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9(2)(ba)(i)	to protect information which is subject to an obligation of confidence or which any person has been or could be compelled to provide under the authority of any enactment, where the making available of the information would be likely to prejudice the supply of similar information, or information from the same source, and it is in the public
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9(2)(j)	to enable a Minister of the Crown or any public service agency or organisation holding the information to carry on, without prejudice or disadvantage, negotiations (including commercial and industrial negotiations)



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Do Minimum Report

Appendix number: E-A

WIP DRAFT P02

23 November 2023

Issue and revision record

Technical Memo: Do Minimum Approach				Creator	Reviewer	Approver
Rev	Date	Description	Name	Sakhi Sumaria Waldo Posthumus	Patrick Andison	Matthew Dillon
1.0	21/08/23	WIP Draft	Signature	s 9(2)(a)		
			Name	Sakhi Sumaria	Patrick Andison	Matthew Dillon
P02	23/11/23	WIP Draft P02	Signature	s 9(2)(a)		
			Name	Sakhi Sumaria	Patrick Andison	Matthew Dillon

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1. Introduction and approach

This technical note sets out the approach and assumptions used in the development of the Do Minimum scenario for the ALR City Centre to Māngere (CC2M) corridor. The Do Minimum scenario is the version of the world if the ALR CC2M were not to be delivered. This includes both the transport network and the likely path of land use and urban development. The choice of Do Minimum is important as it is the baseline against which additional benefits and costs from the ALR scheme, and the supporting urban infrastructure, will be judged.

The Do Minimum Scenario articulates the expected future state, including land use and transport network outcomes, without ALR CC2M. The Do Minimum assumes background growth and the delivery of schemes that have been committed, or are considered likely to happen, but that there is no strategic investment in transport or urban infrastructure in the corridor.

The Do Minimum Scenario has been developed in conjunction with Waka Kotahi and Auckland Transport so that it is aligned with assumptions and agreements across the three ALR projects to ensure a common baseline across all projects. An aligned baseline, the Do Minimum, is critical to ensure the three projects are undertaking assessments based on a shared view of the future that allows for comparison of impacts and benefits across all three links of the broader ALR network. The map of the ALR Network is outlined in Figure 1-1 below.



Figure 1.1 Auckland Transport Rapid Transit Network map including ALR projects

The Do Minimum is not a straightforward projection forward of the situation today, but includes:

- Committed capital enhancement schemes (i.e. those already funded or committed to) and policies, including road user charging, emission reduction, crash reduction and business as usual levels of investment and maintenance in the transport network, as well as (section 2).
- Future patterns of urban growth and land use in the corridor that are consistent with an absence of the ALR CC2M scheme (section 3).

- Costs of urban enabling infrastructure that are consistent with this urban growth and land use (section 4).
- The corresponding carbon emissions (section 5).

Figure 1.2 below summarises these four component elements.

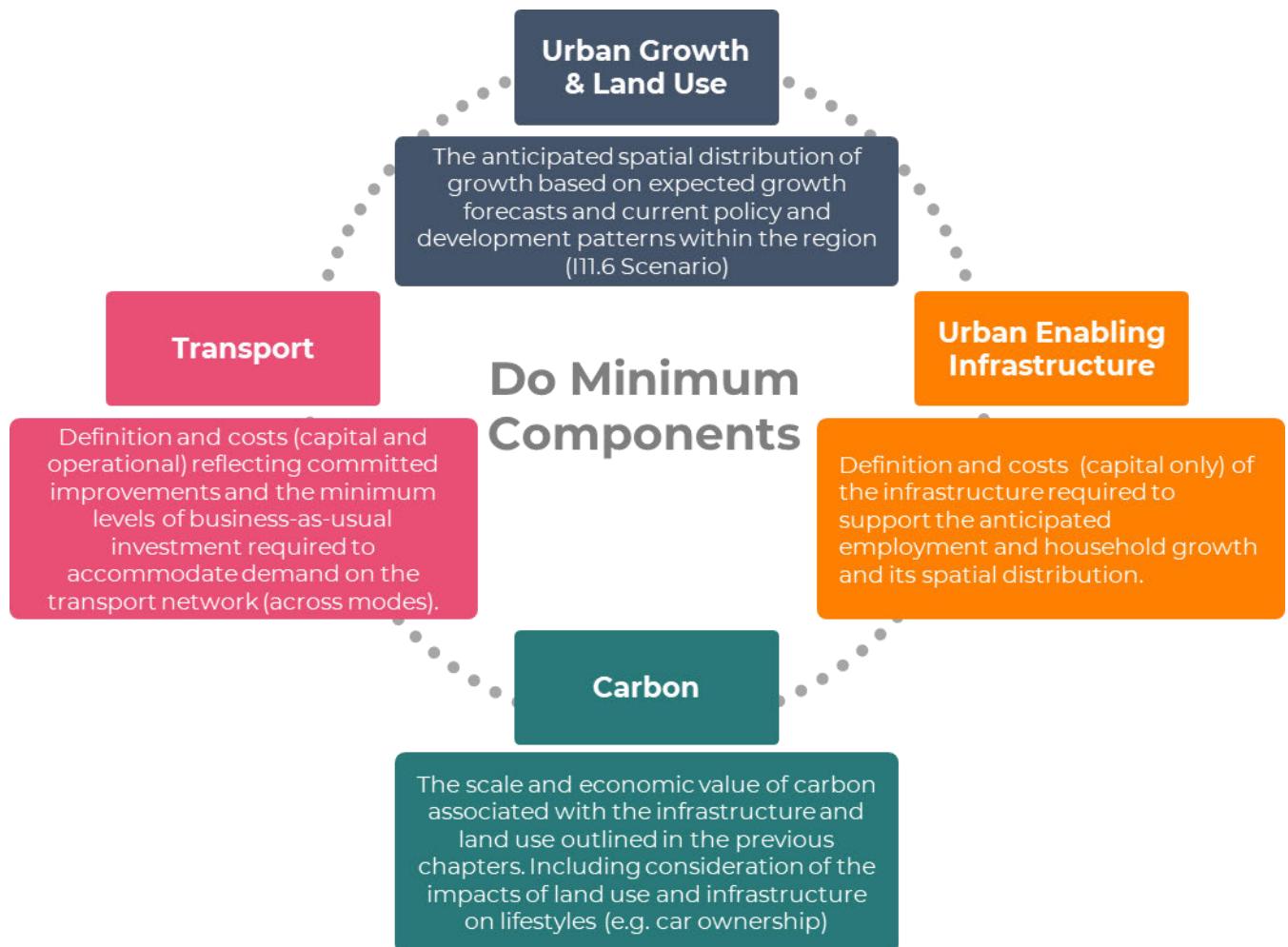


Figure 1.2 Do Minimum components

The business case also includes the understanding of Te Ao Māori within the project, taking into account the principles of Te Tiriti o Waitangi and acknowledging the relationship between the Crown and Mana Whenua. With respect CC2M, consideration is given as to how the scheme will improve access and opportunities for employment and commercial investments, while also positively impacting the environment by having a more sustainable transport modes for Māori living along the corridor which is vital for Mana Whenua as Kaitiaki (Guardians) of Tamaki Makaurau.

2. Transport

2.1 Definition

The transport components of the Do Minimum scenario define the state of the transport network without ALR CC2M. The transport assessment is based around two component parts comprising the committed schemes, other included schemes, and transport network assumptions.

2.2 Committed schemes

The committed schemes included in the Do Minimum are those included in the following policy documents:

- Regional Land Transport Plan 2031 for Tāmaki Makaurau Auckland (RLTP).
- Auckland Transport Alignment Projects (ATAP).
- Te Tupui Ngātahi Supporting Growth Alliance (SGA).

The projects included are those of a larger scale and have been agreed by the Tri-light group. The list of projects includes non-funded projects which go beyond the current RLTP but are supported by ATAP and largely comprise of public transport extensions.

2.3 Other included schemes

2.3.1 Road pricing ('The Congestion Question')

Whilst road pricing or 'The Congestion Question' (TCQ) is currently not a committed project in Tāmaki Makaurau Auckland, it is included in the ALR CC2M Do Minimum scenario. The inclusion of TCQ as an alternative service plan has been recommended by the sponsors which include Crown, Auckland Council and Mana Whenua representatives. The recommendation is a result of emission reduction targets which requires a behavioural tool to disincentivise car use.¹

In addition to the committed schemes, there are wider policies that affect the transport outcomes for the Do Minimum scenario and are outlined below.

2.3.2 Vision Zero and Road to Zero

Vision Zero is Aotearoa New Zealand's road safety policy which is being governed by Waka Kotahi NZ Transport Agency. The policy implements road safety measures through a safe system approach which address road safety as a systemic issue just as much as a road user issue. Road to Zero outlines the planned approach to reduce death and serious injuries (DSI) across the road network by 40% in 2030 and a reduction to zero DSIs by 2050. The Road to Zero includes a series of priorities which will deliver road safety measures across the network.

It should be noted that the Do Minimum scenario only includes projects which has resulted from Auckland Transport's approach to improve safety along their network so that policy targets can be achieved.

¹ As per note 11 of the sponsors recommendation from 31st May 2023

2.3.3 Network enhancements schemes beyond 2031

For forecast years beyond 2031, the Do Minimum scenario includes several projects that are not yet fully committed within the RLTP, ATAP or SGA. These have been discussed and approved by the ALR projects steering group which included representatives from Auckland Council, Auckland Transport and Waka Kotahi. This agreement between the steering group aligns with the ministerial direction for integration between the ALR projects as stated in the letter from the minister. The full list of committed projects is provided in Appendix A. These projects represent the minimal level of investment that is required to achieve the growth predicted within the I-11.6 projections. The I-11.6 is the current adopted population growth scenario for Auckland Council. Figure 3.1 below outlines the major projects included within the Do Minimum.

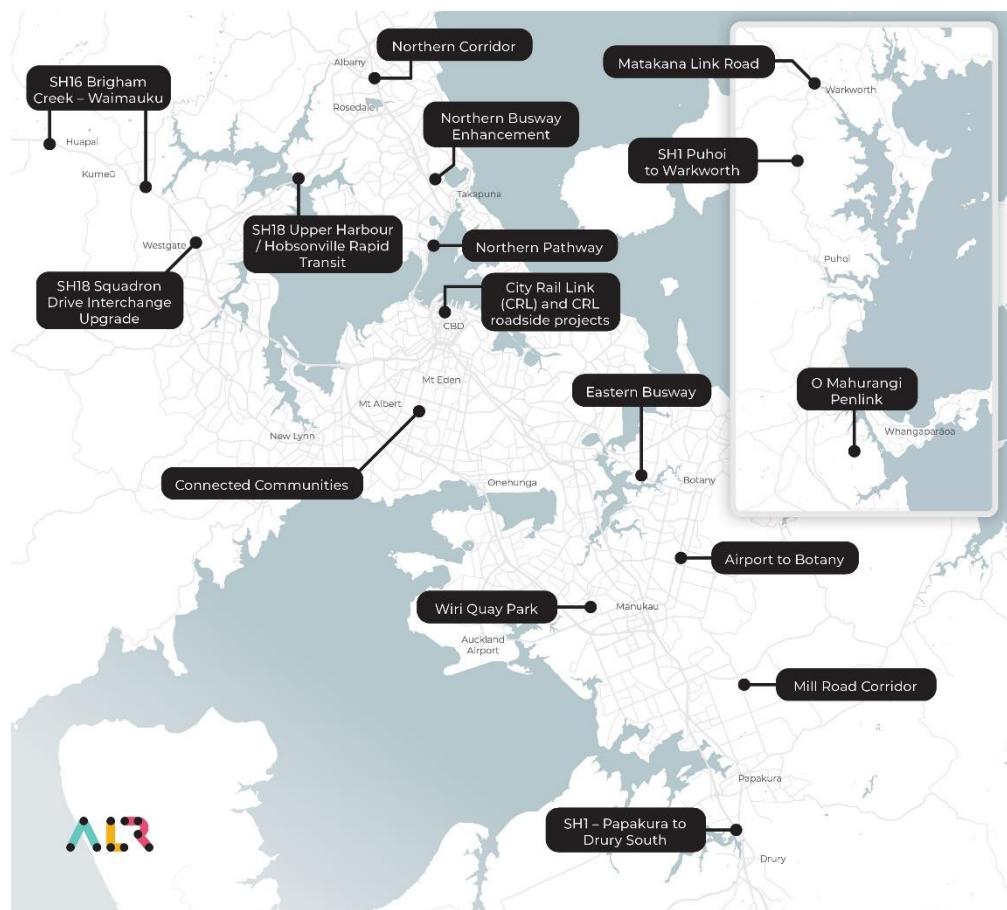


Figure 2.1 Summary of major projects included in the transport Do Minimum scenario

These projects include a range of interventions from rapid transport network investment to major road and multi modal upgrades.

2.4 Transport modelling (MSM) assumptions

The above committed schemes, and other included schemes feed into the transport modelling (MSM) suite. The MSM strategic transport model covers the whole of the Auckland region. It is run by the Auckland Forecasting Centre (AFC) which is a joint transport modelling group established by Auckland Council, Auckland Transport and Waka Kotahi. The MSM is what is known as a four-stage transport model, with those four stages

being trip generation, trip distribution, mode split and trip assignment. The MSM model's primary purpose is to develop trip forecasts by all transport modes, based on a set of agreed inputs, including land use (population, employment and education), transport investment (by all modes) and various policy assumptions.

We do not re-list all of the MSM assumptions here. For ALR CC2M Do Minimum scenario there was a need to update assumptions in the MSM model to reflect the change in conditions particularly capturing post COVID-19 conditions as well as reflecting impacts of recent policy changes as outlined above. The main adjustments that have been included within the Macro Strategic Model (MSM)² are outlined in Table 2-1 below.

Table 2-1 Adjustments made to MSM model based on agreed assumptions ³

Topic	Assumptions	Rationale
Parking costs	Modelled parking costs are assumed to be double existing parking costs within the MSM model.	<p>This will act as a proxy to capture disincentives for traveling into the city centre and town centres coming forward as part of wider strategies and management plans including those outlined in the Transport Emissions Reduction Plan (TERP).</p> <p>Parking costs have been chosen as a proxy as it is a variable within the MSM. Car travel disincentives would include long and short term parking costs, on and off street parking supply, car movement constraints, and other policy disincentives that may eventuate. However, the MSM currently does not include these variables hence the need to use a proxy.</p>
Working from home	Increased percentage of people working from home to 14% ⁴ (which is 7% on top of the embedded 7% already included within the MSM model).	The current model assumption of 7% does not correctly capture the proportion of people working from home as a result of more flexible working post the COVID 19 pandemic. Increasing the percentage to 14% more realistically reflects existing conditions.
Public transport crowding	The Do Minimum accounts for public transport crowding on all public transport modes. These crowding parameters are 7 people per sqm standing people per sqm seated, and 6 people per sqm standing for heavy rail. The MSM model allows the crowding affect to be either activated or not during a model run.	The effect of crowding on public transport can be perceived as negative and might result in people avoiding service due to crowding (essentially reaching or exceeding parameters assumed). By applying crowding in the model, the Do Minimum will more accurately represent public transport patronage especially with the proposed projects and mode shift expectations from different policy interventions.

² MSM Model Information (AN00272 Preliminary Studies Report Final)

³ Agreed by ALR projects steering group

⁴ Waka Kotahi NZ Transport Agency's customer journey survey (January 2021 to February 2023)

Topic	Assumptions	Rationale
Short car trip penalty	Short car trip penalty (journey time penalty) within urban areas includes an additional travel time penalty of 20% applied to all trips within each zone in the MSM model.	The increase of the short trip penalty further reflects policy interventions such as the TERP to discourage short trips.
Bus speeds	Adjustment of bus speeds on priority bus lanes/facilities to account for increased volume of buses on bus lanes.	The change was implemented to better represent bus delays across the network especially in the CBD area.
City Rail Link (CRL) public transport service	Inclusion of additional public transport services related to the implementation of CRL including bus services.	These services will allow for additional feeder routes to the CRL stations which will contribute to delays to bus services within the CBD and consider implications on mode shift, as more people use public transport.

2.5 Māori Travel Pattern Assumptions

Māori travel for school and work was investigated to establish current demands across the region. These patterns are assumed to remain the same for the future Do Minimum scenario as well as the travel growth that will align with populational growth across the region. This will establish a Do Minimum accessibility investigation that will seek to establish future access limitations due to limited transport choices and feeder services for Māori.

These values will feed into the Strategic Case to support Māori aspects of the case making especially around Mana Whenua and Mataawaka access to transport choice within the region and the ALR CC2M corridor.

2.6 Operations and maintenance costs

Operations and maintenance costs of the existing infrastructure, and the committed and other included schemes, are also included in the Do Minimum. The operational and maintenance costs for roads in the Do Minimum will be calculated based on a VKT unit rate for different road types (namely State Highways or local roads) across the network.

3. Urban growth and land use

3.1 Definition

The land use component of the Do Minimum scenario considers the spatial distribution of future population, household, and employment growth within Tāmaki Makaurau Auckland, without the delivery of the ALR CC2M.

3.2 Population growth

Growth forecasts are based on Statistics New Zealand's total population projection for Auckland⁵. The distribution of growth in the Do Minimum is based on existing patterns of growth as well as where and when large scale infrastructure and development projects are anticipated occur over a 30-year period, but not including ALR CC2M. Assumptions made around land use and anticipated growth inform all other components of the Do Minimum Scenario—transport, urban enabling infrastructure, and carbon.

In December 2022, Statistics NZ released updated national population projections⁶ for Aotearoa New Zealand. The projections consider wider factors that may have influenced growth projection—particularly the effects of the COVID-19 pandemic including the significant decrease in immigration that occurred during this time. These adjusted population projects indicate a possible reduction in population growth for Aotearoa, including Tāmaki Makaurau.

To note, it is anticipated that projections could be further modified as the impacts of the COVID-19 pandemic continue to be eased. The population projections are therefore currently under review by Auckland Council. For the time being, and reflecting advice from Auckland Council and Auckland Transport, ALR is continuing to use the I-11.6 projection scenario until further advice is received from Auckland Council.

3.2.1 Māori Population Growth

The Do Minimum further expands on what the future of Māori will look like within the CC2M corridor without the project. To investigate this further, an understanding of where Māori are currently residing has been investigated as well as the future population across the region.

To understand the future for Māori without ALR CC2M, the Do Minimum scenario investigates the population growth for Māori based on the 2018 Stats NZ census, which is forecasted to 2038 and will be further extrapolated to 2051. The data analysis of the future projections from local board areas along the corridor, show a significant increase in Māori population. Due to restrictions and privacy issues, Māori population data cannot be extrapolated below local board level.

3.3 Urban policies

The spatial distribution of land use assumptions and growth in terms of population, employment and households for the Do Minimum scenario are derived from the I-11.6 growth scenario. The I-11.6 growth scenario underpins the Auckland Plan 2050 Development Strategy (Future Development Strategy) and represents a spatial distribution of growth that

⁵ [National population projections: 2020\(base\)–2073](#)

⁶ [National population projections: 2022\(base\)–2073](#)



aligns with the 30-year, strategic direction of Auckland. The current scenario was adopted in 2020 and is used by infrastructure providers to plan and sequence infrastructure investment and is the growth projection used in Auckland Council's Long-term Plan (10-year Budget).

3.4 Land use assumptions

The Do Minimum land use scenario is based on the I-11.6 population growth scenario. Auckland Council distributes the total growth across Auckland based on local knowledge of where and when infrastructure investment is planned to occur as well as aligning with known large scale developments. This is Auckland Council's currently adopted growth scenario (2020) and is the central scenario most commonly used for transport projects and infrastructure planning in Tāmaki Makaurau Auckland.

Some modifications are made for Do Minimum scenario for population, household, and employment growth. Additional growth, coming forward as a result of the light rail investment was included within Auckland Council's growth scenario in 2018/19. This additional growth was calculated during the 2018 Waka Kotahi IBC phase and was then added to subsequent versions of the growth scenario.

For the 2021 IBC and the current Corridor Business Case a portion of the previously added growth need to be removed from the Council's growth scenario to create a 'true' Do Minimum land use.

Additional growth that would occur as a result of the ALR CC2M scheme has been removed from the CC2M corridor and re-allocated to existing urban areas within the city, except for the ALR corridors. This approach has been agreed by the steering group which included representatives from Auckland Council, Auckland Transport and Waka Kotahi across the ALR projects.

The adjusted projections will allow the growth in the Do Minimum scenario to represent a more realistic scenario for the region without ALR CC2M, ultimately showing where growth is anticipated in the region aligning with the Auckland Plan 2050. This will help to create a baseline for predicted population, household and employment growth which will be used to inform economic appraisal. Figure 3.1 outlines the population and employment projections in 2051 in the Do Minimum scenario.

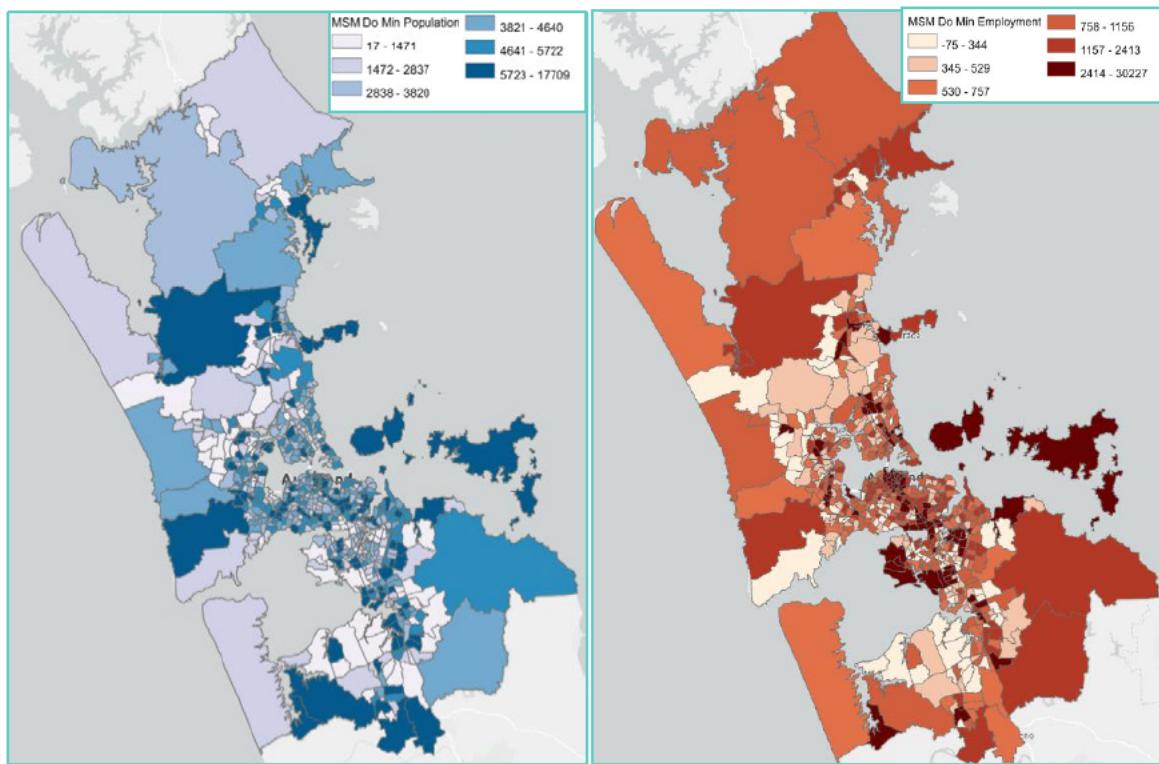


Figure 3.1 Population growth (left) and employment growth (right) by Macro Strategic Model (MSM) zone based on adjusted I-11.6 scenario for 2051

4. Enabling infrastructure

4.1 Definition

Development along the ALR CC2M corridor will comprise largely of brownfield development through a combination of both private and public investment. In the Do Minimum scenario this development will continue to come forward and investment in a range of infrastructure to enable development (in line with current patterns for growth) will still be required, as in table 4-1. This enabling infrastructure for urban development includes:

- Primary assets: those directly required for urban uplift. In other words, this is infrastructure that a developer must implement in order to deliver their scheme.
- Secondary assets: those indirectly linked to any one urban development, but which are cumulatively required for urban uplift, such as schools and parks. These will be delivered through separate owner entities or as part of private sector development.

In the context of the ALR CC2M, 'enabling infrastructure' is defined as primary and secondary infrastructure in utilities, which includes water, wastewater, stormwater, and electricity. This mainly includes trunk water and wastewater, local distribution lines from Transpower's transmission network, intermediate connections to strategic assets and other minimum infrastructure needed to serve development. Other infrastructure requirements including transport, parks, and open space as well as community infrastructure are not considered as part of the Do Minimum. Table 4.1 outlines different infrastructure types, and their asset owners.

Table 4-1 Enabling infrastructure owner by type

Infrastructure type	Asset owner
Included in Do Minimum:	
Water	Watercare
Wastewater	Watercare
Stormwater	Watercare
Electricity	Vector
Not included in Do Minimum:	
Telecommunications	Chorus
Parks and Open Space	Auckland Council
Local road network	Auckland Council
National highway network	Waka Kotahi
Community Facilities	Auckland Council
Schools	Ministry of Education

4.2 Methods and assumption

To determine the enabling infrastructure requirements of the Do Minimum scenario, the project assumes asset owners' current plans for infrastructure investment to support the forecast population growth for the next 30 years at a regional level. Asset owners have undertaken their most recent long-term planning based on Auckland Council's I-11.6 scenario as well as the Auckland Unitary Plan (AUP). Whilst the I-11.6 projections are currently being used as the base growth scenario for Tāmaki Makaurau Auckland, each independent asset owner will have their own interpretation of the projections to guide their investment decision. The project team will engage with each asset owner to understand how projections are being interpreted.

Network Utility Operators (NUOs) have variable levels of long-term planning for their assets. The information available across providers will inevitably differ. It is unlikely that this information can be easily compiled, compared and formed into a detailed analysis of the infrastructure required to meet forecast growth. To overcome this, the analysis of primary and strategic infrastructure required for the Do Minimum scenario will be performed at a higher level. The approach will look at the projected level of investment in Tāmaki Makaurau Auckland required to meet forecast growth. The analysis will assume 25% of this investment value would be available to the CC2M corridor. Further investigation into the current capacity estimation from NUOs as well as the planned capacity already accounted for in the Do Minimum scenario will be undertaken to ascertain infrastructure capacity beyond the NUOs existing forecasts.

An exercise to determine the cost of the minimal level infrastructure required to support forecast growth will be undertaken for the following categories: wastewater, water, stormwater, and electricity.

5. Carbon

5.1 Definition

The section covers the carbon emissions produced from the transport network, and the embodied carbon emissions associated with vehicle production, as the vehicle fleet transitions to the use of electric vehicles.

The Do Minimum scenario also includes carbon emissions associated with constructing enabling infrastructure as well as carbon emissions associated with construction of new dwellings in the Tāmaki Makaurau Auckland region.

5.2 Sustainability policies

The policy environment surrounding carbon emissions has significantly changed since the development of the IBC with multiple policies being introduced through local and national authorities. These policies do not directly impact the emissions assumptions for the Do Minimum, but in some case indirectly affects projects that are taking into account for the MSM modelling scenarios. The Te Tāruke-ā-Tāwhiri: Auckland's Climate Action Plan informs the RLTP on aspects related to emissions reduction and improving resilience and sustainability. The following measures were accounted for as part of the RLTP for 2031:

- 1% to 12% reduction in GHG emissions compared to 2016 emissions for Tāmaki Makaurau
- 50% GHG reduction from 2018 baseline on AT's corporate activities, facilities and trains
- 50% of AT buses being electric
- Treatment of 30% of the runoff of Tāmaki Makaurau's busiest local roads

The RLTP outcomes should result in these measures which are accounted for in the outcomes of the MSM model for the Do Minimum.

5.3 Methods and assumptions

The carbon assessment is split in three main components comprising the transport network, enabling infrastructure, and household growth. The approach to each component is outlined below.

5.3.1 Transport network

5.3.1.1 Transport operational emissions assumptions

The transport operational emissions for the Do Minimum are estimated by the Vehicle Emissions Prediction Model (VEPM) and the MSM model. The latest version of VEPM (VEPM 6.3 updated in April 2022) has been used to determine the Do Minimum scenario with the detailed assumptions used within the model outlined in the industry technical report⁷

The VEPM requires information on the vehicle fleet mix, which is predicted through the Vehicle Fleet Emissions Model (VFEM)⁸. Outputs from the VFEM feed into VEPM to forecast the emissions from the vehicle fleet. The outputs of these models are directly used in the

⁷ [Vehicle Emissions Prediction Model: VEPM 6.3 update technical report](#)

⁸ [Vehicle Fleet Emissions Model Documentation 2022-06-08](#)

MSM model which is the primary tool to estimate future transport emissions for the network in Tāmaki Makaurau Auckland.

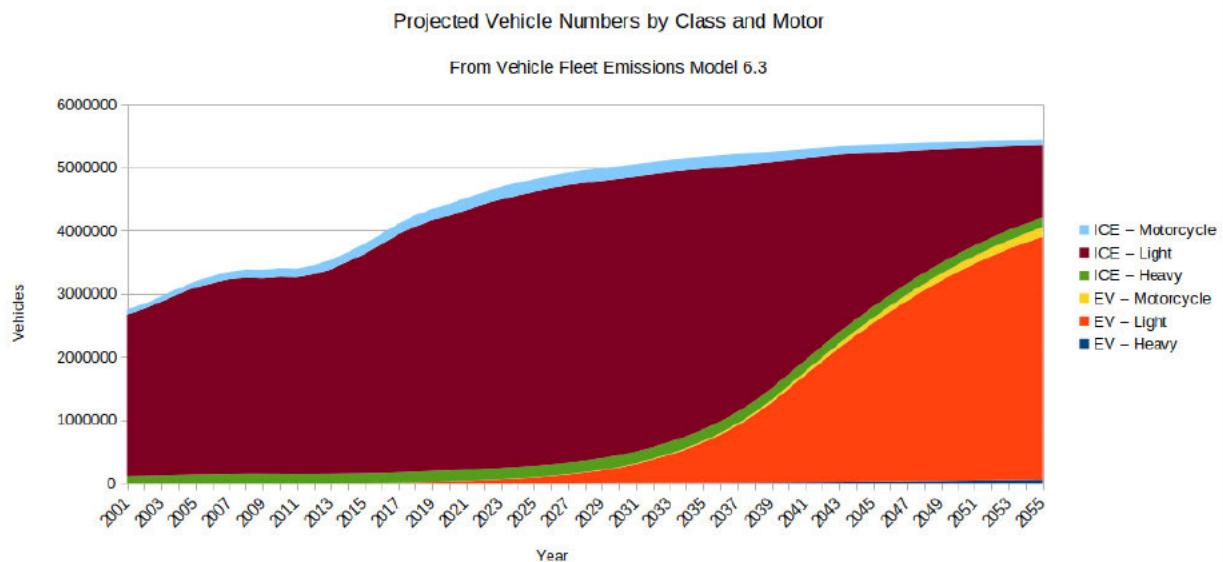


Figure 5.1 Predicted vehicle fleet mix from VFEM model

The assumptions based on the project inclusion in the project and within the prediction models have an impact on the levels of emissions that are forecasted for the Do Minimum scenario as an emission reduction is expected.

It should be noted that the VEPM only forecasts carbon emissions from the vehicle fleet until 2050 and does not consider carbon emissions associated with electricity consumption from electric vehicles. To forecast emissions for the Do Minimum for the full appraisal period, data from VEPM has been extrapolated until 2065.

5.3.1.2 Assumptions on vehicle fleet embodied emissions

The total embodied carbon emissions from the production and shipment of vehicles are included in the Do Minimum scenario, as outlined in the table below.

Table 5-1 Assumptions used for embodied carbon calculations for the production and shipment of vehicles.

Key Inputs	Summary of inputs and assumptions
VFEM Model	The VFEM model contain a variety of inputs and assumptions from both historic and future data including fleet mix, fleet travel, GHG emissions from transport and vehicle registration. Full detail of the model can be found in the VFEM documentation. ⁹
Vehicle ownership data	<ul style="list-style-type: none"> Vehicle ownership and transport fleet statistics from the Ministry of Transport. The proportion of new vs used vehicles required remains constant by vehicle type The average vehicle age at deregistration remains constant

⁹ <https://www.transport.govt.nz/assets/Uploads/Data/Transport-outlook-updated/Vehicle-Fleet-Emissions-Model-Documentation-20220608.pdf>

Industry standard practice embodied calculation values	<ul style="list-style-type: none"> Light vehicle emission factors from: Volvo cars live cycle assessment report for battery electric XC40 recharge and the XC40 ICE10. Heavy vehicle emissions factors from: Scania Life cycle assessment of distribution vehicles.¹¹ Light vehicles, heavy vehicles, and buses are homogenous in their production. Global materials production decarbonises according to IEA predictions. Future EVs are constructed with similar materials and quantities to today's EVs.
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5.3.2 Enabling infrastructure

Determining the carbon associated with enabling infrastructure under the Do Minimum scenario is based on predicted growth using I-11.6 projections. The projections will provide the household growth for future years by zones used within the MSM model and will utilise a 'per person' calculation.

The assumptions used for estimating emissions per person for greenfield and brownfield developments were taken from previous work completed by Kāinga Ora (emissions related to Wesley West Development). The basis of the analysis is that development on greenfield areas generates higher infrastructure carbon emissions compared to brownfield land. The assumptions are outlined below:

- Greenfield – 10 tCO2e/person.
- Brownfield – 7 tCO2e/person.

These assumptions are applied to the predicted growth rates for the region to estimate total emissions from carbon relating to enabling infrastructure in the Do Minimum scenario. Assumptions relating to the emissions per person are kept constant until 2030 after which the factors relating to emissions per person were reduced by half every 10 years. This is due to policy and building code changes requiring the use of lower emission materials as well as improved industry practices, leading to the reduction in emissions per person.

5.3.3 Household growth

The approach for assessing the changes to carbon emissions from constructing and operating residential buildings is based on previous work done by Kāinga Ora for the Wesley West masterplan.

The basis for this assessment is that constructing different housing typologies, such as stand-alone houses, duplexes, walk-up apartments, and multi-storey apartments all result in different levels of carbon emissions, as follows:

- Household/population growth from land use scenarios.
- Building consent data from Stats NZ.
- I-11.6 growth projections from the Auckland Unitary Plan.
- Carbon emissions factors for different building typologies supplied by Kāinga Ora.

¹⁰ <https://www.volvocars.com/images/v-/media/applications/pdpspecificationpage/my24/xc40-electric/pdp/volvo-cars-LCA-report-xc40.pdf>

¹¹ <https://www.scania.com/content/dam/group/press-and-media/press-releases/documents/Scania-Life-cycle-assessment-of-distribution-vehicles.pdf>

The assumptions used for different building typologies are outlined in the table below.

Table 5-2 Urban development assumption overview ¹²

Building typology	Density range (dwellings/ha)	Carbon emission assumption	Operation emission assumption
Detached houses	0 – 15	The same as a standalone, double-storey dwelling	112 kWh/m2
2 storey terrace houses	15-35	The same as a standalone, double-storey dwelling	112 kWh/m2
3 storey terrace housing/walk up apartments	35-50	The same as a Cross Laminated Timber walk up apartment	70 kWh/m2
4 storey walk up apartments	50-100	The same as Highbury Triangle Building D	70 kWh/m2
Multi storey lifted apartments	100+	The same as Highbury Triangle Building D	70 kWh/m2

An approximate estimate of the expected density of development in the Tāmaki Makaurau Auckland is calculated based on the adjusted I-11.6 projections and calculated for each zone within the MSM model. Once the expected density by MSM zone is ascertained, the carbon emissions of constructing dwellings in each zone can be calculated. Each zone is assigned a building typology, dwelling size (m²/dwelling), and carbon emissions factor for buildings (kgCO₂e/m²) based on the expected density of development in the area.

The average dwelling size per zone and the average carbon emissions from constructing new dwellings in each zone are multiplied together to give the average carbon emissions of building one dwelling. This is then multiplied by the change in number of households within the zone and the summed up across the whole city to provide total emissions for Tāmaki Makaurau Auckland.

¹²Source - ALR Whole of Life Carbon Assessment Methodology – TOC1

Appendix A Data sources

The main data sources that have been used to inform the Do Minimum scenario are outlined below, to note this list is not exhaustive but outlines the key sources of information:

- I-11.6 land use projections from the Auckland Unitary Plan;
- MSM transport model from Auckland Forecasting Centre;
- Auckland Transport operational and maintenance rates for both the network and public transport;
- Kāinga Ora utilities cost, and carbon emission rates used to establish enabling infrastructure emissions as well as household emissions;
- Vehicle Emissions Prediction Model (VEPM) developed by Waka Kotahi NZ Transport Agency and Auckland Council; and
- Vehicle Fleet Emissions Model (VFEM) developed by the Ministry of Transport which details the vehicle fleet profile used in the MSM model.

Appendix B Do Minimum transport projects and assumptions within the Macro Strategic Model

			Do Minimum Model Years			
#	Project Name	Category	2031	2041	2051	2065
1	Te Whau Pathway (Auckland Council)	Active	Y	Y	Y	Y
2	Urban Cycleways Programme (AT)	Active	Y	Y	Y	Y
3	Northern Pathway (Waka Kotahi/NZUP) (Westhaven to Akoranga)	Active	Y	Y	Y	Y
4	Glen Innes to Tāmaki cycleway (AT/Waka Kotahi)	Active	Y	Y	Y	Y
5	Māngere Cycleway (Airport Access) (AT)	Active	Y	Y	Y	Y
6	Greenfield transport infrastructure – Northwest (AT) and Northwest Growth Improvements (AT)	Greenfield	Y	Y	Y	Y
7	Drury Local Road Improvements (AT)	Greenfield	Y	Y	Y	Y
8	Sandspit Link Road	Greenfield	X	Y	Y	Y
9	Western Link Road	Greenfield	X	X	Y	Y
10	Wider Western Link	Greenfield	X	X	Y	Y
11	New arterial connection between Milldale and Grand Drive	Greenfield	X	X	Y	Y
12	Upgrade Pine Valley Road, Wainui Road, Dairy Flat Highway and Bawden Road to urban standards including walking and cycling	Greenfield	X	X	Y	Y
13	New arterial connection from Dairy Flat Highway to Penlink via Jackson Way	Greenfield	X	X	Y	Y
14	New arterial connection between Bawden Road and SH1	Greenfield	Y	Y	Y	Y
15	New full interchange at SH1/Redvale (Penlink)	Greenfield	X	X	Y	Y
16	New SH1 crossing near Dairy Stream	Greenfield	X	X	Y	Y
17	New motorway interchange at SH1/Wilks Road	Greenfield	X	X	Y	Y
18	New north-south arterial 'Postman Road extension' from Dairy Flat Highway near Silverdale to Wilks Road – two lanes each direction	Greenfield	X	X	Y	Y
19	Postman Road added as new arterial – two lanes each direction	Greenfield	X	Y	Y	Y
20	Upgrade Access and Station Roads - Access Road widened to two lanes each direction	Greenfield	X	Y	Y	Y

Do Minimum Model Years

#	Project Name	Category	2031	2041	2051	2065
21	Upgrade Coatesville-Riverhead Highway between SH16 and Riverhead - Coatesville-Riverhead Highway widened to two lanes each direction	Greenfield	✗	✓	✓	✓
22	Northside Drive extension to Nixon	Greenfield	✓	✓	✓	✓
23	Fred Taylor Drive Upgrade	Greenfield	✗	✓	✓	✓
24	Fred Taylor Drive and Don Buck Road Upgrade	Greenfield	✓	✓	✓	✓
25	New east west connections from Nelson Road to Fred Taylor Drive	Greenfield	✗	✓	✓	✓
26	New east west connections from Nelson Road to Fred Taylor Drive	Greenfield	✗	✓	✓	✓
27	New north south connection from the east-west connection (I2) to Royal Road - New arterial – one lane each direction	Greenfield	✗	✓	✓	✓
28	Upgrade and extension of Spedding Road	Greenfield	✗	✓	✓	✓
29	Dunlop Road extension - New arterial – one lane each direction	Greenfield	✗	✓	✓	✓
30	Royal Road upgrade from Don Buck Road to SH16 - Royal Road widened to two lanes each direction	Greenfield	✗	✓	✓	✓
31	Māmari Road upgrade and extension	Greenfield	✗	✓	✓	✓
32	Upgrade Brigham Creek Road - Brigham Creek Road widened to two lanes each direction	Greenfield	✓	✓	✓	✓
33	Trig Road upgrade	Greenfield	✗	✓	✓	✓
34	Trig Road upgrade	Greenfield	✗	✓	✓	✓
35	Upgrade Hobsonville Road and Fred Taylor Drive between SH18 and Don Buck Road - Widen Hobsonville Road to two lanes each direction	Greenfield	✗	✓	✓	✓
36	Matahaka Link Road (AT)	Local roads	✓	✓	✓	✓
37	Wainui Improvements (AT)	Local roads	✓	✓	✓	✓
38	Glenvar Road / East Coast Road intersection and corridor improvements (AT)	Local roads	✓	✓	✓	✓
39	Medallion Drive Link (AT)	Local roads	✓	✓	✓	✓
40	Huapai Improvements (AT)	Local roads	✓	✓	✓	✓
41	Lake Road/Esmonde Road Improvements (AT)	Local roads	✓	✓	✓	✓
42	Smales / Allens Road Widening and Intersection Upgrade (AT)	Local roads	✓	✓	✓	✓
43	Network Performance -East Tamaki Road/Ormiston Road/Preston Road (AT)	Local roads	✓	✓	✓	✓
44	Ormiston Town Centre Link (AT)	Local roads	✓	✓	✓	✓

Do Minimum Model Years

#	Project Name	Category	2031	2041	2051	2065
45	Network Performance - Pukekohe Dual Signals (Manukau / Massey / King / Stadium and East / Stadium) (AT)	Local roads	Y	Y	Y	Y
46	Wynyard Quarter Integrated Road Programme (AT)	Local roads	Y	Y	Y	Y
47	Carrington Road Improvements (AT)	Local roads	Y	Y	Y	Y
48	Wolverton Culverts (AT)	Local roads	Y	Y	Y	Y
49	Matakanā Link Road	Local roads	Y	Y	Y	Y
50	Hill Street improvements	Local roads	X	Y	Y	Y
51	Upgrade East Coast Road from Silverdale to Redvale Interchange	Local roads	X	X	Y	Y
52	Upgrade southern section of Dairy Flat Highway	Local roads	Y	Y	Y	Y
53	New Argent Lane connection and Milldale to Highgate SH1 crossing	Local roads	X	Y	Y	Y
54	Northside Drive East	Local roads	X	Y	Y	Y
55	Upgrade Mahia Road and Popes Road	Local roads	X	X	Y	Y
56	Upgrade Mahia Road and Popes Road	Local roads	X	X	Y	Y
57	Upgrade Mahia Road and Popes Road	Local roads	X	X	Y	Y
58	Upgrade Opaheke Road and Ponga Rd	Local roads	X	X	Y	Y
59	New arterial between Papakura industrial area to Waihoehoe Road	Local roads	X	X	Y	Y
60	Upgrade Jesmond Road, Bremner Road, and Waihoehoe Road	Local roads	X	X	Y	Y
61	Upgrade Jesmond Road, Bremner Road, and Waihoehoe Road	Local roads	X	Y	Y	Y
62	Pukekohe Ring Road	Local roads	X	X	Y	Y
63	Upgrade Mill Road, Pukekohe	Local roads	Y	Y	Y	Y
64	Puhoi-Warkworth (Waka Kotahi)	Major roads	Y	Y	Y	Y
65	Penlink (Waka Kotahi / NZUP)	Major roads	Y	Y	Y	Y
66	SH16 Brigham Creek-Waimauku (Waka Kotahi)	Major roads	Y	Y	Y	Y
67	SH18 Squadron Drive Interchange Upgrade (Waka Kotahi)	Major roads	Y	Y	Y	Y
68	Network Performance - Mount Wellington Highway/SH1 Southbound Onramp (AT)	Major roads	Y	Y	Y	Y
69	SH20B Improvements (Waka Kotahi)	Major roads	Y	Y	Y	Y
70	Mill Road Corridor (Waka Kotahi/NZUP) - Northern section and road improvements	Major roads	Y	Y	Y	Y

Do Minimum Model Years

#	Project Name	Category	2031	2041	2051	2065
71	State Highway 1 Papakura to Drury South (Waka Kotahi/NZUP)	Major roads	Y	Y	Y	Y
72	Optimisation Programme - The Strand Special Vehicle Lane (Waka Kotahi)	Major roads	Y	Y	Y	Y
73	SH18 Hobsonville - local improvements	Major roads	X	Y	Y	Y
74	Warkworth to Wellsford	Major roads	X	X	Y	Y
75	Mill Road Corridor	Major roads	Y	Y	Y	Y
76	Upgrade to the State Highway 16 and State Highway 18 interchange	Major roads	X	X	Y	Y
77	SH1 Warkworth Southern interchange	Major roads	Y	Y	Y	Y
78	Ara Tuhono Puhoi to Warkworth SH1 motorway	Major roads	X	X	Y	Y
79	Ara Tuhono Warkworth to Wellsford SH1 motorway	Major roads	Y	Y	Y	Y
80	Additional managed motorway capacity between Albany and Silverdale	Major roads	X	X	X	Y
81	Additional managed motorway capacity between Albany and Silverdale	Major roads	X	X	X	Y
82	Additional managed motorway capacity between Albany and Silverdale	Major roads	X	Y	Y	Y
83	Penlink	Major roads	X	Y	Y	Y
84	Alternative State Highway 16 Corridor - New 'Kumeu Bypass' arterial – two lanes each direction	Major roads	X	Y	Y	Y
85	SH16-SH18 connections, +new shared paths	Major roads	X	Y	Y	Y
86	SH16/Northside Drive I/C	Major roads	X	Y	Y	Y
87	SH18 / Squadron Drive interchange	Major roads	Y	Y	Y	Y
88	Mill Road Corridor (2028)	Major roads	X	X	Y	Y
89	Mill Road Corridor (2028)	Major roads	X	X	Y	Y
90	Mill Road Corridor (2028)	Major roads	X	X	Y	Y
91	Mill Road Corridor (2028)	Major roads	X	X	Y	Y
92	Mill Road Corridor (2038)	Major roads	X	X	Y	Y
93	SH1 south upgrades	Major roads	X	X	Y	Y
94	Upgrade Drury West Section of SH22	Major roads	X	X	X	Y
95	Connections for SH22 to the Pukekohe Expressway	Major roads	X	X	X	Y
96	New Pukekohe Expressway connecting Pukekohe to SH1	Major roads	X	X	Y	Y
97	SH1 Papakura to Bombay Project	Major roads	X	X	Y	Y


Do Minimum Model Years

#	Project Name	Category	2031	2041	2051	2065
98	SH1 Papakura to Bombay Project	Major roads	Y	Y	Y	Y
99	Northern Corridor (inc. busway extension) (Waka Kotahi)	Multimodal	Y	Y	Y	Y
100	Connected Communities (AT)	Multimodal	Y	Y	Y	Y
101	Rodney Targeted Rate - Warkworth Community Transport Hub (AT)	PT	Y	Y	Y	Y
102	Rosedale Road Corridor (AT)	PT	Y	Y	Y	Y
103	Rosedale and Constellation Bus Stations (AT)	PT	Y	Y	Y	Y
104	Northern Busway Enhancements (AT)	PT	Y	Y	Y	Y
105	Northwest Interim Bus Improvements (AT/CRRF)	PT	Y	Y	Y	Y
106	Lincoln Road Corridor Improvements (AT)	PT	Y	Y	Y	Y
107	Public Transport Minor Capital Improvements - Neighbourhood Interchanges (AT)	PT	Y	Y	Y	Y
108	Matiatia Park and Ride (AT)	PT	Y	Y	Y	Y
109	Network Performance - Maioro Street Dynamic Bus Lane (AT)	PT	Y	Y	Y	Y
110	Sylvia Park Bus Improvements (AT)	PT	Y	Y	Y	Y
111	Airport to Botany Interim Bus Improvements (AT)	PT	Y	Y	Y	Y
112	Downtown Crossover Bus Facilities (AT)	PT	Y	Y	Y	Y
113	Midtown Bus Improvements (AT)	PT	Y	Y	Y	Y
114	Albert and Vincent Street Bus Priority Improvements (AT)	PT	Y	Y	Y	Y
115	Downtown Ferry Basin Redevelopment (AT)	PT	Y	Y	Y	Y
116	Warkworth South Bus Interchange	PT	X	X	Y	Y
117	Bus shoulder lanes from Albany to Silverdale (interim)	PT	X	Y	Y	Y
118	High frequency bus route connecting Orewa and Silverdale with the Rapid Transit corridor	PT	X	X	X	Y
119	Minor enhancements to bus lanes along Great South Road	PT	X	X	Y	Y
120	New bus lanes	PT	X	X	Y	Y
121	Wiri to Quay Park (KiwiRail/NZUP)	Rail	Y	Y	Y	Y
122	Papakura Rail Station Park and Ride (AT)	Rail	Y	Y	Y	Y
123	Drury Stations (KiwiRail / NZUP)	Rail	Y	Y	Y	Y

Do Minimum Model Years

#	Project Name	Category	2031	2041	2051	2065
124	Papakura to Pukekohe Electrification (KiwiRail/NZUP)	Rail	Y	Y	Y	Y
125	Level Crossing Removal – Group 1 (AT)	Rail	Y	Y	Y	Y
126	Pukekohe electrification, third main Westfield-Wiri and further new electric trains	Rail	X	Y	Y	Y
127	Closure of road level crossings to vehicles	Rail	Y	Y	Y	Y
128	Grade separation of level crossings	Rail	Y	Y	Y	Y
129	New Drury Central Train Station (with park and ride)	Rail	Y	Y	Y	Y
130	New Drury West Train Station (with park and ride)	Rail	Y	Y	Y	Y
131	New Paerata Train Station (with park and ride)	Rail	X	X	Y	Y
132	Rail electrification – Papakura to Pukekohe	Rail	Y	Y	Y	Y
133	Eastern Busway (AT)	RTN	Y	Y	Y	Y
134	City Rail Link (CRL) and CRL Road Side Projects (AT)	RTN	Y	Y	Y	Y
135	Airport to Botany	RTN	X	X	Y	Y
136	Cross-isthmus rapid transit – New Lynn to Penrose and Onehunga	RTN	X	X	Y	Y
137	Ellerslie to Panmure eastern busway extension	RTN	X	X	Y	Y
138	SH18 Upper harbour (Westgate to Albany) / Hobsonville rapid transit	RTN	X	X	Y	Y
139	Upper Harbour Rapid Transit (Westgate to Hobsonville)	RTN	X	X	Y	Y
140	Upper Harbour Rapid Transit (Westgate to Hobsonville)	RTN	X	X	Y	Y
141	Dome Valley Safety Improvements (Waka Kotahi)	Safety	Y	Y	Y	Y
142	Safety Programme - Matakana Road (Melwood Drive to Green Road) (AT)	Safety	Y	Y	Y	Y
143	Safety Programme – Hibiscus Coast Highway (Hatfields Bridge to Waiwera Road) (AT)	Safety	Y	Y	Y	Y
144	Safety Programme - Devonport Town Centre (AT)	Safety	Y	Y	Y	Y
145	Manurewa (Coxhead Quadrant) (AT)	Safety	Y	Y	Y	Y
146	Popes Porchester Intersection (AT)	Safety	Y	Y	Y	Y
147	Waiuku Road corridor (Colombo Road to Domain Road) (AT)	Safety	Y	Y	Y	Y
148	Fanshawe Street (AT)	Safety	Y	Y	Y	Y
149	Hobson Street / Nelson Street (AT)	Safety	Y	Y	Y	Y

Do Minimum Model Years

#	Project Name	Category	2031	2041	2051	2065
150	Glenfield Road (AT)	Safety	Y	Y	Y	Y
151	Onewa Road (AT)	Safety	Y	Y	Y	Y
152	Ash Street and Rata Street (AT)	Safety	Y	Y	Y	Y
153	Mt Albert Road (AT)	Safety	Y	Y	Y	Y
154	Atkinson Avenue (AT)	Safety	Y	Y	Y	Y
155	Takanini School Road / Manuroa Road Intersection (AT)	Safety	Y	Y	Y	Y
156	Tamaki Drive / Ngapipi Road safety improvements (AT)	Safety	Y	Y	Y	Y
157	Meadowbank Kohimarama Connectivity Project (AT)	Other	Y	Y	Y	Y
158	Projects Supporting Auckland Housing Programme (Tamaki) (AT) and Tamaki Regeneration (AT)	Other	Y	Y	Y	Y
159	Projects Supporting Auckland Housing Programme (Roskill) (AT)	Other	Y	Y	Y	Y
160	Projects Supporting Auckland Housing Programme (Mangere) (AT)	Other	Y	Y	Y	Y
161	Scott Point Repayment (AT)	Other	X	Y	Y	Y