

11 February 2019

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**Local Government Official Information and Meetings Act 1987**

**CAS-960466-K8Y3R8**

This letter is in response to your recent follow up to the above LGOIMA request regarding the Stage Timing Model used in the Central Access Programme study.

Although we initially were unable to provide the model itself due to concerns regarding intellectual property, Auckland Transport has been in discussions with MRCagney (the creators of the model) about its release. We are now able to provide a copy of the model as requested. Please note that a large number of different scenarios were tested with the model and although we expect this is the most recent version of the scenarios, the numbers in this spreadsheet may not match the final report outputs.

As the model is being released, we will not respond to your queries regarding its withholding, however responses to your further questions are below:

**1) Can AT confirm if it holds a copy of the Stage Timing Model?**

AT has a copy – the same copy is attached.

**2) Who else was provided with a copy of, or direct access to, the Stage Timing Model?**

Only AT and MRCagney have access to the model.

**3) Can AT provide a copy of the contract, letter of engagement and/or similar work specifications to MR Cagney that contained the detailed requirements for the Stage Timing Model?**

A copy of the relevant contract is attached. There were few detailed requirements in the contract. The model was developed as the project evolved.

**4) Can AT provide a copy of the contract, letter of engagement and/or similar work agreement with MR Cagney that authorised them to develop the Stage Timing Model for AT?**

This is the same contract attached in response to question 3. This covers the development of a spreadsheet-based model to test scenarios.

- 5) **Can AT provide a copy of the report or document which states the work by MR Cagney on producing the Stage Timing Model was complete?**

The satisfactory completion of outputs were the desired product, not the completion of a model, so there is no document recording the completion of the model as such.

- 6) **Has the Stage Timing Model been reviewed by AT and, if so, can I please have a copy of any report, presentation and/or correspondence about the AT review and its findings?**

AT reviewed the methodology and the model outputs, rather than the model itself, however AT provided the details of bus services as inputs and was involved in discussions to develop the model. The summary methodology paper is attached.

- 7) **Has the Stage Timing Model been independently reviewed and, if so, can I please have a copy of any report, presentation and/or correspondence with the independent reviewers about the independent review and its findings?**

The model itself was not peer reviewed, although the overall Central Access Programme was peer reviewed by Aurecon.

- 8) **Was direct access to the Stage Timing Model provided to the peer reviewer of the Centre City Access Plan?**

Access was available at the time, but the peer reviewer did not request it.

We trust the above information has addressed the matters raised however, should you believe that we have not responded appropriately to your request, you have the right in accordance with section 27(3) of the LGOIMA to make a complaint to the Office of the Ombudsman to seek an investigation and review in regard to this matter.

If you have any further queries, please contact Chris Morgan on (09) 355 3553 during business hours, quoting Local Government Official Information request number **CAS-960466-K8Y3R8**.

Yours sincerely

  
**Cynthia Gillespie**  
**Executive General Manager - Planning & Investment Group**

Encl.

TITLE : Stage Timing Model Summary and Background  
DATE : 27 January 2016  
PREPARED BY : Ross Savedge, Rachel Lees-Green (MRCagney)  
STATUS : *Internal working draft for AT Metro review*

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## 1 Executive Summary

The Stage Timing Model (STM) was developed to provide guidance about when each stage of the proposed Light Rail Transit (LRT) network should be built, by identifying when bus volumes at stops on key city centre corridors exceed operational capacity. The capacity for bus operations can be determined by the capacity of terminals, roads (including signal capacity), or bus stops. This study looks at bus stop capacity because in the Auckland city centre bus stops are considered to be the most constrained factor. Bus stop capacities were determined with AT Metro based on operational and network legibility considerations. However, the capacities do not take into account urban amenity thresholds, which may present a lower limit for bus volumes.

The STM identifies the year in which city centre bus stops exceed capacity within the study period of 2016–2046. Inputs to the STM are derived from the *Bus Reference Case* (BRC), including bus stop operational capacities, bus volumes and routing, as described in Section 3.1: Stage Timing Model Inputs. The basis for the bus stop operational capacities and sizes defined in the BRC was documented in the *Stop Capacity Methodology* and *Bus Stop Monitoring* memos. The key outcomes used for the STM were the stop capacities:

- 16 vehicles per hour for a single stop,
- 33 vehicles per hour for a double stop, and
- 53 vehicles per hour for a triple stop.

These stop capacities were based on a 10% stop failure rate (as defined in the TCQSM<sup>1</sup>), which means that one in ten buses will be unable to pull into a stop because all designated spaces are occupied.

The STM can use the event of a stop exceeding capacity in a given year to trigger implementation of infrastructure and/or operational changes in that year, such as relocating buses from a stop that exceeds capacity to a stop with spare capacity. Section 3.2: Stage Timing Model Rules: Triggers and Actions describes the full range of triggering events and resultant actions that can be specified in the STM.

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<sup>1</sup> Transit Cooperative Research Program (2013). Bus Transit Capacity. In *TCRP Report 165: Transit Capacity and Quality of Service Manual* (3rd ed.). Washington, DC: Transportation Research Board. Retrieved from <http://www.trb.org/Main/Blurbs/169437.aspx> on 22 January 2015.

The following table shows the year in which stops on each corridor are expected to exceed capacity and why, based on the original bus volumes and routing from the BRC.

<b>Corridor</b>	<b>Stop group(s) exceeding capacity</b>	<b>Year</b>	<b>Reason for exceeding capacity</b>	<b>Option to prolong corridor life</b>
<b>Wellesley Street</b>	Wynyard-bound routes (AM westbound); Crosstown/North Shore peak routes (AM eastbound)	2016 (2023)	Too many route groups using the stops; insufficient kerb space for an additional stop	Reconfigure the three stop groupings
<b>Symonds Street (Wellesley Street to K Road)</b>	Wynyard-bound routes (AM northbound)	2016	Too many route groups using the stop; limited to triple stops for customer service reasons	No option – total corridor volumes exceed total stop capacity on corridor (two triple stops)
<b>Symonds Street (Upper)</b>	All routes (AM northbound)	2016	Too many route groups using the stop; limited to triple stops for customer service reasons	No option – only one stop
<b>Albert Street</b>	All routes (AM northbound)	2016	Stops must be in-line; limited to triple stops for customer service reasons	No option – only one stop
<b>Fanshawe Street (Victoria Park)</b>	North Shore to Universities routes (AM eastbound); Isthmus/Link routes (AM westbound and eastbound)	2016	Limited to triple stops for customer service reasons; insufficient kerb space for required number of stops	Out of scope – assumed to be fixed as part of Wynyard-Fanshawe project
<b>K Road (Pitt Street to Ponsonby Road)</b>	All routes (AM eastbound)	2019	Stops must be in-line; limited to triple stops for customer service reasons	No option – only one stop
<b>Pitt Street</b>	All routes (AM northbound)	2044	Limited to triple stops for customer service reasons	No option – only one stop

Several options were considered for prolonging the life of Wellesley St by reconfiguring which routes use which bus stops. Taking into account network legibility and customer service as well as stop capacities, the best available option uses the following three stop groupings:

- NEX & Grafton (triple stop);
- Upper Symonds & North Shore peak (triple stop); and
- North Shore & Crosstown (double stop).

Details of which routes use each stop group are provided in Section 5.2.5: Option 4b: Low Legibility, Exceeds Capacity Immediately.

# Auckland Light Rail

With this configuration, the number of buses using the Upper Symonds & North Shore peak stop in the peak exceed capacity by one from 2016–2022. Bus volumes at this stop grow from 2023 onwards. Although bus volumes exceed capacity from 2016, Option 4b provides a significant improvement in legibility over Option 4a (in which all stops remain below capacity until 2027) and is therefore proposed as the preferred option for Wellesley Street.

If Dominion and Sandringham Road buses are removed from the city centre—for example, if LRT is built on those two corridors—bus volumes on Symonds and Wellesley Streets are reduced and new bus stop configuration options become available.

Removing Dominion Road buses has the following impacts on when stops exceed capacity:

Corridor	Stop group(s) exceeding capacity	Option to prolong corridor life	Year
<b>Wellesley Street</b>	Crosstown/North Shore peak routes (AM eastbound)	Reconfigure the three stop groupings	2016 (2032)
<b>Symonds Street (Wellesley to K Rd)</b>	Wynyard-bound routes (AM northbound)	Relocating inbound Manukau Rd buses to the Britomart-bound stop (drop-off only) postpones when the Wynyard-bound stop exceeds capacity to 2032	2019 (2032)
<b>Symonds Street (Upper)</b>	All routes (AM northbound)	No option – only one stop	2024

The preferred option for prolonging the life of Wellesley St stops in the scenario without Dominion Road uses the following stop groupings:

- Eastbound:
  - North Shore (all-day services);
  - Upper Symonds & Crosstown (plus North Shore peak-only services);
  - Grafton (plus Hibiscus Coast express services);
- Westbound:
  - North Shore (all-day services);
  - Isthmus (plus North Shore peak-only and Hibiscus Coast express services);
  - Crosstown (plus Gillies Ave and Manukau Rd services, drop-off only).

Details of the specific routes using each stop group are provided in Section 5.3.2: Wellesley St Option 5.

Following removal of Dominion Road buses, the Wynyard-bound stop on Symonds Street (between Grafton Bridge and Wellesley Street) still exceeds capacity in 2019 during the AM peak. This could be postponed by assigning the Manukau Rd buses to use the Britomart-bound stop (drop-off only). This option is shown in the Appendix (5.7 Symonds St Bus Volumes).

A different route grouping is used in the southbound direction between Grafton Bridge and Wellesley Street (i.e., Grafton-bound and Upper Symonds St-bound) and on Upper Symonds St. The Upper Symonds St stop exceeds capacity in the peak direction in 2024.

**With this configuration, the stops on Wellesley Street remain below capacity until 2032, when bus volumes exceed capacity at the Isthmus (westbound) and Upper Symonds & Crosstown**

**(eastbound) stop groups. On Symonds Street, the stop grouping with Upper Symonds Street routes exceeds capacity in 2024.**

Removing both Dominion and Sandringham Road buses has the following impacts:

Corridor	Stop group(s) exceeding capacity	Option to prolong corridor life	Year
<b>Wellesley Street</b>	Crosstown/North Shore peak routes (AM eastbound)	Reconfigure the three stop groupings	2016 (2042)
<b>Symonds Street (Wellesley to K Rd)</b>	None	Bus volumes remain below capacity for the duration of the study period	>2046
<b>Symonds Street (Upper)</b>	None	Bus volumes remain below capacity for the duration of the study period	>2046

In the scenario without Dominion or Sandringham Road, the following stop groupings are proposed for prolonging the life of Wellesley St stops:

- North Shore (all-day services);
- Isthmus (plus North Shore peak-only services); and
- Crosstown (plus Hibiscus Coast express services).

Details of the specific routes using each stop group are provided in Section 5.4.2: Wellesley St Option 6.

**With this configuration, all stops on Wellesley Street remain below capacity until 2042, at which point the Crosstown stop group goes over capacity, and stops on Symonds Street remain below capacity beyond 2046.**

In conclusion, this study found that the life of bus stops on key city centre corridors cannot be prolonged without compromising on either operational stop capacities or legibility for customers. On the other hand, removing Dominion Road and Sandringham Road buses can prolong the life of stops on Wellesley and Symonds Streets to 2042.

# Auckland Light Rail

## 2 Introduction

The Stage Timing Model (STM) was developed to provide guidance about when each stage of the proposed Light Rail Transit (LRT) network should be built, based on information about bus volumes and bus stop capacities on corridors and at terminals in the city centre.

This initial phase of work with the STM aims to identify when bus stops on key city centre corridors exceed capacity. The capacity for bus operations can be determined by the capacity of terminals, roads (including signal capacity), or bus stops. This study looks at bus stop capacity because in the Auckland city centre bus stops are considered to be the most constrained factor.

Bus stop capacities were developed with AT Metro based on operational and network legibility considerations. However, the capacities do not take into account urban amenity thresholds, which may present a lower limit for bus volumes.

*This memo is an internal working document intended for review by AT Metro Bus Services. The text and findings of this document are considered to be draft and are not for wider circulation until agreed by AT Metro.*

## 3 Methodology

### 3.1 Stage Timing Model Inputs

The STM inputs are derived from the Bus Reference Case (BRC). The assumptions underlying the BRC are described in more detail in Section 4.2.

The following data are required for each year from 2016–2046:

- (i) Bus volumes: Vehicle volumes for each route, split into peak-direction and counter-peak/all-day volumes. This can be based on planned supply (as in the BRC) or calculated based on predicted demand using:
  - a. Passenger demands for each route; and
  - b. Planned vehicle capacities on each route (single-decker, double-decker).
- (ii) Routing: Which stop groups each bus route in city centre use on each of the corridors they run through and the termini they use.
- (iii) Route groups: A labelling system that allows multiple routes to be grouped according to criteria such as their origin.
- (iv) Corridor stop capacities: The capacities of stop groups on each corridor in each direction, as detailed in the BRC.
- (v) Terminus stop capacities: The capacities of each stop group within a terminus, based on planned capacities at Britomart, and a review of the likely scale of termini at Wynyard Quarter and the Learning Quarter, as detailed in the BRC.

### 3.2 Stage Timing Model Rules: Triggers and Actions

Based on the input data, rules are developed to specify infrastructure and/or operational changes that will occur when particular criteria are met. Each rule contains one trigger and one or more actions. There are seven types of rule triggers:

- (i) Reach given year;
- (ii) Exceed given percent of stop capacity at a stop on a corridor;
- (iii) Exceed given bus volume at a corridor stop;
- (iv) Drop below given bus volume at a corridor stop;
- (v) Exceed given percent of stop capacity at a stop at a terminus;
- (vi) Exceed given bus volume at a terminus stop; and
- (vii) Drop below given bus volume at a terminus stop.

For each rule, a set of actions must also be specified. When a trigger condition is met, the actions associated with the rule are implemented. The following rule actions are available to choose from:

- (i) Modify the capacity of a corridor stop group;
- (ii) Modify the capacity of a terminus stop group;
- (iii) Remove a route or route group from a set of corridor stop groups;
- (iv) Remove a route or route group from a set of terminus stop groups;
- (v) Add a route or route group to a set of corridor stop groups;
- (vi) Add a route or route group to a set of terminus stop groups; and
- (vii) Change the capacity of vehicles on a route or route group.

The “remove route” and “add route” actions can be used in combination to reassign routes from their existing corridor or terminus stop groups to other stop groups on the same or different corridors/termini.

The following are examples of rule triggers and actions described in sentences:

- Year: “In 2022 the CRL becomes operational: remove western and southern peak express bus routes from the network.”
- Stop capacity on a corridor: “If bus volumes at the Albert St northbound stop exceed 100% of the stop capacity, remove the Richmond Road buses (route 105) from Albert St and the West/Northwest stop group of the Britomart West terminus, and reroute to use the Wellesley St Crosstown stop groups and the Learning Quarter terminus.”
- Stop capacity at a terminus: “If bus volumes at the Wynyard Quarter terminus exceed 100% of the terminus capacity, implement LRT on Queen St and Dominion Rd; remove Dominion Rd buses from Symonds St, Wellesley St, and the Wynyard Quarter terminus; remove City Link buses from Queen St; and realign SkyBus from Queen St to Albert St.”



Note that the same trigger can be used for multiple rules, e.g., capacity at the Symonds St Wynyard-bound stop group can be used as a trigger for LRT to Dominion Rd and for LRT to Sandringham Rd. Similarly, the same set of actions can have multiple triggers, e.g., LRT to Dominion Rd could be triggered when the year is 2022 or when either the Symonds St Wynyard-bound stop group or the Wellesley St Wynyard-bound stop group exceeds capacity.

The number of years a rule will take to implement can also be specified. The default assumption is that, in general, only one major intervention can be implemented each year. However, for interventions that do not require any new infrastructure, the number of years can be set to zero, allowing more than one change to be implemented in the same year. Conversely, if infrastructure is expected to take more than one year to build, a higher number of years can be specified and no further interventions will be triggered until that time is finished.

The order of the rules determines the order in which they are tested and implemented. Therefore the easiest and most affordable interventions should be listed first, followed by larger, more expensive interventions.

## 4 Assumptions

### 4.1 Stage Timing Model Assumptions and Caveats

#### 4.1.1 Flexibility of Timing

The year each rule triggers in the STM provides a general guideline for the timing of each intervention, rather than a fixed date. The actual stage timing can be delayed or accelerated depending on operational requirements.

The default trigger for bus stop capacities is when a stop on a corridor or at a terminus exceeds 100% of capacity. However, the capacity does not represent a threshold between a perfectly functioning network and a complete network failure. Rather, the capacity of a stop is defined as the volume of buses for which no more than 10% of all buses are required to wait for a loading area to become available. If the capacity is exceeded by a few buses, a higher proportion of buses will queue at the stop but it will continue to function reasonably well. Thus an intervention could be delayed by a few years if a decrease in operational performance can be tolerated during that period.

On the other hand, if the aim is to implement changes *before* a stop goes over capacity, construction of large-scale infrastructure interventions like LRT must be started well in advance to ensure they are completed by the time they are required. Furthermore, construction will tend to reduce the space available in the city centre, so it is desirable to implement such changes while there is still spare capacity on the affected corridors.

#### 4.1.2 Interval between Interventions

The STM allows the number of years between interventions to be assigned. For example, each LRT stage is likely to take at least two years to build. Conversely, operational interventions, like reassigning buses to different corridors or stop groups, require relatively little time and investment to implement so multiple interventions could be effected in one year.

## 4.2 Business-as-Usual: The Bus Reference Case

The business-as-usual scenario includes all the current projects that are programmed or underway in the city centre:

- New Network redesign and efficiency improvements;
- City Rail Link (CRL);
- Double-deckers on major corridors;
- New bus terminals at Wynyard Quarter and the Learning Quarter;
- Reconfiguration of Britomart terminals; and
- A new “street busway” corridor on Wellesley St.

The bus volumes and stop capacities anticipated in the city centre with these projects are documented in the Bus Reference Case (BRC).

### 4.2.1 Planned Bus Network Changes

The STM assumes that the New Network is in place for the duration of the modelled period from 2016 to 2046. Bus routing in the city centre is assumed to follow the alignments proposed in the New Network Central Suburbs consultation.

It is assumed that CRL construction will be completed in 2022 and, as a result, various changes will be made to the bus network independent of changes implemented as part of rules defined in the STM. The following bus network changes will occur upon completion of the CRL:

- Remove West Express buses from the Albert St corridor and Britomart West terminus (with passengers instead transferring at Glen Eden, New Lynn, and Avondale Stations); and
- Discontinue the 360X Papakura to City express bus service.

Note that the Bus Reference Case assumed New North Rd buses would be realigned to Newmarket when the CRL opened, to maintain a connection between the west and Grafton/Newmarket. However, a Henderson–Otahuhu rail service is now planned to provide this connection, so New North Rd buses will instead continue to terminate at Wynyard Quarter in the city centre.

### 4.2.2 Planned Infrastructure Improvements

As part of a business-as-usual scenario, several bus infrastructure improvements are proposed for the city centre in order to accommodate the anticipated bus volumes using key corridors and termini. The business-as-usual improvements are detailed in Table 1 below.

Table 1: Surface bus improvements proposed as part of the Basic Network.

Project	Description	Year	Estimated budget
<b>CBD Bus Infrastructure – Learning Quarter</b>	Better on-street bus infrastructure on Symonds St and potential for a terminus/layover facility for North Shore services.	2021/22	\$7m
<b>Downtown Interchange</b>	Redesign and expansion of bus facilities around Britomart as more effective bus-to-bus interchange.	2021/22	\$20m
<b>CBD Bus Infrastructure – Fanshawe St</b>	Bus priority measures on Fanshawe St and Customs St.	2022/25	\$30m
<b>Wynyard Bus Interchange</b>	Off-road bus interchange on southern fringes of Wynyard Quarter – provides terminus facilities for buses using the Wellesley St corridor and allows connection between Britomart and Wellesley services. Includes land acquisition.	2022/25	\$20m
<b>CBD Bus Infrastructure – Wellesley St</b>	Upgrade bus stop facilities and implement double bus lanes and bus priority measures on Wellesley St from Symonds St to Halsey St.	2023/24	\$15m
<b>Albert / Vincent St improvements</b>	Improving bus priority and providing continuous bus lanes to improve journey time and reliability between K Rd and Britomart.	Not in basic network	Not in basic network

### 4.2.3 Bus Reference Case Assumptions

The Bus Reference Case (BRC) sets out the existing plans and assumptions about the city centre bus networks and operations, including existing and projected bus volumes, proposed network changes and infrastructure projects. The implications for the corridor and terminus requirements in the city centre were discussed, along with physical constraints.

Bus stop operational capacities and sizes were defined in the BRC and the basis for these values was documented in the Stop Capacity Methodology and Bus Stop Monitoring memos. The key outcomes used for the STM were the stop capacities:

- 16 vehicles per hour for a single stop,
- 33 vehicles per hour for a double stop, and
- 53 vehicles per hour for a triple stop.

These stop capacities were based on a 10% stop failure rate (as defined in the TCQSM<sup>2</sup>), which means that one in ten buses will be unable to pull into a stop because all designated spaces are occupied.

Terminus capacities were also provided in the BRC.

Bus volumes for the years 2018, 2026 and 2036 were provided by Auckland Transport for the BRC. For the purpose of the STM, these bus volumes were interpolated and extrapolated to provide bus volumes for the years 2016–2046 for each route entering the city centre. The BRC also outlined which corridors and termini would be used by each bus route. The vehicle type (e.g., single- or double-decker) and capacity of buses on each route were also provided.

## 5 Results: Bus Stop Configuration Options for Deferring when Stops Exceed Capacity

The Bus Reference Case (BRC) developed initial concepts for bus stop configurations for the New Network. This section builds on that work to refine those concepts with the aim of reducing delaying and reducing the extent to which bus stops exceed the operational capacities agreed on in the BRC. **This section presents a series of bus stop configurations that are to be considered for approval by AT Metro; the agreed-upon configuration will be presented in the final version of this report.**

It should be noted that there is a trade-off between maintaining network legibility and postponing when stops exceed capacity. Shifting routes from stops that exceed capacity to different stops on the same corridor could prolong the life of stops on the corridor; however, it typically required network legibility to be compromised by separating routes that would optimally be grouped according to similarities in alignment or destination.

The impact of the bus stop configuration options are visualised using the STM.

### 5.1 Bus Stops Exceeding Capacity: Planned Network

The following table outlines the first year and stop at which corridors are expected to exceed capacity, based on planned morning peak service. Bus stops at other corridors in the city centre remain below capacity for the duration of the study period. Note that exceeding capacity in 2016 indicates that the stop capacity is exceeded from the very first year of the model; in reality, full implementation of the New Network is not expected until at least 2017.

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<sup>2</sup> Transit Cooperative Research Program (2013). Bus Transit Capacity. In *TCRP Report 165: Transit Capacity and Quality of Service Manual* (3rd ed.). Washington, DC: Transportation Research Board. Retrieved from <http://www.trb.org/Main/Blurbs/169437.aspx> on 22 January 2015.

Table 2: Year and stop(s) at which bus volumes exceed capacity on each corridor.

Corridor	Stop group(s)	Year	Reason for exceeding capacity	Option to prolong corridor life
<b>Wellesley Street</b>	Wynyard-bound routes (AM westbound); Crosstown/North Shore peak routes (AM eastbound)	2016	Too many route groups using the stops; insufficient kerb space for an additional stop	Reconfigure the three stop groupings
<b>Symonds Street (Wellesley Street to K Road)</b>	Wynyard-bound routes (AM northbound)	2016	Too many route groups using the stop; limited to triple stops for customer service reasons	No option – total corridor volumes exceed total stop capacity on corridor (two triple stops)
<b>Symonds Street (Upper)</b>	All routes (AM northbound)	2016	Too many route groups using the stop; limited to triple stops for customer service reasons	No option – only one stop
<b>Albert Street</b>	All routes (AM northbound)	2016	Stops must be in-line; limited to triple stops for customer service reasons	No option – only one stop
<b>Fanshawe Street (Victoria Park)</b>	North Shore to Universities routes (AM eastbound); Isthmus/Link routes (AM westbound and eastbound)	2016	Limited to triple stops for customer service reasons; insufficient kerb space for required number of stops	Out of scope – assumed to be fixed as part of Wynyard-Fanshawe project
<b>K Road (Pitt Street to Ponsonby Road)</b>	All routes (AM eastbound)	2019	Stops must be in-line; limited to triple stops for customer service reasons	No option – only one stop
<b>Pitt Street</b>	All routes (AM northbound)	2044	Limited to triple stops for customer service reasons	No option – only one stop

The following section presents stop configuration options for Wellesley St. Other corridors that exceeded capacity were not considered because total corridor volumes exceeded total stop capacity and this could not be remedied by altering stop configurations.

## 5.2 Bus Stop Configuration Options for Wellesley St: Planned Network

The baseline scenario is given by the bus stop configuration presented in the Bus Reference Case. The following table shows the stop groups on Wellesley St in the Bus Reference Case. Stop groupings are the same in each direction, with peak-only buses operating only in the peak direction.

Stop Groups	North Shore (Triple)	Isthmus (Triple)	Crosstown (Double)
Eastbound/Westbound	North Shore (all-day) to/from Universities	Isthmus to/from Wynyard	Crosstown, North Shore (peak-only) and Hibiscus Coast express

Bus stop capacity is exceeded immediately at the Crosstown and North Shore peak stop (eastbound in the AM peak and westbound in the PM peak).

The following sections present four options that were considered for prolonging bus stop life on Wellesley St while attempting to maintain an acceptable level of network legibility for customers. Each option presents an alternative way to group the routes using Wellesley St into two triple stops and a double stop.

Of the four options investigated, the first three were unable to postpone the date at which bus stop operational capacity is exceeded and are presented to demonstrate the bus volumes arising from more legible stop configurations. The fourth option postpones when bus stop capacity is exceeded on Wellesley St to 2027 by compromising on network legibility.

### 5.2.1 Option 1: High Legibility, Exceeds Capacity Immediately

Option 1 aims to reduce bus volumes and improve network legibility at the Crosstown/North Shore Peak stop by moving the Crosstown services to the Isthmus stop.

*Table 3: Bus stop route groupings for Wellesley St Option 1.*

Stop Groups	North Shore (Triple)	Isthmus (Triple)	North Shore Peak (Double)
Eastbound/Westbound	North Shore (all-day) to/from Universities;	Isthmus to/from Wynyard; Crosstown	North Shore (peak-only); Hibiscus Coast express

Bus volumes at each stop are shown in the Appendix (6.1 Option 1). This option does not change bus volumes at the Isthmus stop in the peak direction (AM westbound/PM eastbound) so it does not defer when stops exceed capacity on Wellesley St.

**Option 1 was discarded because it compromises legibility without improving the life of stops on Wellesley St.**

### 5.2.2 Option 2: High Legibility, Exceeds Capacity Immediately

Option 2 aims to reduce bus volumes at the Crosstown stop by moving North Shore peak-only services to the North Shore and Isthmus stops.

Table 4: Bus stop route groupings for Wellesley St Option 2.

Stop Groups	North Shore (Triple)	Isthmus (Triple)	Crosstown (Double)
Eastbound/Westbound	North Shore (all-day) to/from Universities; Hibiscus Coast express	Isthmus to/from Wynyard; North Shore (peak-only)	Crosstown

Bus volumes at each stop are shown in the Appendix (6.2 Option 2). This option does not change bus volumes at the Isthmus stop in the peak direction (AM westbound/PM eastbound) so it does not defer when stops exceed capacity on Wellesley St.

**Option 2 was discarded because it compromises legibility without improving the life of stops on Wellesley St.**

### 5.2.3 Option 3: Medium Legibility, Exceeds Capacity Immediately

Option 3 aims to reduce peak bus volumes at the Isthmus and Crosstown stops by shifting Isthmus services that travel east/south via Grafton Bridge to the Crosstown double stop and shifting North Shore peak-only services to the Isthmus triple stop.

Table 5: Bus stop route groupings for Wellesley St Option 3.

Stop Groups	North Shore (Triple)	Upper Symonds (Triple)	Crosstown & Grafton (Double)
Eastbound/Westbound	North Shore (all-day) to/from Universities	Isthmus via Upper Symonds St; North Shore (peak-only); Hibiscus Coast express	Isthmus via Grafton Bridge; Crosstown

Bus volumes at each stop are shown in the Appendix (6.3 Option 3).

This option does not sufficiently reduce bus volumes at either of the isthmus stops (Upper Symonds and Crosstown/Grafton). With this configuration, both stops start out exceeding capacity by one bus in the peak direction (AM westbound/PM eastbound). Thus the life of the stops on the corridor are not prolonged.

**Option 3 was discarded because it compromises legibility without improving the life of stops on Wellesley St.**

### 5.2.4 Option 4a: Low Legibility, Defers when Capacity is Exceeded

Option 4a aims to reduce peak bus volumes at the Isthmus and Crosstown stops by splitting the North Shore and Isthmus services across two triple stop groups. This option utilises the fact that the Isthmus and North Shore services peak in the opposite direction and are therefore complementary. However, doing so compromises on network legibility by separating routes with similar destinations across multiple stops and combining routes with diverse destinations at the same stop.

Table 6: Bus stop route groupings for Wellesley St Option 4a.

Stop Groups	NEX & Upper Symonds (Triple)	Grafton (Triple)	North Shore & Crosstown (Double)
<b>Eastbound</b>	NX2 <i>(to Universities)</i>	New North Rd <i>(to Upper Symonds St)</i>	Crosstown 4 <i>(to Parnell)</i>
	Dominion Rd Sandringham Rd <i>(to Upper Symonds St)</i>	Remuera Rd Manukau Rd Gillies Ave <i>(to Grafton)</i>	Jervois Rd Takapuna/Hillcrest <i>(to Universities)</i>
		North Shore peak-only Hibiscus Coast express <i>(to Universities)</i>	
Stop Groups	NEX & Upper Symonds (Triple)	North Shore & Grafton (Triple)	Crosstown (Double)
<b>Westbound</b>	NX2 <i>(to Northern Busway)</i>	New North Rd Remuera Rd Manukau Rd	Crosstown 4 Jervois Rd <i>(to College Hill)</i>
	Dominion Rd Sandringham Rd <i>(to Wynyard Quarter)</i>	Gillies Ave <i>(to Wynyard Quarter)</i>	Hibiscus Coast express n91 (North Shore peak) <i>(to North Shore)</i>
		Takapuna/Hillcrest North Shore peak-only <i>(to North Shore)</i>	

Bus volumes at each stop are shown in the Appendix (6.4 Option 4a).

**Option 4a defers when bus stops exceed capacity on Wellesley St to 2027. However, it provides an unacceptable reduction in network legibility and customer service.**

### 5.2.5 Option 4b: Low Legibility, Exceeds Capacity Immediately

Option 4a significantly compromises network legibility. It would be preferable to group eastbound New North Rd buses with Dominion and Sandringham Rd buses as all three of these routes travel via Upper Symonds St. This would enable the simplified and somewhat more legible grouping shown below for Option 4b.

However, the Dominion/Sandringham/New North Rd grouping results in 54 buses per hour at a stop with capacity for 53 buses per hour in the peak direction (westbound AM/eastbound PM), so the Upper Symonds & North Shore peak stop exceeds capacity by one bus from 2016. The same stop also exceeds capacity by one bus in the opposite direction (eastbound AM/westbound PM) from 2019. No stops exceed capacity by more than one bus until 2023.



Table 7: Bus stop route groupings for Wellesley St Option 4b.

Stop Groups	NEX & Grafton (Triple)	Upper Symonds & North Shore peak (Triple)	North Shore & Crosstown (Double)
<b>Eastbound</b>	NX2 <i>(to Universities)</i>	New North Rd Dominion Rd Sandringham Rd <i>(to Upper Symonds St)</i>	Crosstown 4 <i>(to Parnell)</i>
	Remuera Rd Manukau Rd Gillies Ave <i>(to Grafton)</i>	North Shore peak-only Hibiscus Coast express <i>(to Universities)</i>	Jervois Rd Takapuna/Hillcrest <i>(to Universities)</i>
Stop Groups	NEX & Grafton (Triple)	Upper Symonds & North Shore peak (Triple)	North Shore & Crosstown (Double)
<b>Westbound</b>	NX2 <i>(to Northern Busway)</i>	New North Rd Dominion Rd Sandringham Rd <i>(to Wynyard Quarter)</i>	Crosstown 4 Jervois Rd <i>(to College Hill)</i>
	Remuera Rd Manukau Rd Gillies Ave <i>(to Wynyard Quarter)</i>	North Shore peak-only Hibiscus Coast express <i>(to North Shore)</i>	Takapuna/Hillcrest <i>(to North Shore)</i>

Bus volumes at each stop are shown in the Appendix (6.5 Option 4b: Low Legibility, Exceeds Capacity Immediately).

**Option 4b significantly improves legibility when compared to Option 4a, but it does not defer when bus stops first exceed capacity on Wellesley St. However, stop capacity is exceeded by just one bus at the Upper Symonds & North Shore peak stop group from 2016–2022, so Option 4b is proposed as the preferred option for prolonging the life of Wellesley St.**

### 5.3 Bus Stop Configuration Options: Dominion Rd Buses Removed

This section shows the suggested bus stop configurations that can delay when stops on Symonds St and Wellesley St exceed capacity following the removal of Dominion Rd buses (e.g., to be replaced with light rail).

#### 5.3.1 Symonds St

Following removal of Dominion Rd buses, the Wynyard-bound stop on Symonds St (between Grafton Bridge and Wellesley St) still exceeds capacity in 2019 during the AM peak. This could be prevented by assigning the Manukau Rd buses to use the Britomart-bound stop (drop-off only). This option is shown in Appendix 6.8: Symonds St Bus Volumes (without Dominion Rd). **This enables the Wynyard-bound stop on Symonds St to remain within capacity until 2032.**

A different route grouping is used in the southbound direction between Grafton Bridge and Wellesley St (i.e., Grafton-bound and Upper Symonds St-bound) and on Upper Symonds St. **The Upper Symonds St stop exceeds capacity in the peak direction in 2024.**

### 5.3.2 Wellesley St Option 5

Option 5 aims to fit the Isthmus and Crosstown services into two stops—a double and a triple—while keeping the all-day North Shore services in a separate triple stop. The North Shore peak-only services are still fitted into the Isthmus/Crosstown stops because there is not sufficient capacity for them at the main North Shore stop.

*Table 8: Bus stop route groupings for Wellesley St Option 5 (without Dominion Rd buses).*

Stop Groups	North Shore (Triple)	Upper Symonds & Crosstown (Triple)	Grafton (Double)
<b>Eastbound</b>	North Shore (all-day) <i>(to Universities)</i>	Sandringham Rd New North Rd <i>(to Upper Symonds St)</i>  Crosstown 4 <i>(to Parnell)</i>  Jervois Rd North Shore peak-only <i>(to Universities)</i>	Remuera Rd Manukau Rd Gillies Ave <i>(to Grafton)</i>  Hibiscus Coast express <i>(to Universities)</i>
Stop Groups	North Shore (Triple)	Isthmus (Triple)	Crosstown (Double)
<b>Westbound</b>	North Shore (all-day) <i>(to Fanshawe St)</i>	Sandringham Rd New North Rd Remuera Rd <i>(to Wynyard Quarter)</i>  North Shore peak-only Hibiscus Coast express <i>(to North Shore)</i>	Crosstown 4 Jervois Rd <i>(to College Hill)</i>  Gillies Ave (drop-off only) Manukau Rd (drop-off only) <i>(to Wynyard Quarter)</i>

Note that the inclusion of Gillies Ave and Manukau Rd in the westbound Crosstown stop (as drop-off only) prevents the westbound Isthmus stop from exceeding capacity in 2023.

Bus volumes at each stop are shown in the Appendix (6.6 Wellesley St Option 5).

**Option 5 defers when bus stops on Wellesley St exceed capacity to 2032. This is the preferred option for the scenario without Dominion Rd buses.**

### 5.4 Bus Stop Configuration Options: Dominion Rd and Sandringham Rd Buses Removed

This section shows the suggested bus stop configurations that can delay when stops on Symonds St and Wellesley St exceed capacity following the removal of Sandringham Rd buses in addition to Dominion Rd buses (e.g., to be replaced with light rail).

# Auckland Light Rail

## 5.4.1 Symonds St

Removing both Dominion Rd and Sandringham Rd buses from Symonds St means **both stop groupings in each direction remain below capacity for the remainder of the study period** (through to 2046), as shown in Appendix 6.9: Symonds St Bus Volumes (without Dominion or Sandringham Rd).

## 5.4.2 Wellesley St Option 6

Option 6 utilises three stop groups: North Shore, Isthmus, and Crosstown. The North Shore peak-only services are still fitted into the Isthmus and Crosstown stops because there is not sufficient capacity for them at the North Shore stop.

*Table 9: Bus stop route groupings for Wellesley St Option 6 (without Dominion Rd or Sandringham Rd buses).*

Stop Groups	North Shore (Triple)	Isthmus (Triple)	Crosstown (Double)
<b>Eastbound</b>	North Shore (all-day) <i>(to Universities)</i>	New North Rd <i>(to Upper Symonds St)</i>	Crosstown 4 <i>(to Parnell)</i>
		Remuera Rd Manukau Rd Gillies Ave <i>(to Grafton)</i>	Jervois Rd Hibiscus Coast express <i>(to Universities)</i>
		North Shore peak-only <i>(to Universities)</i>	
Stop Groups	North Shore (Triple)	Isthmus (Triple)	Crosstown (Double)
<b>Westbound</b>	North Shore (all-day) <i>(to Fanshawe St)</i>	New North Rd Remuera Rd Manukau Rd Gillies Ave <i>(to Wynyard Quarter)</i>	Crosstown 4 Jervois Rd <i>(to College Hill)</i>
			Hibiscus Coast express <i>(to North Shore)</i>
		North Shore peak-only <i>(to North Shore)</i>	

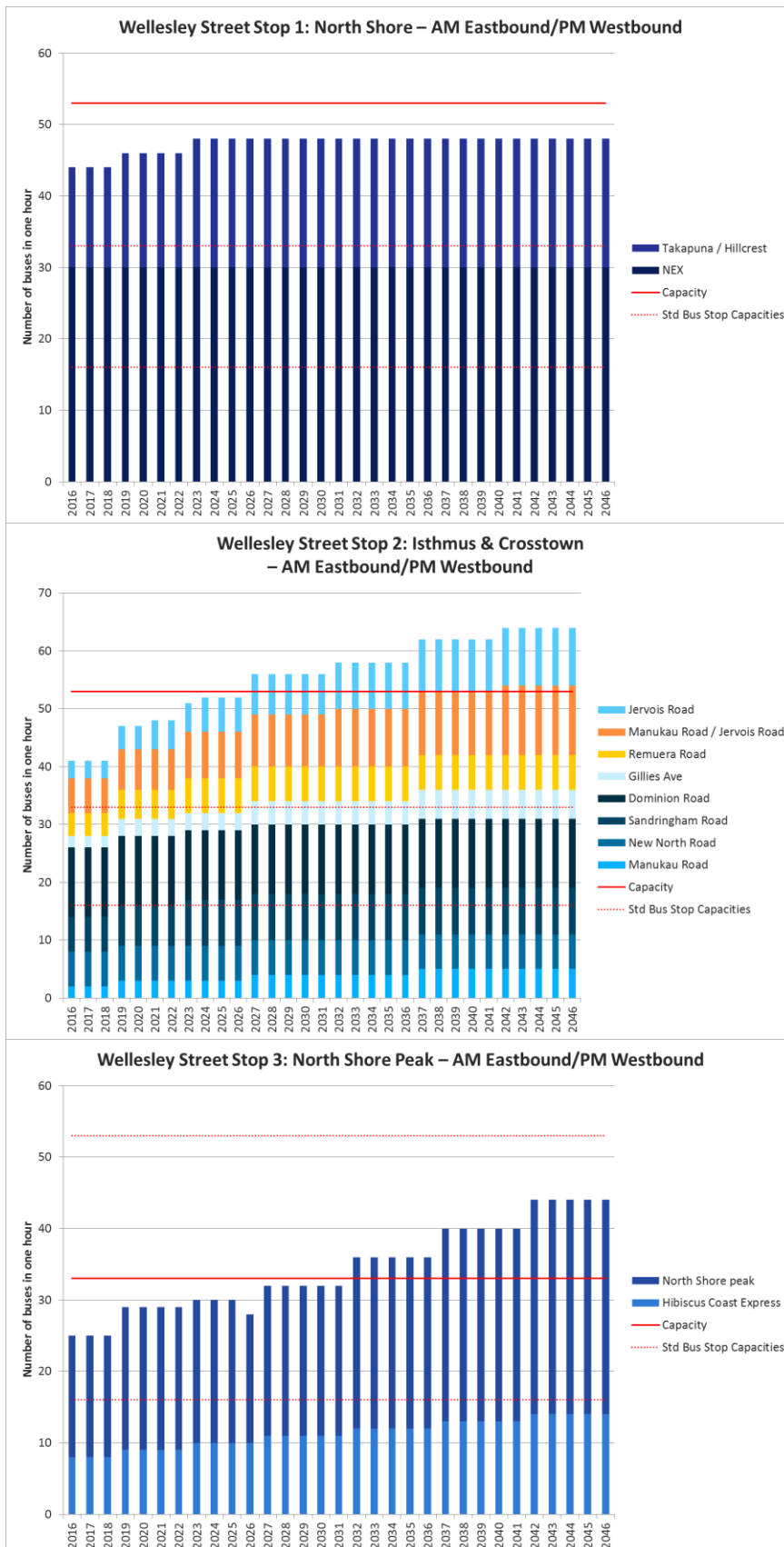
Bus volumes at each stop are shown in the Appendix (6.7 Wellesley St Option 6).

Using this stop configuration, stops on Wellesley St remain below capacity until 2042, when the Crosstown stop goes over capacity in the North Shore peak direction (eastbound AM/westbound PM). Note that if the Hibiscus Coast express service used the Isthmus stop with the rest of the North Shore peak-only services, the Isthmus stop would exceed capacity in the North Shore peak direction (eastbound AM/westbound PM) in 2032.

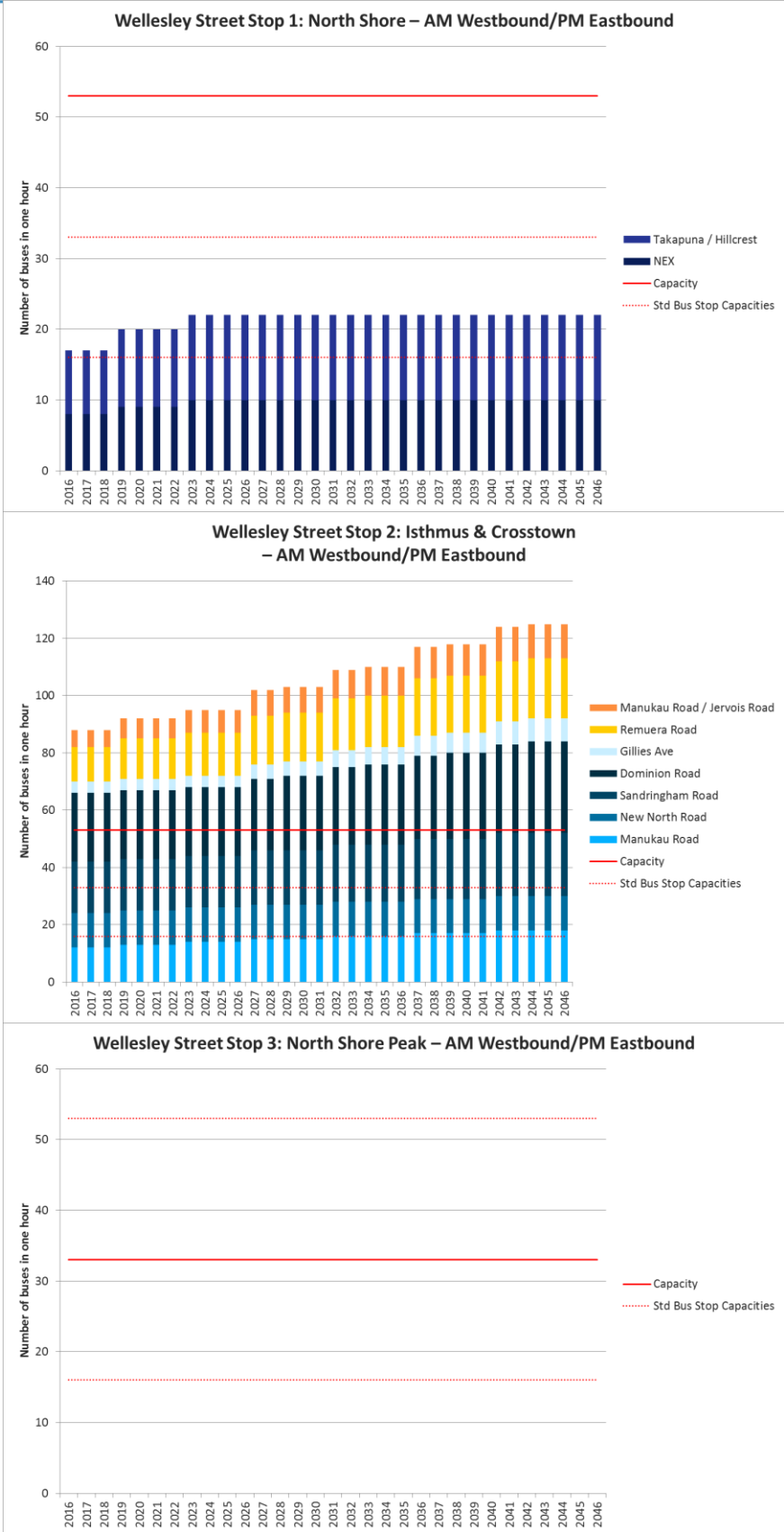
**Option 6 can defer when stops exceed capacity on Wellesley St until 2042.**

# 6 Appendix

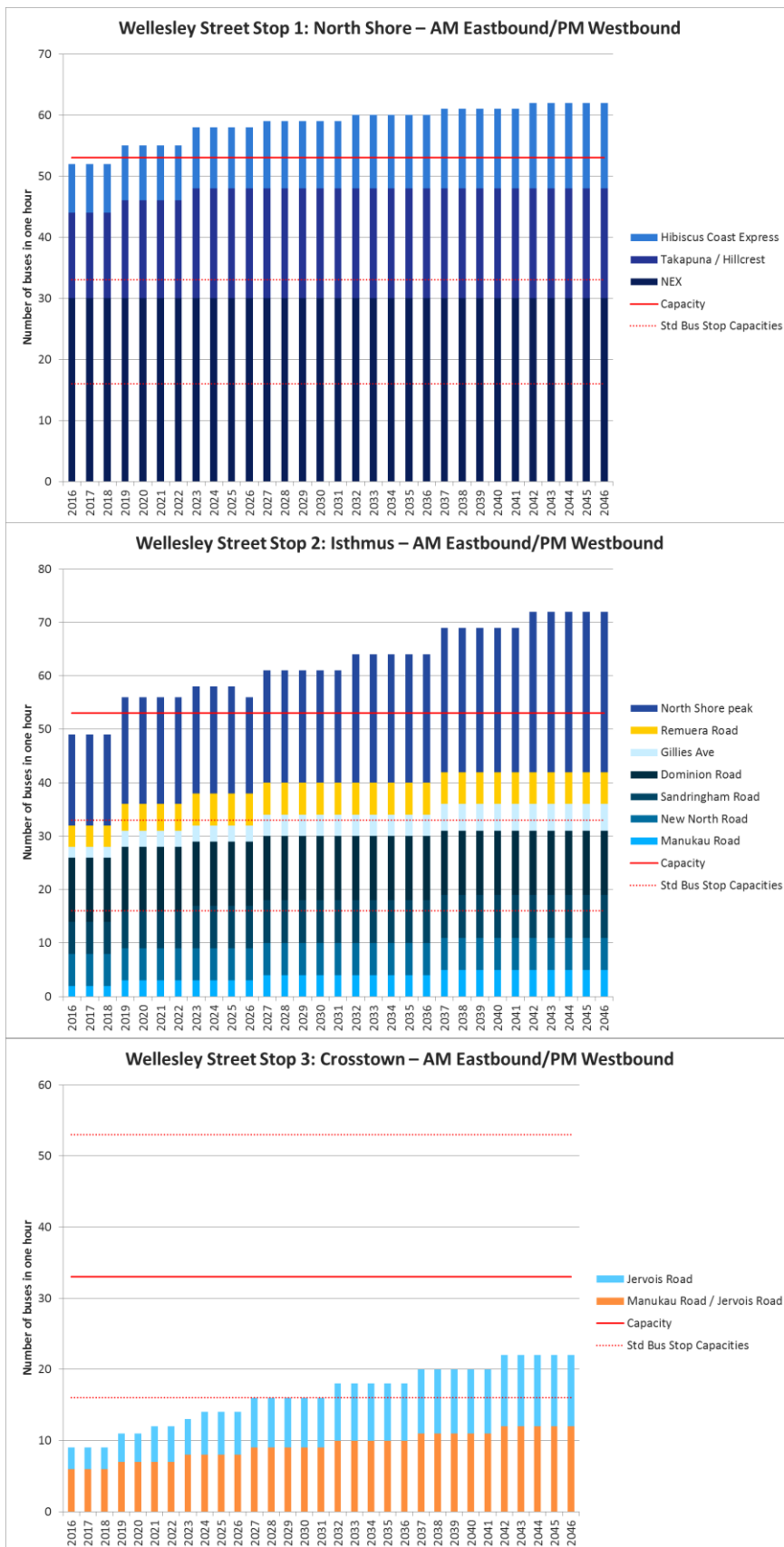
## 6.1 Option 1: High Legibility, Exceeds Capacity Immediately



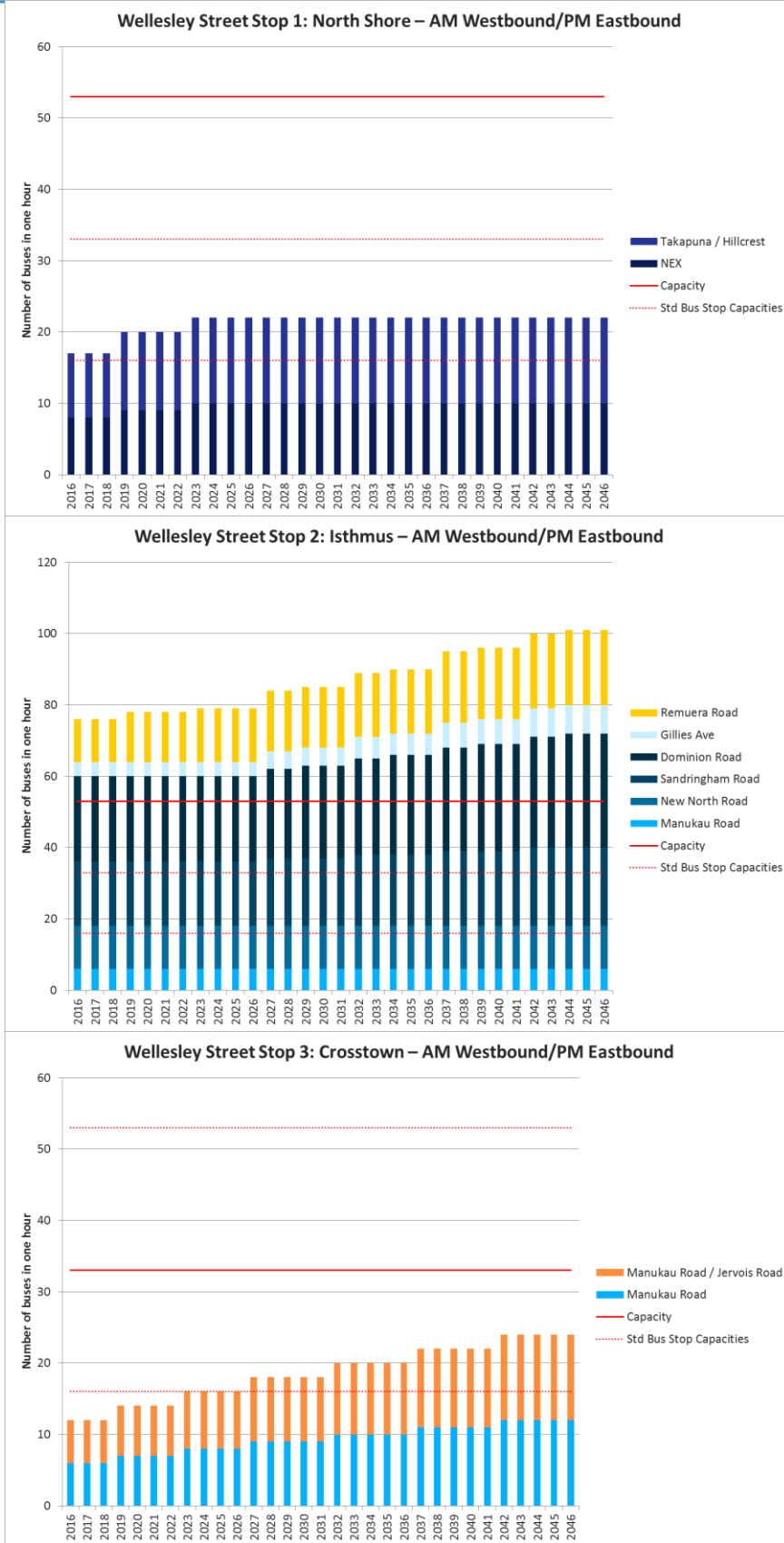
# Auckland Light Rail



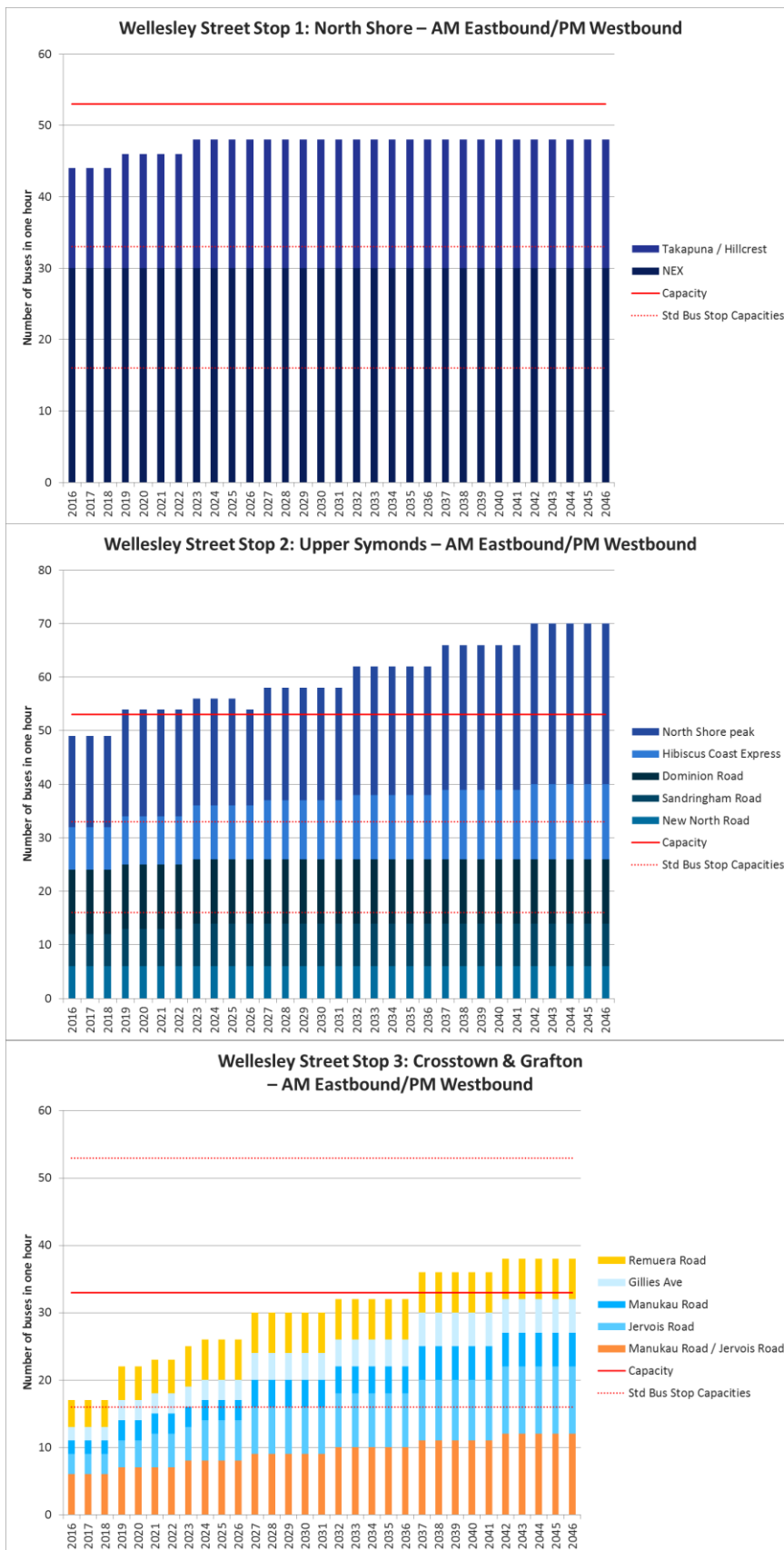
## 6.2 Option 2: High Legibility, Exceeds Capacity Immediately



# Auckland Light Rail

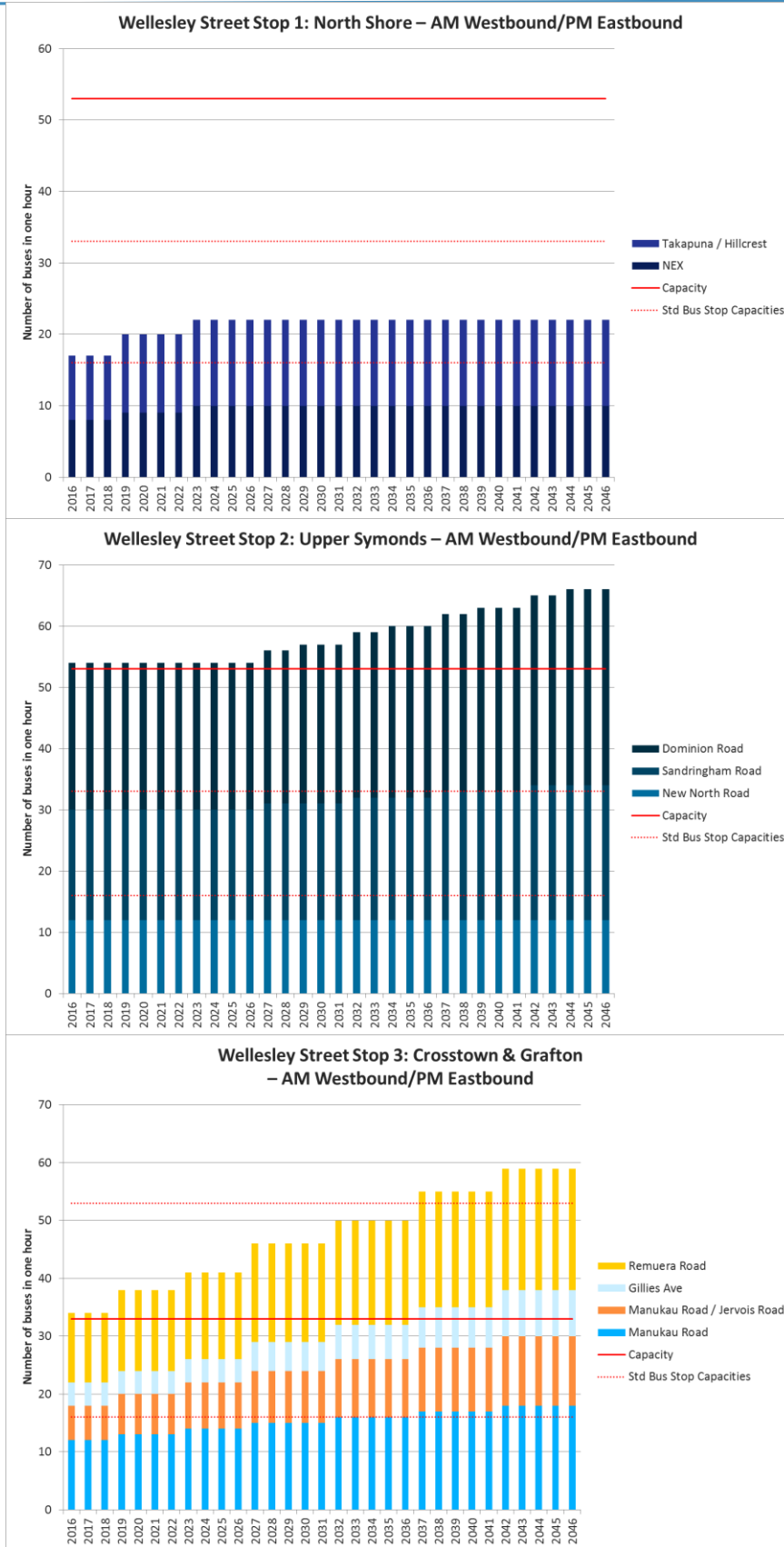


### 6.3 Option 3: Medium Legibility, Exceeds Capacity Immediately

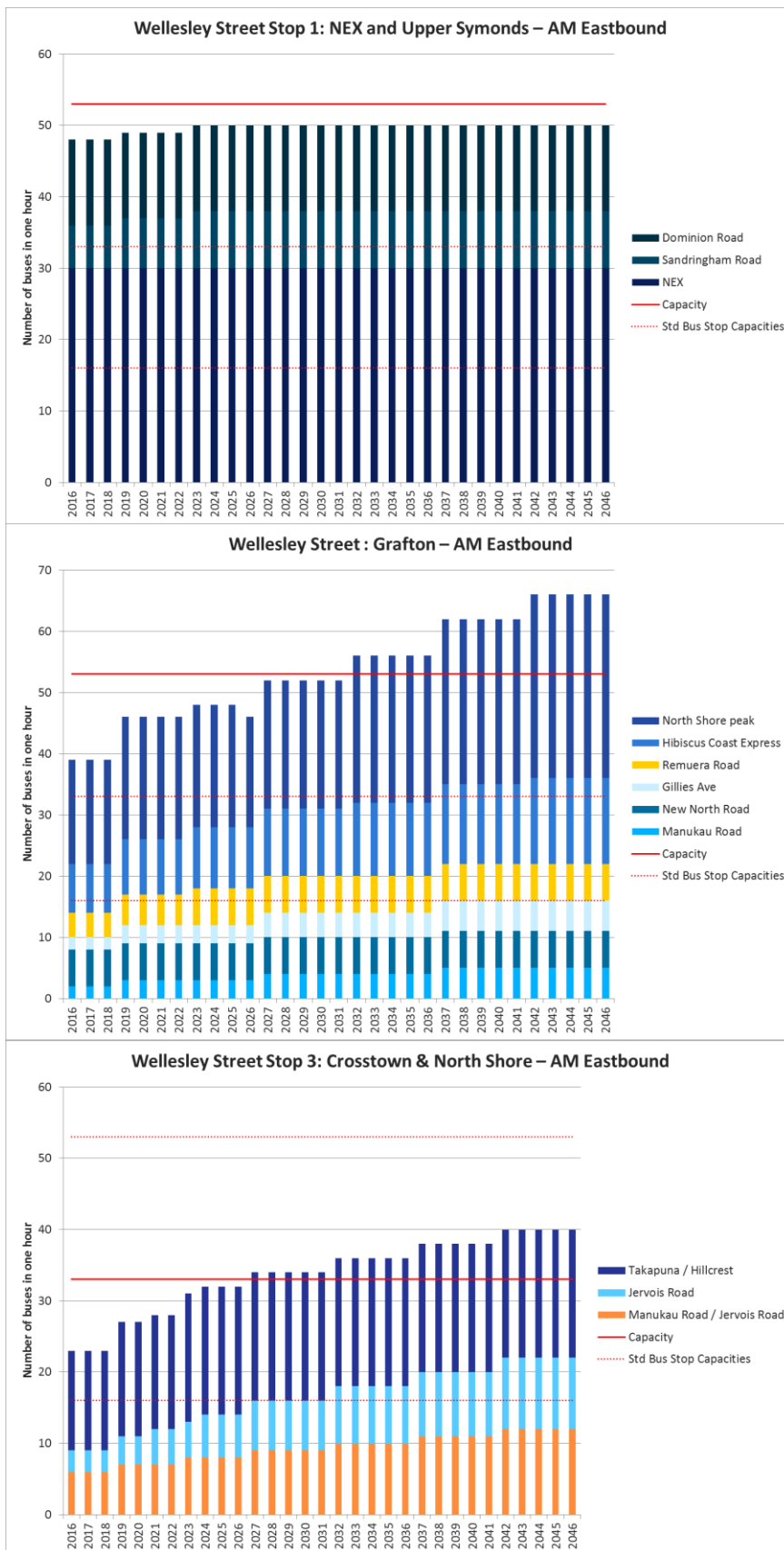




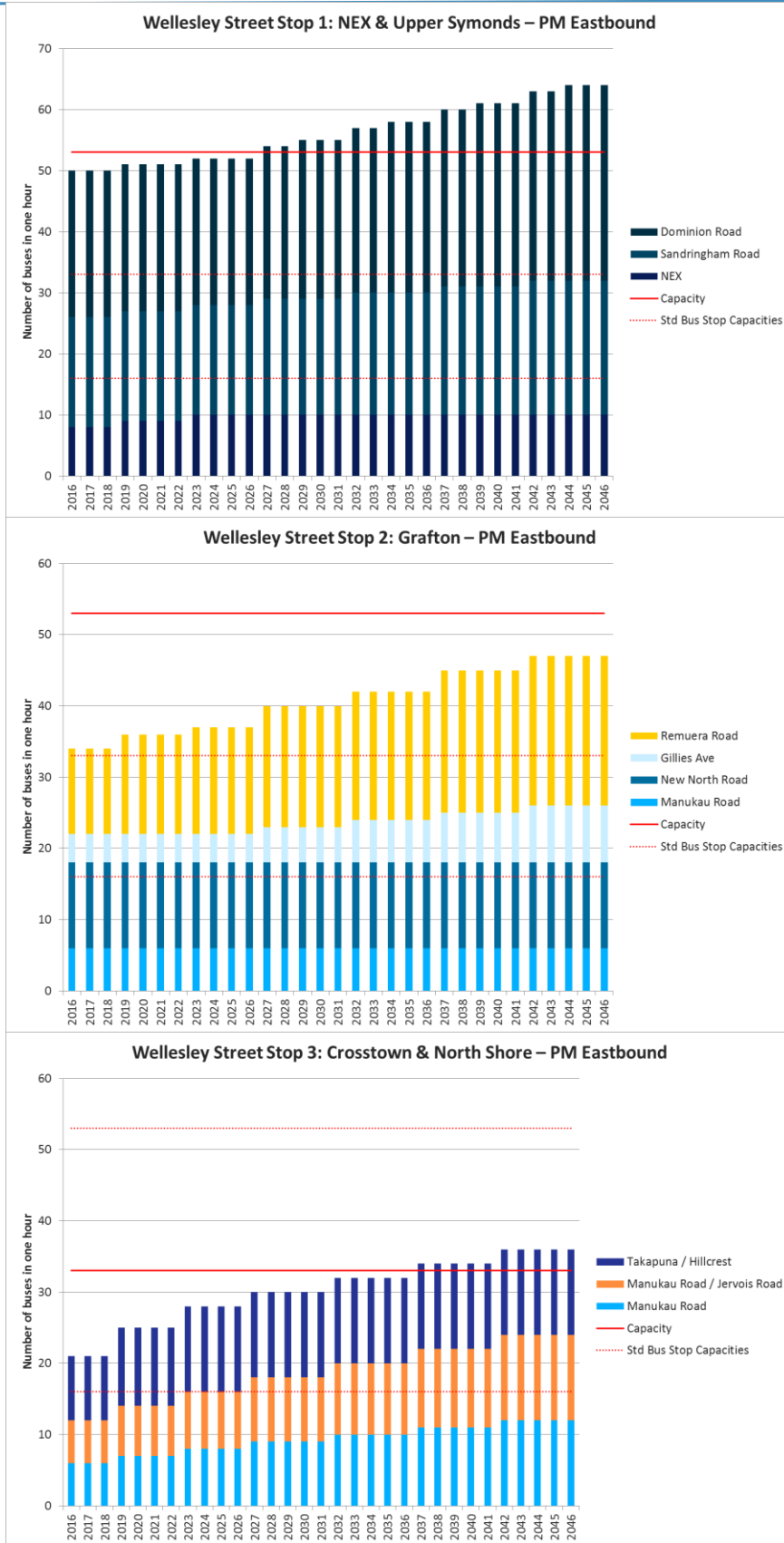
# Auckland Light Rail

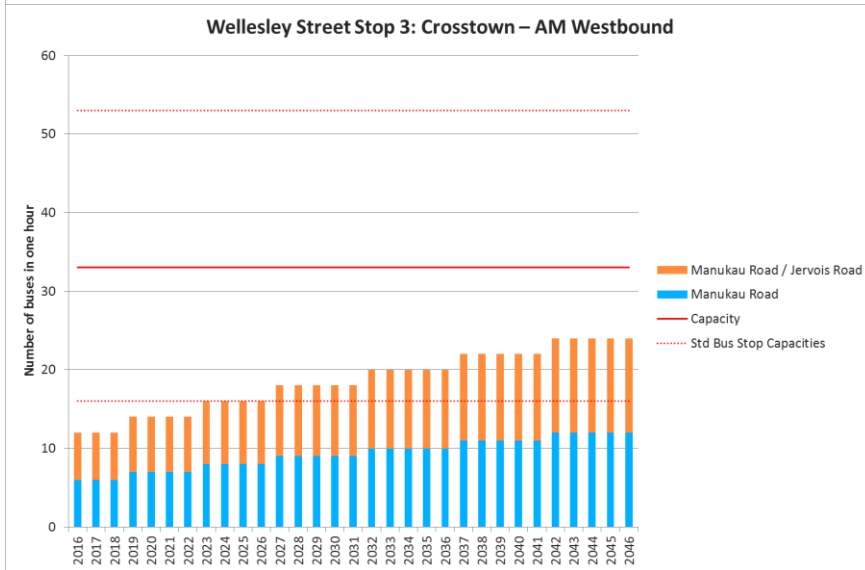
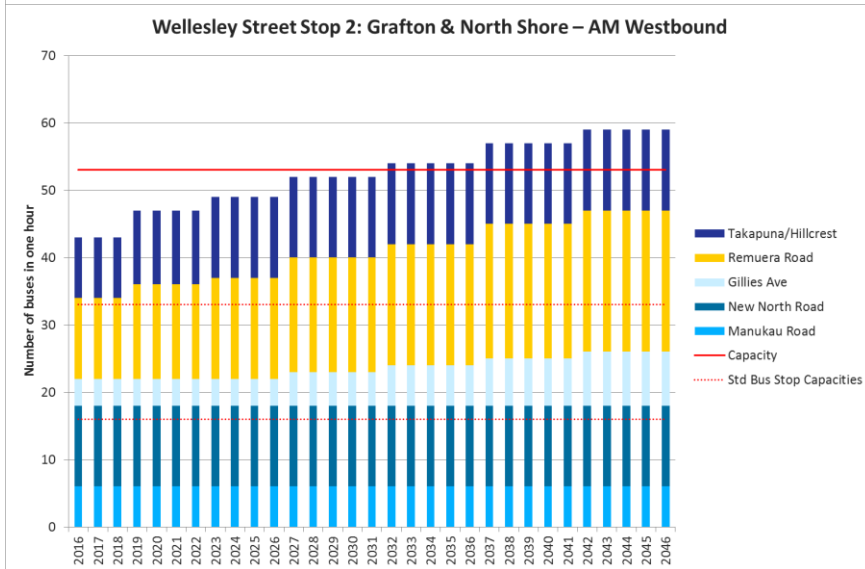
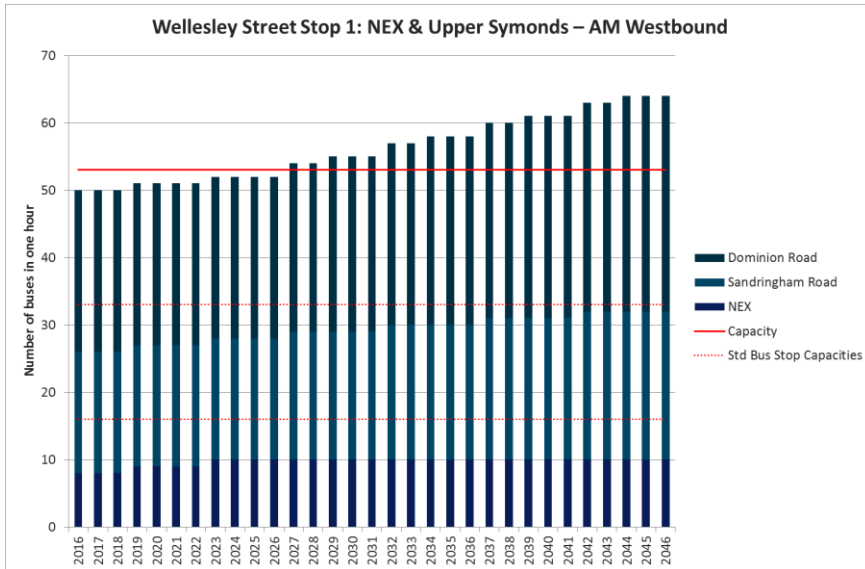


## 6.4 Option 4a: Low Legibility, Defers when Capacity is Exceeded

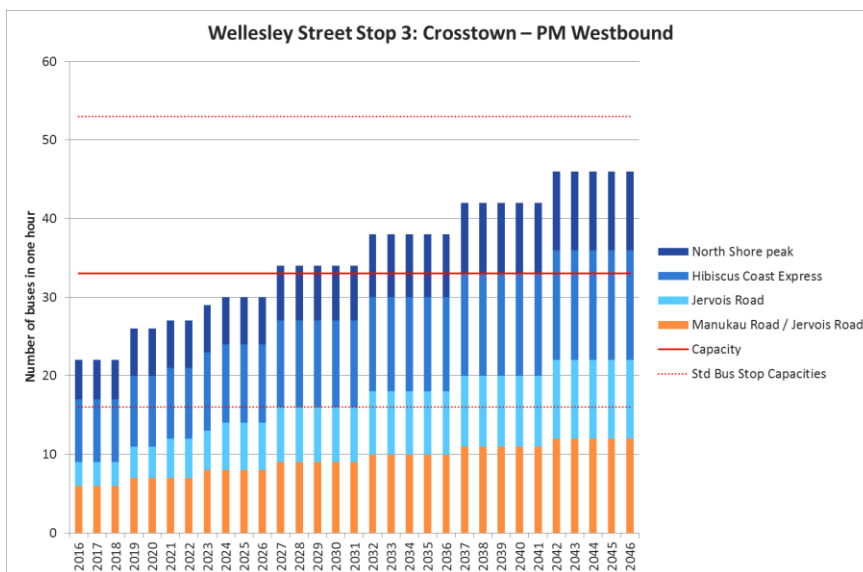
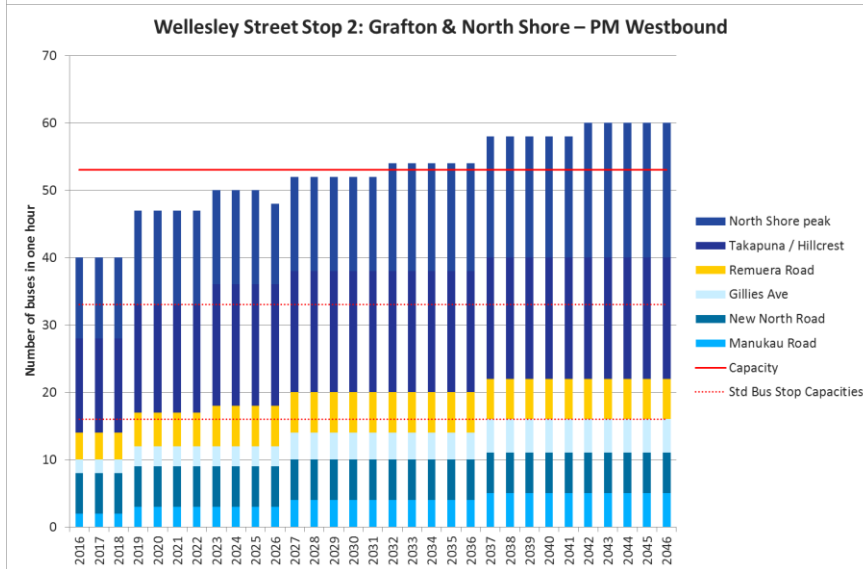
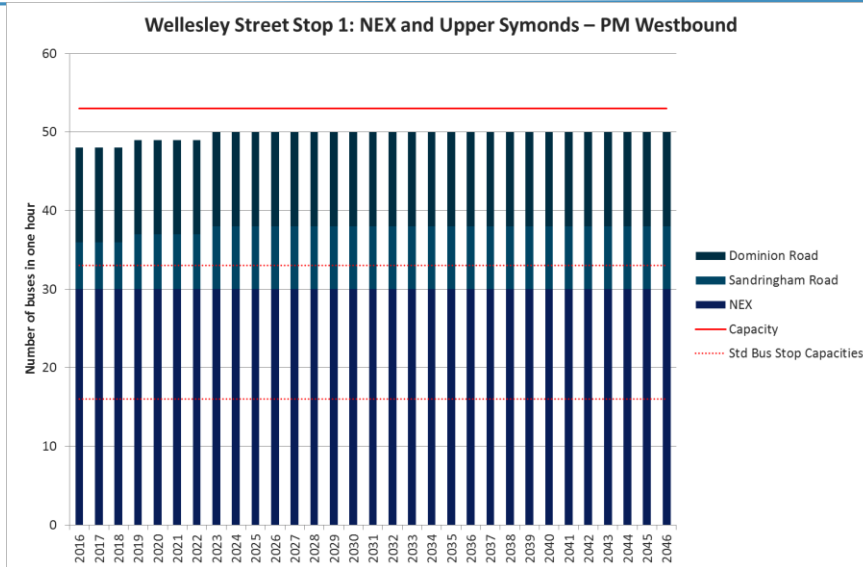


# Auckland Light Rail

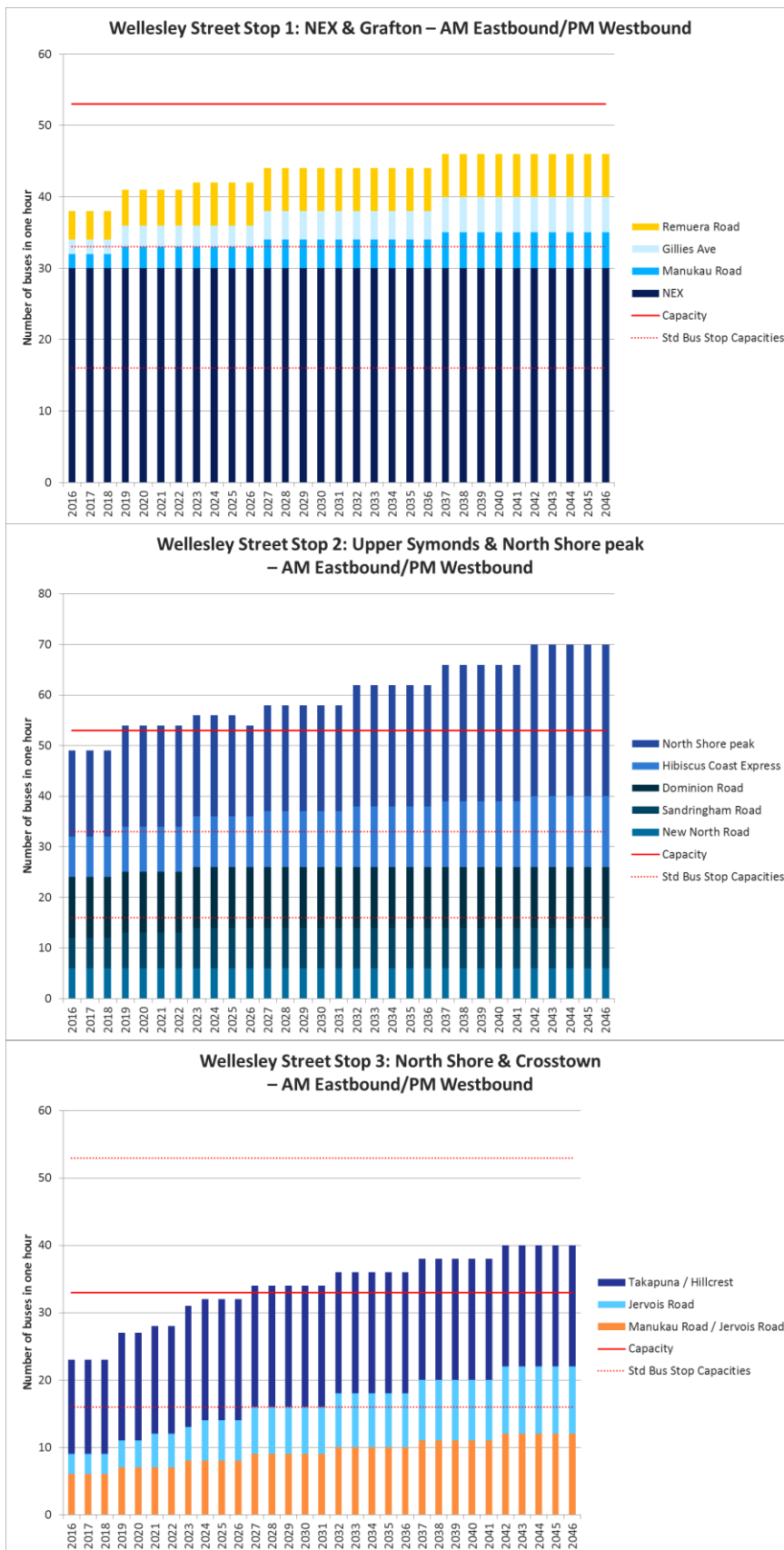




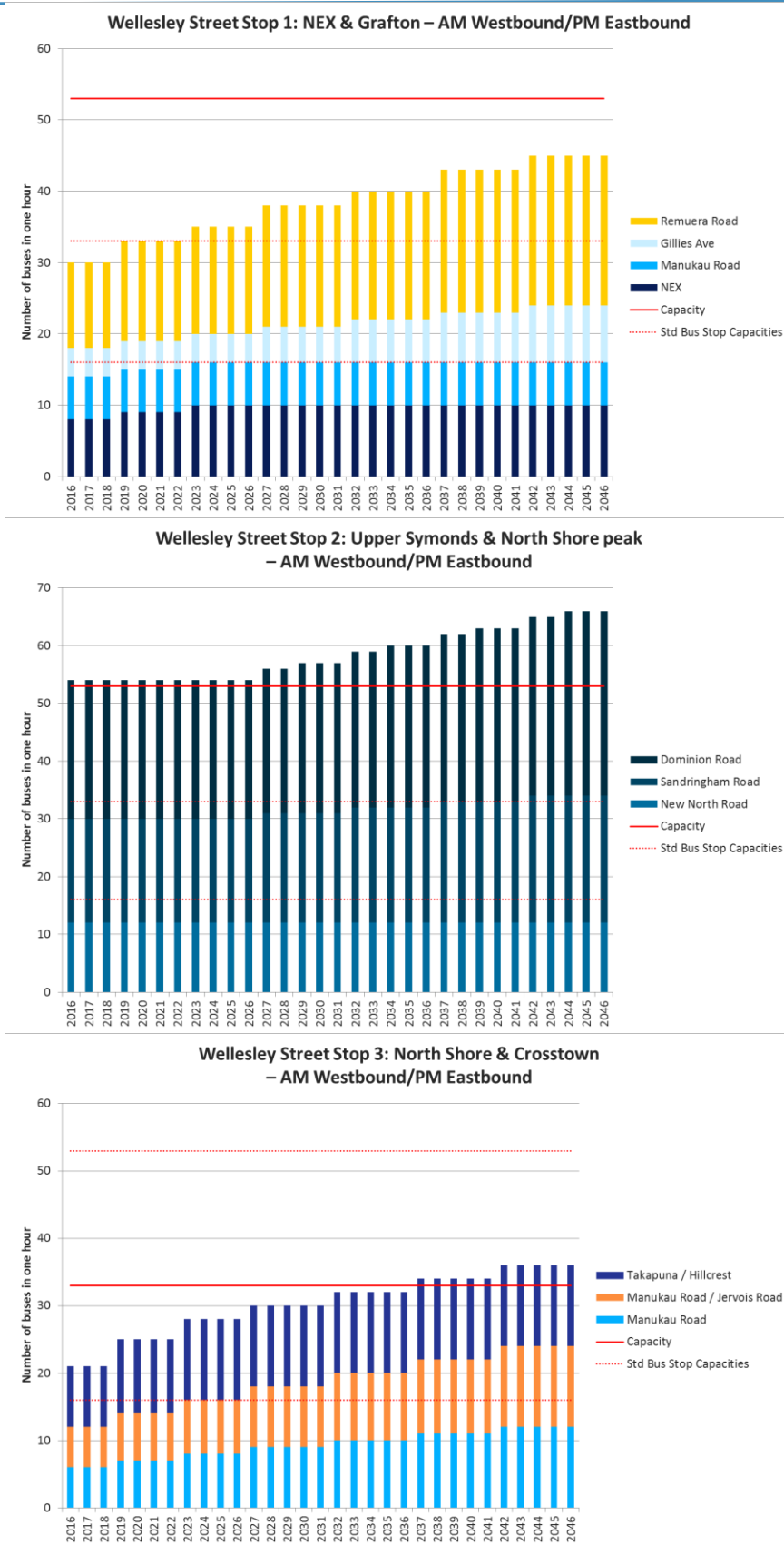
# Auckland Light Rail



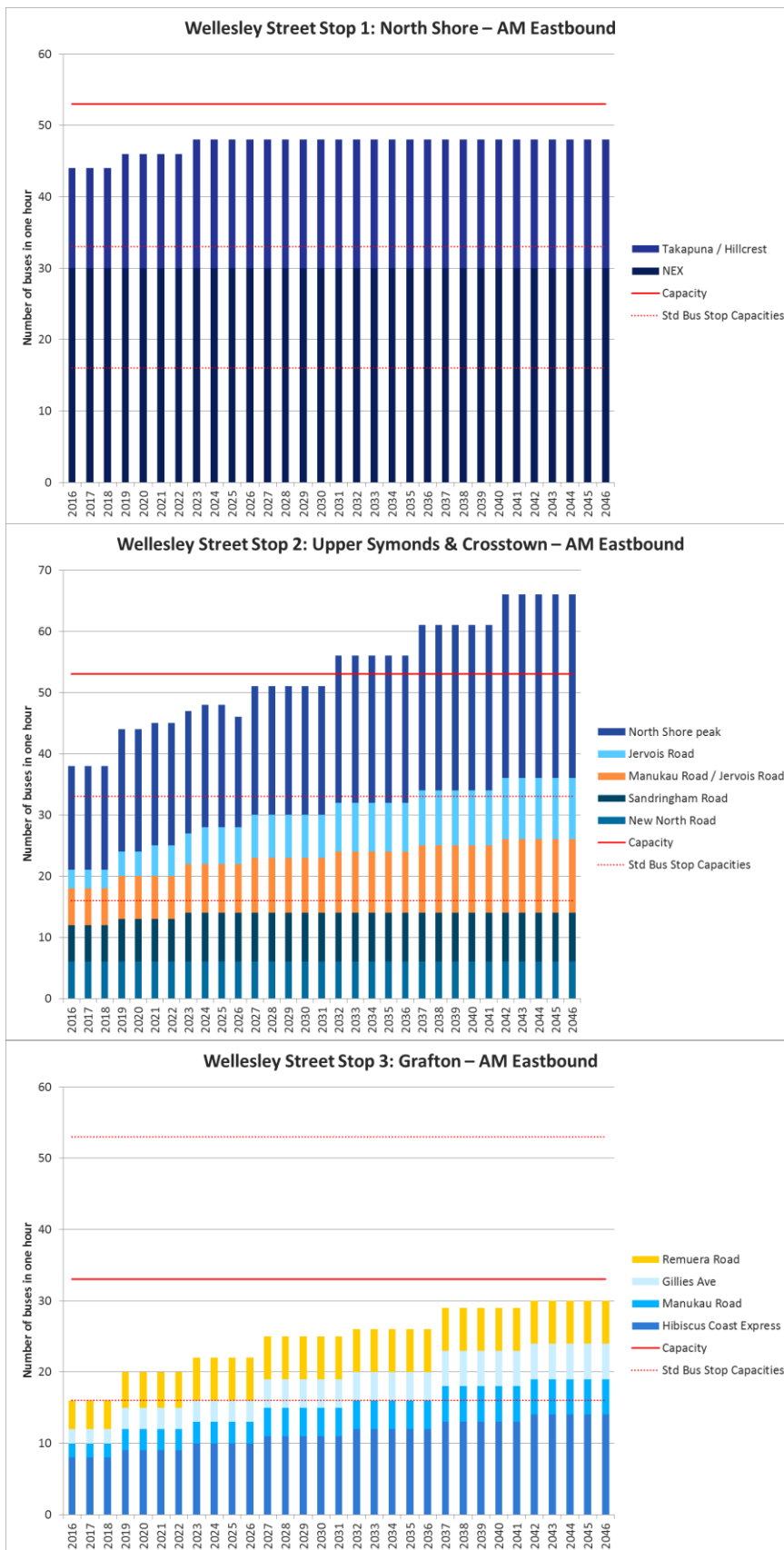
## 6.5 Option 4b: Low Legibility, Exceeds Capacity Immediately



# Auckland Light Rail

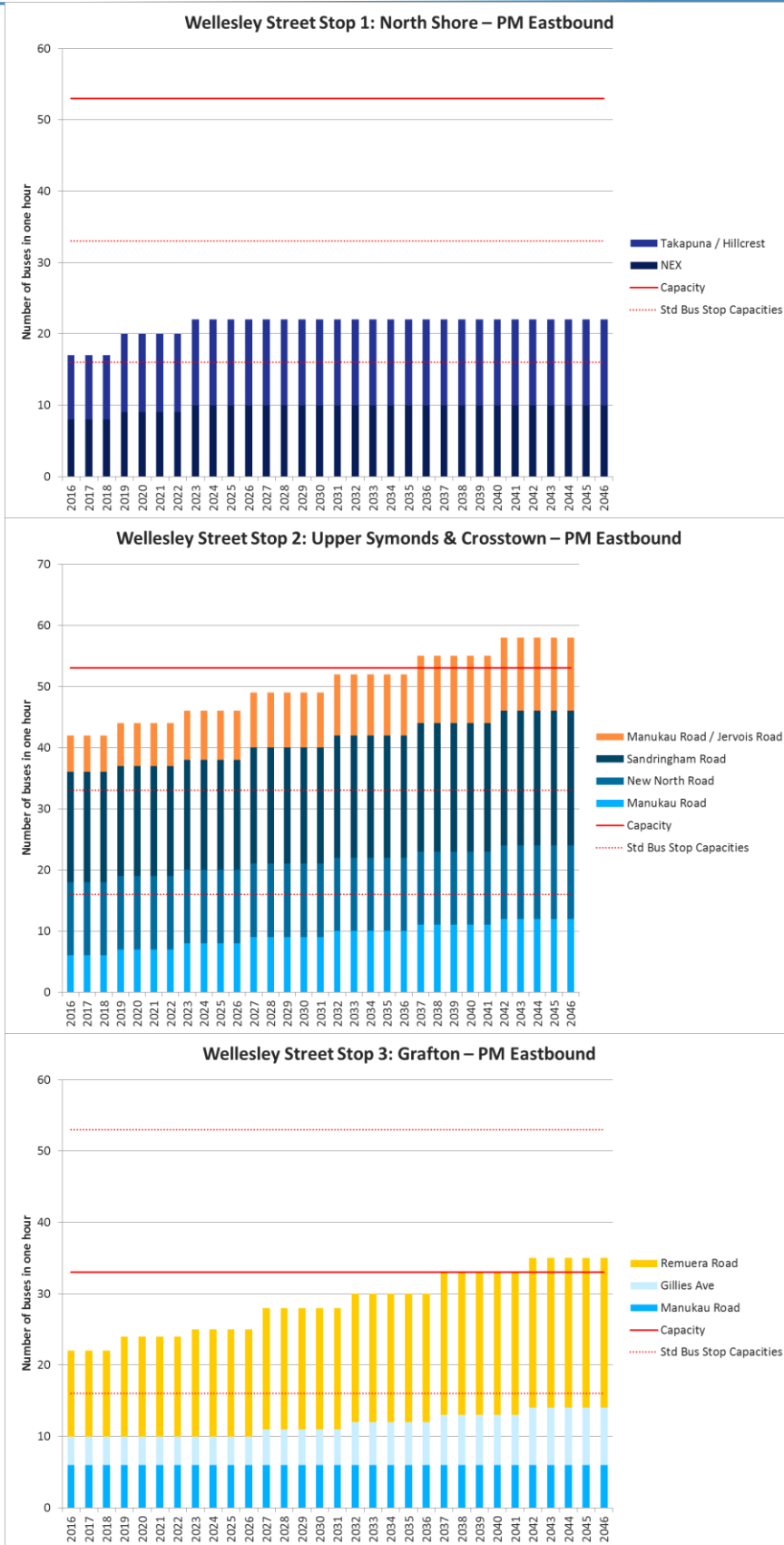


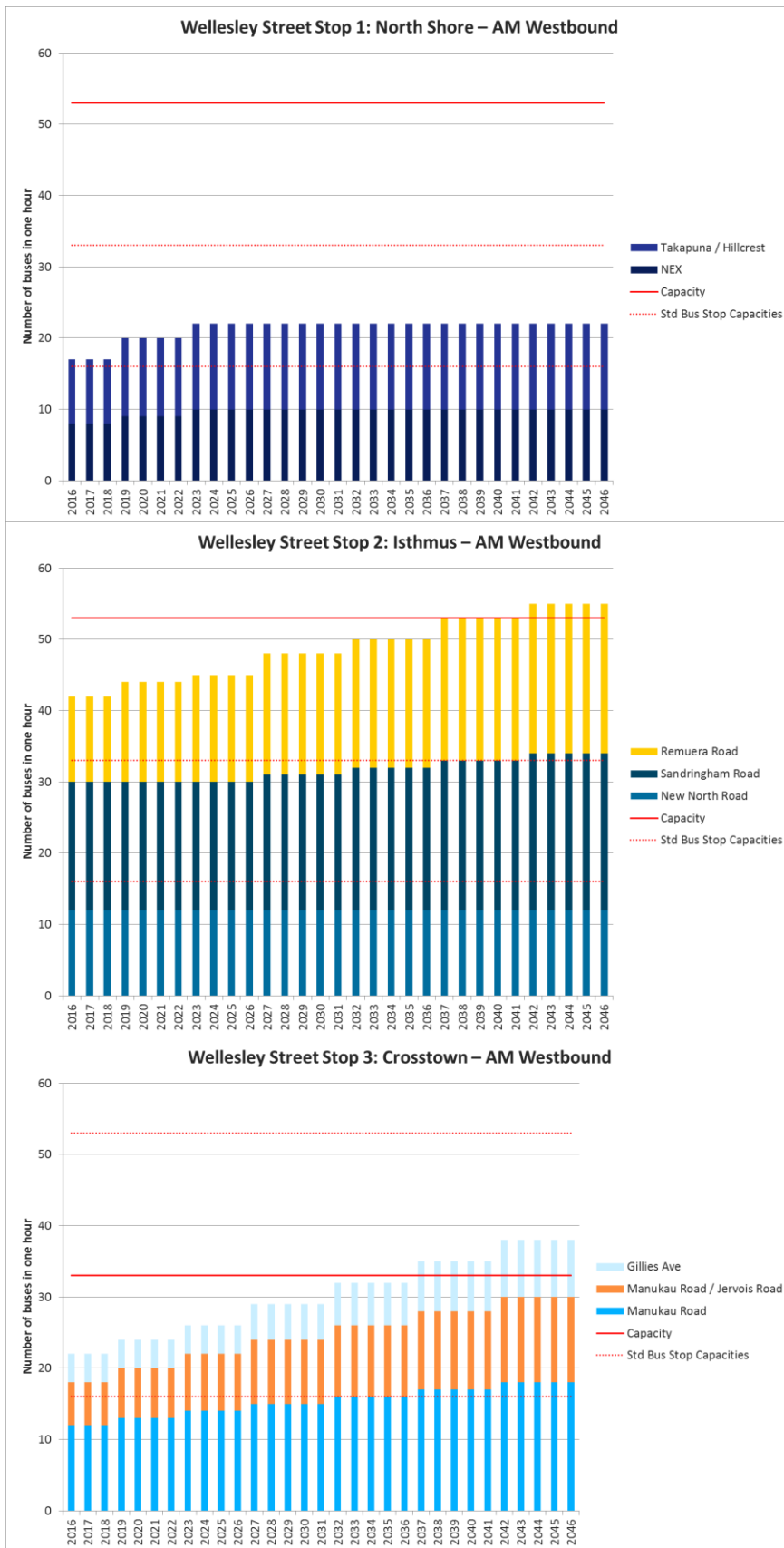
## 6.6 Wellesley St Option 5



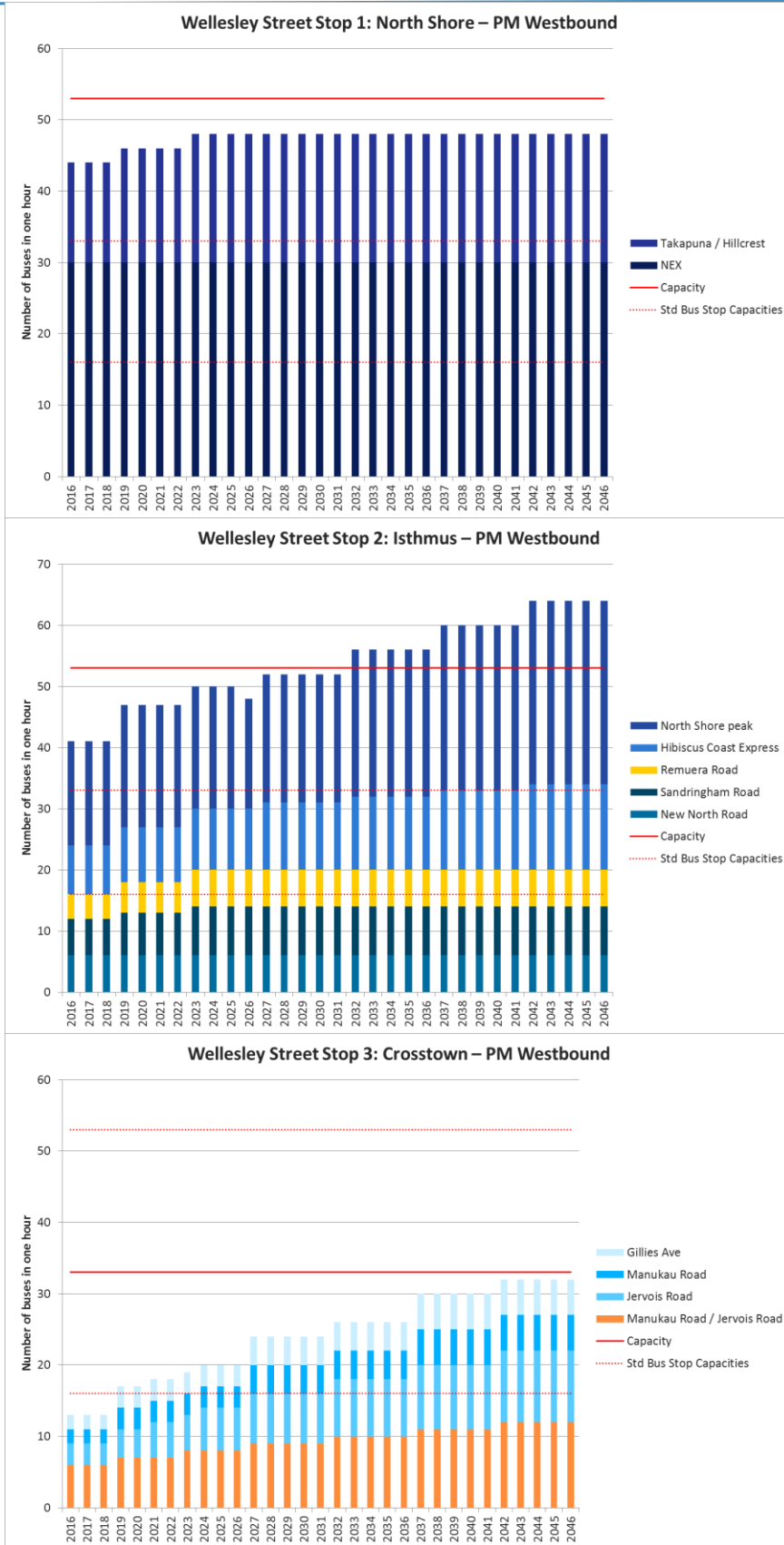


# Auckland Light Rail

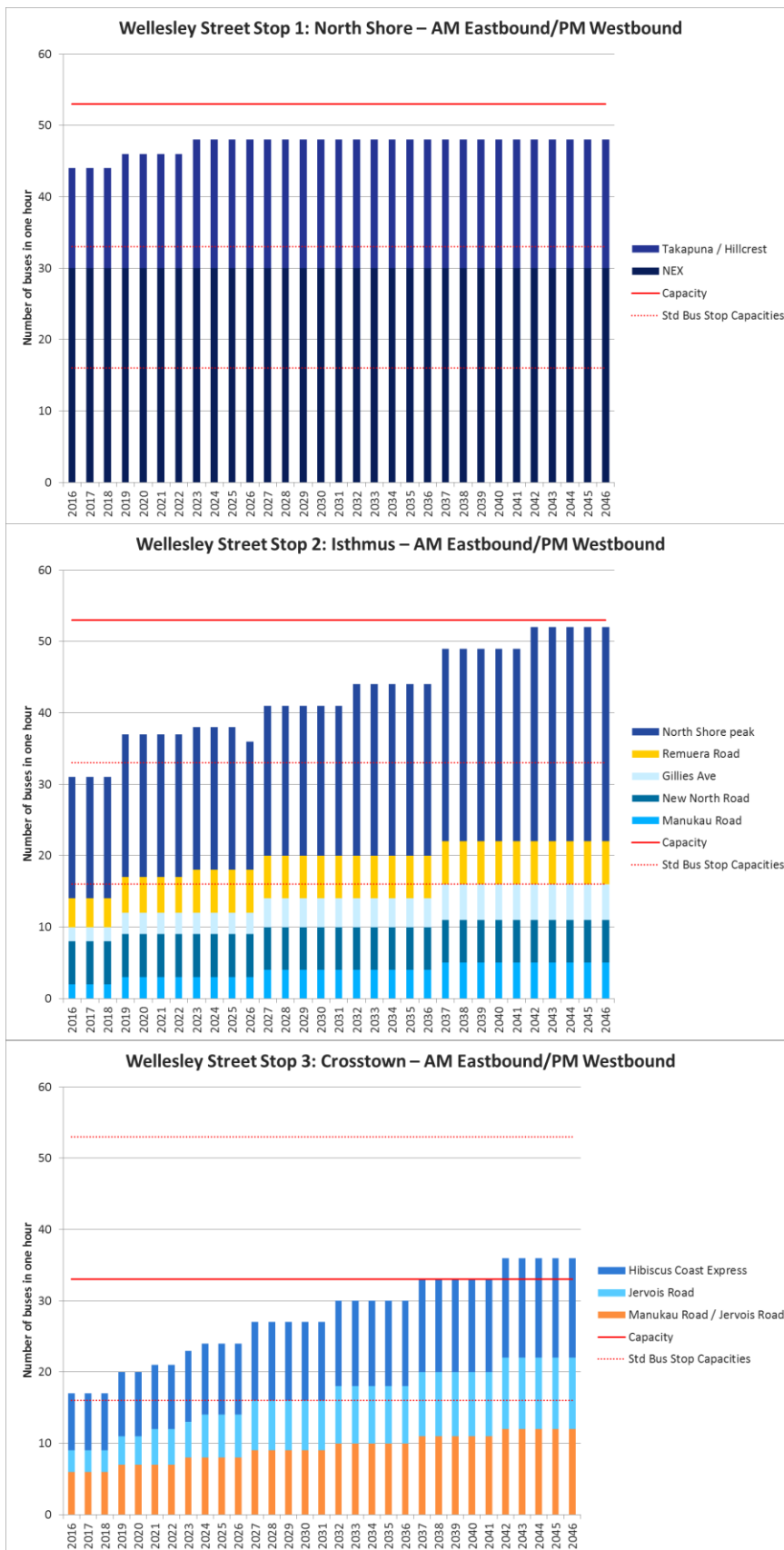




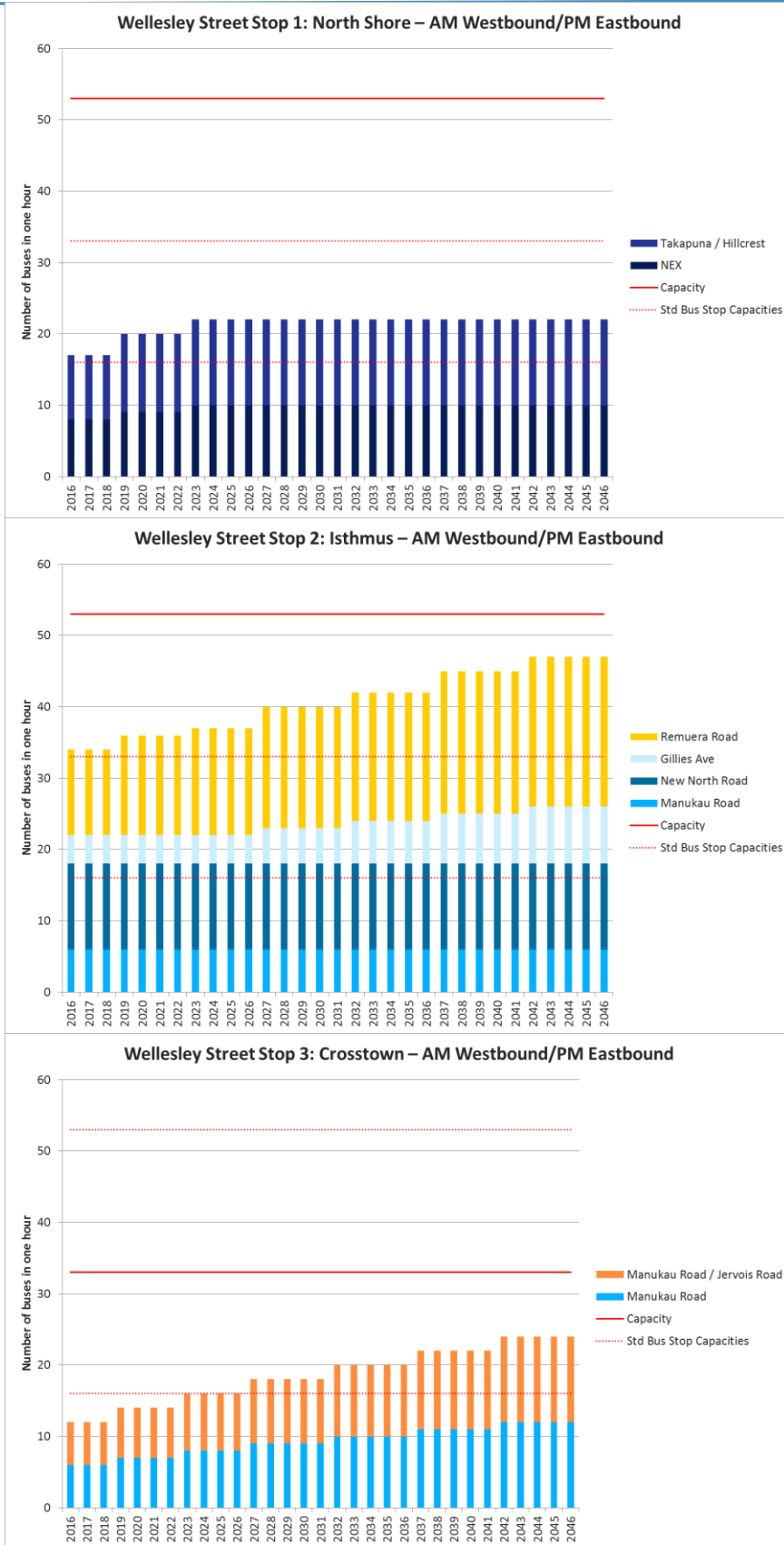
# Auckland Light Rail



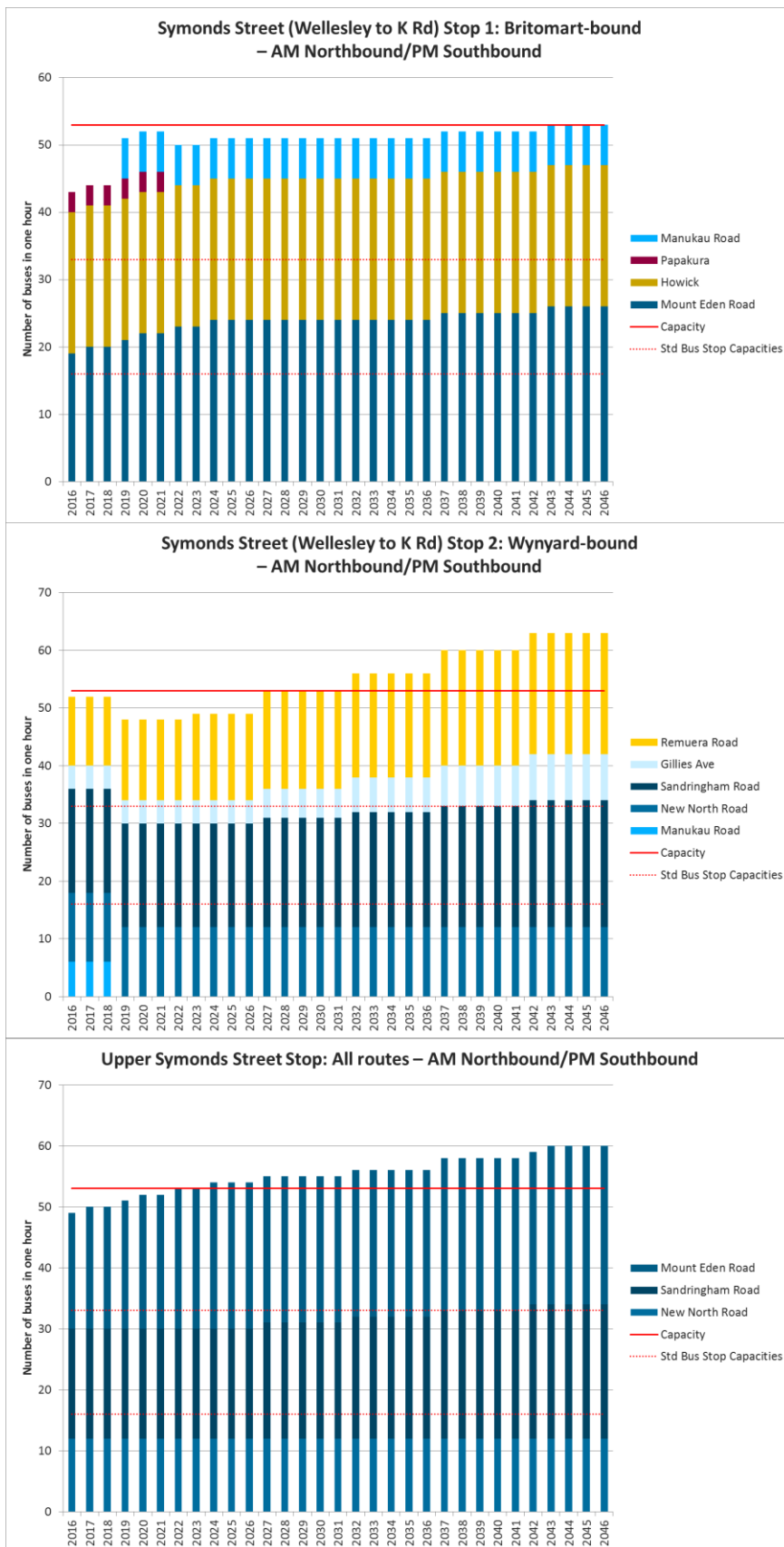
## 6.7 Wellesley St Option 6



# Auckland Light Rail

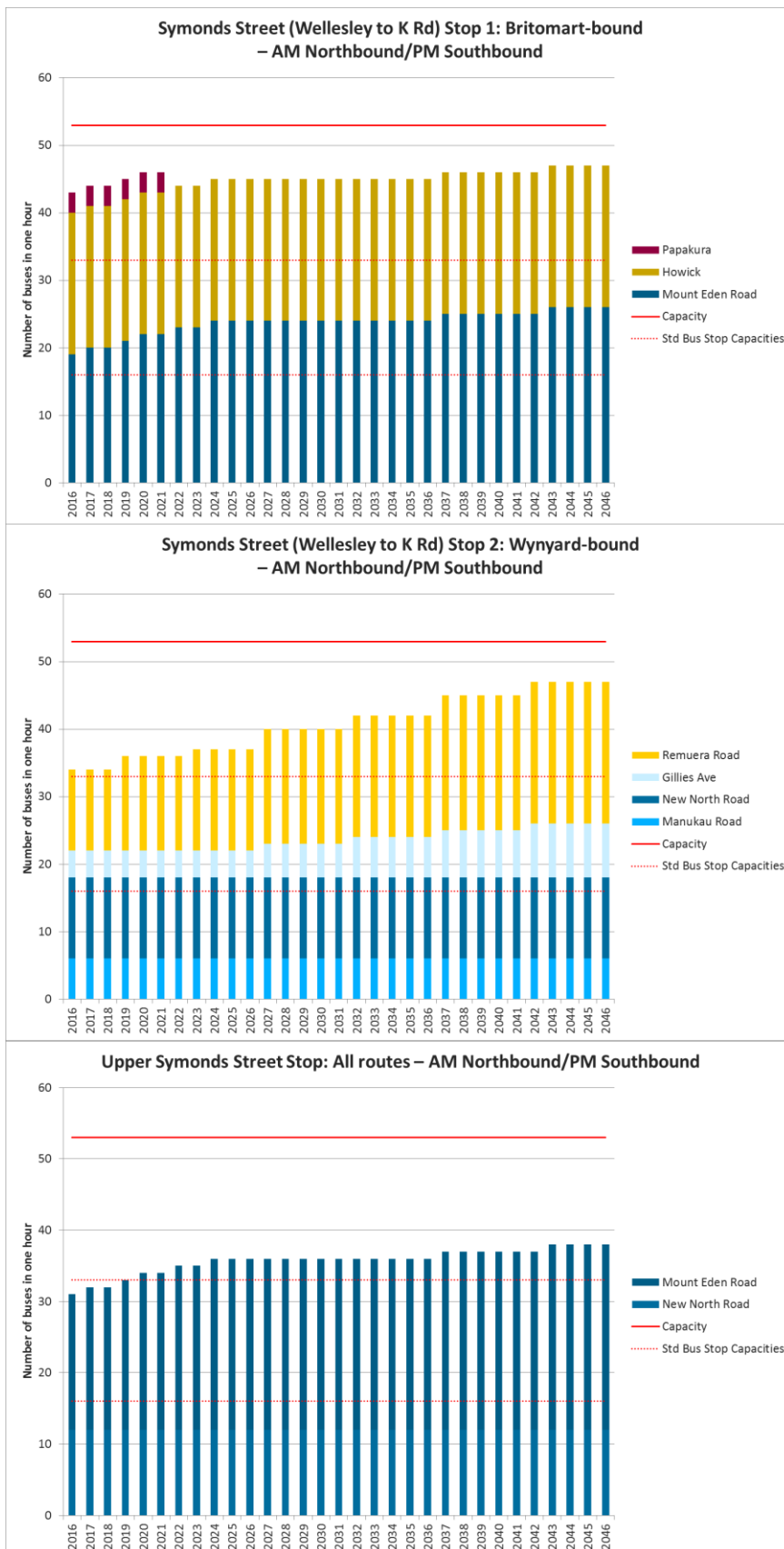


## 6.8 Symonds St Bus Volumes (without Dominion Rd)



# Auckland Light Rail

## 6.9 Symonds St Bus Volumes (without Dominion or Sandringham Rd)





Engineering Professional Services Short Form Contract

## Public Transport Planning Inputs for CCFAS2

Reference Number:

342-16-031-PS

Between

Auckland Transport

And

M R Cagney Limited



**Short Form Agreement for Consultant Engagement**

Based on ACENZ and IPENZ Short Form Agreement - March 2012 Version.  
This version has been endorsed for use by Auckland Transport.

**Between: Auckland Transport (AT)**

.....  
(Client)

**and: M R Cagney Limited**

.....  
(Consultant)

Collectively referred to herein as the "Parties" and individually as a "Party"

**Project:**

Provide technical Public Transport (PT) planning assistance to Auckland Transport on the CCFAS2 project.

**Scope & nature of the Services:**

Refer to attached Offer of Service letter dated 10 July 2015.

**Programme for the Services:**

As stated in attached Offer of Service letter dated 10 July 2015.

**Fees & timing of payments:**

Fees and disbursements for the work carried out shall be paid in accordance with the Conditions of Contract with a ceiling of [REDACTED]

The time for payment shall be on the 20th of the following month from the date of issue of any Tax Invoice.

**Information or services to be provided by the Client:**

None

The Client engages the Consultant to provide the Services described above and the Consultant agrees to perform the Services for the remuneration provided above. Both Parties agree to be bound by the provision of the Short Form Model Conditions of Engagement (overleaf), including clauses 2, 3, 9 and 10 and any variations noted below. Once signed, this agreement, together with the conditions overleaf and any attachments, will replace all or any oral agreement previously reached between the Parties.

**Variations to the Short Form Model Conditions of Engagement (overleaf):**

Clause 8; 9; 11; 13; 16  
Additional Clause 20

<b>Client authorised signatory (ies):</b>	<b>Consultant authorised signatory (ies):</b> 
<b>Print name:</b>	<b>Print name:</b> JENSON VARGHESE
<b>Date:</b>	<b>Date:</b> 24 / 07 / 2015



## SHORT FORM MODEL CONDITIONS OF ENGAGEMENT

1. The Consultant shall perform the Services as described in the attached documents.
2. Nothing in this Agreement shall restrict, negate, modify or limit any of the Client's rights under the Consumer Guarantees Act 1993 where the Services acquired are of a kind ordinarily acquired for personal, domestic or household use or consumption and the Client is not acquiring the Services for the purpose of a business.
3. The Client and the Consultant agree that where all, or any of, the Services are acquired for the purposes of a business the provisions of the Consumer Guarantees Act 1993 are excluded in relation to those Services.
4. In providing the Services the Consultant shall exercise the degree of skill, care and diligence normally expected of a competent professional.
5. The Client shall provide to the Consultant, free of cost, as soon as practicable following any request for information, all information in his or her power to obtain which may relate to the Services. The Consultant shall not, without the Client's prior consent, use information provided by the Client for purposes unrelated to the Services. In providing the information to the Consultant, the Client shall ensure compliance with the Copyright Act 1994 and shall identify any proprietary rights that any other person may have in any information provided.
6. The Client may order variations to the Services in writing or may request the Consultant to submit proposals for variation to the Services. Where the Consultant considers a direction from the Client or any other circumstance is a Variation the Consultant shall notify the Client as soon as practicable.
7. The Client shall pay the Consultant for the Services the fees and expenses at the times and in the manner set out in the attached documents. Where this Agreement has been entered by an agent (or a person purporting to act as agent) on behalf of the Client, the agent and Client shall be jointly and severally liable for payment of all fees and expenses due to the Consultant under this Agreement.
8. All amounts payable by the Client shall be paid within twenty (20) working days of the relevant invoice being mailed to the Client. Late payment shall constitute a default, and the Client shall pay default interest on overdue amounts from the date payment falls due to the date of payment at the rate of the Consultant's overdraft rate plus 2% and in addition the costs of any actions taken by the Consultant to recover the debt.
9. Where Services are carried out on a time charge basis, the Consultant may purchase such incidental goods and/or Services as are reasonably required for the Consultant to perform the Services. The cost of obtaining such incidental goods and/or Services shall be payable by the Client. The Consultant shall maintain records which clearly identify time and expenses incurred.
10. Where the Consultant breaches this Agreement, the Consultant is liable to the Client for reasonably foreseeable claims, damages, liabilities, losses or expenses caused directly by the breach. The Consultant shall not be liable to the Client under this Agreement for the Client's indirect, consequential or special loss, or loss of profit, however arising, whether under contract, in tort or otherwise.
11. The maximum aggregate amount payable, whether in contract, tort or otherwise, in relation to claims, damages, liabilities, losses or expenses, shall be five times the fee (exclusive of GST and disbursements) with a maximum limit of \$NZ500,000.
12. Without limiting any defences a Party may have under the Limitation Act 2010, neither Party shall be considered liable for any loss or damage resulting from any occurrence unless a claim is formally made on a Party within 6 years from completion of the Services.
13. The Consultant shall take out and maintain for the duration of the Services a policy of Professional Indemnity insurance for the amount of liability under clause 11. The Consultant undertakes to use all reasonable endeavours to maintain a similar policy of insurance for six years after the completion of the Services.
14. If either Party is found liable to the other (whether in contract, tort or otherwise), and the claiming Party and/or a Third Party has contributed to the loss or damage, the liable Party shall only be liable to the proportional extent of its own contribution.
15. Intellectual property prepared or created by the Consultant in carrying out the Services ("New Intellectual Property") shall be jointly owned by the Client and the Consultant. The Client and Consultant hereby grant to the other an unrestricted royalty-free license in perpetuity to copy or use New Intellectual Property. Intellectual property owned by a Party prior to the commencement of this Agreement and intellectual property created by a Party independently of this Agreement remains the property of that Party. The ownership of data and factual information collected by the Consultant and paid for by the Client shall, after payment by the Client, lie with the Client. The Consultant does not warrant the suitability of New Intellectual Property for any purpose other than the Services or any other use stated in the Agreement.
16. The Consultant has not and will not assume any obligation as the Client's Agent or otherwise which may be imposed upon the Client from time to time pursuant to the Health and Safety in Employment Act 1992 ("the Act") arising out of this engagement. The Consultant and Client agree that in terms of the Act, the Consultant will not be the person who controls the place of work.
17. The Client may suspend all or part of the Services by notice to the Consultant who shall immediately make arrangements to stop the Services and minimise further expenditure. The Client and the Consultant may (in the event the other Party is in material default) terminate the Agreement by notice to the other Party. Suspension or termination shall not prejudice or affect the accrued rights or claims and liabilities of the Parties.
18. The Parties shall attempt in good faith to settle any dispute by mediation.
19. This Agreement is governed by the New Zealand law, the New Zealand courts have jurisdiction in respect of this Agreement, and all amounts are payable in New Zealand dollars.



## Special Conditions of Contract

**Clause to be deleted from the Short Form Model conditions of engagement**

**Clause to be included in Standard Short Form Model Conditions of Engagement:**

**Clause 8**

8. All amounts approved as payable by the Client shall be in accordance with that shown on the front page of this Agreement under "Fees & timing of payments". Tax Invoices should be send to: [invoices@aucklandtransport.govt.nz](mailto:invoices@aucklandtransport.govt.nz) or Auckland Transport, Private Bag 92255, Auckland 1142

All Tax invoices should include:

- Contract Order Number (43.....)
- Client's Representatives name: **Daniel Newcombe**
- a description of the activities or components of work to which the Tax invoice relates

**Clause 9**

9. Where Services are carried out on a time charge basis, the Consultant may purchase such incidental Goods and/or Services as are reasonably required for the Consultant to perform the Services. The cost of obtaining such incidental Goods and/or Services shall be payable by the Client subject to them having; been listed under the "Fees" section of the agreement; or been specifically agreed to by the Client prior to the expenditure having been incurred. The Consultant shall maintain records which clearly identify time and expenses incurred.

**Clause 11**

11. The maximum aggregate amount payable, whether in contract, tort or otherwise, in relation to claims, damages, liabilities, losses or expenses, shall be five times the fee (exclusive of GST and disbursements) with a minimum limit of \$100,000 and maximum limit of \$500,000.

**Clause 13**

13. The Consultant shall take out and maintain for the duration of the Services insurance policies as follows:

- Public Liability - The Consultant acknowledges that the Consultant currently holds a policy of Public liability insurance for a minimum of \$2,000,000
- Professional Indemnity - The Consultant acknowledges that the Consultant currently holds a policy of Professional Indemnity insurance for a minimum of the amount of Liability under clause 11. The Consultant undertakes to use all reasonable endeavours to maintain a similar policy of insurance for six years after the completion of the Services.
- Motor vehicle third party liability insurance shall be effected by the Consultant for a minimum of \$2,000,000.

The Consultant must produce certificates evidencing the currency of such cover and proving that Public Liability, Professional Indemnity and Motor Vehicle third party insurance policies meet the requirements of this clause.

**Clause 16**

16. The Consultant does not assume any obligation of the Client under the Health and Safety in Employment Act 1992, unless that obligation is part of the Services. The Consultant agrees that it will comply with the Client's Health and Safety Management Policy Statement and all related policies, standards, guidelines and procedures, to the extent applicable to the Services provided under this contract.



**Clause to be  
added to the  
Short Form  
Model conditions  
of engagement**

**20.** The Consultant will not use any of the Client's trademarks, service marks, logos or other brand identifiers (each an AT brand) without the prior written approval of the Client.

The Consultant will, if required by the Client, use AT brands in any signage, correspondence or other documentation relating to the Agreement. Any use of an AT brand will be for the purposes of this Agreement only, and is to be in accordance with the branding requirements notified by the Client to the Consultant or as otherwise available on the Client's website [[www.aucklandtransport.co.nz](http://www.aucklandtransport.co.nz)]



PO Box 3696, Shortland Street, Auckland 1010  
Level 1, Princes Court, 2 Princes Street, Auckland 1010

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F: +64 9 377 5591  
E: auckland@mrcagney.com

[www.mrcagney.com](http://www.mrcagney.com)

MRCagney Pty Ltd  
Company Number: 1317981

10 July 2015

Theunis Van Schalkwyk  
Key Strategic Initiatives Project Director  
Auckland Transport

Dear Theunis,

**Re: Public Transport Planning inputs for Auckland Light Rail Project**

Thank you for the opportunity to submit this proposal to provide technical Public Transport (PT) planning assistance to Auckland Transport (AT) on the CCFAS2 project. We understand that Auckland Transport requires Public Transport (PT) planning inputs over the next six months as part of the update and refinement of the CCFAS2 project.

This letter outlines our understanding of the key tasks required and includes our fee estimate for undertaking the work.

### **Key Tasks**

We understand we will be required to provide inputs, but not limited to, the following areas:

#### **1. CCFAS Peer Review**

Nicolas Reid will be providing advice and clarification to the CCFAS2 peer reviewers. It is envisaged that most inputs will be via email although there may be the need to attend meetings and undertake additional analysis if required.

#### **2. LRT staging/timing analysis with bus reference case**

We understand that there is a desire to revised the estimates and analysis of bus volumes, growth over time, corridor capacities and termini. This will include the development of graphs and a schematic style representation as a metro map or 'pipe' diagram. To develop a robust planning assessment that allows testing various scenarios and assumptions will require us to build a spreadsheet model with some coding. With this tool, if assumptions and inputs are changed, it automatically calculate the volumes on corridors and termini, and generate the graphs and diagrams. This will allow for testing, retesting and multiple comparisons to help identify the best outcomes under a variety of input assumptions. This will help provide a much more robust programme than the current indicative staging, and it would also allow for inputs to be quickly changed in response to any stakeholder feedback or changes in the route, capacities and concepts. Key steps within this task include:

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This task will be undertaken by MRCagney Auckland support staff with management and review from Nicolas Reid.

### **3. Hop data analysis (Transit Flows)**

We will obtain a recent extract of HOP ticketing data and load it into our tools which to help answer questions around patronage, loadings, crowding and reliability. This will help with the project planning to see exactly which services people are using, how many people are getting off at specific stops and which services and stops have overcrowding or excessive boardings.

Key steps in this task include:

- Obtaining ticketing data from AT
- Cleaning ticketing data
- Linking the ticketing data to scheduling data (GTFS) for the study period
- Computing statistics relating to stops and segments
- Visualising the data in the existing [Transit Stops/Ridership](#) and [Transit Flow](#) tools (click on the links for more information)

### **4. Meetings and Presentations**

In this task we have assumed that Nicolas Reid (primarily) will be required to attend and prepare for meetings, workshops and presentations throughout the duration of the project, as requested or as need to report or manage stakeholders.

### **5. Provisional sums**

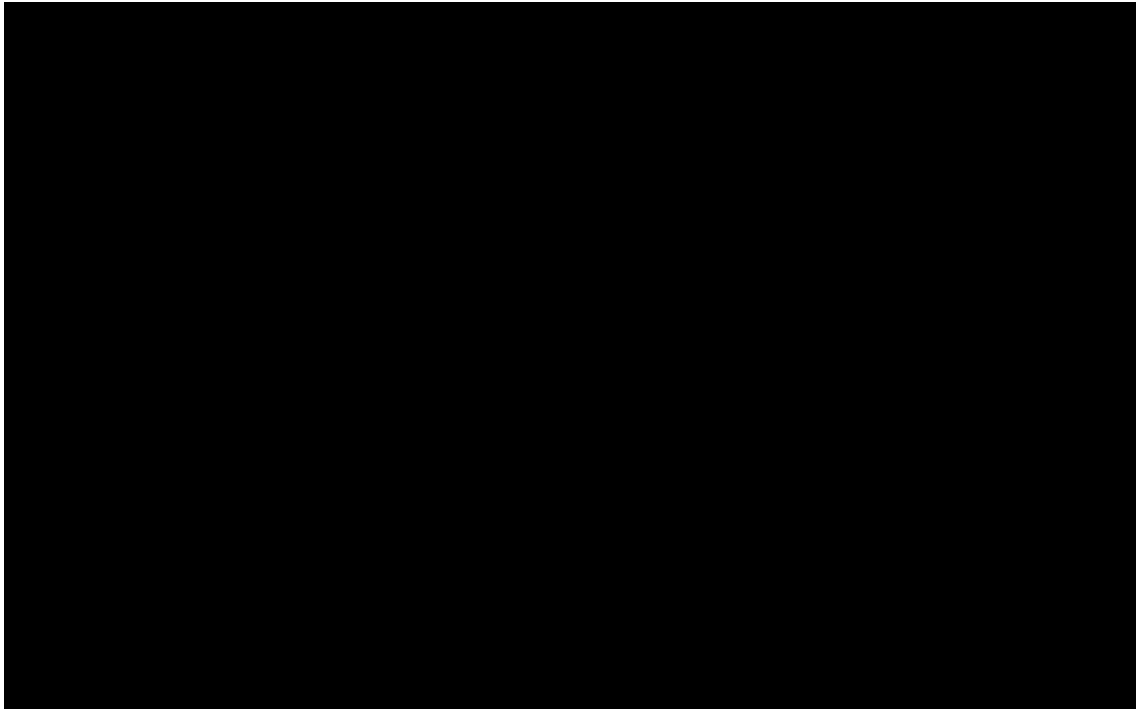
- Allowance for advice/analysis for stakeholder engagement
- Allowance for potential network mapping, presentations and stakeholder materials
- Allowance for potential data analysis support to project team
- Allowance for potential GIS support to project team

## **Fee Estimate**

The following table presents the fee (excluding GST) and preliminary time estimates of key staff we expect will be involved in the project until the 24<sup>th</sup> of December 2015.



**MRCagney**



We note that the project scope, required inputs and the budget estimates above may change as the project progresses. We propose to invoice this project monthly on a time-and expenses basis.

Appendix 1 includes the hourly rate for all staff who may be involved in the project over the next 12 months. Approval for any additional staff will be requested prior to their involvement with the project.

Please let us know if you have any queries on the above

Yours sincerely,

Nicolas Reid  
**Principal Public Transport Planner**  
**MRCagney New Zealand**



**Public Liability Insurance Certificate**

**CONTRACT NO: 342-16-031-PS PUBLIC TRANSPORT PLANNING INPUTS FOR CCFAS2**

To: Auckland Transport  
 Private Bag 92250  
 Auckland 1142

From: .....

(Name of Insurance Company)

..... (Branch)

Dear Sir/Madam

We confirm that we have issued a Public Liability Policy to:

**M R CAGNEY LIMITED**

in respect of :

**PUBLIC TRANSPORT PLANNING INPUTS FOR CCFAS2**

We undertake that this policy will not be cancelled or amended by us within the period of insurance without written advice to the insureds.

Period of Insurance is from.....to.....

The Limit of Indemnity / Liability is: .....

Sub limit insured for vibration, removal or weakening of support .....

Deductible is .....

Deductible for vibration, removal or weakening of support .....

The policy covers Liability arising out of:

- |  |          |
|--|----------|
| Principal's vicarious liability is covered by the policy | YES / NO |
| the ownership / use of mechanical plant                  | YES / NO |
| the use of hired plant                                   | YES / NO |
| the ownership / use of watercraft                        | YES / NO |
| the ownership / use of aircraft                          | YES / NO |
| the use of explosives                                    | YES / NO |

We advise that "special" terms, copy attached, have been specifically applied to the Project YES / NO

.....  
 Company Stamp Date



**Professional Indemnity Insurance Certificate**

**CONTRACT NO: 342-16-031-PS PUBLIC TRANSPORT PLANNING INPUTS FOR CCFAS2**

To: Auckland Transport  
 Private Bag 92250  
 Auckland 1142

From: .....  
 (Name of Insurance Company)  
 ..... (Branch)

Dear Sir/Madam

We confirm that we have issued a Professional Indemnity Policy to:

**M R CAGNEY LIMITED**

in respect of :

**PUBLIC TRANSPORT PLANNING INPUTS FOR CCFAS2**

We confirm that the policy provides indemnity for breach of professional duty by reason of negligence, whether by way of act, error or omission in the conduct of the business or occupation (as defined).

We undertake that this policy will not be cancelled or amended by us within the period of insurance without written advice to the insureds.

Period of Insurance is from.....to.....

The Limit of Indemnity / Liability is: .....  
 (Maximum \$500,000 - Minimum \$100,000, excluding costs and GST)

The Deductible is .....

The Policy provides for:

- |  |        |
|--|--------|
| 1. legal and other agreed costs in connection with any claim<br>If yes, limit \$ | Yes/No |
| 2. liability arising from error in design<br>If yes, limit \$                    | Yes/No |
| 3. liability for loss of documents<br>If yes, limit \$                           | Yes/No |

We advise that "special" terms, copy attached, have been specifically applied to the Project

Yes / No

(Signed)

.....  
 Company Stamp

.....  
 Date



**Motor Insurance Certificate**

**CONTRACT NO: 342-16-031-PS PUBLIC TRANSPORT PLANNING INPUTS FOR CCFAS2**

To: Auckland Transport  
 Private Bag 92250  
 Auckland 1142

From: .....  
 (Name of Insurance Company)  
 ..... (Branch)

Dear Sir/Madam

We confirm that we have issued a Motor Policy to:

**M R CAGNEY LIMITED**

in respect of :

**PUBLIC TRANSPORT PLANNING INPUTS FOR CCFAS2**

We undertake that this policy will not be cancelled or amended by us within the period of insurance without written advice to the insureds. Five (5) days written notice of cancellation shall be given to the Principal in the event of cancellation for non-payment of premium.

Period of Insurance is from.....to.....

The Sum Insured is

Section 1 – Vehicles .....

Section 2 – Liability .....

The Policy deductibles are

Section 1 .....

+ additional Driver under age

Section 2 .....

Policy extensions included are:

Earthquake YES /NO

Principal's vicarious liability YES /NO

We advise that "special" terms , copy attached, have been specifically applied to the Project YES / NO

.....  
 Company Stamp Date

