 1.2 - Tauranga, cars only	Scenario 2.1 - Northport, full move	Scenario 2.2 - Tauranga, full move	Scenario 2.3 - Northport & Tauranga, full move	Scenario 2.4 - New Port in Firth of Thames
Multi-Criteria Analysis Score: Weighted							
Multi-Criteria Analysis Score: Unweighted							
Estimated capital cost: Total (\$m)		65	68	1,776	3,526	3,417	3,370

The full scoring of the Multicriteria analysis is included in Appendix 1.

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## 5.2.2 Applying an Investment Logic to Shortlist Scenarios

Following this MCA the options were shortlisted using a simple investment logic:

- 1 Can the scenario realistically deliver a workable alternative logistics and supply chain from both the port side and land side perspective?
- 2 Can the scenario deliver such an alternative within an acceptable time period?
- 3 Is the scenario able to deliver the alternative at a capital cost that represents better value for money than other scenarios?

On this logic, the “Full Move - Tauranga Only” and the Super Port scenarios were not taken forward to a short list

### Full Move - Tauranga Only

The Tauranga Only scenario effectively entailed an increased reliance on a logistics and supply chain focussed on meeting the Upper North Island’s needs through an almost exclusively Sothern solution. This reduced resilience in the UNI Supply Chain, compared to the current situation, and was materially more expensive than options that diversified the supply chain. This was due to the need to invest in the land side infrastructure to address the significantly increased freight volumes through the Bay of Plenty, Waikato and South Auckland.

### Super Port Scenario

The Super Port scenario was discounted from detailed consideration and further development for the following reasons:


- ▶ A Super Port would only be required if it was considered that the combination of existing, established ports could not deliver on the requirements for the logistics and supply chain in the Upper North Island. There is no evidence to suggest that the combination of existing ports could not meet the supply chain needs.
- ▶ The costs of development of a brand new port serviced by a land side logistics and supply chain are significantly higher than all alternative scenarios. The high capital costs apply to both the development of a new port (\$5+ billion) and new land-side road and rail links (\$2+ billion).
- ▶ There are likely to be challenges around gaining resource consent to develop a new port in the Firth of Thames. Any development would require a coastal permit, with consideration of the impacts of reclaiming part of the foreshore or seabed, constructing a structure in, on, under, or over any foreshore or seabed, disturbing the seabed (e.g. by excavation or dredging) and the occupation of part of the common marine and coastal area. Consent for up to 50km of new road and rail corridor (some of which would traverse the Tapapakanga Regional Park) would be required, along with careful consideration of iwi cultural values and concerns relating to the site (although there would potentially be trade-offs with the potential freeing up of the current Waitemata Harbour site, which is of high significance). Also of strong concern would be shipping impacts on established (and growing) marine farm developments in the Hauraki Gulf and Firth of Thames. This consideration would take place in an environment in which alternatives such as developing NorthPort or expanding the Port of Tauranga exist, potentially at lower cost than developing a new port. Whether or not consent would be attainable is uncertain, but what is certain is that the process would be long and costly.

The non-progression of this scenario is not a discounting of this as an option. Ownership structures mean that a decision to advance a Super Port could be made by port owners. It has been discounted as a scenario to be modelled as it is felt that other scenarios are sufficient to understand whether there is the potential to deliver an economically better-performing logistics and supply chain (with associated economic development impacts) approaches.



### 5.3 Shortlisted Scenario Analysis Overview

#### Scenario 1.1: Partial move to Northport

	Infrastructure	Costs (\$000,000, non-discounted)	
<p>Port Infrastructure and Logistics hubs/Distribution Centres</p> 	<ul style="list-style-type: none"> <li>▶ Limited investment to provide yard space for cars at NorthPort</li> <li>▶ Assume that all cars go on rail</li> </ul> <p>Constraints:</p> <ul style="list-style-type: none"> <li>▶ Will have to develop wharf to accommodate RoRo vessel and vehicle operations</li> <li>▶ Develop dedicated road access from wharf to vehicle staging area (doubtful use of public roads will be possible due to customs, security and congestion)                             <ul style="list-style-type: none"> <li>▶ Will require shuttle to transport stevedores back to vessel</li> </ul> </li> <li>▶ Have assumed new car hardstand is required to reduce interference with existing port operations</li> </ul>	<p>Construction of car hardstand at Northport</p>	<p>\$28.8M (estimate)</p>

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Infrastructure				Costs (\$000,000, non-discounted)	
<b>Moving cars to Northport 2034</b>					
		Base case		Costs of moving cars to Northport	
	Unit	Amount	Total cost	Amount	Total cost
<b>Port</b>					
Dredging	m3	0 \$	-	0 \$	-
Reclamation	m3	0 \$	-	0 \$	-
Quay Wall	m	0 \$	-	0 \$	-
<b>Container Facilities</b>					
Pavement and utilities	Ha	0 \$	-	0 \$	-
Quay Cranes	ea	0 \$	-	0 \$	-
ASC	ea	0 \$	-	0 \$	-
AutoStrad	ea	0 \$	-	0 \$	-
<b>Log Facilities</b>					
Pavement	Ha	0 \$	-	0 \$	-
<b>Car Facilities</b>					
Pavement	Ha	0 \$	-	5.3	28,770,000
<b>Total cost</b>			\$ -		\$ 28,770,000
<b>Marginal cost</b>					\$ 28,770,000
<b>Moving cars to Northport 2049</b>					
		Base case		Costs of moving cars to Northport	
	Unit	Amount	Total cost	Amount	Total cost
<b>Port</b>					
Dredging	m3	0 \$	-	0 \$	-
Reclamation	m3	0 \$	-	0 \$	-
Quay Wall	m	0 \$	-	0 \$	-
<b>Container Facilities</b>					
Pavement and utilities	Ha	0 \$	-	0 \$	-
Quay Cranes	ea	0 \$	-	0 \$	-
ASC	ea	0 \$	-	0 \$	-
AutoStrad	ea	0 \$	-	0 \$	-
<b>Log Facilities</b>					
Pavement	Ha	0 \$	-	0 \$	-
<b>Car Facilities</b>					
Pavement	Ha	0 \$	-	1.8	9,770,000
<b>Total cost</b>			\$ -		\$ 9,770,000
<b>Marginal cost</b>					\$ 9,770,000

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