

Technical Report 9

Traffic Design Group – Traffic Assessment



Wellington International Airport

Proposed Runway Extension

Transportation Assessment Report

April 2016

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Construction Traffic Management Plan Framework

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1. Introduction

Wellington International Airport Limited (**WIAL**) has engaged Traffic Design Group Limited (**TDG**) to examine and assess the transportation planning effects arising as a consequence of its proposal to extend its existing airport runway.

This assessment is based on the project description provided by the overarching application. Due to the scale of the proposed works, this report has a particular focus on the likely extent and nature of the construction related transport effects and assumes a worst-case scenario in respect of the volume of material that may need to be transported by road direct to the site. In the event then that more material is marine sourced, the road transport volumes and associated effects will be less than assessed.

The principal traffic engineering and transportation planning considerations involved include the following:

- movement and number of construction vehicles to and from the site;
- types of haulage vehicles likely to be used, and the practical travel time for trucks to transport material to site;
- access requirements and provisions, including the suitability of existing roads;
- the transportation of over-dimension and over-weight loads;
- transportation route characteristics;
- traffic volume data on the state highways and the local road networks;
- road safety;
- local road and intersection capacity and adequacy;
- the need for mitigation improvements;
- construction traffic management planning; and
- post-construction transportation demands.

The relevant provisions of the regional and national transport Plans are addressed, as is WIAL's 2030 Masterplan, with a view to presenting the future context.

An earlier draft version of this report was prepared for the purposes of public consultation held through the period November 2015 to February 2016. Some responses expressed concerns as to the transportation effects during construction, and operational traffic effects following construction. The feedback received has led to a full review of road transport considerations, with new road routes recommended for truck haulage during construction, and traffic demands post-construction identified.

Key conclusions of this report are that:

- the existing state highways and urban road networks are capable of supporting all construction related traffic subject to the implementation of a Construction Traffic Management Plan (**CTMP**);
- haulage operations on public roads shall not occur during the weekday morning and afternoon peak hour traffic periods in order to avoid any adverse traffic related impacts

during these time periods. In a similar manner, no haulage related transportation will occur on the road network on weekends. Haulage times will be:

- 9:30am to 2:30pm weekdays; and
 - 10:00pm to 6:00am weekdays.
- inbound haulage trucks will use a southbound route through the airport precinct, following Stewart Duff Drive, with the corresponding outbound route returning through the airport precinct during night time haulage hours and using Principal Roads on the west side of the airport during day time haulage hours;
 - day time truck numbers will be limited by available road capacities, to a maximum of 30 trucks per hour between 9:30am and 2:30pm on weekdays, with outbound movements managed at the site exit to one truck every two minutes. Night time truck numbers will be limited to manage noise effects, with a range of maximum volumes between 5 and 30 trucks per hour determined to be appropriate between 10:00pm and 6:00am weekdays, as shown at Table 6 to follow in this report. There will be a maximum total daily volume of 310 trucks, noting that truck movements will vary considerably below this maximum through the construction programme;
 - the CTMP will provide controls for the operational requirements of all construction related traffic travelling to and from the construction site, including driver protocols; and
 - the passenger increases forecast following construction of the runway extension will give rise to airport-related road traffic increases that can be regarded as minor.

With these arrangements, construction, operation and maintenance of the proposed runway extension can be achieved in a manner that would not unduly compromise the function, capacity and safety of the road network.

The fuller findings and conclusions reached in this report should be read in conjunction with the Construction Methodology Report that sets out the detail of the planned construction and methodology, and informs the assessment of temporary transportation effects associated with construction of the runway extension.

2. The Runway Extension Project

WIAL has identified a need to extend its existing runway to provide a take-off length of at least 2300 metres, to accommodate larger passenger aircraft so as to enable Wellington International Airport to link directly with overseas long haul destinations and improve operating restrictions for other aircraft.

The proposed works involve the extension of the existing runway on reclaimed land at Lyall Bay, at the airport's southern end. Construction is expected to be completed by a combination of land and marine based methods which will become more clear as construction planning is refined.

For this transportation assessment however, the approach has been purposefully conservative, and assumes a worst-case scenario in respect of the volume of material that may need to be transported by road direct to the site.

Full details of the construction methodology are set out in the Construction Methodology Report. Broadly, the methodology involves the establishment of a rock dyke around the full perimeter of the runway extension and filling to create a reclaimed land platform inside the rock dyke. The rock dyke and reclamation are expected to be constructed with imported fill sourced from local quarries and/or combined with dredged material. Primary armouring will also be placed on the periphery of the reclamation. This will involve the construction of concrete accropods which, for the purposes of this report, have been assumed to be either batched on-site or barged to site.

It is anticipated that the reclamation will require compaction and settlement, involving a period of surcharging by the placement of additional fill material to expedite its compaction. Once the surcharging is complete, the additional fill material will need to be transported off site prior to the construction of the sealed runway and the installation of other associated runway infrastructure.

The proposed runway works also involve bridging over Moa Point Road as a first stage of works, in a way that will initially provide for internal access to the runway construction site, and ultimately extension of the taxiway. Temporary and permanent alterations will be made to parts of Moa Point Road to facilitate the bridging, with the roading changes designed and constructed to match the existing carriageway standards. Moa Point Road is to remain accessible to the public and also construction traffic throughout the proposed construction period, albeit with some traffic management at times.

Site compounds, including site offices, amenities, storage for plant and equipment, and parking for construction staff and construction vehicles are proposed to be established on both sides of the existing runway.

Table 1 indicates the volumes of materials anticipated to be required for all of the described works, referenced to the construction stages set out in the Construction Methodology Report. The expected source and mode of transport is also provided.

Construction Stage	Work Activity	Quantity m ³ (Solid in Place)	Mode of Transportation (and Alternatives)
	Site Compound Aggregate	1,000	Direct to site on road
	Moa Point Road and Bridge	2,000	Direct to site on road
A	Stone Columns	40,000	Direct to site by barge
B	Stone Blanket	56,000	Direct to site by barge
C	Rock Dyke Core	163,000	Direct to site on road
D	Filter Material	48,000	Direct to site on road
E/F	Secondary Dyke Armour	137,000	Likely sourced from Nelson area and barged to site
E/F	Primary Dyke Armour (prefabricated)	152,000	Materials transported direct to site then batched and placed, or prefabricated units barged to site
H	Fill	850,000	Direct to site on road, or
			From dredge
I	Wave Wall (prefabricated)	980 lineal metres	Direct to site on road
J	Surcharge Material	200,000	Direct to site on road, or
			From dredge
K	Surcharge Removal	200,000	Direct from site on road
K	Runway Aggregates	13,000	Direct to site on road
K	Asphaltic Cement (Runway and Taxiway)	13,000	Direct to site on road

Table 1: Construction Quantities and Transport Options

As indicated, there is potential for a significant volume of land based material to be trucked to the site, while other materials may be excavated from marine sources and / or directly barged.

It is estimated (at most) that approximately 1.5Mm³ of material would be transported by trucks directly to site. While this total volume of material is relevant, in terms of overall construction timeframes, this assessment has concentrated on determining transport limitations, and management thereof, in relation to the material source, road transport, and site restrictions, through the approximate 3-4 year construction period.

In order to transport the above quantities by road, this assessment has anticipated that truck and trailers will predominately be 23m long High Productivity Motor Vehicles (HPMV's). Such trucks can typically carry up to 20m³ of loose material. As is explained in more detail later in this report, conservative cartage quantities of 18m³ per truck have been adopted when assessing the likely volumes of material to be transported, to take account of possible variations in truck loads and the potential for standard truck and trailers to also be used in combination with HPMV's.

The supply of the majority of the rock and fill material is expected to be sourced from land quarries. Two local quarries have been identified as being the most likely sources of most

of the required rock dyke and fill material, involving Kiwi Point (a Holcim managed quarry at Ngauranga Gorge) and the Horokiwi Quarry south of Petone.

Initial enquiries have indicated that the Kiwi Point and Horokiwi quarries are both able to supply the volume of materials required for the runway extension and related works, and that the materials at these sources are of the appropriate quality required. Both quarries are also understood to have the appropriate resource consents and have no current limitations on their hours of operation or on the quantities they are able to extract.

Further discussions have confirmed that each quarry could manage the loading and site operational requirements of up to 30 trucks per hour. The two quarries may be relied on in tandem to provide the required material. As set out in a subsequent chapter of this report, the combination of these two quarries can provide material at a rate approximately double the maximum required at peak construction.

It is not expected that the construction works will require any more than 50 staff on the site at any one time to fulfil all of the daily construction tasks including (but not necessarily limited to):

- on site construction supervision;
- operating construction machinery; and
- traffic management of arriving and departing trucks.

Staff will likely reside locally in Wellington and / or be temporarily accommodated nearby.

3. Location in the Road Network

Figure 1 identifies the location of Wellington Airport, the state highway and non state highway routes relevant for haulage, and the key locations for sourcing fill materials.

Wellington Airport is well connected and served by the state highway network. In addition, and of relevance to the anticipated transport routes, Wellington City Council (**WCC**) is responsible for the urban road networks that link with the state highway routes within the proximity of the airport.

Figure 2 illustrates the fuller roading hierarchy for the southern area of Wellington City, as defined by the Wellington City District Plan. It shows SH1 variously as a defined route in its own right as well as an Arterial Road for the eastern sections following Ruahine Street, Wellington Road, Cobham Drive and Calabar Road. The route around the south coast, including Moa Point Road and Lyall Bay is then classified as a Principal Road, together with Onepu Road, Evans Bay Parade, Troy Street and Rongotai Road to the west of the airport.

The State Highways, Arterial Roads and Principal Roads form the primary road network. A series of Collector Roads (including Tirangi Road, Coutts Street and Salek Street on the western side of the airport) and the remainder of the network as Local Roads form the secondary road network.

In this location, the intended construction site is well positioned with respect to road options available for transporting construction materials.

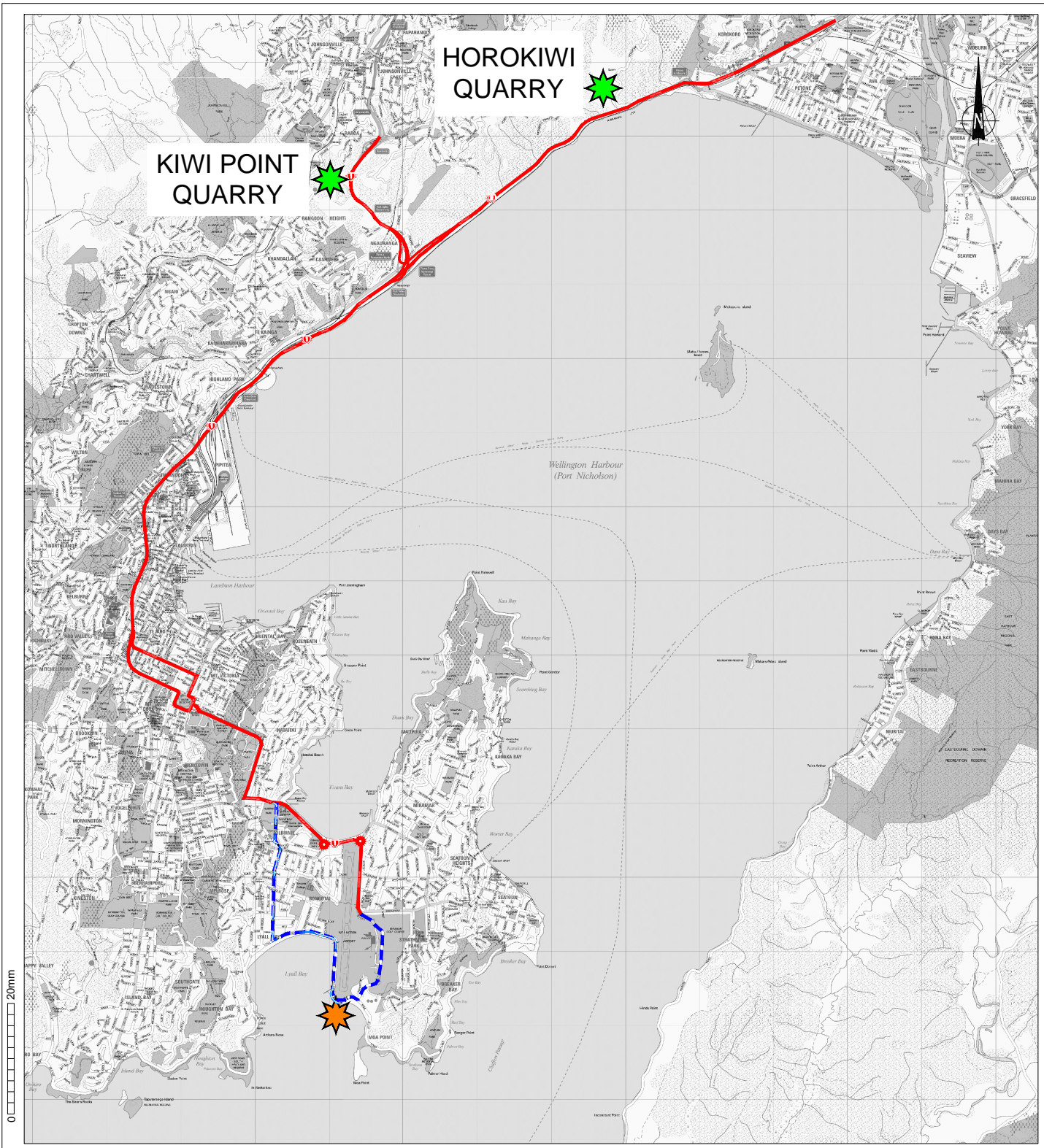
Most heavy construction equipment and over-dimensioned loads will be delivered to the site using State Highway 1 (**SH1**) and State Highway 2 (**SH2**) and other defined overdimensioned routes described in Chapter 6 of this report.

As conservatively assumed for this assessment, the vast majority of the materials will be transported by road to the proposed construction site from the existing quarries located at Kiwi Point (Ngauranga Gorge) and Horokiwi (south of Petone), with transportation routes centred principally on SH1 and SH2.

The road transport routes to be used by construction related traffic for the runway extension are proposed to involve the following roads to and from the two identified quarries:

- SH2 (connecting with SH1 at Ngauranga Gorge);
- SH1 from Ngauranga Gorge to Cobham Drive and Calabar Road;
- then requiring inbound (southbound) transportation through the airport precinct, and outbound (northbound) transportation through the airport precinct at night time and via Principal Roads on the western side of the airport during day time.

Trips by construction workers, sub-contractors, and routine deliveries will be made to and from the site compounds and the site directly, via the public roading network and Stewart Duff Drive.



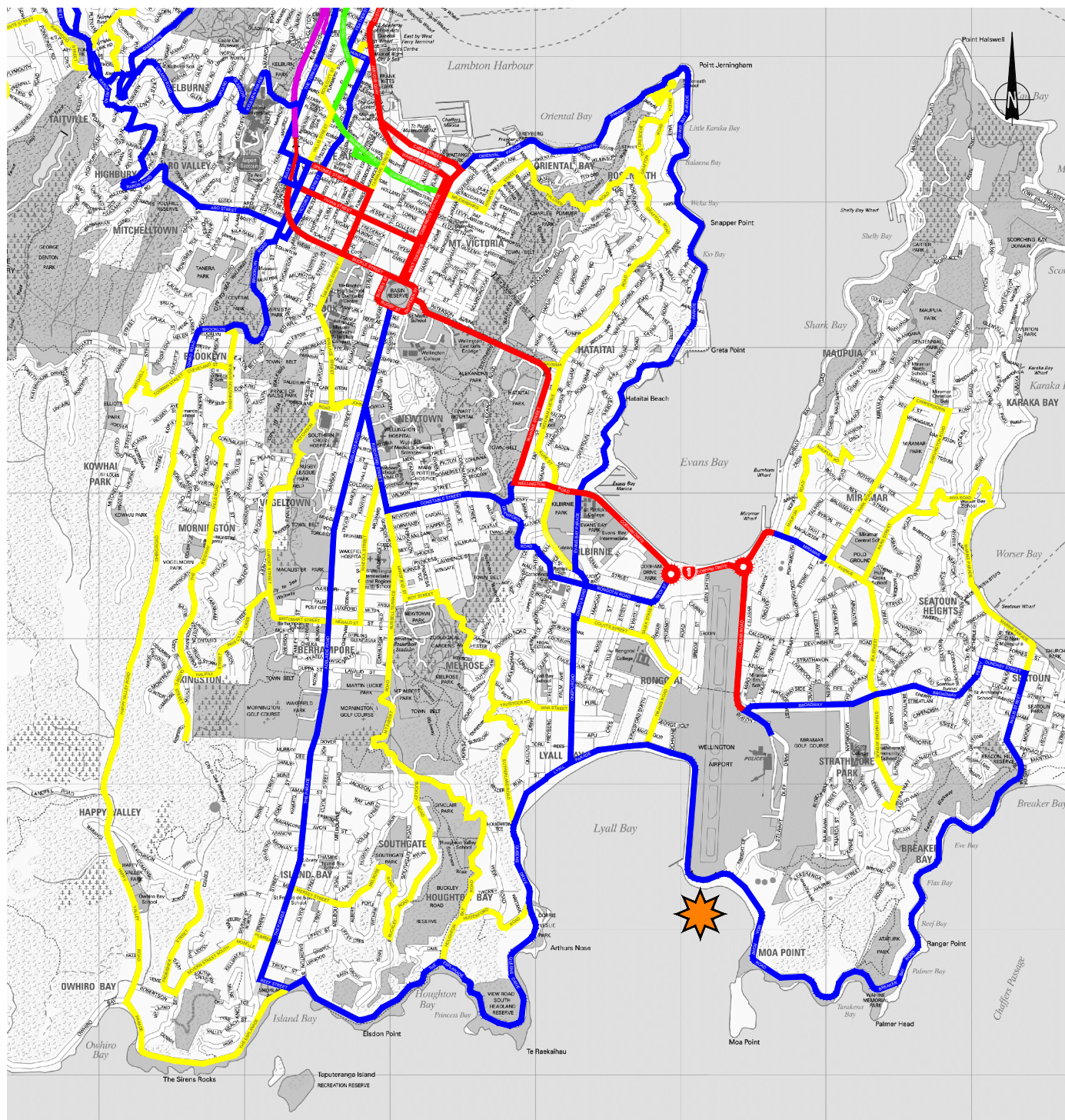
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Tuesday, 12 April 2016

- State Highway Haul Routes
- - - Non State Highway Haul Routes

★ Site Location

Sourced from Terralink Street Maps



- Motorway
- Arterial Street
- Principal Street
- Golden Mile
- Collector
- Site Location

Sourced from ----

Wellington International Airport Proposed Runway Extension Road Hierarchy Plan



FIGURE
2

SCALE: 1:40000 @ A4

4. National, Regional and Airport Plans

4.1 Connecting New Zealand

'Connecting New Zealand' is a document that summarises the government's broad policy direction for the entire transport sector. It effectively supersedes the 2008 New Zealand Transport Strategy.

Connecting New Zealand sets out the government's plan for an effective, efficient, safe, secure, accessible and resilient transport system that supports the growth of the country's economy, to deliver greater prosperity, security and opportunities for all New Zealanders.

The government is focussed on three key areas to deliver on this overall transport objective. These are:

- economic growth and productivity;
- value for money; and
- road safety.

The document covers all modes, with transport having an important role to play in making domestic and international connections, to link and provide access to services, businesses, markets and economies. Airports, and their related transport networks, are recognised as key parts of the transport system to support efficient movement of passengers, goods, and exports and imports.

Extending Wellington International Airport's runway and the improvement it will make to the transport system, is well matched with the objectives and directions of Connecting New Zealand.

The Government Policy Statement (2015), or GPS, then outlines the government's strategy to guide land transport investment. It has an overall direction that aligns with Connecting New Zealand, *"to drive improved performance from the land transport system by focussing on economic growth and productivity, value for money, and road safety"*. The GPS provides guidance on how government plans to invest to achieve this direction, and informs Regional Land Transport Plans, as discussed next.

4.2 The Wellington Regional Land Transport Plan

The Regional Land Transport Plan (RLTP) 2015 sets out the strategic direction for land transport in the Wellington region.

The RLTP vision is *"to deliver a safe, effective and efficient land transport network that supports the region's economic prosperity in a way that is environmentally and socially sustainable"*. The related key strategic objectives are to have:

- a high quality, reliable, public transport network;
- a reliable and effective strategic road network;
- an effective network for the movement of freight;

- a safer system for all users of the regional transport network;
- an increasingly resilient transport network;
- a well-planned connected and integrated transport network;
- an attractive and safe walking and cycling network; and
- an efficient and optimised transport system that minimises the impact on the environment.

The RLTP includes a series of corridor plans, including for the Ngauranga to Airport **(N2A)** Corridor. This corridor extends from the Ngauranga interchange in the north, to the regional hospital in Newtown to the south, and to Wellington International Airport in the east.

The long term vision for the N2A Corridor is as follows:

“Along the Ngauranga to Wellington Airport Corridor, access to key destinations such as Centre Port, Wellington City CBD, Wellington Hospital and the International Airport will be efficient, reliable, quick and easy. Passenger transport will provide a very high quality, reliable and safe service along the Wellington City growth spine and other key commuter routes. The local street network will provide a safe, attractive and accessible environment for pedestrians and cyclists, particularly through the Golden Mile and Wellington City CBD. The strategic road network will provide an effective corridor through trips and access to key destinations, including freight trips. Traffic congestion through the corridor will be managed at levels that balance demand against the ability to fully provide for peak demand due to community impacts and cost constraints, and the provision of an efficient and effective public transport system. Maximum utilisation of the existing network will be achieved by removal of key bottlenecks on the road and rail networks.”

As above, priority and improvements are to be afforded in the corridor to facilitate reliable peak period travel and reduced congestion. Informed by these outcomes, this assessment has identified that the transportation of construction materials should avoid traffic peaks and rely on the availability of good road capacity and more reliable travel times during off-peak periods, in the way described through subsequent chapters of this report.

4.3 Wellington Airport’s Masterplan

WIAL’s 2030 Masterplan presents a framework for facilitating and responding to the airport’s projected growth and development.

The forecast of aircraft movements, worldwide, anticipates the introduction of progressively larger aircraft types. Better performance on Tasman routes and the opportunity to make direct flights to Asian destinations is anticipated, as is a runway extension, as now proposed.

Transport access to the airport is addressed, with travel time reliability identified to be of primary importance. Again, for reasons of ensuring travel reliability for not only passengers but also other commuters, and avoiding congestion, the transportation of construction materials on public roads to the site is proposed in a manner to avoid traffic peaks.

5. Existing State Highway Environment

TDG has completed route inspections of the various roads available for haulage trucks arriving at and departing from the proposed runway extension site.

For the transportation of fill material by road, SH2 (Petone to Ngauranga) and SH1 (Ngauranga to Cobham Drive and Calabar Road), are the relevant state highway routes.

5.1 SH2 (Dowse / Petone to Ngauranga)

This section of SH2 will be used by truck and trailer units transporting bulk fill material directly to the Wellington Airport (via SH1 to the south).

Available traffic data indicates that this section of SH2 typically supports 68,000 vehicles per day (vpd), involving some 2,800 heavy trucks. The weekday morning traffic peak occurs generally between 7:00am and 9:00am at a rate of up to around 6,000 vehicles per hour (vph). The weekday afternoon peak generally extends between 4:00pm and 6:00pm and involves a more concentrated peak volume of up to around 7,000vph.

Figure 3 provides a graphical representation of these traffic volumes on SH2, south of the Petone Interchange, and also provides a Saturday and Sunday traffic profile for comparison.

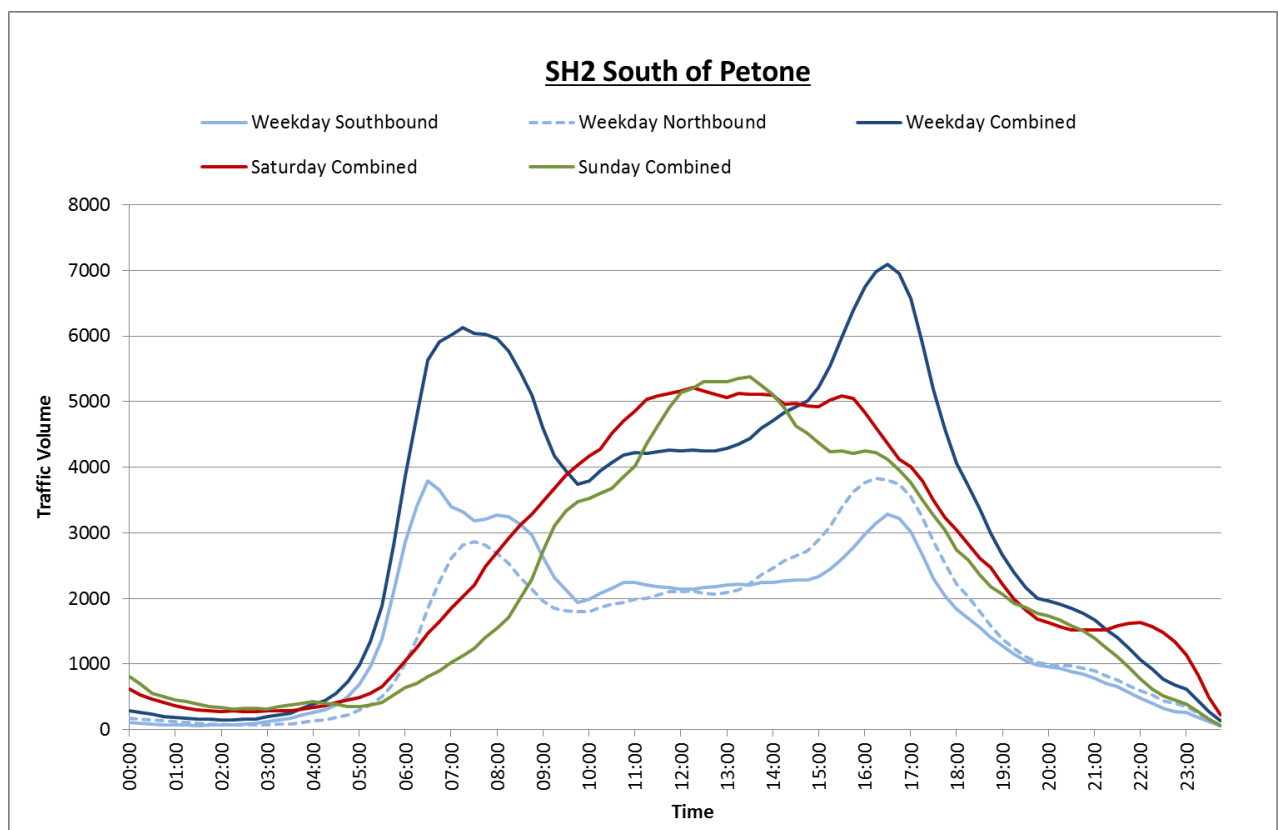


Figure 3: Traffic Volumes on SH2, South of Petone Interchange

Of relevance, the blue-coloured weekday profiles (southbound, northbound and combined) show significant AM and PM peaks corresponding to workbound and homebound

commuter demands, with substantially less traffic flows through the intervening period, which are also less than the corresponding weekend flows. Traffic congestion occurs during these weekday commuter peaks, when travel times are also less reliable and often widely different on different days.

This is one of the reasons for proposing that truck haulage of fill materials on public roads avoids these traffic peaks and instead occurs during the following transport windows:

- 9.30am to 2.30pm weekdays; and
- 10.00pm to 6.00am weekdays.

No truck haulage on public roads is proposed on weekends.

The existing local intersections that connect the Horokiwi Quarry with SH2, including turnaround facilities at the Petone and Dowse interchanges to the north, and at the Ngauranga interchange to the south, that support the left-in / left-out configuration of Horokiwi Road, serve the existing quarry traffic well and have been assessed to remain suitable to handle increased truck traffic, as already occurs in practice with routine fluctuations in quarry demands. No road improvements are required for SH2.

5.2 SH1 (Ngauranga to Cobham Drive and Calabar Road)

SH1 (including the Wellington Motorway) will be the principal travel route for trucks hauling materials to the proposed airport extension site. It follows the western side of Wellington Harbour and then traverses through Wellington City, around the Basin Reserve and then to Cobham Drive (via the Mt Victoria Tunnel) and terminates at the southern end of Calabar Road at Wellington Airport. It includes urban and motorway sections.

As expected for a state highway, the route is equally able to support trucks transporting materials and equipment to the proposed construction site, without the need for change.

The Kiwi Point Quarry is located on the western side of SH1 midway up Ngauranga Gorge. Access to this site only permits left-turn entry and left-turn exit movements. Accordingly, trucks intending to travel south from the site are required to first travel north and turnaround at the Newlands Interchange, as they routinely do in conjunction with the existing daily operations of the quarry.

Figures 4, 5, 6 and 7 confirm the typical weekday traffic volumes on SH1, taken at the following three separate locations:

- SH1 south of Ngauranga Interchange;
- SH1 through The Terrace Tunnel;
- SH1, Cobham Drive, west of Troy Street; and
- SH1, Calabar Road, south of Caledonia Street.

These selected traffic count sites appropriately cover the range of vehicular demands along this haulage route. Existing daily and heavy truck volumes are shown in **Table 2**.

Location	Daily Traffic Volume	Daily Heavy Truck Volume
South of Ngauranga Interchange	87,000	3,000
Terrace Tunnel	45,000	1,400
Cobham Drive	35,000	1,000
Calabar Road	23,000	700

Table 2: SH1 Traffic Volumes

In a very similar manner to the traffic profiles observed for SH2, these four graphs show a weekday morning peak on SH1 from about 7.00am and the afternoon peak from about 4.00pm. For Calabar Road, and to a lesser extent Cobham Drive, the traffic patterns are influenced strongly by airport traffic, but again showing weekday morning and afternoon peaks. In each instance, traffic during the middle of the day remains smaller, and again less than the equivalent weekend flows.

As before, it is proposed that truck haulage of fill materials on public roads occur on weekdays, avoiding the congested AM and PM traffic peaks.

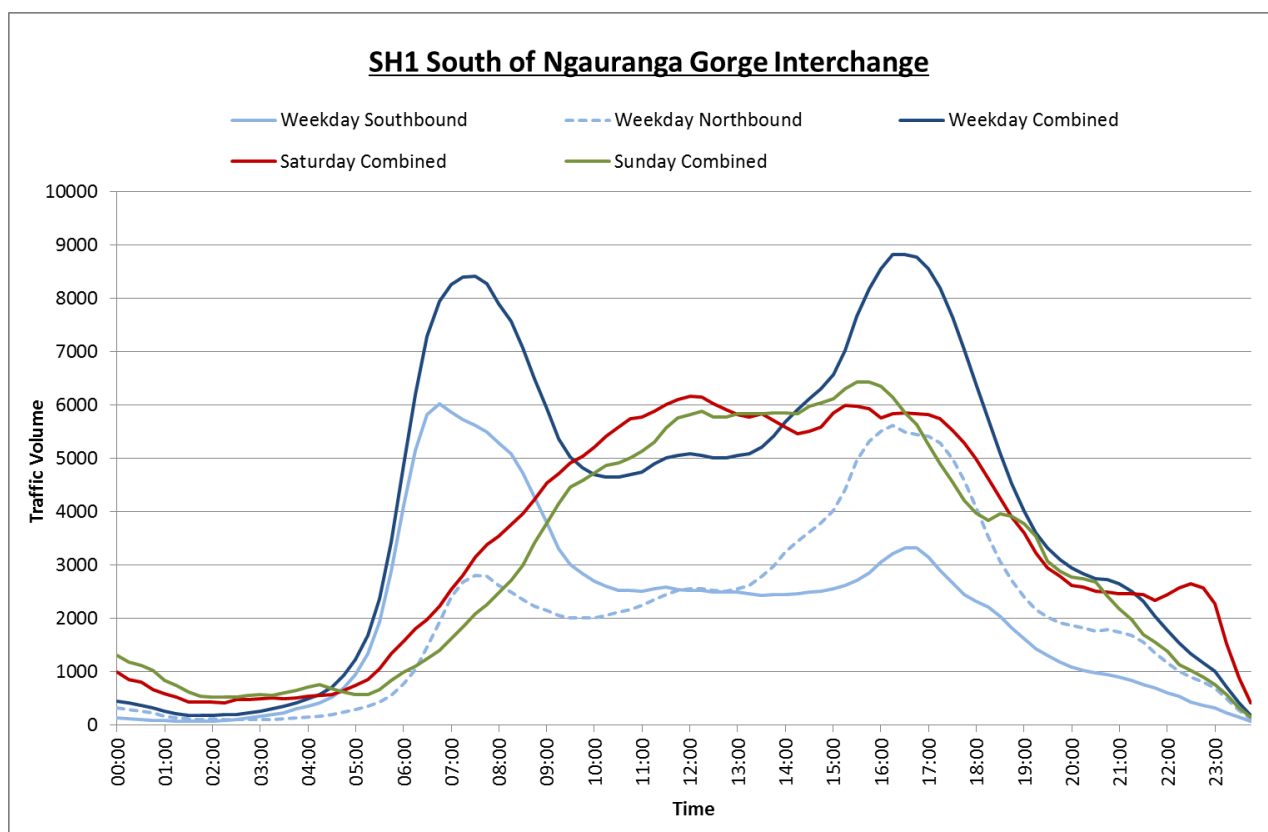


Figure 4: Traffic Volumes on SH1, South of Ngauranga Interchange

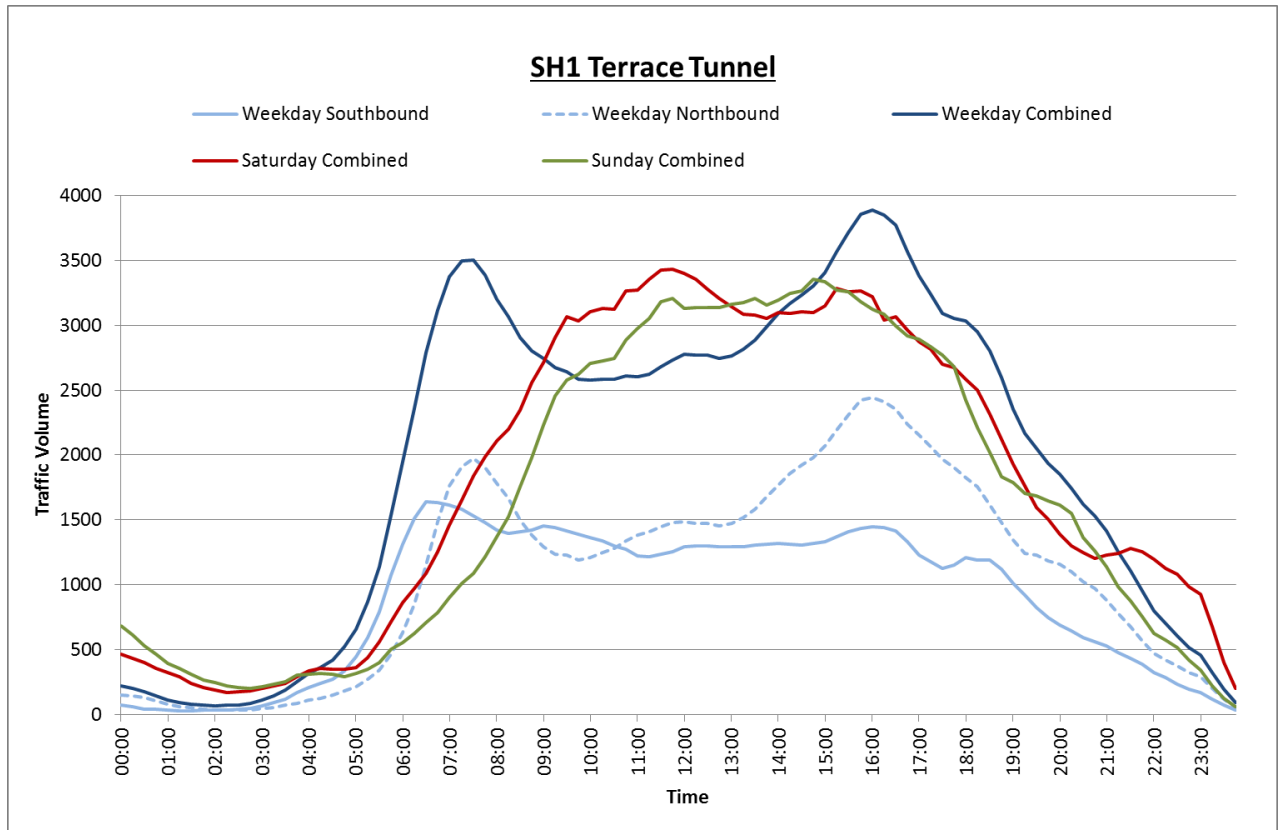


Figure 5: Traffic Volumes on SH1, Terrace Tunnel

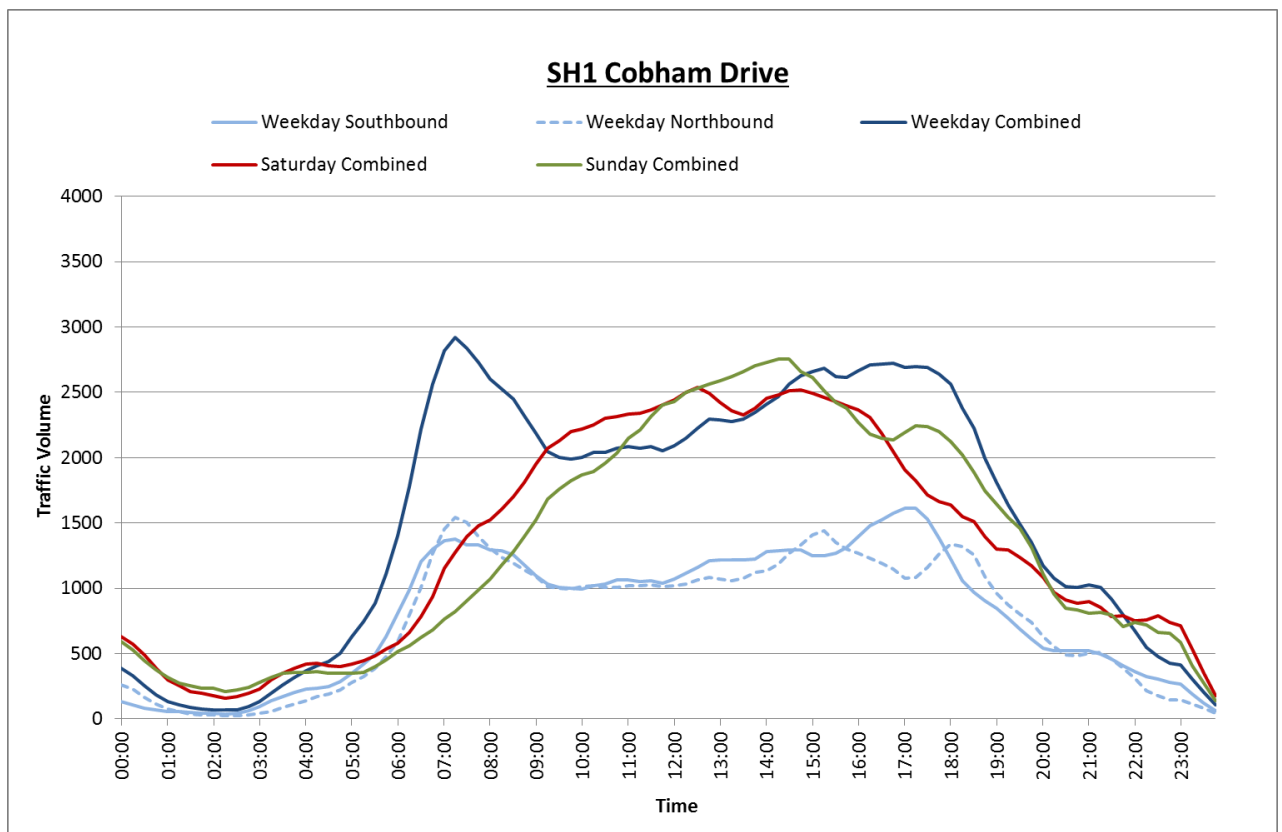


Figure 6: Traffic Volumes on SH1, Cobham Drive

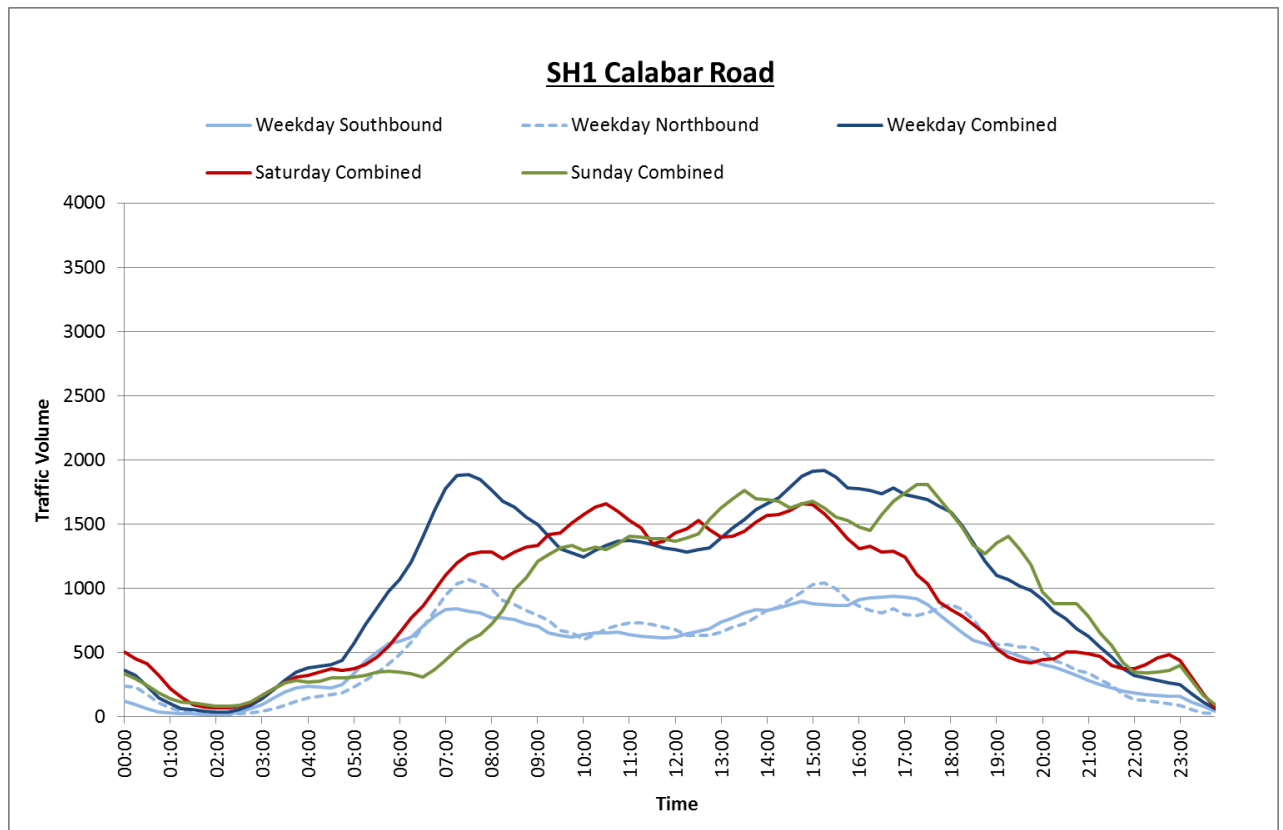


Figure 7: Traffic Volumes on SH1, Calabar Road

Near the Basin Reserve, SH1 supports a large volume of commuter traffic travelling to and from the city and suburbs on the eastern side of Mt Victoria Tunnel and importantly also, the airport. It provides access to the regional hospital and, in the immediate area, access to many local schools (including Wellington East Girl's College, St Mark's Church School and Wellington College), and also Massey University. Further south, SH1 provides access to the Wellington Aquatic Centre, St Patrick's College, Rongotai College, as well as many retail and commercial businesses throughout.

These local and wider land use sensitivities are another reason for proposing truck haulage during off-peak day time and night time periods, and in a way that avoids the 'before' and 'after' school peaks.

6. Transport Routes through Rongotai

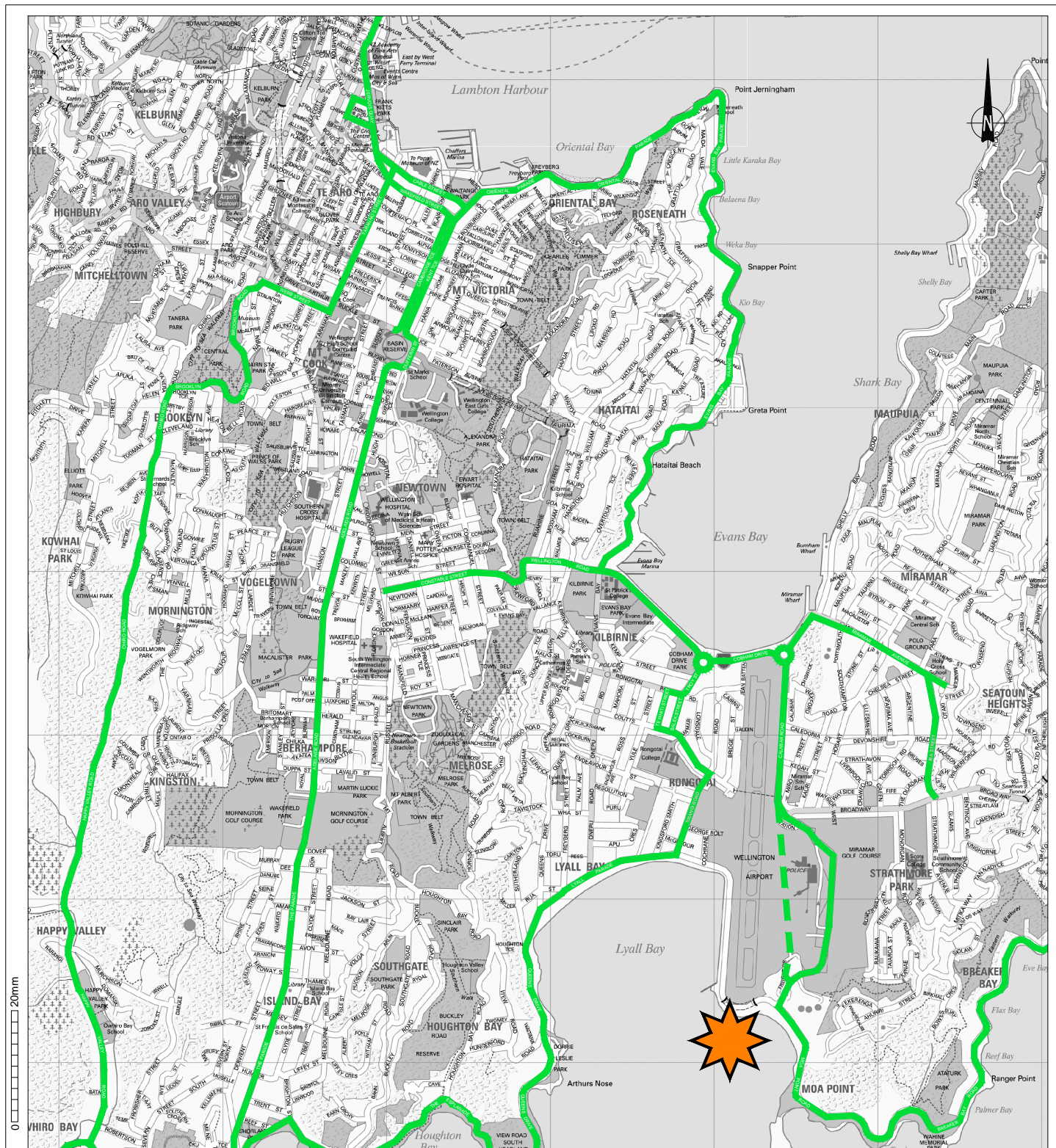
Due to previous and ongoing physical changes at the airport, overdimensioned vehicles cannot now travel on Stewart Duff Drive through the airport precinct. Consequently, NZTA's designated Overdimension Vehicle Route (**OVR**), which had previously followed Stewart Duff Drive now diverts from the route at the intersection of Station Drive and continues (airside) across the airport to link with Freight Drive, in the manner shown by the dashed green line in **Figure 8**, alongside the wider designated OVRs. The revised airside OVR is subject to strict airport permissions.

While the airside OVR is practical for occasional overdimensioned loads, airport operations prevent it from being considered a viable truck access route for construction purposes. In the same way, it is not practical to provide for trucks to access airside on the western apron. Airport Operations advise that frequent truck volumes cannot be managed in a responsible and safe manner across the critical airside activities, without significantly risking and interfering with aircraft and apron movements. As a result, and as set out in the next chapter of this report, road access to and from the construction site needs to be achieved via a combination of SH1 / SH2, the Principal Road network, and the airport-owned Stewart Duff Drive.

On the eastern side of the airport, Calabar Road extends southwards as Stewart Duff Drive, through the airport precinct. This is a viable southbound haulage route (day time and night time), but during the day time the return northbound route through the airport precinct immediately adjacent the terminal building is not, since it would compromise the safety and movement of airport customers in this very active and dynamic part of the airport precinct, and noting also that the bridge structure at this Level 01 concourse was not designed or built to carry frequent heavy trucks. That said, a managed solution can be implemented along Stewart Duff Drive to provide for outbound trucks during the night time, but during the day time, Principal Roads on the western side of the airport are proposed for the return outbound journey to SH1.

On the western side of the airport, as shown in Figure 8, the OVR follows Tirangi Road, Coutts Street, Salek Street and Troy Street between Lyall Parade and SH1. This generally follows the city's defined Collector Roads as illustrated in Figure 2, but noting that the OVR also includes a Local Road variant via Te Whiti Street. The OVR does not follow the higher – functioning Principal Road route of Onepu Road since that road is an established bus route with trolley bus wires that prevent access by overdimensioned loads. They do not however prevent access by standard trucks. For the reasons described in this report, it is recommended that haulage trucks be accommodated by Principal Roads rather than the lesser OVRs.

The next chapter of this report sets out and describes the recommended truck haulage routes.



- Overdimension Vehicle Routes
- - - Updated Overdimension Vehicle Route
- ★ Site Location

Sourced from Terralink Street Maps

Wellington International Airport Proposed Runway Extension NZTA Overdimension Routes



FIGURE
8
SCALE: NTS

7. Recommended Transport Routes

The recommended haulage route (from and to SH1) to serve the construction site is illustrated in **Figures 9a and 9b**, with the inbound and outbound sections of the route described individually next.

It is noted again that the following day time and night time transport windows have been identified for truck haulage, and recommended to minimise traffic effects, and also noise effects as described in the separate Construction Noise Report submitted with the application:

- 9.30am to 2.30pm weekdays; and
- 10.00pm to 6.00am weekdays.

At night (10.00pm to 6.00am), the haulage route will involve both inbound and outbound trips via the airport precinct. During day time operations (9.30am to 2.30pm), the haulage route will involve inbound trips via the airport precinct, with the corresponding outbound trips made via Principal Roads on the western side of the airport.

7.1 Inbound Haulage Route

SH1 (Calabar Road) has its southern end at the Broadway roundabout. Extending south from this intersection the inbound haulage route continues as Stewart Duff Drive through the airport precinct to connect with Freight Drive at a tee intersection near the southern end of the airport. Stewart Duff Drive is a private road through the airport, to which through-traffic is granted access by WIAL. Freight Drive is also an airport-owned private road, from where access will be available to the eastern site compounds and internally to the runway construction site via the taxiway bridge to be built over Moa Point Road as a first stage of works.

The central length of Stewart Duff Drive running parallel to the Miramar Golf Course functions as a one-way southbound road, with the corresponding northbound movements handled immediately adjacent the terminal building.

As a private airport road, truck traffic can be safely managed by WIAL through the precinct in a manner that minimises disruption for other airport-related traffic, including for example by dedicating barriered entry and exit lanes to haulage trucks.

7.2 Outbound Haulage Route

Two routes are recommended for use by outbound haulage trucks. For the reasons described in the previous chapter of this report, it is only possible to provide for outbound trucks to travel through the airport precinct at night time when airport traffic volumes are small. The arrangements will generally be as shown in **Figure 10**.

This figure shows an intention to utilise the section of Stewart Duff Drive parallel to the golf course as a managed two-way road (as compared with its established one-way southbound arrangement) at night time. All traffic management arrangements will be addressed by the CTMP.



REVISION	DATE	DESCRIPTION

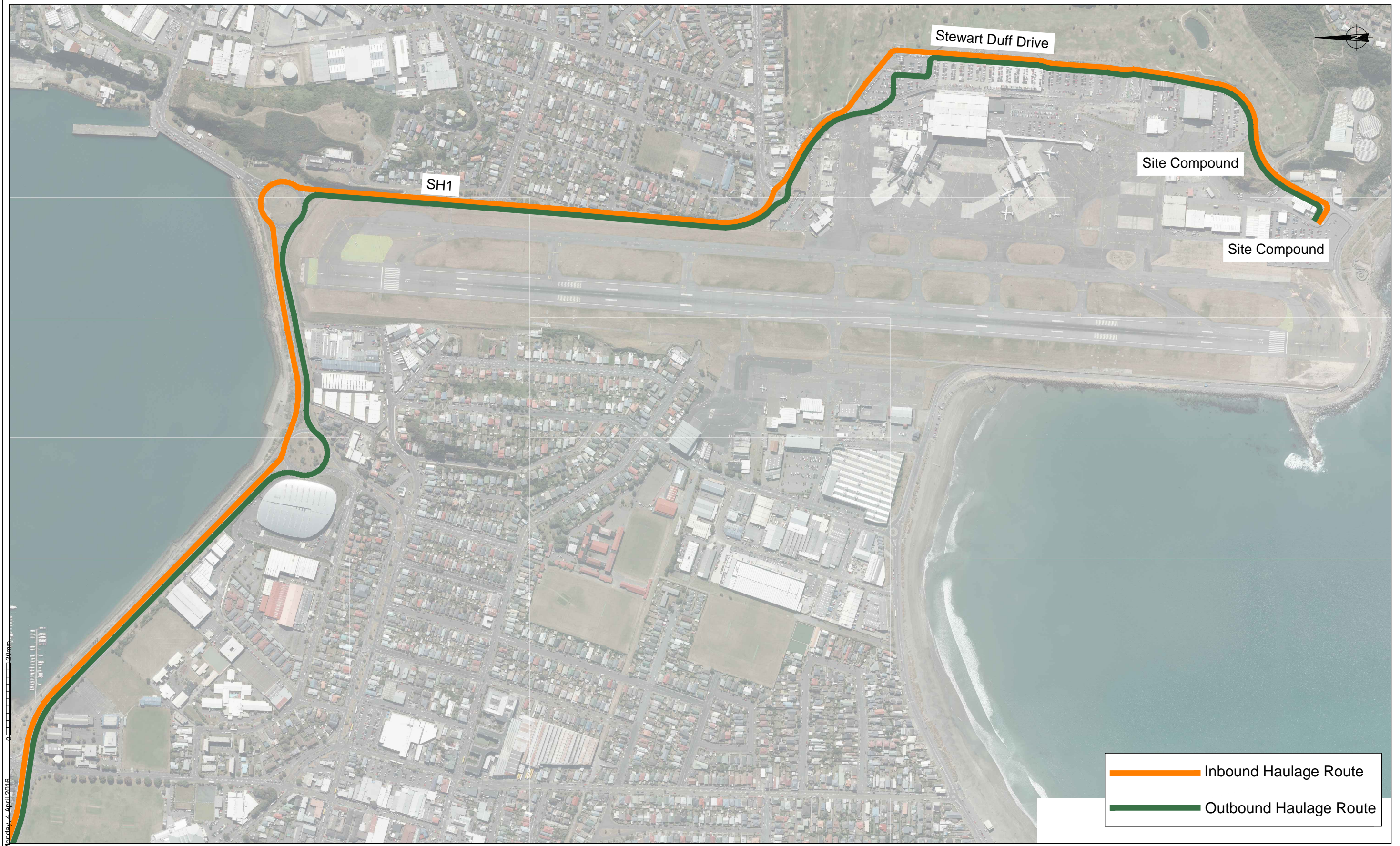
Wellington International Airport Proposed Runway Extension

Recommended Day Time Haulage Route

DRAWN: MP
DATE: 4/04/2016
SCALE: NTS
DWG NO:13043 N1C



FIGURE
9a



REVISION	DATE	DESCRIPTION
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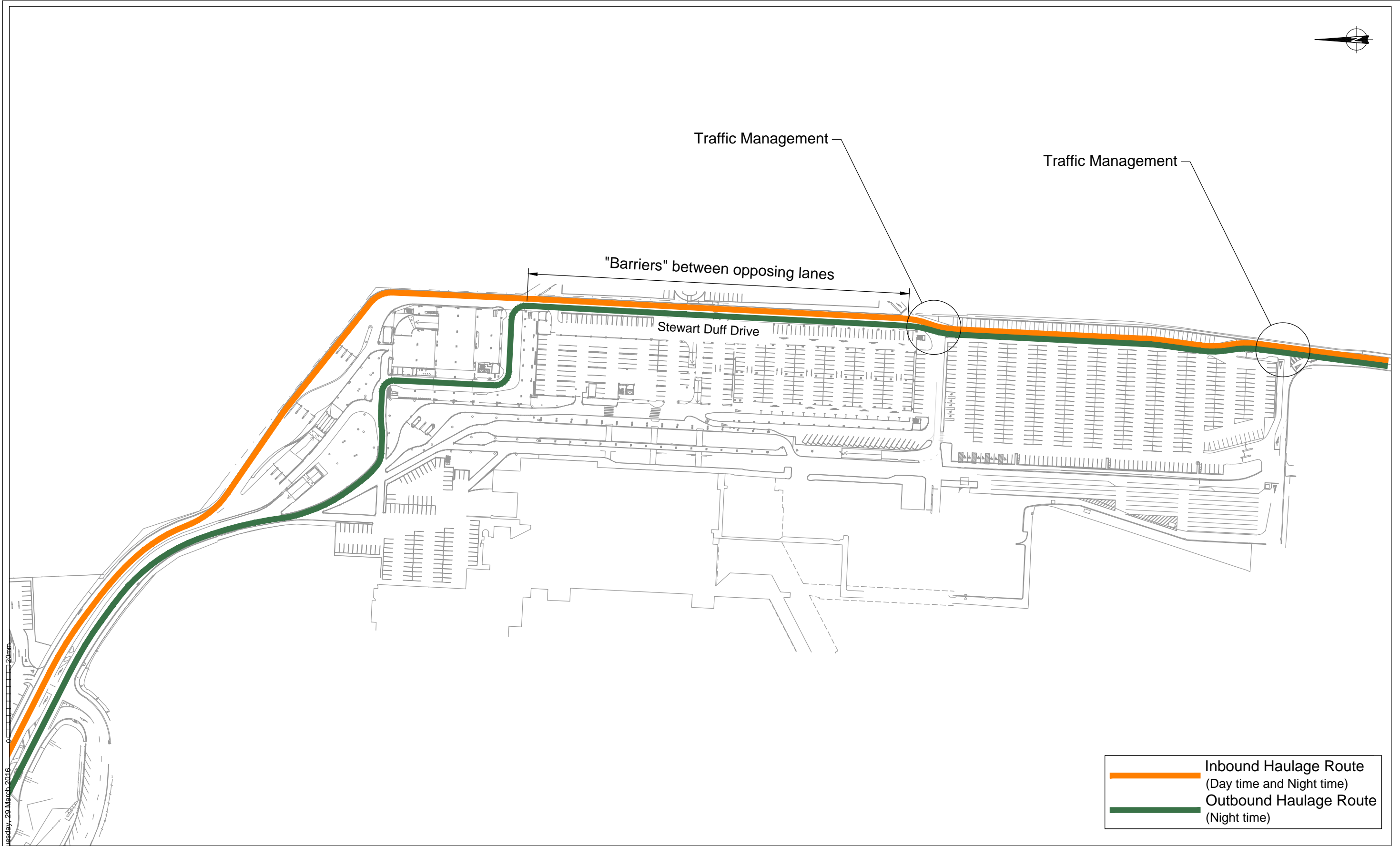
Wellington International Airport Proposed Runway Extension

Recommended Night Time Haulage Route

DRAWN: MP
DATE: 4/04/2016
SCALE: NTS
DWG NO:13043 N1C



FIGURE
9b



REVISION	DATE	DESCRIPTION
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Wellington International Airport Proposed Runway Extension

Haulage Route Through Airport Precinct

DRAWN: GE
DATE: 29/03/2016
SCALE: 1:2,000@A3
DWG NO:13043 N4A



FIGURE
10

During the day time, the recommended haulage route on the western side of the airport follows Moa Point Road, Lyall Parade, Onepu Road and Evans Bay Parade. This route has been purposefully selected for outbound haulage since it forms part of Wellington City's Principal Road network, as mapped earlier in Figure 2, which has a predominant through-traffic function and where a range of vehicle types (including trucks) is anticipated. This contrasts with other Local and Collector Roads in the area which have been considered for truck haulage but discarded on the basis of the types of effects previously described, and with preference afforded to the primary network as defined by Council.

Each section of this route is discussed in turn next.

7.2.1 Moa Point Road and Lyall Parade

From Freight Drive, Stewart Duff Drive has its southern intersection with Moa Point Road as shown next in **Photograph 1**. From this point, haulage trucks will turn right into Moa Point Road.



Photograph 1: On Stewart Duff Drive facing south to Moa Point Road

Moa Point Road provides a transport connection between the coastal suburbs of Lyall Bay and Breaker Bay. It also services some existing airport traffic as well as supporting light industrial businesses at the southern end of the airport. From Stewart Duff Drive it extends northwards on the western side of the existing runway, and is proposed to provide the first section of the outbound haulage route.

The route around the south coast, including Moa Point Road and Lyall Parade is designated within the Wellington City District Plan as involving Principal Roads, being part of the city's primary road network.

Photographs 2 and 3 show that Moa Point Road and Lyall Parade are well appointed with wide traffic lanes commensurate with their roading functions.



Photograph 2: On Moa Point Road facing north



Photograph 3: On Lyall Parade facing west

Along the seaward side of Moa Point Road, a rock seawall has been constructed for erosion protection, along which there is an informal pedestrian track. On its opposite side, against Wellington Airport's security fence, is a 1.5m wide concrete footpath. At its southern end, the road passes beneath the runway through a short tunnel which also has a dedicated pedestrian pathway. At its northern end, the road continues around Lyall Bay as Lyall Parade.

Traffic count data confirms that this section of the route has an average daily volume of around 4,000vpd. As can be seen in the following **Figure 11**, the weekday morning and afternoon peak flows are in the order of 300 to 400vph, occurring between 8:00 to 9:00am and 3:00pm to 4:00pm. As also shown, greater flows are experienced on weekends, reflecting the popularity of the coastal area and coastal drive on weekends.

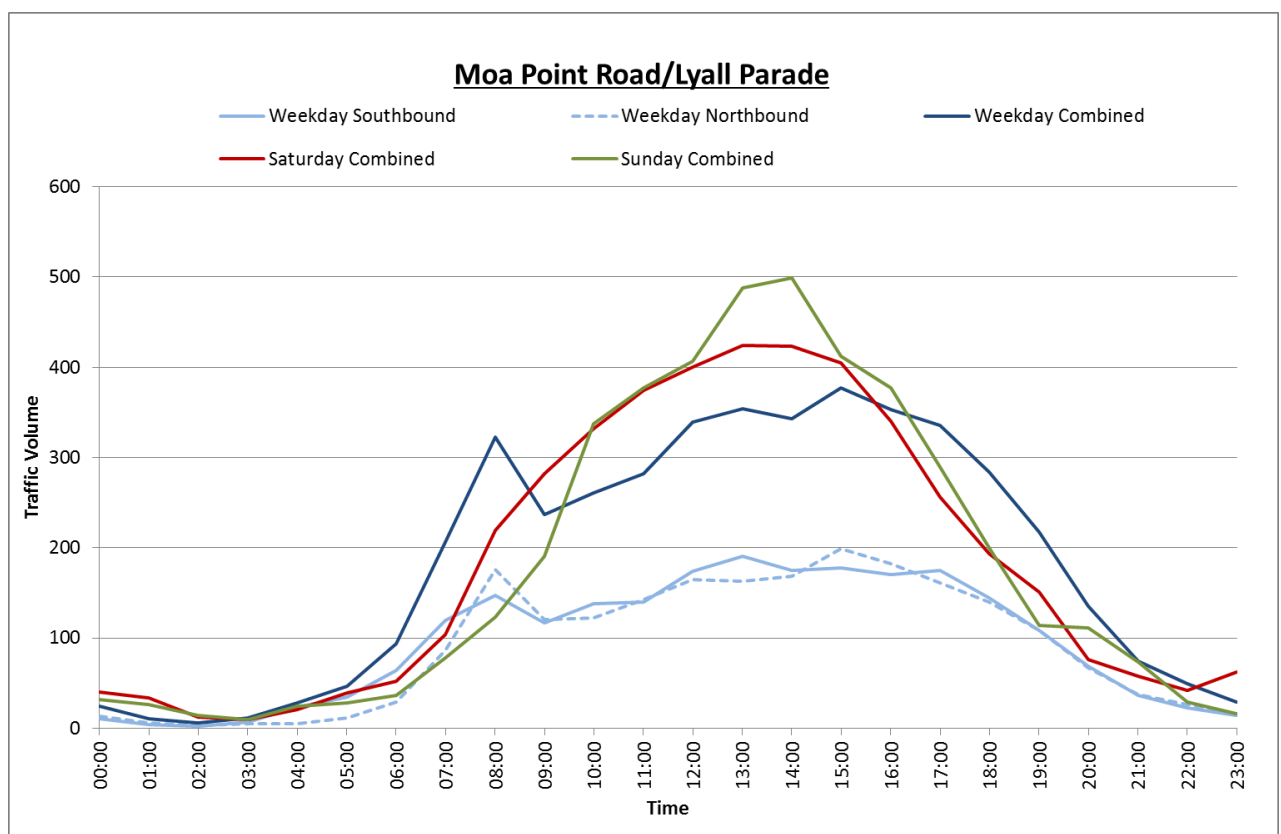


Figure 11: Hourly Traffic Volumes on Moa Point Road/Lyall Parade

Separate manual counts have identified the use of Moa Point Road by cyclists, and both the adjacent footpath and informal seaside track by pedestrians. The counts were undertaken in fine weather on a weekday and Saturday in February 2015, with the number of movements as recorded in **Table 3**.

Period	Cyclists per hour	Pedestrians per hour
Weekday AM peak	44	3
Weekday Interpeak	11	3
Weekday PM peak	19	4
Saturday AM peak	107	11
Saturday Interpeak	29	17

Table 3: Cyclist and Pedestrian Activity on Moa Point Road

In a similar manner as vehicle patterns, the counts show heightened cyclist and pedestrian activity on the Saturday, with lowest flows observed during the middle of the day on weekdays when haulage truck movements are planned. In this way, the effect of haulage trucks on vehicle, cyclist and pedestrian users of Moa Point Road and its continuation around Lyall Bay as Lyall Parade will be minimised.

Overall, this first part of the day time outbound route is assessed to be in good condition and well able to support outbound haulage trucks, without the need for mitigation works, as anticipated for a Principal Road.

7.2.2 Lyall Parade / Tirangi Road Roundabout

Photograph 4 below illustrates the westbound approach to the Lyall Parade / Tirangi Road roundabout. The roundabout has single approach lanes and a single circulating lane, appropriate for the traffic volumes it carries, and has a design that involves a main central island with a mountable concrete apron.



Photograph 4: Westbound Approach to Roundabout

The concrete apron is designed in such a way that enables larger vehicles (trucks and buses) to track across the edge of the roundabout in order to perform a turn, whereas cars, vans and other smaller vehicles can negotiate the roundabout within the available lane space. As shown in **Figure 12**, truck and trailers can perform the westbound movement by tracking across the apron, as intended.

No mitigation improvements are considered necessary, although the CTMP will capture road condition surveys that might identify the need for remedial improvements.

7.2.3 Lyall Parade / Onepu Road

Photographs 5 and 6 below illustrate the form of the roundabout at the Lyall Parade / Onepu Road intersection, where trucks will follow the defined Principal Road route from Lyall Parade, turning right into Onepu Road. This roundabout also has single approach and circulating lanes, again relative to the required traffic capacity but, unlike the design of the Lyall Parade / Tirangi Road roundabout, has a central island with a fully mountable profile.



Photograph 5: Westbound Approach to Roundabout

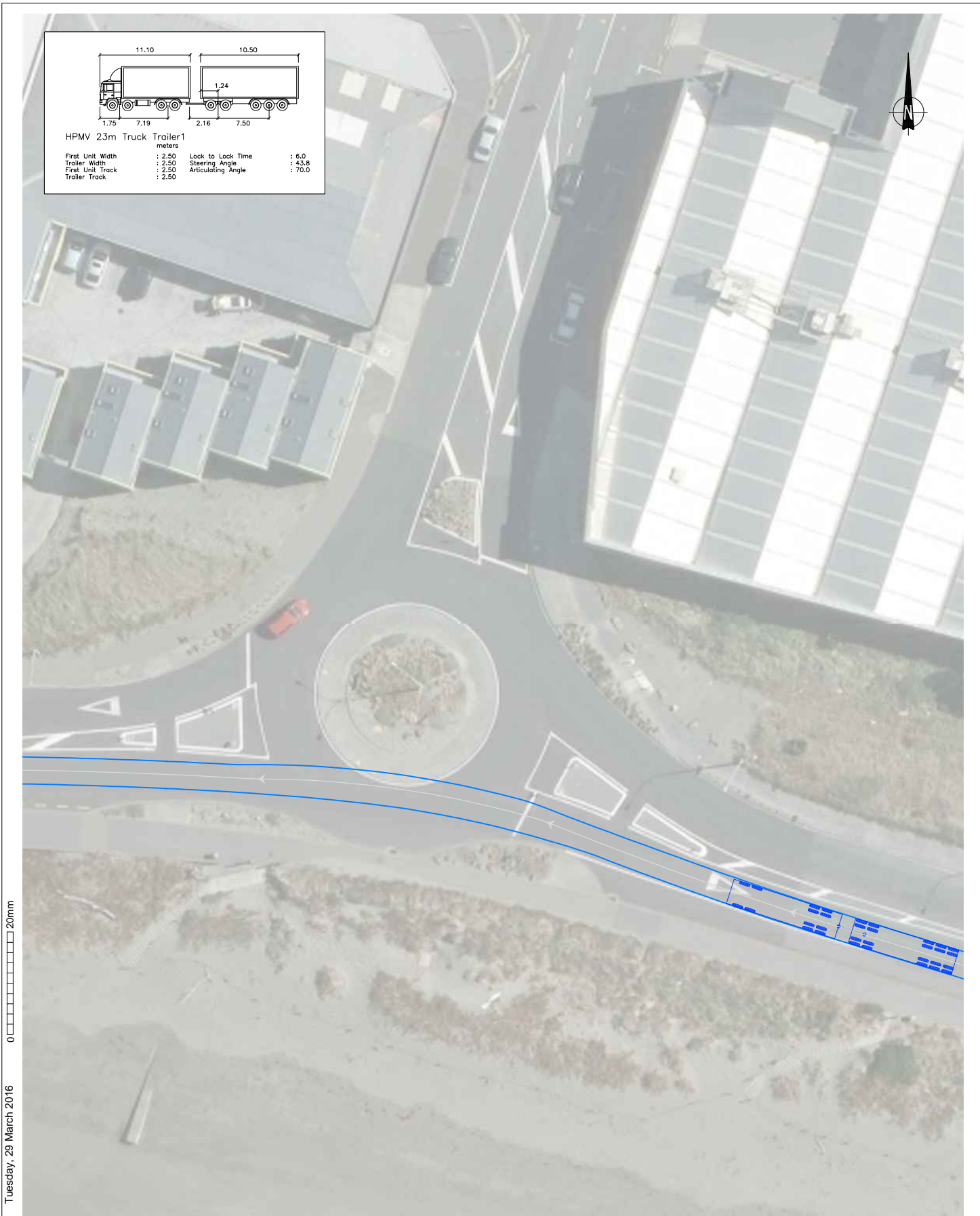


Photograph 6: Central Island Detail

Figure 13 shows the manner in which haulage trucks will track across the central mountable island in making a right turn from Lyall Parade into Onepu Road, in the same manner as the tyre tracks noticeable in Photograph 6. Again, since the roundabout design facilitates this movement, no mitigation improvements are considered necessary, although remedial measures may be identified through the CTMP.

7.2.4 Onepu Road

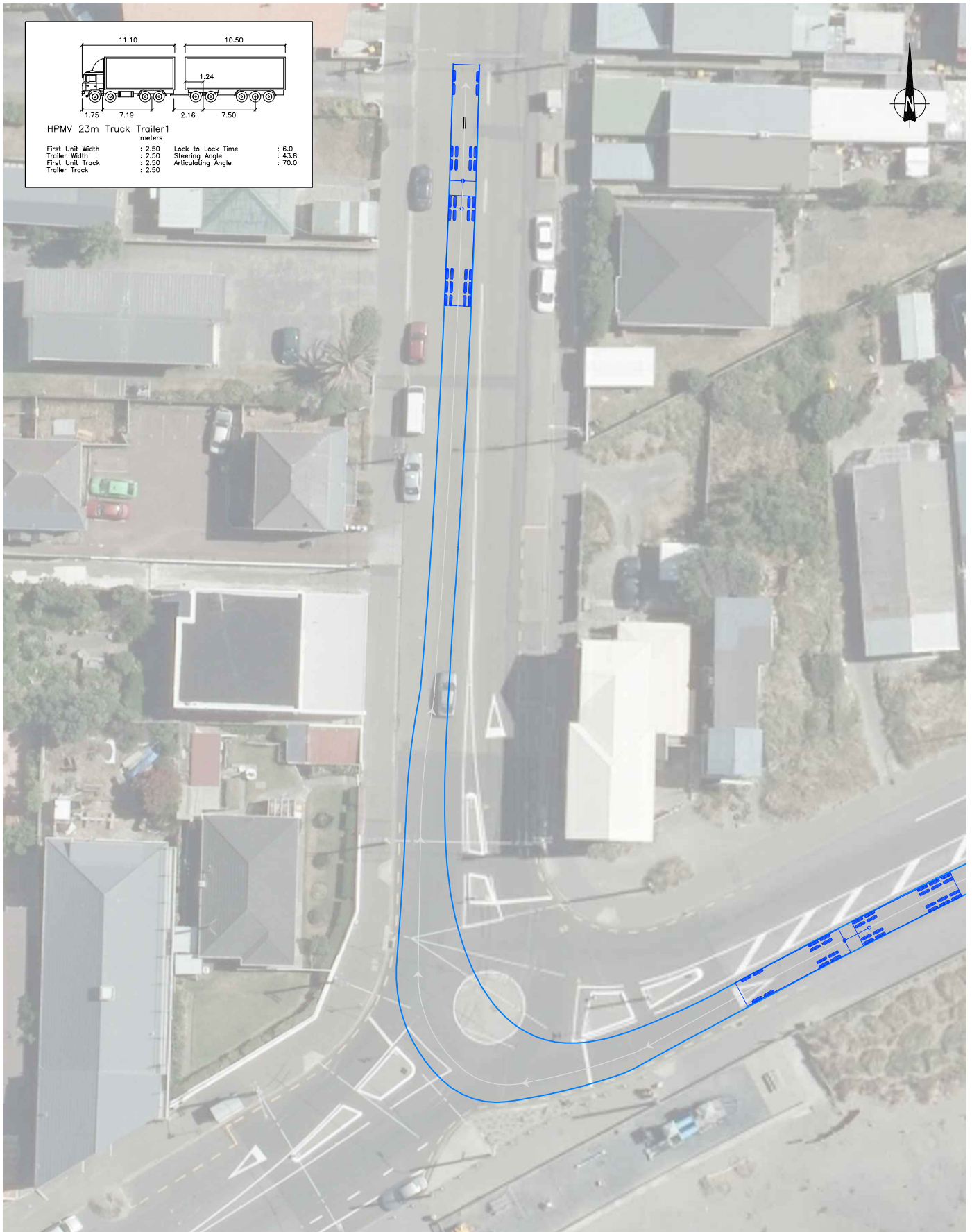
The City's network of Principal Roads includes Onepu Road. Much like Moa Point Road and Lyall Parade, the road has a reasonably flat weekday traffic profile (without commuter peaks) and has heightened traffic activity on Saturdays and Sundays, as identified in the traffic volume graph included at **Figure 14**.



Wellington International Airport Proposed Runway Extension
Truck Tracking at Lyall Parade/Tirangi Road Roundabout

FIGURE
12
SCALE: 1:500 (A4)

Tuesday, 29 March 2016
0 10 20mm



Wellington International Airport Proposed Runway Extension
Truck Tracking at Lyall Parade/Onepu Road Roundabout



FIGURE
13
SCALE: 1:500 (A4)

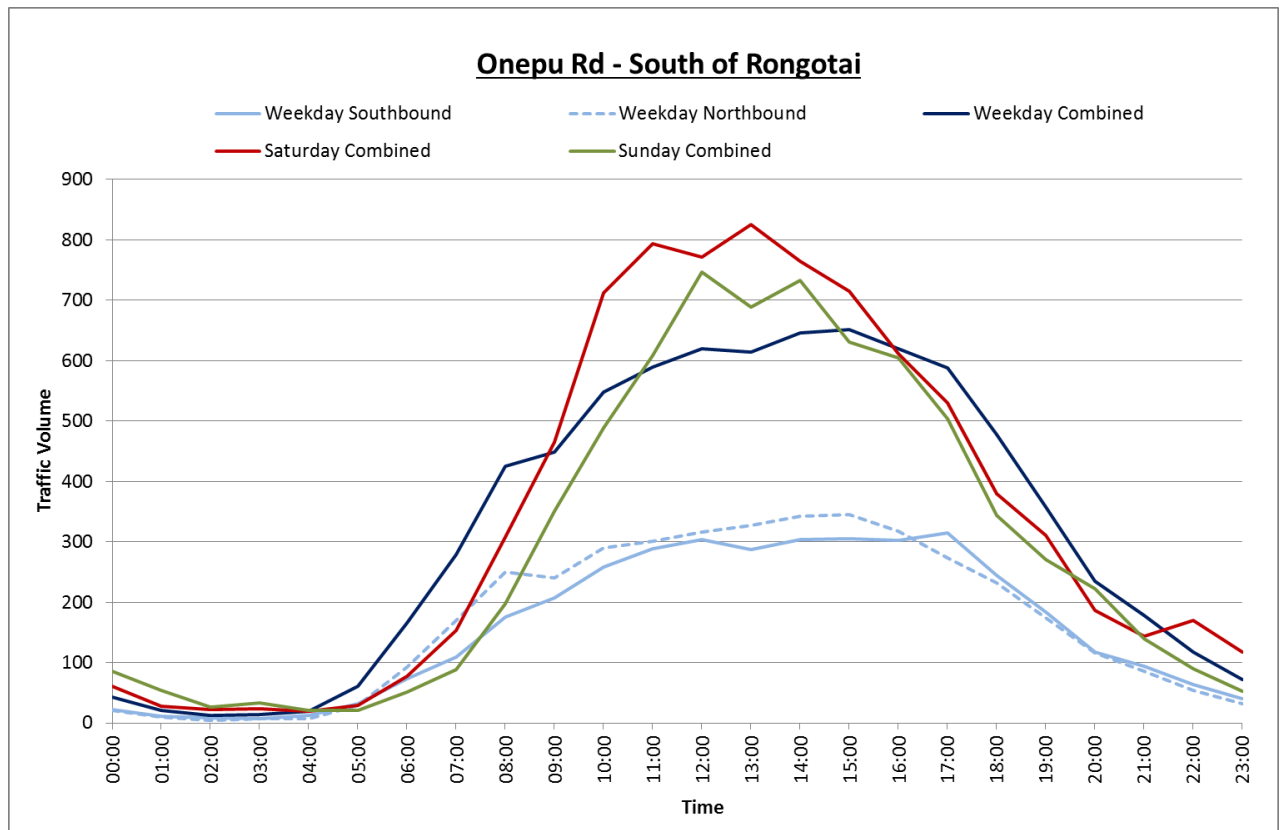


Figure 14: Hourly Traffic Volumes on Onepu Road

As shown, on weekdays, traffic flows through the middle part of the day are about one quarter less than on weekends, again reinforcing the relevance of avoiding weekend haulage on public roads. Overall, daily volumes are in the order of 7,000vpd with weekday traffic peaking at around 600vph.

Photographs 7 and 8 that follow show the road is wide, at approximately 14m between kerbs, and is formed with a painted centreline in parts and a central painted median elsewhere. Kerbside parking is variously present.



Photograph 7: On Onepu Road Facing North



Photograph 8: On Onepu Road Facing North

As identified by the trolley bus wires, the road is also a bus route. As previously mentioned, this is the reason why Onepu Road does not form part of the defined OVR.

7.2.5 Onepu Road / Coutts Street Intersection

Photograph 9 illustrates the traffic signal form of the Onepu Road intersection with Coutts Street, as viewed by northbound drivers. It has a single through-lane, and separate left and right turning provisions.



Photograph 9: Northbound Approach to the Intersection

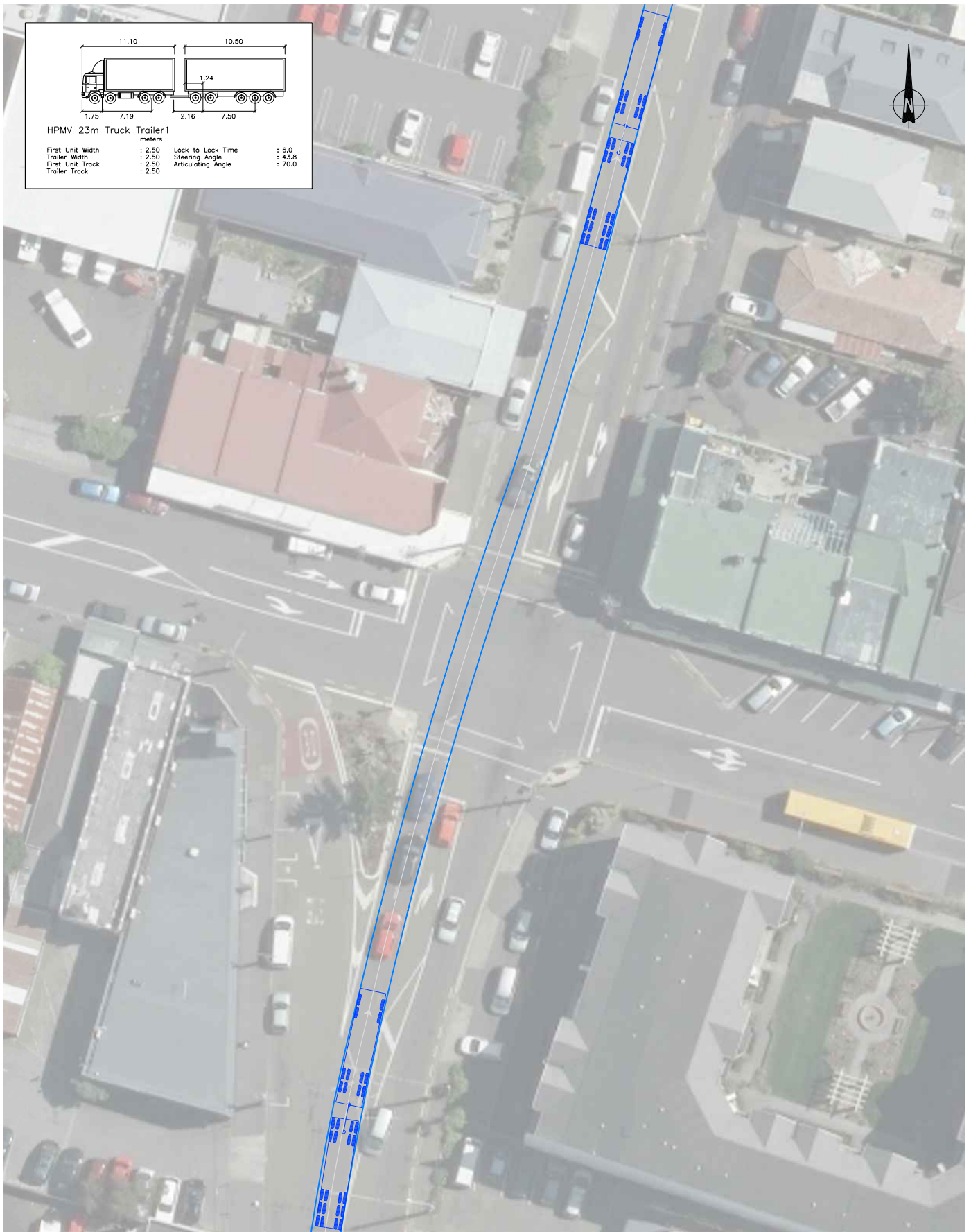
Figure 15 shows the manner in which northbound trucks will track directly through the intersection.

Beyond the intersection, Onepu Road continues as a wide road with a central painted median and kerbside parking, as illustrated in **Photograph 10**.



Photograph 10: On Onepu Road Facing North

Tuesday, 29 March 2016 0 20mm



Wellington International Airport Proposed Runway Extension
Truck Tracking at Onepu Road/Coutts Street Intersection



FIGURE
15
SCALE: 1:500 (A4)

In this section of Onepu Road, between Coutts Street and Rongotai Road, the road remains part of the city's Principal Road network.

7.2.6 Onepu Road / Rongotai Road Intersection

Some 200m north of Coutts Street, Onepu Road intersects with Rongotai Road, another signalised intersection. Here, trucks would follow the central lane in which the white van is shown in **Photograph 11** below.



Photograph 11: Northbound Approach to Intersection

Beyond the intersection, trucks would veer left as Onepu Road becomes Evans Bay Parade, which has a very wide northbound carriageway as clearly shown next in **Photograph 12**.



Photograph 12: On Evans Bay Parade Facing North

Figure 16 has been prepared to show the manner in which trucks will track through the Onepu Road / Rongotai Road intersection to continue their northwards journey into Evans Bay Parade.

7.2.7 Evans Bay Parade / Kilbirnie Crescent Intersection

Continuing northwards, outbound haulage trucks will then pass through the Evans Bay Parade intersection with Kilbirnie Crescent which again exists as a signalised intersection, with the form shown in **Photograph 13**.



Photograph 13: Right Turn at Intersection

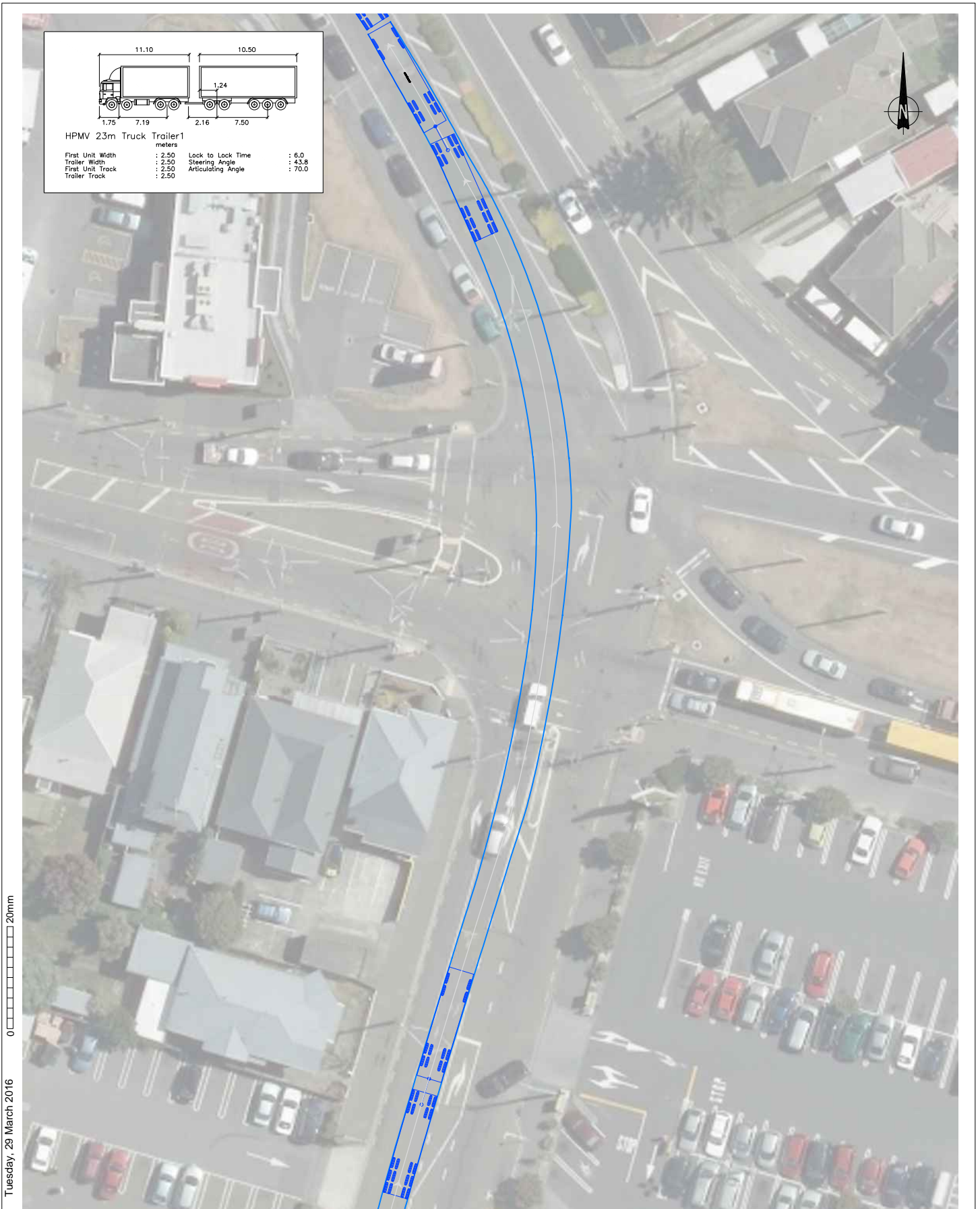
At this intersection, trucks will take the right turn lane to continue their outbound journey northwards along Evans Bay Parade.

Figure 17 shows the corresponding tracking for the right turn movement through the signalised intersection.

7.2.8 Evans Bay Parade

Beyond the Kilbirnie Crescent intersection, Evans Bay Parade extends northwards for a straight length of approximately 500m to the Cobham Drive intersection where trucks will rejoin SH1.

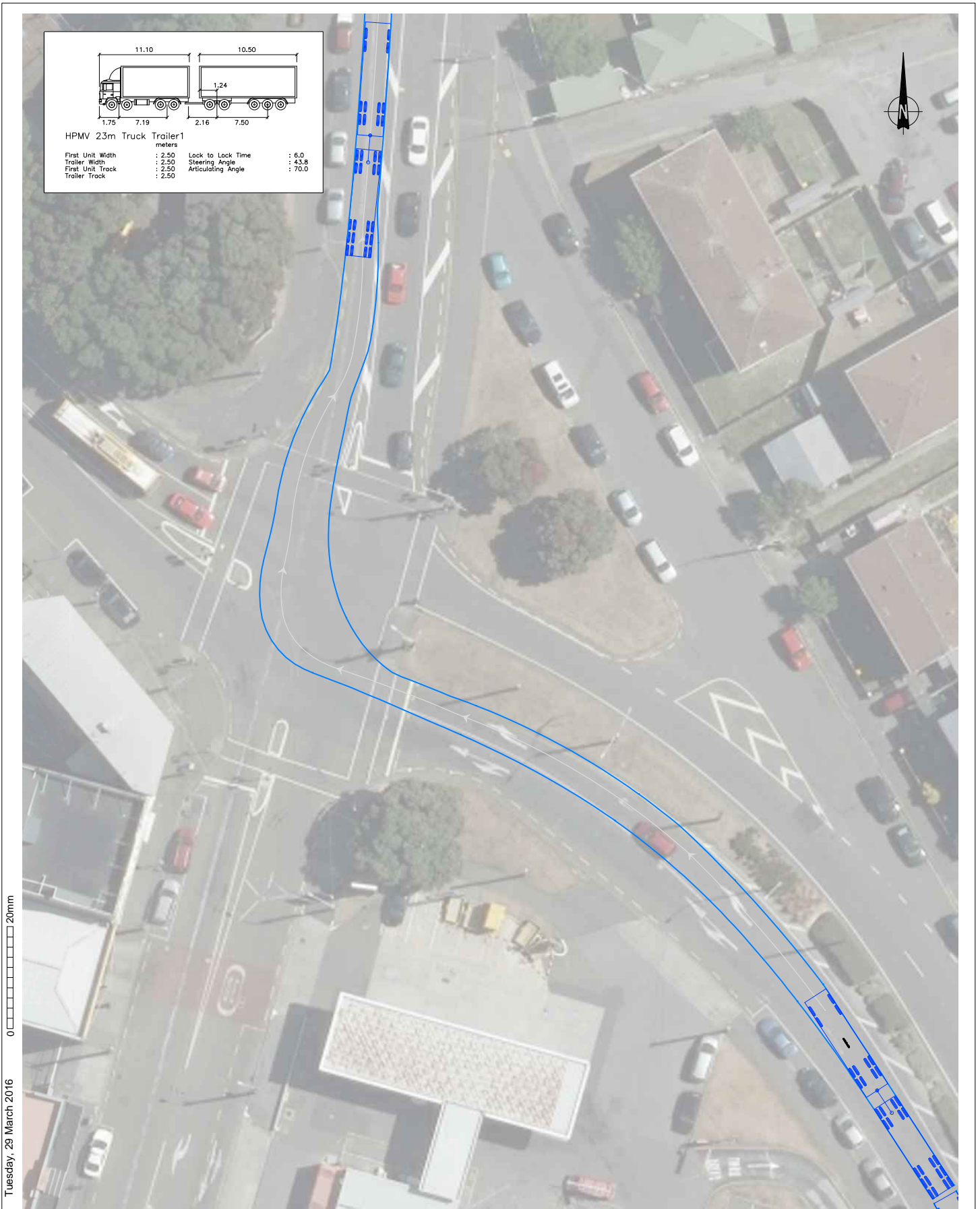
As a Principal Road, this section of Evans Bay Parade remains wide, at approximately 12m, permitting safe two-way traffic flow and kerbside parking, in the manner shown in **Photograph 14**.



Wellington International Airport Proposed Runway Extension
Truck Tracking at Onepu Road/Rongotai Road Intersection



FIGURE
16
SCALE: 1:500 (A4)



Wellington International Airport Proposed Runway Extension
Truck Tracking at Evans Bay Parade/Kilbirnie Cres Intersection



FIGURE
17
SCALE: 1:500 (A4)



Photograph 14: On Evans Bay Parade Facing North

Here, the traffic volumes are very similar to those recorded from Onepu Road, as demonstrated next in **Figure 18**.

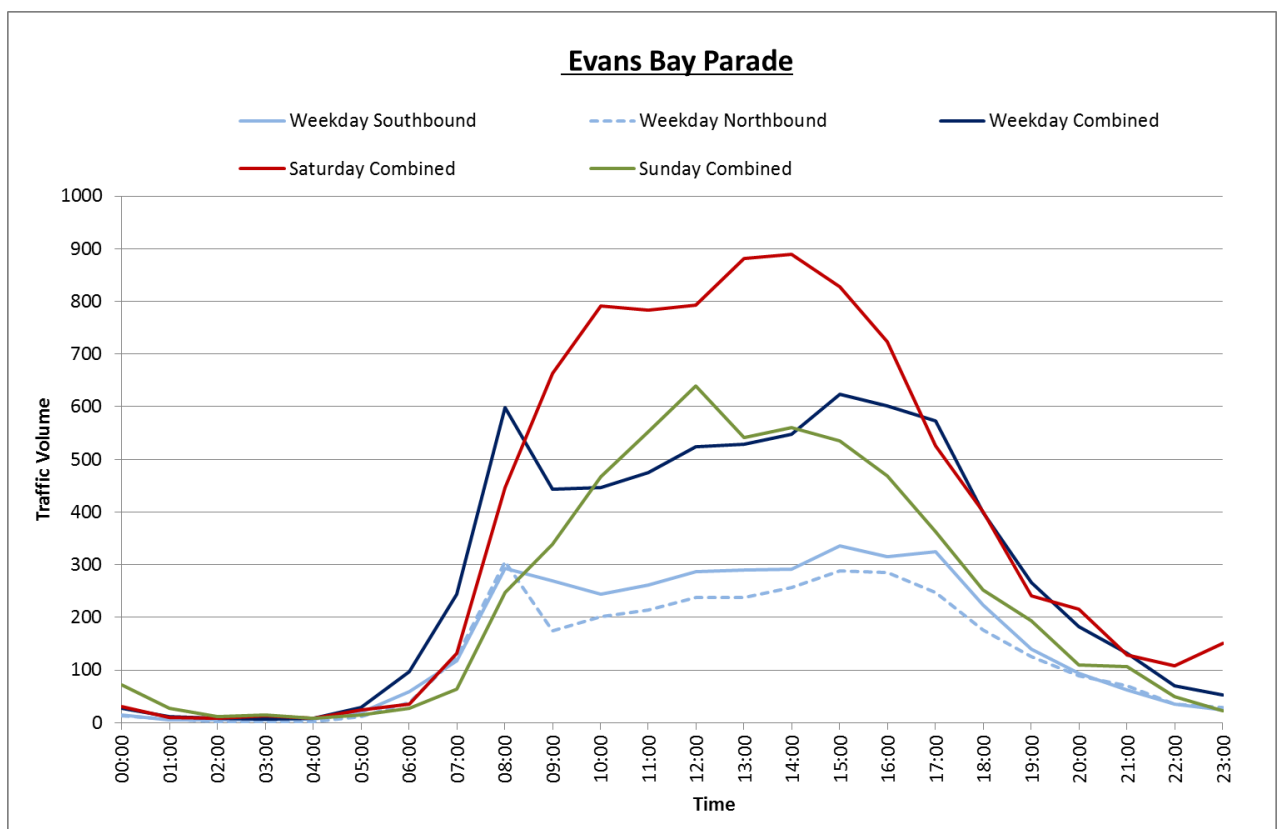


Figure 18: Hourly Traffic Volumes on Evans Bay Parade

Again, in the same manner as previously demonstrated, the weekday volumes are smaller through the middle part of the day proposed for truck haulage, and less than weekend volumes.

7.2.9 Evans Bay Parade / Cobham Drive Intersection

Photograph 15 shows where northbound trucks on Evans Bay Parade will rejoin SH1 via a left turn onto Cobham Drive.



Photograph 15: Left Turn at Intersection

Figure 19 then shows the related tracking for a truck and trailer rounding this left turn, being able to do so within the available lane space as expected for the function of this intersection in the road network.

7.3 Summary of Recommended Haulage Routes

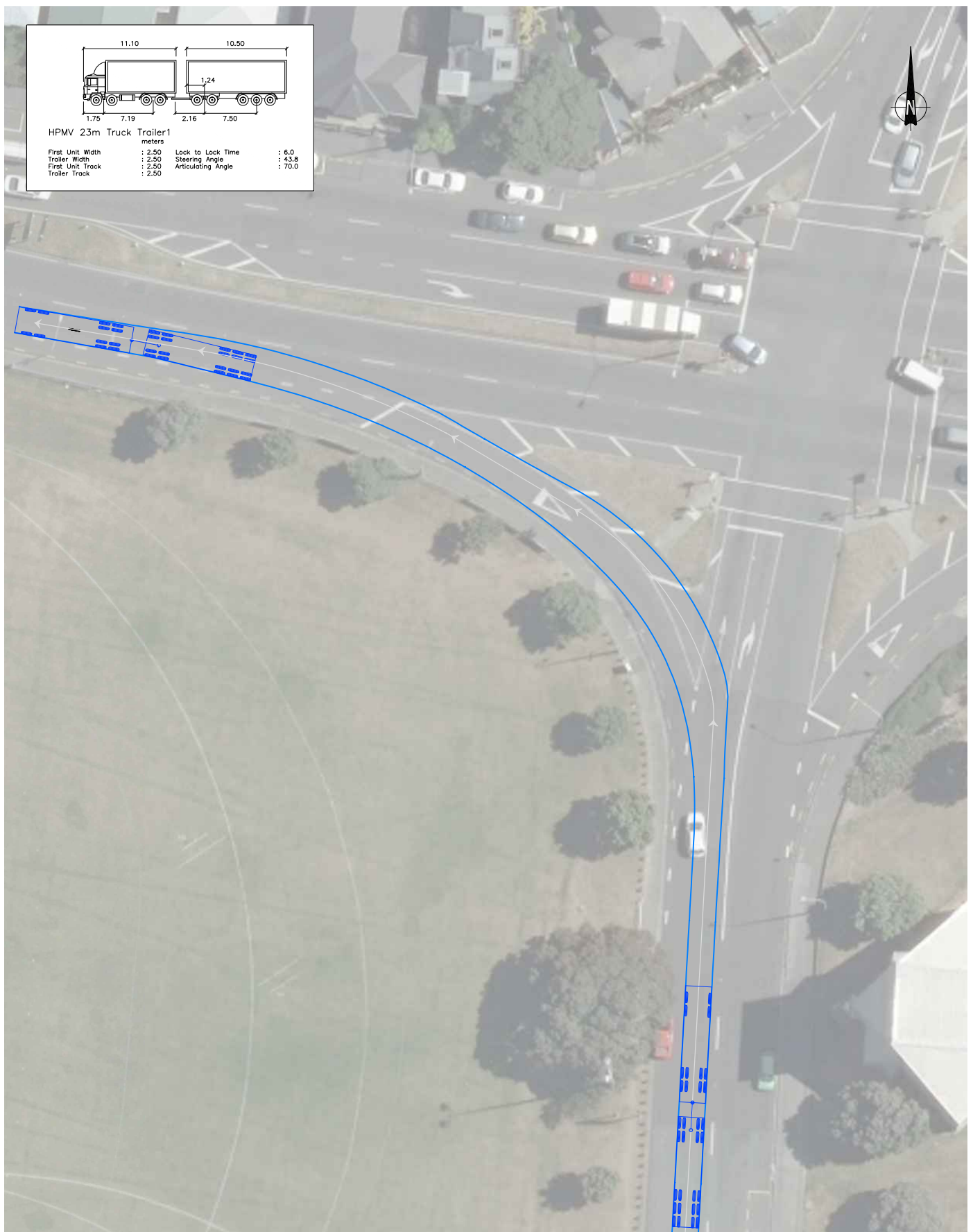
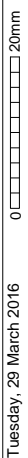
For the reasons described through this chapter, it is assessed that an effective outbound day time haulage route through Rongotai can be provided as previously illustrated by Figure 9a.

As described, the outbound route passes through four signalised intersections, at:

- Onepu Road / Coutts Street;
- Onepu Road / Rongotai Road;
- Evans Bay Parade / Kilbirnie Crescent; and
- Evans Bay Parade / Cobham Drive.

These intersections have been assessed to be the traffic capacity limitations on the route. Each functions with varying signal cycle times during the day, usually of the order of 80 to 100 seconds in the proposed day time transport window (9:30am to 2:30pm), and up to 120 seconds at AM and PM peak times.

It is assessed that beyond the addition of one haulage truck per northbound signal phase, the addition of more trucks per cycle would begin to become noticeable to existing users. This would materialise in the form of queue space being occupied by trucks, with a gradual



Wellington International Airport Proposed Runway Extension Truck Tracking at Evans Bay Parade/Cobham Dr Intersection



FIGURE
19
SCALE: 1:500 (A4)

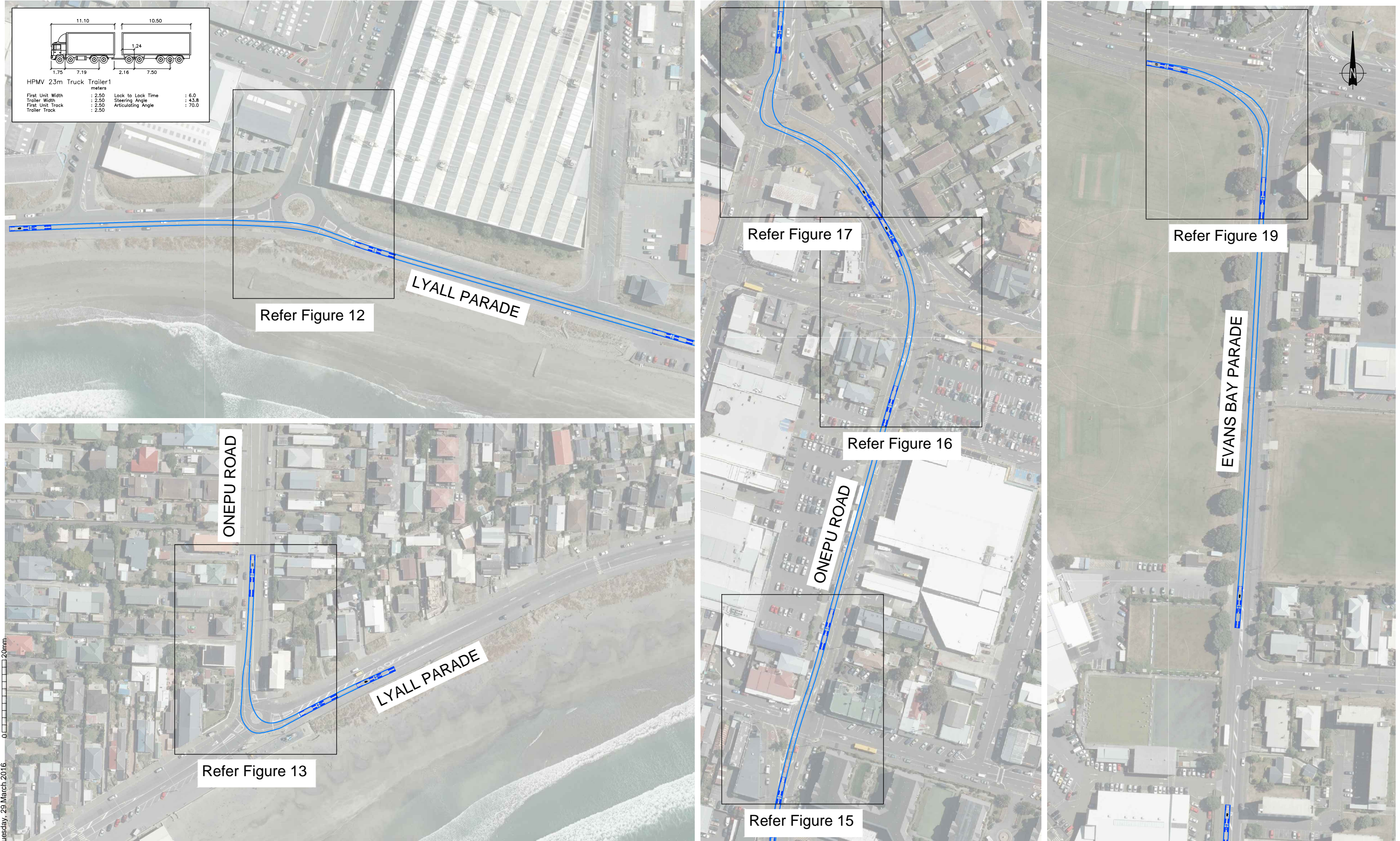
deterioration in intersection performance that, while not significantly compromising levels of service at off-peak times, will result in some existing users being unable to travel through the intersection in a single green phase as they can at present.

It is for this reason that it is proposed to limit outbound truck movements to the equivalent of just one truck per signal cycle time. Assuming (conservatively) that each intersection operates with a cycle time of 120 seconds, this translates to 30 trucks being able to travel through the intersections per hour. These movements will be controlled at the construction site, and appropriate provisions developed in the CTMP to manage departures at the Freight Drive egress to 120 second intervals.

The truck tracking shown in **Figure 20** illustrates the overall outbound paths of 23m long HPMV's, through the Principal Road network on the western side of the airport, and has been annotated to identify the individual locations assessed earlier in this chapter.

As has been reported, this investigation has not identified a need for mitigation works along parts of the route to provide for the safe travel of 23m long HPMV's. This outcome arises for two reasons. First, the recommended outbound haulage route follows the Principal Road network on which such vehicle types and additions can reasonably be anticipated. Secondly, the otherwise greater effects have been mitigated by the proposed restrictions on haulage hours and truck volumes.

Beyond the Principal Road network, and again, the traffic effects of adding haulage trucks to SH1 and SH2 are suitably mitigated by the recommended haulage hours and restricted truck volumes.



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Wellington International Airport Proposed Runway Extension

Outbound Tracking In Rongotai

DRAWN: GE

DATE: 29/03/2016

SCALE: 1:2000 @ A3

DWG NO:13043 N1C



FIGURE

20

8. Road Safety

A search has been made of the NZTA recorded crash database for the five-year period 2011 to 2015 to identify truck crashes and their causes across the urban roads and state highways of the recommended haulage routes.

The crash records and the levels of crash severity are presented in **Table 4** below for the respective parts of each route. The data is presented for weekdays only since no haulage truck movements will occur on weekends.

ROUTE SEGMENT	STREETS	SEVERITY		CRASH TYPES
		9:30am to 2:30pm and 10:00pm to 6:00am	Other Times	
Calabar Road (Broadway Roundabout) to Freight Drive	Stewart Duff Drive.	Fatalities: 0 Serious: 0 Minor: 0 Damage only: 0	0 0 0 0	No crashes.
Moa Point Road to Cobham Drive	Local Roads – Moa Point Rd, Lyall Pde, Onepu Rd, Evans Bay Pde.	Fatalities: 0 Serious: 0 Minor: 0 Damage only: 1	0 0 1 2	Turning / crossing at signalled intersections, parking
Mt Victoria Tunnel to Calabar Road (Broadway Roundabout)	SH1 – Taurima St, Ruahine St, Wellington Rd, Cobham Dr, Calabar Rd.	Fatalities: 0 Serious: 0 Minor: 0 Damage only: 2	0 0 0 5	Rear end, overtaking and lane change, turning verses same direction, merging, crossing (no turns).
Mt Victoria Tunnel to Terrace Tunnel (northern terminus)	SH1 – Paterson St, Dufferin St, Rugby St, Ellice St, Sussex St, Kent Tce, Buckle St, Vivian St, Arthur St, Karo Dr, Motorway.	Fatalities: 0 Serious: 0 Minor: 0 Damage only: 12	0 0 2 5	Overtaking and lane change, collision with obstruction, turning verses same direction, merging, rear end.
Terrace Tunnel (northern terminus) to Ngauranga Interchange	SH1 – Motorway.	Fatalities: 0 Serious: 0 Minor: 3 Damage only: 10	0 0 3 12	Trailer/load, lost control (straight roads), rear end, overtaking and lane change, merging, cornering.
Ngauranga Interchange to Newlands Interchange	SH1 – Motorway, Centennial Hwy, Newlands off-ramp, on-ramp and over bridge.	Fatalities: 0 Serious: 0 Minor: 1 Damage only: 10	0 1 2 12	Overtaking and lane change, lost control (straight roads), rear end, trailer/ load, cornering.
Ngauranga Interchange to Dowse Interchange	SH2 – Hutt Rd.	Fatalities: 0 Serious: 1 Minor: 2 Damage only: 3	0 0 3 14	Overtaking and lane change, lost control (straight roads), collision with obstruction, trailer/load, rear end, head on, merging.

Table 4: Recorded Accidents on Proposed Haulage Routes

This road safety analysis indicates that the rate of reported accidents involving trucks is generally more elevated at times other than haulage times proposed. This finding further reinforces the proposal to ensure haulage trucks use these roads at times when potential

conflicts can be minimised. The only exception in this regard is the urban sections of SH1 between the Mt Victoria and Terrace Tunnels, which have undergone significant changes in this safety review period, including with the addition of the Arras Tunnel and improvements to the Vivian Street corridor.

It is also noted that the urban roads and state highways included in this search are already designated as roads to be used by heavy vehicles. As such, haulage operators routinely use these roads when transporting goods and materials to, from and through Wellington.

There are no identified existing safety issues on the state highways and Principal Road routes that need to be addressed to facilitate truck haulage for the runway extension. That said, local traffic control measures will be developed and implemented through the CTMP, including driver protocols.

With recommended transport windows and transportation on established primary routes, it is concluded that haulage trucks can be safely accommodated by the public road network in the manner proposed. Moreover, the CTMP will have a particular focus on safety, both on and off-site, and include provisions around the safe management of truck movements.

9. Construction Traffic Volumes

To determine the likely volume and management of construction traffic, this assessment has included evaluation of:

- materials sourced locally and transported by road directly to site;
- transportation of construction plant and heavy equipment required at the site; and
- construction staff and contractors.

Initially, the expected traffic patterns will be a direct function of the delivery of materials and machinery to site to undertake site establishment works. Once this has been completed and construction including the marine based operations is mostly underway, the locally sourced stone, rock and fill material will be delivered. During this period, there will also be an increase in site servicing involving the delivery of fuel, parts and ancillary construction items. Routine numbers of staff will be involved through each phase of construction.

9.1 Site Establishment Works

The site establishment works will occur at the outset of the project.

Site compounds will be established on land located adjacent to Stewart Duff Drive and Tirangi Road, on both the eastern and western sides of the existing runway.

As previously commented the peak workforce demands expected during the planned construction period involves up to 50 staff on site at any one time. All staff parking will be accommodated on-site and within the site compounds in formed hard-stand areas.

Also as an early phase of works, parts of Moa Point Road are to be realigned to provide for construction of the bridge for the proposed new taxiway. The materials associated with these works will include the supply of road aggregate, prefabricated concrete units and the delivery of wet concrete by standard readymix concrete trucks. These estimated quantities are included in the schedule to follow.

9.2 Runway Extension Construction

For the reasons described in this report to manage and mitigate traffic and noise effects, truck haulage will occur Monday to Friday from 9:30am to 2:30pm, and 10:00pm to 6:00am, with other accompanying controls as discussed elsewhere in this report.

Peak truck traffic generation attributed to building the reclamation works will result from the construction of the rock dyke, the reclamation platform, delivery of rock and fill material, and subsequent removal of any surcharge material. The intensity of traffic generation from these key construction activities will be largely unaffected should changes be made to the intended construction programme. That is, there will be physical limitations relative to the rate at which materials are able to be received and processed on site.

Drawing from Table 1, **Table 5** sets out the anticipated schedule of quantities required and the assessed volume of truck deliveries that would transport the material direct to the site by road.

Construction Stage	Work Activity	Quantity m ³ (Solid in Place)	Loose Quantity m ³ (Bulking Factor Applied)	Number of Truck Deliveries (18m ³ per Truck and Trailer)	Mode of Transportation
	Site Compound Aggregate	1,000	1,200	67	Direct to site on road
	Moa Point Road and Bridge	2,000	2,400	133	Direct to site on road
A	Stone Columns	40,000	56,000	3,111	Direct to site by barge
B	Stone Blanket	56,000	78,400	4,360	Direct to site by barge
C	Rock Dyke Core	163,000	228,200	12,678	Direct to site on road
D	Filter Material	48,000	58,000	3,222	Direct to site on road
E/F	Secondary Dyke Armour	137,000	-	-	Likely sourced from Nelson area and barged to site
E/F	Primary Dyke Armour (prefabricated)	152,000	152,000	8,444	Materials transported direct to site then batched and placed, or precast units barged to site
H	Fill	850,000	1,020,000	56,667	Direct to site on road, or
					From dredge
I	Wave Wall (prefabricated)	980 lineal metres	980 lineal metres	325	Direct to site on road
J	Surcharge Material	200,000	240,000	13,333	Direct to site on road, or
					From dredge
K	Surcharge Removal	200,000	240,000	13,333	Direct from site on road
K	Runway Aggregates	13,000	15,600	867	Direct to site on road
K	Asphaltic Cement (Runway and Taxiway)	13,000	15,600	867	Direct to site on road

Table 5: Proposed Construction Quantities to be transported to site

Some on-site stockpiling is anticipated. Any such instances of trucked material being stockpiled will occur within the recommended haulage hours and volumes on weekdays, with stockpiled material then able to be transported internally from the stockpile areas within the site compounds on Stewart Duff Drive to the runway construction site, without the need to use public roads.

Site access at the construction site proper will involve entry and exit via the airport-owned Freight Drive, in the manner shown previously in Figures 9a and 9b.

The construction site entranceways will be gated (for security purposes after hours) and will have an appropriate level of traffic management to safely control all vehicle movements. The particular procedures for site management will be addressed in the CTMP.

The supply and placement of materials will involve different phases of construction. Informed by the Construction Methodology Report, the primary stages of the 3-4 year construction programme (Stages A to K) are represented in the chart included at **Figure 21**.

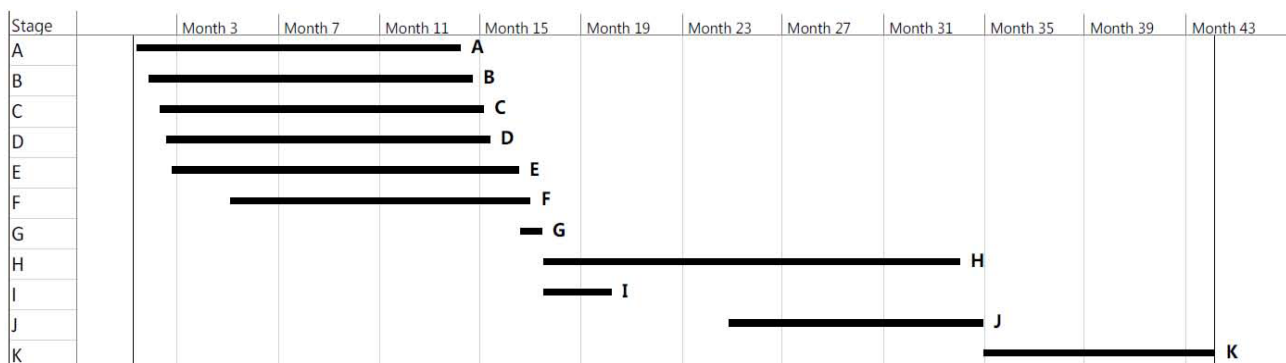


Figure 21: Construction Programme

This programme has provided the basis for further analysis of the profile of haulage truck movements through the construction period.

Figure 22 has been prepared to illustrate the anticipated worst-case truck profile, with the number of trucks per week and per day shown. The numbers of trucks is calculated based on 18m³ being transported per trip.

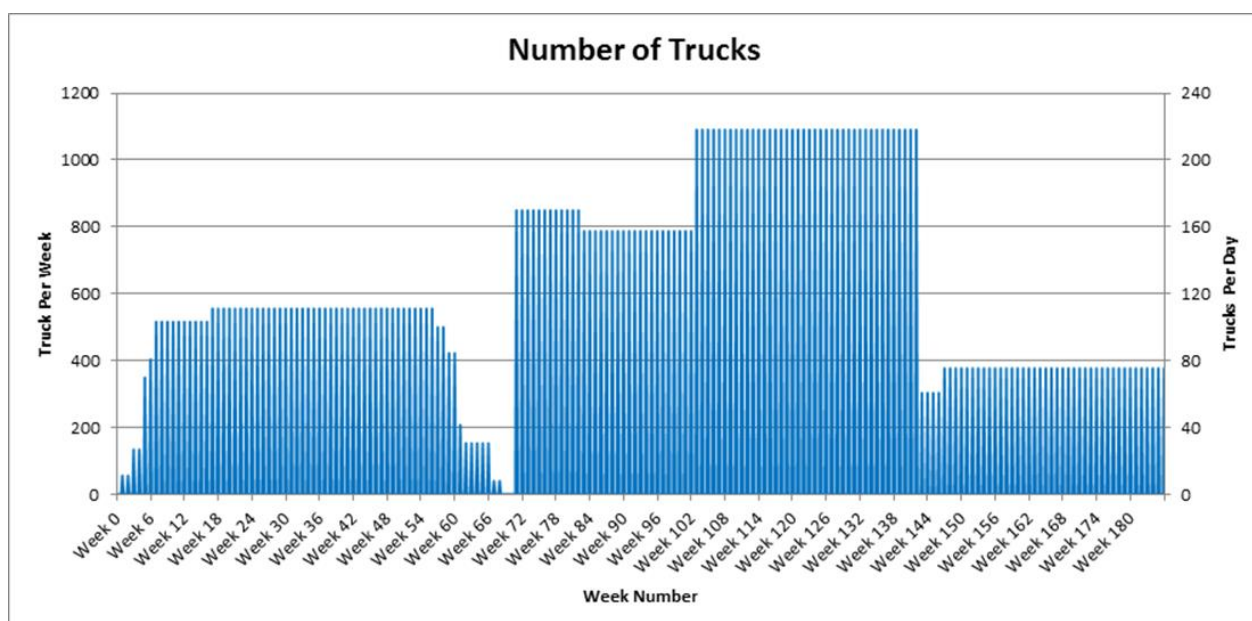


Figure 22: Weekly and Daily Truck Profile:

As shown:

- up to 110 trucks per day are anticipated through the first year of construction;
- up to 200 trucks per day will occur about two-thirds the way through the construction programme, when the 'fill' and 'surcharge' additions will be the most intensive; and
- a reduced level of 75 trucks per day though the final Stage K works.

It is appreciated that there will be some variability around this profile in recognition of daily and weekly variances in material demands on site, but noting that these will be mitigated and managed as far as practicable by the programme and by the ability to stockpile materials.

The road network itself presents limitations as to the volume of trucks able to be accommodated, with the Construction Noise Report identifying that night time volumes will be determined by noise levels, and the details of Chapter 7 of this report having identified that the traffic signalised intersections along the urban outbound route on the western side of the airport will present traffic capacity limitations for day time volumes. With these traffic and noise limitations, the maximum daily truck volumes have been determined to be as included below in **Table 6** for the respective day time (9:30am to 2:30pm) and night time (10:00pm and 6:00am) transport routes.

Hour	Number of Trucks*	
	Day Time (Figure 9a)	Night Time (Figure 9b)
9:30am – 10:00am	15	
10:00am – 11:00am	30	
11:00am – 12 noon	30	
12 noon – 1:00pm	30	
1:00pm – 2:00pm	30	
2:00pm – 2:30pm	15	
9:30am – 2:30pm	150	
10:00pm – 11:00pm		30
11:00pm – 12 midnight		25
12 midnight – 1:00am		25
1:00am – 2:00am		15
2:00am – 3:00am		5
3:00am – 4:00am		10
4:00am – 5:00am		20
5:00am – 6:00am		30
10:00pm – 6:00am		160

**number of trucks relates to one-way movements, so that the combined inbound and outbound totals are twice that shown in the table*

Table 6: Hourly Truck Volumes

On this basis, peaks of up to 310 trucks per day can be planned for, with no more than minor traffic capacity (and noise effects), but noting that truck numbers will be more in line with the profile shown on Figure 22.

Other routine traffic related to servicing and staff will occur each day, involving approximately:

- 20 standard single unit trucks per day (two to four per hour) for site servicing; and
- 40 cars / vans per day (15 per hour) for staff travel.

These routine daily vehicles will be accommodated (inbound and outbound) via the public roading network and Stewart Duff Drive (and Freight Drive), to and from the site compounds and the construction itself, and will not be subject to the truck haulage hours.

9.3 Overdimension Loads

While the specific details of overdimension loads will be dependent on the type and size of construction plant to be used, some special deliveries can be anticipated. These loads will be transported to and from the site via the designated OVR routes (as provided earlier in Figure 8), and will require separate permitting. Experienced specialist heavy haulage contractors will apply for the relevant permits at the appropriate time.

It is anticipated that the construction machinery will be transported along the preferred OVR route involving SH1 and then across the airport via the newly authorised airside route between Station Drive and Freight Drive.

10. Post Construction Traffic Volumes

10.1 Operational Traffic Generation

Once the runway extension works are fully commissioned, the area will attract only routine maintenance vehicles, both airside and landside.

These operational requirements already apply for the existing runway. As such, the extended runway will involve little added maintenance over and above existing demands.

As briefly described at Section 4.3 of this report, the matter of future roading improvements that may be required in response to airport growth, including as influenced by the runway extension, are addressed by WIAL's Masterplan and will mostly be the subject of actions by road controlling authorities. Notwithstanding the framework of the Masterplan, an assessment has been made of the traffic changes likely to arise in response to the airline and passenger changes resulting from the runway extension, as included next.

10.2 Traffic Forecasts from Passenger Forecasts

The March 2016 'Wellington International Airport Air Traffic Forecasts' Report prepared by InterVISTAS submitted with the application sets out the 'most likely' passenger forecasts for a number of forward years. For the purpose of this transportation assessment, vehicle trip forecasts have been derived from these passenger forecasts.

This section of the report presents busy hour vehicle trip forecasts for the Business As Usual (i.e. no lengthening of the runway) and Runway Extension options for Wellington Airport, for FY2030, relating to the published 2030 Masterplan, and also for FY2045, representing a 30 year forward period.

The 2030 Masterplan forecasts annual passenger numbers increasing to about 10.5 million in 2030. That previously-forecast position is also included for comparison with the latest updated forecasts which present a (downward) adjustment.

The key infrastructure features of the 2030 Masterplan are currently and will continue to be progressed, independent of a runway extension, generally as described in the published document, such that the key road traffic difference between the Business as Usual (**BAU**) and the Runway Extension options arises from the ability to operate larger aircraft types under a longer runway scenario, and improve operating restrictions for other aircraft.

The vehicle trip forecasts are based on the following assumptions:

- the busy hour peaking factor, which is used to identify the number of busy hour passengers from total passengers, will remain constant. This conservative assumption is based on the premise that the busy hour will grow at a similar rate to the annual passenger forecasts throughout the forecast period and that peak spreading will not occur; and

- the vehicle mix will remain the same throughout the forecast period. This conservative assumption is based on the premise that vehicle trip generation will remain at the current levels of 0.73 inbound, 0.77 outbound, whereas international passengers typically make greater use of higher-occupancy vehicles and can therefore be expected to have lower vehicle trip generation rates.

Table 7 shows the forecast busy hour vehicle trips for the BAU option. These are shown separately for the inbound and outbound directions, for the overall hour and on a per minute basis.

BAU Option	FY2015	FY2030	FY2045	2030 Masterplan
Passengers (thousands)	5,457	7,796	11,553	10,500
Busy hour passengers	1388	1983	2939	2671
Busy hour inbound vehicle trips	1013	1448	2145	1950
Busy hour outbound vehicle trips	1069	1527	2263	2057
Busy hour inbound vehicle trips per minute	17	24	36	32
Busy hour outbound vehicle trips per minute	18	25	38	34

Table 7: BAU option forecasts

It will be clear from these comparisons that the passenger forecasts of the 2030 Masterplan are noticeably larger than the latest FY2030 forecasts, and more closely related to the FY2045 forecasts.

Table 8 shows the equivalent forecast busy hour vehicle trips for the Runway Extension option.

Runway Extension Option	FY2015	FY2030	FY2045	2030 Masterplan
Passengers (thousands)	5,457	8,654	12,072	10,500
Busy hour passengers	1388	2202	3071	2671
Busy hour inbound vehicle trips	1013	1607	2242	1950
Busy hour outbound vehicle trips	1069	1696	2365	2057
Busy hour inbound vehicle trips per minute	17	27	37	32
Busy hour outbound vehicle trips per minute	18	28	39	34

Table 8: Runway Extension option forecast

In this instance, the forecasts of the 2030 Masterplan sit midway between the FY2030 and FY2045 forecasts.

Table 9 shows the increase in busy hour vehicle trips that result from the Runway Extension option compared to the BAU option, based on the conservative assumptions made.

	FY2030	FY2045
Busy hour inbound vehicle trips per minute	+3	+1
Busy hour outbound vehicle trips per minute	+3	+1

Table 9: Increase in busy hour vehicle trips per minute

From this summary, the airport-related road traffic increase averages just 0.2%pa, compared to the BAU option, with a 2-3% total change per direction overall to 2045.

11. Route Travel Times

Travel time surveys have been completed as part of this assessment to confirm the time a haulage truck will likely take to travel between the two identified quarries and the construction site at Wellington International Airport. Travel distances of approximately 34kms and 40kms are involved with the round trips for Kiwi Point Quarry and Horokiwi Quarry respectively.

Table 10 summarises the weekday morning (AM) peak, inter-peak, afternoon (PM) peak and night time travel times relative to each journey involved.

Route	Travel Time (rounded to five minutes)							
	AM Peak		Interpeak		PM Peak		Night Time	
	Min	Max	Min	Max	Min	Max	Min	Max
Kiwipoint to Airport	35	50	25	30	30	35	20	25
Airport to Kiwipoint	30	40	25	30	30	45	20	25
Horokiwi to Airport	40	60	30	35	30	40	25	30
Airport to Horokiwi	35	45	30	35	35	50	25	30

Table 10: Measured Travel Times

As can be seen above, the surveys confirm, as expected, that there is significant variability and added time involved in travel during the weekday AM and PM commuter peak periods, as compared with the interpeak and night time hours.

With less travel reliability, due to highway congestion, and in order to minimise the effect of additional truck volumes and utilise the availability of capacity during off-peak periods, it is proposed that truck haulage occur outside the peak hours, in a day time transport window between 9:30am and 2:30pm, and in a night time transport window between 10:00pm and 6:00am.

Transport efficiencies by way of vehicle operating cost savings can be anticipated through avoidance of traffic peaks.

12. Construction Traffic Management Planning

In order to guide and inform management of construction traffic and mitigate its effect both on and off site, it is intended that a Construction Traffic Management Plan (**CTMP**) will be finalised and implemented by the contractor. To assist in this regard, a CTMP framework is appended to this report as **Appendix A**.

This framework has been prepared to provide a broad overview of the minimum required objectives and environmental controls which all construction related traffic activities must adhere to.

The fuller CTMP (to be finalised by the appointed Contractor) may be varied, provided that any variation relates only to the means by which the environmental controls will be met. It is also recommended that a copy of any variations be provided to WCC, NZTA and WIAL, prior to being implemented and no later than five working days from the date the variations are made.

The final CTMP will ensure accountability for construction vehicle movements on private and public roads, and will provide a mechanism for forward planning, monitoring and implementation.

13. Conclusion

Having examined the details of the existing transportation environment across the road network serving Wellington International Airport and its proposed runway construction requirements, it is concluded that the existing road network can provide safe and convenient access to and from the proposed works site. With the mitigation measures and management controls described in this report, the road network is assessed as capable of safely accommodating the volumes of truck traffic anticipated to be generated during construction, for a worst-case scenario in respect of the volume of material that may need to be transported by road direct to the site. In the event that more material is marine sourced, the road transport volumes and associated effects will be less than assessed.

The key to managing construction traffic effects lies in confirming transportation windows for haulage trucks that avoid busy commuter traffic peaks, school peaks, business peaks, and weekends, and provides for movements in the following off peak periods which afford road capacity and less vehicle and land use conflict:

- 9:30am to 2:30pm weekdays; and
- 10:00pm to 6:00am weekdays.

With these times, two truck haulage routes (day time and night time) have been identified as mapped in Figures 9a and 9b, and truck volumes are to be restricted to a maximum of one truck exit from the site every two minutes and 310 trucks per day, as set out in Table 6, but noting that truck movements will vary considerably below this maximum in response to the different activities and stages through the construction programme.

Beyond these managed haulage times, routes and volumes, no physical works are identified as necessary on the urban and state highway networks.

A Construction Traffic Management Plan, applying throughout construction, will provide controls on the operational requirements of all construction related traffic travelling to and from the proposed construction site, and within the site too. The Plan will require approval by the relevant road controlling authorities and WIAL.

Post-construction, and with the resulting changes in the dynamics of domestic and international air travel arising from the extended runway, the road traffic increases have been found to equate to a very minor change averaging just 0.2%pa.

With these arrangements and outcomes, it is assessed that construction, operation and maintenance of the proposed runway extension and all associated auxiliary activities can be achieved in a manner that would have no undue effect on the function, capacity and safety of the road network. There are no traffic or transportation reasons that would preclude the establishment of the runway extension as proposed.

TDG

Appendix A

Construction Traffic Management Plan Framework



Wellington International Airport Proposed Runway Extension

Construction Traffic Management Plan Framework

April 2016

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1. Preface

This framework identifies the key traffic management elements that will be required to form a final Construction Traffic Management Plan (CTMP) for the proposed runway extension at Wellington International Airport.

It provides a broad outline to assist with the preparation of a comprehensive CTMP that will need to be finalised by the appointed Contractor prior to the runway extension proceeding, and in response to conditions sought by the road controlling authorities and WIAL as well as any relevant conditions of the resource consent.

The environmental controls specified in this framework provide the minimum requirements that the Contractor must comply with when undertaking construction activities involving vehicle movements to and from the site. More site specific details will be developed in due course (including signage, delineation, and the management of the approved transport routes).

The CTMP may be varied so long as any variation is confined to the methodology by which the objectives and environmental controls within the final plan are achieved.

2. Environmental Management

The CTMP sets out how construction traffic will be managed to ensure that the works are undertaken in accordance with WIAL's requirements, and any conditions and legislative requirements set by the road controlling authorities and any relevant conditions of the resource consent.

2.1 CTMP Objectives

The objectives of the CTMP are to:

- meet the specific requirements for construction traffic management including, where required, to obtain approval from road controlling authorities for the activities required. Where any approval is required from a private land holder, or a person having an interest in private land; to obtain those approvals before undertaking any work; to be in accordance with the relevant By-Laws, Acts, Regulations and Wellington City conditions pertaining to traffic;
- adopt NZTA's Code of Practice for Temporary Traffic Management including any activity that varies the normal operating conditions of any road;
- ensure the application of best practice methodology to all traffic controls associated with construction;
- ensure compliance with relevant legislative requirements;
- effectively manage traffic generated during the construction phases of the project so that:
 - construction traffic volumes are safely accommodated within the existing road network;
 - so far as is reasonably practicable, congestion or traffic delays are avoided;
 - any traffic effects associated with construction are mitigated as far as reasonably practicable; and
 - the needs of other road users and liaison with road controlling authorities, residents, businesses, sports facilities, major events organisers and emergency services are considered and where appropriate addressed.

2.2 Contractor Objectives

The Contractor(s) will be required to set themselves objectives with respect to undertaking the project works which are consistent with the consent holders' objectives and the resource consents. Those objectives will include consideration of the following:

- complying with the conditions applicable to the Contract Works and associated legislation;
- actively encouraging a culture of environmental awareness and commitment within all staff;
- undertaking regular training and taking advantage of all opportunities to improve environmental awareness; and

- undertaking the project to enhance the reputation of both WIAL and the Contractors.

2.3 CTMP Review

The CTMP may be reviewed for the purposes of informing any variation of the methodology or means by which the environmental controls outlined in Section 3 will be met.

CTMP reviews may be undertaken when:

- a previously unforeseen event occurs;
- following any environmental incidents; and
- periodically during and at the end of the project.

3. Environmental Controls

The following environmental controls have been identified as the minimum requirements which all construction related traffic activities must adhere to in order to minimise, as far as practicable, any potential adverse environmental effects on the transportation network.

Transportation recommendations and requirements have been identified within the Transportation Assessment Report prepared by TDG. The recommended measures will be as conditioned by consent.

3.1 Vehicle Occupancy

The contractor will encourage its staff and/or subcontractors' staff to car-pool, targeting an average vehicle occupancy rate of at least two persons per vehicle, and to use public transport.

3.2 Routine Staff and Servicing Travel Routes

All routine traffic movements associated with construction staff and site servicing during the extent of the construction period will be monitored and managed by the Contractor.

Specific travel routes will be recommended.

3.3 Overdimension Loads

The consent holder will ensure that any contractor abides by the requirements for pilot vehicles and other safety measures, as detailed in NZTA's "Vehicle Mass and Dimensions Rule 2002", in order to ensure that overdimension loads are delivered without affecting the safety or convenience of other road users.

Additionally, the Contractor will be responsible for obtaining permits from the road controlling authorities to transport overdimension loads.

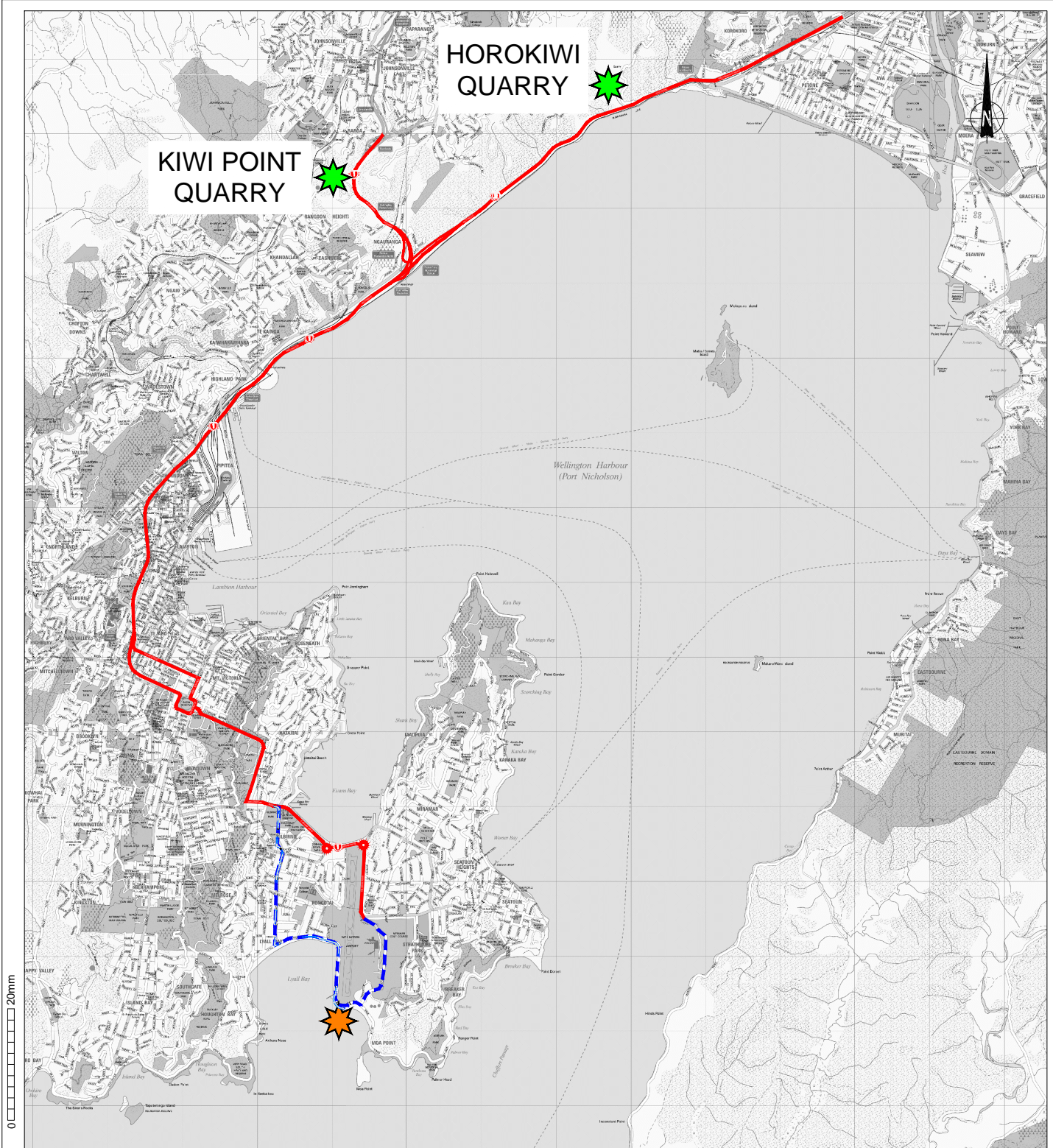
3.4 Haulage Trucks

A directive will be given to all truck operators that they will use the haulage routes as mapped in **Figure A1**, as the preferred travel routes during the construction. Separate day time and night time routes will apply with respect to the non state highway roads.

Contractors will schedule haulage truck movements on public roads on weekdays, within the following periods:

- 9:30am to 2:30pm; and
- 10:00pm to 6:00am.

Within these haulage periods, the following maximum truck volumes will apply:



0 20mm

Tuesday, 12 April 2016

- State Highway Haul Routes
- Non State Highway Haul Routes
- ★ Site Location

Sourced from Terralink Street Maps

Wellington International Airport Proposed Runway Extension Road Transport Network



FIGURE
A1

SCALE: NTS

Hour	Number of Trucks*	
	Day Time (Figure 9a)	Night Time (Figure 9b)
9:30am – 10:00am	15	
10:00am – 11:00am	30	
11:00am – 12 noon	30	
12 noon – 1:00pm	30	
1:00pm – 2:00pm	30	
2:00pm – 2:30pm	15	
9:30am – 2:30pm	150	
10:00pm – 11:00pm		30
11:00pm – 12 midnight		25
12 midnight – 1:00am		25
1:00am – 2:00am		15
2:00am – 3:00am		5
3:00am – 4:00am		10
4:00am – 5:00am		20
5:00am – 6:00am		30
10:00pm – 6:00am		160

**number of trucks relates to one-way movements, so that the combined inbound and outbound totals are twice that shown in the table*

Table A1: Hourly Truck Volumes

Truck volumes are to be restricted to a maximum of one truck exit from the construction site every two minutes, and to a maximum of 310 trucks per day.

3.5 Driver Management

Truck movements to and from the site will be closely managed and monitored. Driver Management Protocols will be developed and must be adhered to by all drivers. Measures include:

- drivers will receive a site induction, which covers:
 - road network overview, heavy vehicle routes and traffic controls;
 - details of restrictions such as transport times and use of engine braking;
 - locations of key road features and potential hazards;
- drivers will be managed and monitored to ensure compliance with speed restrictions, and will be reminded of the need for courteous and safe driving , including the fact that mobile phone use is forbidden whilst driving;
- drivers will be encouraged to report near misses, potential hazards, and issues such as road degradation.

Trucks will be fitted with fleet equipment that enables real-time observation of vehicle movements and performance, and communication equipment to ensure drivers are in contact with site personnel.

3.6 Temporary Traffic Management

Where trucks are required to cross at intersections and/or their turning movements are likely to place them in conflict with existing road users, these sections on the haulage routes will be accompanied by temporary traffic management arrangements in full accordance with the Code of Practice for Temporary Traffic Management.

Detailed temporary traffic measures and layout plans for each area will be prepared by the Contractor and provided to WCC, NZTA and WIAL, as appropriate, for their prior approval. The Temporary Traffic Management measures are expected to include:

- adoption of 'Level 1' (500 to 10,000 vehicles per day) temporary traffic management controls for all WCC roads;
- adoption of Level 2 (greater than 10,000 vehicles per day) temporary traffic management controls for NZTA roads (or as instructed by the Authority);
- appointment of suitably trained Site Traffic Management Supervisor and / or a Traffic Controller and staff in the use, implementation and application of temporary traffic management controls;
- arranging for the publication of approved notices in local newspapers or other media notifying of any potential delays due to construction traffic movements;
- recording details of regular inspections / audits of temporary traffic management measures; and
- reporting of any incidents and responses.

3.7 Pre and Post Construction Pavement Condition Survey

Due to the scale of works and overall volume of construction related traffic that will be generated during the project, the contractor will be responsible for Pre- and Post-Construction Pavement Condition Surveys on WCC and WIAL roads.

A Pre-Construction Pavement Condition Survey is considered necessary for this project as it will record the existing road conditions prior to any construction traffic being used. Any defects and / or pavement issues that could potentially fail or deteriorate during the construction period are located, recorded (and photographed), measured and appropriately documented.

Once the construction has been completed a Post-Construction Pavement Condition Survey is to be undertaken to confirm if any previously recorded problems have further exacerbated as a direct result of the project's construction traffic and / or if any new pavement problems are detected as a result of construction movements and remedial works required.

Equivalent condition surveys may also be appropriate periodically during construction.

3.8 Monitoring

A monitoring protocol will be prepared and submitted to WCC, NZTA and WIAL as part of the final CTMP, including but not limited to the specific data to be monitored, the method of monitoring, the frequency with which monitoring will be undertaken, the personnel responsible, trigger levels for intervention, and the corresponding response.

As a minimum the monitoring protocol will address the following matters:

- travel times, queues, delays and any disruptions resulting from construction vehicles; and
- implementation and compliance with those temporary traffic management provisions outlined in Section 3.6 above, as required by the Code of Practice for Temporary Traffic Management.

The monitoring is required to ensure that there are no inappropriate or unreasonable delays, disruption, or adverse safety effects on other road users. Where that monitoring shows that there are interventions required, the contractor will take steps immediately to address them.

3.9 Communication Protocols

A communications protocol will be developed and implemented including but not limited to the following:

- names and contact details of key staff and/or contractors responsible for implementing the CTMP;
- contact details of key staff within WIAL, WCC, NZTA, and / or any other third party who have operational interests in the surrounding road network;
- contact details and location of the site offices;
- details of signage to be established, including content and locations;
- location of all relevant consents, managements plans, health and safety plans, and other key project documentation;
- a process for receiving and responding to complaints, including a register for recording all complaints and actions taken;
- a process for scheduling planned overdimension loads such that this can be communicated to the general public and road controlling authorities;
- a plan for informing stakeholders and the general public of construction traffic movements, times and routes;
- a process for managing construction traffic during events. Communications with key event organisers will be required; and
- a list of people and organisations that the CTMP will be distributed to. All amendments and updates to the CTMP will then be forwarded to those named on the list.

3.10 Emergency Response and Incident Management

Serious incidents and emergencies must be reported immediately to the relevant emergency services.

All reports of accidents and other environmental emergencies, regardless of their origin are to be reported to the Construction Manager and WIAL. An environmental emergency is any event that causes or has the potential to cause material harm to the environment or people.

Where disruption to traffic or significant damage has occurred within the roading network the appropriate road controlling authority shall be notified immediately.

All incidents involving environmental non-compliance will be recorded and reported through the Contractors' incident and non-conformance procedures. An environmental incident register will held at the Site Office.

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