Ngāmotu Strategic Transport Model

Forecasting Report

Prepared for New Plymouth District Council
Prepared by Beca Limited

21 October 2024

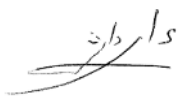
Contents

Appendices

Revision History

Revision Nº	Prepared By	Description	Date
1	Ali Danesh and Apurba Ghosh	First revision for client and peer review comments	15/11/2023
2	Ali Danesh	Second revision following client and peer review comments and an update of the Preferred Option scenario specification.	22/1/2024
3	Ali Danesh	Third revision to include brief description of model results for the 2053 Core Preferred Option (Section 9)	21/10/2024

Document Acceptance

Action	Name	Signed	Date
Prepared by	Ali Danesh		21/10/2024
Reviewed by	Matt Hickson		21/10/2024
Approved by	Nyan Aung Lin		21/10/2024
on behalf of Beca Limited	Beca Limited		

Executive Summary

Introduction

Beca Ltd (Beca) developed the Ngāmotu Strategic Transport Model (Ngāmotu STM) of the New Plymouth urban area for New Plymouth District Council (NPDC) in Autumn 2023. The model has a base year of 2018 to align with the most recent census year. The Ngāmotu STM v1.0 Development Report describes the model development process and the calibration and validation of the model. Ngāmotu STM v1.0 was successfully validated and considered suitable for transport demand forecasting and strategic level assessment of transport schemes. Ngāmotu STM v1.0 was peer reviewed by Flow Transportation Specialists and[1] is awaiting endorsement from Peer Reviewer.

The model was then used to support assessment of options for the programme business case of New Plymouth's Integrated Transport Framework. For this work Beca prepared Do Minimum, Short List Options, and Preferred Option forecast scenarios with the model. These scenarios cover several land use interventions and many interventions related to transport infrastructure, travel demand management initiatives and other transport plans.

Forecast Scenarios

NPDC required two forecast years to be modelled: 2035 and 2053. 2035 was chosen as a circa 10-year horizon from today and to align with the light vehicle kilometres travelled reduction target year in the Emissions Reduction Plan. 2053 was chosen as the 30-year horizon year from today.

The forecast population, household and employment assumptions were provided by NPDC. **Figure A** depicts a summary of population and household growth projected for the New Plymouth District.

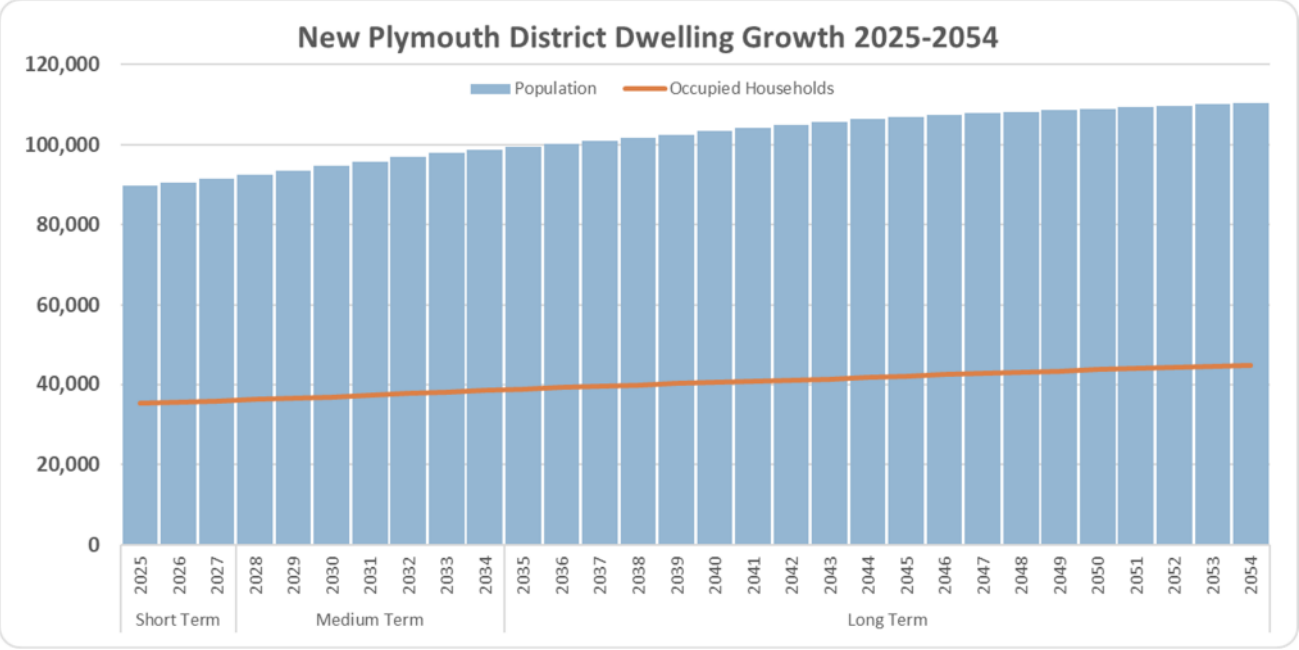


Figure A Population and Household growth in New Plymouth District

The forecast scenarios that were developed and described in this report are:

[1] As per the Transport Modelling Guidelines the Peer Reviewer was engaged in the model development process an in principle supports Model version 1.0. Endorsement is still to be formalised.

- Do Minimum (DM) – Years 2035 and 2053
- Short List Options (Options) – Years 2035 and 2053
  - Liveability (Option 1)
  - Connected Urban Centres (Option 2)
  - Reduce Transport Emission (Option 3)
  - Common interventions (Option 0)
- Preferred Option (PO) – Years 2035 and 2053

Sensitivity tests for the 2053 Preferred Option scenarios also have been carried out with a new ring road in the southwest of New Plymouth urban limit from SH3 to SH45.

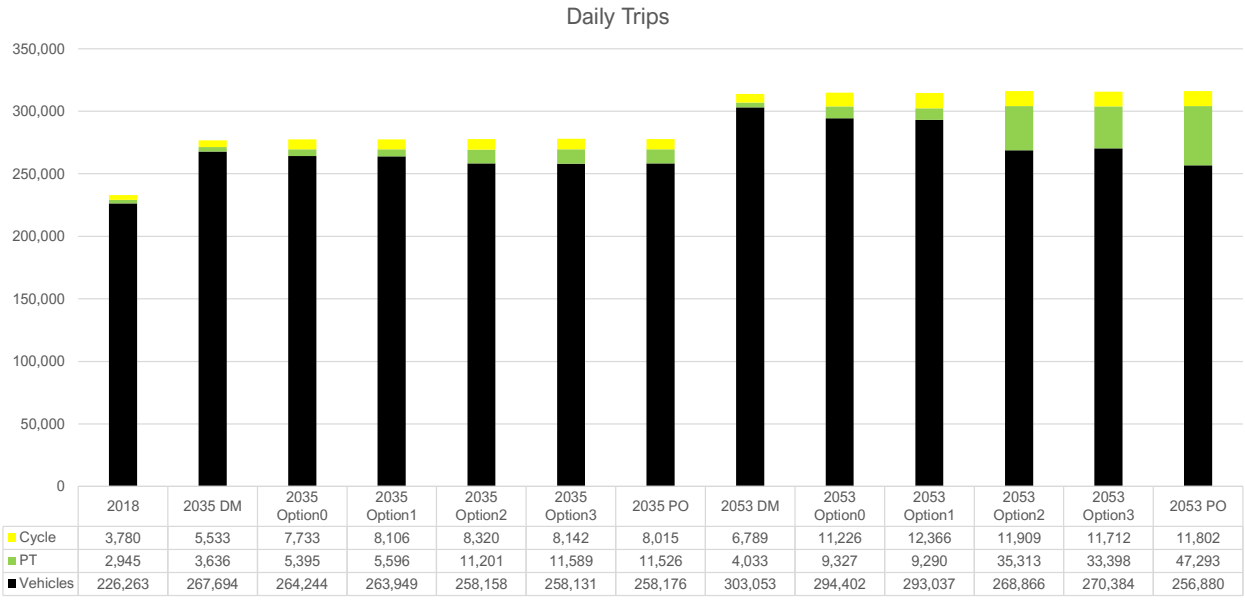
Following the submission of the final version of the New Plymouth Integrated Transport Framework (ITF) Programme Business Case (PBC) in March 2024, additional NZ Transport Agency (NZTA) feedback on the affordability of the programme and the financial case was received, and the draft 2024-2027 Government Policy Statement (GPS) on land transport was released. To respond to these changes and move towards gaining endorsement from all agencies, NPDC requested Beca to provide an updated version of the NPDC ITF. A revised 2053 Preferred Option was developed. This scenario is referred to as the 2053 Core Preferred Option. The scenario includes coding of the new arterial connection between SH3 and Smart Road and the removal of the High Speed Public Transport intervention between New Plymouth, Bell Block and Waitara. A brief description of model results for the 2053 Core Preferred Option are provided in Section 9.

The transport intervention assumptions for the DM, Options and Preferred Options are presented later in the report.

Key model outcomes from DM, Option and Preferred Option scenarios are summarised below:

Forecast Travel Demand

Figure B1 below illustrates the forecast of daily trips for Vehicles (light and heavy vehicles), PT, and cycle for each of the forecast scenarios. There is predicted to be an 18% increase in vehicle trips by, 23% increase in PT trips and 46% increase in Cycle trips by 2035 in the DM scenario compared to 2018. By 2053, there is predicted to be an 34% increase in vehicle trips by, 37% increase in PT trips and 80% increase in Cycle trips in the DM scenario compared to 2018. Figure B2 below presents PT and Cycle Mode shares to illustrate how the number of trips by these modes change with the interventions proposed in each of the Options and in the Preferred Scenario. Due to the improved cycle and PT network in the forecasting scenarios, there is forecast to be a substantial increase in both cycling and public transport trips across all options. The Preferred Option has a daily PT mode share of 3.5% in 2035 and 12.9% in 2053, and a Cycle mode share of 2.4% in 2035 and 3.2% in 2053.



	2018	2035 DM	2035 Option0	2035 Option1	2035 Option2	2035 Option3	2035 PO	2053 DM	2053 Option0	2053 Option1	2053 Option2	2053 Option3	2053 PO
Cycle	3,780	5,533	7,733	8,106	8,320	8,142	8,015	6,789	11,226	12,366	11,909	11,712	11,802
PT	2,945	3,636	5,395	5,596	11,201	11,589	11,526	4,033	9,327	9,290	35,313	33,398	47,293
Vehicles	226,263	267,694	264,244	263,949	258,158	258,131	258,176	303,053	294,402	293,037	268,866	270,384	256,880

Figure B1 Daily trips by mode forecasts.

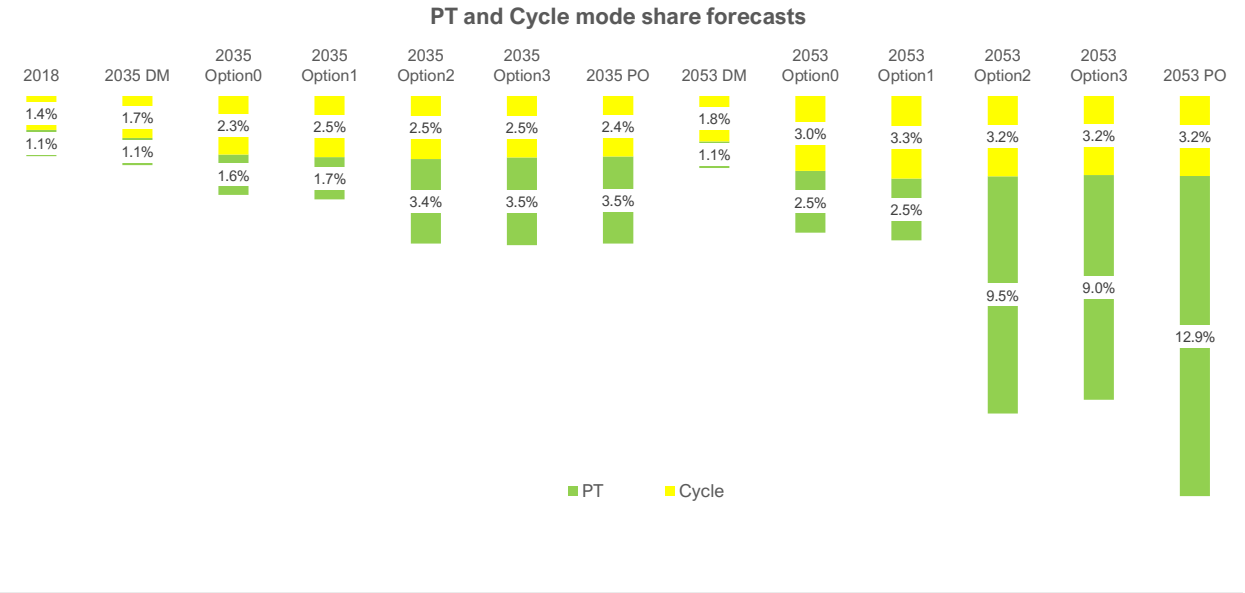


Figure B2 PT and Cycle mode share forecasts

*The peak hour and daily demands along with mode share forecasts are provided in **Section 5.1** for DM scenario, **Section 6.10** for Option scenarios and **Section 7.1** for PO scenario.*

Road Network Vehicle Statistics

Figure C below depicts the changes in average daily VKT (for light vehicles and heavy vehicles) in year 2035 and 2053. It is observed that for both years, PO scenarios have the lowest daily VKT followed by Option 2.

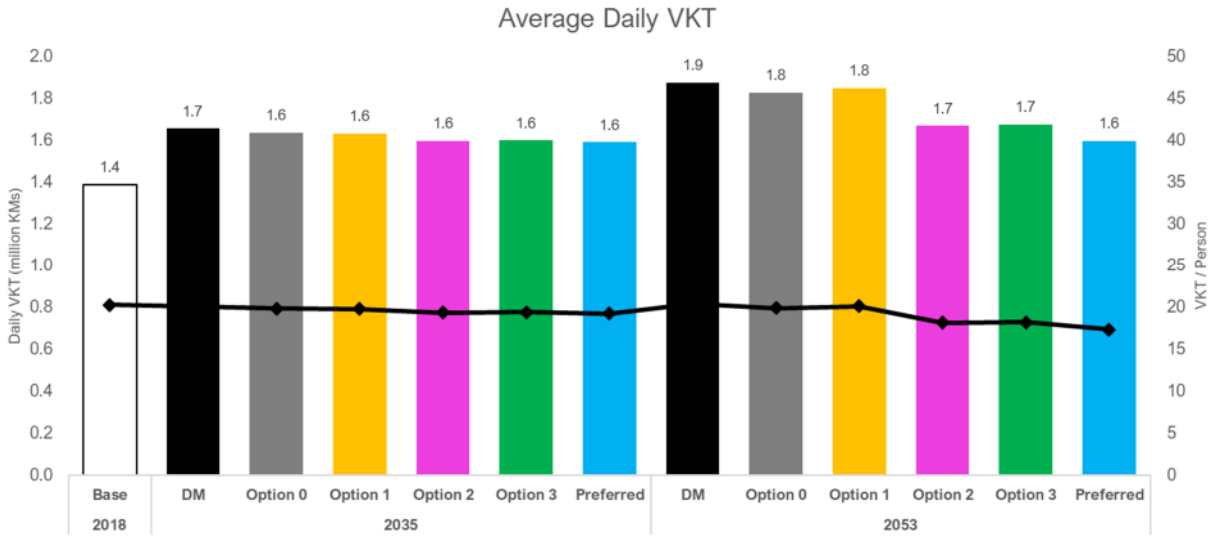


Figure C Average daily VKT

*Total network statistics are given in **Section 5.2** for DM scenario, **Section 6.2** for Option scenarios and **Section 7.2** for PO scenario*.

Vehicle Emissions

NZ Transport Agency's VEPM version 6.3 (released in April 2022) was adopted for analysing the vehicle emissions in this study. Figure D below illustrates the CO_2 emission for all the scenarios. As shown, the Option 2 has the lowest CO_2 equivalent emissions of the four options in both forecast years, and the Preferred Option provides a slight improvement on Option 2 in reduced CO_2 equivalent emissions in both forecast years.

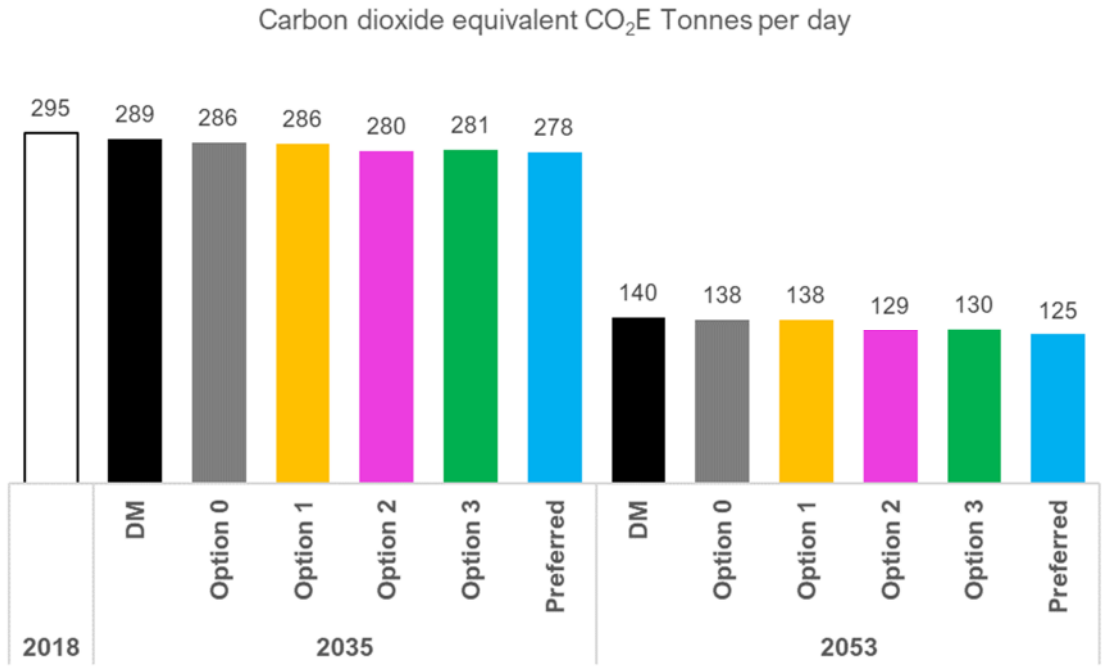


Figure D Vehicle CO_2E emissions summary

*The detailed vehicle emission outcomes are provided in **Section 5.3** for Do Minimum, **Section 6.3** for Short List Options and **Section 7.3** for Preferred Option.*

Flow difference plots

Average daily traffic vehicle flow difference plots and PT Patronage difference plots are provided in **Appendix E and F** respectively.

Level of Service (LOS)

LOS plots are useful to identify locations with severe traffic congestion. LOS plots are provided in **Appendix G**. The LOS results are summarised in **Section 5.4** for Do Minimum, **Section 6.4** for Short List Options and **Section 7.4** for Preferred Option. The key observations are:

- For both years, Option 2 has the least number of intersections with LOS=F.
- For both years, there is no link or corridor with LOS=F in Option 3.
- For both years, there is no link or corridor with LOS=F in the Preferred Option.

Summary

The key metrics from the modelling of the Preferred Scenario were:

- The Preferred Option has a daily public transport mode share of 3.5% in 2035 and 12.9% in 2053.
- The Preferred Option has a cycle mode share of 2.4% in 2035 and 3.2% in 2053.
- The Preferred Option provides a 4% reduction in CO_2 equivalent emissions on the DM scenario in both 2035 and 10% reduction in 2053.
- The Preferred Option provides a 10% reduction in vehicle delay across the network compared to the DM scenario in 2035 and a 41% reduction in vehicle delay across the network in 2053.

1 Introduction

1.1 Background

Beca developed Ngāmotu STM version 1.0, a strategic multi-model transport model of the New Plymouth urban area for New Plymouth District Council (NPDC) in Autumn 2023 to support the development of an integrated transport plan for the district. The model has a base year of 2018 to align with the most recent census year. The model was built using CUBE software.

1.2 Report Purpose

The purpose of this report is to document the methodology and assumptions adopted for modelling of the forecast scenarios and the modelling results. These scenarios encompass a range of land use interventions and various transport infrastructure improvements, travel demand management initiatives, and other transportation plans. The methodology of producing KPIs for the Integrated Transport Framework programme business case and a comparison between scenarios are documented in this report.

2 Methodology

2.1 Modelling Approach

The development of forecasting models involved the following steps:

- Define the target forecast years for modelling.
- Implement the future year land use assumptions for the forecasted years.
- Incorporate the committed and near certain transport interventions (road network, PT and cycle) in the Do Minimum scenarios.
- Work closely with the Programme Business Case (PBC) team to represent the short list scenarios and their respective interventions in the model.
- Extract the required KPI outputs required for the PBC team to inform decision making on the preferred scenario.
- Develop the Preferred Scenario, model and extract KPIs.
- Refine the assumptions in the Preferred Scenario to achieve the 2035 Light VKT reduction target, model and extract final set of KPIs.

2.2 Forecast Years

The Ngāmotu STM forecast years are 2035 and 2053 for the following reasons:

2035 – Chosen to represent a short-term outlook just over 10 years into the future and align with central government's Emissions Reduction Plan VKT reduction target year of 2035

2053 – Chosen to represent a long-term outlook, 30 years from today.

3 Forecast Scenarios

3.1 Do Minimum Scenarios

The Do Minimum scenarios are 2035 and 2053 future year scenarios with the central future year land use forecasts in place with committed and near certain transport schemes. The Do Minimum scenarios serve as the base scenario for comparison with options, during the assessment stages. **Figure** 3-1 below presents the Do Minimum scenario assumptions.

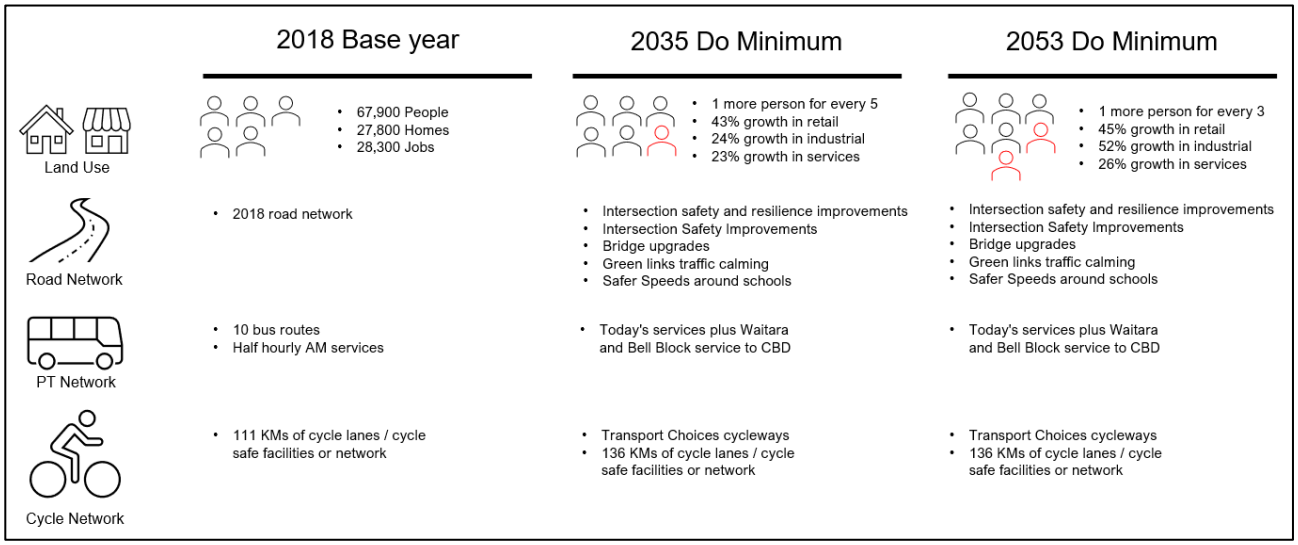


Figure 3-1 Do Minimum scenario assumptions

3.2 Short List Options

Three scenarios were proposed as part of Short List Options, these were:

- Liveability (Option 1),
- Connected Urban Centres (Option 2), and
- Reduce Transport Emission (Option 3).

An Option 0 was also developed in which only the common interventions across all the three options were modelled. **Figure** 3-2 presents the objectives of each of the short list options.

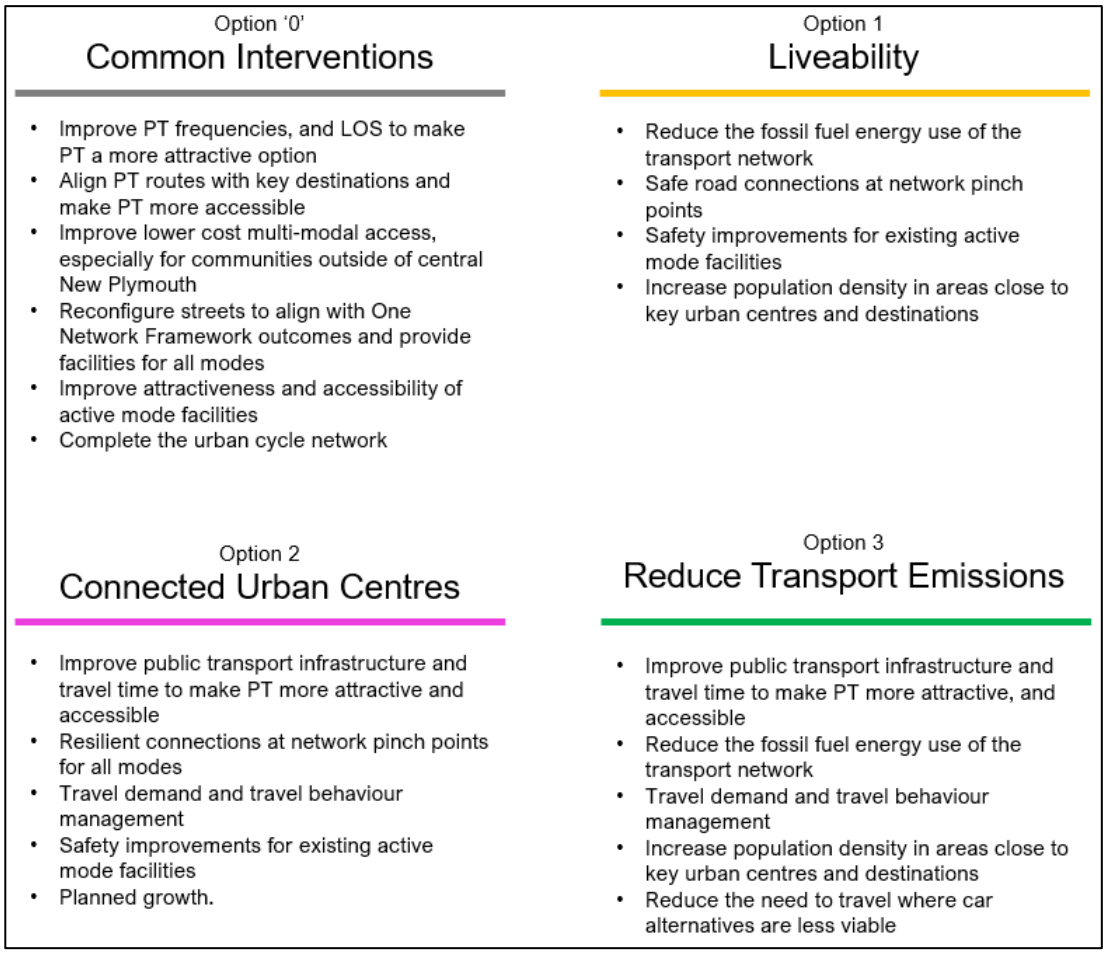


Figure 3-2 Objectives of the Short list options

3.3 Preferred Option

After evaluating the effects of each option on the existing road and PT network and assigning scores to each scenario, it was determined that the 'Connected Urban Centres' (Option 2) in combination with the land use assumptions utilised in Option 3 is the Preferred Option. Initially, the 2035 Preferred Option was developed further to include additional interventions achieve a 12% reduction in VKT by light vehicles by the year 2035 compared to a 2035 baseline. At the time, the ERP 2022 target for the New Plymouth district was a 12% reduction in VKT by 2035. However, as per the most recent iteration of the Waka Kotahi Arataki 30-year sector plan, the target of 12% reduction has been removed for the New Plymouth District. Arataki now simply targets a decrease in VKT relative to a 2035 baseline (Arataki 30 Year Plan September 2023). This combined with consideration of budgetary constraints the PBC team and project partners arrived at final Preferred Option specifications that took account of scheduling interventions to smooth the annual and total programme costs.

A detailed description of the land use, transport policy and network assumptions for each scenario is presented in **Section 4.**

4 Scenario Assumptions

4.1 Do Minimum Scenario Assumptions

4.1.1 Land Use Forecast

The central forecast supplied by NPDC[2] is used in the Do Minimum scenarios. The central forecast predicts a 21% increase in the population of the New Plymouth urban area represented in the model between 2018 and 2035, and a 34% increase by 2053. The employment forecast was provided for 2050 and is used in the model for the purpose of spatial distribution of journey to work trips in forecast. To maintain a reasonable ratio of employment to population, the 2035 and 2053 employment totals were adjusted to align with the population projections. **Table 4-1** presents a summary of the central land use assumptions.

Table 4-1 Land use assumptions (modelled area)

Forecast Year	Population	Households	Employment
2018	67,900	27,800	28,300
2035	82,000	32,000	33,300
2053	91,500	36,900	37,400
Growth 2018-2035 (%)	+21%	+15%	+18%
Growth 2018-2053 (%)	+35%	+33%	+32%

Between 2018 and 2035 the top 5 growth SA2s by population are:

1. Bell Block East-Puketapu
2. Bell Block West
3. Glen Avon
4. New Plymouth Central
5. Hurdon

Between 2035 and 2053 the top 5 growth SA2s by population are:

1. Glen Avon
2. Hurdon
3. Bell Block East-Puketapu
4. Waitara East
5. Bell Block West

The population, household and employment projections by SA2 are provided in **Appendix A**.

4.1.2 Network Assumptions

The DM road network, PT service and cycle assumptions are summarised in **Table 4-2.**

Table 4-2 Network assumptions – DM Scenario

S. N	Projects	2035	2053
Road Network Assumptions			
1	Free Speed Reduction to 30 km/hr on Gover Street, Fillis Street, Liardet Street from Gover Street / Rogan Street to Molesworth Street / SH44	✓	✓

[2] Population and household land use was developed by Informetric on behalf of NPDC and the employment land use was developed by Property Economics on behalf of NPDC.

S. N	Projects	2035	2053
2	Free Speed Reduction to 30 km/hr on all school frontages	✓	✓
3	Signalisation at Tukapa Street / Sanders Avenue	✓	✓
4	Upgrade of Intersection Layout at Mangorei Road/ Rimu Street Intersection	✓	✓
5	Signalisation at Lorna Street / Devon Street	✓	✓
6	Single Lane Roundabout at Parklands Avenue / Mangati Road	✓	✓
7	Realignment of Airport Drive to connect with Parklands Avenue	✓	✓
8	Single Roundabout at Belair Avenue / Ōmata Road	✓	✓
9	Two-Lane Junction Bridge (one Lane per Direction)	✓	✓
10	Signalisation at SH3 / Henwood Road Interchange	✓	✓
11	Signalisation at Nugent Street / Henwood Road	✓	✓
12	New Connection and Intersections between Egmont road and Henwood road via Bishop Road	✓	✓
13	Two-Lane Corbett Road Bridge (one Lane per Direction)	✓	✓
14	Upgrade of Road Network and Intersections on Mangorei Road (Tupuhi Place to Mangorei School)	✓	✓
15	Upgrade the Intersection Layout at Egmont Road/ SH3		✓
16	New Connection and Intersections from Colson Road to Henwood Road		✓
PT Assumptions			
17	New Express Service between CBD and Waitara	✓	✓
18	Increase Route 5020 (Waitara - Bell Block - CBD service) frequency from 1 bus/hr to 2 bus/hr	✓	✓
Cycle Assumptions			
19	Devon St West from Barrett Road - Dawson Street. Approximately 3.7km of separated cycle facilities, 17 intersection improvements, 3 raised safety platforms	✓	✓
20	Mangorei Road, Northgate - SH3. Approx 1.1km of improved on road cycle facility, 2 raised safety platforms, ~615m of shared pathway	✓	✓
21	SH44, Ngāmotu Road - Hobson Street. Approximately 4km of separated cycle facilities, 20 intersection improvements, 3 raised safety platforms, 2km of shared pathways.	✓	✓
22	Devon Street East & Clemow Road Record - Eliot. Approx 1.6km of separated cycle facilities, 1.2 km of neighbourhood greenway, 1 raised safety platform and 1 set of traffic signals.	✓	✓
23	Coronation Avenue - Liardet Street, approximately 1.3km of separated cycle facilities, 800m of neighbourhood greenway, 2 sets of traffic signals.	✓	✓
24	Waiwhakaiho pedestrian bridge to The Valley	✓	✓
25	Pohutukawa Place walking and drainage improvements	✓	✓
26	Waitaha Stream underpass	✓	✓
27	Coastal Walkway Extension to Waitara	✓	✓

4.1.3 PT Assumptions

The PT service and headways coded for DM scenarios are the same for both years and are given in **Appendix B Table 10-2**Table 10-2 . School bus services use the same headway as the base year. Based on the assumptions, the base year (2018) zonal fare system has been used for the 2035 and 2053 DM scenarios.

4.2 Short List Scenario Assumptions

To model the short list programme options while maintaining a high-level view as appropriate for a PBC, the following approach was adopted:

- Define model inputs based on the intended outcomes of each intervention category, rather than specific interventions.
- Only consider the impacts of interventions that could be well represented in the model.
- Combine building blocks of intervention category level model inputs to constitute the programme options.

4.2.1 Land Use Scenarios

Option 1 and Option 3 considered alternative land use scenarios in 2053. The alternatives assume the same land use growth assumptions to 2035, but then considered different growth assumptions for some SA2s between 2036 and 2053. In addition to the land use alternatives, Option 3 also adopted a change to the assumption regarding growth to and from external zones which has been categorised as a response to land use changes.

Option 1 land use assumptions:

- Population and housing growth projections in Glen Avon and Hurdon between 2036 and 2053 is reduced by 90% as compared to the central land use projections. The population and housing growth that was assumed in these two SA2s is instead shifted to SA2s with proposed medium density housing, namely, Spotswood, Moturoa, Kawaroa, NP Central, Westown, Welbourn, Strandon, Fitzroy and Waitara West.

Option 3 land use assumptions:

- As per Option 1, population and housing growth projections in Glen Avon and Hurdon between 2036 and 2053 is reduced by 90% (as compared to the central land use projections). The population and housing growth that was assumed in these two SA2s is instead shifted to SA2s with proposed medium density housing, namely, Spotswood, Moturoa, Kawaroa, NP Central, Westown, Welbourn, Strandon, Fitzroy and Waitara West.
- Retail and commercial growth in New Plymouth Central and Bell Block South is reduced by 50% as compared to the central employment projection, and spread across the nine medium density SA2s: Spotswood, Moturoa, Kawaroa, NP Central, Westown, Welbourn, Strandon, Fitzroy and Waitara West.
- Change to the assumption regarding growth to and from external zones from 2% per annum to 1% per annum.

4.2.2 Network Assumptions

A high-level description of the modelling inputs for the short list programme options is given in **Table 4-3.**

Table 4-3: High level modelling inputs for short list programme options

Intervention category	Ngāmotu STM network component	Intervention description	Model Assumptions	Programme option*			
				Option 0 Common interventions	Option 1 Liveability	Option 2 Connected urban area	Option 3 Reduce transport emissions hybrid
Align public transport routes with key destinations and make public transport more accessible	Public transport	Extending TRC bus route 5020 and increasing headway	Extend Route 5020 to Waitara East and Westown and update headway to 30 minutes	● ●	● ●	● ●	● ●
	Public transport	Implementing airport to CBD bus route	New Airport Line with headway of 30 minutes	● ●	● ●	● ●	● ●
	Public transport	Decreasing walking perception factors	Reduce the Walking Perception Factor from 2 to 1.5	●	●	●	●
Improve public transport infrastructure and travel time to make public transport more attractive, and accessible	Road	Implementing bus priority on bus routes	Bus lanes on Route 5020			●	●
	Public transport	Improving bus stop quality	Upgrade bus stops from 'Normal' to 'Medium' quality			● ●	● ●
	Public transport	Reducing bus route time factors	Reduce Route 5020 time factors by 50%			●	●
Improve public transport frequencies and level of service to make public transport a more attractive option	Public transport	Increasing bus service frequencies	Elevate the frequency of all PT services to 200%	●	●	●	●
			Elevate the frequency of all PT services to 400%	●	●	●	●
Improve lower cost multi-modal access, especially for communities outside of central New Plymouth	Public transport	Reducing public transport fares	Reduce PT fare by 50%	● ●	● ●	● ●	● ●
	Cycle	Reducing cycle journey costs	Reduce costs for all cycle journeys by 10%	● ●	● ●	● ●	● ●
	Cycle	Increasing off road trail perception factors	Improve perception factor for all off road trails by 20%	●	●	●	●
Resilient connections at network pinch points for all modes	Road	Implementing additional capacity at certain intersections and midblock sections	Provide additional capacity at up to 10 signalised intersection pinch points.			● ●	
			Provide additional capacity at up to 10 midblock pinch points.			●	
Travel demand and travel behaviour management	Road	Increasing parking costs and expanding parking cost zone	100% increase in the CBD parking cost and expand parking cost zone to all of New Plymouth Central SA2 area			● ●	● ●
	Road	Increasing car journey costs	Increase Car Cost by 2 times in Mode Split Module as a proxy for a road pricing scheme.			●	●
Reconfigure streets to align with One Network Framework outcomes and provide facilities for all modes	Road	Reducing speed limits on certain road types	Reduce local street (link type=4) free speed to 30km/hr	● ●	● ●	● ●	● ●
	Cycle	Implementing speed management facilities on certain road types	Add facility type 7 onto all local streets (speed management)	● ●	● ●	● ●	● ●
	Cycle	Implementing cycle lanes on arterial roads	Cycle lanes on all Arterial roads	●	●	●	●
	Road	Reducing capacity on SH44 and increasing capacity on SH45	Reduce capacity on SH44 and increase capacity on SH45		●	●	
	Road	Implementing ring route around New Plymouth			●		
Safety improvements on existing active mode facilities	Cycle	Upgrading existing cycle lanes to buffered lanes	Existing cycle lanes changed from on-road painted to on-road barrier (change facility type 4 to 5)		● ●	● ●	
	Cycle	Implement shared paths on all off-road trails	All off-road trails changed from trail to shared path (change facility type 3 to 1)		●	●	
Improve attractiveness and accessibility of active mode facilities	Cycle	Uplifting cyclist confidence factors	Uplift medium confidence factors towards high confidence	● ●	● ●	● ●	● ●
	Cycle	Reducing cycle journey costs for trips to the CBD	Reduce cost of journeys into NP central SA2 by 10%	●	●	●	●
			Reduce cost of journeys into NP central SA2 by 20%	●	●	●	●
Complete the urban cycle network	Cycle		All E+C routes converted to type 5 facility	● ●	● ●	● ●	● ●

Intervention category	Ngāmotu STM network component	Intervention description	Model Assumptions	Programme option*			
				Option 0 Common interventions	Option 1 Liveability	Option 2 Connected urban area	Option 3 Reduce transport emissions hybrid
		Implement ‘enthused and confident’ and ‘interested but concerned’ cycle routes	All I+C routes converted to type 2 facility	●	●	●	●
Increase population density in areas close to key urban centres and destinations	Land use assumptions	Redistributing most population growth in proposed future urban zones to areas with medium density zoning	Adjusting 2035-2053 growth distribution at SA2 level		●		●
Reduce the need to travel where car alternatives are less viable	Land use assumptions	Reducing traffic growth between central New Plymouth and other townships	Reduce external growth from 2% trip generation to 1%				● ●
	Land use assumptions	Partially redistributing retail and commercial employment growth in Bell Block area to areas with medium density zoning	Adjust 2035-2053 employment growth distribution at SA2 level				●

*● ● - Both in year 2035 and 2053
● - Year 2035
● - Year 2053

4.2.3 PT Assumptions

For the Option scenarios, DM PT service assumptions are used as a starting point and adjusted for each respective scenario. As per the DM, a new express line that connects CBD to Airport is added (Route AirEX) and route 5020 is extended to Waitara East and Westown with increased frequency. Bus frequencies are increased by 200% (doubled) in 2035 in all options. In 2053 bus frequencies are increased by 400% in all options. School bus services use the same headway as the base year.

Bus stop quality influences PT usage. Higher quality stops and stations attract more patronage. There are three levels of bus stop quality in Ngāmotu STM, namely Normal, Medium and High. These represent the physical quality of the stops, with different levels of wait perception factors, transfer penalties and transfer perception factors applied to quality level. Typically, all bus stops are classified as Normal quality. The PT stop and station quality parameters for Normal, Medium, and High stations are documented in **Table 10-1** of *"Ngāmotu STM v1.0 Strategic Transport Model: Model Development Report".*

PT fares are reduced by 50% for all the Option scenarios in both years. In the base year, only one fare zone was used for the modelling purpose. The PT fare system consists of different ticket types, such as Cash and Bee Card users, as received from the NPDC and the weighted average fare for adults and students were calculated. This process is explained in **Section 10.5** of *"Ngāmotu STM Strategic Transport Model: Model Development Report".* The PT fare for the adults and students are given in **Table 4-4**.

Table 4-4 PT Fare system

Trip Purpose	2035		2053	
	DM	Options	DM	Options
HBW	$2.12	$1.06	$2.12	$1.06
Other Trip Purposes	$1.71	$0.86	$1.71	$0.86
HBE	$2.06	$1.03	$2.06	$1.03

4.3 Preferred Option Scenario Assumptions

As previously described, the Preferred Option is a combination of the interventions proposed in the 'Connected Urban Centres' option (Option 2) with some additions, and the land use assumptions used in Option 3. The assumptions for the Preferred Option (PO) scenario are in the table below.

Table 4-5: Preferred Option Assumptions

Intervention category	Ngāmotu STM network component	Intervention description	Model Assumptions	Preferred Option
Align public transport routes with key destinations and make public transport more accessible	Public transport	Extending TRC bus route 5020 and increasing headway	Extend Route 5020 to Waitara East and Westown and update headway to 30 minutes	● ●
	Public transport	Implementing airport to CBD bus route	New Airport Line with headway of 30 minutes	● ●
	Public transport	Decreasing walking perception factors	Reduce the Walking Perception Factor from 2 to 1.5	●
Improve public transport infrastructure and travel time to make public transport more	Road	Implementing bus priority on bus routes	Bus lanes on Route 5020	●
	Road	Implementing bus priority on bus routes	Bus lane on all roads traversed by buses	●

Intervention category	Ngāmotu STM network component	Intervention description	Model Assumptions	Preferred Option
attractive, and accessible	Public transport	Improving bus stop quality	Upgrade bus stops from 'Normal' to 'Medium' quality	● ●
	Public transport	Improving bus stop quality	Upgrade bus stations and hubs in CBD, Waitara, Bell Block further from medium to high quality	●
	Public transport	Reducing bus route time factors	Reduce Route 5020 time factors by 50%	●
Improve public transport frequencies and level of service to make public transport a more attractive option	Public transport	Increasing bus service frequencies	Elevate the frequency of all PT services to 200%	●
			Elevate the frequency of all PT services to 400%	●
Improve lower cost multi-modal access, especially for communities outside of central New Plymouth	Public transport	Reducing public transport fares	Reduce PT fare by 50%	● ●
	Cycle	Reducing cycle journey costs	Reduce costs for all cycle journeys by 10%	● ●
	Cycle	Increasing off road trail perception factors	Improve perception factor for all off road trails by 20%	●
Resilient connections at network pinch points for all modes	Road	Intersection delay capped at E (55-80 seconds)	Provide additional capacity at up to 10 signalised intersection pinch points.	● ●
		Link delay capped to LOS E (<X% V/C)[3]	Provide additional capacity at up to 10 midblock pinch points.	●
Travel demand and travel behaviour management	Road	Increasing parking costs and expanding parking cost zone	100% increase in the CBD parking cost and expand parking cost zone to all of New Plymouth Central SA2 area	●
	Road	Increasing parking costs and expanding parking cost zone	300% increase in the CBD parking cost and expand parking cost zone to all of New Plymouth Central SA2 area	●
	Road	Increasing car journey costs	Increase Car Cost by 2 times in Mode Split Module as a proxy for a road pricing scheme.	●
Reconfigure streets to align with One Network Framework outcomes and provide facilities for all modes	Road	Reducing speed limits on certain road types	Reduce local street and high friction collector roads (link type=4&5) free speed to 30km/hr	● ●
	Road	Reducing speed limits on certain road types	Reduce speed limit on rural roads from 100kph to 80kph (Link type=13 free speed change to 80km/hr)	● ●

[3] Model changes were not required to represent this scenario as link LOS were all under LOS F on the East West route

Intervention category	Ngāmotu STM network component	Intervention description	Model Assumptions	Preferred Option
	Cycle	Implementing speed management facilities on certain road types	Add facility type 7 onto all local streets (speed management)	● ●
	Cycle	Implementing cycle lanes on arterial roads	Cycle lanes on all Arterial roads	●
	Road	Reducing capacity on SH44 and increasing capacity on SH45	Reduce capacity on SH44 and increase capacity on SH45	●
Safety improvements on existing active mode facilities	Cycle	Upgrading existing cycle lanes to buffered lanes	Existing cycle lanes changed from on-road painted to on-road barrier (change facility type 4 to 5)	● ●
	Cycle	Implement shared paths on all off-road trails	All off-road trails changed from trail to shared path (change facility type 3 to 1)	●
Improve attractiveness and accessibility of active mode facilities	Cycle	Uplifting cyclist confidence factors	Uplift medium confidence factors towards high confidence	● ●
	Cycle	Reducing cycle journey costs for trips to the CBD	Reduce cost of journeys into NP central SA2 by 10%	●
	Cycle	Reducing cycle journey costs for trips to the CBD	Reduce cost of journeys into NP central SA2 by 20%	●
Complete the urban cycle network	Cycle	Implement ‘enthused and confident’ and ‘interested but concerned’ cycle routes	All E+C routes converted to type 5 facility	● ●
			All I+C routes converted to type 2 facility	●
Increase population density in areas close to key urban centres and destinations	Land use assumptions	Redistributing most population growth in proposed future urban zones to areas with medium density zoning	Adjusting 2035-2053 growth distribution at SA2 level	●
Reduce the need to travel where car alternatives are less viable	Land use assumptions	Reducing traffic growth between central New Plymouth and other townships	Reduce external growth from 2% trip generation to 1%	● ●
	Land use assumptions	Partially redistributing retail and commercial employment growth in Bell Block area to areas with medium density zoning	Adjust 2035-2053 employment growth distribution at SA2 level	●

5 Do Minimum Scenario Results

5.1 Forecast Travel Demand

The forecast demand for travel is largely driven by the land use changes in New Plymouth. As previously described, population is expected to increase by 21% between 2018 and 2035 and by 35% between 2018 and 2053. **Table 5-1** presents the forecast travel demand by the modes represented in the model. Note that the mode share comparison is obtained by multiplying the vehicle trips with occupancy factor of 1.2 (to convert to passenger trips).

As shown, the growth in vehicle demand closely follows population growth, demand for public transport is slightly ahead of population growth, and cycle demand growth is ahead of population growth.

Table 5-1 Forecast Daily demand by mode and mode share

	Demand by mode			Mode share		
Scenarios/ Measure	Vehicles (vehicle trips)	PT (Person trips)	Cycle (person trips)	% Car	% PT	% Cycle
2018	226,263	2,945	3,780	97.58%	1.06%	1.36%
2035 DM	267,694	3,636	5,533	97.22%	1.10%	1.67%
2053 DM	303,053	4,033	6,789	97.11%	1.08%	1.81%
	Percent change in 2018			*Percentage point change in 2018*		
2035	+18%	+23%	+46%	-0.36%	+0.04%	+0.32%
2053	+34%	+37%	+80%	-0.47%	+0.02%	+0.45%

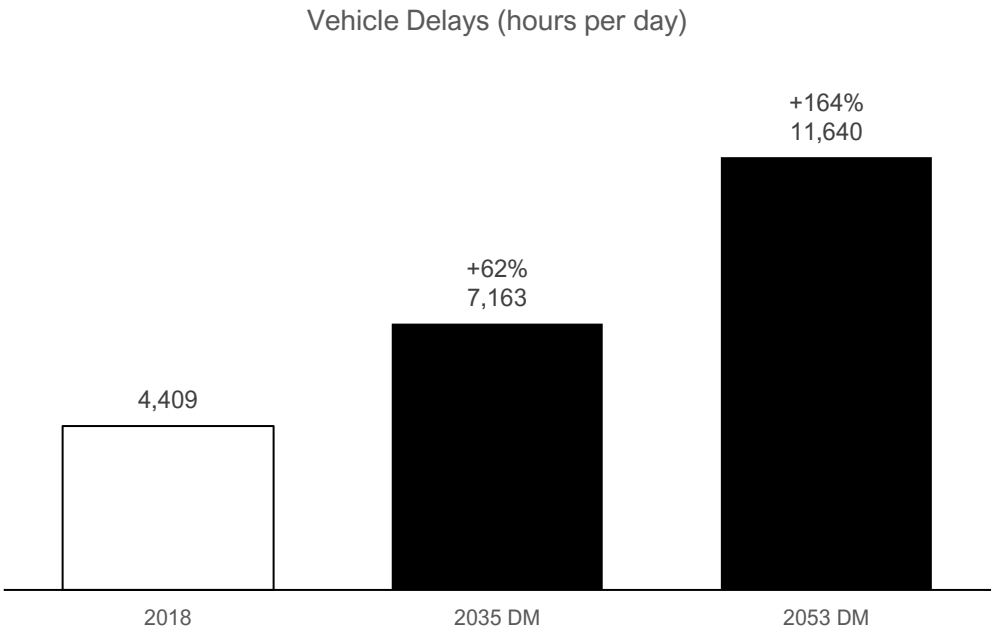
The slight shift in mode share from car to PT and Cycle is influenced by higher travel costs for the Car mode due to congestion on the traffic network and additional cycle infrastructure included in the DM scenarios.

The forecast travel demand by modelled time period for Vehicle and PT trips is provided in **Appendix C Table 10-4**. The cycle demand is modelled at daily level and not available at time period.

5.2 Road Network Vehicle Statistics

The forecast additional traffic in 2035 and 2053 is predicted to result in an increase in the number of hours vehicles are delayed on the network in the Do Minimum scenarios. By 2035 the model predicts a 62%

increase in hours delayed, and by 2053 the model predicts a 164% increase in hours delayed. This is illustrated in **Figure** 5-1 below.



Vehicle Delays (hours per day)
+164%
11,640
+62%
7,163
4,409
2018
2035 DM
2053 DM

Figure 5-1 Do Minimum Vehicle Delay

Other road network vehicle statistics including total VKT (light and heavy vehicles), total hours travelled, and average trip length are presented in **Table 5-2** below.

Table 5-2 Do Minimum Road Network vehicle statistics

Scenario	Average Daily VKT	Average Daily VHT	Average Daily Delays VHT	VKT / Person	Vehicle Trips / Person	Average Trip Length (km)
2018	1,387,799	28,642	4,409	20.26	3.30	6.13
2035 DM	1,656,446	36,449	7,163	20.05	3.24	6.19
2053 DM	1,875,134	44,858	11,640	20.37	3.29	6.19
Percent change in 2018						
2035 DM vs. 2018	+19.4%	+27.3%	+62.5%	-1.0%	-1.8%	+1.0%
2053 DM vs 2018	+35.1%	+56.6%	+164.0%	+0.5%	-0.3%	+1.0%
2053 DM vs 2035 DM	+13.2%	+23.1%	+62.5%	+1.6%	+1.5%	+0.0%

The number of vehicle trips per person drops slightly in both forecast years, and the number of KMs travelled per person, however the average trip length (vehicle KMs travelled *per trip*) increases by 1% suggesting that the land use changes required people to travel further on average compared to the base year.

Detailed outputs of total network statistics for private vehicle modes for the DM scenarios is provided in **Appendix C** in **Table 10-5**Table 10-5.

5.3 Vehicle Emissions

Vehicle emissions are estimated by applying the Waka Kotahi's Vehicle Emission Prediction Model 6.3 (VEPM) emission rates to Ngāmotu STM outputs of flows on links by speed band and vehicle type. For details on the VEPM assumptions refer to **Appendix D.**

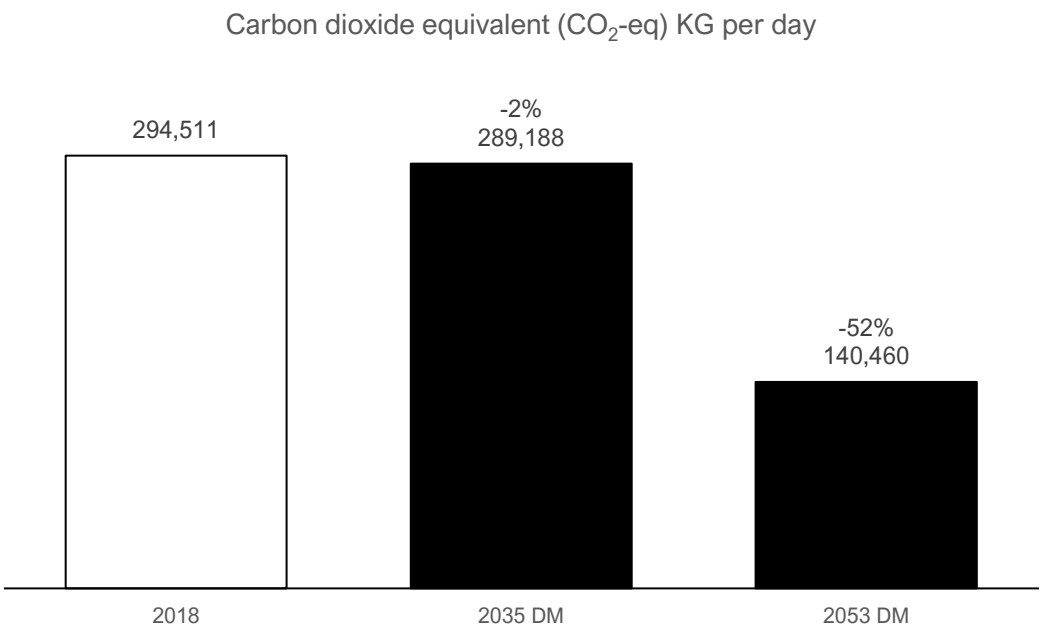


Figure 5-2 Do Minimum scenario CO_2E emissions

The summary of vehicle emission statistics is given in **Appendix C Table 10-6**Table 10-6 . A reduction in all emission types is predicted for both forecast years. For instance, CO emission rate decreased by 77.8% for the year 2035. This rate decreased further to 93.5% in the year 2053 compared to the base year 2018. Since the fleet distribution in future years mostly comprised of hybrid/electric vehicles, the emissions in 2053 is considerably lower than 2035. The fleet distribution as per the Waka Kotahi's VEPM guidelines is given in **Appendix D Figure 10-1**Figure 10-1**.**

5.4 Level of Service (LOS)

LOS plots of link and intersection have been produced for the modelled scenarios. These plots show the worst LOS in any model time periods (i.e., AM, IP, PM). LOS plots for all modelled scenarios are provided in **Appendix G**.

The key observations from LOS plots are:

- The following intersections are performing over capacity (i.e., LOS=F) in the year 2035
  - SH3 and Smart Road intersection
  - SH3 and Bridle Street
  - SH3 and Katere Road
  - SH3 and Egmont Road
  - SH3 and Corbett Road
  - SH3 and Wills Road
- In addition to the above intersections, the following intersections also have LOS=F in the year 2053
  - SH3 and Mount Edgcumbe Street
  - SH3 and Mangorie Road
  - SH3 and Vickers Road
  - Henwood Road and Paraite Road
  - SH3 and De Havilland Drive
- The following road or corridors are performing over capacity (i.e., LOS=F) in the year 2035
  - SH3 East-bound between entry ramp from Henwood Road and Mangati Road
  - SH3 East-bound between Hobson Street and Watson Street
- In addition to the above ones, the following road or corridors also have LOS=F in the year 2053
  - SH3 corridor between Devon Street East and Egmont Road on both directions
  - Devon Street East east-bound between Brown Street and Watson Street
  - Henwood Road bridge on SH3

The increase in number of intersection and corridors with LOS F is due to the population growth in New Plymouth between current and future years and insufficient committed interventions or transport policy to manage or support the forecast level of travel demand growth. The outcomes demonstrate the need for development of a long-term integrated transport framework.

The major contributing movement to the failure of intersections with poor LOS were as follows:

- SH3 and Smart Road intersection (left-turn movement from Smart Rd to SH3 in PM peak)
- SH3 and Bridle Street (left-turn movement from Bridle St to SH3 in PM peak)
- SH3 and Katere Road (left-turn movement from Katere Rd to SH3 in PM peak)
- SH3 and Egmont Road (left-turn movement from Egmont Rd to SH3 in PM peak)
- SH3 and Corbett Road (right-turn movement from Corbett Rd. to SH3 in AM peak)
- SH3 and Wills Road (right-turn movement from Wills Rd. to SH3 in AM peak)
- SH3 and Mount Edgcumbe Street (all movements southbound from Mount Edgcumbe St in AM peak)
- SH3 and Mangorie Road (all movements west bound from SH3 in PM peak)
- SH3 and Vickers Road (left-turn movement from Vickers Rd to SH3 in PM peak)
- Henwood Road and Paraite Road (left-turn movement from Bridle St to SH3 in PM peak)
- SH3 and De Havilland Drive (right-turn movement from Havilland Dr to SH3 in PM peak)

Further details on the LOS criteria are given in **Appendix D.**

5.5 KPI Summary

As part of the PBC, Key Performance Indicators (KPIs) were defined. These are described in **Table 5-3** below.

Table 5-3 KPI descriptions

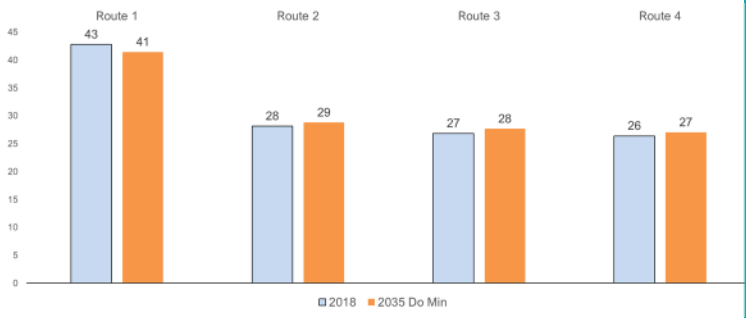
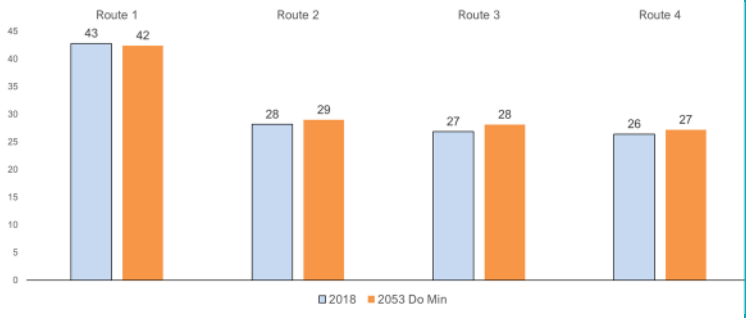
KPI	Measure
KPI 1[4]: Public transport travel times (average, variability)	The AM peak PT travel time for 4 routes: Route 1: Bell Block to CBD Route 2: Highlands Park to CBD Route 3: Hurdon to CBD Route 4: Spotswood to CBD
KPI 3: Percentage of population within 400 and 800 metre walking catchments of public transport	Percentage of population within 400 metre walking catchments of public transport
KPI 4a: Public transport mode share for journey to work KPI 4b: Public transport mode share for school trips	PT mode share for AM Peak journey to work/ school trips
KPI 5: CO2 transport related emissions	CO2-eq emission in tonnes per day
KPI 6a: Journey to work by single occupancy vehicle	AM JTW by Lights vehicle mode share (change on DM)
KPI 6b: VKT per capita per day	As per the KPI.
KPI 10: Comparative travel times between transport modes between key locations	The travel times difference between PT and vehicles for four routes: Route 1: Bell Block to CBD Route 2: Highlands Park Route 3: Hurdon to CBD Route 4: Spotswood to CBD
KPI 11: Percentage of residents living within 400 and 800 metre walking catchments of local centres.	Percentage of residents living within 400 metre walking catchments of local centres.
KPI 13: Percentage of freight on appropriate arterial corridors, and average freight travel times.	- Percentage of freight on non-arterial corridors -Average freight travel time for 3 routes: Route1: Port Taranaki - Bell Block Route2: Port Taranaki-Highlands Park Route3: Port Taranaki-Hurdon

[4] KPI numberings follow the same numberings as in the ITF PBC report. KPIs that were not informed by the models have been excluded from the summary table.

KPI	Measure
KPI 14: Deaths and serious injuries (DSI) for active mode users	Deaths and serious injuries (DSI) for cyclists.
KPI 15: Percentage of primary cycling network which is safe, separated and continuously connected.	Percentage of primary cycling network which is one of the following types: Separated shared path Separated cycleway Separated trail On-road painted On-road barrier

Table 5-4 presents the KPI outcomes for DM scenario in both years.

Table 5-4 KPI outputs for DM scenario

KPI	2018 Baseline	DM Outcome	Comments
KPI 1: PT travel time	Year 2035:  Year 2053: 		PT Travel time reduced by 2 minutes in Route 1. It increased in all other routes. The PT frequency for Bell Block-CBD was doubled for both years. This intervention has resulted less PT travel time for Route 1.
KPI 3: Percentage of population within walking catchments of public transport	58.3% within 400m 74.6% within 800m	Year 2035: 57.2% within 400m 74.1% within 800m Year 2053: 55.5% within 400m 73.6% within 800m	The measure has reduced for both years
KPI 4a: PT mode share for AM Peak journey to work trips	0.68%	Year 2035: 0.68% Year 2053: 0.66%	PT mode shared has remained relatively the same for both years

KPI	2018 Baseline	DM Outcome	Comments
KPI 4b: PT mode share for AM Peak journey to school trips	14.05%	Year 2035: 13.9% Year 2053: 13.5%	PT mode shared has slightly decreased in both years
KPI 5: CO2E emission	295	Year 2035: 289 Year 2053: 140	CO2-eq emissions reduced for both years. The level of reduction is more for the year 2053.
KPI 6a: JTW by single occupancy vehicles	99.3% journey to work vehicle mode share	Year 2035 and 2053= 99.3%	No changed was observed for both years
KPI 6b: VKT per capita	20.3	Year 2035: 20.1 Year 2053: 20.4	VKT per capita decreased for 2035, but increased for 2053
KPI 10: Comparative Travel time between modes	Route 1 = +27 min, Route 2 =+15 min Route 3 = +13min Route 4 = +14 min from	Year 2035: Route 1= +25 min Route 2= +15 min Route 3= +14 min Route 4= +14 min Year 2053: Route 1= +24 min Route 2= +15 min Route 3= +14 min Route 4= +14 min	The difference between PT and private vehicle's travel time has improved for Route 1. Other routes have almost similar values
KPI 11: Percentage of residents living within local center catchment	10% within 400m 34% within 800m	Year 2035 and 2053: 10% within 400m 33% within 800m	
KPI 13: Percentage of freight on non-arterial corridors	76.7% of freight is on non-arterial road. Average freight travel time: Route1=21 min Route2=14 min Route3= 5 min	Percentage of freight vehicles on non-arterial roads: Year 2035= 76.4% Year 2053: 75.1% Average freight travel time: Year 2035 Route1= 22 min Route2= 14 min Route3= 5 min	

KPI	2018 Baseline	DM Outcome	Comments
		Year 2053 Route1= 23 min Route2= 14 min Route3= 5 min	
KPI 14: DSI for Active mode users	2.19 annual DSI for cyclists	Year 2035= 2.88 Year 2053= 3.72	Death and serious injury have increased for both years
KPI 15: Percentage of primary cycling network which is safe / separated	6%	Year 2035= 13% Year 2053= 13%	The proportion of the cycle network that is safe and separated has almost doubled for both years

6 Short List Option Results

This section covers the results for Short List options:

- Option 0: Common interventions
- Option 1: Liveability,
- Option 2: Connected Urban Centres, and
- Option 3: Reduce Transport Emission.

The section follows the same structure as the previous section reporting the Do Minimum results.

6.1 Forecast Travel Demand

Table 6-1 presents the forecast travel demand by the modes represented in the model.

As shown, the growth in vehicle demand closely follows population growth, demand for public transport is slightly ahead of population growth, and cycle demand growth is ahead of population growth.

Table 6-1 Short list Options Forecast Daily demand by mode and mode share

	Demand by mode			Mode share		
Scenarios/ Measure	Vehicles (vehicle trips)	PT (Person trips)	Cycle (person trips)	% Car	% PT	% Cycle
2018	226,263	2,945	3,780	97.6%	1.1%	1.4%
2035 DM	267,694	3,636	5,533	97.2%	1.1%	1.7%
2035 Option 0	264,244	5,395	7,733	96.0%	1.6%	2.3%
2035 Option 1	263,949	5,596	8,106	95.9%	1.7%	2.5%
2035 Option 2	258,158	11,201	8,320	94.1%	3.4%	2.5%
2035 Option 3	258,131	11,589	8,142	94.0%	3.5%	2.5%
2053 DM	303,053	4,033	6,789	97.1%	1.1%	1.8%
2053 Option 0	294,402	9,327	11,226	94.5%	2.5%	3.0%
2053 Option 1	293,037	9,290	12,366	94.2%	2.5%	3.3%
2053 Option 2	268,866	35,313	11,909	87.2%	9.5%	3.2%
2053 Option 3	270,384	33,398	11,712	87.8%	9.0%	3.2%

Key Observations:

- All options result in higher PT and Cycle mode shares
- Option 2: ‘Connected Urban Centres’ and Option 3: ‘Reduce Transport Emissions’ have higher PT mode share driven by higher parking costs is both forecast years and a road price for driving in 2053.

- In 2035 Option 2 has the highest cycle mode share. However, for year 2053, the highest cycle mode share is observed in Option 1.

The forecast travel demand by modelled time period for Vehicle and PT trips is provided in **Appendix C** in **Table 10-7**Table 10-7 to **Table 10-9**Table 10-9.

6.2 Road Network Vehicle Statistics

The transport interventions proposed in the options all reduce road network delay compared to the Do Minimum scenarios. Options 2 and 3 are the most effective, and this is largely driven by the parking charge in 2035 and the road price in 2053.

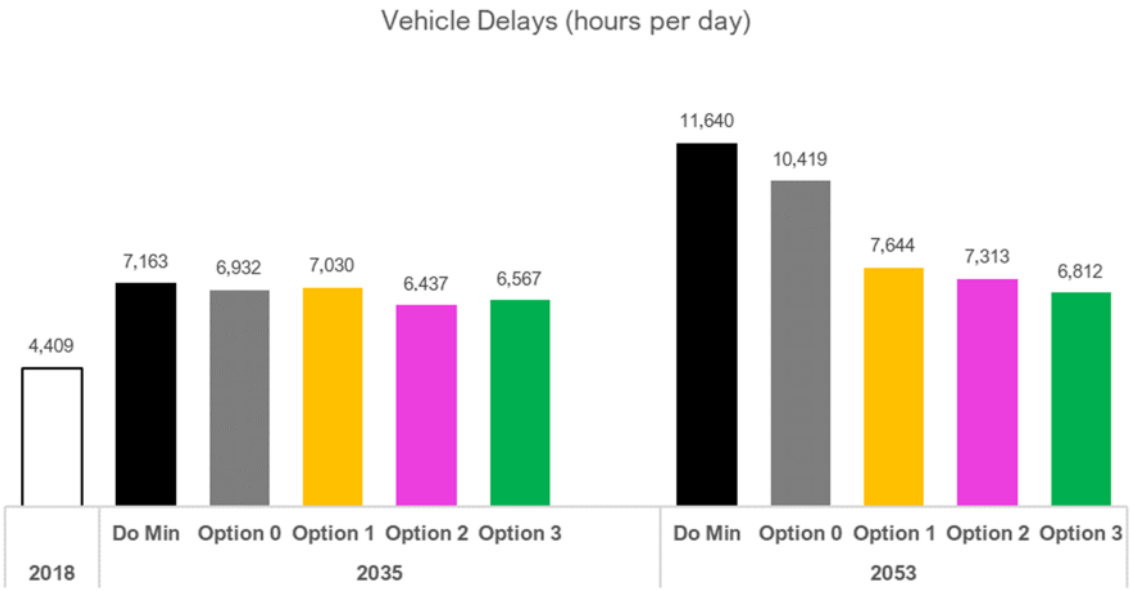


Figure 6-1: Short List Option Vehicle Delay

Other road network vehicle statistics including total VKT (light and heavy vehicles), total hours travelled, and average trip length are presented in **Table 6-2** below.

Table 6-2 Short-list Options Road Network vehicle statistics

Scenario	Average Daily VKT	Average Daily VHT	Average Daily Delays VHT	VKT / Person	Vehicle Trips / Person	Average Trip Length (km)
2018	1,387,799	28,642	4,409	20.26	3.30	6.13
2035 DM	1,656,446	36,449	7,163	20.05	3.24	6.19
2035 Option 0	1,636,656	35,941	6,932	19.81	3.20	6.19
2035 Option 1	1,632,976	35,941	7,030	19.77	3.20	6.19
2035 Option 2	1,598,351	34,715	6,437	19.35	3.13	6.19

Scenario	Average Daily VKT	Average Daily VHT	Average Daily Delays VHT	VKT / Person	Vehicle Trips / Person	Average Trip Length (km)
2035 Option 3	1,600,389	34,842	6,567	19.37	3.12	6.20
2053 DM	1,875,134	44,858	11,640	20.37	3.29	6.19
2053 Option 0	1,828,944	42,828	10,419	19.87	3.20	6.21
2053 Option 1	1,848,565	39,576	7,644	20.08	3.18	6.31
2053 Option 2	1,668,250	36,721	7,313	18.12	2.92	6.20
2053 Option 3	1,675,997	36,349	6,812	18.20	2.94	6.20

The number of vehicle trips per person drops slightly in each of the options, and the number of KMs travelled per person across all options particularly in Option 2 and Option 3 in 2053, which is the effect of the road price.

Detailed outputs of total network vehicle statistics for option scenarios is provided in **Appendix C** in **Table 10-10**Table 10-10 and **Table 10-11**Table 10-11.

Key Observations:

- Option 2 demonstrates the most substantial reduction in VKT. In 2035, this reduction amounts to 3.5%, and by 2053 the reduction is 11%.
- The estimated delays in the Option scenarios, especially in the year 2053, are significantly lower compared to those in the DM scenarios.

6.3 Vehicle Emissions

CO2-e vehicle emissions for the Shortlist options are shown in **Figure 6-2** below. All options provide a reduction in CO2-e emissions, with Option 2 and 3 providing the greatest reduction.

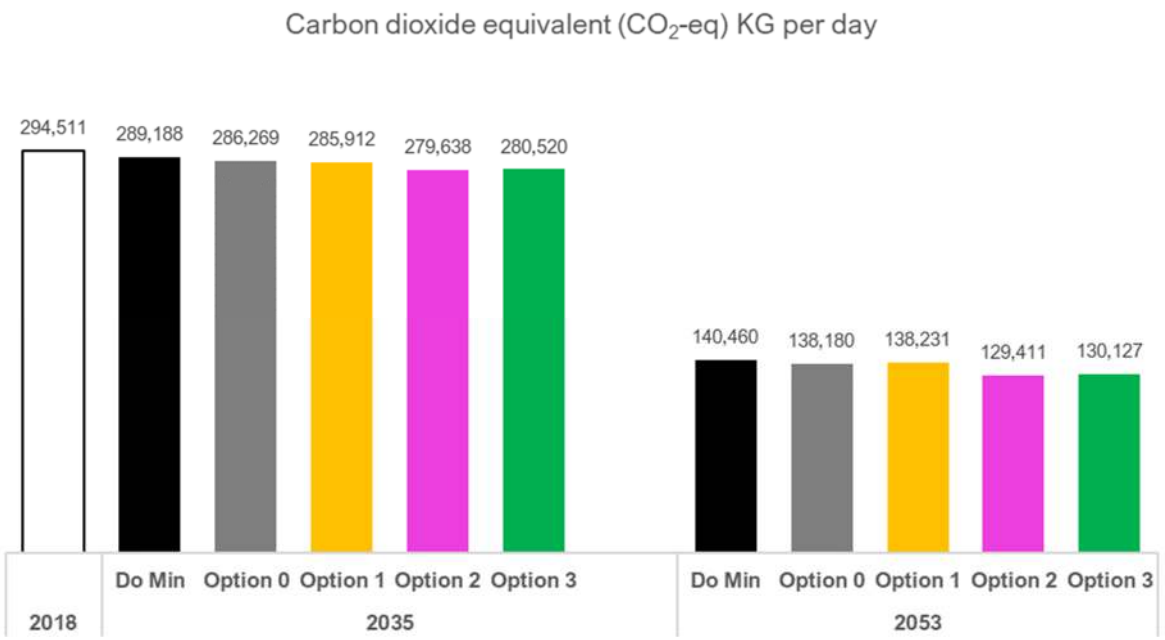


Figure 6-2: Short list Scenarios CO_2-e emissions

Further detail on the vehicle emission forecast and the percentage change in emission are provided in **Appendix C** in **Table 10-12**Table 10-12 and **Table 10-13**Table 10-13. Year 2053 has considerably lower emissions compared to 2035 which is mostly because of fleet distribution in future years.

6.4 Level of Service (LOS)

LOS plots of link LOS (LOS A-F shown) and intersection LOS (Only LOS F shown) have been produced for each short list scenario. These plots show the worst LOS in any model time periods (i.e., AM, IP, PM). LOS plots for all modelled scenarios are provided in **Appendix G**.

A summary of intersections with LOS=F is provided in **Table 6-3**. Also, a list of road or corridors that perform over capacity is given in **Table 6-4**. Generally, there are more intersection or links with LOS=F in the year 2053 than 2035. This observation indicates that the 2053 interventions could not manage the large growth in NP between 2035 and 2053.

Table 6-3 Intersections with LOS=F

Intersection	2035				2053			
	Option 0	Option 1	Option 2	Option 3	Option 0	Option 1	Option 2	Option 3
SH3 and Corbett Road	✓	✓		✓	✓	✓		✓
SH3 and Egmont Road	✓	✓		✓	✓	✓		✓
SH3 and Katere Road	✓	✓		✓	✓	✓		✓
SH3 and Smart Road	✓	✓		✓	✓	✓		✓
SH3 and Bridle Street	✓	✓	✓	✓	✓	✓	✓	✓

Intersection	2035				2053			
	Option 0	Option 1	Option 2	Option 3	Option 0	Option 1	Option 2	Option 3
SH3 and Wills Road		✓		✓	✓	✓		✓
SH3 and Vickers Road					✓			
Henwood Road and Paraite Road					✓	✓		✓
SH3 and De Havillan Drive					✓	✓		✓

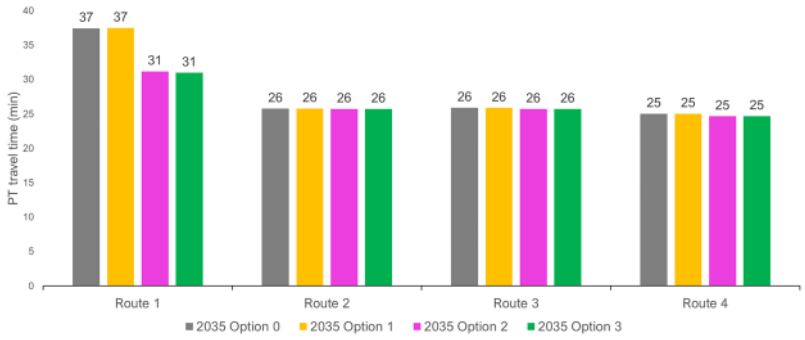
Table 6-4 Link/Corridors with LOS=F

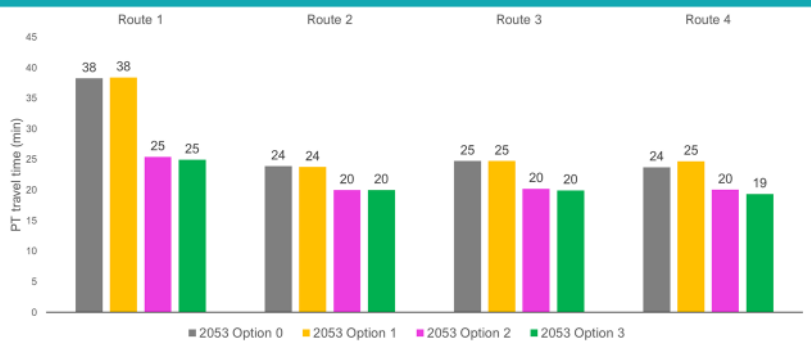
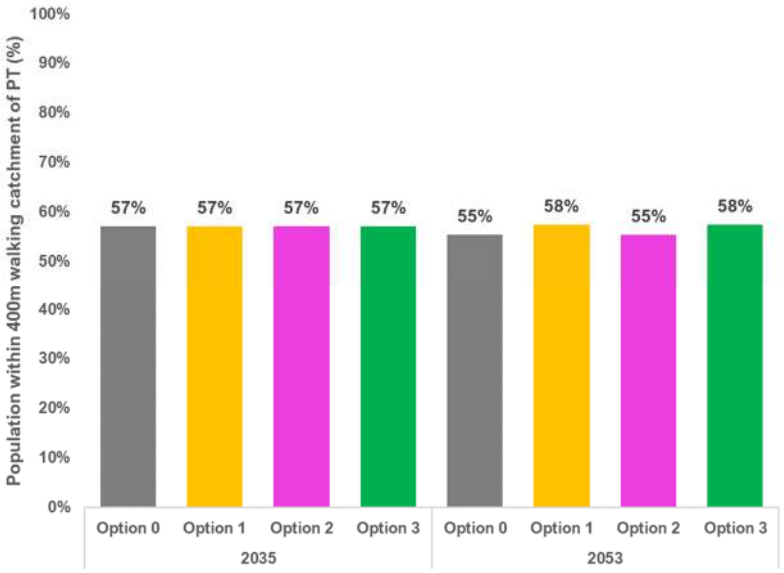
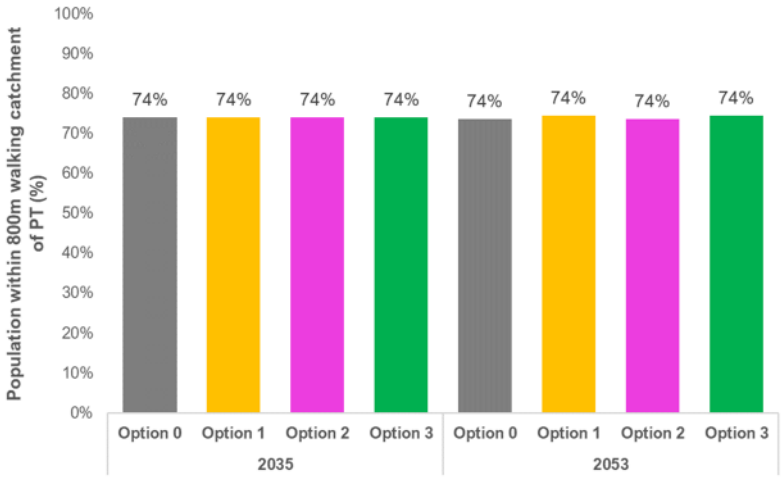
Road/Corridor	2035				2053			
	Option 0	Option 1	Option 2	Option 3	Option 0	Option 1	Option 2	Option 3
SH3 east-bound between entry ramp from Henwood Road and Mangati Road	✓	✓	✓		✓	✓		
SH3 between Devon Street East and Egmont Road on both directions					✓			
SH3 East-bound between Hobson Street and Watson Street	✓	✓			✓	✓	✓	

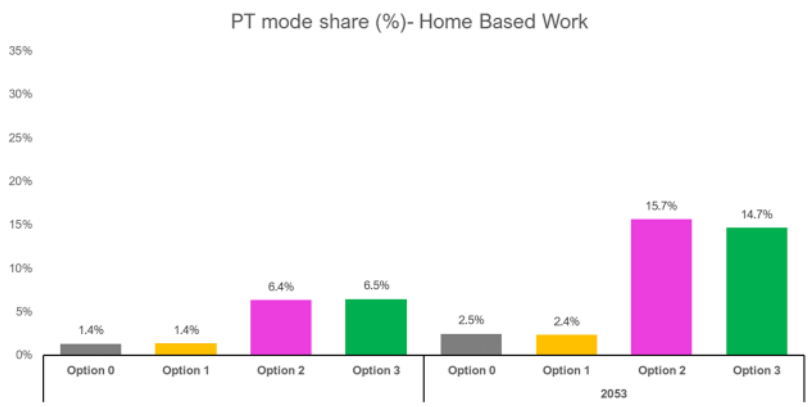
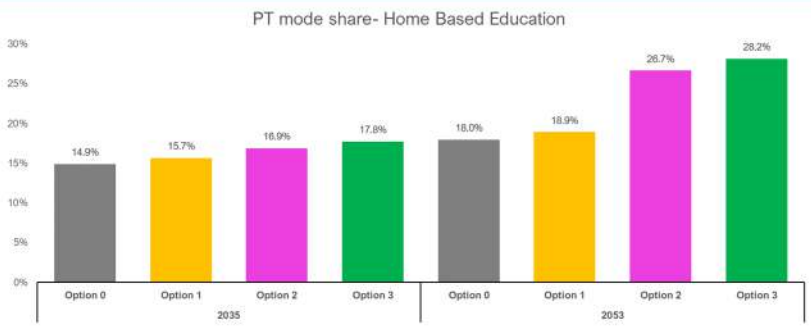
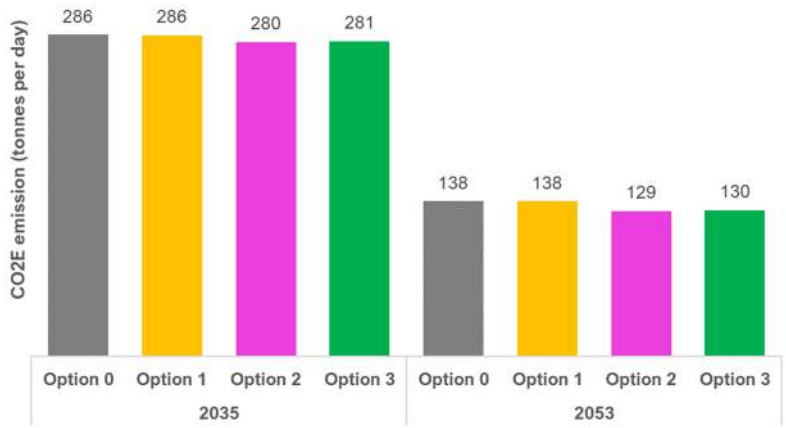
6.5 KPI Summary

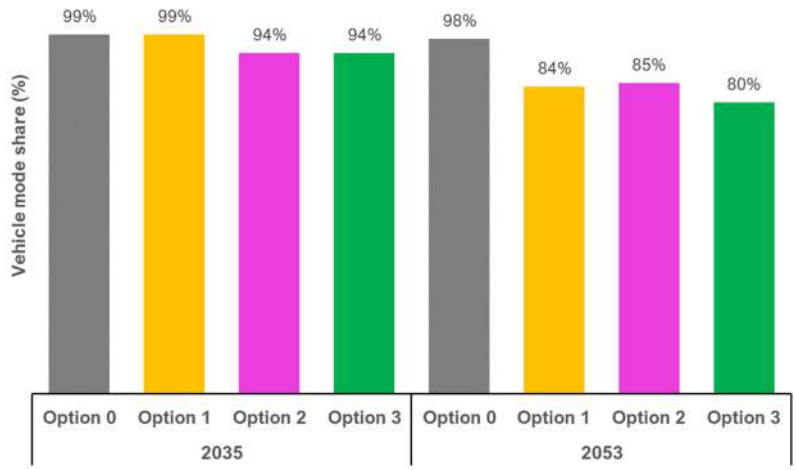
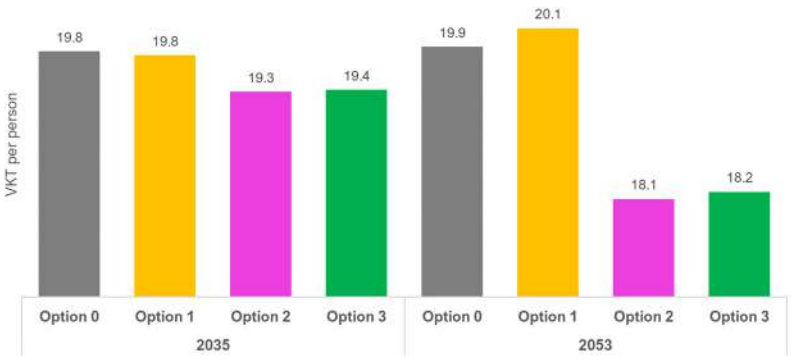
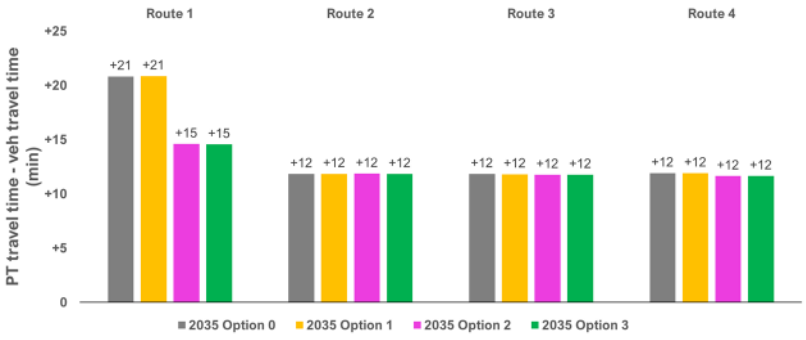
The KPIs are defined in Chapter 5, **Table 5-3**. **Table 6-5** below provides the KPI outcome for each option scenario.

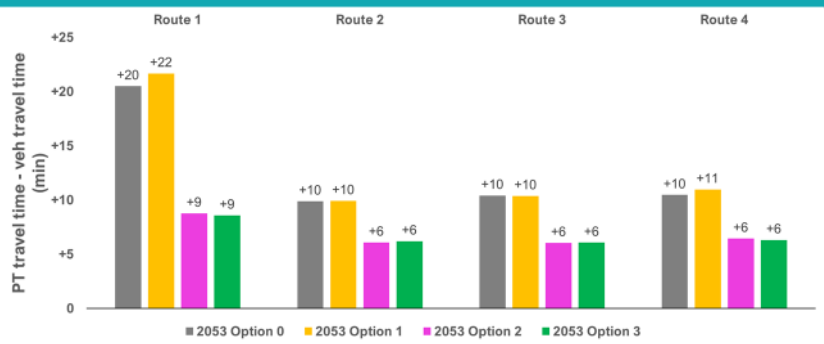
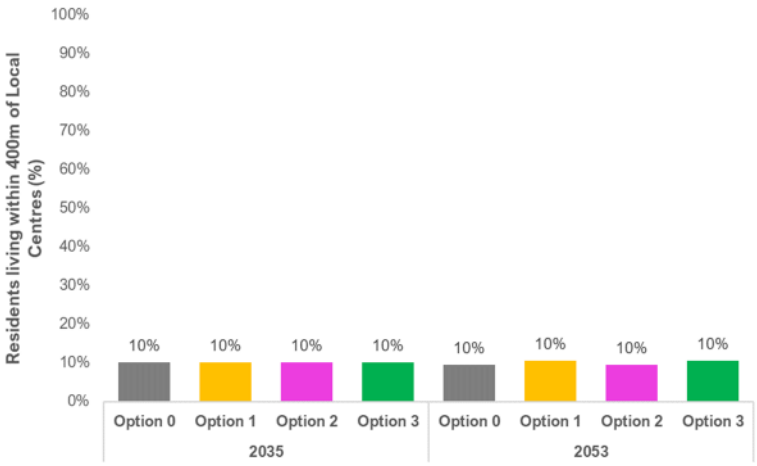
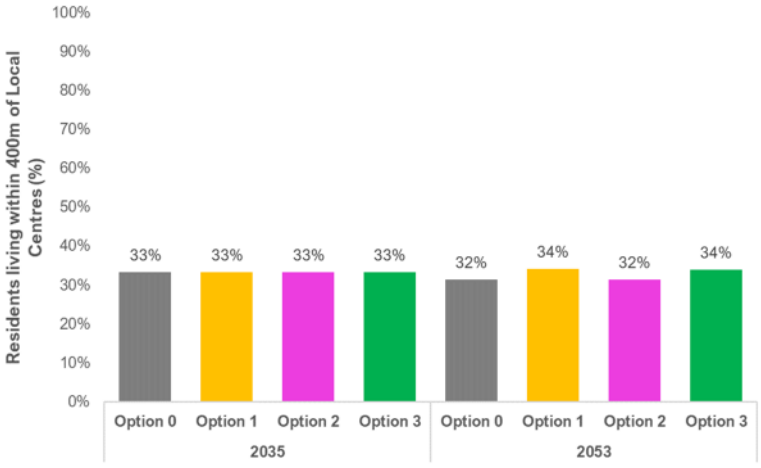
Table 6-5 KPI outputs for Option scenarios

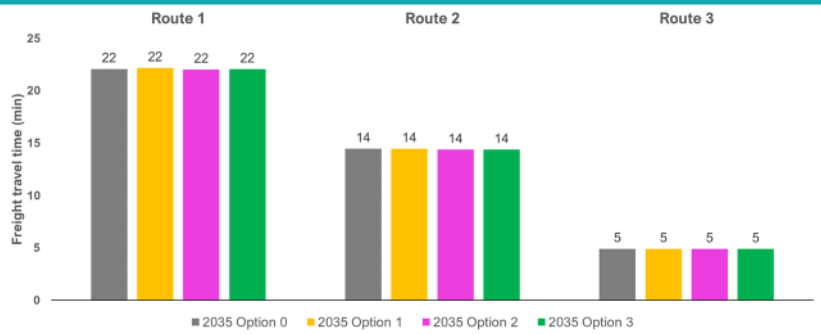
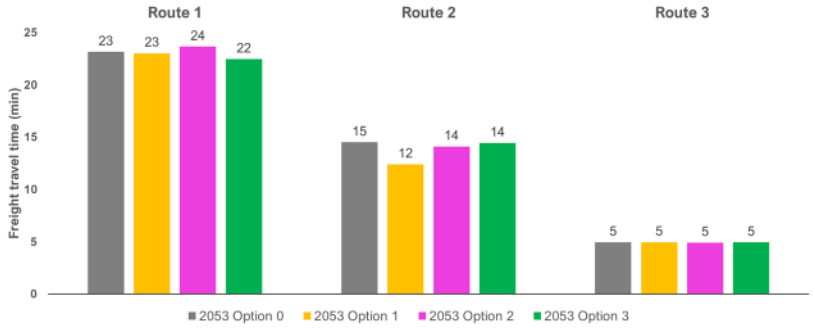
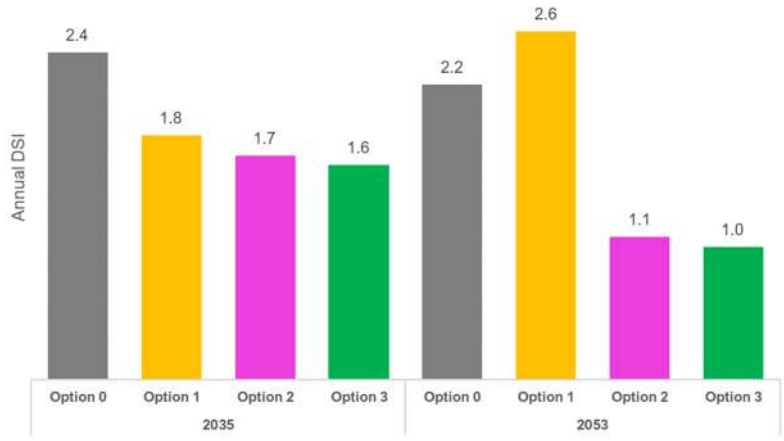
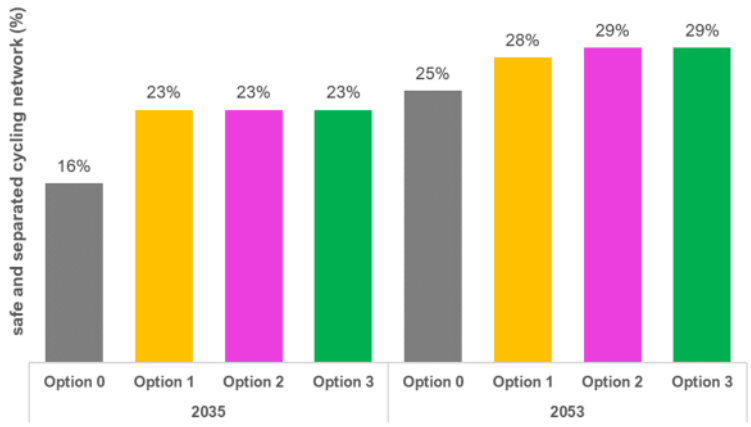
KPI	Outcome	Comments
KPI 1: PT travel time	Year 2035:  Year 2053:	Year 2035: PT travel time between options is alike for most Routes except for Route 1 where Option 2 and 3 are 6 min faster than Option 0 and 1. This is the result of the provision of bus lanes for route 20 in 2035 in these options Year 2053: The PT travel time

KPI	Outcome	Comments
		improvements in options 2 and 3 are the result of the provision of bus lanes on all routes in 2053.
KPI 3: Percentage of population within walking catchments of public transport	Within 400m:  Within 800m: 	The % of population within 400 m and 800 m of catchment is similar between options. They are: • 400 m of PT catchment– 55%-58% of population • 800 m of PT catchment - 74% of population The land use changes in Option 1 and Option 3 result in very slight increases in the population within walking distance of PT.

KPI	Outcome	Comments
KPI 4a: PT mode share for AM Peak journey to work		The PT mode share for option 2 and 3 is about 5% higher than Option 0 and 1 in the year 2035. This difference is around 13% in the year 2053. One significant reason is increasing CBD parking cost and expanding parking zone in 2035, and the road price in 2053.
KPI 4b: PT mode share for AM Peak journey to education		Option 3 has the highest PT mode share in both years.
KPI 5: CO_2E emission		Option 2 and 3 provide slightly lower overall CO_2-eq emissions due to the mode shift from vehicles to PT and Cycle modes.

KPI	Outcome	Comments
KPI 6a: JTW by single occupancy vehicles		Vehicle's mode share in JTW trips is higher for Option 0 and 1 compared to Option 2 and 4 indicating that more people are attracted to PT in Option 2 and Option 3.
KPI 6b: VKT per capita		Option 1 in 2053 has the highest VKT which is partly due to the Ring Route intervention, but also the interventions like parking charges and road price (in 2053) in Option 2 and 3 which result in mode shift from car to PT and Cycle modes.
KPI 10: Comparative Travel time between modes	Below graph shows PT travel time minus Car Travel time Year 2035:  Year 2053:	This KPI is consistent with KPI1 where in 2035 PT travel time between options are alike for most Routes except for Route 1 where Option 2 and 3 are 6 min faster than Option 0 and 1. This is the result of the provision of bus lanes for route 20 in 2035 in these options. In year 2053, the PT travel time improvements in options 2 and 3 are the result of the provision of bus

KPI	Outcome	Comments
		lanes on all routes in 2053.
KPI 11: Percentage of residents living within local center catchment	Within 400m:  Within 800m: 	For all Options, about 10% of residents live within 400 m of the local centres and over 30% within 800 m.
KPI 13: Percentage of freight on non-arterial corridors	Percentage of freight vehicles on non-arterial corridors: Year 2035 Option 0, Option 1= 76.5% Option 2 and Option 3= 76.8% Year 2053: Option0= 75.3% Option 1= 79.9% Option 2= 77.9% Option 3= 76.3% Freight travel time: Year 2035	The percentage of freight vehicles on non-arterial corridors and freight travel time do not change significantly across the options. Option 1 in the year 2053 has the highest %HCV which is partly due

KPI	Outcome	Comments
	 Year 2053: 	to construction of the ring road.
KPI 14: DSI for Active mode users		The DSI for active mode users is about 50% or more, less for Option 2 and 3 compared to other options in Year 2053
KPI 15: Percentage of primary cycling network which is safe / separated		Option 1,2,3 have safer cycling network compared to Option 0.

7 Preferred Option Results

Following a review of the short list options' impacts on the existing highway and PT network and scoring each scenario, 'Connected urban centres' (Option 2) was identified as the highest performing programme. This programme was combined with the land use assumptions used in Option 3 plus some additional modifications to the intervention assumptions as set out in Section 4.3. This section presents the results of the Preferred Option and compares these against the 2018 and future Do-Minimum scenarios.

7.1 Forecast Travel Demand

Table 7-1 presents the forecast travel demand by mode. As shown in the table, there is a substantial shift to PT in the Preferred Option with PT mode share being above 10% in both forecast years. There is also a shift to cycle in the Preferred Option in future years, but this is not forecast to be as substantial as the shift to PT.

Table 7-1 Preferred Option Forecast Daily demand by mode and mode share

Scenarios/ Measure	Demand by mode			Mode Share		
	Vehicles (vehicle trips)	PT (person trips)	Cycle (person trips)	% Car	% PT	% Cycle
2018	226,263	2,945	3,780	97.6%	1.1%	1.4%
2035 DM	267,694	3,636	5,533	97.2%	1.1%	1.7%
2035 PO	258,176	11,526	8,015	94.07%	3.50%	2.43%
2053 DM	303,053	4,033	6,789	97.1%	1.1%	1.8%
2053 PO	256,880	47,293	11,802	83.9%	12.9%	3.2%

The forecast travel demand by modelled time period for Vehicle and PT trips for the Preferred Option is provided in **Appendix C** in **Table 10-14** to **Table 10-16.**

7.2 Road Network Vehicle Statistics

The transport interventions proposed in the Preferred Option reduce road network delay to well below the Do Minimum scenarios in each forecast year, and delay is close to the 2018 base year level of network delay. This is illustrated in **Figure 7-1** below.

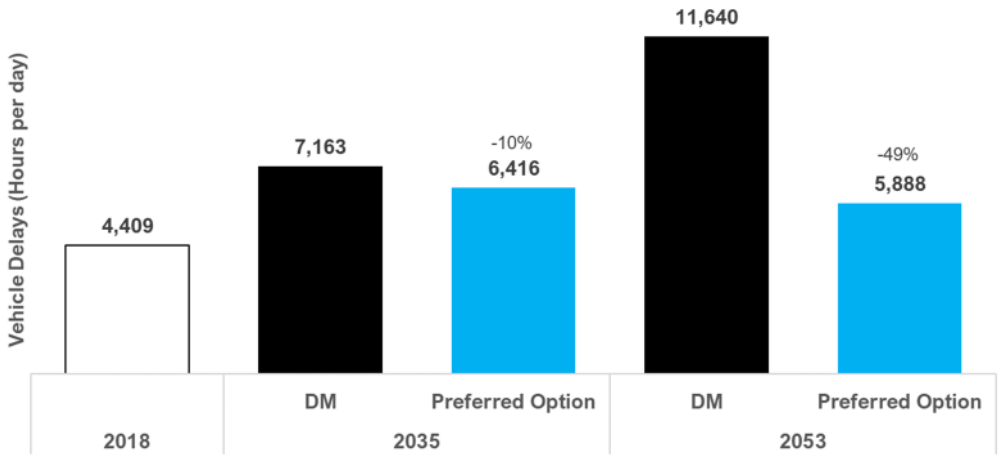


Figure 7-1 Preferred Option Network Delay

Other road network vehicle statistics including total VKT (light and heavy vehicles), total hours travelled, and average trip length are presented in **Table 7-2** below.

Table 7-2: Preferred Options Road Network vehicle statistics

Scenario	Average Daily VKT	Average Daily VHT	Average Daily Delays VHT	VKT / Person	Vehicle Trips / Person	Average Trip Length (km)
2018 Base	1,387,799	28,642	4,409	20.3	3.3	6.13
2035 DM	1,656,446	36,449	7,163	20.1	3.2	6.19
2035 PO	1,589,984	34,898	6,416	19.2	3.1	6.24
2053 DM	1,875,134	44,858	11,640	20.4	3.3	6.19
2053 PO	1,596,551	34,335	5,888	17.3	2.8	6.20

Key Observations:

- Average daily VKT is reduced by 4% and 15% in the Preferred Option compared to the DM for years 2035 and 2053 respectively.
- For both years, the average vehicle trip length is slightly longer compared to DM.

Detailed outputs of the road network vehicle statistics for Preferred Option scenarios is provided in **Appendix C** in **Table 10-17**Table 10-17 and **Table 10-18**Table 10-18.

7.3 Vehicle Emissions

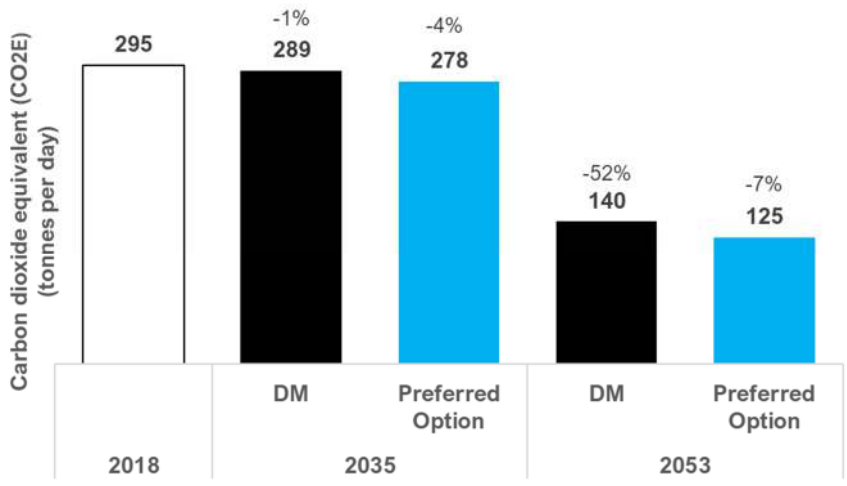


Figure 7-2 presents the forecast CO_2-e emissions for the Preferred Option vs Do minimum options, and the base year CO_2E emissions estimate for reference. As shown in the figure, the Preferred Option is forecast to provide a 10% reduction in CO_2E in both forecast years.

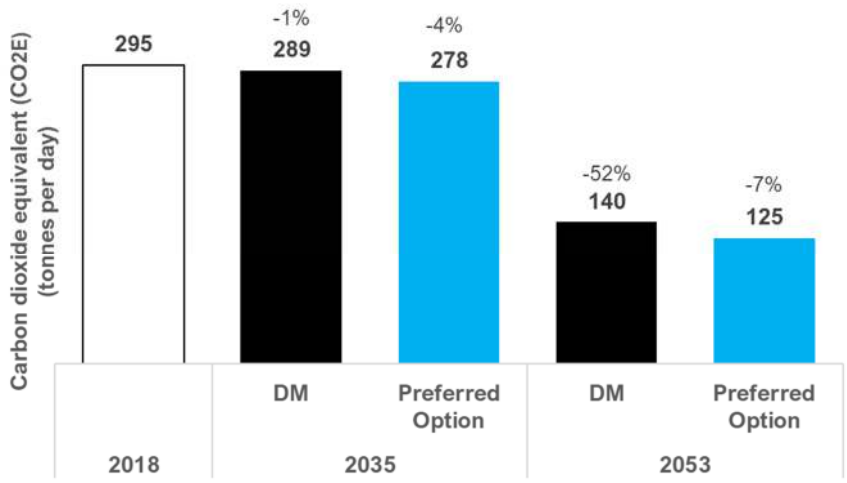


Figure 7-2: Preferred Option vs Do minimum CO_2-e emissions

The outcomes from the VEPM model and scenario comparisons are provided in **Appendix C** in **Table 10-19**Table 10-19 and **Table 10-20**Table 10-20**.**

7.4 Level of Service (LOS)

LOS plots of link LOS (LOS A-F shown) and intersection LOS (Only LOS F shown) have been produced for the modelled scenarios. These plots show the worst LOS from all model periods (i.e., AM, IP, PM). LOS plots for all modelled scenarios are provided in **Appendix G**.

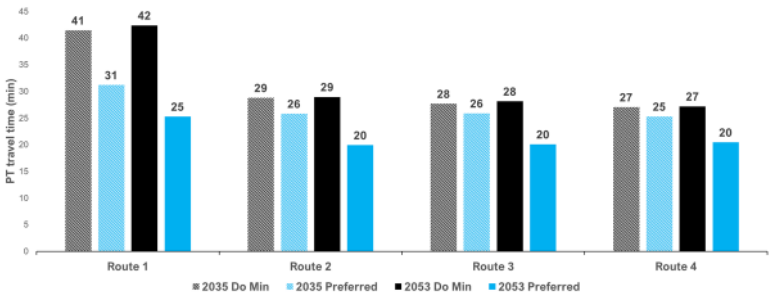
The LOS issues in the Preferred Options are noted as follows:

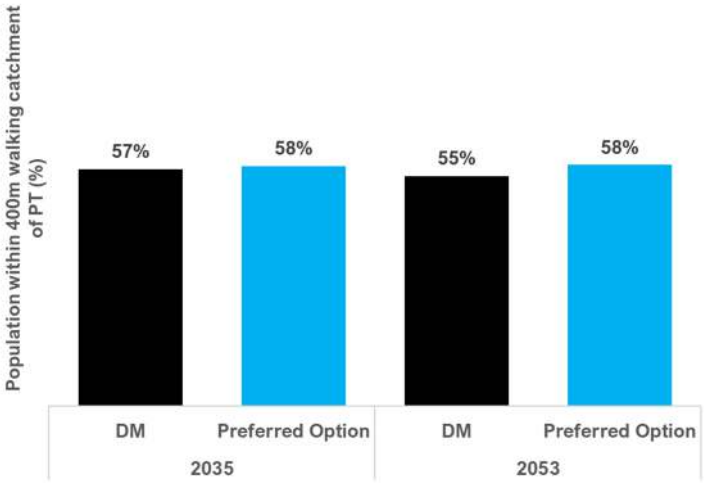
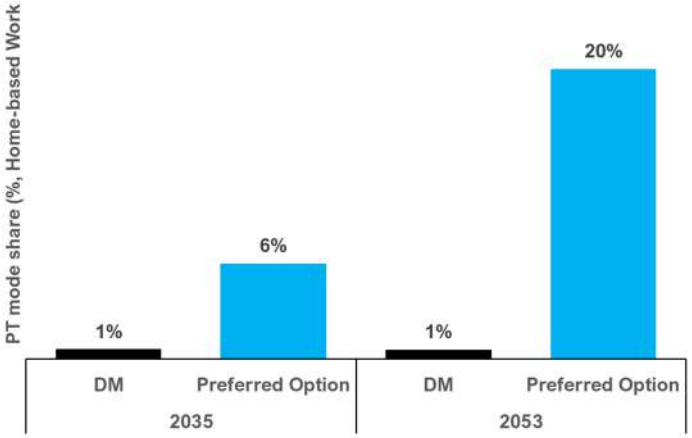
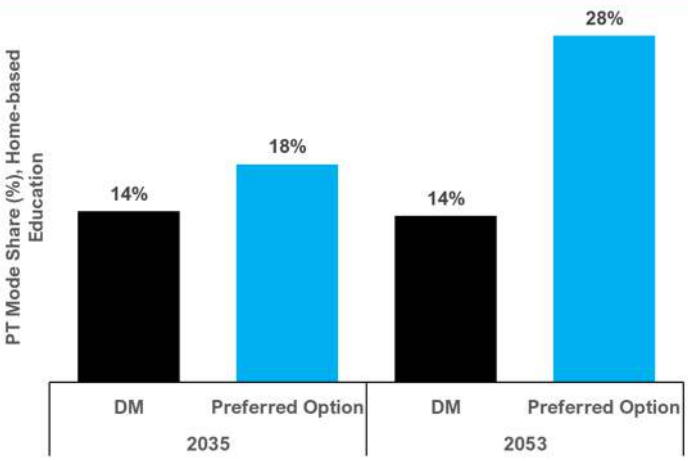
- For the year 2035, SH3 and Corbett Road intersection has poor performance (i.e., LOS F). Also, the corridor between St Luke's Lawn Cemetery and Mangati Road East-bound that has speed of 80 kph is experiencing LOS F.
- For the year 2053, SH3 and Bridle Street intersection has LOS F. Also, the one-lane section of SH3 between Courtenay Street and Watson Street has LOS F.

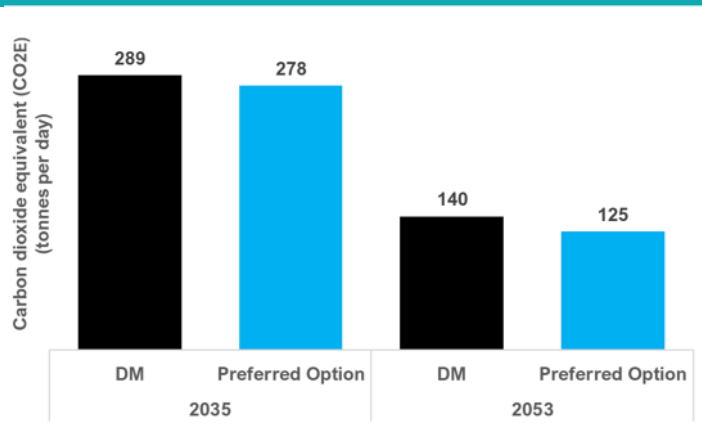
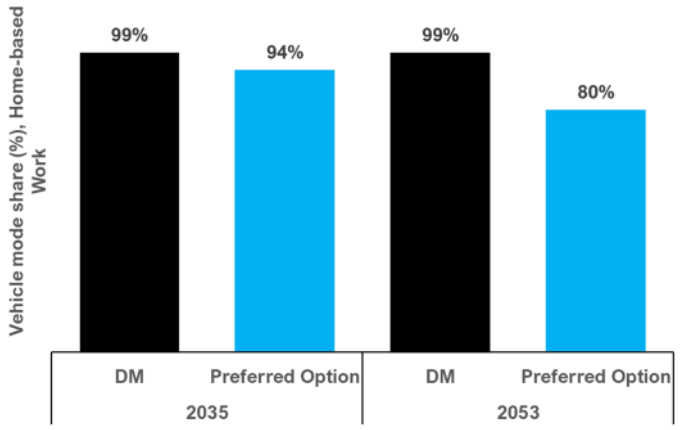
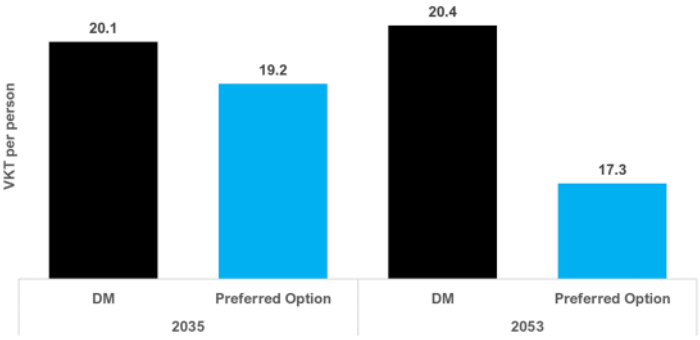
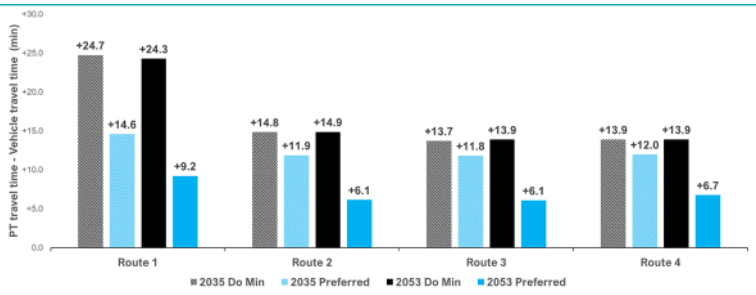
7.5 KPI Summary

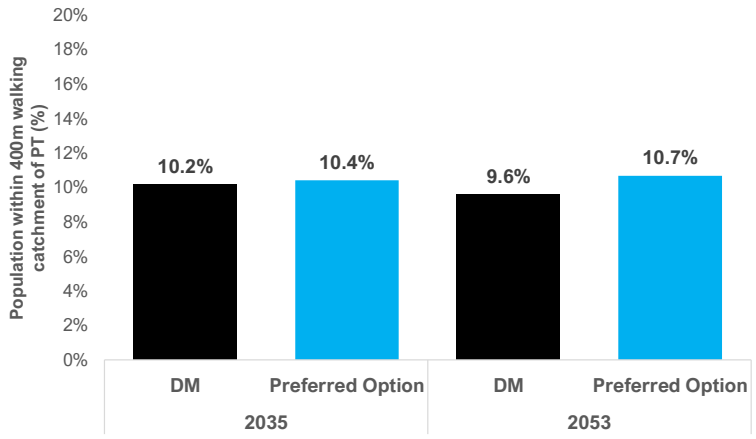
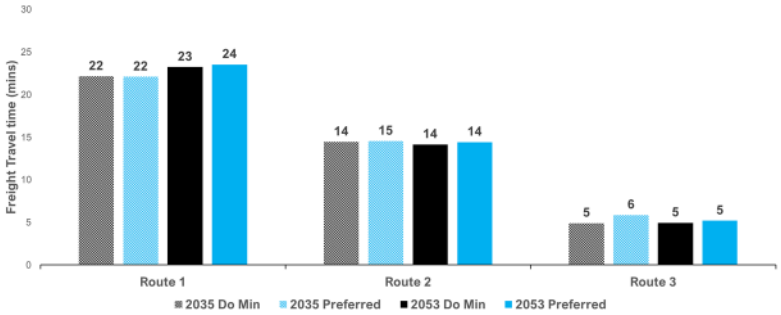
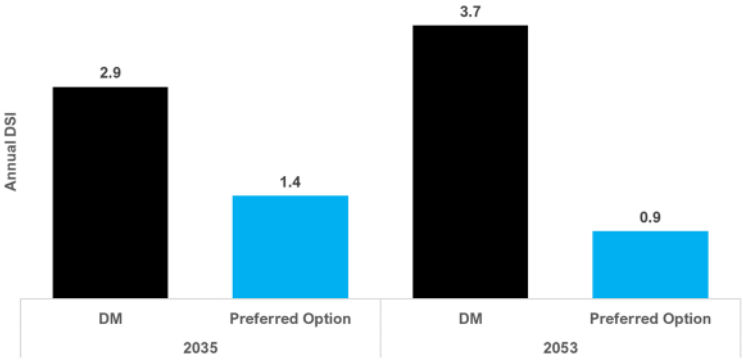
KPI descriptions is defined in Chapter 5, **Table 5-3.** The following table presents the KPI outcomes for DM and PO scenarios.

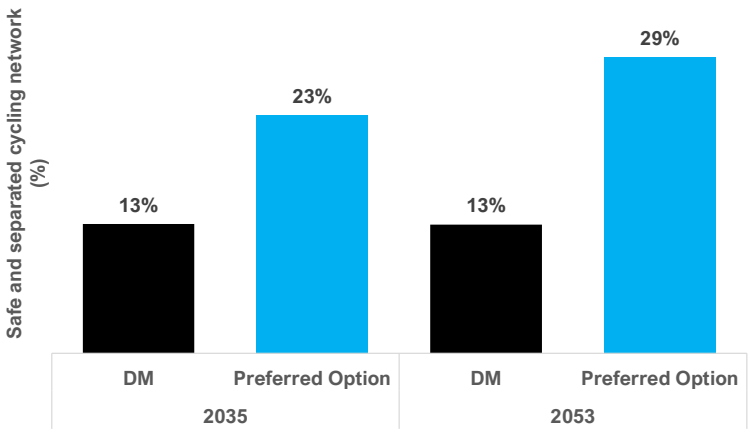
Table 7-3 KPI outcome for preferred option

KPI	Outcome	Comments
KPI 1: PT travel time		Preferred Option has improvement on PT travel time across all routes and in both forecast years. The PT travel time has decreased on Route 1 which is due to the improvement for route 5020 and bus

KPI	Outcome	Comments
		station improvement in Bell Block.
KPI 3: Percentage of population within walking catchments of public transport	Within 400m: 	There is improved accessibility for some locations in New Plymouth, but overall, there is little change to this measure of accessibility.
KPI 4a: PT mode share for AM Peak journey to work		There is a significant increase PT mode share for work trips in both years.
KPI 4b: PT mode share for AM Peak journey to school trips		The preferred option has considerably more PT mode share for education trips in both years.

KPI	Outcome	Comments
KPI 5: CO_2E emissions		The preferred option shows 4% and 10% reduction in CO_2E emissions for 2035 and 2053 respectively
KPI 6a: JTW by single occupancy vehicles		In the Preferred Option, private car mode share for JTW trips has decreased. Due to increase in parking cost in CBD. In Preferred Option, CBD parking cost was increased by 100% in 2035 and by 300% in 2053.
KPI 6b: VKT per capita		The VKT per capita is predicted to reduce by 1-3 km per day in the preferred option scenario.
KPI 10: Comparative Travel time between modes		This KPI is following very similar trend as KPI 1.

KPI	Outcome	Comments
KPI 11: Percentage of residents living within local center catchment		No significant change between DM and Preferred Option for the percentage of people living within 400 m of a local centre.
KPI 13: Percentage of freight on non-arterial corridors	Percentage of freight vehicles on non-arterial corridors Year 2035: DM = Preferred Option = 76% Year 2053: DM = 75% Preferred Option = 77% Freight travel time: 	No significant change on freight % or freight travel time were observed.
KPI 14: DSI for Active mode users		The DSI for active mode users is about 51% and 75% less for Preferred in Year 2035 and 2053 respectively
KPI 15: Percentage of primary cycling network		Preferred option has 10%↑ and 16%↑ safer cycling network compared to DM in Year 2035 and 2053 respectively

KPI	Outcome	Comments
which is safe / separated		

8 Ring Road Option

NPDC requested that a variation on the 2053 Preferred Option be modelled to include a Ring Road from SH3 to SH45 around the south of the New Plymouth urban area. The alignment of the Ring Road represented in the model is illustrated in **Figure 8-1** below.

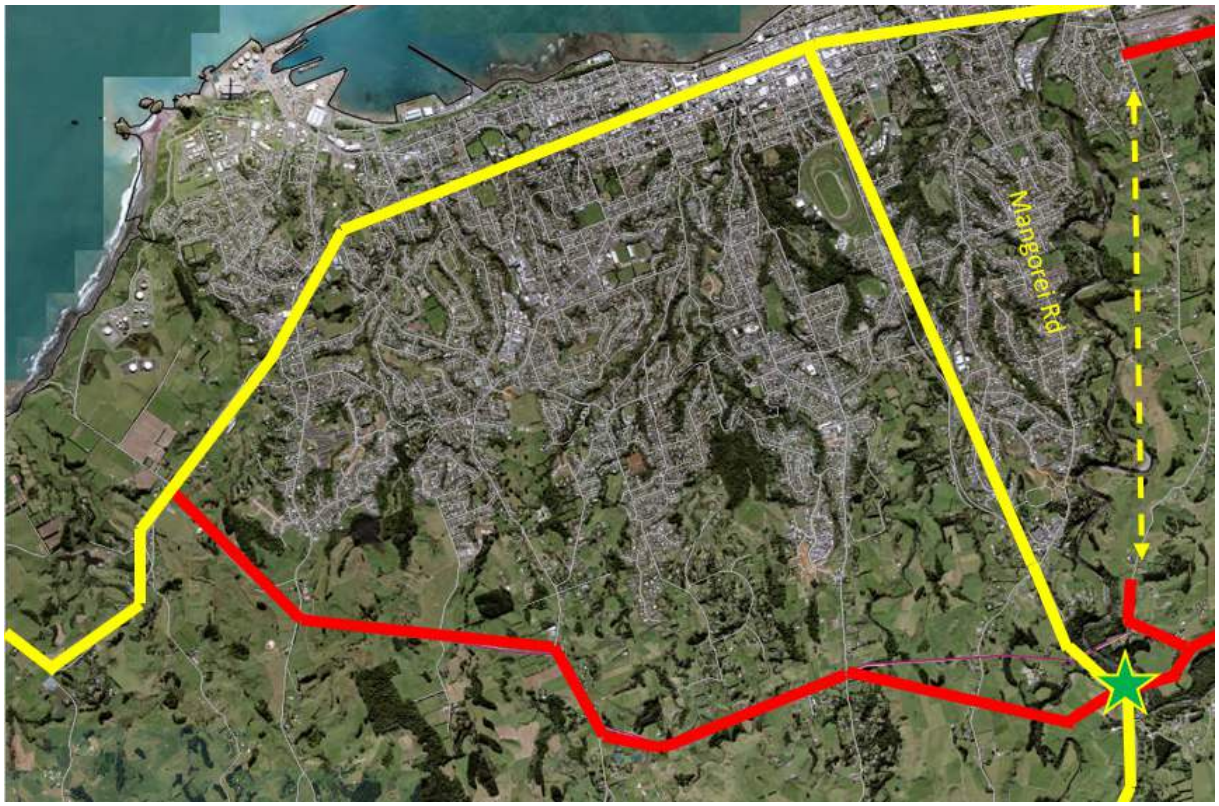


Figure 8-1 Illustration of the Ring Road alignment

Intersections of the Ring Road with existing roads have been assumed to be at a grade of 1 to 2 lanes as illustrated in the figure below.

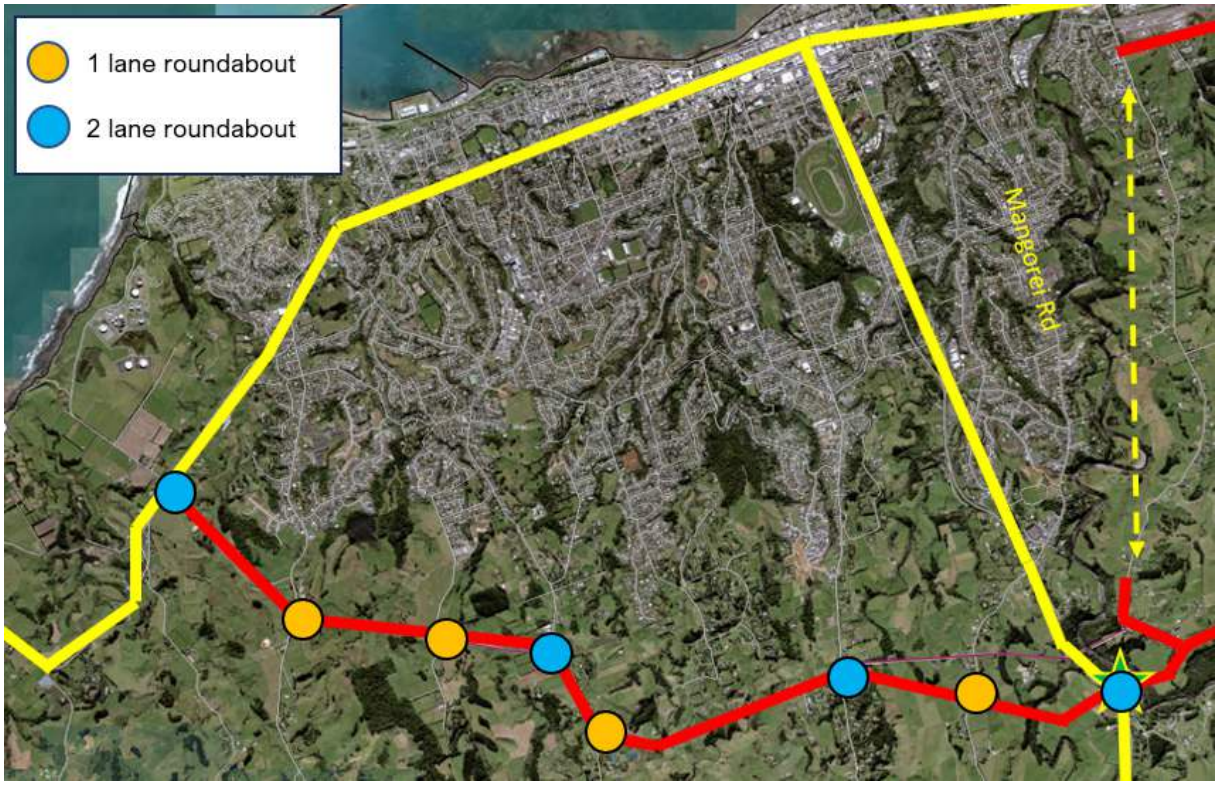


Figure 8-2 Intersection form assumptions for the Ring Road

Table 8-1 presents the forecast travel demand by mode. As shown in the table, there is a slight increase in vehicle trips and car mode share as a result of the addition of the ring road.

Table 8-1 Preferred Option with Ring Road Forecast Daily demand by mode and mode share

Scenarios/ Measure	Demand by mode			Mode Share		
	Vehicles (vehicle trips)	PT (person trips)	Cycle (person trips)	% Car	% PT	% Cycle
2053 DM	303,053	4,033	6,789	97.1%	1.1%	1.8%
2053 PO	256,880	47,293	11,802	83.9%	12.9%	3.2%
2053 PO with Ring Road	257,381	47,105	11,384	84.1%	12.8%	3.1%

The transport interventions proposed in the Preferred Option reduce road network delay to well below the Do Minimum scenarios in each forecast year, and delay is close to the 2018 base year level of network delay.

Road network vehicle statistics including total VKT (light and heavy vehicles), total hours travelled, network delay, average trip length and CO_2-e emissions are presented in **Table 8-2** below. The addition of the Ring Road results in a 1.4% increase in VKT, a 13.2% reduction in network delay and slight increase (+0.3%) in CO_2-e emissions.

Table 8-2 Preferred Options Road Network vehicle statistics

Scenario	Average Daily VKT	Average Daily VHT	Average Daily Delays VHT	VKT / Person	Vehicle Trips / Person	Average Trip Length (km)	CO_2E Kg/day
2053 DM	1,875,134	44,858	11,640	20.37	3.29	6.19	140,460
2053 PO	1,596,551	34,335	5,888	17.34	2.79	6.22	124,661
2053 PO with Ring Road	1,619,452	33,317	5,113	17.59	2.80	6.29	124,692

The flow difference plot comparing Average daily traffic flows with the ring road compared to without the ring road is provided in **Appendix E**, and the Max LOS plot for the scenario is provided in **Appendix G**.

9 Core Preferred Option

Following the submission of the final version of the New Plymouth Integrated Transport Framework (ITF) Programme Business Case (PBC) in March 2024, additional NZ Transport Agency (NZTA) feedback on the affordability of the programme and the financial case was received, and the draft 2024-2027 Government Policy Statement (GPS) on land transport was released. To respond to these changes and move towards gaining endorsement from all agencies, NPDC requested Beca to provide an updated version of the NPDC ITF.

A preferred core programme was developed from the short list stage to improve programme affordability while still delivering similar outcomes. This was achieved by:

- Rescheduling the costed interventions to smooth the annual and total programme costs while maintaining the critical path of the costed interventions to deliver the modelled outcomes.
- Descoping some of the higher-cost interventions to deliver similar outcomes with better value for money by considering the likely triggers for these interventions and testing different model scenarios.

The revised core programme was modelled using the Ngāmotu STM for the 2053 future year. This scenario is referred to as the '2053 Core Preferred Option' (Core PO).

The scenario is represented in the model with the following specification changes (as compared to the previous 2053 Preferred Option)

- Replacement of the loosely specified 'East West connection' (which was represented with link LOS capping) with a single lane road between SH3 and Smart Road
- Removal of the High Speed Public Transport intervention[5] between New Plymouth, Bell Block and Waitara.

The two lane (one lane each direction) arterial connection between Smart Road and SH3 as shown below in **Figure 9-1.** This chapter summarises the model results for Core Preferred Option scenario.

[5] This intervention is listed in **Table 4-5** as Reduce Route 5020 time factors by 50%. In modelling this intervention, a 50% multiplier factor was applied to the bus route 5020 when calculating travel time across links.

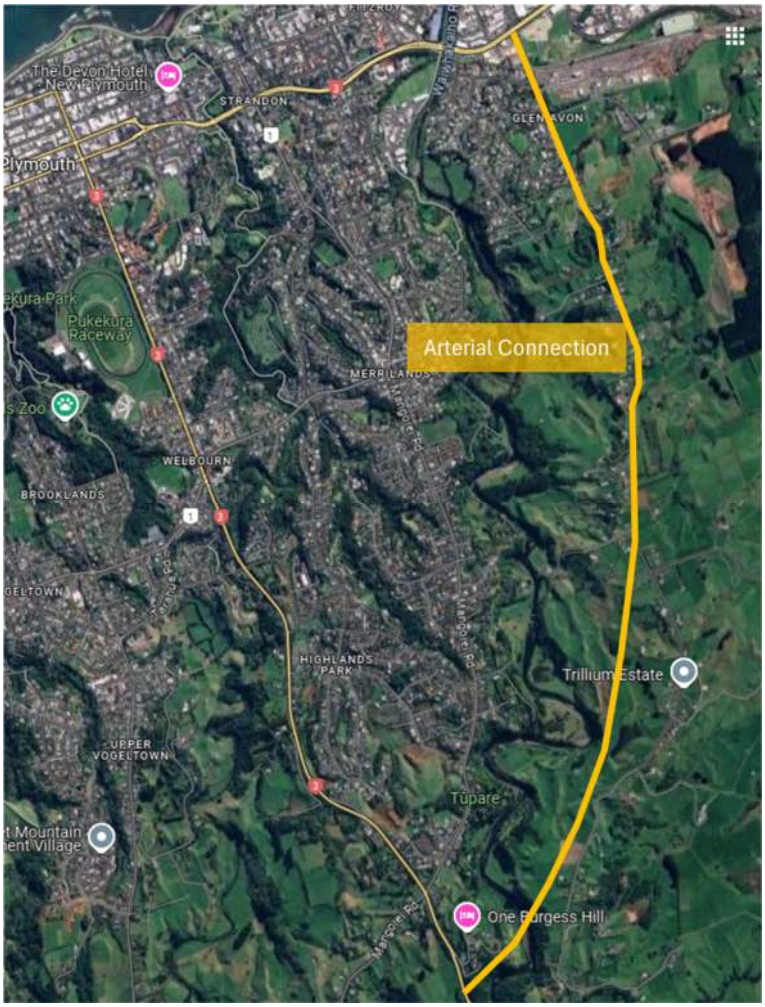


Figure 9-1 Illustration of the Smart Road-SH3 connection

Table 10-1 presents the forecast travel demand by mode. As shown in the table, there is a slight increase in vehicle trips and car mode share in the Core Preferred Option scenario compared to the Preferred Option.

Table 9-1 Core Preferred Option forecast daily demand by mode and mode share

Scenarios/ Measure	Demand by mode			Mode Share		
	Vehicles (vehicle trips)	PT (person trips)	Cycle (person trips)	% Car	% PT	% Cycle
2053 DM	303,053	4,033	6,789	97.1%	1.1%	1.8%
2053 PO	256,880	47,293	11,802	83.9%	12.9%	3.2%
2053 Core PO	258,233	45,907	11,802	84.3%	12.5%	3.2%

Road network vehicle statistics including total VKT (light and heavy vehicles), total hours travelled, network delay, average trip length and CO_2-e emissions are presented in **Table 9-2**. The proposed interventions in the Core Preferred Option assumptions result in a slight increase in VKT and CO_2-e emissions and a reduction in network delay compared to the Preferred Option.

Table 9-2: Core Preferred Options road network vehicle statistics

Scenario	Average Daily VKT	Average Daily VHT	Average Daily Delays VHT	VKT / Person	Vehicle Trips / Person	Average Trip Length (km)	CO_2E Kg/day
2053 DM	1,875,134	44,858	11,640	20.37	3.29	6.19	140,460
2053 PO	1,596,551	34,335	5,888	17.34	2.79	6.22	124,661
2053 Core PO	1,612,162	34,314	5,574	17.51	2.80	6.24	125,023

The Max LOS plot for this scenario is provided in **Appendix G**.

10 Conclusion

This report documents the development of forecast scenarios for New Plymouth's Integrated Transport Framework programme business case. The forecasting was done using the Ngāmotu STM v1.0 model. Several scenarios were considered for forecast scenarios, namely Do Minimum, Short List Options and Preferred Option for the future years of 2035 and 2053. Various land use, transport network, PT, and cycle interventions were tested in these scenarios. Two variations to the 2053 Preferred Option were developed and modelled. These were the 2053 Preferred Option with Ring Road, and the 2053 Core Preferred Option.

The impacts on the strategic transport network of these scenarios is presented in this report as well as the KPIs supplied to the programme business case team.

The key metrics from the modelling of the Preferred Scenario were:

- The Preferred Option has a daily public transport mode share of 3.5% in 2035 and 12.9% in 2053. In the 2035 AM Peak period PT mode share is 6% for journey to work trips and PT mode share is 18% for school trips. These values for the year 2053 are 18% and 28% for journey to work trips and school trips.
- The Preferred Option has a cycle mode share of 2.4% in 2035 and 3.2% in 2053.
- The Preferred Option provides a 4% reduction in CO_2 equivalent emissions on the DM scenario for 2035 and a 10% reduction for 2053.
- The Preferred Option provides a 10% reduction in vehicle delay across the network compared to the DM scenario in 2035 and a 49% reduction in vehicle delay across the network in 2053. The interventions in the Preferred Option which make the biggest contribution to the key metrics are:
  - the parking price and extent that parking price is applied in the CBD.
  - the proxy for road pricing represented in the model; and
  - the combination of PT infrastructure and service level improvements.

A

Appendix A – Land Use Projections by SA2s

Appendix A – Land Use Projections by SA2s

Population																		
SA2_2023	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**
Bell Block Central	2,783	2,797	2,811	2,824	2,838	2,847	2,862	2,877	2,892	2,909	2,928	2,949	2,972	2,996	3,021	3,043	3,061	3,074
Bell Block East	1,153	1,275	1,397	1,519	1,641	1,734	1,851	1,970	2,097	2,236	2,390	2,546	2,688	2,808	2,900	2,962	3,016	3,062
Bell Block West	3,354	3,500	3,646	3,793	3,939	3,983	4,042	4,102	4,166	4,236	4,313	4,396	4,480	4,562	4,636	4,700	4,751	4,791
Blagdon-Lynmouth	2,570	2,583	2,595	2,608	2,621	2,623	2,630	2,639	2,648	2,659	2,673	2,688	2,706	2,724	2,743	2,760	2,773	2,783
Everett Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferndale	904	918	932	946	961	980	1,007	1,038	1,073	1,114	1,163	1,212	1,257	1,294	1,322	1,340	1,355	1,367
Fitzroy	2,085	2,095	2,105	2,115	2,126	2,136	2,152	2,167	2,183	2,200	2,219	2,239	2,260	2,280	2,298	2,314	2,327	2,337
Frankleigh Park	3,323	3,339	3,355	3,372	3,388	3,390	3,398	3,407	3,417	3,430	3,446	3,464	3,484	3,506	3,528	3,549	3,564	3,575
Glen Avon	1,235	1,280	1,326	1,372	1,418	1,435	1,458	1,482	1,509	1,539	1,573	1,618	1,673	1,736	1,806	1,880	1,981	2,109
Highlands Park (New Plymouth district)	3,410	3,427	3,444	3,460	3,477	3,501	3,531	3,560	3,587	3,614	3,641	3,671	3,704	3,739	3,774	3,806	3,831	3,851
Hurdon	2,316	2,353	2,391	2,428	2,466	2,485	2,512	2,541	2,571	2,604	2,641	2,687	2,741	2,801	2,866	2,931	3,000	3,072
Inglewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kaitake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kawaroa	2,400	2,412	2,424	2,435	2,447	2,458	2,472	2,486	2,499	2,512	2,525	2,540	2,556	2,574	2,591	2,606	2,619	2,628
Lepperton-Brixton	1,780	1,803	1,825	1,848	1,871	1,886	1,906	1,928	1,950	1,975	2,002	2,033	2,065	2,099	2,132	2,162	2,188	2,210
Lower Vogeltown	2,950	2,970	2,990	3,010	3,029	3,042	3,062	3,082	3,103	3,126	3,152	3,180	3,210	3,240	3,268	3,293	3,313	3,327
Mangaoraka	47	47	47	48	48	48	48	49	49	49	50	50	51	51	52	52	52	52
Mangorei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marfell	1,705	1,729	1,753	1,777	1,802	1,821	1,848	1,875	1,903	1,935	1,970	2,009	2,049	2,090	2,130	2,166	2,198	2,225
Merrilands	2,990	3,005	3,019	3,034	3,049	3,056	3,069	3,083	3,099	3,117	3,137	3,160	3,185	3,211	3,236	3,259	3,276	3,289
Moturoa	1,870	1,879	1,888	1,898	1,907	1,913	1,923	1,934	1,946	1,959	1,975	1,992	2,010	2,028	2,045	2,061	2,072	2,081
Mount Messenger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Plymouth Central	1,155	1,310	1,465	1,620	1,775	1,782	1,794	1,805	1,818	1,831	1,847	1,863	1,879	1,896	1,911	1,924	1,934	1,941
Oakura	1,580	1,602	1,624	1,646	1,668	1,677	1,691	1,705	1,719	1,735	1,752	1,771	1,792	1,813	1,833	1,852	1,867	1,880
Omata	479	488	496	504	513	521	531	542	554	567	581	598	616	634	651	668	683	696
Paraite	932	935	938	941	944	947	951	956	961	966	971	977	984	992	999	1,006	1,012	1,016
Port Taranaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotswood	3,730	3,736	3,743	3,749	3,755	3,769	3,791	3,815	3,842	3,872	3,906	3,943	3,979	4,013	4,043	4,068	4,086	4,098
Strandon	2,640	2,711	2,782	2,852	2,923	2,934	2,950	2,968	2,987	3,008	3,032	3,058	3,087	3,117	3,147	3,174	3,194	3,208
Tarata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tikorangi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Vogeltown	2,820	2,834	2,848	2,862	2,876	2,924	2,978	3,026	3,067	3,103	3,132	3,164	3,197	3,230	3,262	3,290	3,313	3,332
Waitara East	3,020	3,029	3,039	3,048	3,058	3,079	3,108	3,138	3,170	3,205	3,244	3,290	3,344	3,402	3,463	3,524	3,577	3,622
Waitara West	4,120	4,140	4,161	4,181	4,201	4,215	4,236	4,259	4,284	4,312	4,343	4,378	4,414	4,451	4,485	4,516	4,539	4,556
Waiwhakaiho-Bell Block South	159	186	212	239	265	265	266	266	267	267	268	269	270	271	272	273	273	274
Welbourn	3,417	3,460	3,503	3,546	3,590	3,592	3,600	3,610	3,622	3,637	3,654	3,674	3,697	3,722	3,746	3,770	3,787	3,800
Westown	4,530	4,589	4,648	4,707	4,765	4,769	4,780	4,793	4,808	4,827	4,849	4,875	4,904	4,934	4,965	4,993	5,014	5,029
Whalers Gate	2,419	2,444	2,470	2,496	2,521	2,528	2,539	2,550	2,562	2,574	2,588	2,603	2,620	2,637	2,654	2,670	2,681	2,690
Total	**67,875**	**68,876**	**69,878**	**70,879**	**71,880**	**72,340**	**72,986**	**73,651**	**74,356**	**75,121**	**75,966**	**76,896**	**77,873**	**78,850**	**79,778**	**80,614**	**81,338**	**81,977**
Change	0	1,001	2,003	3,004	4,005	4,465	5,111	5,776	6,481	7,246	8,091	9,021	9,998	10,975	11,903	12,739	13,463	14,102
Perent Change	0%	+1%	+3%	+4%	+6%	+7%	+8%	+9%	+10%	+11%	+12%	+13%	+15%	+16%	+18%	+19%	+20%	+21%

Population																			
SA2_2023	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**
Bell Block Central	3,086	3,096	3,108	3,121	3,136	3,152	3,166	3,179	3,185	3,189	3,191	3,193	3,195	3,197	3,200	3,204	3,207	3,211	3,214
Bell Block East	3,103	3,141	3,178	3,217	3,255	3,293	3,328	3,359	3,386	3,408	3,427	3,442	3,456	3,469	3,483	3,497	3,510	3,523	3,535
Bell Block West	4,824	4,851	4,876	4,903	4,931	4,957	4,980	4,998	5,007	5,014	5,021	5,028	5,036	5,045	5,055	5,066	5,076	5,086	5,095
Blagdon-Lynmouth	2,791	2,797	2,805	2,815	2,827	2,840	2,853	2,864	2,869	2,872	2,873	2,872	2,872	2,872	2,874	2,875	2,877	2,878	2,880
Everett Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferndale	1,379	1,390	1,401	1,414	1,428	1,443	1,458	1,472	1,487	1,500	1,512	1,524	1,535	1,547	1,558	1,569	1,579	1,589	1,598
Fitzroy	2,345	2,354	2,363	2,374	2,385	2,397	2,408	2,418	2,422	2,423	2,424	2,423	2,423	2,423	2,423	2,424	2,425	2,426	2,427
Frankleigh Park	3,584	3,592	3,601	3,613	3,627	3,642	3,657	3,669	3,674	3,676	3,675	3,674	3,674	3,674	3,674	3,676	3,677	3,679	3,680
Glen Avon	2,263	2,444	2,651	2,879	3,122	3,376	3,636	3,895	4,225	4,539	4,839	5,125	5,402	5,665	5,916	6,156	6,384	6,600	6,805
Highlands Park (New Plymouth district)	3,866	3,881	3,895	3,912	3,931	3,951	3,969	3,985	3,992	3,996	3,999	4,001	4,003	4,005	4,009	4,013	4,017	4,022	4,025
Hurdon	3,148	3,232	3,323	3,415	3,504	3,590	3,670	3,742	3,814	3,869	3,911	3,941	3,963	3,983	4,004	4,025	4,044	4,063	4,081
Inglewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kaitake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kawaroa	2,636	2,643	2,652	2,663	2,674	2,686	2,697	2,706	2,710	2,711	2,712	2,712	2,712	2,712	2,714	2,715	2,717	2,719	2,720
Lepperton-Brixton	2,229	2,247	2,266	2,286	2,307	2,328	2,349	2,367	2,382	2,395	2,404	2,412	2,420	2,427	2,435	2,442	2,450	2,457	2,463
Lower Vogeltown	3,339	3,350	3,361	3,375	3,390	3,406	3,420	3,432	3,437	3,438	3,438	3,438	3,437	3,437	3,438	3,440	3,442	3,444	3,445
Mangaoraka	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53
Mangorei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marfell	2,251	2,275	2,299	2,324	2,348	2,372	2,393	2,411	2,423	2,432	2,436	2,438	2,438	2,439	2,440	2,442	2,444	2,446	2,447
Merrilands	3,299	3,307	3,316	3,328	3,342	3,357	3,372	3,384	3,391	3,395	3,399	3,403	3,407	3,412	3,417	3,423	3,429	3,434	3,439
Moturoa	2,088	2,095	2,101	2,110	2,119	2,128	2,137	2,144	2,147	2,150	2,151	2,152	2,154	2,157	2,159	2,162	2,165	2,168	2,171
Mount Messenger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Plymouth Central	1,947	1,953	1,958	1,965	1,973	1,980	1,986	1,991	1,991	1,989	1,987	1,984	1,982	1,981	1,980	1,980	1,980	1,979	1,979
Oakura	1,892	1,904	1,916	1,929	1,941	1,953	1,962	1,970	1,973	1,974	1,974	1,973	1,972	1,972	1,973	1,973	1,974	1,975	1,976
Omata	708	719	730	741	751	761	770	778	784	789	793	796	798	800	802	804	806	809	811
Paraite	1,020	1,023	1,027	1,031	1,035	1,040	1,043	1,046	1,046	1,046	1,045	1,045	1,044	1,044	1,044	1,044	1,045	1,045	1,045
Port Taranaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotswood	4,108	4,116	4,126	4,140	4,156	4,175	4,192	4,208	4,215	4,218	4,221	4,222	4,224	4,226	4,230	4,234	4,239	4,243	4,247
Strandon	3,218	3,225	3,231	3,240	3,250	3,261	3,270	3,277	3,277	3,275	3,273	3,271	3,270	3,270	3,271	3,272	3,274	3,275	3,277
Tarata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tikorangi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Vogeltown	3,348	3,363	3,379	3,398	3,418	3,437	3,455	3,470	3,478	3,483	3,486	3,488	3,490	3,492	3,496	3,500	3,504	3,508	3,511
Waitara East	3,663	3,701	3,739	3,777	3,815	3,851	3,884	3,911	3,932	3,950	3,963	3,975	3,986	3,997	4,008	4,020	4,031	4,042	4,052
Waitara West	4,569	4,580	4,592	4,607	4,625	4,642	4,659	4,673	4,676	4,676	4,675	4,674	4,673	4,673	4,674	4,676	4,678	4,680	4,682
Waiwhakaiho-Bell Block South	274	274	274	274	274	275	275	276	276	275	275	274	274	274	274	274	274	274	274
Welbourn	3,810	3,819	3,829	3,842	3,857	3,872	3,886	3,896	3,898	3,897	3,896	3,894	3,892	3,892	3,893	3,894	3,896	3,898	3,899
Westown	5,040	5,050	5,062	5,077	5,095	5,113	5,130	5,143	5,145	5,144	5,143	5,143	5,143	5,146	5,149	5,153	5,157	5,161	5,165
Whalers Gate	2,696	2,702	2,709	2,718	2,728	2,738	2,747	2,754	2,755	2,756	2,756	2,757	2,758	2,760	2,763	2,766	2,770	2,773	2,775
Total	**82,576**	**83,176**	**83,821**	**84,538**	**85,300**	**86,070**	**86,807**	**87,472**	**88,048**	**88,533**	**88,951**	**89,326**	**89,684**	**90,046**	**90,411**	**90,772**	**91,123**	**91,457**	**91,770**
Change	14,701	15,301	15,946	16,663	17,425	18,195	18,932	19,597	20,173	20,658	21,076	21,451	21,809	22,171	22,536	22,897	23,248	23,582	23,895
Perent Change	+22%	+23%	+23%	+25%	+26%	+27%	+28%	+29%	+30%	+30%	+31%	+32%	+32%	+33%	+33%	+34%	+34%	+35%	+35%

Households																		
SA2_2023	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**
Bell Block Central	1,154	1,156	1,159	1,162	1,165	1,167	1,171	1,174	1,178	1,182	1,186	1,192	1,198	1,205	1,213	1,221	1,229	1,236
Bell Block East	453	504	555	606	658	690	731	773	817	865	919	973	1,022	1,063	1,096	1,118	1,138	1,157
Bell Block West	1,261	1,271	1,281	1,291	1,302	1,316	1,334	1,352	1,371	1,392	1,415	1,441	1,468	1,493	1,518	1,540	1,559	1,576
Blagdon-Lynmouth	968	971	974	976	979	979	980	982	983	985	988	992	997	1,003	1,009	1,016	1,022	1,028
Everett Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferndale	349	349	350	351	352	359	368	379	391	405	422	439	455	468	477	484	490	495
Fitzroy	867	869	871	873	875	879	883	887	892	897	902	908	915	921	928	934	940	945
Frankleigh Park	1,310	1,313	1,316	1,319	1,322	1,322	1,323	1,324	1,325	1,328	1,331	1,336	1,342	1,348	1,356	1,365	1,372	1,379
Glen Avon	496	530	563	597	631	637	645	653	662	672	684	700	720	744	770	799	839	890
Highlands Park (New Plymouth district)	1,509	1,509	1,510	1,511	1,511	1,519	1,528	1,536	1,544	1,551	1,558	1,567	1,577	1,587	1,599	1,611	1,622	1,632
Hurdon	947	955	962	970	978	985	994	1,003	1,013	1,024	1,036	1,052	1,072	1,094	1,118	1,144	1,172	1,203
Inglewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kaitake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kawaroa	1,065	1,069	1,073	1,076	1,080	1,084	1,088	1,092	1,096	1,100	1,103	1,108	1,113	1,119	1,126	1,133	1,140	1,146
Lepperton-Brixton	706	713	720	727	734	739	745	751	758	766	774	784	794	806	817	828	838	848
Lower Vogeltown	1,234	1,238	1,242	1,246	1,250	1,254	1,260	1,266	1,273	1,280	1,288	1,297	1,307	1,318	1,329	1,340	1,350	1,358
Mangaoraka	19	19	19	19	19	19	19	19	20	20	20	20	20	20	20	21	21	21
Mangorei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marfell	580	593	606	619	632	638	646	655	664	674	684	697	710	724	737	751	763	774
Merrilands	1,266	1,272	1,278	1,283	1,289	1,292	1,295	1,298	1,302	1,307	1,312	1,319	1,327	1,336	1,345	1,355	1,363	1,371
Moturoa	814	817	820	823	826	828	831	834	838	842	847	853	860	867	874	881	887	892
Mount Messenger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Plymouth Central	523	522	521	520	520	523	527	531	535	540	546	552	559	566	572	579	585	591
Oakura	621	628	636	643	650	654	658	662	666	671	677	683	690	697	705	712	719	726
Omata	210	211	212	213	214	217	220	224	228	232	237	243	249	255	261	267	273	278
Paraite	376	377	377	378	379	380	381	382	383	384	385	387	389	391	393	396	398	401
Port Taranaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotswood	1,484	1,490	1,497	1,503	1,509	1,514	1,520	1,527	1,534	1,543	1,553	1,565	1,576	1,588	1,599	1,609	1,617	1,626
Strandon	1,176	1,181	1,186	1,191	1,196	1,200	1,205	1,209	1,215	1,221	1,228	1,237	1,246	1,257	1,268	1,280	1,290	1,298
Tarata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tikorangi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Vogeltown	1,168	1,172	1,176	1,181	1,185	1,203	1,223	1,240	1,254	1,266	1,274	1,285	1,296	1,307	1,319	1,330	1,341	1,351
Waitara East	1,191	1,200	1,210	1,220	1,229	1,236	1,246	1,255	1,265	1,275	1,287	1,302	1,320	1,340	1,363	1,386	1,407	1,427
Waitara West	1,612	1,611	1,610	1,608	1,607	1,611	1,617	1,623	1,629	1,637	1,646	1,656	1,667	1,679	1,692	1,704	1,715	1,724
Waiwhakaiho-Bell Block South	58	64	70	76	82	82	82	82	82	82	82	82	82	82	83	83	83	83
Welbourn	1,366	1,369	1,372	1,376	1,379	1,379	1,379	1,380	1,382	1,385	1,388	1,393	1,399	1,406	1,415	1,424	1,432	1,439
Westown	1,855	1,856	1,857	1,859	1,860	1,860	1,861	1,862	1,865	1,868	1,873	1,880	1,888	1,898	1,909	1,921	1,932	1,942
Whalers Gate	1,121	1,124	1,127	1,129	1,132	1,134	1,136	1,139	1,142	1,145	1,148	1,152	1,157	1,163	1,169	1,176	1,182	1,187
Total	**27,758**	**27,954**	**28,150**	**28,347**	**28,543**	**28,700**	**28,895**	**29,094**	**29,306**	**29,537**	**29,794**	**30,094**	**30,415**	**30,746**	**31,080**	**31,407**	**31,719**	**32,023**
Change	0	196	393	589	785	942	1,137	1,336	1,548	1,780	2,037	2,336	2,657	2,989	3,323	3,650	3,962	4,266
Perent Change	0%	+1%	+1%	+2%	+3%	+3%	+4%	+5%	+6%	+6%	+7%	+8%	+10%	+11%	+12%	+13%	+14%	+15%

Households																			
SA2_2023	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**
Bell Block Central	1,242	1,248	1,253	1,258	1,263	1,268	1,273	1,277	1,282	1,288	1,293	1,297	1,302	1,306	1,310	1,314	1,318	1,322	1,325
Bell Block East	1,174	1,190	1,205	1,219	1,233	1,245	1,257	1,268	1,282	1,294	1,306	1,316	1,325	1,334	1,343	1,351	1,359	1,367	1,374
Bell Block West	1,591	1,604	1,615	1,625	1,634	1,642	1,648	1,654	1,663	1,671	1,680	1,689	1,698	1,707	1,716	1,724	1,732	1,739	1,746
Blagdon-Lynmouth	1,033	1,037	1,042	1,046	1,050	1,055	1,059	1,063	1,068	1,073	1,078	1,082	1,085	1,089	1,092	1,096	1,099	1,102	1,105
Everett Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferndale	501	505	510	515	520	525	530	535	542	549	556	562	568	574	580	586	591	596	601
Fitzroy	950	955	960	964	968	972	976	980	984	988	991	995	998	1,001	1,003	1,006	1,009	1,011	1,013
Frankleigh Park	1,386	1,391	1,397	1,402	1,407	1,412	1,417	1,422	1,428	1,434	1,439	1,444	1,449	1,453	1,458	1,462	1,466	1,469	1,473
Glen Avon	952	1,024	1,107	1,197	1,292	1,391	1,492	1,593	1,728	1,858	1,983	2,104	2,222	2,334	2,441	2,543	2,640	2,733	2,821
Highlands Park (New Plymouth district)	1,641	1,649	1,656	1,663	1,669	1,676	1,681	1,687	1,694	1,701	1,707	1,714	1,720	1,725	1,731	1,736	1,741	1,746	1,750
Hurdon	1,235	1,271	1,308	1,345	1,380	1,413	1,444	1,472	1,504	1,532	1,554	1,572	1,586	1,600	1,613	1,625	1,636	1,647	1,658
Inglewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kaitake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kawaroa	1,152	1,157	1,162	1,167	1,172	1,177	1,181	1,185	1,190	1,194	1,199	1,203	1,208	1,212	1,215	1,219	1,223	1,226	1,229
Lepperton-Brixton	856	864	872	880	887	894	901	908	916	923	930	937	943	948	953	958	963	968	972
Lower Vogeltown	1,366	1,374	1,380	1,386	1,392	1,398	1,403	1,408	1,414	1,420	1,426	1,431	1,436	1,441	1,445	1,450	1,454	1,458	1,462
Mangaoraka	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	22	22	22
Mangorei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marfell	785	795	805	814	823	831	838	844	851	857	862	866	870	873	876	878	881	883	886
Merrilands	1,377	1,383	1,389	1,394	1,399	1,404	1,409	1,414	1,421	1,427	1,434	1,441	1,447	1,454	1,460	1,465	1,471	1,476	1,481
Moturoa	897	902	906	910	914	917	921	924	928	932	936	940	944	948	952	956	959	963	966
Mount Messenger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Plymouth Central	596	600	604	608	612	615	617	619	622	625	628	630	633	635	638	640	642	644	646
Oakura	732	739	744	750	755	759	762	765	769	772	775	778	780	783	785	787	790	792	794
Omata	283	287	292	296	300	303	306	309	312	315	317	320	321	323	325	326	328	329	331
Paraite	403	405	406	408	409	411	412	413	414	415	416	418	419	420	421	422	423	424	425
Port Taranaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotswood	1,633	1,639	1,645	1,651	1,657	1,664	1,670	1,676	1,683	1,691	1,698	1,706	1,712	1,719	1,725	1,731	1,737	1,742	1,748
Strandon	1,305	1,311	1,315	1,319	1,323	1,326	1,329	1,332	1,336	1,340	1,344	1,349	1,353	1,358	1,362	1,366	1,370	1,373	1,377
Tarata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tikorangi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Vogeltown	1,360	1,369	1,377	1,385	1,393	1,400	1,406	1,412	1,419	1,426	1,433	1,439	1,445	1,450	1,456	1,461	1,466	1,470	1,475
Waitara East	1,445	1,462	1,478	1,493	1,507	1,520	1,531	1,541	1,553	1,565	1,576	1,586	1,596	1,605	1,614	1,622	1,630	1,637	1,644
Waitara West	1,733	1,740	1,747	1,754	1,760	1,766	1,771	1,776	1,782	1,789	1,795	1,801	1,807	1,813	1,818	1,823	1,828	1,833	1,837
Waiwhakaiho-Bell Block South	83	84	84	84	84	84	84	84	84	85	85	85	85	85	85	86	86	86	86
Welbourn	1,446	1,452	1,458	1,463	1,468	1,472	1,477	1,480	1,485	1,490	1,495	1,500	1,505	1,509	1,514	1,518	1,522	1,526	1,529
Westown	1,951	1,959	1,967	1,974	1,981	1,987	1,993	1,998	2,005	2,012	2,020	2,028	2,036	2,044	2,052	2,059	2,065	2,072	2,078
Whalers Gate	1,192	1,197	1,201	1,205	1,209	1,213	1,216	1,218	1,222	1,227	1,231	1,236	1,241	1,246	1,250	1,254	1,258	1,262	1,266
Total	**32,321**	**32,614**	**32,905**	**33,196**	**33,481**	**33,759**	**34,025**	**34,276**	**34,604**	**34,915**	**35,210**	**35,490**	**35,757**	**36,011**	**36,254**	**36,486**	**36,707**	**36,917**	**37,118**
Change	4,563	4,856	5,147	5,438	5,724	6,001	6,268	6,519	6,846	7,157	7,452	7,732	7,999	8,254	8,496	8,729	8,949	9,160	9,361
Perent Change	+16%	+17%	+19%	+20%	+21%	+22%	+23%	+23%	+25%	+26%	+27%	+28%	+29%	+30%	+31%	+31%	+32%	+33%	+34%

Retail

SA2_2023	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
Bell Block Central	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Bell Block East	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
Bell Block West	60	61	61	62	63	63	63	64	64	64	65	65	66	66	67	67	67	67	68	68	68	68	68	68	68	68	69	69	69	69	69	69	69	69	69	69	69
Blagdon-Lynmouth	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Everett Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferndale	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
Fitzroy	98	103	108	113	118	123	130	137	145	153	162	171	181	191	199	207	213	218	222	226	230	235	241	246	252	256	258	259	259	259	258	258	259	259	260	260	260
Frankleigh Park	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Glen Avon	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Highlands Park (New Plymouth district)	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Hurdon	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43
Inglewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kaitake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kawaroa	74	75	75	75	76	76	76	77	77	77	78	78	79	79	80	80	80	81	81	81	81	82	82	82	83	83	83	83	83	83	83	83	83	83	83	83	83
Lepperton-Brixton	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Lower Vogeltown	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56
Mangaoraka	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mangorei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marfell	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Merrilands	40	41	41	41	42	42	42	42	43	43	43	44	44	45	46	46	46	47	47	47	47	48	48	48	48	49	49	49	49	49	49	49	49	50	50	50	50
Moturoa	67	71	74	78	81	83	87	91	96	101	107	113	120	127	133	139	143	147	149	152	154	157	161	164	168	170	172	172	173	173	174	175	176	177	178	179	180
Mount Messenger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Plymouth Central	1,250	1,268	1,285	1,303	1,320	1,334	1,352	1,370	1,389	1,409	1,432	1,459	1,488	1,517	1,547	1,576	1,604	1,631	1,658	1,684	1,710	1,736	1,762	1,786	1,810	1,833	1,862	1,890	1,916	1,941	1,965	1,988	2,009	2,030	2,050	2,069	2,086
Oakura	97	98	98	99	99	99	100	100	100	101	101	101	102	102	103	103	104	104	104	104	105	105	105	106	106	106	106	106	106	106	106	106	106	106	106	106	106
Omata	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Paraite	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Port Taranaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotswood	46	47	49	50	51	54	58	63	69	75	81	89	96	103	109	114	117	120	122	123	125	128	131	135	139	142	143	144	144	145	145	145	146	147	148	149	149
Strandon	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
Tarata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tikorangi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Vogeltown	51	51	51	51	51	52	53	53	54	54	55	55	56	56	57	57	57	57	58	58	58	58	59	59	59	59	59	59	60	60	60	60	60	60	60	60	60
Waitara East	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Waitara West	225	227	230	232	234	235	238	240	243	246	249	253	257	260	264	267	270	272	273	274	276	277	279	281	283	284	284	285	284	284	284	284	284	284	285	285	285
Waiwhakaiho-Bell Block South	487	570	652	735	817	818	819	821	823	825	827	829	832	835	838	841	843	844	844	844	844	845	846	848	850	851	850	849	848	847	846	845	845	844	844	844	844
Welbourn	81	82	83	84	85	85	85	85	85	86	86	86	87	87	88	88	88	89	89	89	89	89	90	90	90	91	91	91	90	90	90	90	90	90	91	91	91
Westown	143	145	146	148	150	150	150	150	151	151	152	153	154	155	155	156	157	157	158	158	158	159	159	160	160	161	161	161	161	161	161	161	161	161	161	161	161
Whalers Gate	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Total	**3,605**	**3,721**	**3,838**	**3,954**	**4,071**	**4,099**	**4,138**	**4,178**	**4,222**	**4,269**	**4,322**	**4,381**	**4,444**	**4,508**	**4,570**	**4,627**	**4,675**	**4,718**	**4,756**	**4,793**	**4,831**	**4,872**	**4,915**	**4,959**	**5,000**	**5,037**	**5,071**	**5,100**	**5,126**	**5,150**	**5,174**	**5,198**	**5,222**	**5,245**	**5,268**	**5,290**	**5,310**
Change	0	116	233	349	466	494	533	574	617	664	717	776	839	903	965	1,022	1,071	1,113	1,151	1,188	1,226	1,267	1,311	1,354	1,395	1,432	1,466	1,495	1,521	1,546	1,569	1,593	1,617	1,641	1,663	1,685	1,706
Perent Change	0%	+3%	+6%	+10%	+13%	+14%	+15%	+16%	+17%	+18%	+20%	+22%	+23%	+25%	+27%	+28%	+30%	+31%	+32%	+33%	+34%	+35%	+36%	+38%	+39%	+40%	+41%	+41%	+42%	+43%	+44%	+44%	+45%	+46%	+46%	+47%	+47%

Commercial

SA2_2023	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
Bell Block Central	105	105	106	106	106	107	107	108	108	108	109	109	110	111	111	112	112	113	113	113	114	114	115	115	115	116	116	116	116	116	116	116	116	116	116	117	117
Bell Block East	93	93	93	93	94	94	94	94	95	95	95	96	96	96	96	96	96	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	98	98
Bell Block West	218	222	225	228	231	232	233	234	236	237	239	240	242	244	246	247	248	249	250	250	251	251	252	252	253	253	253	254	254	254	254	254	254	255	255	255	255
Blagdon-Lynmouth	120	121	122	123	124	124	125	125	126	127	128	129	130	132	133	134	135	136	137	137	138	139	139	140	141	142	143	143	143	143	143	143	143	143	143	143	143
Everett Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferndale	44	44	44	44	44	45	45	46	46	47	48	48	49	50	50	50	50	51	51	51	51	51	52	52	52	52	52	53	53	53	53	53	54	54	54	54	54
Fitzroy	163	163	164	165	166	166	168	169	170	171	172	174	175	177	178	179	180	181	182	182	183	184	185	186	186	187	187	188	188	188	187	187	188	188	188	188	188
Frankleigh Park	144	145	146	146	147	147	148	148	149	149	150	151	152	153	154	155	155	156	156	156	157	157	158	159	159	160	160	160	160	160	160	160	160	160	160	160	160
Glen Avon	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	68	68	68	68	69	69	69	69	70	70	70	71	71	71	72	72	72	73	73	73
Highlands Park (New Plymouth district)	324	325	327	328	330	331	334	336	339	341	343	345	348	351	354	356	359	360	361	363	364	365	367	368	370	371	372	372	372	372	373	373	373	373	374	374	374
Hurdon	114	115	115	115	116	116	116	117	117	117	118	118	119	120	120	121	122	123	124	125	126	127	128	129	130	130	131	132	132	133	133	133	133	134	134	134	134
Inglewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kaitake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kawaroa	502	505	509	512	516	519	523	528	532	536	540	544	549	554	559	564	568	571	573	575	578	581	585	588	592	595	596	596	596	596	596	596	597	597	598	598	599
Lepperton-Brixton	232	232	233	233	234	234	235	235	236	236	237	237	238	239	240	240	241	241	242	242	242	243	243	244	244	245	245	245	245	246	246	246	246	246	246	246	247
Lower Vogeltown	183	184	185	186	187	188	189	190	191	192	193	195	196	198	199	201	202	202	203	203	204	205	205	206	207	208	208	208	208	208	208	208	208	208	208	208	208
Mangaoraka	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Mangorei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marfell	38	38	38	38	38	38	38	39	39	39	39	40	40	40	40	41	41	41	41	41	42	42	42	42	42	43	43	43	43	43	43	43	43	43	43	43	43
Merrilands	141	142	143	143	144	144	145	145	146	147	148	149	150	151	152	153	153	154	154	155	155	156	156	157	157	158	158	158	159	159	159	159	159	160	160	160	160
Moturoa	143	144	145	146	147	148	149	150	151	153	155	157	159	161	163	165	166	167	168	169	170	171	172	173	174	175	175	175	176	176	176	176	177	177	177	178	178
Mount Messenger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Plymouth Central	3,666	3,700	3,734	3,768	3,802	3,830	3,863	3,898	3,935	3,975	4,019	4,071	4,127	4,184	4,242	4,298	4,352	4,405	4,457	4,507	4,558	4,608	4,657	4,706	4,752	4,795	4,852	4,906	4,957	5,005	5,051	5,096	5,137	5,178	5,216	5,252	5,287
Oakura	200	202	203	205	206	207	208	209	210	211	212	213	215	216	218	219	220	221	222	222	223	224	225	226	226	227	227	227	227	227	227	227	227	227	227	227	227
Omata	48	49	49	49	49	49	49	50	50	50	50	51	51	51	52	52	52	53	53	53	53	53	54	54	54	54	54	54	54	55	55	55	55	55	55	55	55
Paraite	67	67	67	67	67	67	67	67	67	67	67	67	67	67	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68
Port Taranaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotswood	208	208	209	209	210	211	212	214	216	218	221	224	226	229	231	233	234	235	236	236	237	238	239	241	242	243	244	244	244	244	244	245	245	245	245	246	246
Strandon	568	582	595	608	621	623	626	630	633	637	642	647	652	658	663	668	672	675	676	678	679	681	682	684	686	688	687	687	687	686	686	686	686	687	687	687	687
Tarata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tikorangi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Vogeltown	167	168	168	169	170	172	174	177	179	180	182	183	185	186	188	189	190	191	192	193	193	194	195	196	197	198	198	198	198	198	199	199	199	199	199	199	200
Waitara East	193	194	194	194	194	194	195	195	196	196	197	198	198	199	200	201	202	203	203	204	204	205	206	206	207	207	207	208	208	208	208	208	208	209	209	209	209
Waitara West	445	448	450	452	454	454	456	458	461	464	467	470	474	478	482	486	490	492	494	495	497	498	500	502	504	506	507	507	508	507	507	507	507	507	508	508	508
Waiwhakaiho-Bell Block South	623	662	702	742	781	782	783	783	784	785	786	787	788	790	792	793	794	794	794	794	794	795	795	796	797	798	797	797	796	796	795	795	795	795	794	794	794
Welbourn	287	295	302	310	318	318	320	321	324	326	329	333	337	341	346	350	353	355	357	358	360	362	365	368	370	372	372	372	372	372	372	371	371	371	372	372	373
Westown	1,505	1,536	1,567	1,598	1,629	1,631	1,636	1,643	1,651	1,661	1,673	1,686	1,701	1,718	1,734	1,749	1,760	1,767	1,773	1,778	1,785	1,793	1,802	1,812	1,820	1,827	1,828	1,828	1,827	1,827	1,827	1,828	1,830	1,832	1,834	1,837	1,839
Whalers Gate	211	213	214	216	217	218	218	219	220	221	221	222	223	224	225	226	227	227	228	228	229	229	230	230	231	231	231	231	231	231	231	232	232	232	232	232	232
Total	**10,823**	**10,970**	**11,117**	**11,265**	**11,412**	**11,461**	**11,529**	**11,600**	**11,676**	**11,760**	**11,852**	**11,958**	**12,073**	**12,191**	**12,309**	**12,421**	**12,517**	**12,600**	**12,676**	**12,749**	**12,823**	**12,904**	**12,988**	**13,071**	**13,149**	**13,219**	**13,284**	**13,341**	**13,393**	**13,442**	**13,489**	**13,537**	**13,585**	**13,631**	**13,677**	**13,720**	**13,760**
Change	0	147	295	442	590	638	706	778	854	937	1,030	1,136	1,250	1,369	1,487	1,598	1,694	1,777	1,853	1,926	2,001	2,081	2,165	2,248	2,327	2,397	2,461	2,519	2,570	2,619	2,667	2,715	2,762	2,809	2,854	2,897	2,938
Perent Change	0%	+1%	+3%	+4%	+5%	+6%	+7%	+7%	+8%	+9%	+10%	+10%	+12%	+13%	+14%	+15%	+16%	+16%	+17%	+18%	+18%	+19%	+20%	+21%	+21%	+22%	+23%	+23%	+24%	+24%	+25%	+25%	+26%	+26%	+26%	+27%	+27%

Industrial																																					
SA2_2023	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**
Bell Block Central	59	60	60	60	60	60	60	60	60	60	60	61	61	61	61	61	61	61	62	62	62	62	62	62	62	63	63	63	63	63	63	63	63	64	64	64	64
Bell Block East	57	57	58	58	58	58	59	59	59	60	60	61	61	62	62	63	63	64	64	64	65	65	66	66	67	67	68	68	68	69	69	70	70	70	71	71	71
Bell Block West	109	109	110	110	110	110	110	111	111	111	111	112	112	112	113	113	113	114	114	114	115	115	115	116	116	116	116	117	117	117	118	118	118	118	119	119	119
Blagdon-Lynmouth	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67
Everett Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferndale	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	27	27	27	27	27	27	27	27	27	27	27	27	27	27	28	28	28	28	28	28	28
Fitzroy	192	192	192	192	192	192	193	193	193	193	194	194	194	194	194	195	195	195	195	196	196	196	196	197	197	197	197	198	198	198	198	198	199	199	199	199	199
Frankleigh Park	97	98	98	98	98	98	98	99	99	99	99	99	100	100	100	100	101	101	101	101	102	102	102	102	103	103	103	103	104	104	104	104	104	105	105	105	105
Glen Avon	79	79	79	79	79	79	79	79	80	80	80	80	80	81	81	81	81	81	82	82	82	82	82	83	83	83	83	83	84	84	84	84	84	85	85	85	85
Highlands Park (New Plymouth district)	199	199	199	200	200	200	201	201	201	202	202	203	203	204	204	205	205	206	206	207	207	208	208	209	209	209	210	211	211	211	212	212	213	213	213	214	214
Hurdon	83	83	83	83	83	83	83	83	84	84	84	84	84	84	85	85	85	85	85	86	86	86	86	86	86	87	87	87	87	87	87	88	88	88	88	88	88
Inglewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kaitake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kawaroa	179	179	179	180	180	180	180	180	181	181	181	181	182	182	182	183	183	183	184	184	184	185	185	185	186	186	186	187	187	187	187	188	188	188	188	189	189
Lepperton-Brixton	348	350	351	353	354	356	357	359	361	362	365	367	370	372	375	378	380	383	385	387	390	392	394	397	399	401	404	406	409	411	413	415	417	419	421	422	424
Lower Vogeltown	77	77	77	77	77	77	77	77	77	77	77	78	78	78	78	78	78	78	78	78	78	79	79	79	79	79	79	79	79	79	80	80	80	80	80	80	80
Mangaoraka	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Mangorei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marfell	69	69	69	69	69	69	69	69	69	69	70	70	70	70	70	70	70	70	70	71	71	71	71	71	71	71	71	71	72	72	72	72	72	72	72	72	72
Merrilands	110	110	110	110	110	110	110	110	111	111	111	111	111	111	112	112	112	112	112	112	113	113	113	113	113	113	114	114	114	114	114	114	115	115	115	115	115
Moturoa	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143	144	144	144	144	144	144	144	144
Mount Messenger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Plymouth Central	2,320	2,322	2,324	2,326	2,328	2,330	2,332	2,335	2,337	2,340	2,342	2,346	2,349	2,353	2,357	2,360	2,364	2,367	2,371	2,374	2,377	2,380	2,384	2,387	2,390	2,392	2,396	2,400	2,403	2,406	2,409	2,412	2,415	2,417	2,420	2,422	2,424
Oakura	133	133	134	134	134	134	134	134	134	134	134	134	134	134	135	135	135	135	135	135	135	135	135	136	136	136	136	136	136	136	136	136	136	137	137	137	137
Omata	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	102	102	102	102	102	102	102	102	102	102	102	102
Paraite	81	82	83	84	84	85	86	87	88	89	90	91	93	94	95	97	98	99	101	102	103	105	106	107	108	109	111	112	113	114	116	117	118	119	120	121	121
Port Taranaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotswood	234	234	235	236	236	237	238	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	264	265	266
Strandon	362	363	364	364	365	365	366	367	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	382	383	384	385	386	387	388	389	389	390	391	392	392
Tarata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tikorangi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Vogeltown	152	152	152	153	153	153	153	153	153	154	154	154	154	155	155	155	156	156	156	157	157	157	157	158	158	158	158	159	159	159	160	160	160	160	160	161	161
Waitara East	133	133	133	133	133	133	133	133	133	134	134	134	134	134	134	134	135	135	135	135	135	135	135	135	136	136	136	136	136	136	136	137	137	137	137	137	137
Waitara West	529	530	531	532	533	534	535	536	537	538	539	541	542	544	546	548	549	551	552	554	555	557	558	559	561	562	564	565	567	568	570	571	572	573	574	575	576
Waiwhakaiho-Bell Block South	1,505	1,581	1,656	1,731	1,807	1,867	1,942	2,018	2,100	2,189	2,287	2,402	2,525	2,653	2,781	2,906	3,026	3,143	3,257	3,370	3,481	3,593	3,702	3,809	3,911	4,008	4,133	4,253	4,366	4,473	4,576	4,673	4,767	4,856	4,940	5,021	5,098
Welbourn	121	121	121	121	121	121	121	121	121	122	122	122	122	122	122	122	122	123	123	123	123	123	123	123	123	123	124	124	124	124	124	124	124	124	124	124	124
Westown	248	249	250	250	251	251	252	252	253	253	254	255	256	257	257	258	259	260	261	262	262	263	264	265	265	266	267	268	269	269	270	271	271	272	273	273	274
Whalers Gate	70	70	70	70	70	70	71	71	71	71	71	71	71	71	72	72	72	72	72	72	72	72	73	73	73	73	73	73	74	74	74	74	74	74	74	74	74
Total	**7,884**	**7,970**	**8,055**	**8,141**	**8,226**	**8,294**	**8,379**	**8,466**	**8,558**	**8,659**	**8,771**	**8,901**	**9,040**	**9,185**	**9,330**	**9,472**	**9,608**	**9,740**	**9,870**	**9,997**	**10,124**	**10,250**	**10,375**	**10,495**	**10,611**	**10,720**	**10,863**	**10,998**	**11,126**	**11,248**	**11,364**	**11,475**	**11,580**	**11,682**	**11,778**	**11,869**	**11,957**
Change	0	85	171	256	342	410	495	581	674	774	886	1,016	1,156	1,300	1,445	1,588	1,724	1,856	1,985	2,113	2,239	2,366	2,490	2,611	2,727	2,836	2,978	3,114	3,242	3,364	3,480	3,591	3,696	3,797	3,893	3,985	4,072
Perent Change	0%	+1%	+2%	+3%	+4%	+5%	+6%	+7%	+9%	+10%	+11%	+13%	+15%	+16%	+18%	+20%	+22%	+24%	+25%	+27%	+28%	+30%	+32%	+33%	+35%	+36%	+38%	+39%	+41%	+43%	+44%	+46%	+47%	+48%	+49%	+51%	+52%

Agriculture																																					
SA2_2023	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**
Bell Block Central	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
Bell Block East	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Bell Block West	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
Blagdon-Lynmouth	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Everett Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferndale	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Fitzroy	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
Frankleigh Park	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Glen Avon	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Highlands Park (New Plymouth district)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Hurdon	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Inglewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kaitake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kawaroa	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
Lepperton-Brixton	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Lower Vogeltown	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Mangaoraka	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Mangorei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marfell	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Merrilands	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Moturoa	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
Mount Messenger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Plymouth Central	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249	249
Oakura	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Omata	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Paraite	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Port Taranaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotswood	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101
Strandon	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
Tarata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tikorangi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Vogeltown	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Waitara East	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Waitara West	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367
Waiwhakaiho-Bell Block South	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137	2,137
Welbourn	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
Westown	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77	77
Whalers Gate	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Total	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**	**3,881**
Change	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Perent Change	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Total Employment																																				
SA2_2023	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**	**2049**	**2050**	**2051**	**2052**	**2053**	**2054**
Bell Block Central	278	279	280	281	282	282	283	284	285	286	287	288	290	291	292	293	294	295	296	297	298	298	299	300	301	301	302	302	303	303	303	303	304	304	304	304	305
Bell Block East	264	268	271	275	279	282	285	288	292	295	298	301	304	308	311	314	317	320	322	323	324	326	327	328	329	330	331	332	333	334	335	335	336	337	338	338	339
Bell Block West	523	530	538	545	553	558	561	564	567	571	575	579	583	587	590	594	597	600	602	603	605	606	608	609	610	611	612	613	614	614	615	616	617	617	618	619	620
Blagdon-Lynmouth	291	292	294	295	296	297	297	298	299	301	302	304	305	307	309	310	312	313	314	314	315	316	317	318	320	321	321	322	322	322	322	322	322	322	322	323	323
Everett Park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ferndale	117	118	118	119	120	120	122	123	124	126	127	129	130	132	133	134	135	136	137	137	138	138	139	139	140	141	141	142	142	143	143	144	144	145	145	146	146
Fitzroy	546	552	558	564	570	577	585	594	604	614	625	636	648	660	671	680	688	694	699	704	709	716	723	729	736	741	744	745	746	746	746	746	746	747	748	749	749
Frankleigh Park	354	355	357	358	359	360	361	361	362	364	365	366	368	369	371	373	374	375	376	377	378	379	380	381	382	383	384	384	384	385	385	385	385	386	386	386	386
Glen Avon	224	225	226	227	229	230	231	233	234	236	237	239	241	242	244	245	247	249	254	259	264	269	275	282	289	295	302	310	317	324	331	338	345	351	357	362	368
Highlands Park (New Plymouth district)	639	641	643	646	648	650	654	657	661	664	667	671	675	679	683	687	690	693	695	697	699	701	703	706	708	710	711	712	713	714	715	715	716	717	718	718	719
Hurdon	269	270	272	273	275	276	278	279	281	282	284	286	288	290	292	294	296	298	301	305	308	311	314	317	320	322	325	327	328	330	331	332	333	334	335	335	336
Inglewood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kaitake	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kawaroa	810	814	819	823	828	832	837	842	847	852	857	862	868	875	881	887	892	896	899	902	905	909	914	918	922	926	927	928	929	929	929	930	930	931	932	933	934
Lepperton-Brixton	1,218	1,221	1,223	1,226	1,229	1,231	1,233	1,236	1,239	1,242	1,245	1,249	1,253	1,257	1,261	1,265	1,269	1,272	1,275	1,279	1,282	1,285	1,288	1,291	1,294	1,297	1,300	1,304	1,306	1,309	1,312	1,314	1,316	1,319	1,321	1,323	1,325
Lower Vogeltown	363	365	366	368	369	371	372	374	376	377	379	381	384	386	388	390	392	393	394	395	396	397	398	399	400	401	402	402	402	402	402	402	402	403	403	403	403
Mangaoraka	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Mangorei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Marfell	144	145	146	147	147	148	149	150	151	152	154	155	156	157	158	159	161	162	162	163	164	165	166	166	167	167	168	168	169	169	169	169	169	169	170	170	170
Merrilands	375	376	378	379	381	382	383	384	386	388	390	392	394	396	398	400	402	404	405	406	407	408	409	410	412	413	414	414	415	415	416	416	417	418	418	419	419
Moturoa	453	458	463	467	472	475	481	486	493	500	508	517	526	535	544	552	558	563	567	570	574	578	583	587	592	596	597	598	599	600	601	602	604	605	607	608	610
Mount Messenger	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Plymouth Central	7,626	7,683	7,740	7,797	7,855	7,901	7,954	8,009	8,067	8,131	8,201	8,283	8,371	8,462	8,554	8,643	8,729	8,812	8,894	8,974	9,054	9,134	9,212	9,288	9,361	9,429	9,519	9,604	9,685	9,761	9,834	9,904	9,970	10,034	10,094	10,152	10,207
Oakura	564	567	569	572	574	576	578	579	581	583	585	587	590	592	594	597	599	600	602	603	605	606	608	609	610	611	611	612	612	612	612	612	612	612	613	613	613
Omata	214	214	214	215	215	216	216	217	217	218	219	219	220	221	222	222	223	224	224	225	225	226	226	226	227	227	227	228	228	228	228	228	228	229	229	229	229
Paraite	220	221	222	223	224	225	226	227	228	229	231	232	234	235	237	239	240	242	243	244	246	247	248	250	251	252	254	255	256	257	258	260	261	262	263	264	264
Port Taranaki	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spotswood	759	762	764	767	769	774	781	789	798	808	819	830	842	853	863	872	878	883	887	891	895	900	905	912	918	923	926	929	930	932	933	935	937	939	941	943	945
Strandon	1,386	1,401	1,417	1,432	1,448	1,452	1,456	1,461	1,465	1,470	1,476	1,482	1,489	1,497	1,504	1,510	1,515	1,520	1,522	1,525	1,527	1,530	1,533	1,536	1,538	1,541	1,542	1,542	1,543	1,543	1,544	1,545	1,546	1,547	1,548	1,549	1,550
Tarata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tikorangi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Upper Vogeltown	450	452	453	455	456	460	464	468	472	475	478	481	484	487	490	493	495	497	499	501	502	504	506	508	509	511	512	512	513	513	514	514	515	515	516	516	517
Waitara East	492	493	493	494	494	495	497	498	500	502	503	505	507	509	512	514	516	518	519	521	522	524	526	527	528	529	530	531	532	532	533	534	534	535	535	536	536
Waitara West	1,650	1,656	1,662	1,668	1,674	1,678	1,684	1,691	1,698	1,706	1,715	1,725	1,735	1,745	1,755	1,764	1,771	1,777	1,782	1,786	1,791	1,796	1,801	1,807	1,812	1,816	1,819	1,821	1,822	1,823	1,824	1,825	1,827	1,829	1,830	1,832	1,833
Waiwhakaiho-Bell Block South	4,800	4,998	5,196	5,395	5,593	5,654	5,732	5,811	5,894	5,986	6,087	6,206	6,333	6,465	6,598	6,728	6,851	6,969	7,083	7,195	7,307	7,420	7,532	7,641	7,746	7,844	7,968	8,086	8,197	8,303	8,404	8,501	8,593	8,682	8,767	8,847	8,924
Welbourn	824	833	842	852	861	863	865	867	870	873	877	882	887	892	897	903	906	909	912	914	916	919	922	926	928	931	931	932	931	931	931	931	931	932	932	932	933
Westown	2,085	2,119	2,154	2,188	2,223	2,226	2,233	2,242	2,251	2,263	2,276	2,292	2,309	2,327	2,346	2,363	2,376	2,385	2,392	2,399	2,407	2,416	2,427	2,438	2,448	2,456	2,458	2,459	2,459	2,460	2,461	2,463	2,466	2,468	2,471	2,474	2,477
Whalers Gate	315	318	320	322	324	325	326	327	329	330	331	332	334	335	337	338	339	340	341	341	342	343	344	345	345	346	346	347	347	347	347	348	348	348	349	349	349
Total	**28,263**	**28,637**	**29,011**	**29,384**	**29,758**	**29,927**	**30,137**	**30,354**	**30,584**	**30,833**	**31,109**	**31,422**	**31,757**	**32,102**	**32,445**	**32,775**	**33,073**	**33,349**	**33,607**	**33,860**	**34,113**	**34,377**	**34,643**	**34,904**	**35,153**	**35,383**	**35,637**	**35,872**	**36,088**	**36,292**	**36,489**	**36,680**	**36,866**	**37,046**	**37,219**	**37,384**	**37,542**
Change	0	374	748	1,121	1,495	1,664	1,874	2,091	2,321	2,570	2,846	3,159	3,494	3,839	4,182	4,512	4,810	5,086	5,344	5,597	5,850	6,114	6,380	6,641	6,890	7,120	7,374	7,609	7,825	8,029	8,226	8,417	8,603	8,783	8,956	9,121	9,279
Perent Change	0%	+1%	+3%	+4%	+5%	+6%	+7%	+7%	+8%	+9%	+10%	+11%	+12%	+14%	+15%	+16%	+17%	+18%	+19%	+20%	+21%	+22%	+23%	+23%	+24%	+25%	+26%	+27%	+28%	+28%	+29%	+30%	+30%	+31%	+32%	+32%	+33%

B

Appendix B – Assumptions

B

Appendix B – Assumptions

Appendix B – Assumptions

Network Assumptions

Option and Preferred Option Scenarios

Option and PO scenarios utilise the DM network plus additional network interventions. These interventions are summarised below in **Table 10-1**.

Table 10-1 Network assumptions – Short List Options and Preferred Option

S. N	Projects	2035					2053				
		Option 0	Option 1	Option 2	Option 3	PO	Option 0	Option 1	Option 2	Option 3	PO
Road Network Assumptions											
1	Provide additional capacity at up to 10 signalised intersection pinch points.			✓					✓		
2	Provide additional capacity at up to 10 midblock pinch points.								✓		
3	Increase Car Cost by 2 times in Mode Split Module					✓			✓	✓	✓
4	Reduce local street (link type=4) free speed to 30km/hr	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	Reduce capacity on SH44 and increase capacity on SH45							✓	✓		✓
6	100% increase in the CBD parking cost and expand parking cost zone to all of New Plymouth Central SA2 area			✓	✓				✓	✓	
7	300% increase in the CBD parking cost and expand parking cost zone to all of New Plymouth Central SA2 area and 80% of trips pay for parking					✓					✓
8	Reduce Free Speed of local and collector roads (link type 4,5,6) to 30 km/h					✓					✓
9	Reduce speed of roads with 100 km/h to 80 km/h					✓					✓
10	Ring route							✓			
PT Assumptions											
11	Bus lanes on Route 5020			✓	✓	✓					
12	Bus lanes on all roads traversed by buses					✓			✓	✓	✓
13	Extend Route 5020 to Waitara East and Westown and update headway to 30min	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
14	New Airport Line with headway = 30min	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
15	Reduce the Walking Perception Factor from 2 to 1.5						✓	✓	✓	✓	✓

S. N	Projects	2035					2053				
		Option 0	Option 1	Option 2	Option 3	PO	Option 0	Option 1	Option 2	Option 3	PO
16	Upgrade bus stops from 'Normal' to 'Medium' quality			✓	✓	✓			✓	✓	✓
17	Upgrade bus stations and hubs in CBD, Waitara, Bell Block further from medium to high quality					✓			✓	✓	✓
18	Reduce Route 5020 time factors by 50%								✓	✓	✓
19	Elevate the frequency of all PT services to 200%	✓	✓	✓	✓						
20	Elevate the frequency of all PT services to 400%					✓	✓	✓	✓	✓	✓
21	Reduce PT fare by 50%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cycle Assumptions											
22	Reduce costs for all cycle journeys by 10%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
23	Improve perception factor for all off road trails by 20%						✓	✓	✓	✓	✓
24	Add facility type 7 onto all local streets (speed management)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
25	Cycle lanes on all Arterial roads					✓	✓	✓	✓	✓	✓
26	Existing cycle lanes changed from on-road painted to on-road barrier (change facility type 4 to 5)		✓	✓		✓		✓	✓		✓
27	All off-road trails changed from trail to shared path (change facility type 3 to 1)					✓		✓	✓		✓
28	Uplift medium confidence factors towards high confidence	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
29	Reduce cost of journeys into NP central SA2 by 10%	✓	✓	✓	✓						
30	Reduce cost of journeys into NP central SA2 by 20%					✓	✓	✓	✓	✓	✓
31	All E+C routes converted to type 5 facility	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
32	All I+C routes converted to type 2 facility						✓	✓	✓	✓	✓

Public Transport Assumptions

The Public transport headways for the DM Scenario is given in the **Table 10-2** below.

Table 10-2 PT service and headways (minutes) for DM scenarios, excluding school bus services

Route No.	Route Name	2035 /2053					
		Inbound			Outbound		
		AM	IP	PM	AM	IP	PM
5001	City (Ariki St)-Moturoa	30	70	40	30	70	40
5002	Blagdon/WhalersGate	30	70	40	30	70	40
5003	Lynmouth/Marfell	30	0	0	0	70	40
5004	Westown/Hurdon	30	70	40	30	70	40
5005	Frankleigh Park/Ferndale	30	70	40	30	70	40
5006	Vogeltown/Brooklands	30	70	40	30	70	40
5007	Welbourn/Highlands Park	30	70	40	30	70	40
5008	Merrilands/Highlands Park	30	70	40	30	70	40
5009	Fitzroy/The Valley/Glen Avon	30	84	40	30	84	40
5020	Waitara (via Bell Block)	60	70	60	60	70	60
EX	CBD-Waitara/Bell Block	30	0	30	30	0	30

Cycle Model Feedback Assumption and Inputs

The Cycle Model estimates new cycle trips based on the traffic and PT demands and the cycle network interventions. The new cycle trips are then diverted from the initial estimates of the other modes, i.e., car and PT. The 'diverted' Car and PT trips are fed back to the Ngāmotu STM to model the effects of reduced car and PT demands (as the result of mode shift to cycle). The cycle model then predicts mode shift from Car and PT to cycle mode. **Table 10-3** below provides these adjusted Car and PT trip totals for each scenario.

Table 10-3 Diverted car and PT trips from cycle model

Scenario	Daily diverted trips	
	Car	PT
2035 Do Minimum	682	12
2035 Option0	2396	59
2035 Option1	2672	69
2035 Option2	2798	150
2035 Option3	2615	151
2035 Preferred Option	2609	151
2053 Do Minimum	1099	18
2053 Option 0	4550	196
2053 Option 1	5466	226
2053 Option 2	4274	1059
2053 Option 3	4100	1020
2053 Preferred Option	3945	1729
2053 Preferred Option with Ring Road	3674	1236

C

Appendix C – Results

Appendix C – Results

Do-Minimum Scenario Results

Forecast Travel Demand

Table 10-4 Forecast demand statistics

Scenarios/ Measure	All Vehicles (Vehicle Trips)				PT (Person Trips)				PT Mechanized Mode Share (%)			
	AM	IP	PM	ADT	AM	IP	PM	ADT	AM	IP	PM	ADT
2018	14,554	16,410	19,305	226,263	490	223	151	2,945	2.73%	1.12%	0.65%	1.07%
2035 DM	17,284	19,399	22,828	267,694	586	277	195	3,636	2.75%	1.18%	0.71%	1.12%
2053 DM	19,538	21,974	25,829	303,053	638	309	220	4,033	2.65%	1.16%	0.71%	1.10%
2035 DM vs Base	+19%	+18%	+18%	+18%	+20%	+24%	+29%	+23%	+0.02%	+0.06%	+0.06%	+0.05%
2053 DM vs Base	+34%	+34%	+34%	+34%	+30%	+39%	+46%	+37%	+0.10%	-0.02%	-0.00%	-0.02%
2053 DM vs 2035 DM	+13%	+13%	+13%	+13%	+9%	+12%	+13%	+11%	-0.10%	-0.02%	+0.00%	-0.02%

Road Network Vehicle Statistics

Table 10-5 Road Network Vehicle Statistics

Scenario	Population	Employment (unadjusted)	Average Daily VKT	Average Daily VHT	Average Daily Free Flow VHT	Average Daily Delays VHT2a	Average Daily Vehicle Trips	VKT / Person	Vehicle Trips / Person	Vehicle Trips / Employment	Average Trip Length (km)
2018	68,492	28,263	1,387,799	28,642	24,234	4,409	226,263	20.26	3.30	8.01	6.13
2035 DM	82,609	33,349	1,656,446	36,449	29,287	7,163	267,694	20.05	3.24	8.0	6.19
2053 DM	92,068	37,384	1,875,134	44,858	33,218	11,640	303,053	20.37	3.29	8.1	6.19
2035 DM vs 2018	+20.6%	+18.0%	+19.4%	+27.3%	+20.9%	+62.5%	+18.3%	-1.0%	-1.8%	+0.2%	+1.0%

Scenario	Population	Employment (unadjusted)	Average Daily VKT	Average Daily VHT	Average Daily Free Flow VHT	Average Daily Delays VHT2a	Average Daily Vehicle Trips	VKT / Person	Vehicle Trips / Person	Vehicle Trips / Employment	Average Trip Length (km)
2053 DM vs 2018	+34.4%	+32.3%	+35.1%	+56.6%	+37.1%	+164.0%	+33.9%	+0.5%	-0.3%	+1.2%	+1.0%
2053 DM vs 2035 DM	+11.5%	+12.1%	+13.2%	+23.1%	+13.4%	+62.5%	+13.2%	+1.6%	+1.5%	+1.0%	+0.0%

Vehicle Emissions

Table 10-6 Summary of Emission Results

Scenario	Population	Carbon monoxide (CO)	Carbon dioxide equivalent (CO2-eq)	Volatile organic compounds (VOC)	Nitrogen oxides (NO_x)	Nitrogen dioxide (NO_2)	PM2.5 E	PM10.0 BT	Fuel Consumption	CO_2-eq/ Person
Units		Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	l/day	
2018	68,492	2,335	294,511	161	797	138	38	26	118,506	4.3
2035 DM	82,609	518	289,188	13	458	106	10	32	115,897	3.5
2053 DM	92,068	151	140,460	5	128	28	2	36	54,810	1.5
2035 DM vs 2018	20.6%	-77.8%	-1.8%	-91.7%	-42.6%	-23.0%	-74.3%	22.1%	-2.2%	-18.6%
2053 DM vs 2018	34.4%	-93.5%	-52.3%	-97.1%	-83.9%	-80.1%	-94.2%	39.4%	-53.7%	-64.5%
2053 DM vs 2035 DM	11.5%	-70.9%	-51.4%	-65.4%	-72.0%	-74.1%	-77.6%	14.1%	-52.7%	-56.4%

Short List Option Results

Forecast Travel Demand

Table 10-7 Forecast Travel Demand

Scenarios	All Vehicles (Vehicle Trips)				PT (Person Trips)				PT Mechanized Mode Share (%)			
	AM	IP	PM	ADT	AM	IP	PM	ADT	AM	IP	PM	ADT
2035 DM	17,284	19,399	22,828	267,694	586	277	195	3,636	2.75%	1.18%	0.71%	1.12%
2035 Option0	17,034	19,155	22,541	264,244	718	421	377	5,395	3.39%	1.80%	1.37%	1.67%

Scenarios	All Vehicles (Vehicle Trips)				PT (Person Trips)				PT Mechanized Mode Share (%)			
	AM	IP	PM	ADT	AM	IP	PM	ADT	AM	IP	PM	ADT
2035 Option1	17,011	19,134	22,518	263,949	750	436	388	5,596	3.54%	1.87%	1.41%	1.74%
2035 Option2	16,536	18,767	21,943	258,158	1,276	846	1,050	11,201	6.04%	3.62%	3.84%	3.49%
2035 Option3	16,530	18,767	21,940	258,131	1,324	876	1,081	11,589	6.26%	3.74%	3.94%	3.61%
2053 DM	19,538	21,974	25,829	303,053	638	309	220	4,033	2.65%	1.16%	0.71%	1.10%
2053 Option0	18,899	21,365	25,111	294,402	1,100	739	733	9,327	4.63%	2.80%	2.38%	2.57%
2053 Option1	18,789	21,274	24,989	293,037	1,119	734	715	9,290	4.73%	2.80%	2.33%	2.57%
2053 Option2	17,083	19,606	22,782	268,866	3,260	2,814	3,475	35,313	13.72%	10.68%	11.28%	9.87%
2053 Option3	17,140	19,723	22,931	270,384	3,173	2,652	3,240	33,398	13.37%	10.08%	10.53%	9.33%

Table 10-8 Scenario comparison in demand statistics

Scenarios	All Vehicles (Vehicles Trips)				PT (Person Trips)			
	AM	IP	PM	ADT	AM	IP	PM	ADT
2035 Option0 vs 2035 DM	-1%	-1%	-1%	-1%	+23%	+52%	+94%	+48%
2035 Option1 vs 2035 DM	-2%	-1%	-1%	-1%	+28%	+57%	+99%	+54%
2035 Option2 vs 2035 DM	-4%	-3%	-4%	-4%	+118%	+205%	+440%	+208%
2035 Option3 vs 2035 DM	-4%	-3%	-4%	-4%	+126%	+216%	+455%	+219%
2053 Option0 vs 2053 DM	-3%	-3%	-3%	-3%	+72%	+139%	+233%	+131%
2053 Option1 vs 2053 DM	-4%	-3%	-3%	-3%	+76%	+138%	+224%	+130%
2053 Option2 vs 2053 DM	-13%	-11%	-12%	-11%	+411%	+811%	+1477%	+776%
2053 Option3 vs 2053 DM	-12%	-10%	-11%	-11%	+398%	+758%	+1370%	+728%

Table 10-9 Mode share including cycle in daily trips

Scenarios	Trips			Mode Share (%)		
	Vehicles (vehicle trips)	PT (person trips)	Cycle (person trips)	Car	PT	Cycle
2035 DM	267,694	3,636	5,533	81.02%	1.10%	1.67%
2035 Option0	264,244	5,395	7,733	80.02%	1.63%	2.34%
2035 Option1	263,949	5,596	8,106	79.88%	1.69%	2.45%
2035 Option2	258,158	11,201	8,320	78.39%	3.40%	2.53%
2035 Option3	258,131	11,589	8,142	78.34%	3.52%	2.47%
2053 DM	303,053	4,033	6,789	80.93%	1.08%	1.81%
2053 Option0	294,402	9,327	11,226	78.75%	2.49%	3.00%
2053 Option1	293,037	9,290	12,366	78.50%	2.49%	3.31%
2053 Option2	268,866	35,313	11,909	72.69%	9.55%	3.22%
2053 Option3	270,384	33,398	11,712	73.16%	9.04%	3.17%

Road Network Vehicle Statistics

Table 10-10 Road Network Vehicle statistics

Scenario	Population	Employment (unadjusted)	Average Daily VKT	Average Daily VHT	Average Daily Free Flow VHT	Average Daily Delays VHT2a	Average Daily Vehicle Trips	VKT / Person	Vehicle Trips / Person	Vehicle Trips / Employment	Average Trip Length (km)
2035 DM	82,609	33,349	1,656,446	36,449	29,287	7,163	267,694	20.05	3.24	8.0	6.19
2035 Option0	82,609	33,349	1,636,656	35,941	29,009	6,932	264,244	19.81	3.2	7.9	6.19
2035 Option1	82,609	33,349	1,632,976	35,941	28,911	7,030	263,949	19.77	3.2	7.9	6.19
2035 Option2	82,609	33,349	1,598,351	34,715	28,278	6,437	258,158	19.35	3.13	7.7	6.19
2035 Option3	82,609	33,349	1,600,389	34,842	28,275	6,567	258,131	19.37	3.12	7.7	6.2
2053 DM	92,068	37,384	1,875,134	44,858	33,218	11,640	303,053	20.37	3.29	8.1	6.19
2053 Option0	92,068	37,384	1,828,944	42,828	32,409	10,419	294,402	19.87	3.2	7.9	6.21
2053 Option1	92,068	37,384	1,848,565	39,576	31,932	7,644	293,037	20.08	3.18	7.8	6.31
2053 Option2	92,068	37,384	1,668,250	36,721	29,409	7,313	268,866	18.12	2.92	7.2	6.2
2053 Option3	92,068	37,384	1,675,997	36,349	29,536	6,812	270,384	18.2	2.94	7.2	6.2

Table 10-11 Scenario comparison in network statistics

Scenario	Population	Employment (unadjusted)	Average Daily VKT	Average Daily VHT	Average Daily Free Flow VHT	Average Daily Delays VHT2a	Average Daily Vehicle Trips	VKT / Person	Vehicle Trips / Person	Vehicle Trips / Employment	Average Trip Length (km)
2035 Optio0 vs 2035 DM	0.0%	0.0%	-1.2%	-1.4%	-0.9%	-3.2%	-1.3%	-1.2%	-1.2%	-1.4%	0.0%
2035 Optio1 vs 2035 DM	0.0%	0.0%	-1.4%	-1.4%	-1.3%	-1.9%	-1.4%	-1.4%	-1.2%	-1.5%	0.0%

Scenario	Population	Employment (unadjusted)	Average Daily VKT	Average Daily VHT	Average Daily Free Flow VHT	Average Daily Delays VHT2a	Average Daily Vehicle Trips	VKT / Person	Vehicle Trips / Person	Vehicle Trips / Employment	Average Trip Length (km)
2035 Optio2 vs 2035 DM	0.0%	0.0%	-3.5%	-4.8%	-3.4%	-10.1%	-3.6%	-3.5%	-3.4%	-3.6%	0.0%
2035 Optio3 vs 2035 DM	0.0%	0.0%	-3.4%	-4.4%	-3.5%	-8.3%	-3.6%	-3.4%	-3.7%	-3.6%	0.2%
2053 Optio0 vs 2053 DM	0.0%	0.0%	-2.5%	-4.5%	-2.4%	-10.5%	-2.9%	-2.5%	-2.7%	-2.8%	0.3%
2053 Optio1 vs 2053 DM	0.0%	0.0%	-1.4%	-11.8%	-3.9%	-34.3%	-3.3%	-1.4%	-3.3%	-3.3%	1.9%
2053 Optio2 vs 2053 DM	0.0%	0.0%	-11.0%	-18.1%	-11.5%	-37.2%	-11.3%	-11.0%	-11.2%	-11.3%	0.2%
2053 Optio3 vs 2053 DM	0.0%	0.0%	-10.6%	-19.0%	-11.1%	-41.5%	-10.8%	-10.7%	-10.6%	-10.9%	0.2%

Vehicle Emissions

Table 10-12 Summary of emission results

Scenario	Population	Carbon monoxide (CO)	Carbon dioxide equivalent (CO2-eq)	Volatile organic compounds (VOC)	Nitrogen oxides (NO_x)	Nitrogen dioxide (NO_2)	PM2.5 E	PM10.0 BT	Fuel Consumption	CO_2-eq/ Person
Units		Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	l/day	
2035 DM	82,609	518	289,188	13	458	106	10	32	115,897	3.5
2035 Option0	82,609	513	286,269	13	454	105	10	31	114,705	3.5
2035 Option1	82,609	512	285,912	13	454	105	10	31	114,553	3.5
2035 Option2	82,609	498	279,638	13	444	103	9	31	112,005	3.4
2035 Option3	82,609	502	280,520	13	446	103	10	31	112,352	3.4
2053 DM	92,068	151	140,460	5	128	28	2	36	54,810	1.5
2053 Option0	92,068	148	138,180	5	126	27	2	35	53,887	1.5
2053 Option1	92,068	150	138,231	5	124	27	2	34	53,898	1.5
2053 Option2	92,068	135	129,411	4	116	25	2	32	50,358	1.4
2053 Option3	92,068	136	130,127	4	117	25	2	32	50,630	1.4

Table 10-13 Percentage Change of Emission Results

Scenario	Carbon monoxide (CO)	Carbon dioxide equivalent (CO2-eq)	Volatile organic compounds (VOC)	Nitrogen oxides (NO_x)	Nitrogen dioxide (NO_2)	PM2.5 E	PM10.0 BT	Fuel Consumption	CO_2-eq/ Person
Units	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	l/day	
2035 Option0 vs 2035 DM	-1.1%	-1.0%	-0.9%	-0.8%	-1.0%	-0.6%	-1.2%	-1.0%	-1.0%
2035 Option1 vs 2035 DM	-1.2%	-1.1%	-1.0%	-0.9%	-1.2%	-0.5%	-1.4%	-1.2%	-1.1%
2035 Option2 vs 2035 DM	-3.9%	-3.3%	-3.1%	-3.0%	-3.7%	-2.3%	-2.9%	-3.4%	-3.3%
2035 Option3 vs 2035 DM	-3.0%	-3.0%	-2.7%	-2.5%	-3.1%	-1.7%	-3.4%	-3.1%	-3.0%
2053 Option0 vs 2053 DM	-2.2%	-1.6%	-1.2%	-1.8%	-2.2%	-0.9%	-2.5%	-1.7%	-1.6%
2053 Option1 vs 2053 DM	-0.4%	-1.6%	-2.1%	-3.1%	-2.0%	-2.0%	-4.8%	-1.7%	-1.6%
2053 Option2 vs 2053 DM	-10.5%	-7.9%	-6.4%	-9.3%	-10.8%	-5.1%	-10.6%	-8.1%	-7.9%
2053 Option3 vs 2053 DM	-9.6%	-7.4%	-5.8%	-8.7%	-10.2%	-4.5%	-10.4%	-7.6%	-7.4%

Preferred Option Results

Forecast Travel Demand

Table 10-14 Preferred Option Forecast Travel Demand by Time Period

Scenarios/ Measure	All Vehicles (Vehicle Trips)				PT (Person Trips)				PT Mechanized Mode Share (%)			
	AM	IP	PM	ADT	AM	IP	PM	ADT	AM	IP	PM	ADT
2035 DM	17,284	19,399	22,828	267,694	586	277	195	3,636	2.75%	1.18%	0.71%	1.12%
2035 PO	16,533	18,769	21,946	258,176	1,317	871	1,074	11,526	6.23%	3.72%	3.92%	3.59%
2053 DM	19,538	21,974	25,829	303,053	638	309	220	4,033	2.65%	1.16%	0.71%	1.10%
2053 PO	16,384	18,718	21,752	256,880	4,073	3,847	4,649	47,293	17.16%	14.62%	15.12%	13.30%

Table 10-15 Preferred Option Scenario comparison in demand statistics

Scenarios/ Measure	All Vehicles (Vehicles Trips)				PT (Person Trips)			
	AM	IP	PM	ADT	AM	IP	PM	ADT
2035 PO vs 2035 DM	-4%	-3%	-4%	-4%	125%	214%	452%	217%
2053 PO vs 2053 DM	-16%	-15%	-16%	-15%	539%	1144%	2010%	1073%

Table 10-16 Mode share in daily trips

Scenarios/ Measure	Vehicles (vehicle trips)	PT (person trips)	Cycle (person trips)	% Car	% PT	% Cycle
2035 DM	267,694	3,636	5,533	97.22%	1.10%	1.67%
2035 PO	258,176	11,526	8,015	94.07%	3.50%	2.43%
2053 DM	303,053	4,033	6,789	97.11%	1.08%	1.81%
2053 PO	256,880	47,293	11,802	83.91%	12.87%	3.21%

Total Network Statistics

Table 10-17 Network statistics

Scenario	Population	Employment (unadjusted)	Average Daily VKT	Average Daily VHT	Average Daily Free Flow VHT	Average Daily Delays VHT2a	Average Daily Vehicle Trips	VKT / Person	Vehicle Trips / Person	Vehicle Trips / Employment	Average Trip Length (km)
2035 DM	82,609	33,349	1,656,446	36,449	29,287	7,163	267,694	20.05	3.24	8.0	6.19
2035 PO	82,609	33,349	1,589,984	34,898	28,482	6,416	258,176	19.2	3.1	7.7	6.2
2053 DM	92,068	37,384	1,875,134	44,858	33,218	11,640	303,053	20.37	3.29	8.1	6.19
2053 PO	92,068	37,384	1,596,551	34,335	28,447	5,888	256,880	17.3	2.8	6.9	6.2

Table 10-18 Scenario comparison in network statistics

Scenario	Population	Employment (unadjusted)	Average Daily VKT	Average Daily VHT	Average Daily Free Flow VHT	Average Daily Delays VHT2a	Average Daily Vehicle Trips	VKT / Person	Vehicle Trips / Person	Vehicle Trips / Employment	Average Trip Length (km)
2035 PO vs 2035 DM	0%	0%	-4%	-4%	-3%	-10%	-4%	-4%	-4%	-4%	0%
2053 PO vs 2053 DM	0%	0%	-15%	-23%	-14%	-49%	-15%	-15%	-15%	-15%	0%

Vehicle Emissions

Table 10-19 Summary of Emission Results

Scenario	Population	Carbon monoxide (CO)	Carbon dioxide equivalent (CO2-eq)	Volatile organic compounds (VOC)	Nitrogen oxides (NO_x)	Nitrogen dioxide (NO_2)	PM2.5 E	PM10.0 BT	Fuel Consumption	CO_2-eq/ Person
Units		Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	l/day	
2035 DM	82,609	518	289,188	13	458	106	10	32	115,897	3.5
2035 PO	82,609	487	278,206	13	440	101	9	31	111,438	3.4
2053 DM	92,068	151	140,460	5	128	28	2	36	54,810	1.5
2035 PO	92,068	128	124,661	4	111	23	2	31	48,471	1.4

Table 10-20 Percentage Change of Emission Results

Scenario	Population	Carbon monoxide (CO)	Carbon dioxide equivalent (CO2-eq)	Volatile organic compounds (VOC)	Nitrogen oxides (NO_x)	Nitrogen dioxide (NO_2)	PM2.5 E	PM10.0 BT	Fuel Consumption	CO_2-eq/ Person
Units		Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	Kg/day	l/day	
2035 PO vs 2035 DM	0.0%	-6.0%	-3.8%	-3.9%	-3.8%	-4.8%	-3.3%	-2.3%	-3.8%	-3.8%
2053 PO vs 2053 DM	0.0%	-11.2%	-9.6%	-13.1%	-15.4%	-7.8%	-13.2%	-11.6%	-11.2%	-11.2%

D

Appendix D – Assessment or Modelling Guidelines

Appendix D – Assessment or Modelling Guidelines

Vehicle Emissions

NZ Transport Agency's VEPM version 6.3 (released in April 2022) was adopted for this study. The emission rates for the year 2051 were adopted for year 2053. Features of the VEPM 6.3 model are outlined below:

- VEPM estimates vehicle tail-pipe emissions only, i.e., does not include vehicle manufacture or energy generation.
- VEPM provides grams per km of travel rates, depending on average vehicle speeds.
- VEPM rates are based on assumed vehicle fleet composition in future years.
- VEPM provides methane (CH4) and nitrous oxide (N2O) emission factors to calculate carbon dioxide equivalent (CO2-eq) emission factors instead of carbon dioxide (CO2).

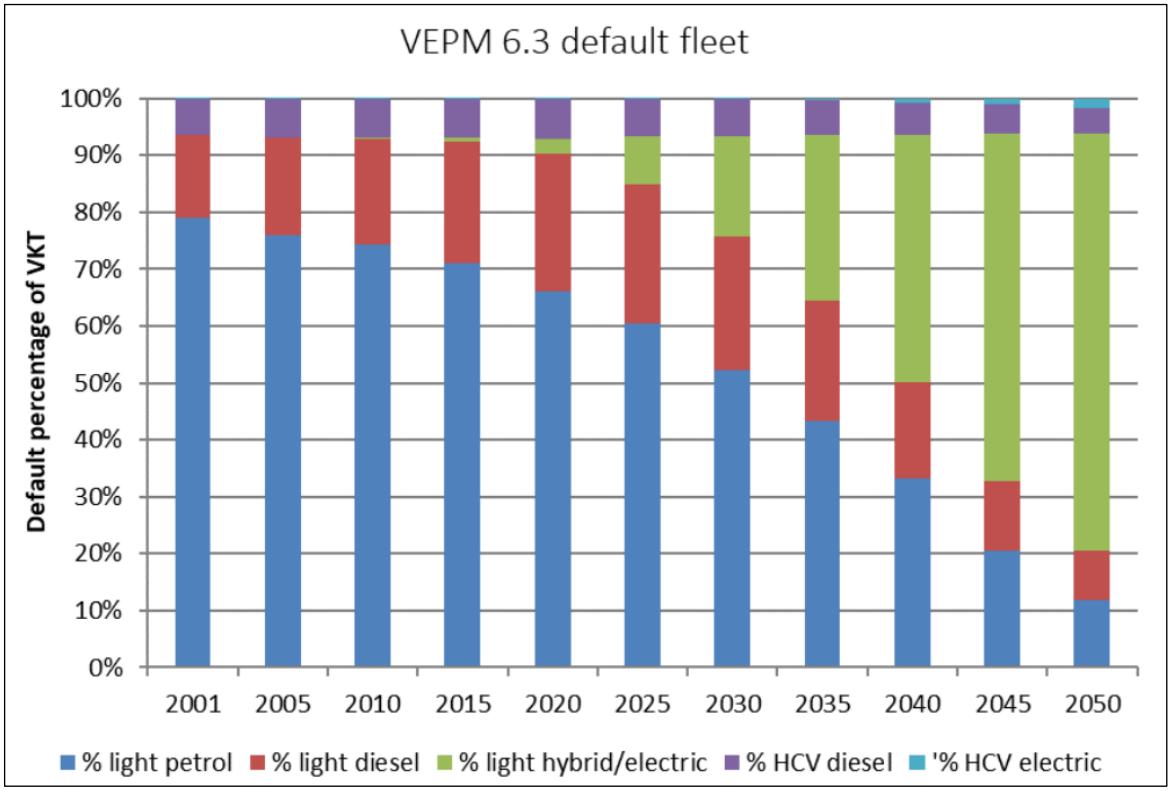


Figure 10-1 Assumed vehicle fleet in VEPM 6.3

Level of Service

To assess the level of congestion (for general traffic), a process was developed using weighted average delay (for intersections) and volume/capacity ratios (for links) to estimate the LOS for the whole network. The LOS criteria adopted for the analysis are shown in **Table 10-21**.

Table 10-21 LOS Criteria for Link and Intersection Types

LOS	Intersection[6] (Weighted Average Delay, s)	Rural [7] (V/C)	Freeway[8] (FFS<80) (V/C)	Arterial[9] & Local (V/C)
A	< 10	< 0.05	< 0.26	< 0.26
B	10 - 20	0.05 - 0.17	0.26 - 0.40	0.26 - 0.43
C	20 - 35	0.17 – 0.33	0.40 – 0.60	0.43 – 0.62
D	35 - 55	0.33 – 0.58	0.60 – 0.85	0.62 – 0.82
E	55 - 80	0.58 – 1.00	0.85 – 1.00	0.82 – 1.00
F	> 80	> 1.00	> 1.00	> 1.00

The Weighted Average Delay for intersections is the normal volume-weighted delay plus an additional weight factor (delay). This additional factor was included to place more weight on critical movements when calculating the “representative average” condition at the intersections.

The calculated LOS indicates a high-level qualitative measure to assess the combined performance of intersections and links for the model network. A more comprehensive LOS assessment is recommended for specific corridors or intersections for detailed studies. The calculated Link LOS doesn’t consider queuing or delay originating at downstream intersections. Hence the performance of the network should be assessed using both link and intersection combined.

In general, LOS A-D indicates that intersections and links are performing with an acceptable level of service. LOS E indicates that intersection/links are performing at a poor level of service, and further investigation/modelling may be needed. LOS F indicates the intersections/links are over capacity.

Note that LOS plots are for general traffic performance and the results shown are indicative only. Bus lanes are modelled in Ngāmotu STM which can travel at free-flow speeds on their dedicated lanes and the bus plots do not represent LOS accurately.

[6] HCM2000 Chapter16- Signalized Intersection.

[7] Austroad Part2- Roadway Capacity, 1988. Assumed 80% of sight distance length.

[8] HCM2000 Chapter23- Basic Freeway Segment.

[9] Technical paper “*Performance Measures and Threshold Value for Northeast Ohio Areawide Coordinating Agency’s (NOACA’s) Congestion Management Process, NOACA, August 2007*”.

E

Appendix E – Flow difference plots


Flow Difference Plot_Average Daily Traffic, Year2035 Do Minimum vs Year 2018 Base
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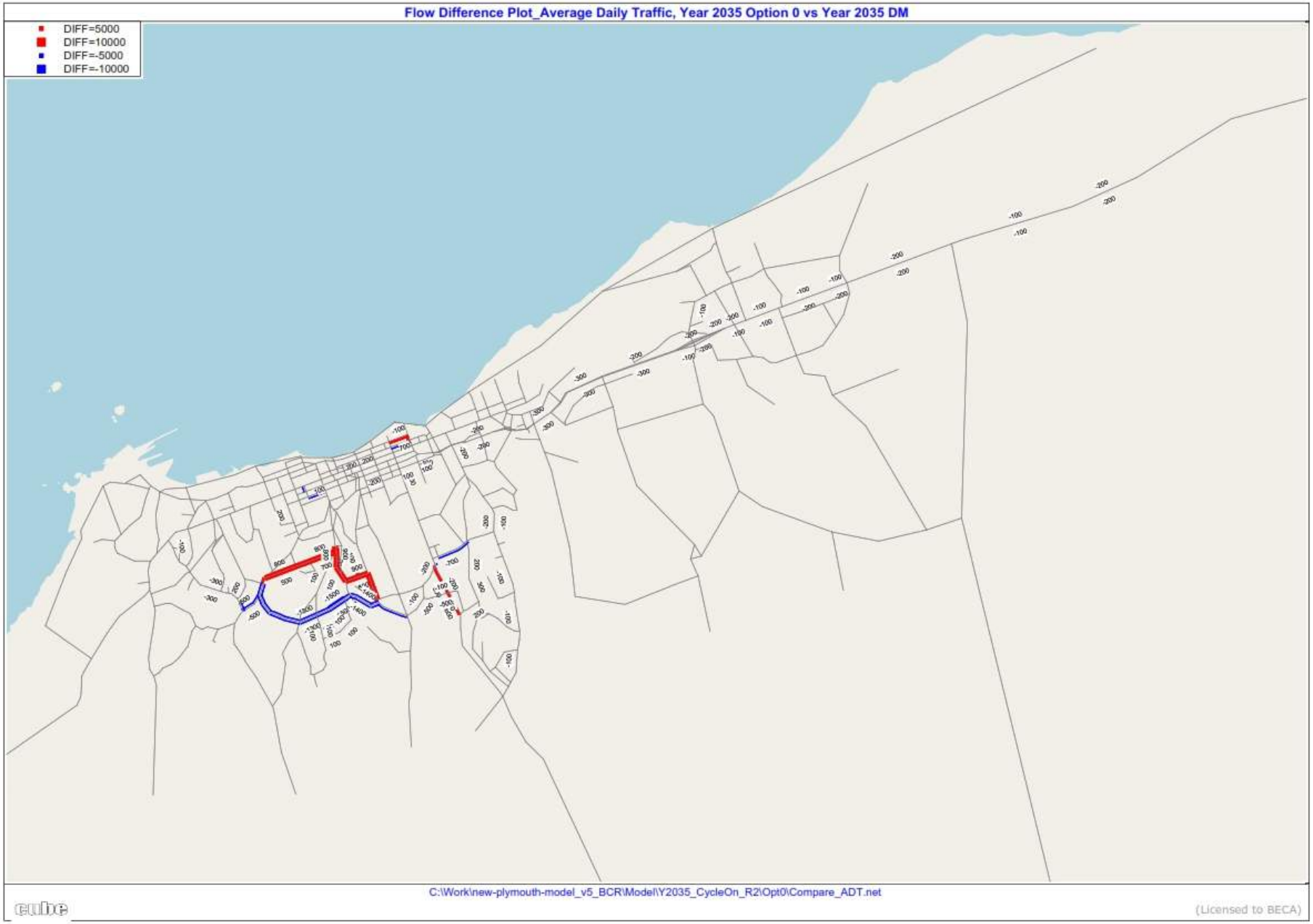
Flow Difference Plot_Average Daily Traffic, Year 2035 Option 0 vs Year 2035 DM
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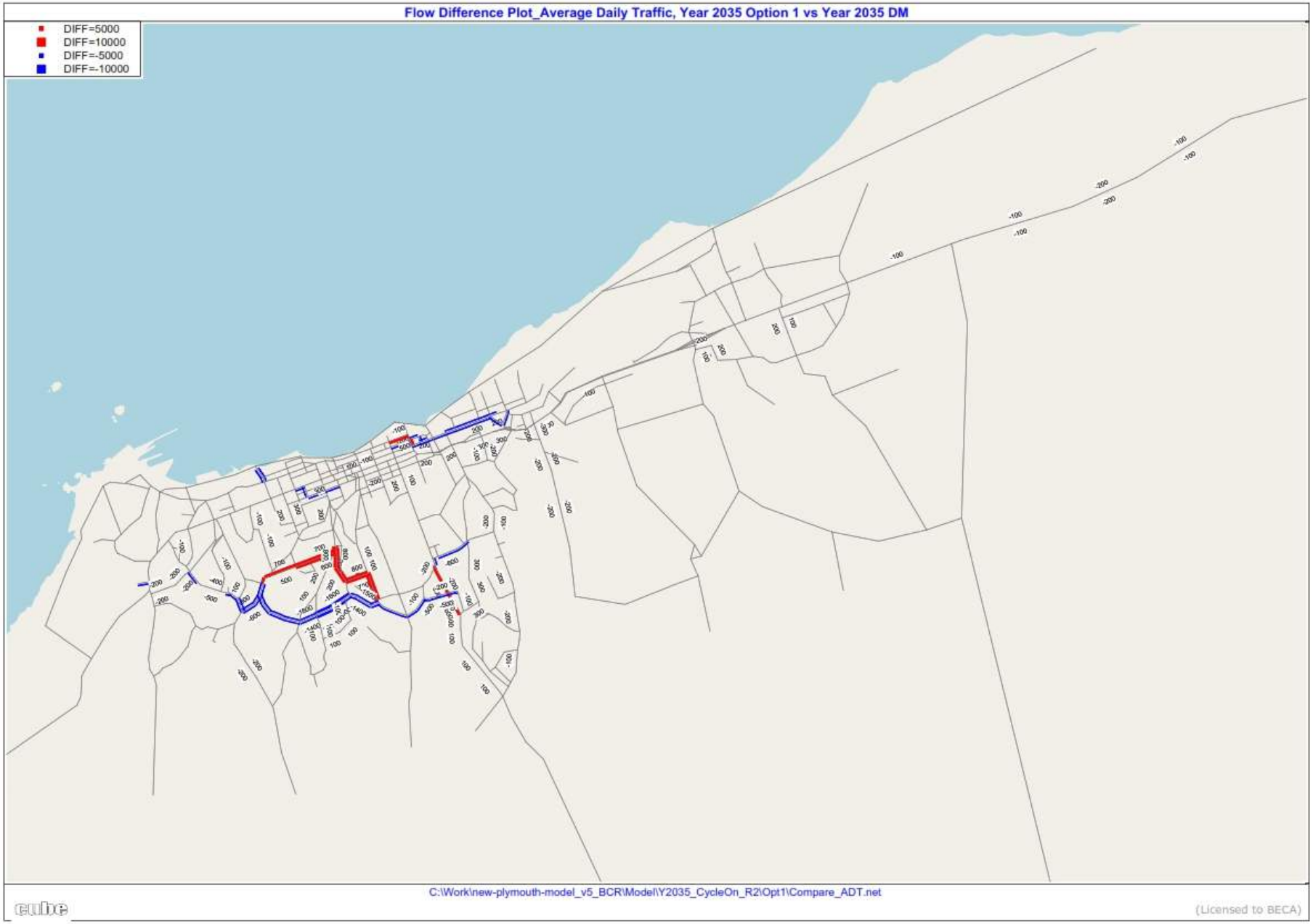
Flow Difference Plot_Average Daily Traffic, Year 2035 Option 1 vs Year 2035 DM
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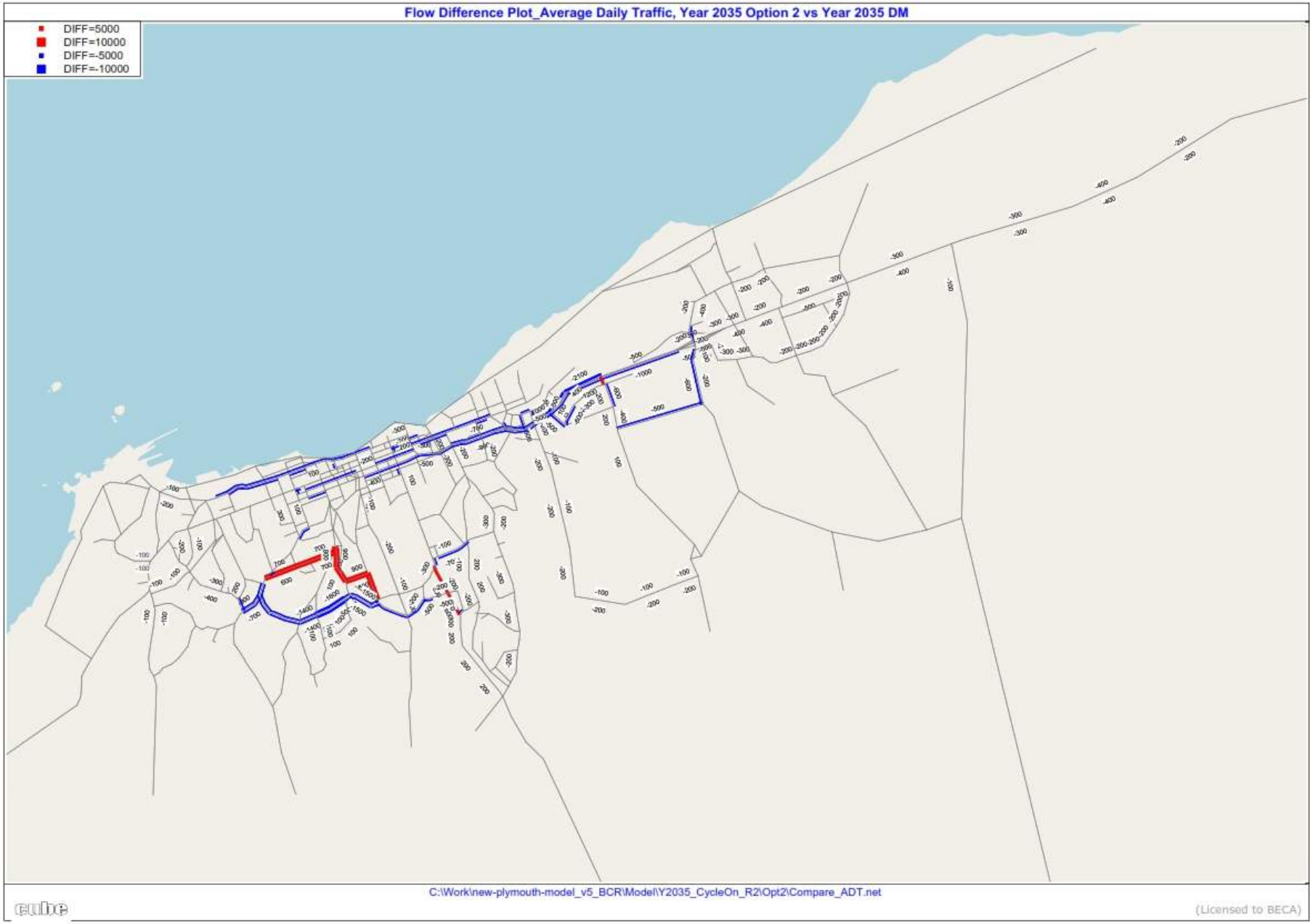
Flow Difference Plot_Average Daily Traffic, Year 2035 Option 2 vs Year 2035 DM
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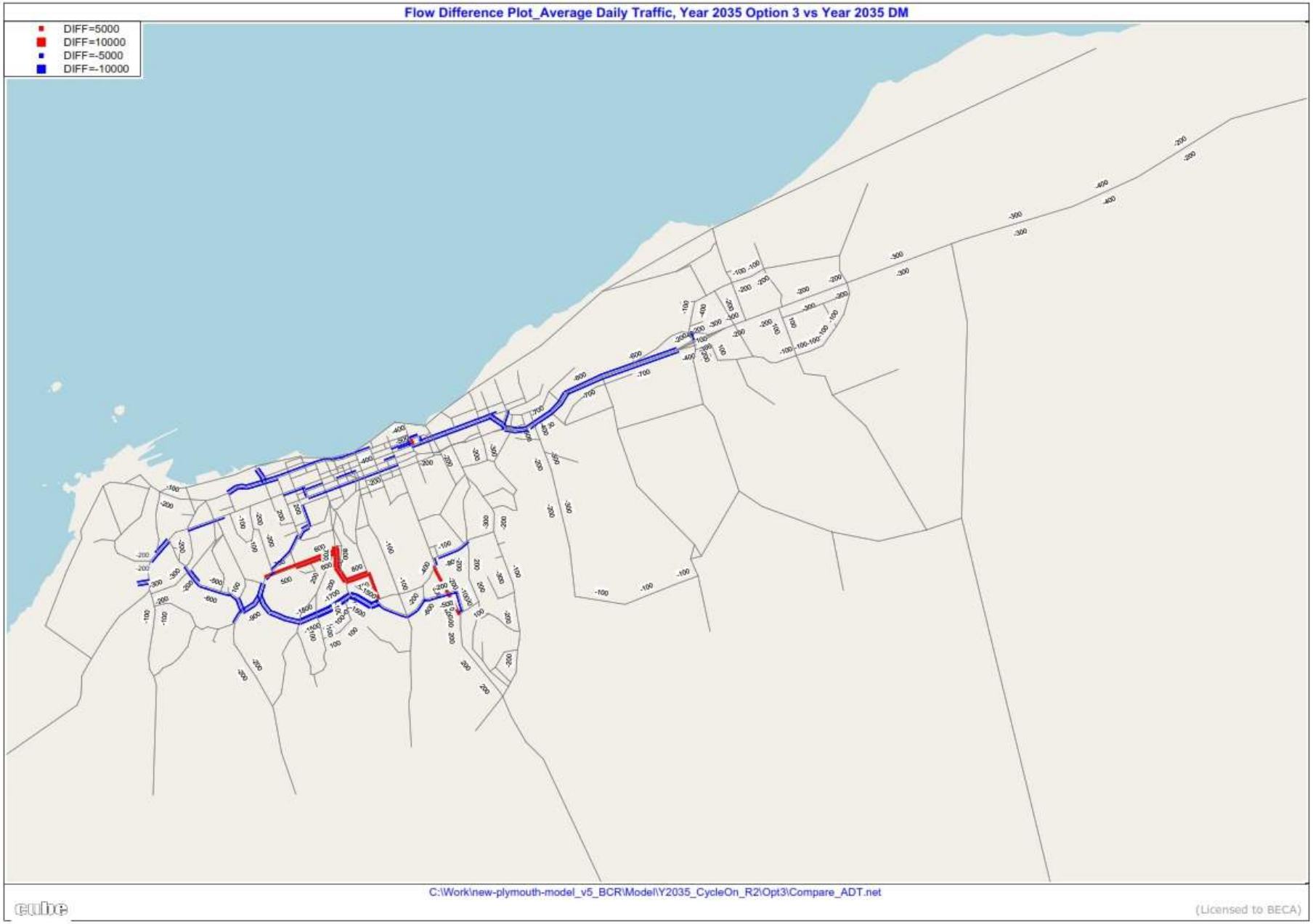
Flow Difference Plot_Average Daily Traffic, Year 2035 Option 3 vs Year 2035 DM
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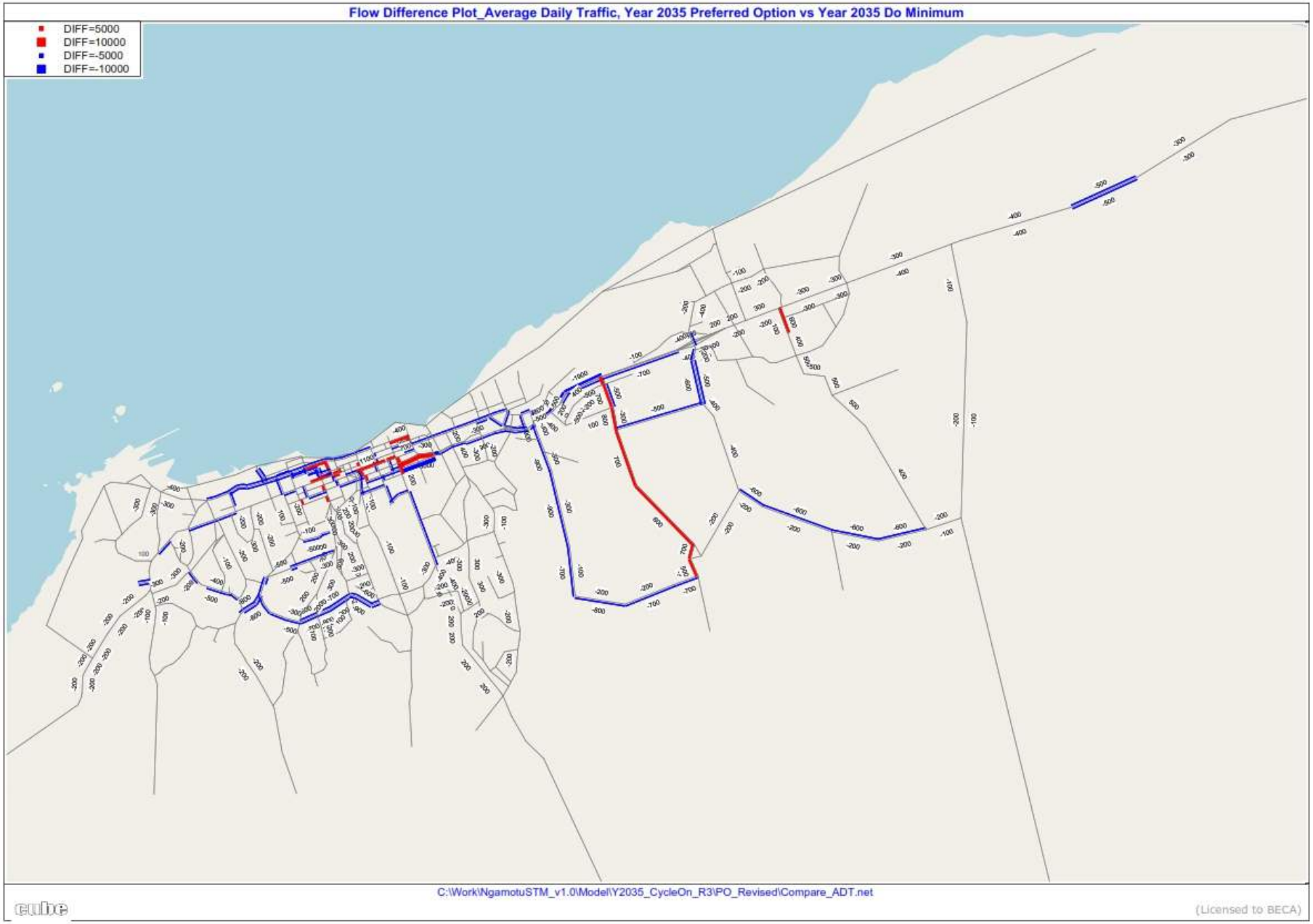
Flow Difference Plot_Average Daily Traffic, Year 2035 Preferred Option vs Year 2035 Do Minimum
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Flow Difference Plot_Average Daily Traffic, Year 2053 Do Minimum vs Year 2018 Base
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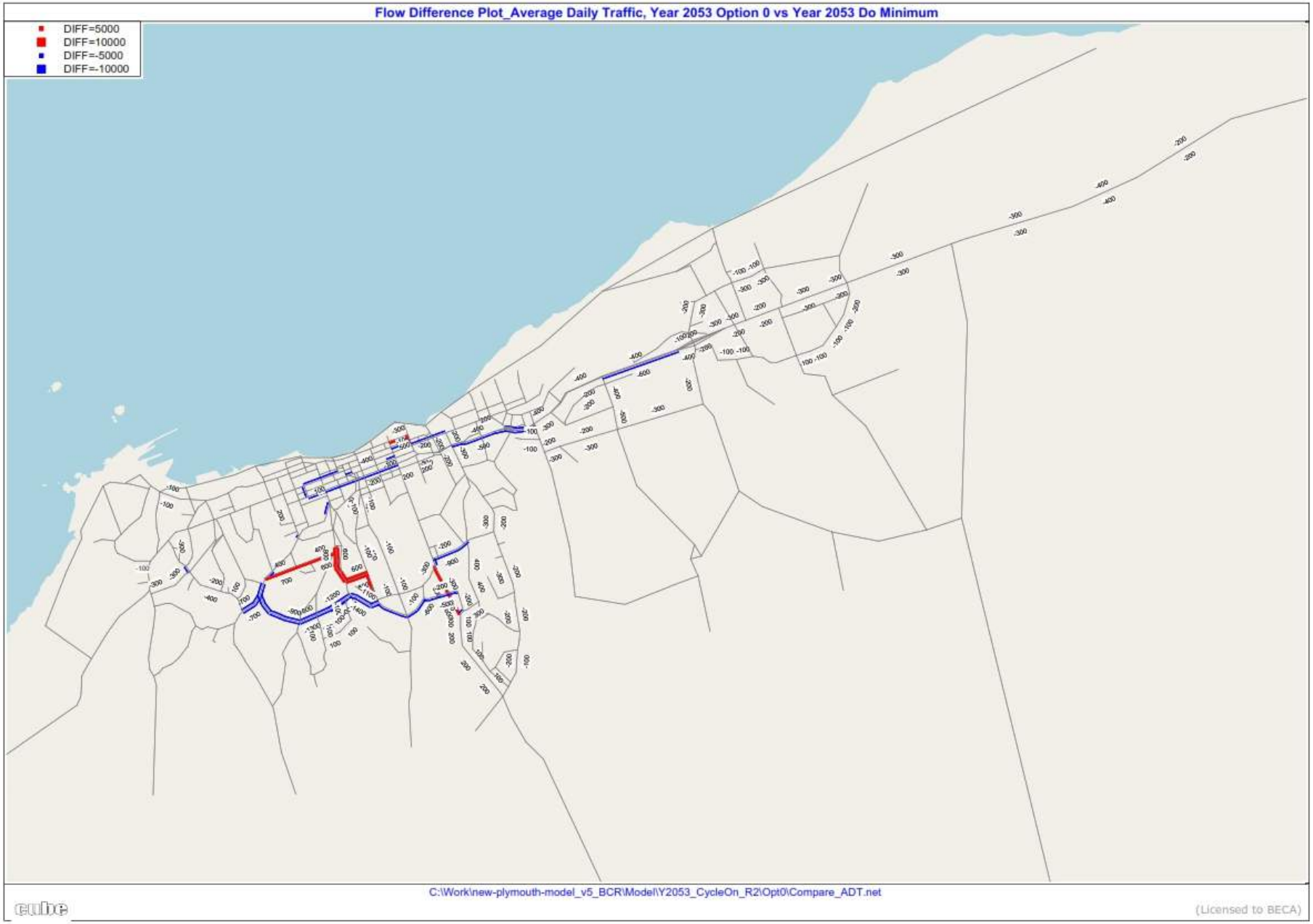
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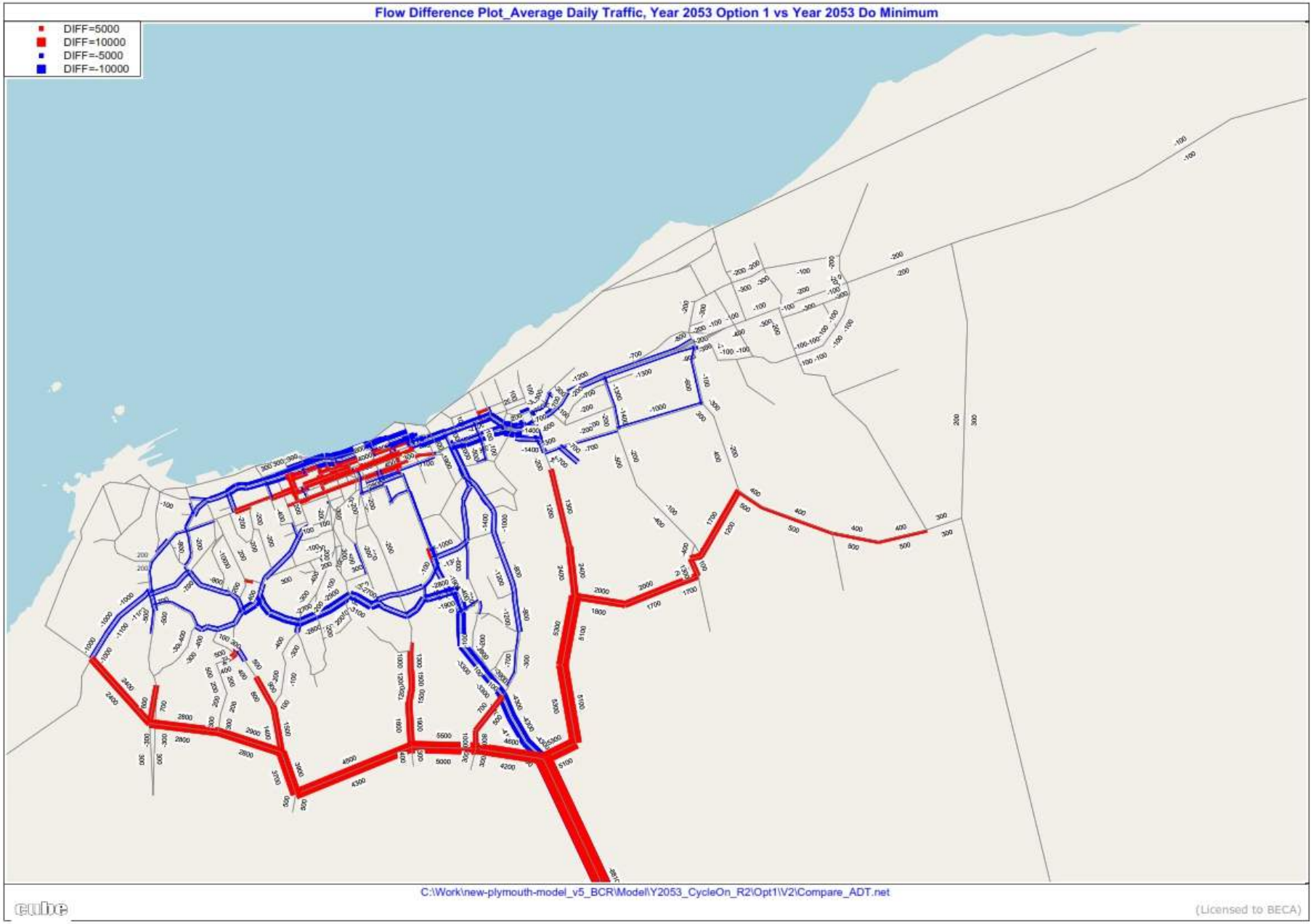
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Flow Difference Plot_Average Daily Traffic, Year 2053 Option 2 vs Year 2053 Do Minimum
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Flow Difference Plot_Average Daily Traffic, Year 2053 Option 3 vs Year 2053 Do Minimum
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Flow Difference Plot_Average Daily Traffic, Year 2053 Preferred Option vs Year 2053 Do Minimum
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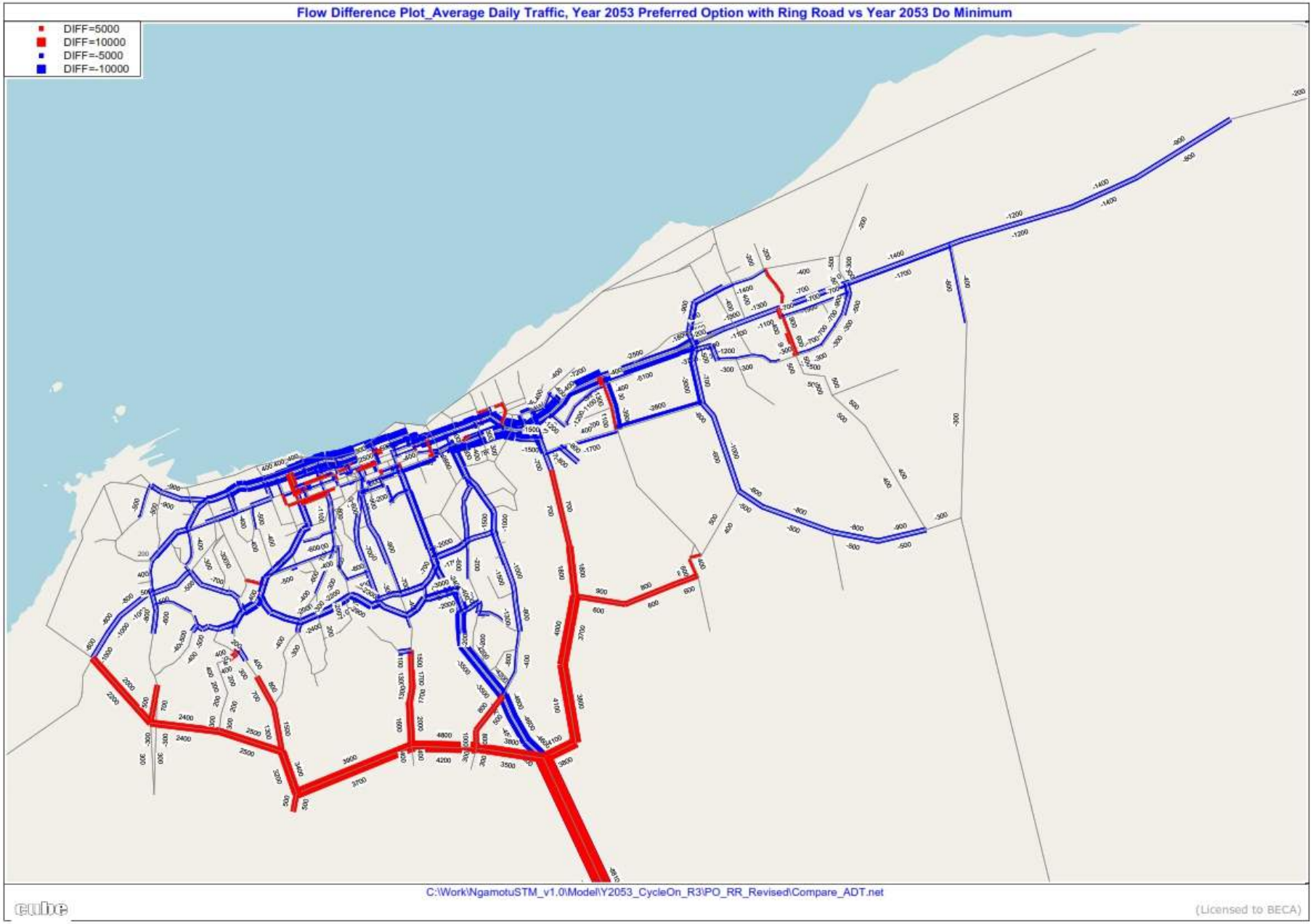
Flow Difference Plot_Average Daily Traffic, Year 2053 Preferred Option with Ring Road vs Year 2053 Do Minimum
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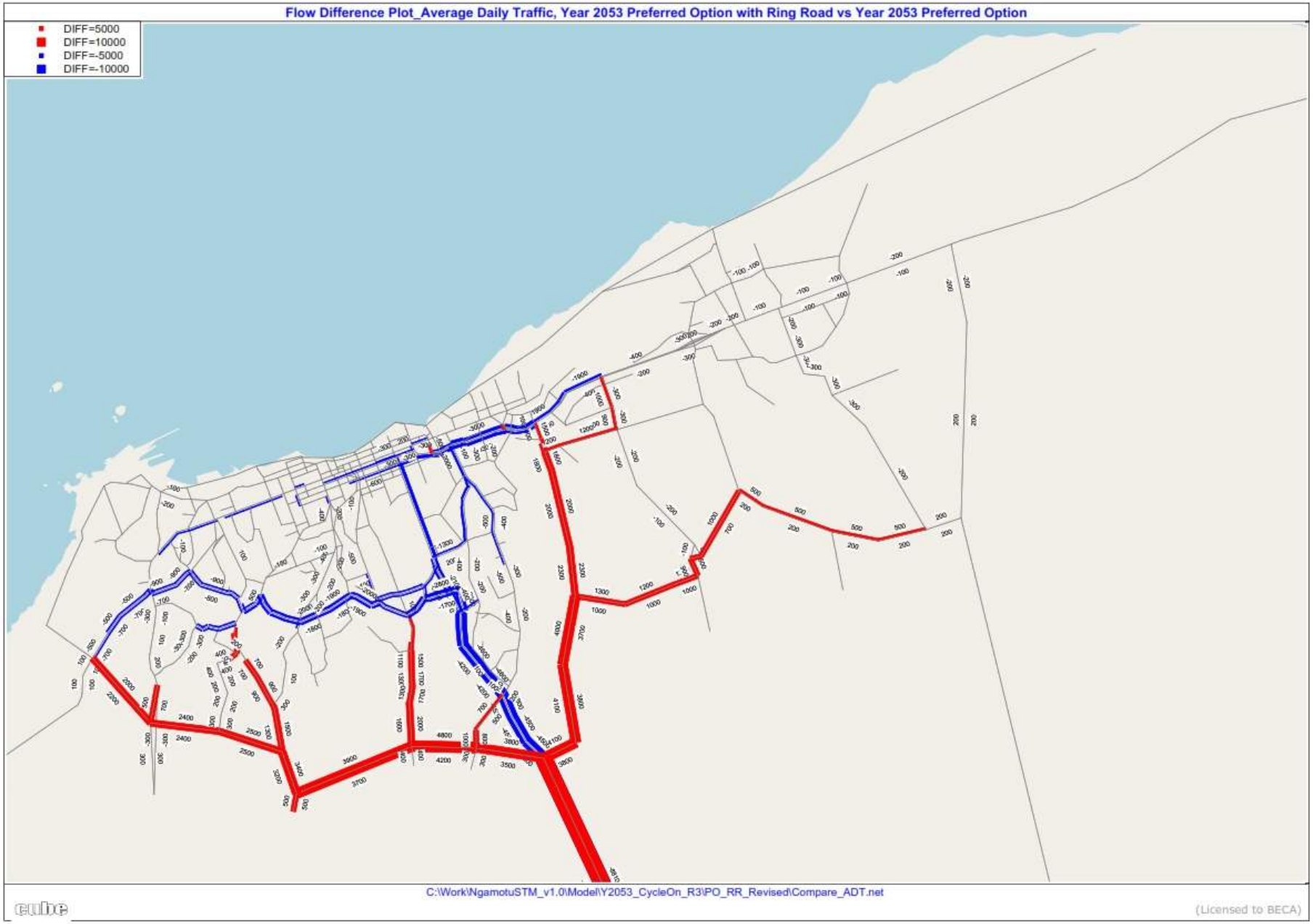
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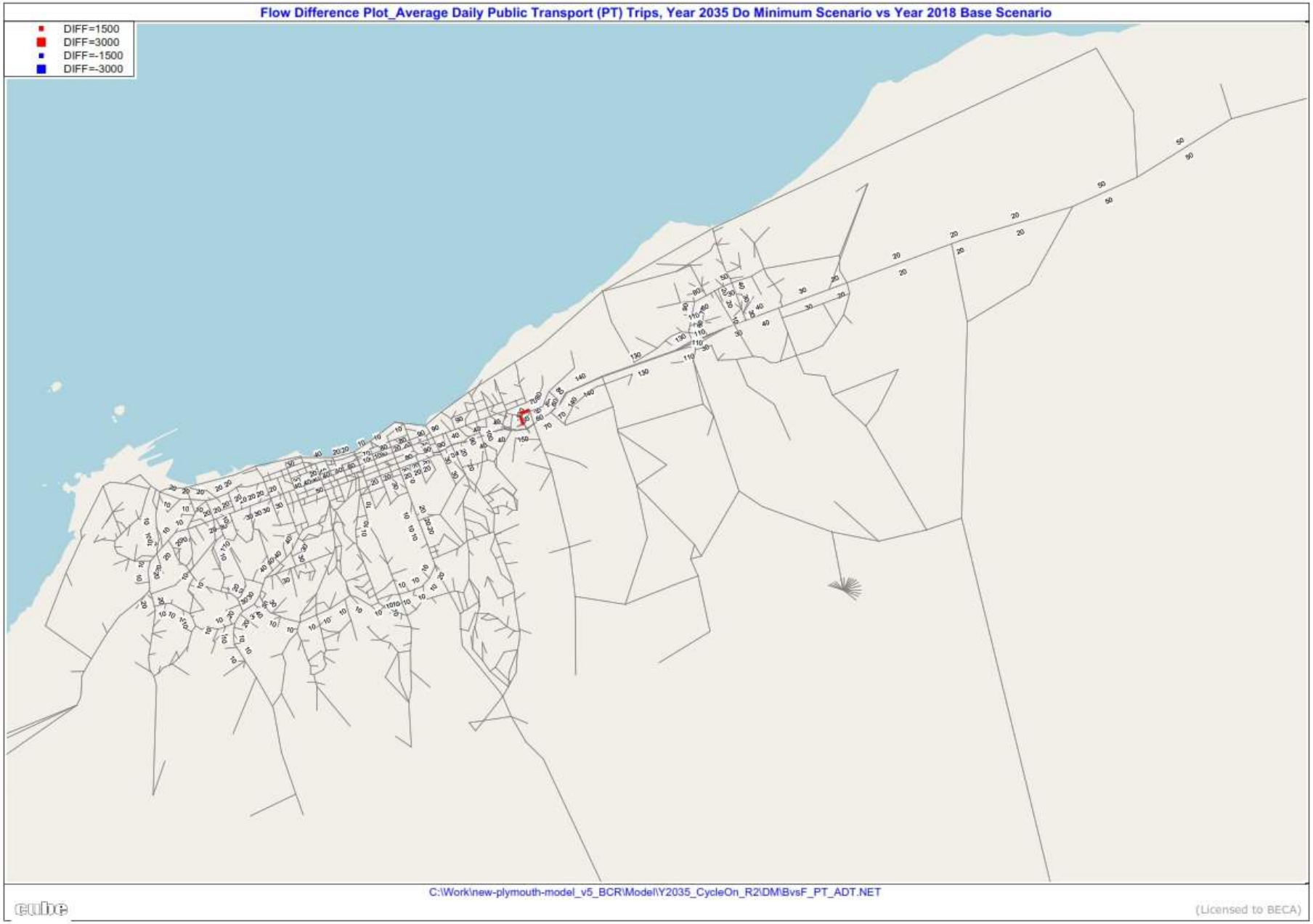
F

Appendix F – Public Transport patronage difference plots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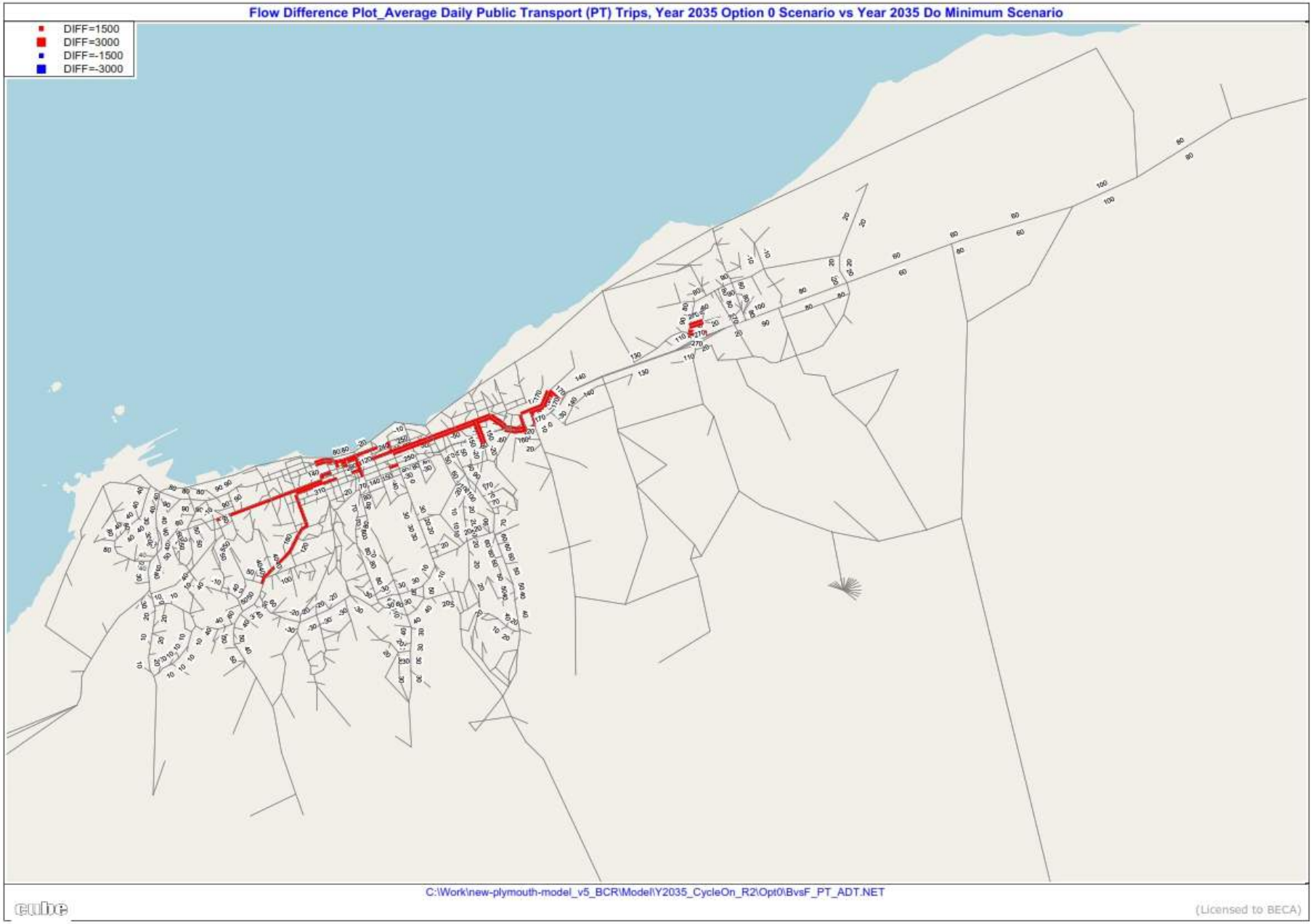
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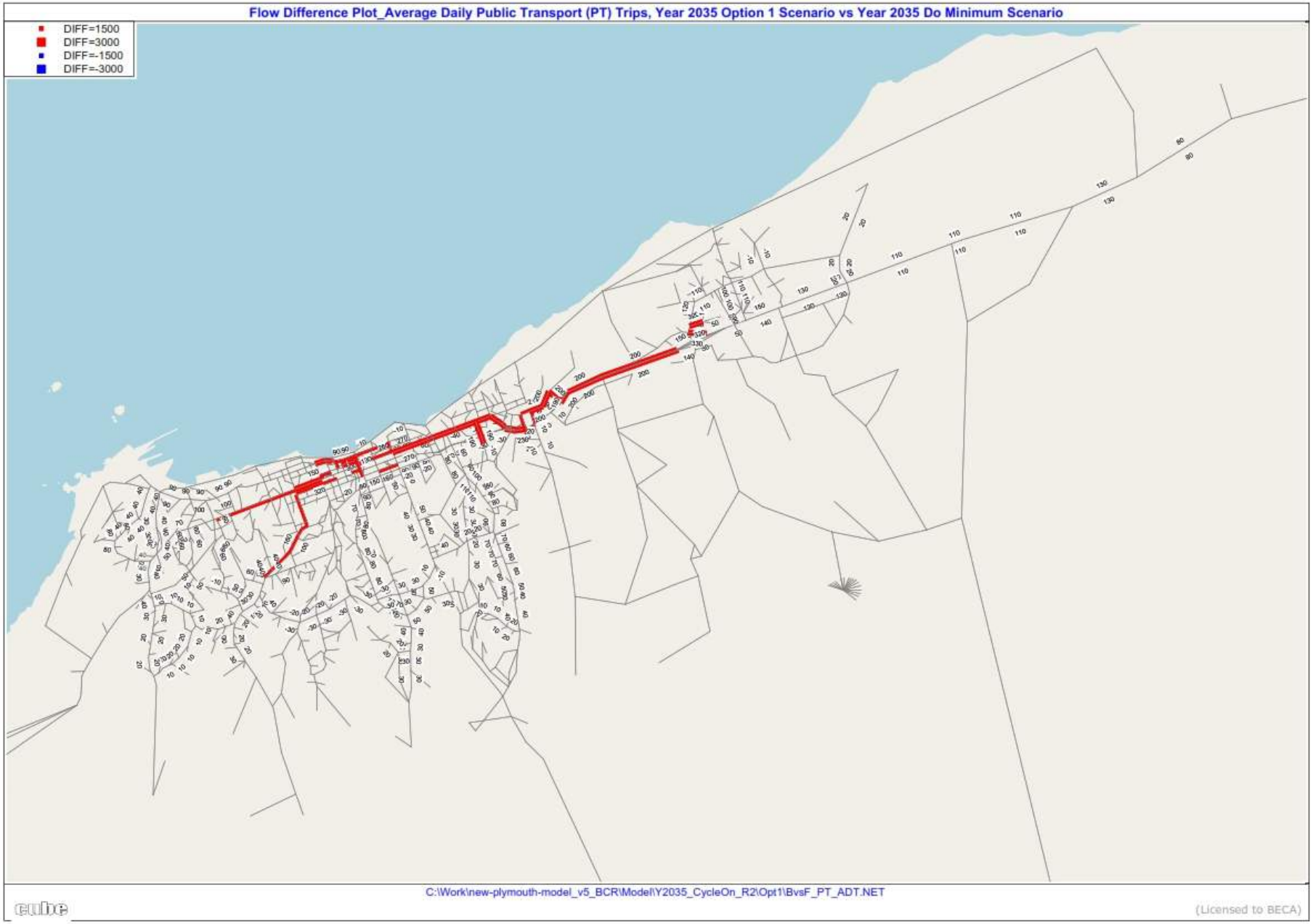
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Flow Difference Plot_Average Daily Public Transport (PT) Trips, Year 2035 Option 2 Scenario vs Year 2035 Do Minimum Scenario
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Flow Difference Plot_Average Daily Public Transport (PT) Trips, Year 2035 Option 3 Scenario vs Year 2035 Do Minimum Scenario
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Flow Difference Plot_Average Daily Public Transport (PT) Trips, Year 2035 Preferred Option Scenario vs Year 2035 Do Minimum
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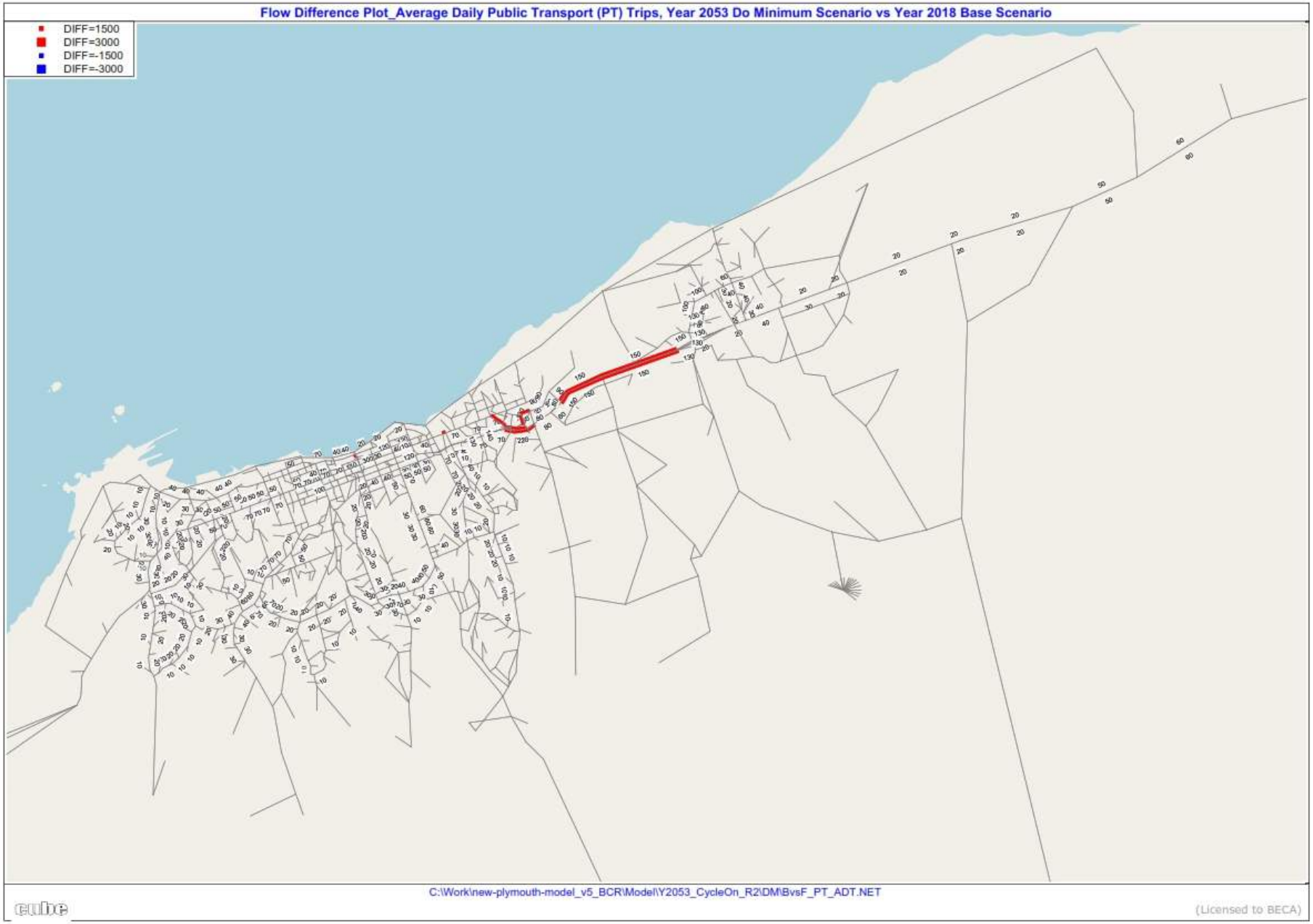
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Flow Difference Plot_Average Daily Public Transport (PT) Trips, Year 2053 Option 0 Scenario vs Year 2053 Do Minimum Scenario
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Flow Difference Plot_Average Daily Public Transport (PT) Trips, Year 2053 Option 1 Scenario vs Year 2053 Do Minimum Scenario
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Flow Difference Plot_Average Daily Public Transport (PT) Trips, Year 2053 Option 2 Scenario vs Year 2053 Do Minimum Scenario
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Flow Difference Plot_Average Daily Public Transport (PT) Trips, Year 2053 Option 3 Scenario vs Year 2053 Do Minimum Scenario
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Flow Difference Plot_Average Daily Public Transport (PT) Trips, Year 2053 Preferred Option Scenario vs Year 2053 Do Minimum
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Flow Difference Plot_Average Daily Public Transport (PT) Trips, Year 2053 Preferred Option Scenario with Ring Road vs Year 2053 Do Minimum
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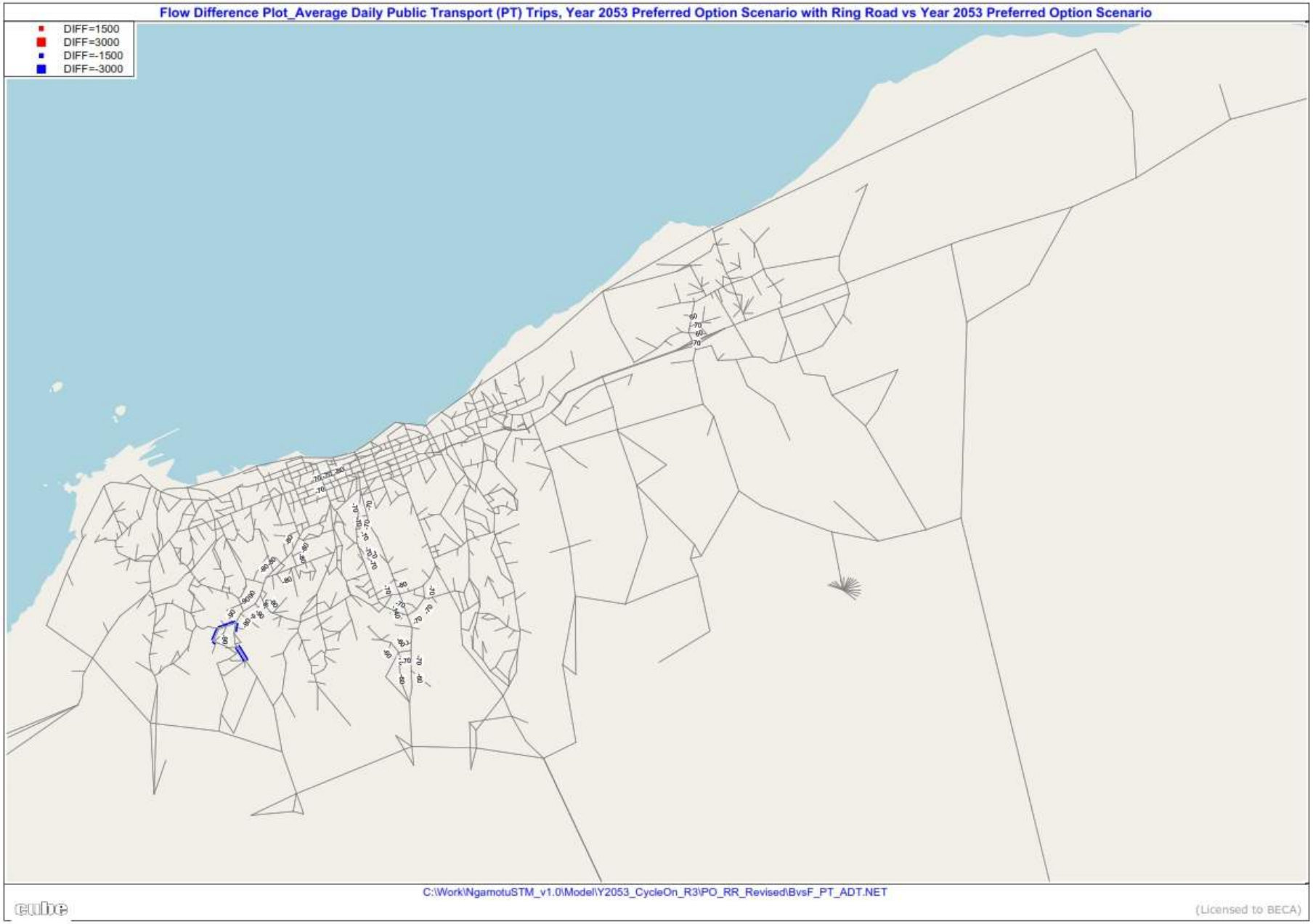
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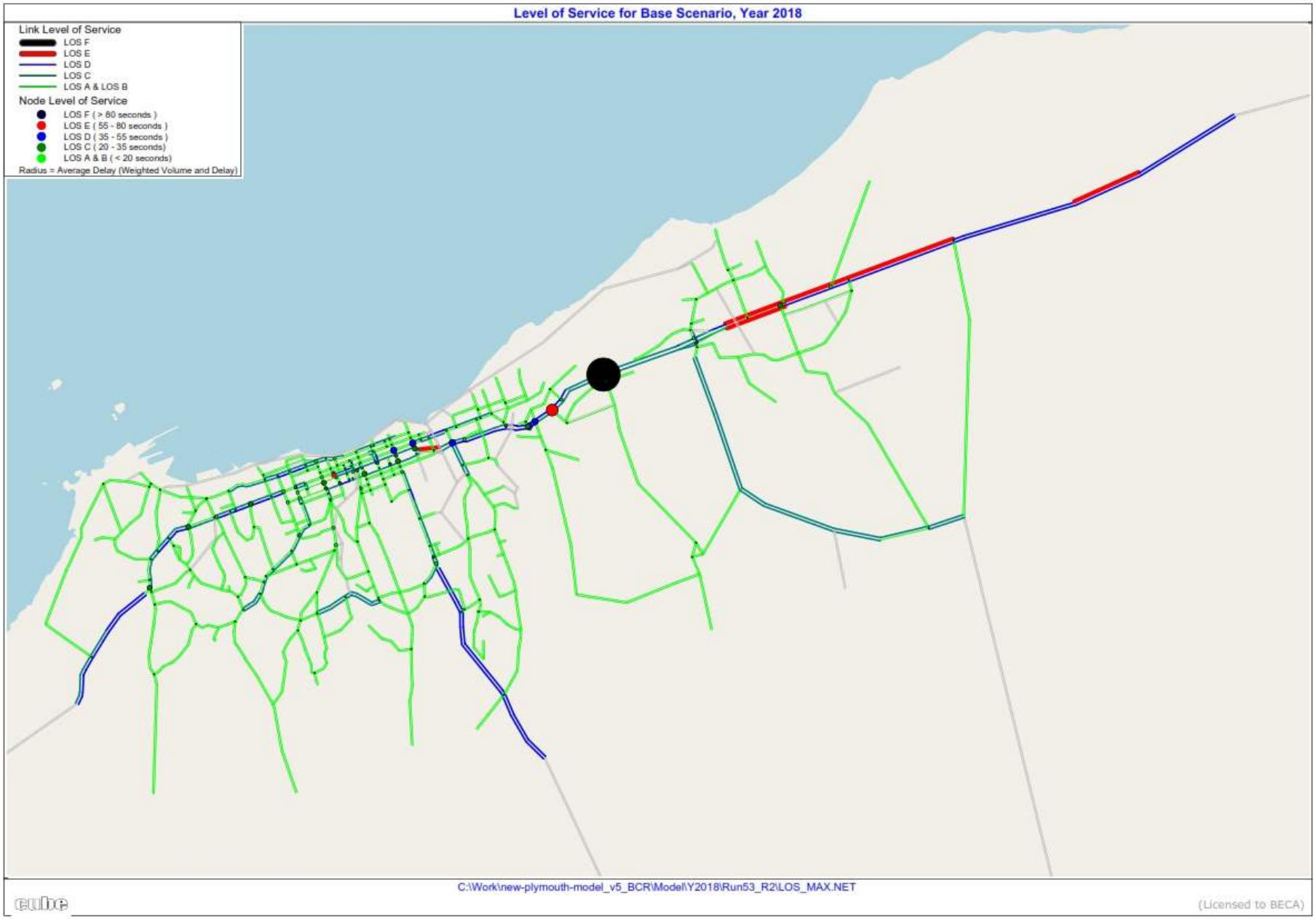
G

Appendix G – Level of Service Plots


Level of Service for Base Scenario, Year 2018
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
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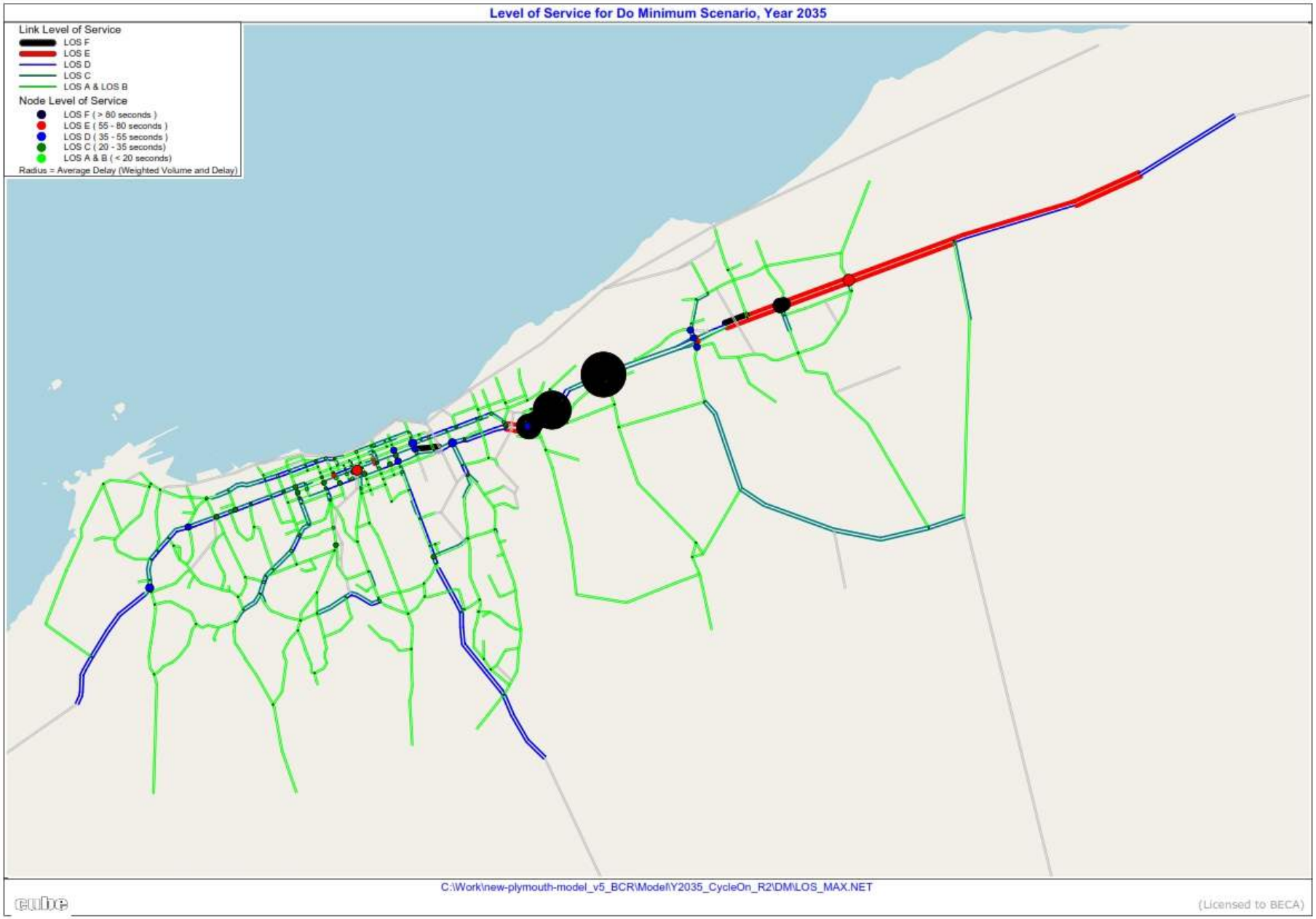
Level of Service for Do Minimum Scenario, Year 2035
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
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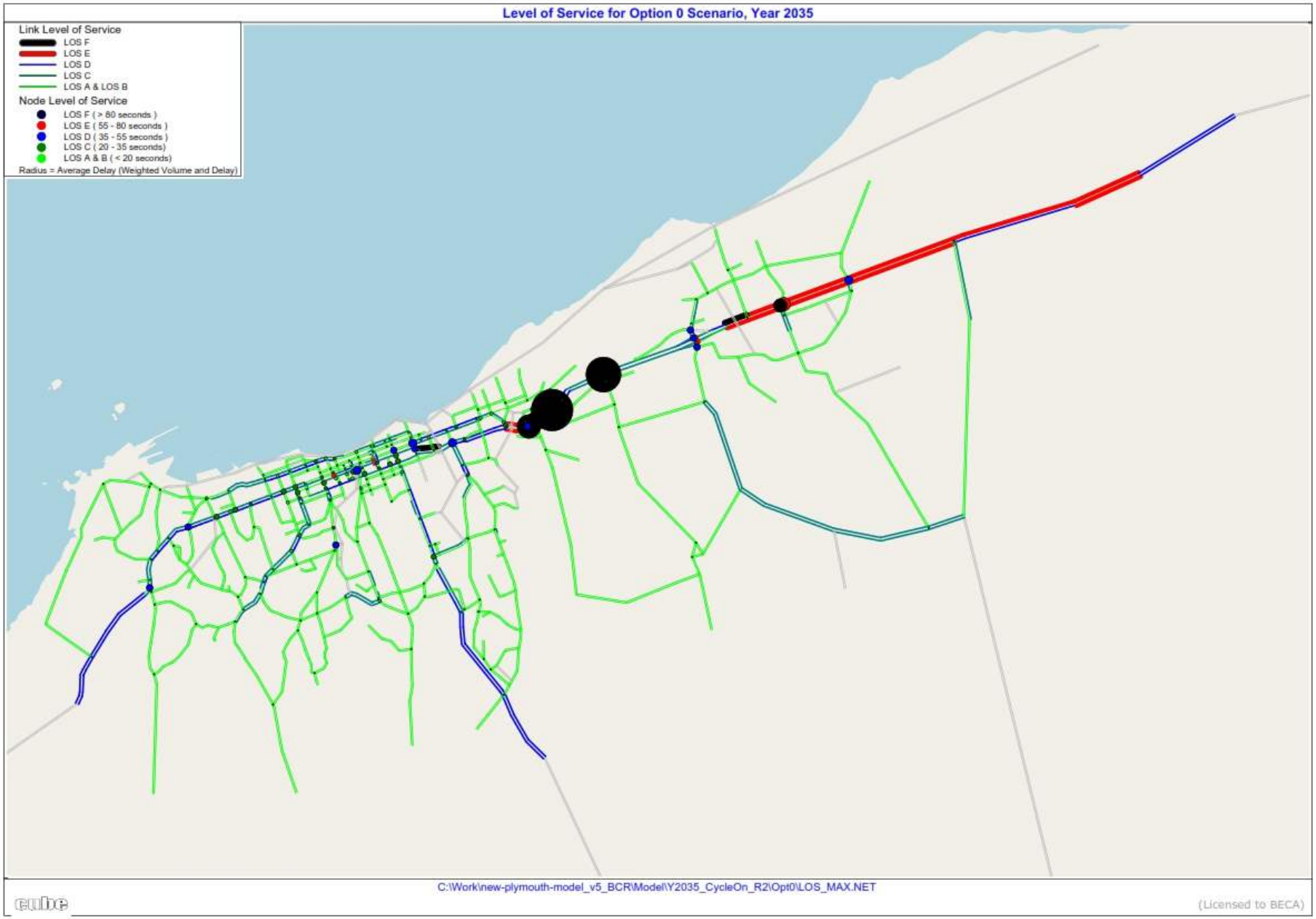
Level of Service for Option 0 Scenario, Year 2035
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
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cube
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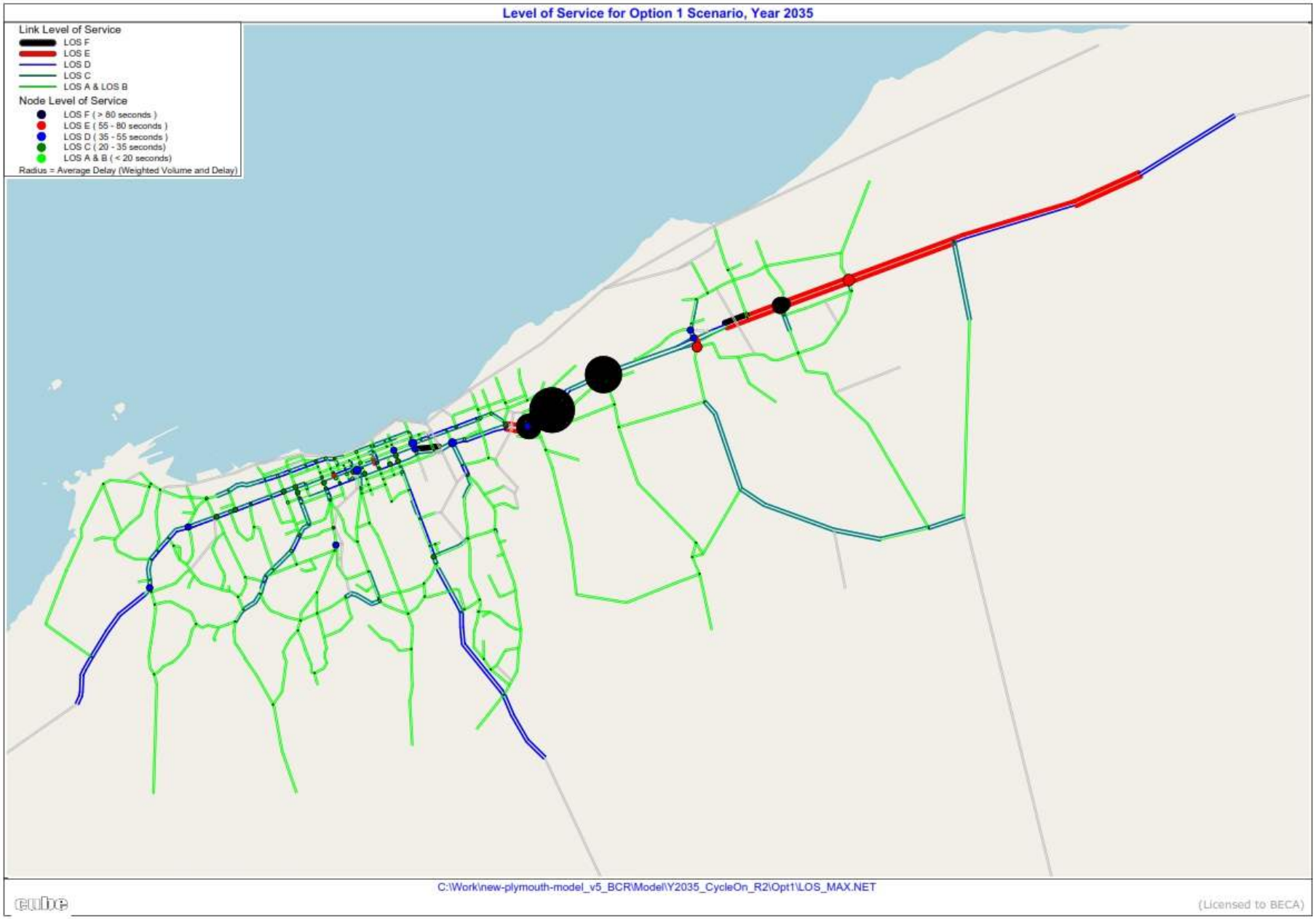
Level of Service for Option 1 Scenario, Year 2035
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
C:\Work\new-plymouth-model_v5_BCR\Model\Y2035_CycleOn_R2\Opt1\LOS_MAX.NET
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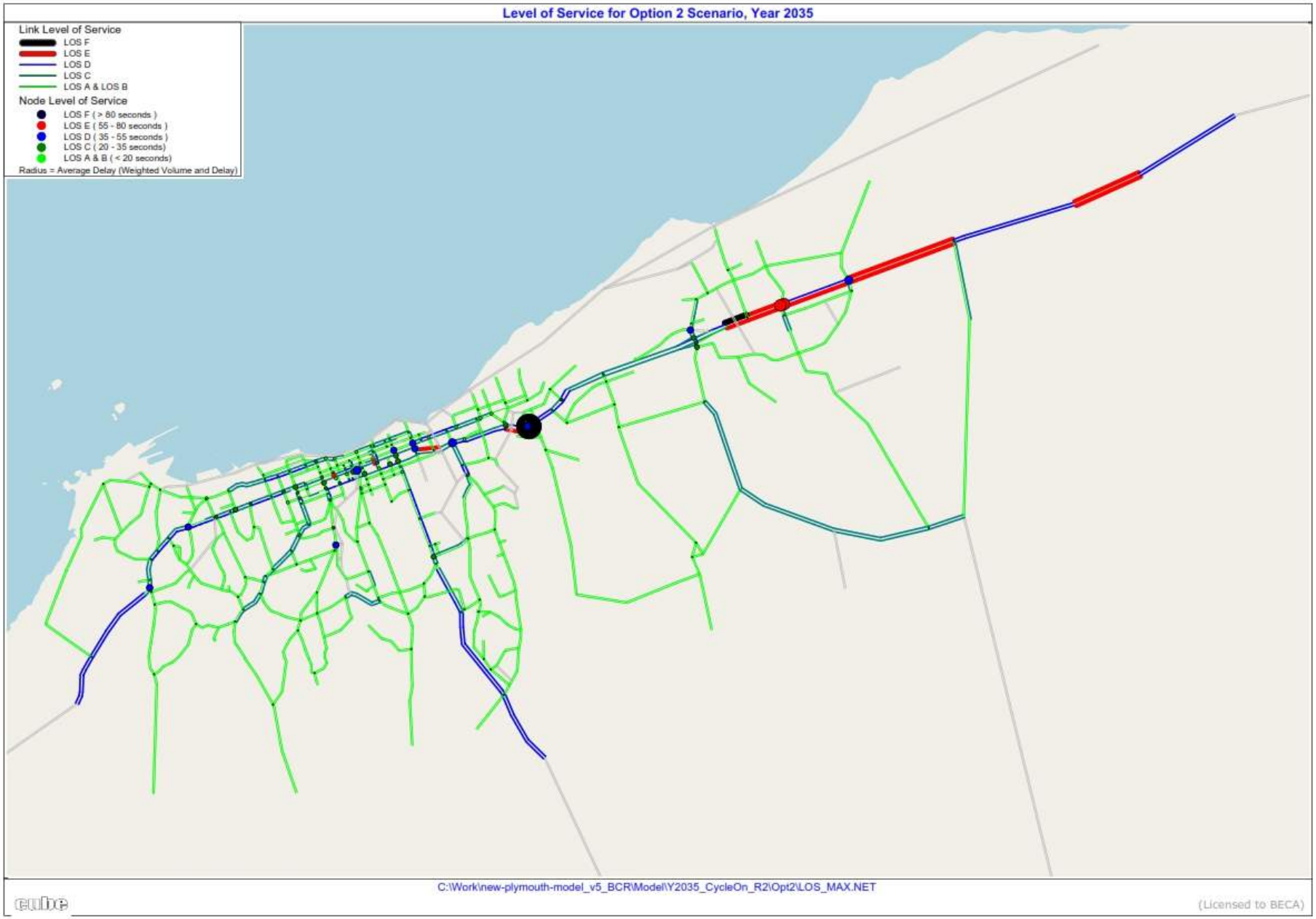
Level of Service for Option 2 Scenario, Year 2035
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
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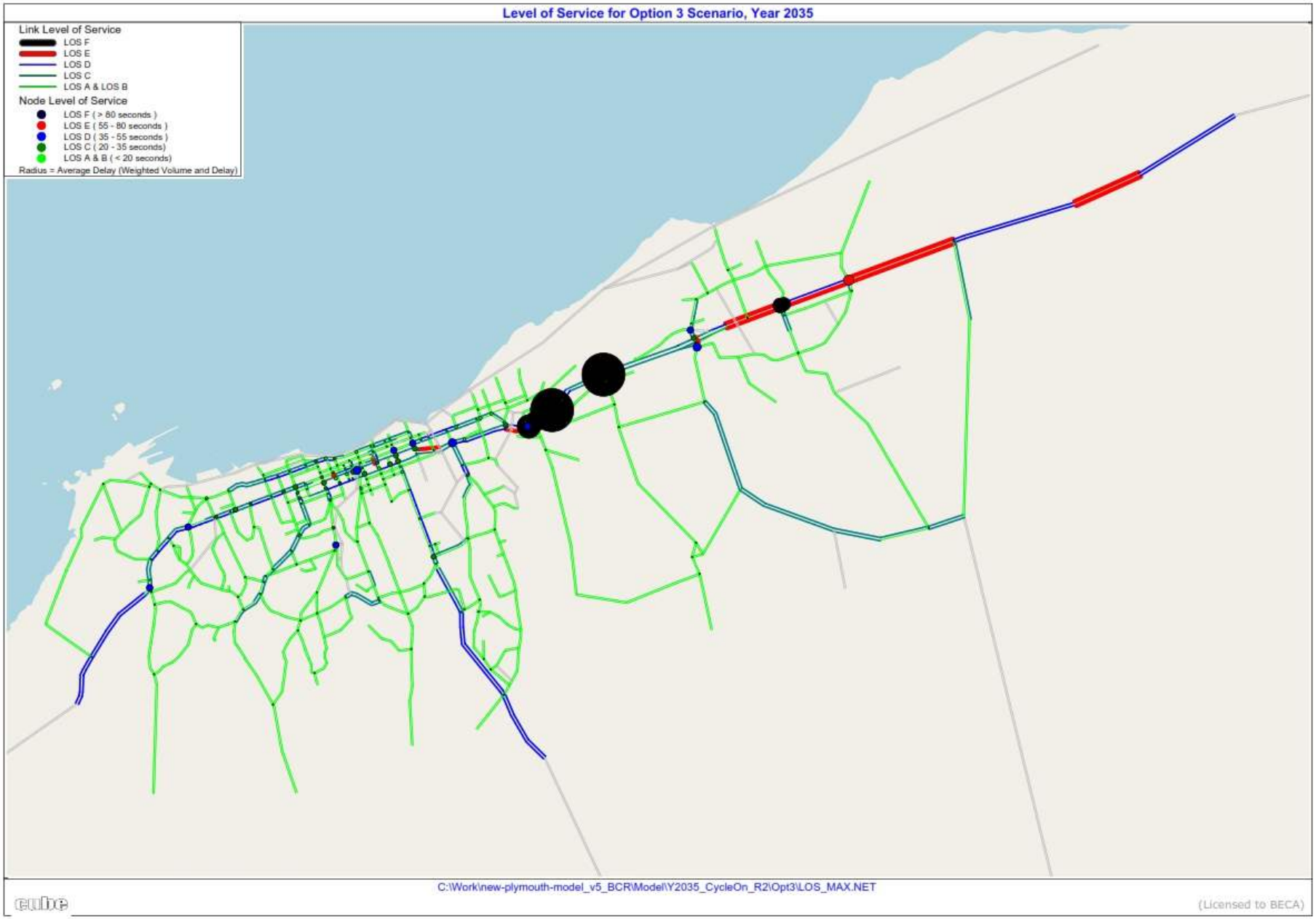
Level of Service for Option 3 Scenario, Year 2035
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
C:\Work\new-plymouth-model_v5_BCR\Model\Y2035_CycleOn_R2\Opt3\LOS_MAX.NET
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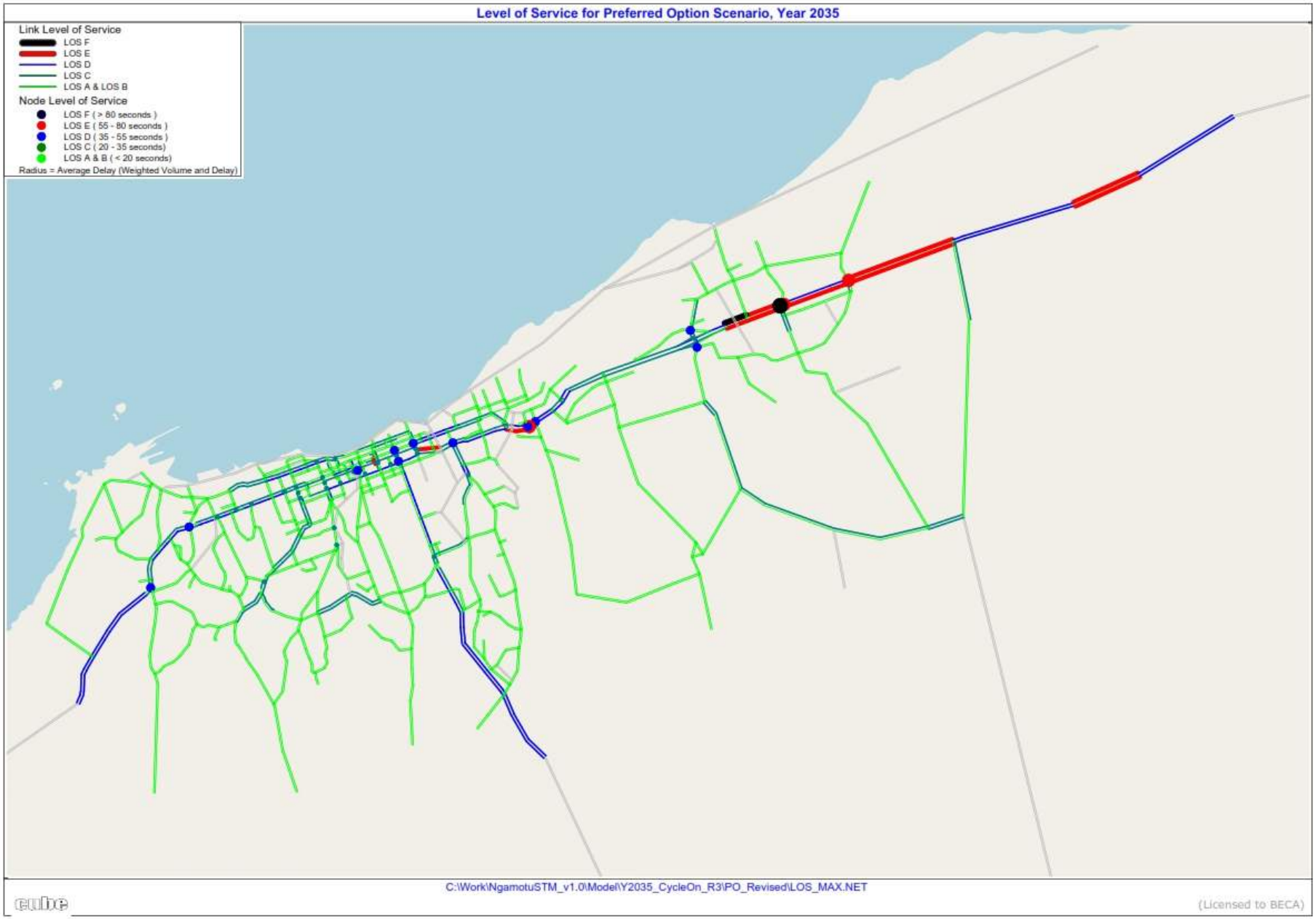
Level of Service for Preferred Option Scenario, Year 2035
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
C:\Work\NgamotuSTM_v1.0\Model\Y2035_CycleOn_R3\PO_Revised\LOS_MAX.NET
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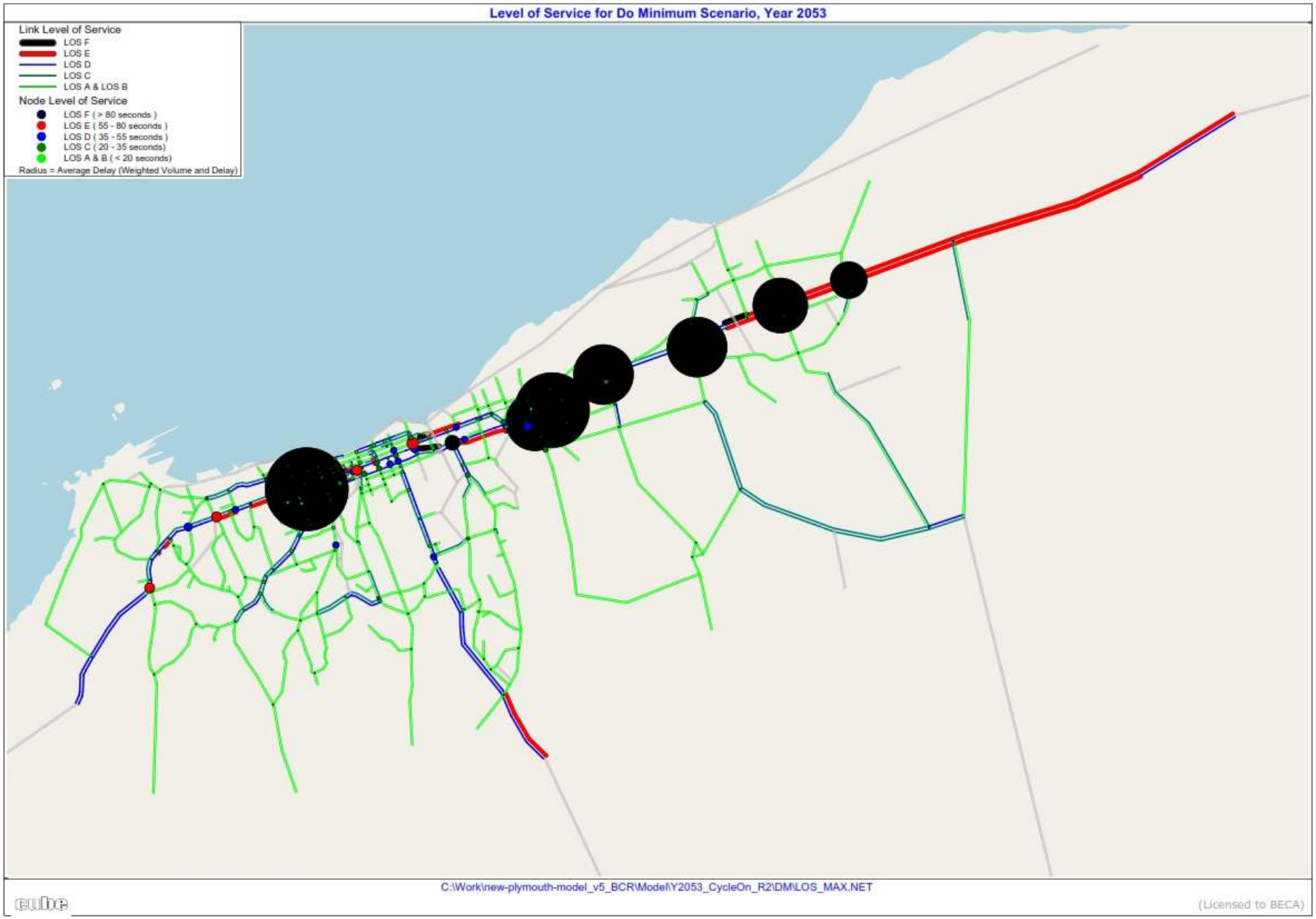
Level of Service for Do Minimum Scenario, Year 2053
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
C:\Work\new-plymouth-model_v5_BCR\Model\Y2053_CycleOn_R2\DM\LOS_MAX.NET
cube
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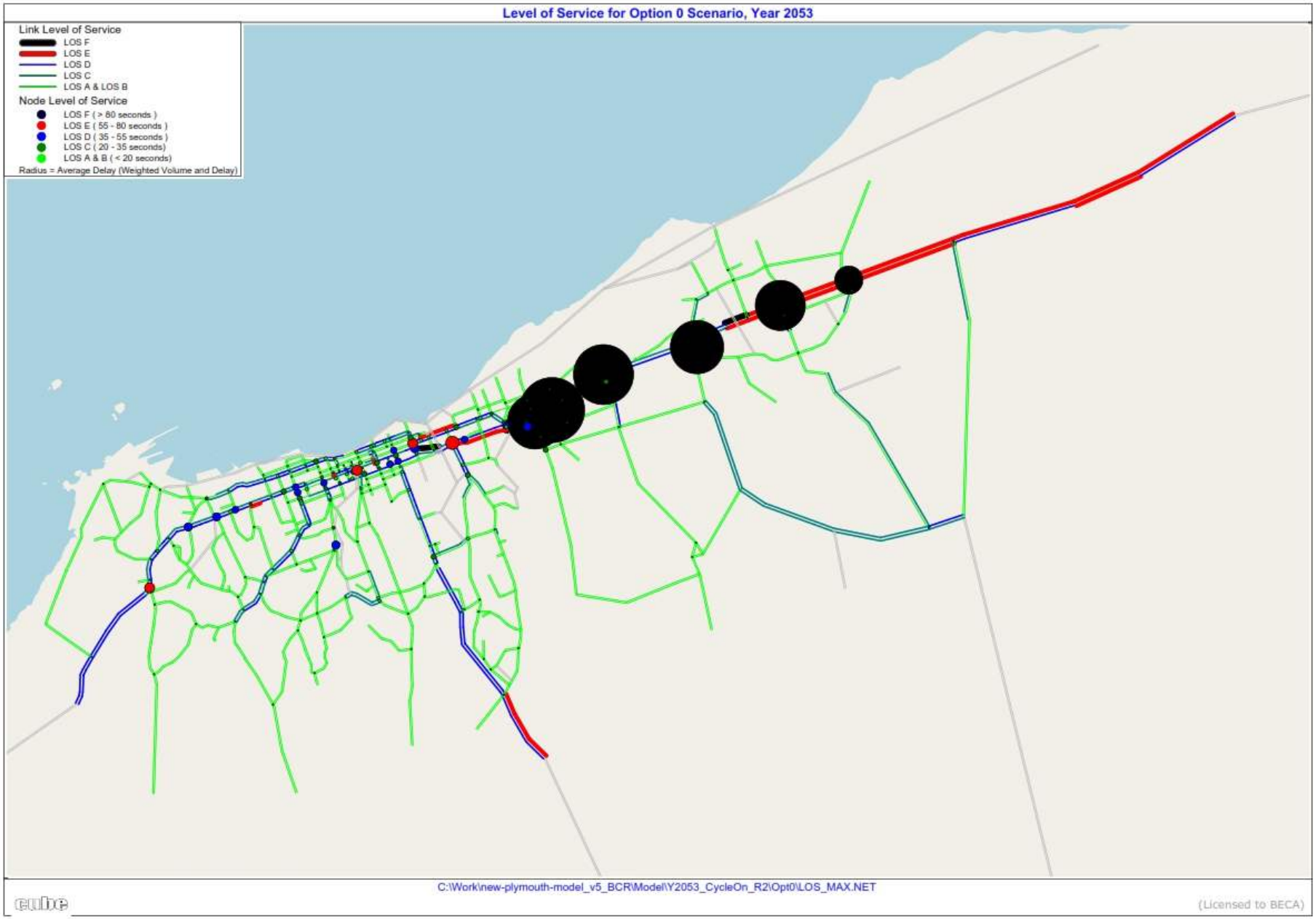
Level of Service for Option 0 Scenario, Year 2053
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
C:\Work\new-plymouth-model_v5_BCR\Model\Y2053_CycleOn_R2\Opt0\LOS_MAX.NET
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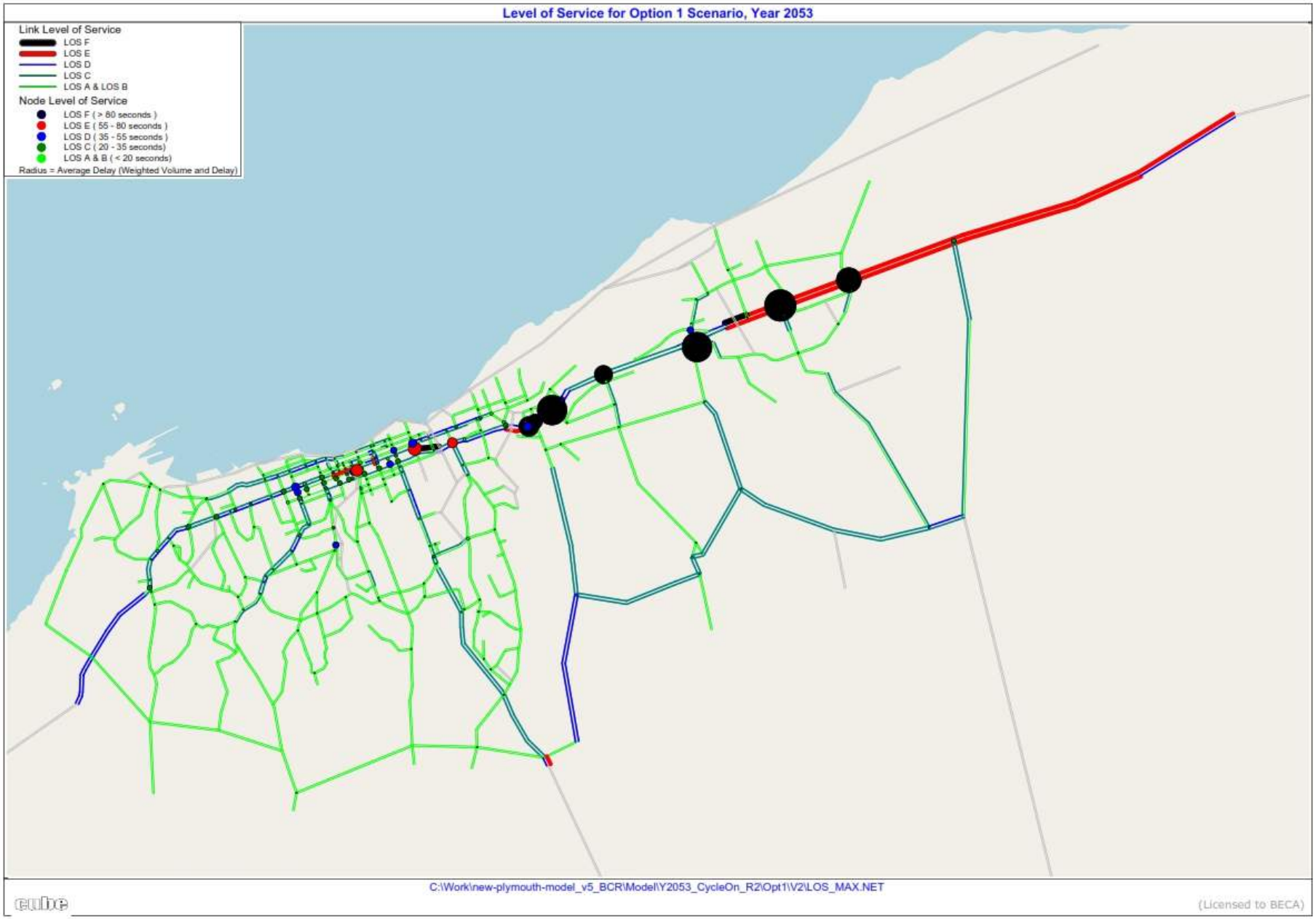
Level of Service for Option 1 Scenario, Year 2053
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
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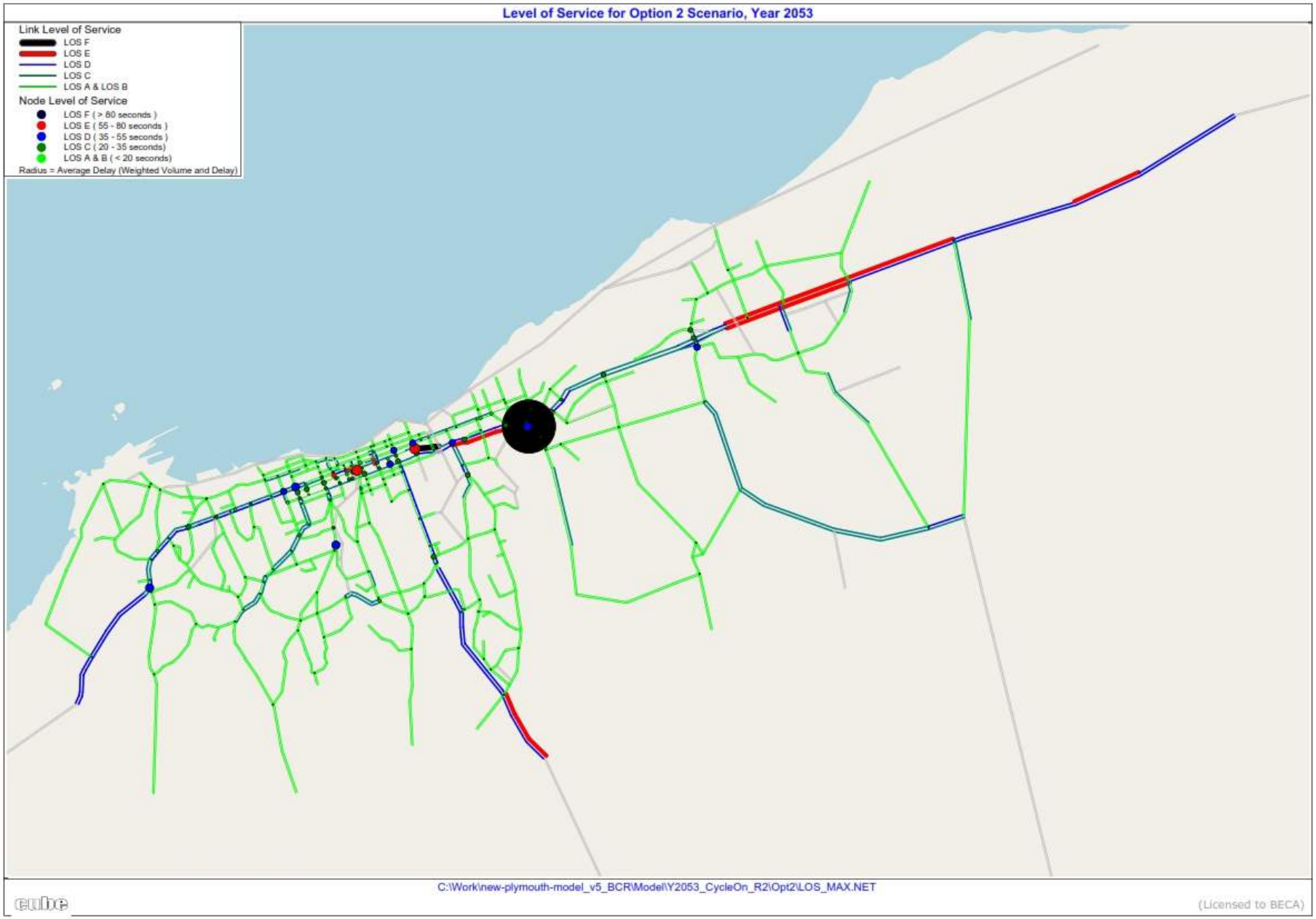
Level of Service for Option 2 Scenario, Year 2053
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
C:\Work\new-plymouth-model_v5_BCR\Model\Y2053_CycleOn_R2\Opt2\LOS_MAX.NET
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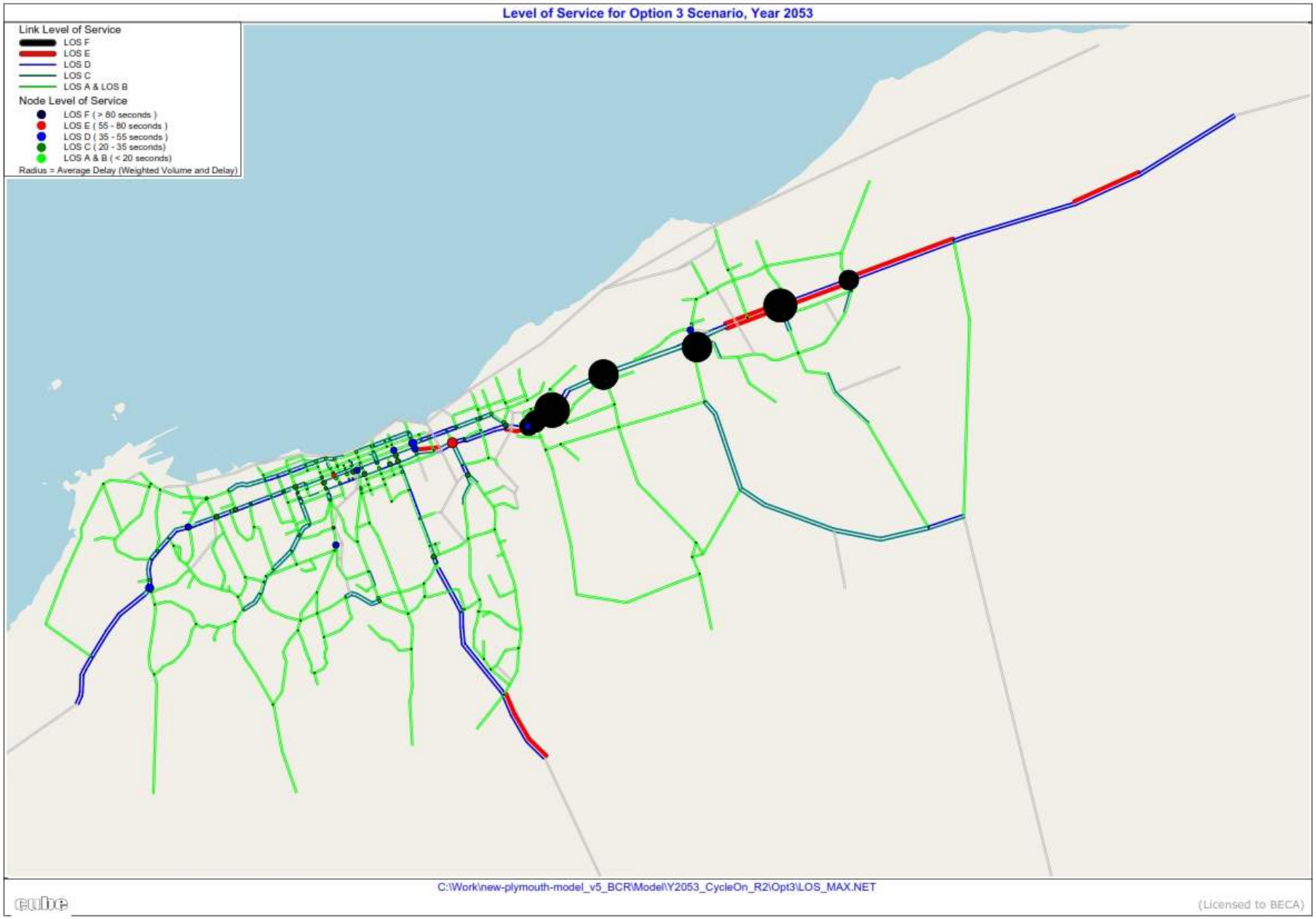
Level of Service for Option 3 Scenario, Year 2053
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
C:\Work\new-plymouth-model_v5_BCR\Model\Y2053_CycleOn_R2\Opt3\LOS_MAX.NET
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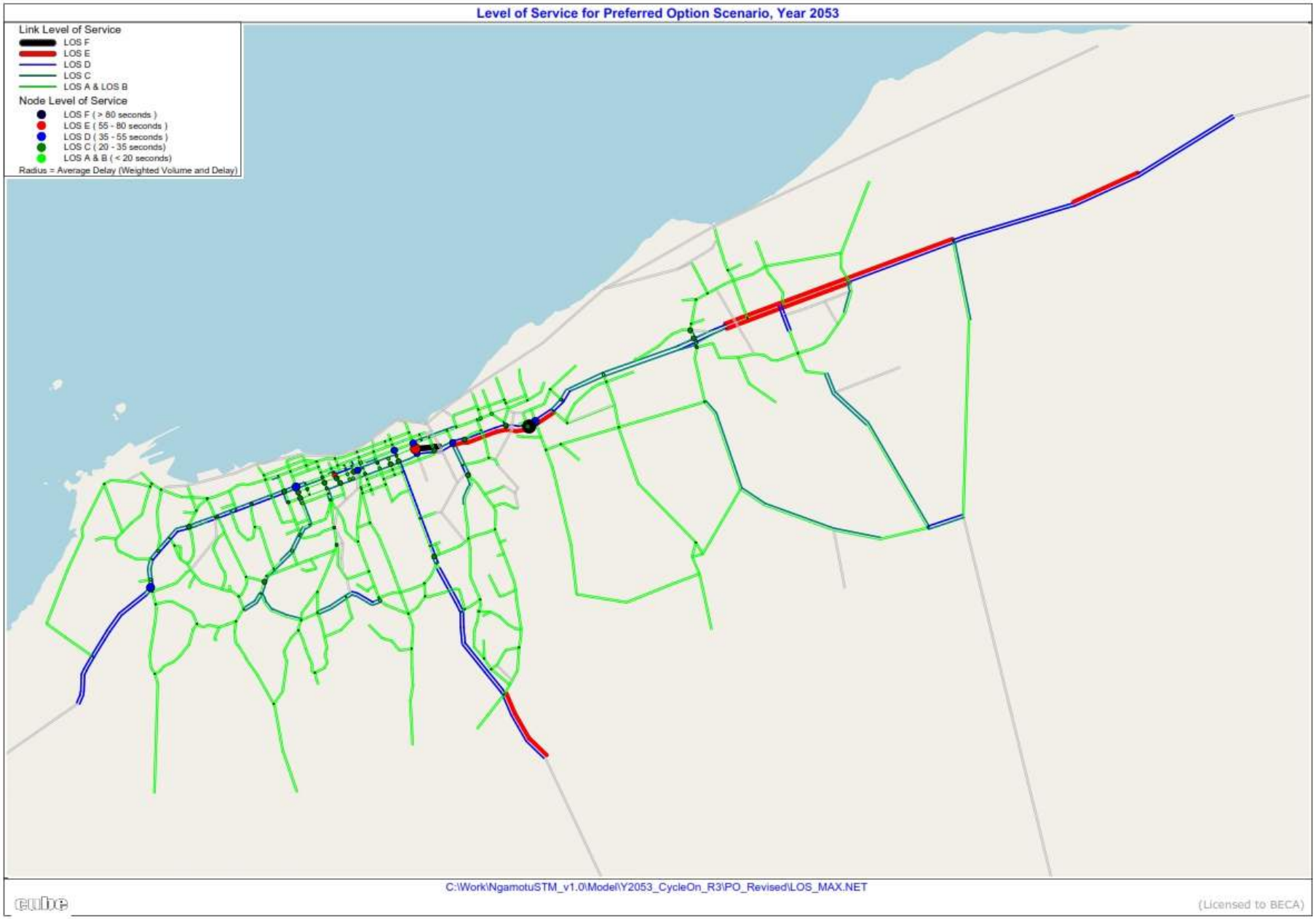
Level of Service for Preferred Option Scenario, Year 2053
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
C:\Work\NgamotuSTM_v1.0\Model\Y2053_CycleOn_R3\PO_Revised\LOS_MAX.NET
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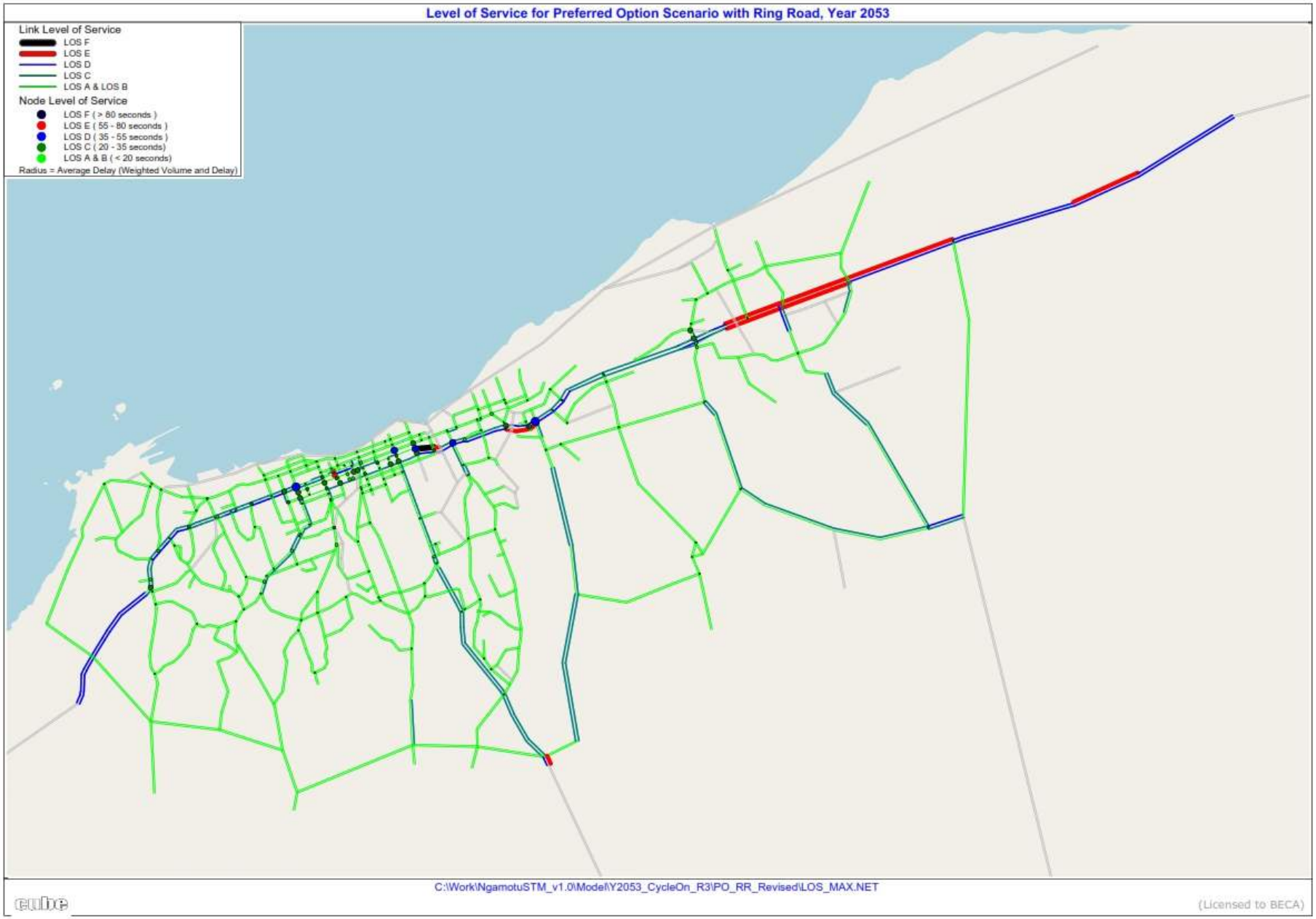
Level of Service for Preferred Option Scenario with Ring Road, Year 2053
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
C:\Work\NgamotuSTM_v1.0\Model\Y2053_CycleOn_R3\PO_RR_Revised\LOS_MAX.NET
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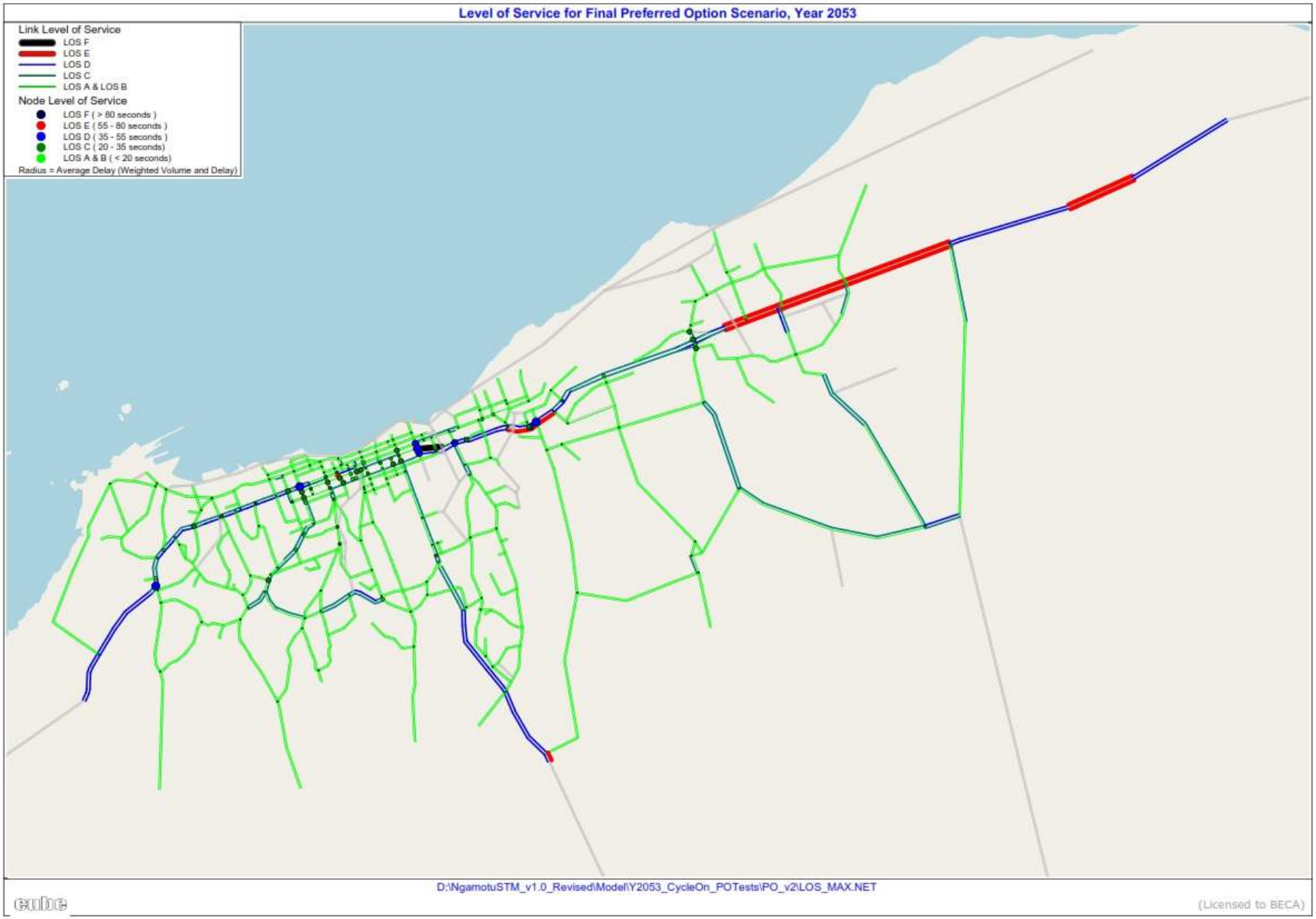
Level of Service for Final Preferred Option Scenario, Year 2053
Link Level of Service
LOS F
LOS E
LOS D
LOS C
LOS A & LOS B
Node Level of Service
LOS F (> 80 seconds)
LOS E (55 - 80 seconds)
LOS D (35 - 55 seconds)
LOS C (20 - 35 seconds)
LOS A & B (< 20 seconds)
Radius = Average Delay (Weighted Volume and Delay)
D:\NgamotuSTM_v1.0_Revised\Model\Y2053_CycleOn_POTests\PO_v2\LOS_MAX.NET
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