

The cover page features a blue background with a blurred cityscape of Auckland. A large, light blue diagonal shape cuts across the page from the bottom left towards the top right. The text is positioned on the white background to the right of this shape.

Auckland City Hospital

Transport review and
proposed transport
management plan

July 2021

flow

TRANSPORTATION SPECIALISTS



TRANSPORTATION SPECIALISTS

Project: Auckland City Hospital
Title: Transport review and proposed transport management plan
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SUMMARY OF OUR TRANSPORT REVIEW AND PROPOSED MANAGEMENT PLAN

Flow Transportation Specialists Limited (Flow) has

- ◆ reviewed the existing transport operations within and around the Auckland City Hospital site to understand and identify key transport related constraints and issues
- ◆ investigated solutions that can be implemented in the short-term to address the specific transport issues identified including an assessment of different options to change the operation of the internal roading connections.

Our key findings, issues identified, recommendations and preferred option to change the operation of the internal roading connections are as follows.

Key findings and issues

Travel patterns, parking provision and demand

- ◆ Travel by staff to the site (2019): 44% by car, 13%: public transport, 4% walk, 3% bike, 31% travel using a combination of modes, with the remainder travel by carpool/ride share, ADHB shuttle, ferry or motorcycle
- ◆ Staff say there are insufficient cycle parking facilities and facilities for those who bike to work
- ◆ Overall, the demand for onsite car parking on a typical weekday exceeds the amount of available parking on the site. Both parking buildings are generally full by 9.30 am on a typical weekday
- ◆ Around 20 to 25% (up to 120 spaces) of parking demand in Carpark A are not visitors or patients (these vehicles are university students, other non-hospital related users or hospital staff)
- ◆ As result of a lack of onsite parking, traffic attempting to enter the Site from Park Road queues along Park Road and Grafton Road from the Carpark A and blocks the single eastbound through lane on Park Road for all vehicles, including buses. The queues on Park Road and Grafton Road delay service and emergency vehicles accessing the Site via Gate 4 from Grafton Road or Gate 1 from Park Road and causes people to miss hospital appointments
- ◆ Carpark B reaches capacity between 9:00 am and 1:00pm during the weekdays
- ◆ Public entering Gate 4 from Grafton Road, who are intending to park in Carpark B are unaware of the remaining capacity of the parking building until entering the Site
- ◆ Based on the number of visitors entering and exiting, it would appear that of the 267 visitor spaces available in Carpark B, approximately 100 spaces are used by staff every day
- ◆ Informal parking in and around the site (eg on Grafton Road grass berms)
- ◆ Offsite parking provided in various locations
- ◆ Staff want an increase in the available of off-site parking options and ADHB to actively encourage their use (to consider subsidising offsite parking)

Pick up and drop off areas

- ◆ Drop off areas are not easily accessible with the current daily congestion on Park Road
- ◆ There are currently informal drop offs near the new Inwards Goods loading dock that need to be discouraged.

Internal wayfinding issues

- ◆ Inconsistent and confusing approach to vehicle and pedestrian wayfinding signage.

Loading and servicing

- ◆ No resilience or alternative access to loading docks
- ◆ Service vehicles required to exit along with all cars at Grafton Road if travelling between Building A21 and docks 1 & 2. This is difficult and time consuming during peak traffic periods

Short term transport management solutions

Inform the public if there are any available parking spaces in Carpark A and Carpark B and manage traffic congestion on Park Road and Grafton Road

- ◆ Provide information to users as to how many parking spaces are available in the parking buildings and/or when the parking buildings are full, well before the time they attempt to enter the Site through the use of electronic variable message signs

Actively manage and restrict who can park in the Hospital parking buildings.

- ◆ Control exit from Carpark A for full 24-hour period, preventing free exit after midnight and before 8.30am
- ◆ Significantly increase parking fees for all casual parking and implement a parking validation scheme, whereby patients and visitors to the Hospital receive a reduced rate if they validate their parking ticket.

Manage allocation of parking to satisfy visitor and patient parking demand first

- ◆ Restrict staff from using Carpark A. Dedicate Carpark A to patients and visitors only
- ◆ Restrict use of visitor spaces on the top levels of Carpark B to visitors (currently staff can park here if lower levels are full, albeit they pay public rates if exiting before 7 pm). However, still provide a separate area for afternoon shift staff, not associated with the public visitor parking area.
- ◆ We understand the number of levels assigned to the afternoon shift staff has been increased recently and further analysis of the demand for afternoon shift parking spaces should be undertaken following this recent change.

Reduce the parking demand on the Site generated by Hospital activities, with a focus on staff parking demand

- ◆ Increase the availability of staff parking off the Site, and provide free, frequent and reliable shuttle services. Retaining the temporary 200 offsite Symonds Street parking spaces after services tunnel construction is complete
- ◆ Encourage and incentivise staff to use available off-site parking

Encourage and incentivise staff to use available public transport, walking and cycling

- ◆ Further development of key areas within the ADHB Transport and Parking Strategy and Staff Travel Plan including subsidised public transport travel, ADHB dedicated subsidised bus services, additional convenient, safe and secure bike, scooter and motorbike parking, end of trip facilities for staff to use.
- ◆ Monitor and report on the performance measure contained in the ADHB Transport and Parking Strategy
- ◆ There are multiple managers assigned to various transport areas. It may be more beneficial to have one person appointed as the Travel Plan representative and champion sustainable transport to and from the Site

Improvements to safety concerning pick up and drop off areas

- ◆ Install an additional length of pedestrian fencing to prevent visitors being dropped off/picked up outside the new Inwards Goods loading dock
- ◆ Implement a marked drop off area east of new Inwards Goods loading dock, to 'replace' the existing informal drop off opposite the loading dock.

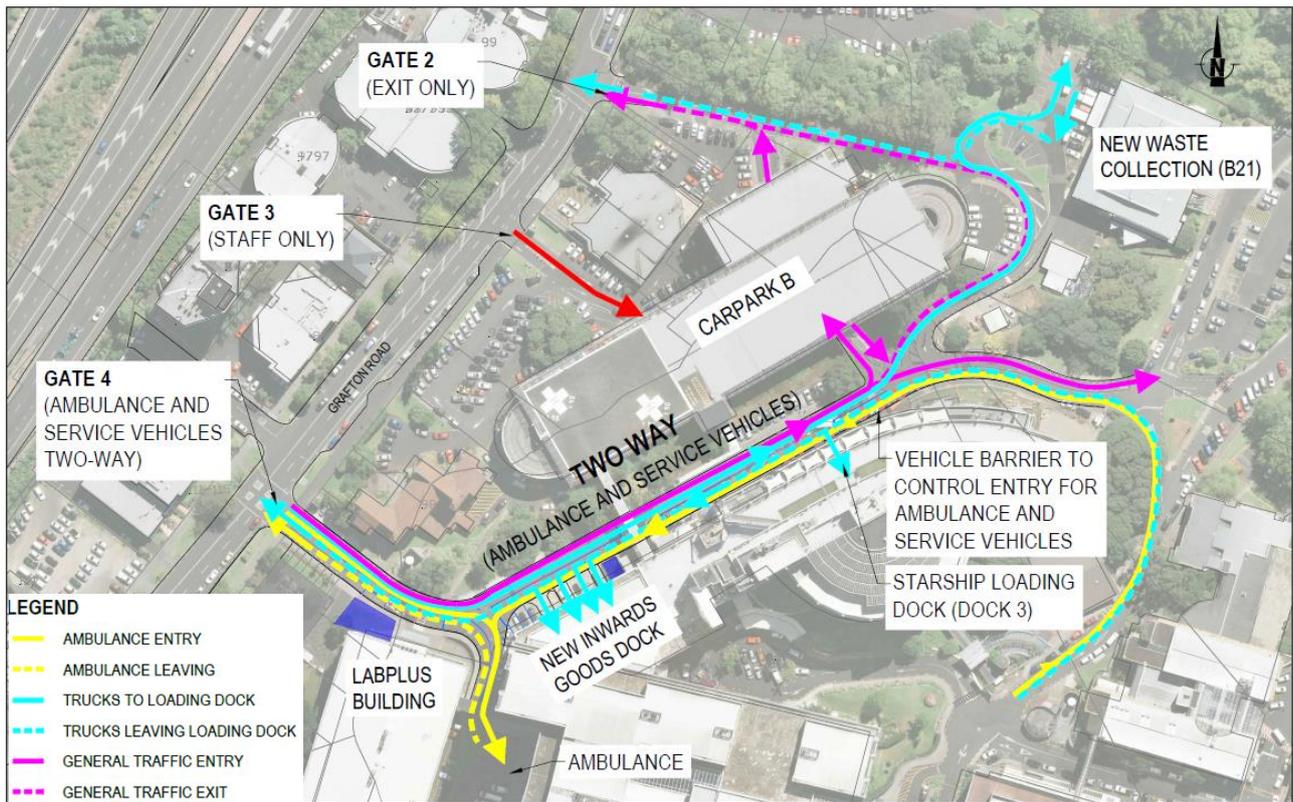
Improve wayfinding signage

- ◆ Develop a universal and coherent approach to both vehicle and pedestrian wayfinding signage and apply as future development occurs. Replace or supplement existing signs where possible.
- ◆ Provide pedestrian wayfinding signage maps at the key access points to the Site

Improvements to loading operations and traffic flow

- ◆ As the demand for the use of the loading docks increase and conflicts arise, an allocated time slot will help better manage the existing loading areas. Implement scheduling of deliveries through a Delivery Management System which often occurs in modern commercial developments
 - Spreading the timing of deliveries more throughout the day, rather than concentrated before 12 noon, would help provide additional loading dock capacity (this is a medium to long term solution if required)
- ◆ Allow for two-way flow of vehicles past loading docks and to Carpark B by implementing Option 2 which alters the traffic flow through the Site. Option 2 is shown in Figure S1 overleaf
- ◆ Option 2 allows for greater internal site connectivity and circulation, especially for internal deliveries, which currently requires trucks to exit out onto Grafton Road, before re-entering to access the new loading dock
- ◆ Greater connectivity will be advantageous during construction of the Central Plant Building if other internal connections are lost.

Figure S1: Option 2



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- APPENDIX B PARK ROAD AND GRAFTON ROAD TRAFFIC DATA
- APPENDIX C TRACKING ASSESSMENT

1 WHAT IS THIS REPORT ABOUT?

Auckland District Health Board (ADHB) has requested Flow Transportation Specialists Limited (Flow) to

- ◆ review the existing transport operations within and around the Auckland City Hospital site to understand and identify key transport related constraints and issues
- ◆ investigate short-term options to address specific transport issues as well as possible implications of changes to the operation of the internal roading connections.

The following matters are covered in this report.

- ◆ Existing transport operations within the Hospital site, identifying issues and suggesting short term solutions concerning
 - General vehicle access
 - Emergency access
 - Parking provision and demand, onsite and offsite
 - Speed management
 - Loading – existing and future relocation
 - Pedestrian wayfinding
 - Cycle parking
 - Public transport
 - External road network
 - ADHB Sustainable Transport Plan and 2019 staff Travel survey results
- ◆ Potential internal operation options (Options 1 to 3) assessment and the identification of a preferred option
- ◆ Summary, recommendations and next steps.

Various stages of development on the Hospital site are envisaged in the future, and the focus of this report is the transport changes that could be implemented in the short-term.

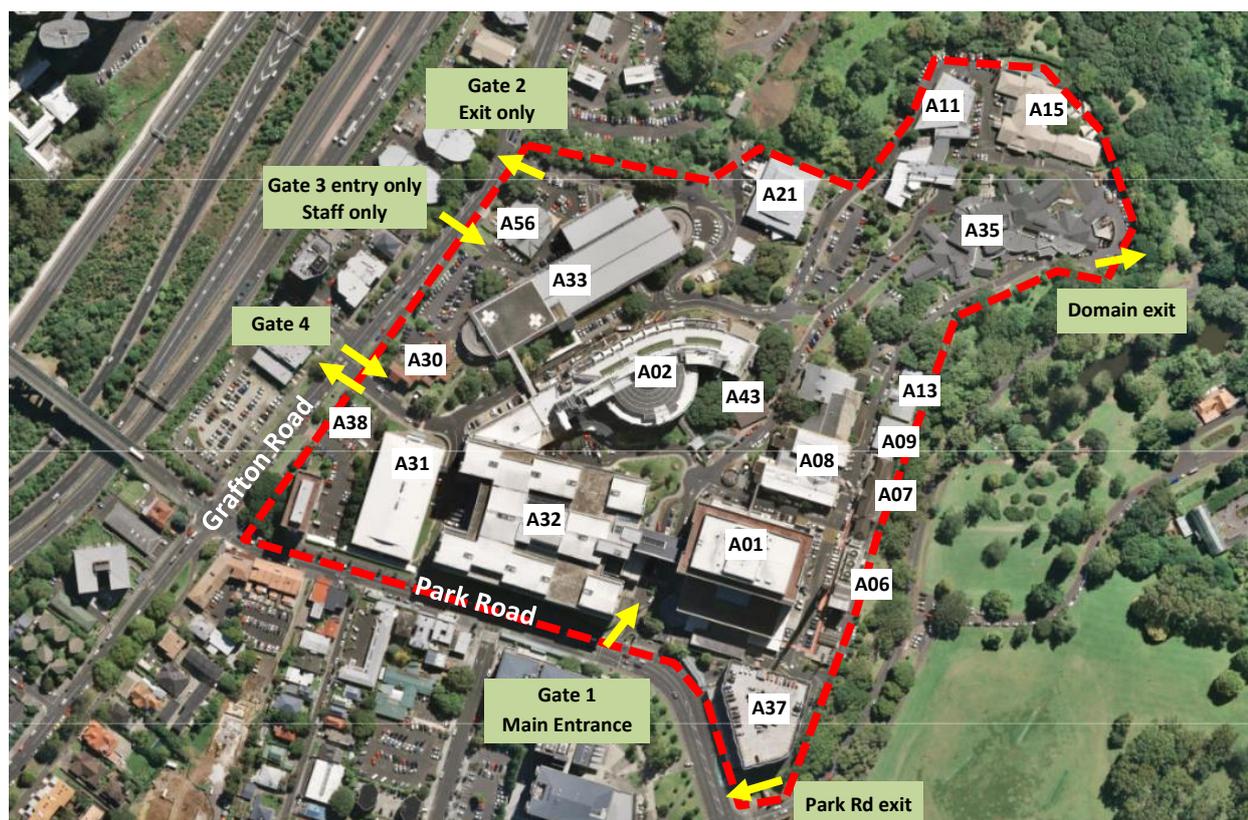
- ◆ **Short-term changes** – the focus of this Transport Assessment
- ◆ **Medium term changes** – construction traffic management associated with the services tunnel project
- ◆ **Long-term changes** - long term aspirations associated with the master plan for the Auckland City Hospital.

2 EXISTING TRANSPORT OPERATION, IDENTIFICATION OF ISSUES AND POSSIBLE SOLUTIONS

2.1 Site location

The extent, and internal layout of the Auckland City Hospital site (Site), is shown in Figure 1. The Site is fronted by the arterial roads of Park Road to the south and Grafton Road to the west, and the Auckland Domain to the north and east.

Figure 1: Existing Auckland City Hospital site layout



2.2 Vehicular access and internal circulation

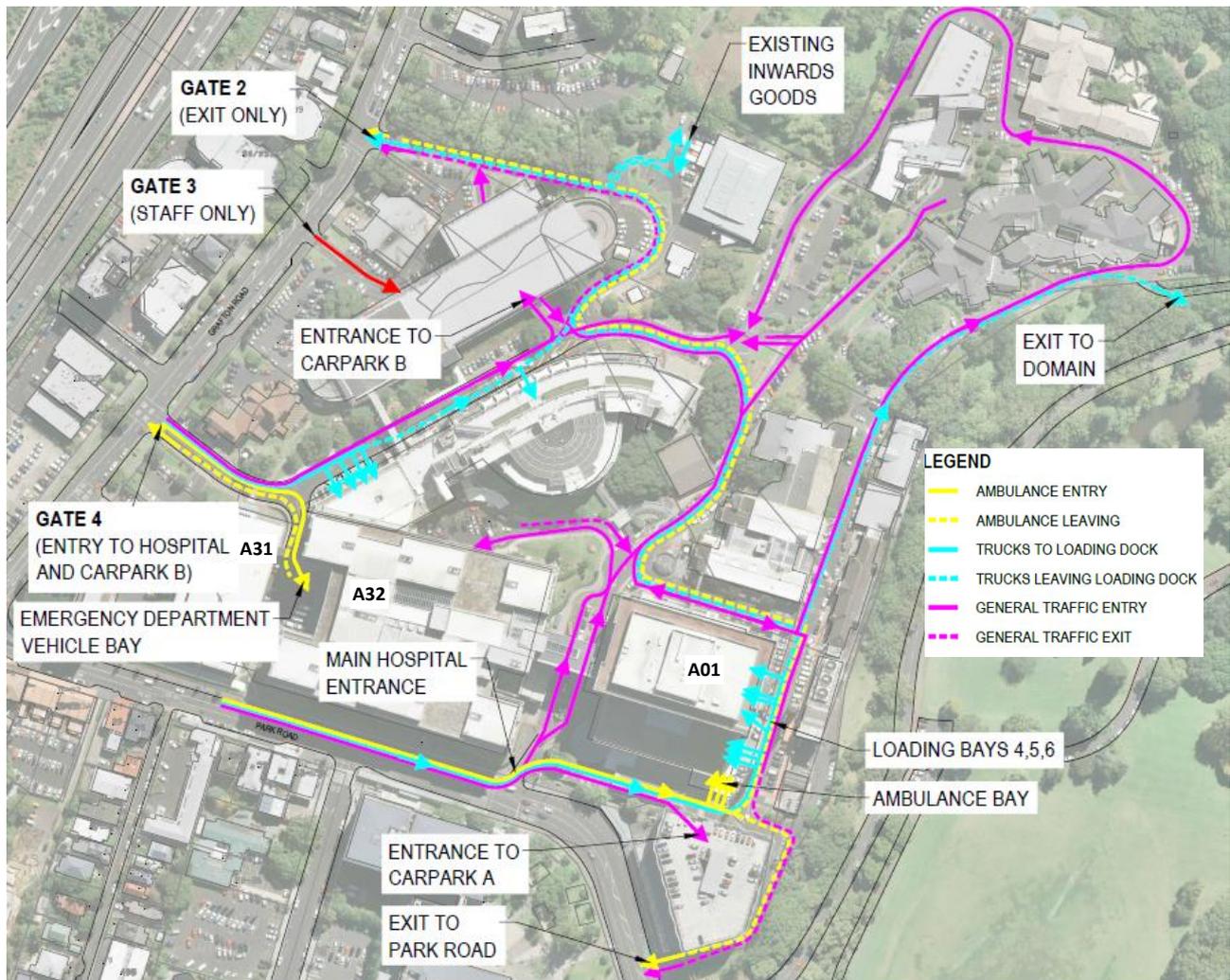
The existing vehicle entry and exit points to and from the Hospital are shown previously in Figure 1.

These access points to the external road network are as follows:

- ◆ **Gate 1** (main entrance) - signalised entry only from Park Road (all vehicles) into the Site including Carpark A (staff and visitor parking building, see building A37)
- ◆ **Gate 2** – signalised exit to Grafton Road (all vehicles)
- ◆ **Gate 3** – entry only to Carpark B (staff only entrance to the parking building, see building A33)
- ◆ **Gate 4** - dual entry and exit point on Grafton Road (all vehicles, provides access to Carpark B)
- ◆ **Park Road exit** – exit only onto Park Road, mostly from Carpark A
- ◆ **Domain exit**, minor exit only from the eastern side of the Site.

Due to the extent of the Site, the locations of the buildings on the Site and the resulting internal vehicle network, there is limited scope to provide additional vehicle access points to service the Site. As such consideration needs to be given as to how better use can be made of the existing access points, and how the existing internal circulation could be improved. Figure 2 summarises the existing internal traffic flows.

Figure 2: Existing internal traffic flows and gate access points



2.3 Emergency access

As highlighted in yellow above, there are two main emergency vehicle bays located in Buildings A01 and A32 (Emergency Department vehicle bay between A31 and A32).

Emergency vehicle access to these vehicle bays can be constrained by existing traffic flows and congestion, internal and external to the Site. In particular

- ♦ access to A01 ambulance bays is via the main Park Road entrance, which is congested at certain times of the day
- ♦ access to Emergency Department ambulance bays is via Gate 4 only (as existing traffic flow is only one way from Gate 4 past Carpark B)

- ♦ there is no internal link between the ambulance bay at A01 and the Emergency Department. Ambulances need to travel via Park Road and Grafton Road due to the existing one-way link adjacent to Starship (Building A02).

2.4 Onsite parking provision

There are two parking buildings on the Site, Carpark A and B. These are available for use by staff, patients and visitors to the Hospital. They can also be used by the general public, including Auckland University students.

A breakdown of the available parking spaces in both parking buildings is shown Table 1. There is a total of 1,663 parking spaces provided in these two buildings. There are also a number of onsite, at grade parking spaces around the Site, both formal and informal.

Parking costs for use of the Carparks A and B start at \$3 for half an hour and extend up to \$19 for 8 hours.

Table 1: Auckland City Hospital parking building capacity

Type of parking spaces	Carpark A	Carpark B
Public spaces	434	267
Staff spaces	39	923
Total spaces in parking buildings	473	1,190
	1,633	

Alternative offsite carparking is available for hospital staff as shown in Table 2. Construction works to commence in the coming year will mean that approximately 200 parking spaces are lost around the site (not within the parking buildings). This has been offset by providing some 200 parking spaces at a site on Symonds Street.

Table 2: Available offsite parking for staff

Carpark	Number of spaces for hospital staff	Cost	Status	Shuttle available nearby
Davis Crescent, Newmarket	106	Pay weekly	Waiting List	Yes
Oxton Motors, Grafton	35	Pay weekly	Waiting list	No
Auckland Trotting Club, Greenlane	100+	Free	Spaces available	Yes
Broadway Carpark, Newmarket (Wilsons)		Pay by month	Spaces available	Yes
Eden Street Carpark (Wilsons)		Pay by month	Spaces available	Yes
Gateway Carpark (Wilsons)		Pay by month	Spaces available	No
Glenside Crescent Carpark (Wilsons)		Pay by month	Spaces available	No
Karangahape Road (Wilsons)		Pay by month	Spaces available	No
Khyber Pass Carpark (Wilsons)		Pay by month	Spaces available	Yes
Symonds Street (temporary during construction on Grafton site)	200	Pay weekly	Spaces available	No

2.5 Parking demand for use of parking buildings

We have been provided with entry and exit traffic volume data from Wilsons Parking who operate the two parking buildings onsite.

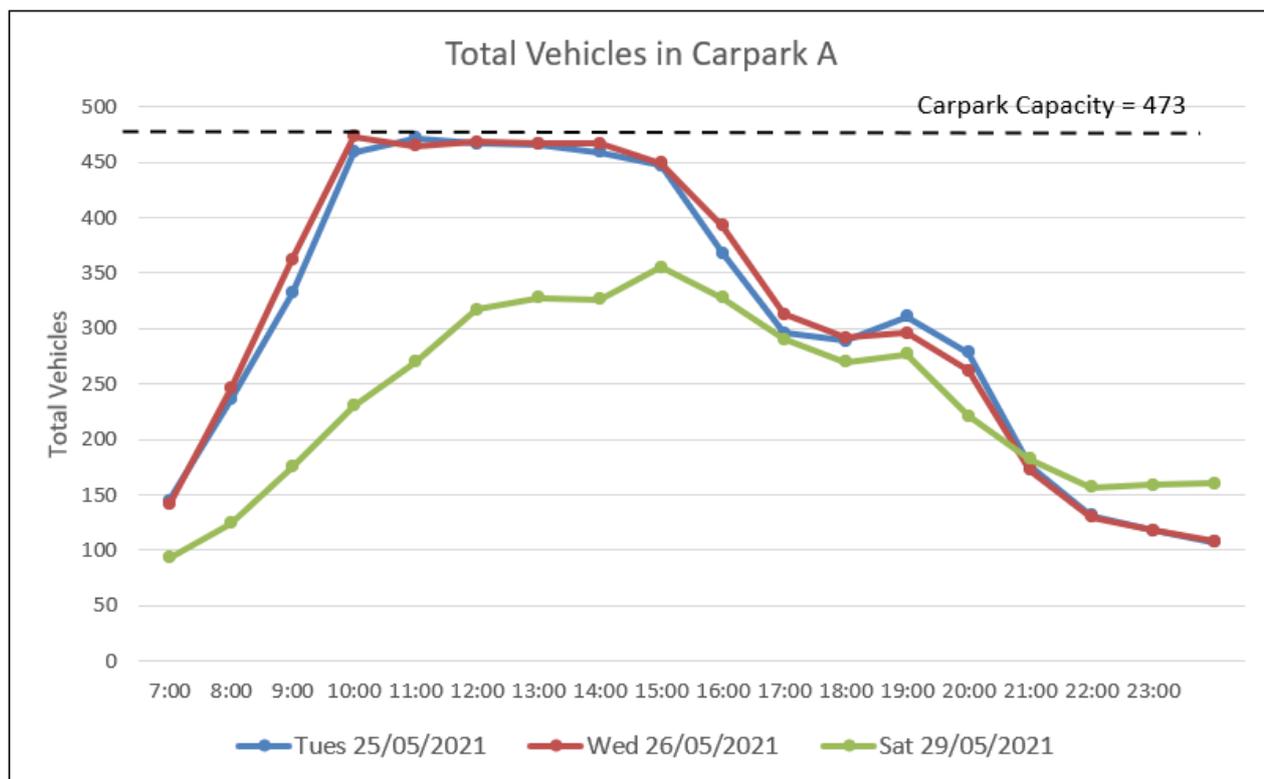
2.5.1 Carpark A demand and resulting issues

Figure 3 overleaf presents the total vehicle demand for use of Car Park A, based on the entry and exit volume data over a 2-day weekday and Saturday in May 2021.

The assessment of this data shows that

- ◆ Carpark A is at capacity between 9:30am and 2:00pm on a typical weekday
- ◆ Onsite observations indicate Carpark A is 50% full at 8am. We have therefore assumed there are at least 80 parked cars at the beginning of the analysed time period and aligns with Car Park A reaching capacity at 9.30am.
- ◆ The exit barrier arms are up between 12 am and 8.30am each weekday morning enabling ‘free’ exit
- ◆ Both Carpark A reaches capacity by around 9:30am on a weekday, causing severe congestion on Park Road and subsequently Grafton Road as drivers queue to obtain access to the parking buildings

Figure 3: Total demand for parking in Carpark A (May 2021 data)



Our onsite observations and discussions with ADHB staff indicate that the demand for use of Carpark A after 9:30 am on weekdays, results in severe congestion eastbound on Park Road as shown in Figure 4. This in turn results in severe accessibility issues for the Hospital

- ◆ Through eastbound and left turning traffic into the Hospital site share a single lane on Park Road. Left turning traffic into the Hospital is typically queued back along Park Road and Grafton Road because of lack of parking capacity in Carpark A between 9.30 am and 2 or 3 pm
- ◆ This congestion and lack of onsite parking causes patients to miss hospital appointments, as they give up trying to find a parking space. Further visitors cannot find parking on the site
- ◆ Bus travel times on Park Road are significantly affected. This matter has been identified by Auckland Transport as a significant problem to bus reliability for buses using the Park Road route.

Figure 4: View west along Park Road showing significant congestion entering hospital (weekday, 11am)



We have reviewed the staff travel survey undertaken in 2019 for the ADHB (discussed further in Section 2.13). A survey of users of Carpark A was undertaken as part of the travel survey with the results presented in Table 3.

Table 3: Carpark A user staff survey (2019)¹

Carpark A user	Proportion of surveyed users
Staff or contractors	16%
Patients/visitors	76%
University or work close by	2%
No response	7%

Key points from the above survey are:

- ◆ 16% of the spaces in Carpark A are occupied by staff on a weekday. These staff do not have designated spaces and pay visitor rates. The survey excluded the small number of staff that have designated parking spaces Carpark A (approximately 40 parking spaces).
- ◆ staff who responded as being part of the university or working close by (2%). From our observations and discussions, we believe this proportion underrepresents the use Carpark A by university students and other non-hospital related users
- ◆ In addition, 7% who ‘did not respond’ when asked the reason for using the car park. Potentially a large proportion of this 7% will be people other than patients or visitors to the Hospital, ie medical students or people who work close by.

¹ ‘Findings of the 2019 Staff Travel Survey – Auckland District Health Board’

Taking the above into account, we consider that between 20% and 25% of drivers who presently park in Carpark A are not visitors or patients associated with Hospital activities (these vehicles are staff, university or work close by, 'no response'). This equates to around between 100 to 120 parking spaces who are not visitors or patients.

2.5.2 Carpark B demand and resulting issues

Figure 5 presents the total vehicle demand for use of Carpark B, based on the entry and exit volume data over a 2-day weekday and Saturday in May 2021.

Figure 5: Total demand for parking in Car Park B (May 2021 data)

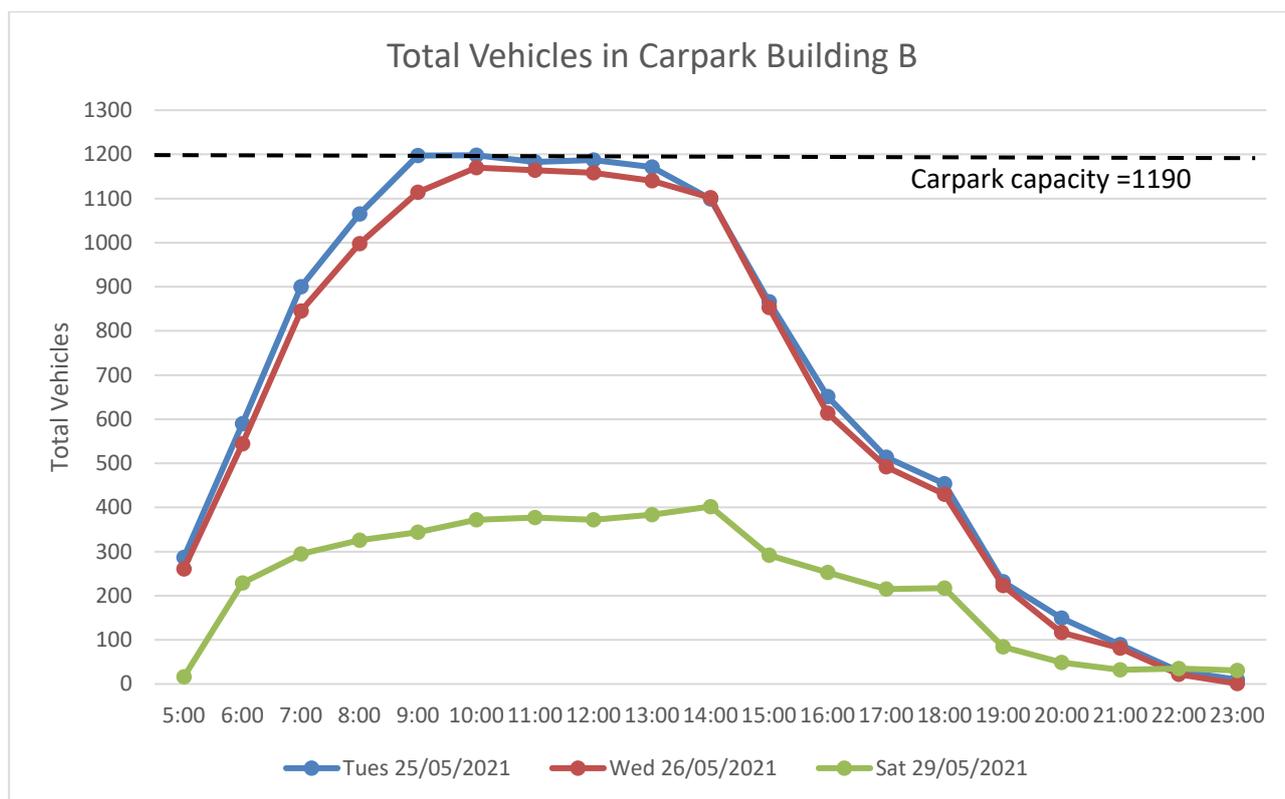


Figure 6 shows the total number of visitors or patients using Carpark B across the day, and Figure 7 shows the total occupancy by staff or visitors and patients. This is based on the ticket and swipe card data and excludes staff. The total number of public parking spaces available in Carpark B is 267 spaces.

Figure 6: Total demand for visitors/patients use of Carpark B (staff entering with swipe cards are excluded)

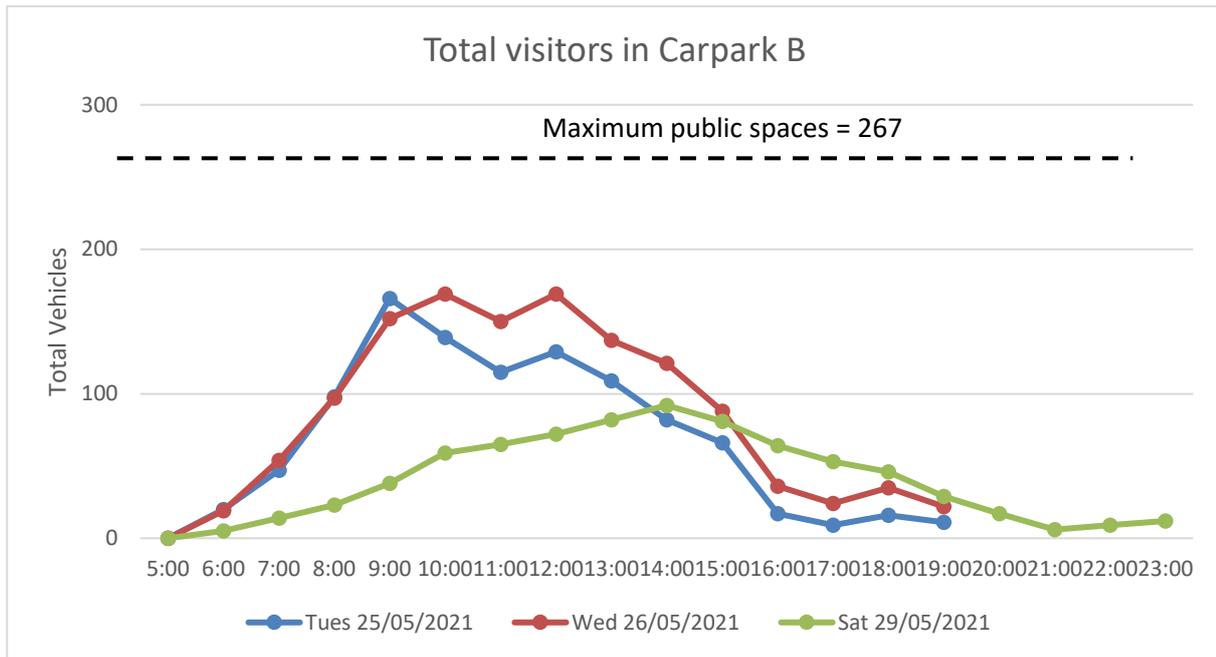
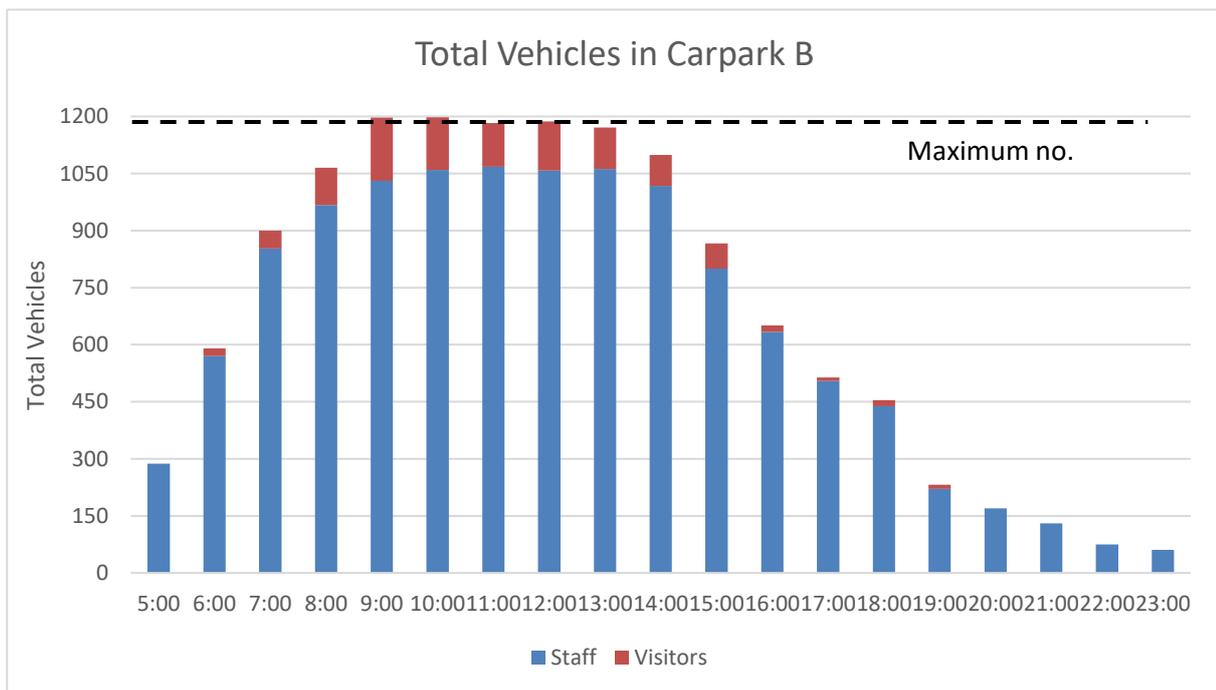


Figure 7: Total demand for visitors/patients use of Carpark B (staff entering with swipe cards are excluded)



From the available data it can be seen that

- ◆ Carpark B reaches maximum capacity around 9:00am or 10:00am during the weekdays
- ◆ The busiest period is between 9:00am and 1:00pm when Carpark B is full
- ◆ Based on the number of visitors/patients entering and exiting, it appears that of the 267 visitors/patient parking spaces available, approximately 100 are used by staff every day. This reduces the supply of visitor and patient spaces to around 170 spaces rather than 270 spaces which in turn results in additional demand for patients and visitors to park in Carpark A

- ◆ To help maintain free parking spaces for visitors and patients, we suggest that staff are restricted to be able to park on the top levels of Carpark B (currently staff can park here if lower levels are full, albeit they pay public rates if exiting before 7 pm). However, we do not propose the number of parking spaces for the afternoon shift staff is reduced. A separate area for afternoon shift staff should still be provided, but not associated with the public visitor parking area. We understand the number of levels assigned to the afternoon shift staff has been increased recently and further analysis of the demand for afternoon shift parking spaces should be undertaken following this recent change.

2.5.3 Summary of parking issues

- ◆ Overall, the demand for onsite parking on a typical weekday exceeds the amount of available parking on the site. Both parking buildings are generally full by 9.30 am on a typical weekday
- ◆ As result of a lack of onsite parking, traffic attempting to enter the Site from Park Road queues along Park Road and Grafton Road from the Carpark A and blocks the single eastbound through lane on Park Road for all vehicles, including buses. The queues on Park Road and Grafton Road delay service and emergency vehicles accessing the Site via Gate 4 from Grafton Road or Gate 1 from Park Road
- ◆ Public entering Gate 4 from Grafton Road, who are intending to park int Carpark B are unaware of the remaining capacity of the parking building until entering the Site
- ◆ A large number of staff drive to the Site and this is detailed in the staff travel survey in Section 2.10 of this report
- ◆ Based on the data provided for Carpark B, approximately 100 of the spaces intended for visitors are occupied by staff every day (some of which will be the afternoon shift staff)
- ◆ Based on the data provided for Carpark A, approximately 100 to 120 spaces are used by people who are not visitors or patients of the Hospital
- ◆ Informal parking in and around the site (eg on Grafton Road grass berms).

2.5.4 Potential parking and associated congestion solutions

Informing the public if there are any available parking spaces in Carpark A and Carpark B

- ◆ Provide information to users that the parking buildings on the site are full, well before the time they attempt to enter the Site. The existing sign at Gate 1 main entrance is positioned too late for most drivers who have waited in the queue on Park Road for up to 20 mins
- ◆ We suggest that variable message signs, which are linked to the carpark management systems, showing how many spaces are available in each parking building and /or when a parking building is full should be located:
 - on Grafton Road southbound 50-100 m before the intersection with Gate 4
 - on Grafton Road northbound 50-100 m before the intersection with Park Road
 - on Park Road westbound 50-100 m before the intersection with Gate 1
 - on Park Road eastbound between the intersection with Grafton Road and Gate 1.

Reserving the parking on the Site for Hospital activities

- ◆ Control entry and exit to Carpark A for full 24-hour period, preventing free exit after midnight and before 8.30am (which university students and others are potentially taking advantage of)
- ◆ Significantly increase parking fees for all casual parking and implement a parking validation scheme, whereby patients and visitors to the Hospital receive a reduced rate if they validate their parking ticket.

Manage allocation of parking to satisfy visitor and patient parking demand first

- ◆ Restrict staff from using Carpark A. Dedicate Carpark A to patients and visitors only
- ◆ Restrict use of visitor spaces on the top levels of Carpark B to visitors (currently staff can park here if lower levels are full, albeit they pay public rates if exiting before 7 pm). However, still provide a separate area for afternoon shift staff, not associated with the public visitor parking area.

Reduce the parking demand on the Site generated by Hospital activities, with a focus on staff parking demand

- ◆ Increase the availability of staff parking off the Site, and provide free, frequent and reliable shuttle services. We recommend considering retaining the temporary 200 offsite Symonds Street parking spaces after services tunnel construction is complete
- ◆ Encourage and incentivise staff to use available off-site parking
- ◆ Further development of key areas within the Transport and Parking Strategy (discussed further in Section 2.10) including subsidised public transport travel, ADHB dedicated subsidised bus services, convenient, safe and secure bike, scooter and motorbike parking, end of trip facilities for staff to use.

Provide additional parking on the Site

- ◆ We understand that an additional parking building has been investigated but discarded due to the high cost.

2.6 Pick up and drop off areas

A large number of patients and visitors are dropped off and picked up at the Site each day. The following are noted regarding pick up and drop off areas within the Site:

- ◆ 2 minute drop-off parks outside the main entrance which also provides for pickups and drop offs for shuttles from other sites
- ◆ People are dropped off at informal drop off areas near the new Inwards loading dock.

Currently members of the public also use the section of road between Gate 4 and Carpark B as an informal drop off point, despite parking restrictions. It is proposed that an additional length of pedestrian fencing should be installed opposite the new Inwards Good loading dock. This will protect pedestrians from heavy vehicles at the loading docks performing reversing movements and will also discourage pickups/drop offs occurring in non-designated parts of the road.

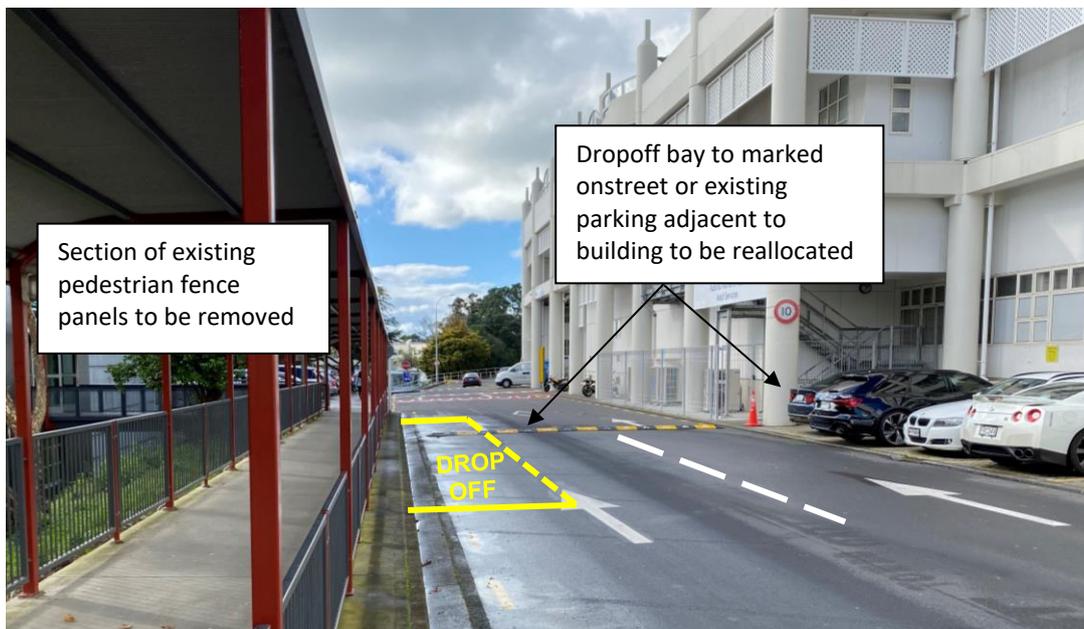
2.6.1 Summary of pick up and drop off issues

- ◆ Drop off areas are not easily accessible with the current daily congestion on Park Road
- ◆ There are currently informal drop offs near the new Inwards Goods loading dock that need to be discouraged.

2.6.2 Potential pick up and drop off solutions

- ◆ Restrict drop offs near the new Inwards Goods loading dock through additional pedestrian fencing (shown in further detail in options in Section 3).
- ◆ Provide a marked drop off area east of new Inwards Goods loading dock, to 'replace' the existing informal drop off opposite the loading dock. Either:
 - in the existing reserved parking adjacent to Starship or
 - on the road next to existing pedestrian fence (with fence panels removed) as shown in Figure 8

Figure 8: Proposed Drop off area



2.7 Internal circulation and wayfinding

The Site has been developed progressively over many years. This has led to an inconsistent approach to vehicle and pedestrian wayfinding signage and presents a very confusing Site for visitors.

We have provided some examples of good pedestrian wayfinding signage in Appendix A. These include:

- ◆ Auckland Transport has recently been delivering a good consistent approach to pedestrian wayfinding in Auckland.
- ◆ Auckland University's city campus has a wayfinding system in place which is generally consistent but can be missed.

While we are not proposing recreating the existing signs, a consistent approach to wayfinding should be developed and incorporated in any new development or construction going forward.

2.7.1 Summary of internal wayfinding issues

- ◆ Inconsistent and confusing approach to vehicle and pedestrian wayfinding signage.

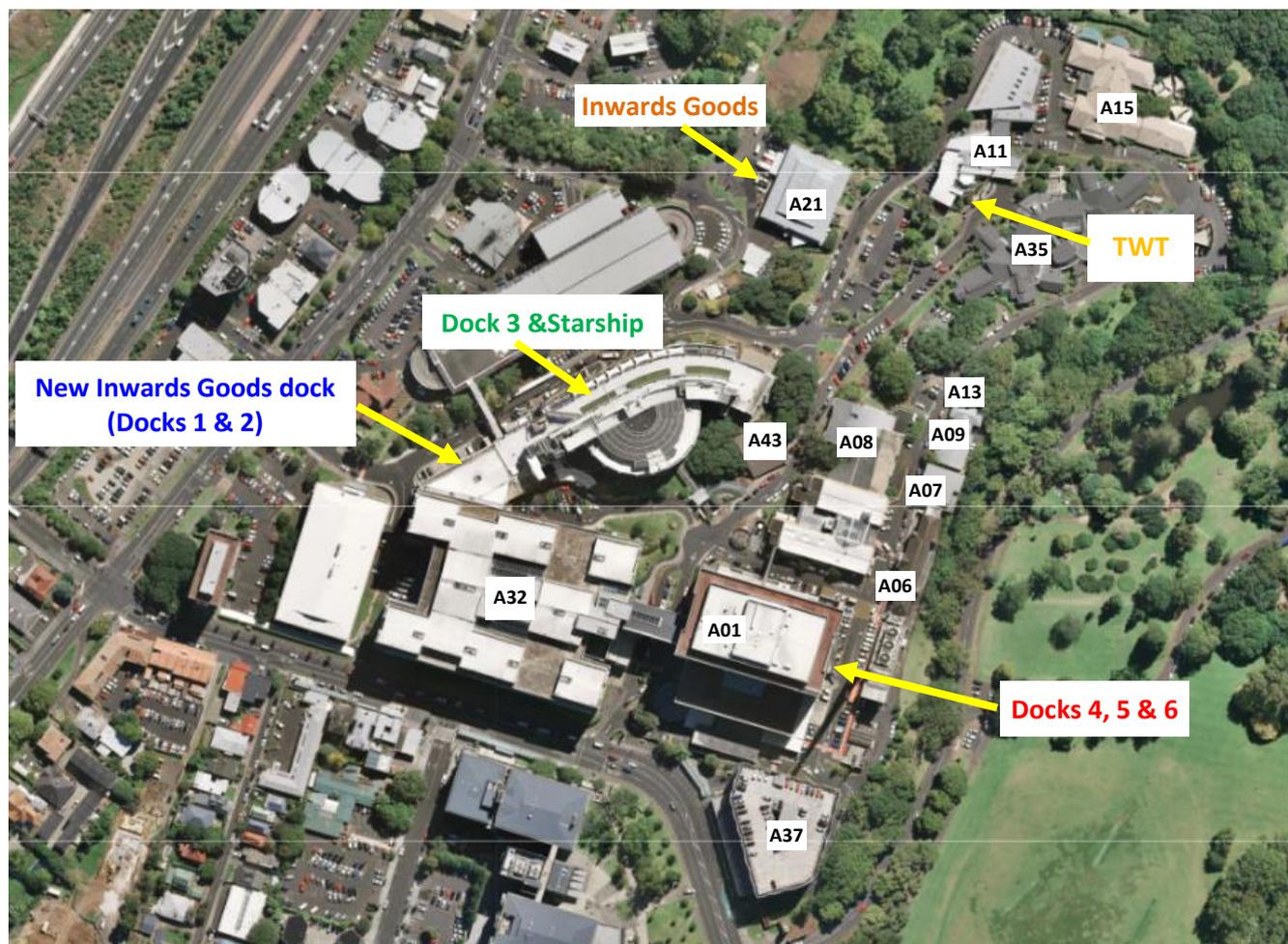
2.7.2 Potential wayfinding solutions

- ◆ Develop a universal and coherent approach to both vehicle and pedestrian wayfinding signage and apply as future development occurs. Replace or supplement existing signs where possible.
- ◆ Provide pedestrian wayfinding signage maps at the key access points to the Site.

2.8 Loading and servicing

The Auckland City Hospital site has considerable loading and servicing requirements on a typical weekday. Loading activities are currently spread around the Site in 4 or more locations as shown in Figure 9.

Figure 9: Auckland City Hospital loading dock locations



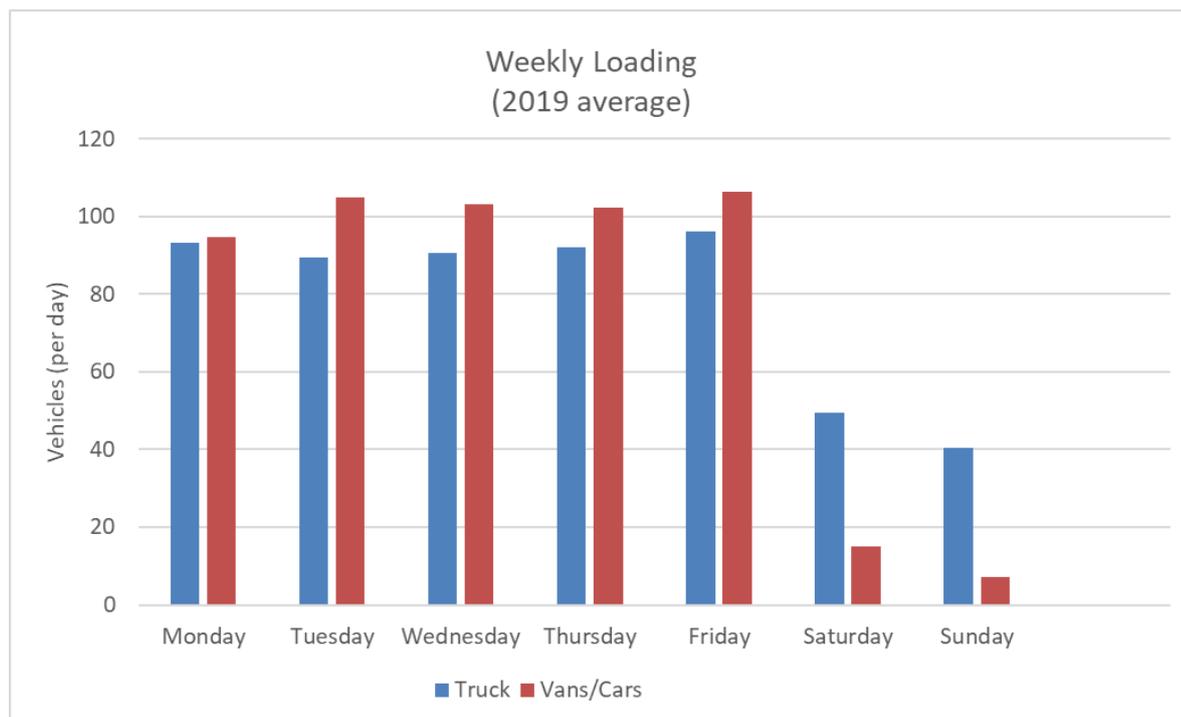
In the immediate future the following changes are proposed.

- ◆ The existing loading operations at Building A21 will all be re-located to the new Inwards Goods loading dock under the Starship building
- ◆ some deliveries from dock 4 will be relocated to docks 1 and 2. However, one loading bay will be lost at dock 4 due to a new power substation being constructed
- ◆ Goods are currently transferred from Building A21 to the hospital buildings via an internal hospital truck. The need for this will be considerably reduced with the relocation of the majority of loading to docks 1 and 2
- ◆ Waste bins and a waste compactor are currently located at loading dock 2 (Inwards Goods loading dock). Building A21 will accommodate waste collection and processing in the future, with the waste compactor removed from the new Inwards Goods loading dock area. However, waste will still be collected at dock 2 and transferred to Building A21, requiring truck movements between these 2 loading areas.

We have analysed data received from ADHB as to the usage of the onsite loading docks. Key information is as follows:

- ◆ Trucks vary in length between 7 m and 10.5 m and van deliveries use a typical 6.4 m courier van. The supplied vehicle lengths have enabled us to test the vehicle tracking requirements of the proposed loading options (Section 3)
- ◆ Deliveries occur between 5 am and 3 pm (with only 1 or 2 after 3 pm)
 - The majority of deliveries occur on a weekday between 6 am and 12 pm
 - There are minimal deliveries on Saturday and Sunday (as shown in Figure 10 below)
- ◆ Truck loading times are typically some 7 minutes, but can be up to 10 minutes. This results in a relatively short time that a truck occupies a loading dock
- ◆ Deliveries have no exact arrival time, but only an approximate arrival time window. It is considered the localised delays are not a significant issue but there are issues with suppliers arriving earlier or later than planned due to traffic congestion, or other delivery jobs.

Figure 10: Auckland City Hospital weekly deliveries (2019 data)



From our understanding, the number and capacity of the loading docks does not currently appear to be an issue. However, implementing a Delivery Management System where deliveries are more actively managed with more specific delivery or pick up times would provide additional capacity in the future. This type of scheduling job is a considerably involved task and we understand has been attempted previously and not completed.

In addition, spreading the timing of deliveries more throughout the day, rather than concentrated before noon, would help provide additional loading dock capacity. This is not necessarily required immediately for capacity reasons, and this will be a complex task to re-schedule deliveries from a number of suppliers.

2.8.1 Summary of loading/servicing issues

- ◆ No resilience or alternative access to loading docks
- ◆ Service vehicles required to exit along with all cars at Grafton Road if travelling between Building A21 and docks 1 & 2 (new Inwards Good loading area). This is difficult and time consuming during peak traffic periods.

2.8.2 Potential loading/servicing solutions

- ◆ As the demand for the use of the loading docks increase and conflicts arise, an allocated time slot will help better manage the existing loading areas. Further consideration of scheduling of deliveries through a Delivery Management System which regularly occurs in modern commercial developments
 - Spreading the timing of deliveries more throughout the day, rather than concentrated before 12 noon, would help provide additional loading dock capacity (this is a medium to long term solution if required)

- Allow two-way flow of vehicles past loading docks and potentially to Carpark B
- 3 options are explored further in further in Section 3.

2.9 Speed management and safety

We understand and have observed traffic safety incidents throughout the Site which include:

- ◆ vehicles dropping off/picking up outside loading docks
- ◆ pedestrians walking in front of loading docks
- ◆ vehicles travelling the wrong way through the one-way system
- ◆ disregarding signs through the Site.

Existing speed management within the internal road network of the Hospital includes speed humps and signage displaying a posted speed limit of 10km/hr as seen in Figure 11 and Figure 12. We understand these speed management tools are a recent addition and have been observed to reduce speeds and provide a safe environment for pedestrians.

Figure 11: Internal network speed management measures



Figure 12: Starship speed management measures



2.10 Cycle parking

Cycle parking is provided for staff, with a locked bike cage located next to building A01 (See Figure 13) and within Carpark B. The bicycle parking rate specified by the Auckland Unitary Plan is a minimum of 1 per 30 beds for visitors, and 1 per 15 beds for long stay.

Figure 13: Existing cycle and motorcycle parking



2.10.1 Summary of cycling issues

- ◆ No significant issues were observed on the Site. However, staff surveys indicate they would like additional convenient and secure facilities including bike cages and shower/locker facilities.

2.10.2 Potential cycling solutions

- ◆ We recommend undertaking cycle parking count/audit and occupancy count, to determine if the supply of cycle racks meets the current demand
- ◆ Staff should be engaged as to where they would like additional bike parking to be provided on the Site.

2.11 External network

As mentioned previously, the Site has access to and from Grafton Road and Park Road. We have analysed traffic flows on Park Road and Grafton Road (taken from the signalised intersections) to provide an understanding of the operation of the Site's accesses during the peak commuter periods. This is provided in Appendix B.

- ◆ Grafton Road traffic flow is busiest in the southbound direction in the morning (AM) peak period towards the motorway and the Port. In the northbound direction, the left turn from Grafton Road to Park Road is often busy with long queues.
- ◆ In the middle of the day, the queues formed at the left turn from Grafton Road into Park Road is as a result of the extensive vehicle queuing on Park Road and beyond associated with the operation of Carpark A. In the AM and evening (PM) peak hours, the left turn queue can extend back to between Gate 4 and Gate 2 due to the high turning flows and the opposing pedestrian crossing at the Grafton Road/Park Road intersection
- ◆ Park Road is busiest in the westbound towards the city in the AM peak period with queues extending back from the right turn to Grafton Road. In the PM peak, traffic flows are heaviest eastbound. As noted previously, there are extensive queues on Park Road extending back from Carpark A which causes extensive delays to all vehicles traveling eastbound on Park Road.

2.12 Public transport

The Auckland City Hospital site is served well by several bus routes travelling to the city centre and Newmarket, including the regular Inner link service. Bus stops are conveniently located outside the main entrance on Park Road. However, these bus services are delayed during the middle of the day by congestion on Park Road, attributed to vehicles seeking to enter the hospital, mainly Carpark A.

2.12.1 Auckland Transport – Temporary bus rerouting up Grafton Road

As part of the City Rail Link project, the intersection of Victoria Street and Albert Street has been closed and will remain closed until approximately mid-2023.

- ◆ As part of this several bus routes have been rerouted. This includes bus route 75 which now travels via Grafton Road and turns left into Park Road. This is up to 6 additional buses in the peak hour
- ◆ Initially Auckland Transport proposed reducing the number of lanes on Grafton Road from 3 to 2 lanes which then allows the double decker bus to turn more easily from the middle lane into Park Road. Noting that the double decker buses require more vertical and horizontal clearance than

the existing routes undertaking this manoeuvre. However, the now agreed option between Auckland Transport and ADHB is to allow the buses to straddle two lanes and turn into Park Road.

We have observed this in operation on site in the busy PM peak period as shown in Figure 14. It appears to operate effectively with no issues, noting that not all drivers need to use both lanes to turn, but some chose to. This should continue to be monitored with further consideration of cyclist safety also important as Grafton Road southbound accommodates a cycle lane for portions of Grafton Road southbound.

Figure 14: View of Grafton Road/Park Road intersection and of double decker bus approaching intersection (8 July 2021)



2.13 ADHB Staff Travel Survey

We have reviewed the results of the ADHB's Staff Travel Survey (2019). There are several key findings of which the following are particularly relevant to our work:

- ◆ Private motor vehicle is the main mode of transport to work (44% of survey respondents for the Auckland City Hospital site). 13% use public transport, 4% walk and 3% bike to work, 31% travel using a combination of modes, with the remainder travel by carpool/ride share, ADHB shuttle, ferry or motorcycle
- ◆ Staff say there are insufficient cycle parking facilities and facilities (eg showers) for those who bike or run to work
- ◆ Feedback from staff was also received concerning increasing the available off-site parking options and actively encourage their use (ADHB may have to consider subsidising offsite parking)
- ◆ A number of alternative travel solutions must be presented to the ADHB staff as there will not be one single mode of transport which will suit everyone
- ◆ We understand that Auckland Transport participates in ADHB's monthly 'new starters' expos, creating bespoke travel plans, brochure stands re public transport, giving away pedestrian and cycling safety gear and offering 'Give it a Go' public transport trial (with free HOP cards). However,

from the survey one of the key findings is that information or incentives to motivate ADHB staff to use public transport has been limited.

The survey provides very useful information around the current mode split for staff at the Auckland City Hospital site, highlighting the current culture of driving to and from work. While there will always be a proportion of staff that need to drive when on call or doing shift work, the proportion of single occupancy car trips needs to be reduced as parking onsite is limited.

2.14 ADHB Transport and Parking Strategy Paper

The ADHB also has developed a Transport and Parking Strategy Paper prepared in July 2020. The Strategy was developed following the staff travel survey in 2019.

The key problem that the Strategy paper identifies is *“The preferred mode of transport to Auckland DHB sites is the car which causes car parking and traffic congestion adding to greenhouse gas emissions.”*

Four key responses are identified with the report, being:

1. Increase the number of occupants in a vehicle

- Carpooling made more attractive (eg car pool bays onsite)

2. Divert vehicles to park offsite

- Park and ride options
- Promote offsite parking

3. Increase attractiveness of alternative modes

- Short-term car rental availability
- Encourage cycling (increase bike parking and associated facilities)

4. Educate staff, patients and visitors on their transport options

- Information on transport options promoted on webpages and at induction
- Promote public transport and other modes of transport

2.14.1 Way forward for the Transport and Parking Strategy

The identified issues and responses are relevant and very important to the Auckland City Hospital site. There are several associated measures and key reporting areas for different departments, however it is unclear if these are regularly undertaken as outlined in the report. Regularly checking in on these measurable areas is critical to progressing the goals of the Transport Strategy.

While there are multiple managers assigned to key areas, it will be more beneficial to have one person appointed as the Travel Plan representative and champion.

2.14.2 Summary of travel and parking strategy issues

- ◆ Transport and Parking Strategy is not actively maintained
- ◆ Reducing the dependency on private motor vehicles and parking onsite will play a large part in improving traffic management of the Site.

2.14.3 Potential travel and parking strategy solutions

- ◆ Actively manage the Transport and Parking Strategy/Travel Plan. There are clear and measurable areas that required regular reporting
- ◆ Appoint a single person to oversee the Transport and Parking Strategy/Travel Plan and become the ADHB travel champion
- ◆ As discussed previously, restrict non-patients/visitors from parking in Carpark A. This would go a long way to reducing the total demand for the parking building and reduce congestion on Park Road.

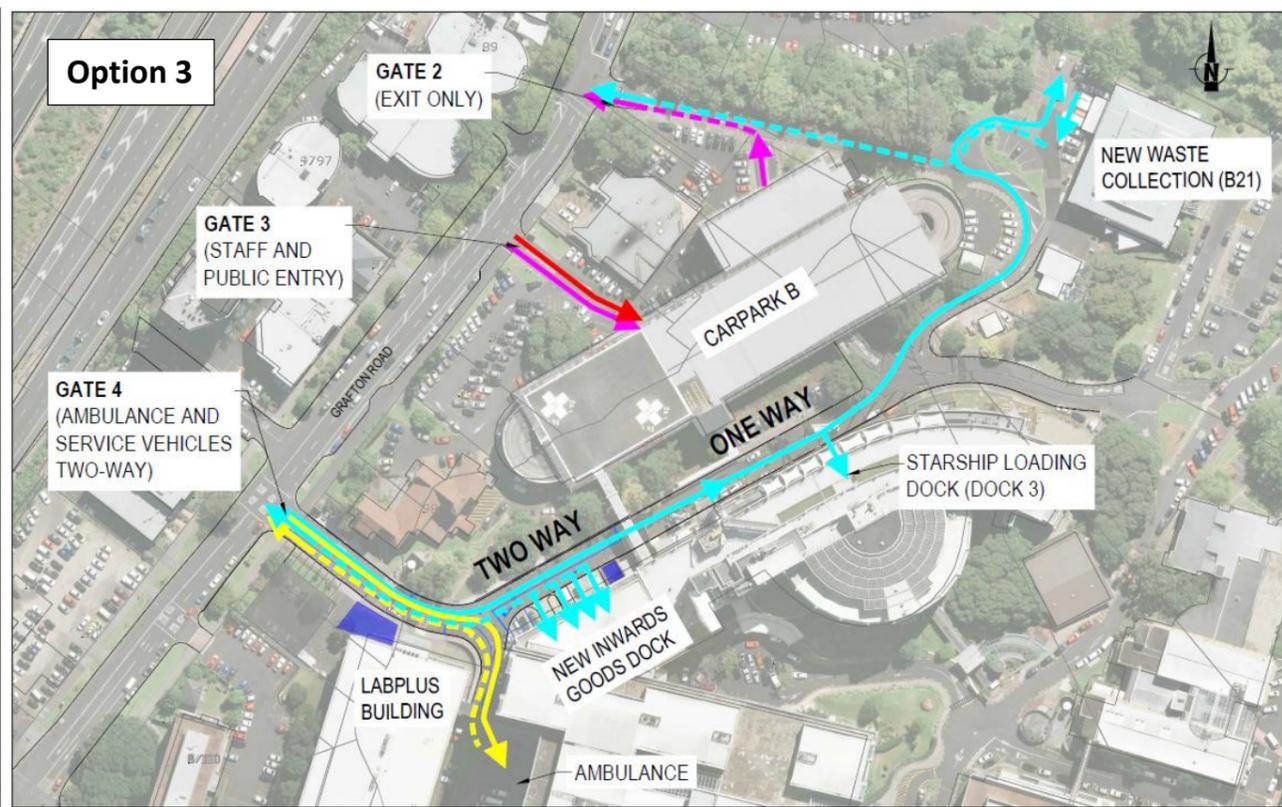
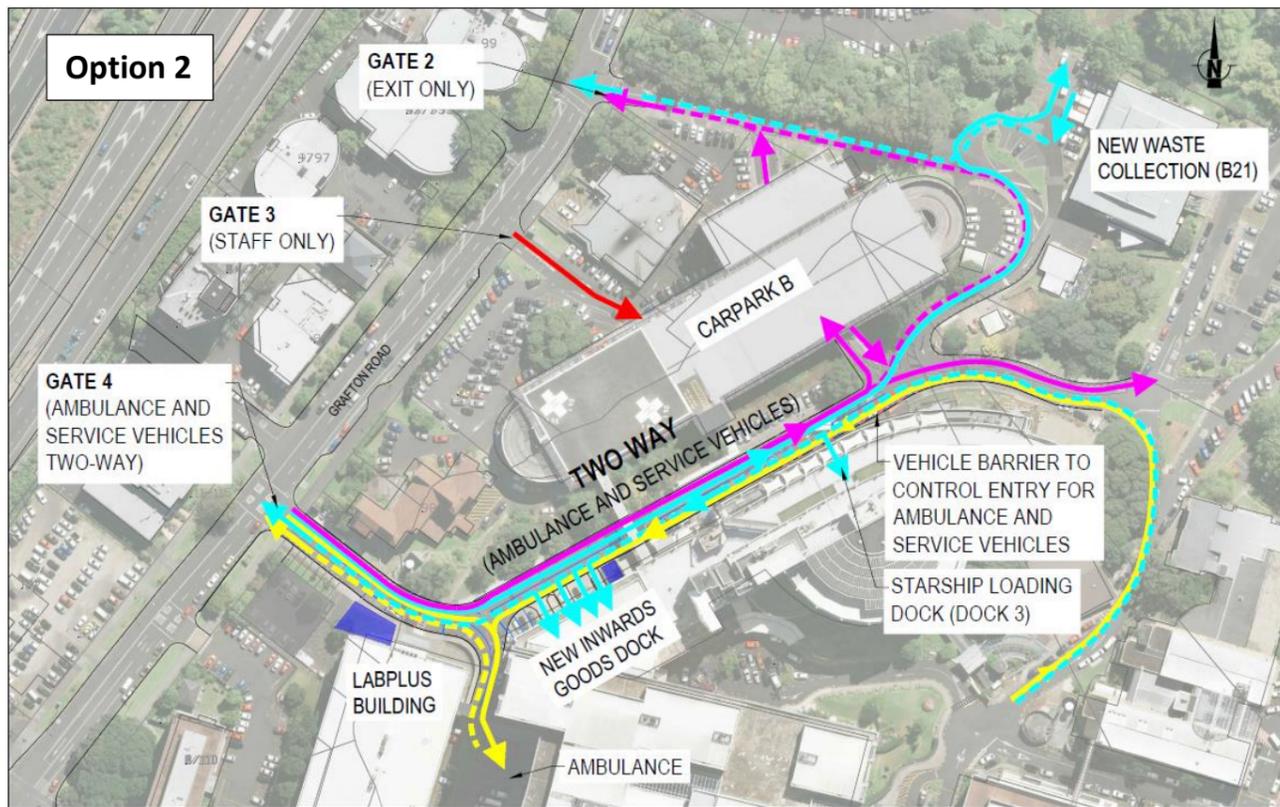
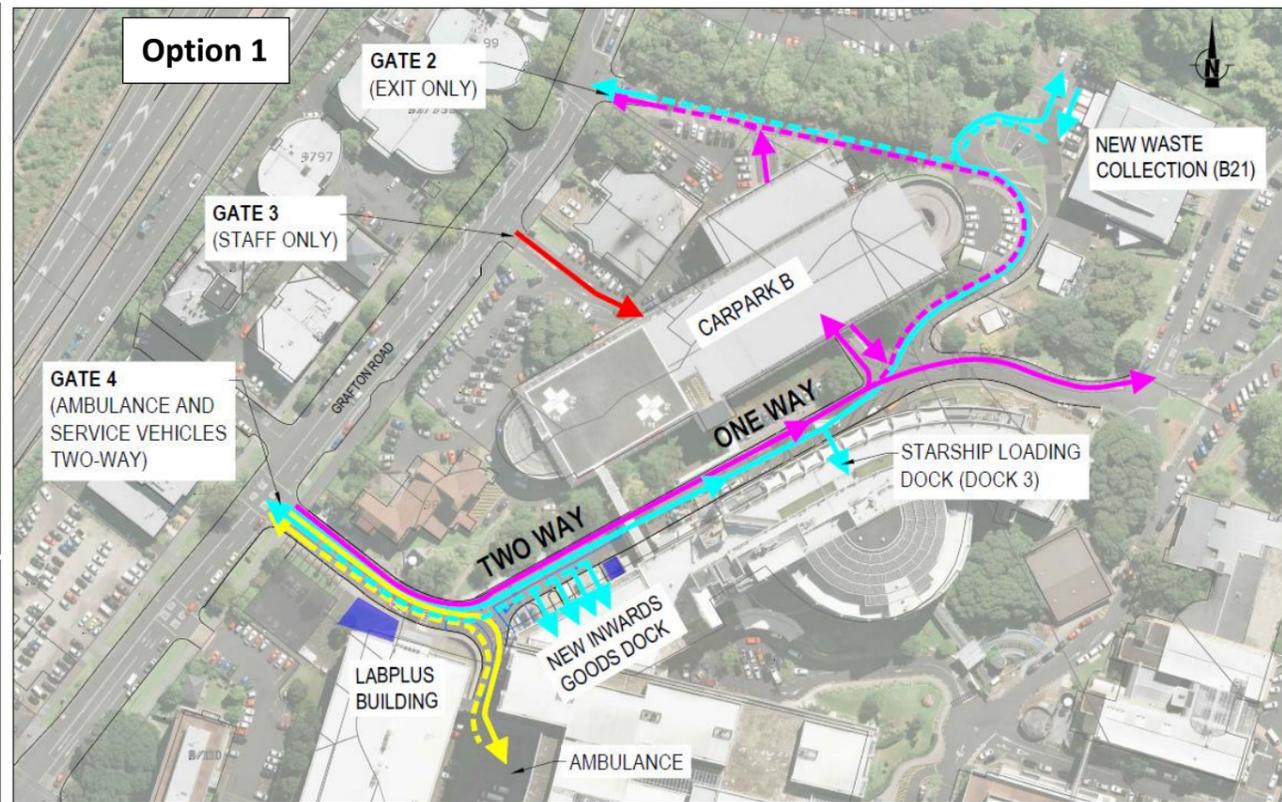
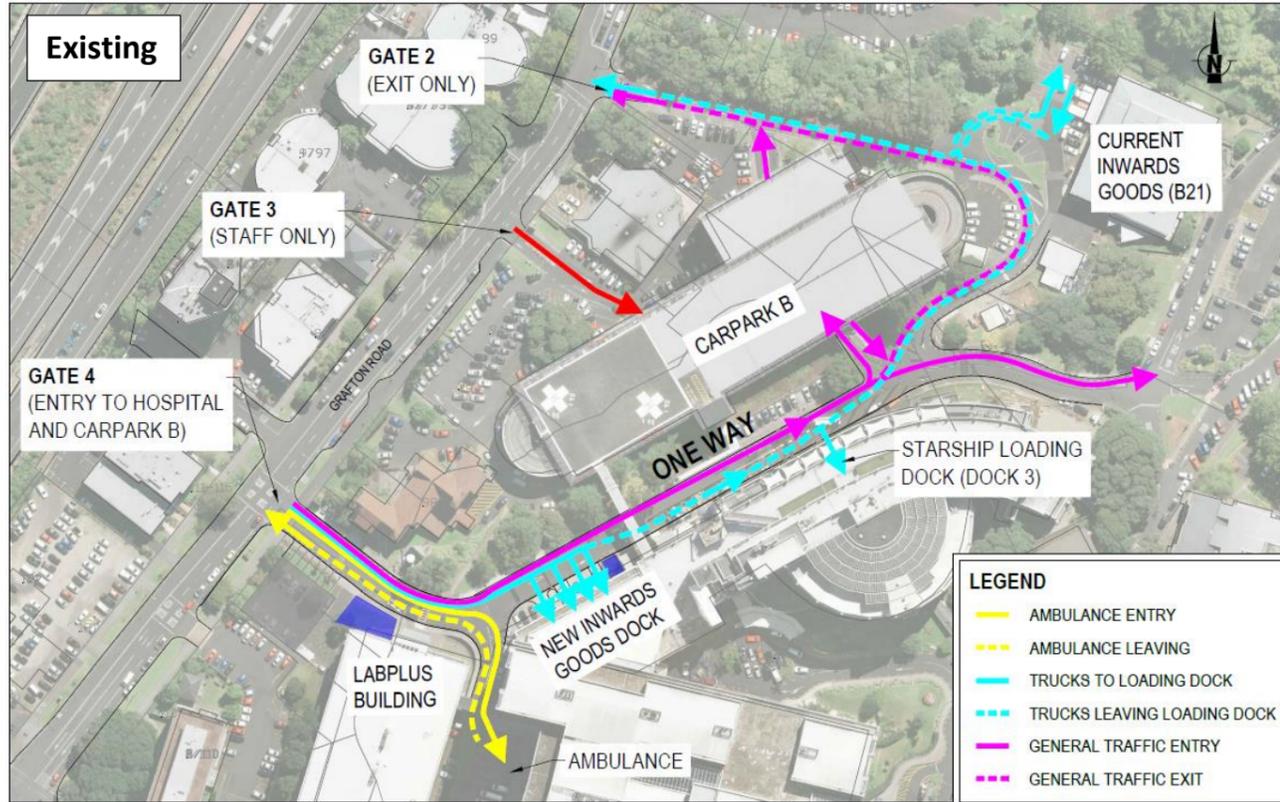
3 INTERNAL NETWORK CHANGES OPTIONS

Following discussions and meetings with AHDB staff and our above review of the existing internal and external transport operations and limitations of the Auckland city Hospital site, we have developed 3 alternative options for consideration and discussion.

The conclusion and recommendations section of this report also provides other recommended measures which should be progressed, no matter which internal network option is chosen.

The 3 principal options, which are illustrated overleaf, are

- ◆ A two-way circulation operation between the new inwards loading dock and Gate 4 only
- ◆ As per Option 1, and including emergency and service vehicle access at Gate 4 only
- ◆ Two-way circulation operation between Carpark B and the new inwards loading dock.

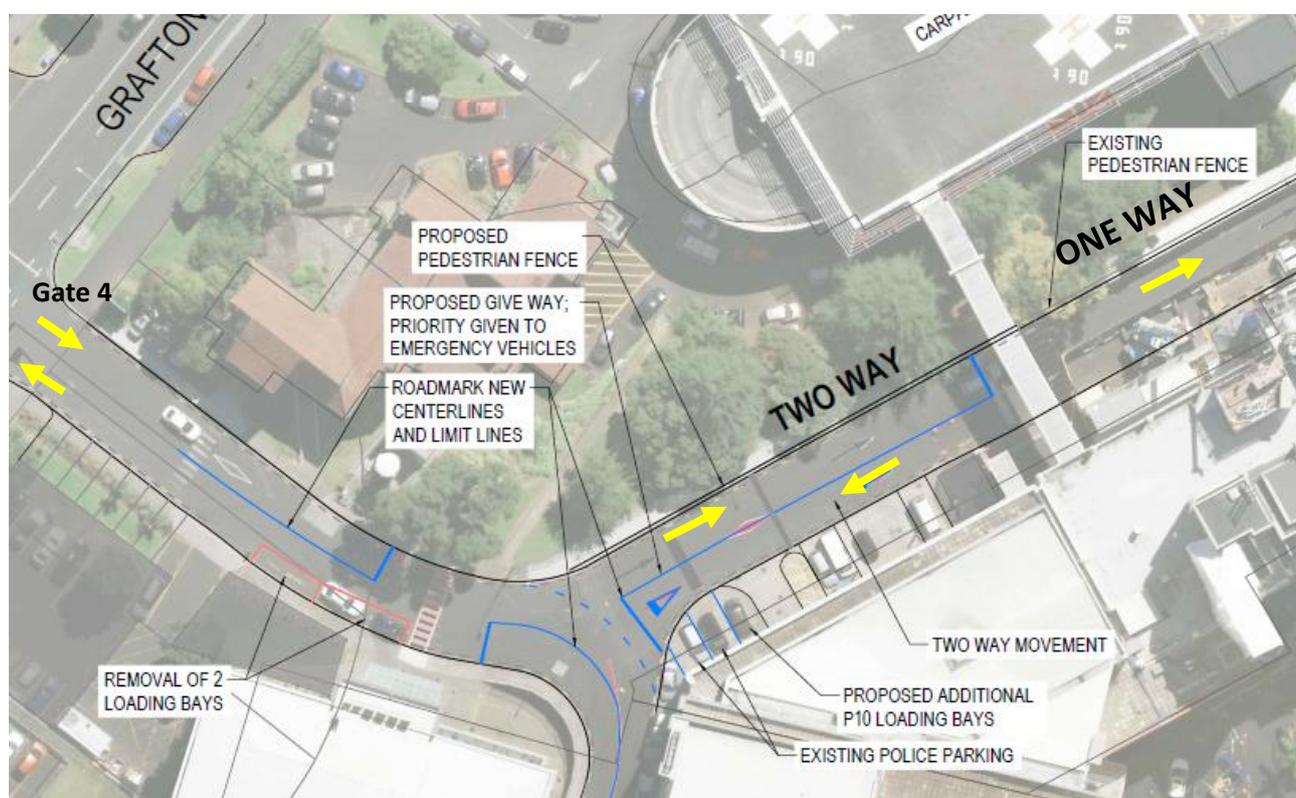


3.1 Option 1: Two-way circulation to access new Inwards Goods loading dock

To provide better access to and from the new Inwards Goods loading dock, Option 1 allows two-way traffic flow between the new dock and Grafton Road. Currently it is one way only eastbound past the loading dock. The proposed two-way circulation ends at the pedestrian entrance to Starship.

The road would be remarked as shown in Figure 15, with the main priority route being for emergency vehicles entering and exiting the ambulance bay adjacent to Building A32. Service vehicles exiting the inwards goods dock would be controlled by a give-way intersection to provide this priority to ambulances.

Figure 15: Option 1



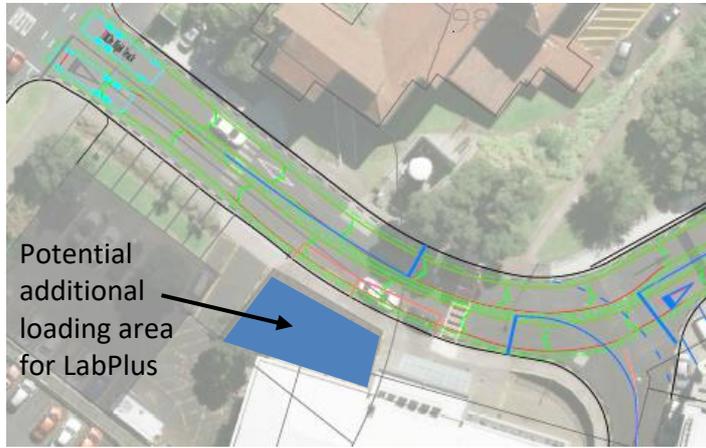
One or two existing loading bays in front of the LabPlus building would need to be removed to allow the two trucks to pass each other. Tracking of trucks for these options is discussed further below.

We have shown 2 options for this:

- ◆ Option 1a – Removal of both loading bays in front of LabPlus
 - This allows 2 large trucks to pass each other with sufficient clearance
 - Alternative loading spaces will need to be provided for service vehicles that previously used these bays
 - There is a risk of service vehicles parking on footpath or in the outbound lane to complete their loading/unloading

- We recommend that the area adjacent to LabPlus and currently used for construction portacabin is set aside for a truck loading space for LabPlus after construction is finished (shaded blue in Figure 16 below).
- ◆ Option 1b - Retain a single loading bay in front of LabPlus.
 - This creates a pinch point where two large trucks have difficulty passing each other as seen in Figure 14
 - The retained loading bay will be long enough for van only due to available space and required clearance
 - Given the road accommodates low traffic volumes, there is a low probability of two large trucks meeting however retaining more than 1 loading bay is not advisable.

Figure 16: Vehicle tracking of Option 1

<p>Option 1A</p> <p>Remove loading bays outside of LabPlus</p>		<p>Tracking of two large rigid trucks passing with the removal of 2 existing loading bays</p>
<p>Option 1B</p> <p>Retain 1 van loading bay outside of LabPlus</p>		<p>Tracking of two large rigid trucks passing each other, while maintaining a single loading bay.</p>

3.1.1 Option 1 advantages

- ◆ Provides more direct link to Grafton Road for service vehicles through Gate 4
- ◆ Prioritises emergency vehicle movements with proposed give-way control for service vehicles leaving loading dock to exit onto Grafton Road.

3.1.2 Option 1 disadvantages

- ◆ An additional 50 to 60 service vehicles per day are likely to use Gate 4 to exit onto Grafton Road. This is unlikely to cause any capacity issues as the schedule of service deliveries is spread across the morning period. At worst it would be up to 5 to 6 vehicles per hour which is not a significant volume of traffic
- ◆ Loss of 1 or possibly 2 loading spaces in front of LabPlus building to accommodate two-way vehicle movements. We have presented 2 options for this:
 - Option 1a – Removal of both loading bays in front of LabPlus
 - Option 1b - Retain a single loading bay in front of LabPlus.
- ◆ An existing issue of insufficient courier parking spaces might be compounded and encourage unsafe practices by drivers. This can be partly offset by an additional marked van courier space adjacent to the new Inwards Goods dock
- ◆ LabPlus couriers are likely to still want to deliver straight to the door of LabPlus, and therefore park on the footpath or block the traffic lane rather than utilising any proposed new loading spaces
- ◆ Reduces the number of eastbound through-lanes to Carpark B from 2 lanes to 1 lane, however there is currently plenty of width available
- ◆ There are currently no traffic signals at Gate 4
 - Potentially difficult for service vehicles to exit onto Grafton Road, especially for trucks turning right (albeit that most deliveries are before 12 noon when traffic volumes are low). However, trucks still have the option of exiting the site via Gate 2 traffic signals
 - Queuing service vehicles waiting to exit may prevent the movement of emergency vehicles.
- ◆ It is possible that the new Inwards Goods loading dock is full and service vehicles are forced to wait for an available bay. This option does not allow for a waiting area for service vehicles due to lack of space. However, we consider there is a low risk of all bays being full at the same time
- ◆ No vehicle counts have been undertaken at Gate 4 on Grafton Road. It is recommended vehicle count data is collected to gain a better understanding of the existing vehicle volumes once the relocation of Inwards Goods dock is complete. This is a relatively simple task to do a video traffic count for a day.

3.1.3 Option 1 discussion and recommendations

- ◆ Two-way traffic flow is feasible between the new Inwards Goods loading dock and Grafton Road. Service vehicles would be able to exit via Gate 2 or 4
- ◆ Option 1 provides more direct link to Grafton Road for service vehicles through Gate 4, however there potentially will be difficulties for trucks turning right out onto Grafton Road in congested periods
- ◆ We recommend that the area adjacent to LabPlus and currently used for construction portacabin is set aside for a truck loading space for LabPlus
- ◆ It is recommended vehicle count data is collected to gain a better understanding of the existing vehicle volumes once the relocation of Inwards Goods dock is complete.

3.2 Option 2: Two-way circulation to access loading dock

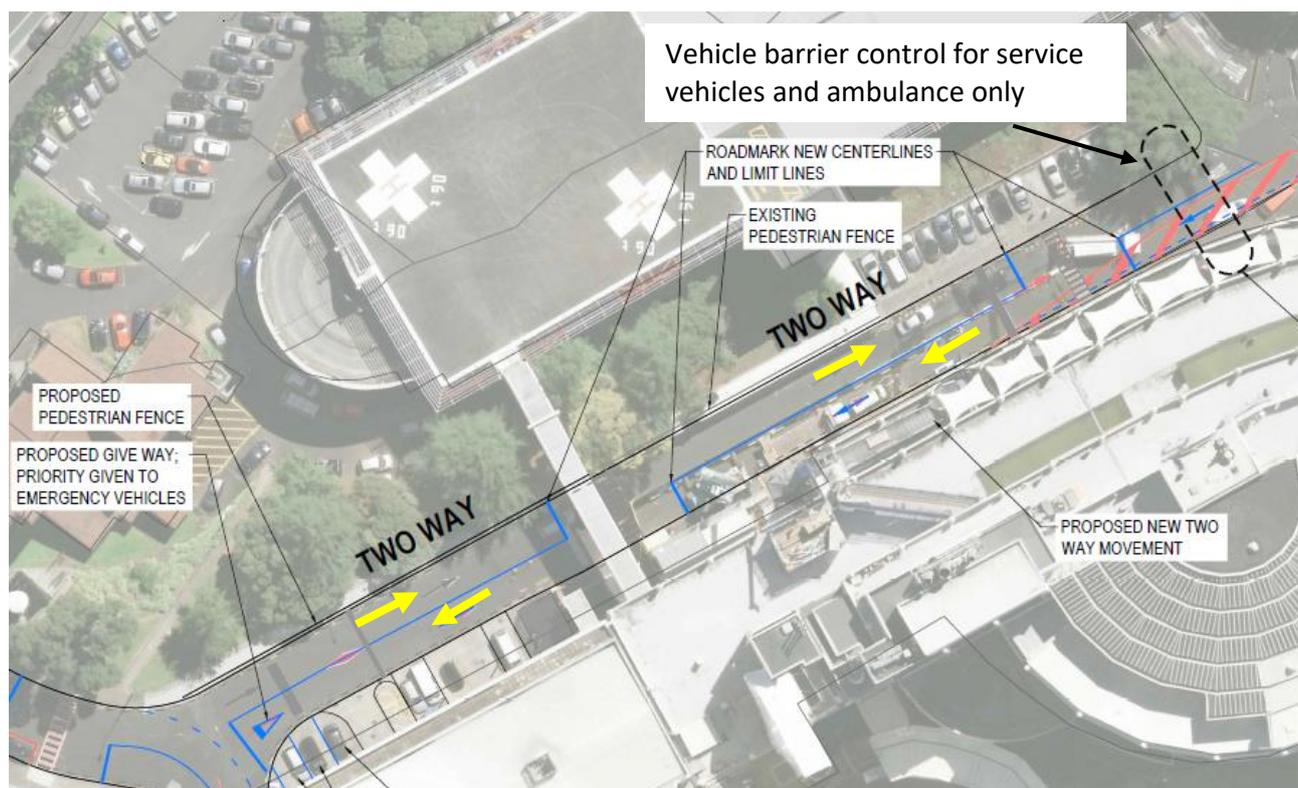
Option 2 involves extending the two-way vehicle movement between Grafton Road and the entry to Carpark B, with service and emergency vehicles being able to travel from the internal hospital network to exit at Gate 4.

This will allow for greater internal circulation of hospital traffic and for better connection to the new Inwards Goods loading dock. However, it is not desirable to allow all vehicles to travel westbound past the new Inwards Goods loading dock, as staff and public would then use it to exit at Gate 4 and avoid the traffic signals at Gate 2.

To allow only service vehicles to travel westbound and restrict general vehicles travelling, the installation of vehicle barriers are required at the Carpark B entrance adjacent to Starship (as shown in Figure 17). A swipe card system would be needed to permit travel westbound, while the barrier would open automatically for any vehicles travelling eastbound (thereby allowing access to Carpark B).

Vehicle tracking for this option is included in Appendix C. The proposed option is as shown in Figure 17.

Figure 17: Option 2



3.2.1 Option 2 advantages

- ◆ Option 2 allows for greater internal site connectivity and circulation, especially for internal deliveries, which currently requires trucks to exit out onto Grafton Road, before re-entering to access the new loading dock
- ◆ Greater connectivity will be advantageous during construction of the Central Plant Building if other internal connections are lost

- ◆ Offers alternative route to the new Inwards Goods dock and ambulance bay.

3.2.2 Option 2 disadvantages

- ◆ Enforcing service/emergency vehicle only access will require vehicle barriers and signs
- ◆ Initially two-way traffic flow of heavy vehicles may increase the safety risks to pedestrians as people become accustomed to the change outside Starship
- ◆ Loss of 1 or possibly 2 loading spaces in front of LabPlus building to accommodate two-way vehicle movements. We have presented 2 options as part of Option 1
- ◆ Increased demand on the existing uncontrolled intersection from Gate 4 to Grafton Road with service vehicles mostly exiting here. It may be difficult for service vehicles wishing to exit onto Grafton Road and this may result in occasional queues of 1 or 2 vehicles. However, service vehicles now have a multiple exit options to Grafton Road (Gate 2 and Gate 4) and predominantly exit before midday.

3.2.3 Option 2 discussion and recommendations

- ◆ Two-way traffic flow is feasible between the new Inwards Goods loading dock and Grafton Road (as per previous options). Service vehicles would be able to exit via Gate 2 or 4.
- ◆ The main benefit provided by two-way circulation is it allows for greater internal site connectivity, especially for internal deliveries, rather than requiring vehicles to travel via Grafton Road. However, this option requires a vehicle barrier to restrict westbound traffic.

3.3 Option 3: Two-way circulation to access loading dock

Option 3 involves restricting entry to Gate 4 to service, emergency and vehicles with special permission (ie accessing localised buildings). There would be no general public access at Gate 4, with visitors and staff accessing Carpark B, via Gate 3 (the existing 'staff only' entry).

This option would require the installation of barriers and enforcement of restricted access at Gate 4 and Carpark B entrance next to Starship. A swipe card system would be needed to enter at Gate 4, while the barrier would open automatically when exiting at Gate 4.

Tracking for this option is included in Appendix C. The proposed traffic flow is as shown previously in figures on page 22.

3.3.1 Option 3 advantages

- ◆ Option 3 prioritises emergency vehicles, reduces the number of vehicles in and out of Gate 4 reducing the risk of emergency vehicles being delayed by queues
- ◆ Service vehicles would exit at Gate 4 and this provides some advantages for service vehicles that do not have to queue to exit Gate 2 in the busy evening peak period. However, the majority of service vehicles exit the Site before the evening commuter peak and the traffic signals at Gate 4 help trucks turn right out onto the busy Grafton Road.

3.3.2 Option 3 disadvantages

- ◆ It may be difficult to access Carpark B for visitors using the top level. Internal access would be required from within the car park, and visitors would need to use the current 'staff only' access on Grafton Road (Gate 3)
- ◆ The upper levels of Carpark B are currently only accessible from entry via Gate 4 and the circulation within the building would need to be altered to allow access from Grafton Road
- ◆ Reducing the access of Carpark B to a single way in, single way out is likely to cause greater congestion within the carpark itself especially during the peak periods and shift changes
- ◆ Enforcing 'emergency/service vehicle only' access will require vehicle barriers at Gate 4 on Grafton Road with a swipe card system. Ambulances would be provided with a separate entry lane (with a total of 2 entry and 1 exit lane). However, this may cause delays for service vehicles entering the Site
- ◆ Most deliveries are between 6am - 12pm, this means Gate 4 maybe underutilised during other times, reducing the efficiency of the hospital network.

3.3.3 Option 3 discussion and recommendations

- ◆ We recommend that this option is discarded as there is no significant advantage over Option 2. Potentially the option could cause issues with vehicle barriers required at Gate 2 and public access required at Gate 3.

4 SUMMARY, RECOMMENDATIONS AND NEXT STEPS

Flow has investigated the existing transport operations within and around the Auckland City Hospital site to understand and identify key transport related constraints and issues.

We have investigated solutions that can be implemented in the short-term to address the specific transport issues identified including an assessment of different options to change the operation of the internal roading connections.

The following table summarises our key findings, issues identified, recommendations and preferred option to change the operation of the internal roading connections.

Table 4: Auckland City Hospital transport review: Key findings, issues and recommendations

Key findings and issues	Recommendations
<p><i>Travel, parking provision and demand</i></p> <ul style="list-style-type: none"> • Travel by staff to the site (2019): 44% by car, 13%: public transport, 4% walk, 3% bike, 31% travel using a combination of modes, with the remainder travel by carpool/ride share, ADHB shuttle, ferry or motorcycle • Staff say there are insufficient cycle parking facilities and facilities for those who bike to work • Around 20 to 25% (up to 120 spaces) of parking demand in Carpark A are not visitors or patients • Carpark A becomes full at around 9:30am during the weekday and results in significant queuing issues on Park Road and Grafton Road. Queues extend down Park Road from the parking building and block the single eastbound lane, including buses. The queues on Grafton Road delay service and emergency vehicles accessing Gate 4 and causes people to miss hospital appointments • Carpark B reaches maximum capacity between 9:00 am and 1:00pm during the weekdays • Based on the number of visitors entering and exiting, it would appear that of the 267 visitor spaces available in Carpark B, approximately 100 are used by staff every day • Offsite parking provided in various locations. Staff want an increase in the available of off-site parking options and ADHB to actively encourage their use (to consider subsidising offsite parking) 	<p><i>Informing the public if there are any available parking spaces in Carpark A and Carpark B</i></p> <ul style="list-style-type: none"> • Provide information to users as to how many parking spaces are available in the parking buildings and/or when the parking buildings are full, well before the time they attempt to enter the Site through the use of variable message signs <p><i>Actively manage and restrict who can park in the Hospital parking buildings</i></p> <ul style="list-style-type: none"> • Control entry and exit to Carpark A for full 24-hour period, preventing free exit after midnight and before 8.30am • Significantly increase parking fees for all casual parking and implement a parking validation scheme, whereby patients and visitors to the Hospital receive a reduced rate if they validate their parking ticket. <p><i>Manage allocation of parking to satisfy visitor and patient parking demand first</i></p> <ul style="list-style-type: none"> • Restrict staff from using Carpark A. Dedicate Carpark A to patients and visitors only. • Restrict use of visitor spaces on the top levels of Carpark B to visitors (currently staff can park here if lower levels are full, albeit they pay public rates if exiting before 7 pm). However, still provide a separate area for afternoon shift staff, not associated with the public visitor parking area. <p><i>Reduce the parking demand on the Site generated by Hospital activities, with a focus on staff parking demand</i></p> <ul style="list-style-type: none"> • Increase the availability of staff parking off the Site, and provide free, frequent and reliable shuttle services. Retaining the temporary 200 offsite Symonds Street parking spaces after services tunnel construction is complete <p><i>Encourage and incentivise staff to use available off-site parking, public transport, walking and cycling</i></p> <ul style="list-style-type: none"> • Further development of key areas within the Transport and Parking Strategy including subsidised public transport travel, ADHB dedicated subsidised bus services, additional convenient, safe and secure bike, scooter and motorbike parking, end of trip facilitates for staff to use. • Monitor and report on the performance measure contained the ADHB Transport and Parking Strategy • There are multiple managers assigned to various transport areas. It may be more beneficial to have one person appointed as the Travel Plan representative and champion sustainable transport to and from the Site.

Table 4: Auckland City Hospital transport review: Key findings, issues and recommendations

Key findings and issues	Recommendations
<p><i>Pedestrians and pick up/drop off areas</i></p> <ul style="list-style-type: none"> • Drop off areas are not easily accessible with the current daily congestion on Park Road • There are currently informal drop offs near the new Inwards Goods loading dock that need to be discouraged. 	<p><i>Improvements to safety concerning pick up and drop off areas</i></p> <ul style="list-style-type: none"> • An additional length of pedestrian fencing is to be installed to prevent visitors being dropped off/picked up outside the new Inwards Goods loading dock • A marked drop off area east of new Inwards Goods loading dock, to ‘replace’ the existing informal drop off opposite the loading dock. Either in the existing reserved parking adjacent to Starship or on the road next to existing pedestrian fence (with fence panels removed)
<p><i>Loading and vehicle circulation options</i></p> <ul style="list-style-type: none"> • No resilience or alternative access to loading docks • Service vehicles required to exit along with all cars at Grafton Road if travelling between Building A21 and docks 1 & 2. This is difficult and time consuming during peak traffic periods • Option 2 is the preferred option for changing the operation of the internal roads 	<p><i>Improvements to traffic flow and loading operations</i></p> <ul style="list-style-type: none"> • Two-way traffic flow is feasible between the new Inwards Goods loading dock and Grafton Road. Service vehicles would be able to exit via Gate 4 (or as they do currently via Gate 2). Providing two-way circulation between Grafton Road and the new Inwards Goods dock means: <ul style="list-style-type: none"> ○ loss of 1 or possibly 2 loading spaces in front of LabPlus building to accommodate two-way vehicle movements ○ does not allow for a waiting area for service vehicles due to lack of space. However, there is a low risk of all bays being full • This can be partially offset by an additional van loading space to be marked adjacent to New Inwards Goods loading dock • We recommend that the area adjacent to LabPlus and currently used for a construction portacabin is set aside for a truck loading space for LabPlus. • Option 2, which provides two-way traffic between Grafton Road and new Inwards Goods loading dock and extending two-way circulation to Carpark B entrance. • Option 2 offers an alternative route to the new Inwards Goods dock and ambulance bay, which benefits internal deliveries • Greater connectivity will be advantageous during construction of the Central Plant Building if other internal connections are lost

Table 4: Auckland City Hospital transport review: Key findings, issues and recommendations

Key findings and issues	Recommendations
	<ul style="list-style-type: none"> Option 2 results in an additional 50 to 60 service vehicles per day using Gate 4 to exit onto Grafton Road. This is unlikely to cause any capacity issues as the schedule of service deliveries is spread across the morning period. At worst it would be up to 5 to 6 vehicles per hour which is not a significant volume of traffic.
<p>Wayfinding</p> <ul style="list-style-type: none"> The Site has been developed progressively over many years. This has led to an inconsistent approach to vehicle and pedestrian wayfinding signage and presents a confusing Site for visitors. 	<p>Wayfinding</p> <ul style="list-style-type: none"> A consistent approach to wayfinding should be developed and incorporated in any new development or construction going forward Provide pedestrian wayfinding signage maps at the key access points to the Site

APPENDIX A Existing Wayfinding Signage

Table A1 Existing wayfinding signage Auckland City Hospital

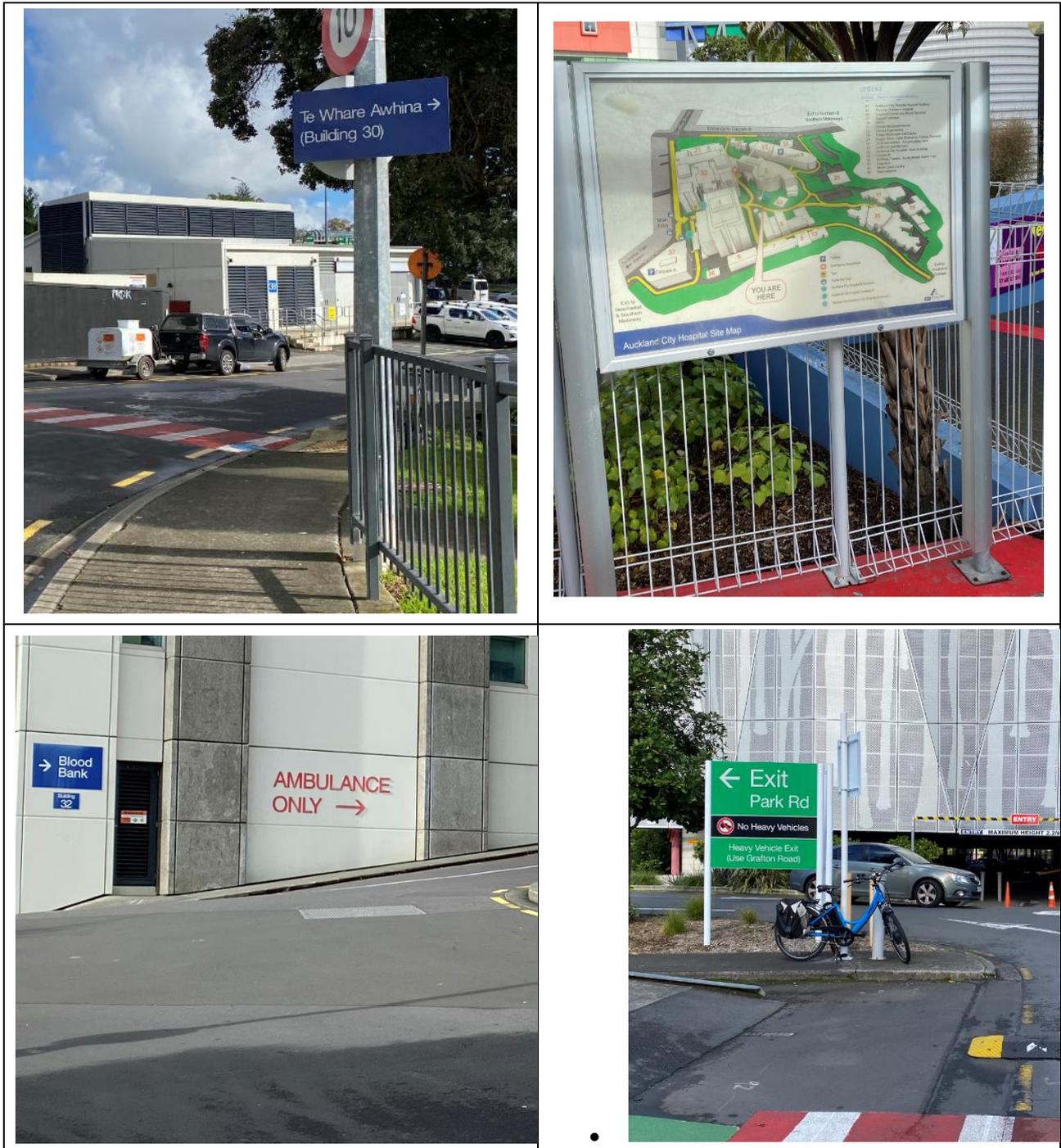


Table A2: Example of wayfinding signage



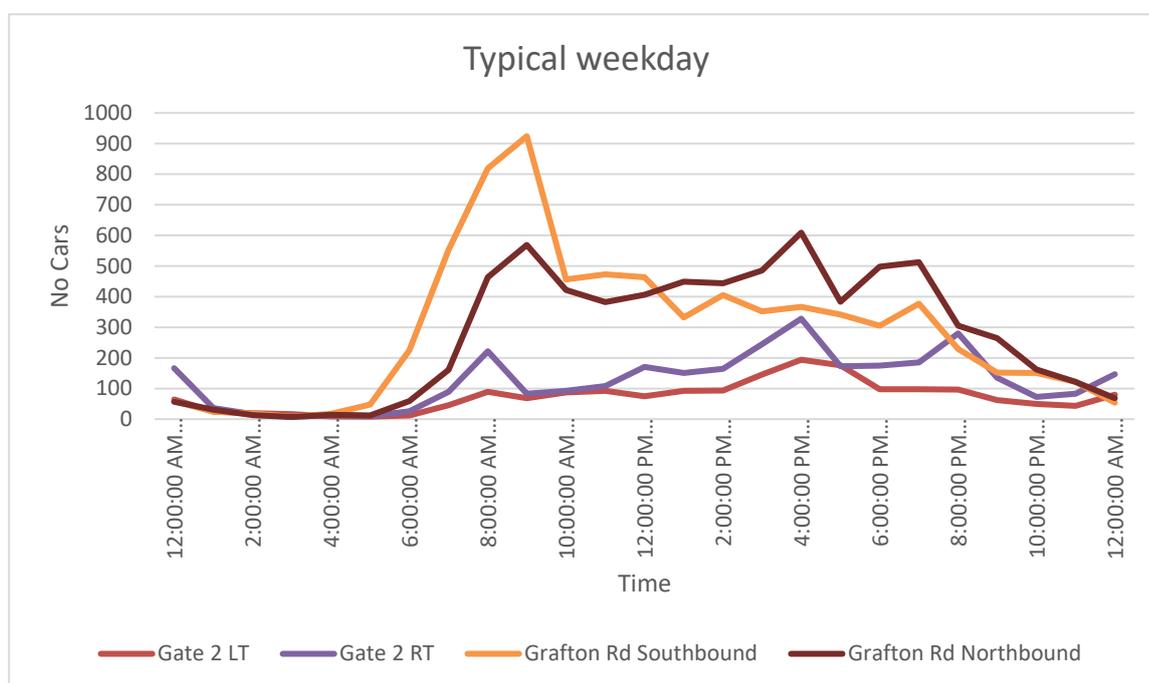
APPENDIX B Park Road and Grafton Road traffic data

Grafton Road

A single entry is provided to the hospital site is from Gate 4 and is an uncontrolled intersection. Exit from the hospital onto Grafton Road is via signalised intersection. The following are noted regarding to Grafton Road traffic flows throughout the day as shown in Figure :

- ◆ Grafton Road southbound to the motorway and Port has a significant morning peak between 6:00am and 9:00am
- ◆ Grafton Road northbound has an afternoon peak at 4:00pm coinciding with traffic leaving the hospital
- ◆ Peaks exiting the hospital in the morning at 7:00am and afternoon at 4:00pm

Figure B1 Traffic Counts (April 2021) – Gate 2 Grafton Road

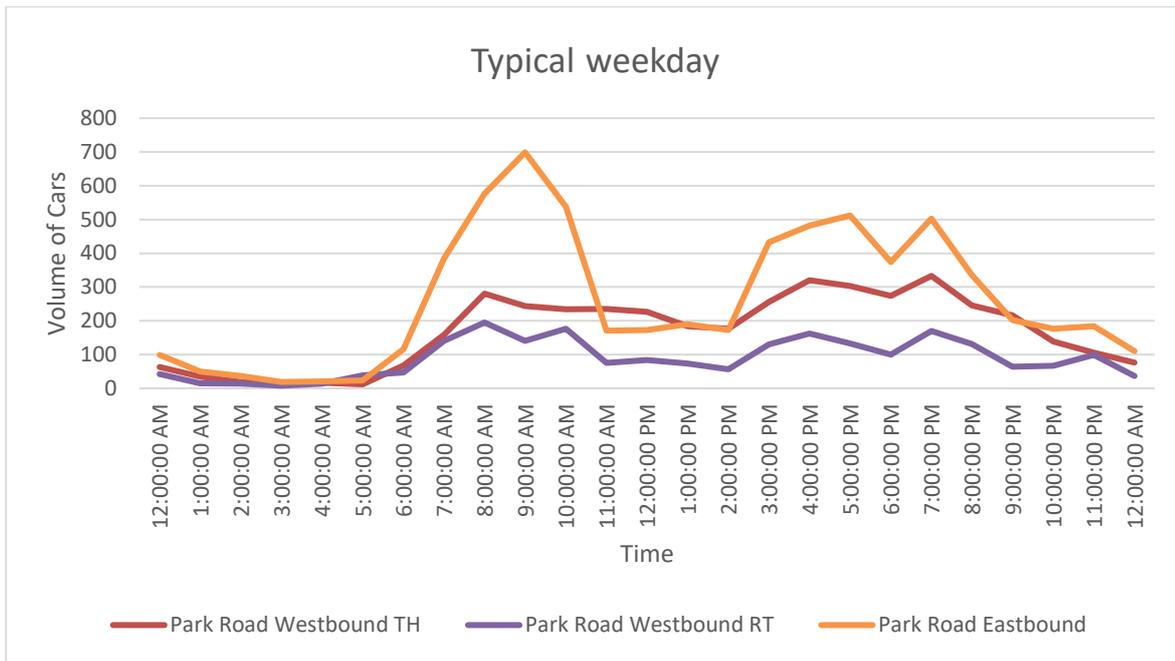


Park Road

Main Entry to the hospital site is from Park Road at a signalised intersection. Traffic counts at this signalised intersection of a typical weekday indicate the following as shown in Figure :

- ◆ Morning peak 7:00-9:00am, afternoon and evening peaks 3:00-5:00pm, 7:00-8:00pm
- ◆ Park Road eastbound movement is combined through and left turn into hospital
- ◆ This coincides with visiting times and ADHB staff shift changes

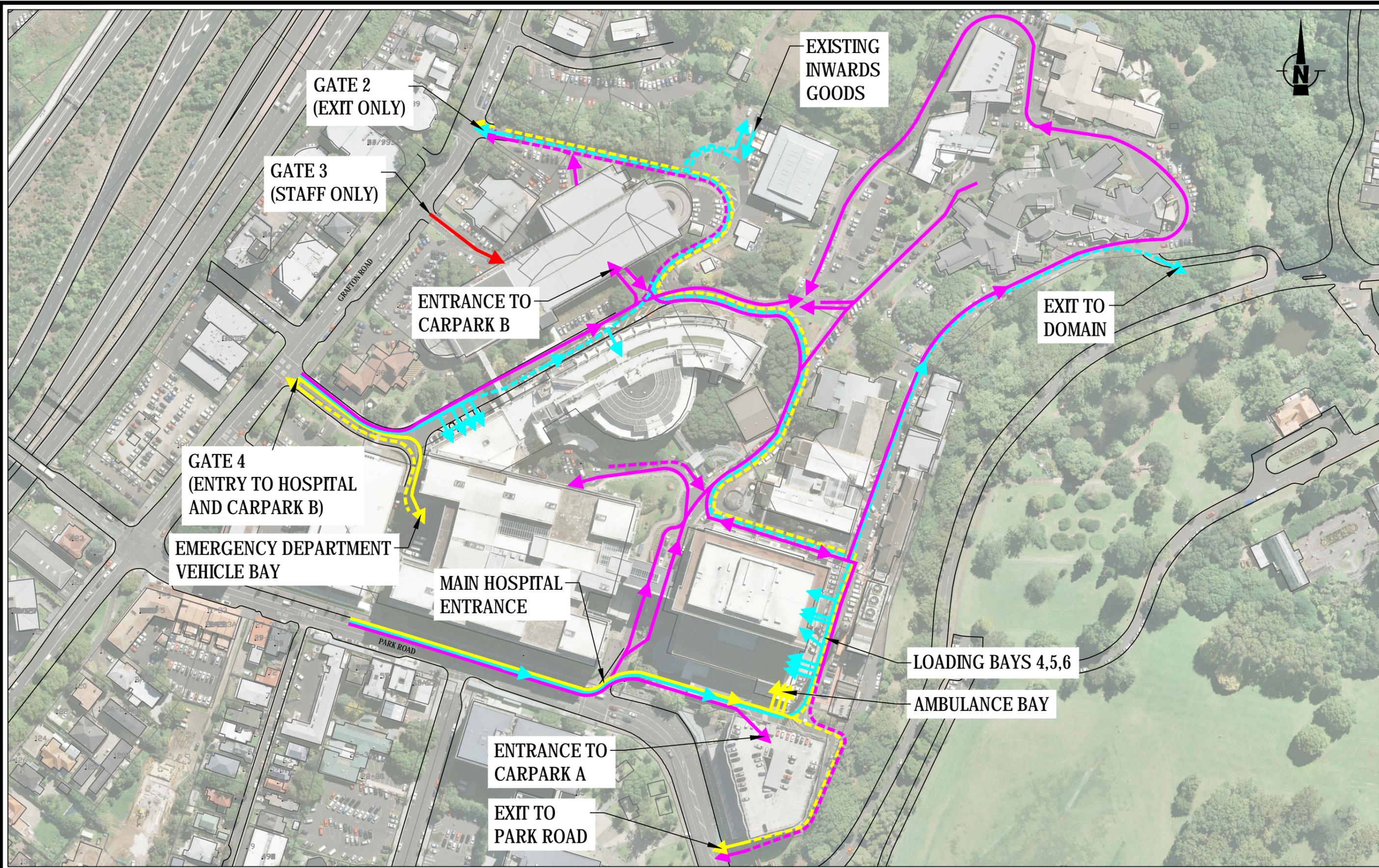
Figure B2: Traffic Counts Entry (April 2021) – Main Entrance Park Road



APPENDIX C

Tracking assessment

Reference: P:\ADHB\010 Auckland Hospital Traffic Operation\4.0 Reporting\R1A210712 Transport Assessment.docx - Harry Ormiston



01 of 13 sheets

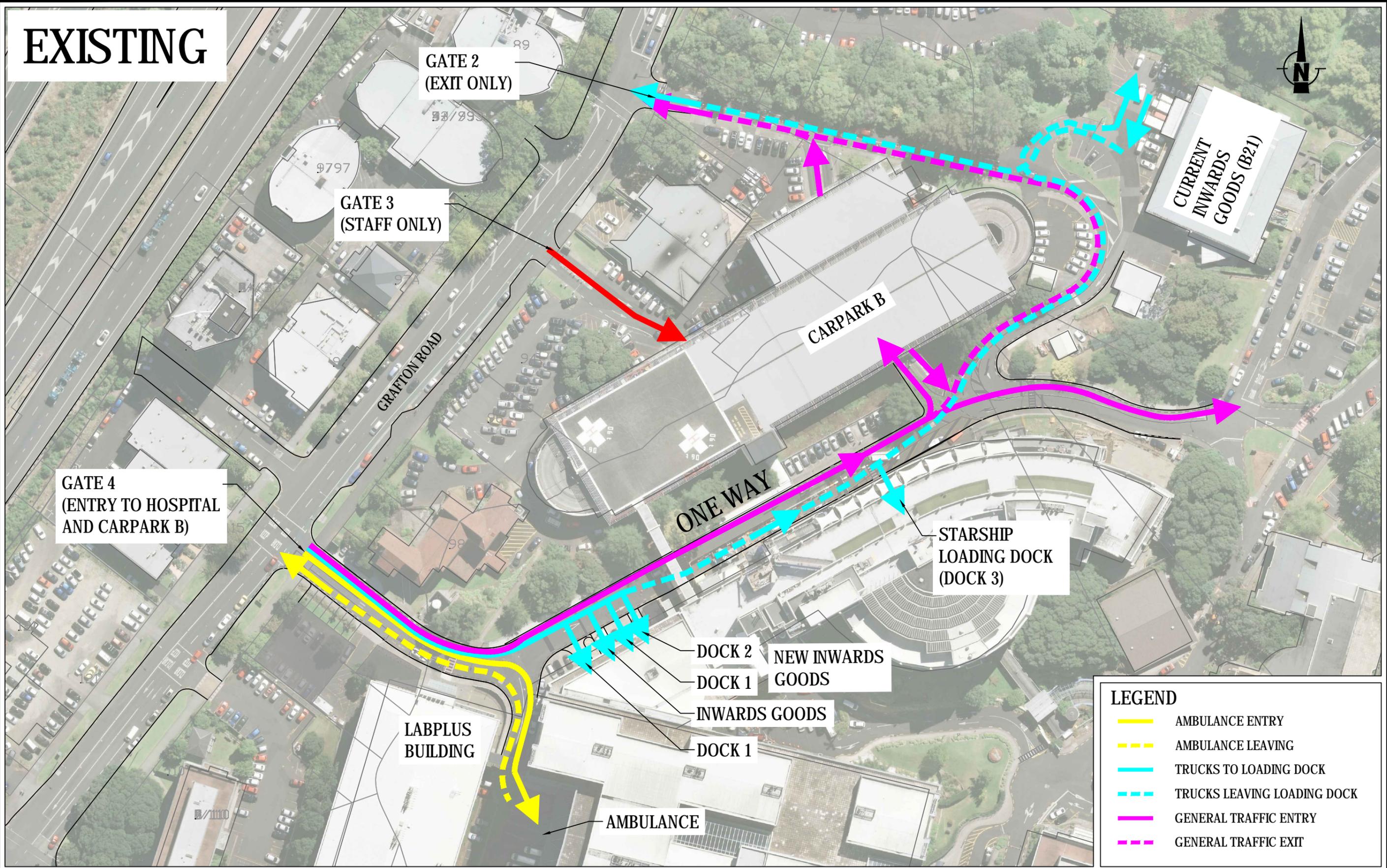
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rev	status	issued
0	First Issue	07/07/2021



Auckland Hospital Traffic Operations Existing Traffic Flows- Hospital

EXISTING



LEGEND

- AMBULANCE ENTRY
- - - AMBULANCE LEAVING
- TRUCKS TO LOADING DOCK
- - - TRUCKS LEAVING LOADING DOCK
- GENERAL TRAFFIC ENTRY
- - - GENERAL TRAFFIC EXIT



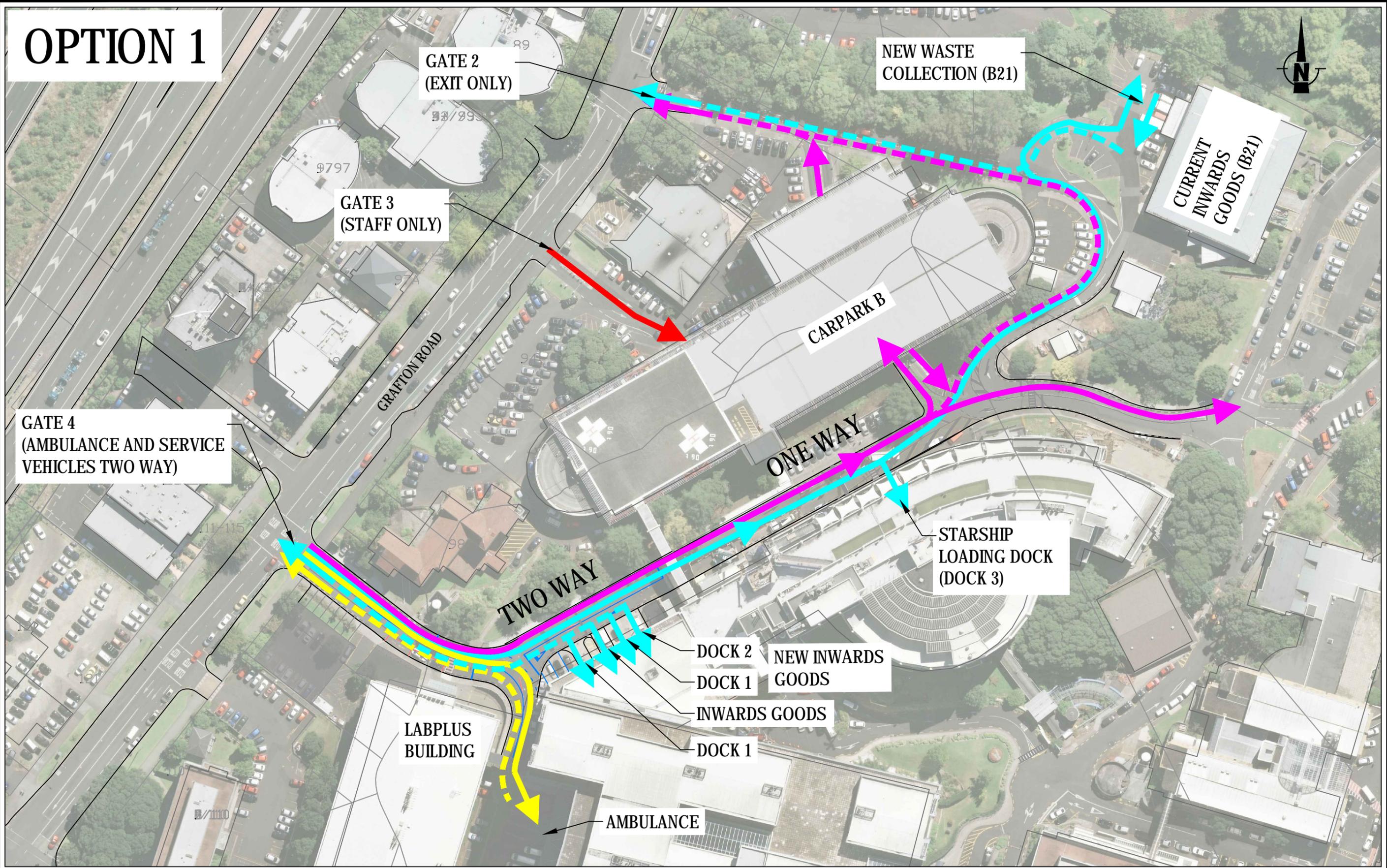
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scale: 1:1,000 @A3	design: cs
ref: D-002 Options	drawn: cs
revision: 0	checked: ho

rev	status	issued
0	First Issue	07/07/2021

Auckland Hospital Traffic Operations Existing Traffic Flows - Dock Area

OPTION 1



GATE 4
(AMBULANCE AND SERVICE
VEHICLES TWO WAY)

GATE 3
(STAFF ONLY)

GATE 2
(EXIT ONLY)

NEW WASTE
COLLECTION (B21)

CURRENT
INWARDS
GOODS (B21)

CARPARK B

ONE WAY

STARSHIP
LOADING DOCK
(DOCK 3)

TWO WAY

DOCK 2 NEW INWARDS
DOCK 1 GOODS
INWARDS GOODS
DOCK 1

LABPLUS
BUILDING

AMBULANCE



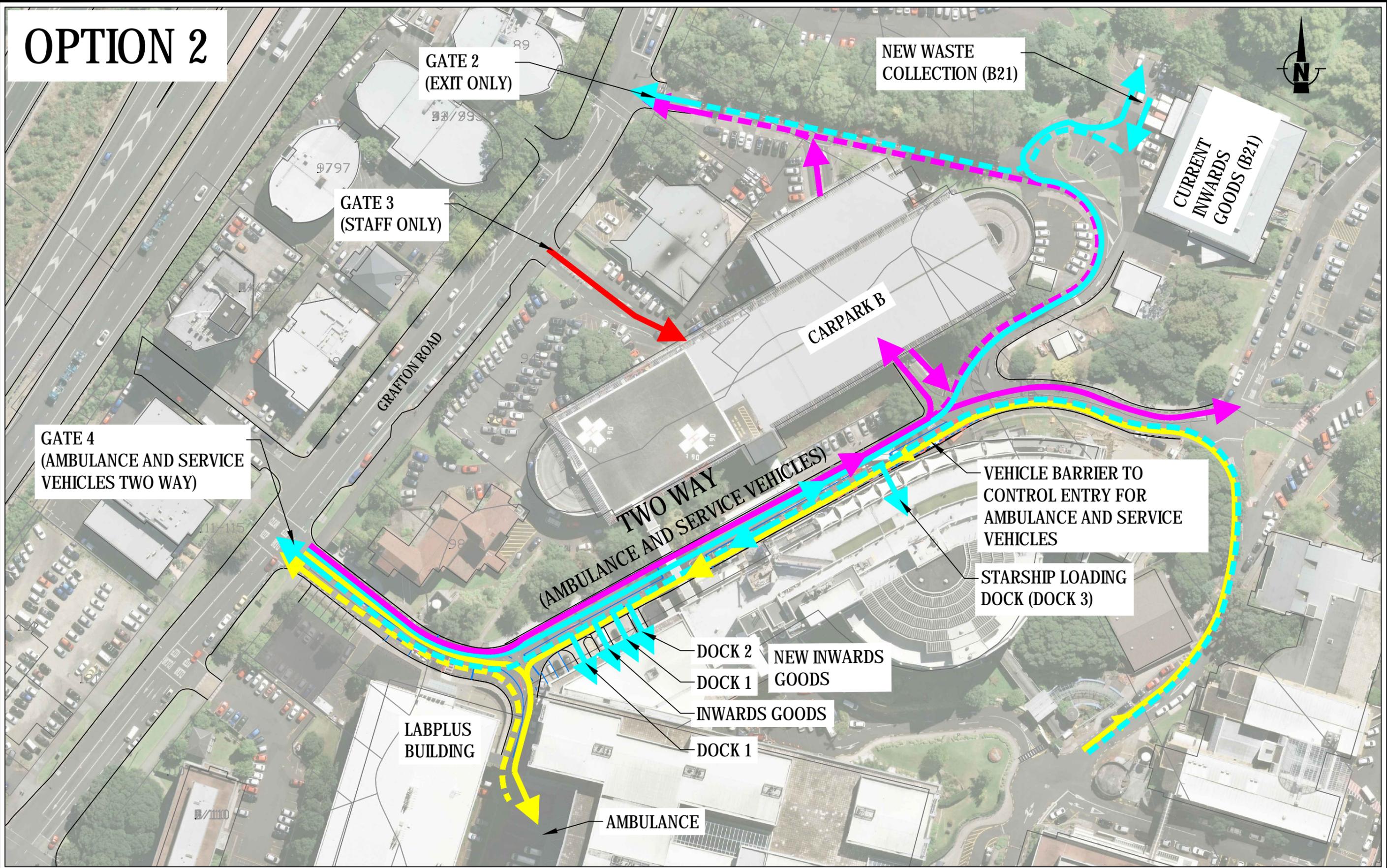
03 of 13 sheets

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ref:	D-002 Options	drawn:	cs
revision:	0	checked:	ho

rev	status	issued
0	First Issue	07/07/2021

Auckland Hospital Traffic Operations Proposed Traffic Flows Option 1- Dock Area

OPTION 2



GATE 4
(AMBULANCE AND SERVICE
VEHICLES TWO WAY)

GATE 3
(STAFF ONLY)

GATE 2
(EXIT ONLY)

CARPARK B

NEW WASTE
COLLECTION (B21)

CURRENT
INWARDS
GOODS (B21)

TWO WAY
(AMBULANCE AND SERVICE VEHICLES)

VEHICLE BARRIER TO
CONTROL ENTRY FOR
AMBULANCE AND SERVICE
VEHICLES

STARSHIP LOADING
DOCK (DOCK 3)

DOCK 2 NEW INWARDS
DOCK 1 GOODS

INWARDS GOODS

DOCK 1

LABPLUS
BUILDING

AMBULANCE



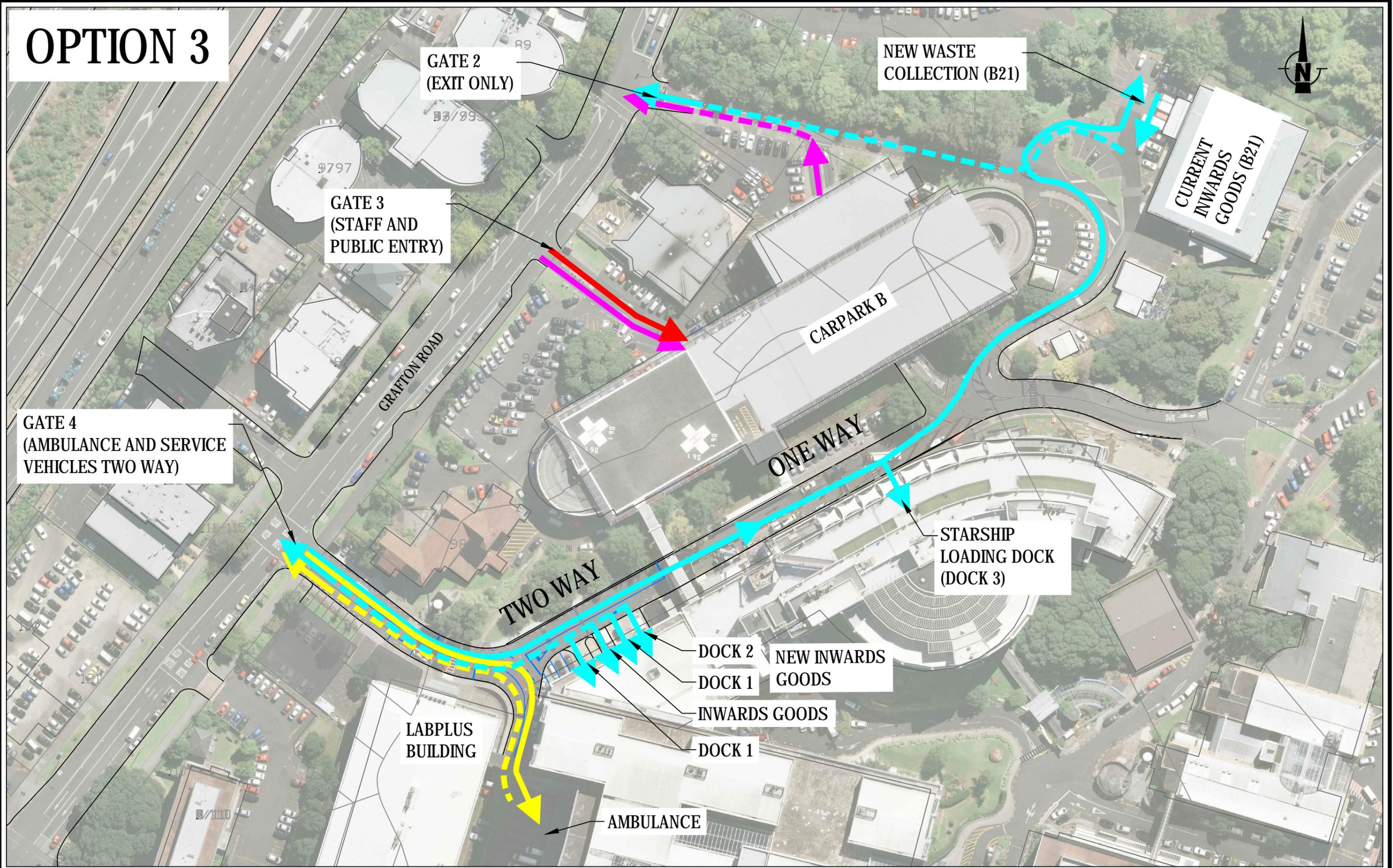
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revision:	0	checked:	ho

rev	status	issued
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Auckland Hospital Traffic Operations Proposed Traffic Flows Option 2- Dock Area

OPTION 3



GATE 4
(AMBULANCE AND SERVICE
VEHICLES TWO WAY)

GATE 3
(STAFF AND
PUBLIC ENTRY)

GATE 2
(EXIT ONLY)

NEW WASTE
COLLECTION (B21)

CURRENT
INWARDS
GOODS (B21)

CARPARK B

ONE WAY

STARSHIP
LOADING DOCK
(DOCK 3)

DOCK 2 NEW INWARDS
GOODS

DOCK 1
GOODS

DOCK 1

TWO WAY

LABPLUS
BUILDING

AMBULANCE



05 of 13 sheets

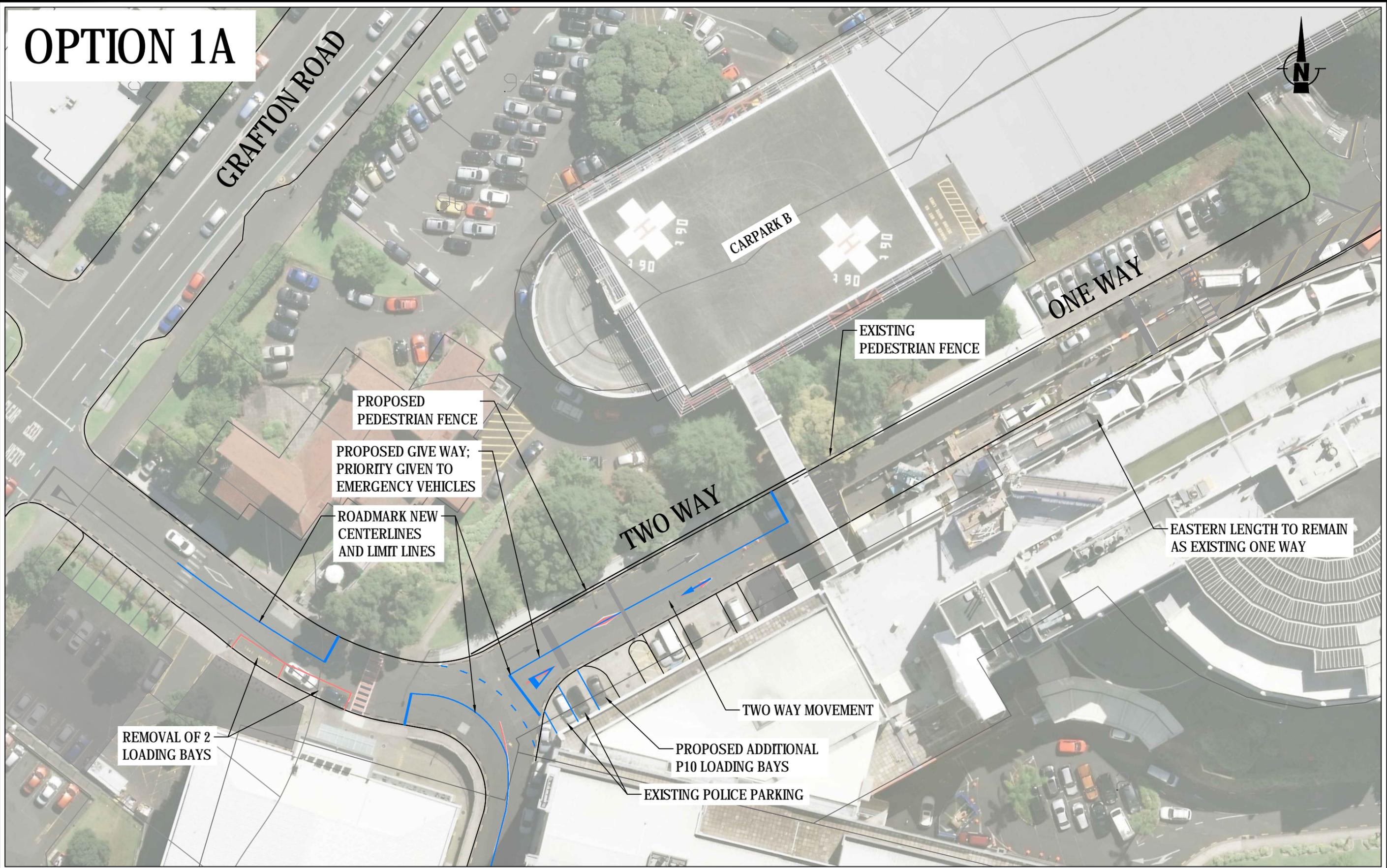
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revision:	0	checked:	ho

rev	status	issued
0	First Issue	07/07/2021

Auckland Hospital Traffic Operations Proposed Traffic Flows Option 3- Dock Area

flow
TRANSPORTATION SPECIALISTS
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OPTION 1A



06 of **13** sheets

scale:	1:1,000 @A3	design:	cs
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revision:	0	checked:	ho

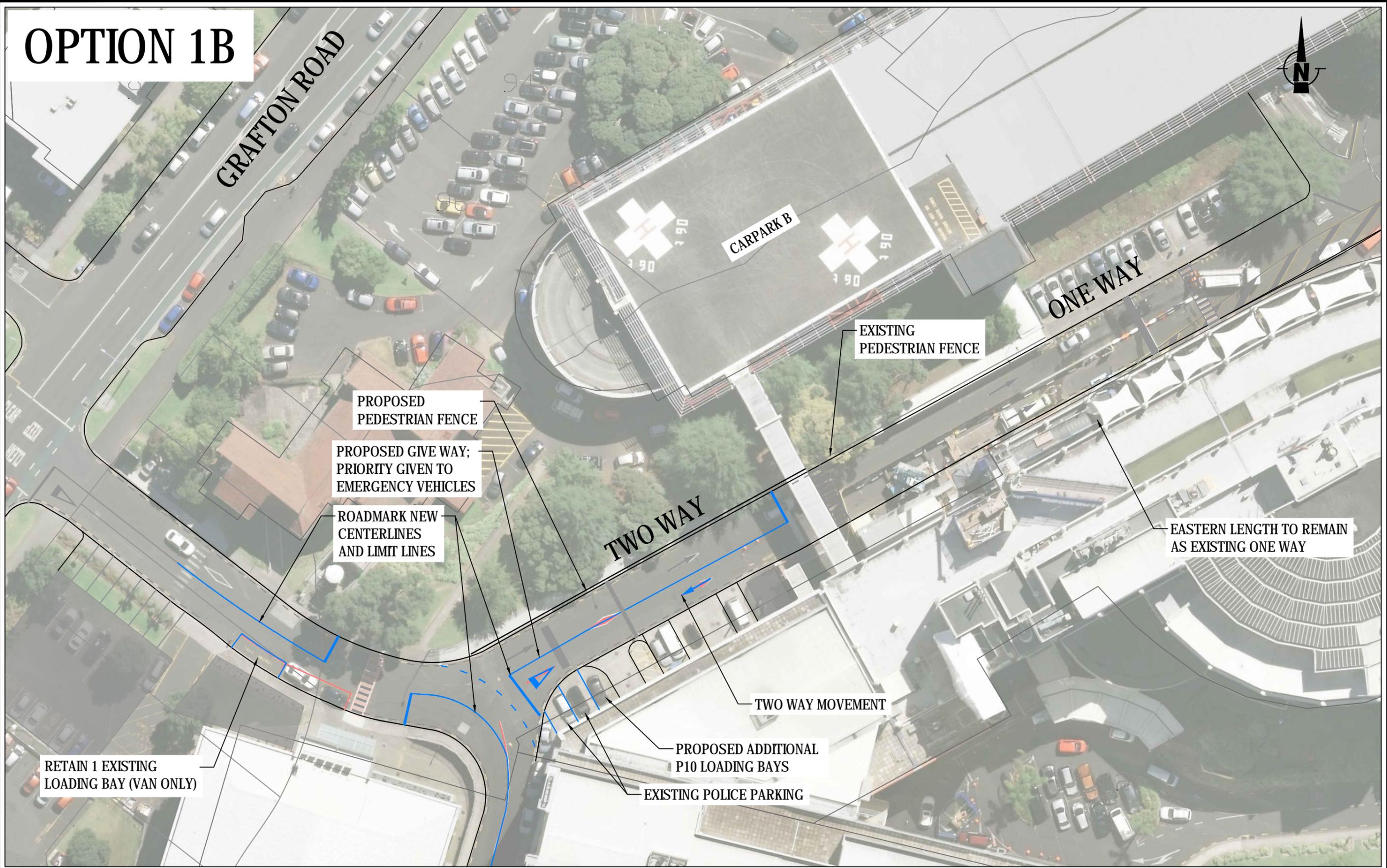
rev	status	issued
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Auckland Hospital Traffic Operations Proposed Option 1A



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OPTION 1B



GRAFTON ROAD

CARPARK B

ONE WAY

EXISTING PEDESTRIAN FENCE

PROPOSED PEDESTRIAN FENCE

PROPOSED GIVE WAY;
PRIORITY GIVEN TO
EMERGENCY VEHICLES

ROADMARK NEW
CENTERLINES
AND LIMIT LINES

TWO WAY

EASTERN LENGTH TO REMAIN
AS EXISTING ONE WAY

TWO WAY MOVEMENT

PROPOSED ADDITIONAL
P10 LOADING BAYS

EXISTING POLICE PARKING

RETAIN 1 EXISTING
LOADING BAY (VAN ONLY)



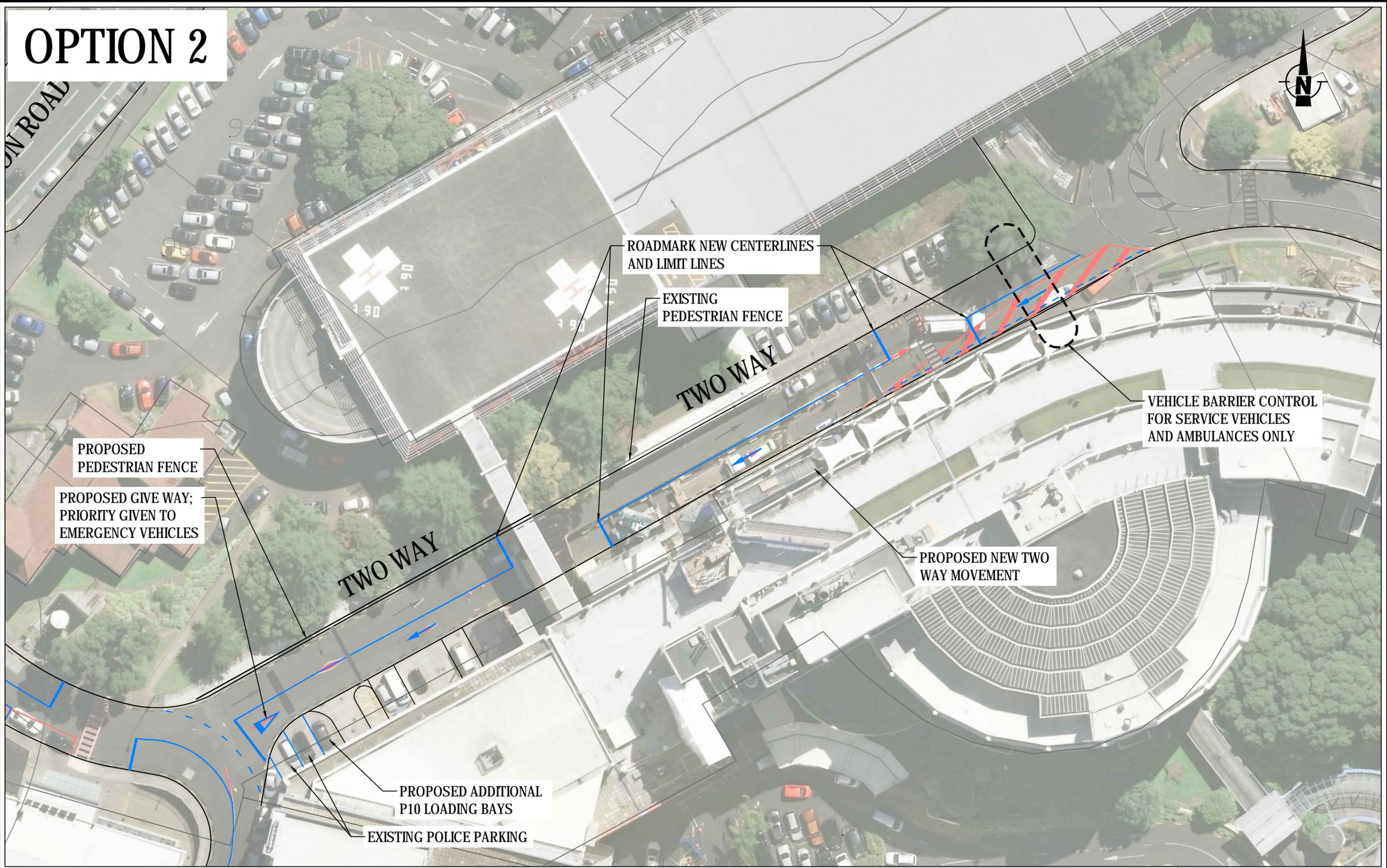
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rev	status	issued
0	First Issue	07/07/2021

Auckland Hospital Traffic Operations Proposed Option 1B

OPTION 2



08 of 13 sheets

scale: 1:1,000 @A3 design: cs
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 revision: 0 checked: ho

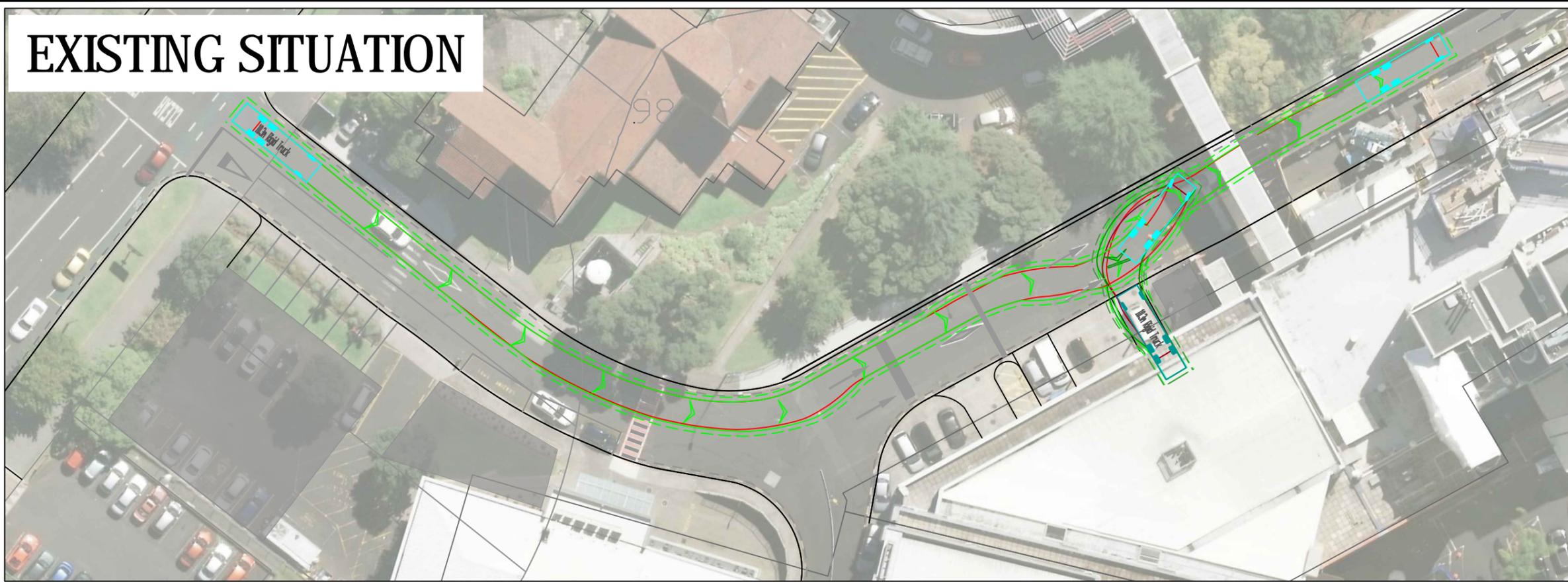
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0	First Issue	07/07/2021

Auckland Hospital Traffic Operations Proposed Option 2



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EXISTING SITUATION



vehicle tracking key:

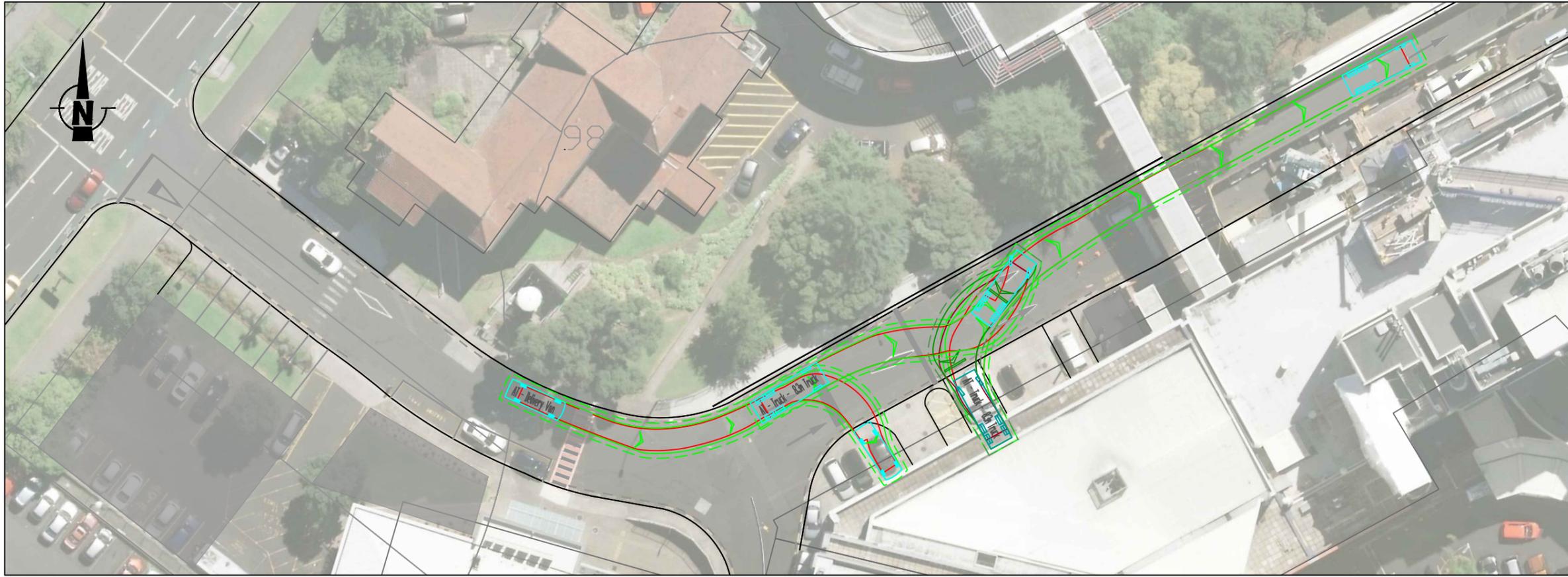
- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

10.3m Truck
 vehicle width: 2.50m
 lock to lock time: 6.00s
 track width: 2.50m
 turning radius: 47 degrees
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION



vehicle tracking key:

- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

AT 8.3m Truck
 vehicle width: 2.55m
 lock to lock time: 6.00s
 track width: 2.55m
 max steering angle: 40.2 degrees
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION



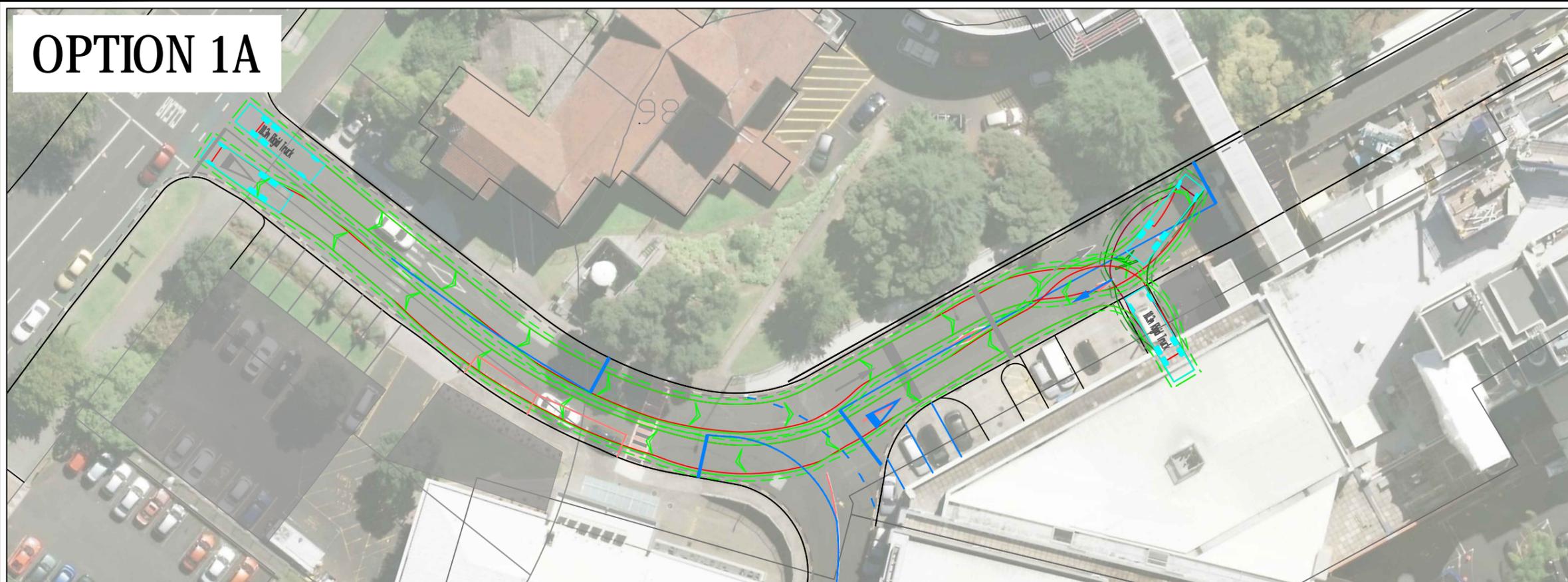
09 of **13** sheets

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 revision: 0 checked: ho

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0	First Issue	07/07/2021

Auckland Hospital Traffic Operations Existing Loading Dock Tracking

OPTION 1A



vehicle tracking key:

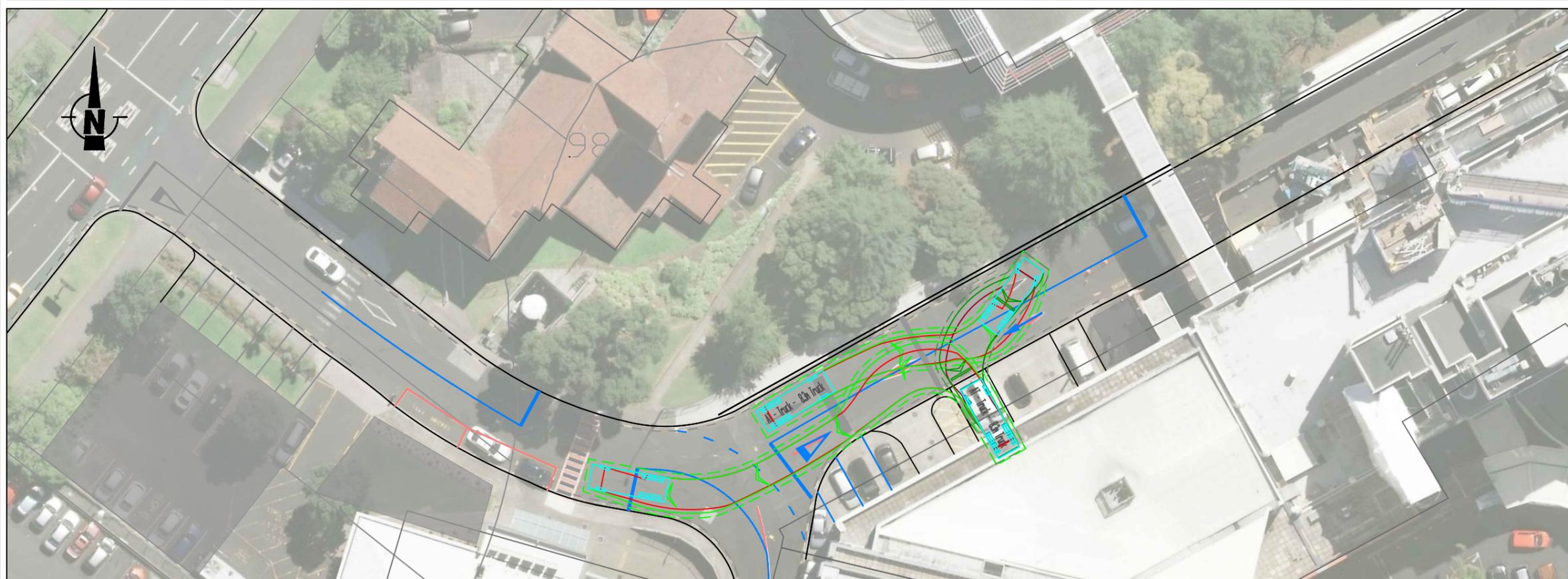
- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

10.3m Truck
 vehicle width: 2.50m
 lock to lock time: 6.00s
 track width: 2.50m
 turning radius: 47 degrees
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION



vehicle tracking key:

- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

AT 8.3m Truck
 vehicle width: 2.55m
 lock to lock time: 6.00s
 track width: 2.55m
 max steering angle: 40.2 degrees
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION



10 of **13** sheets

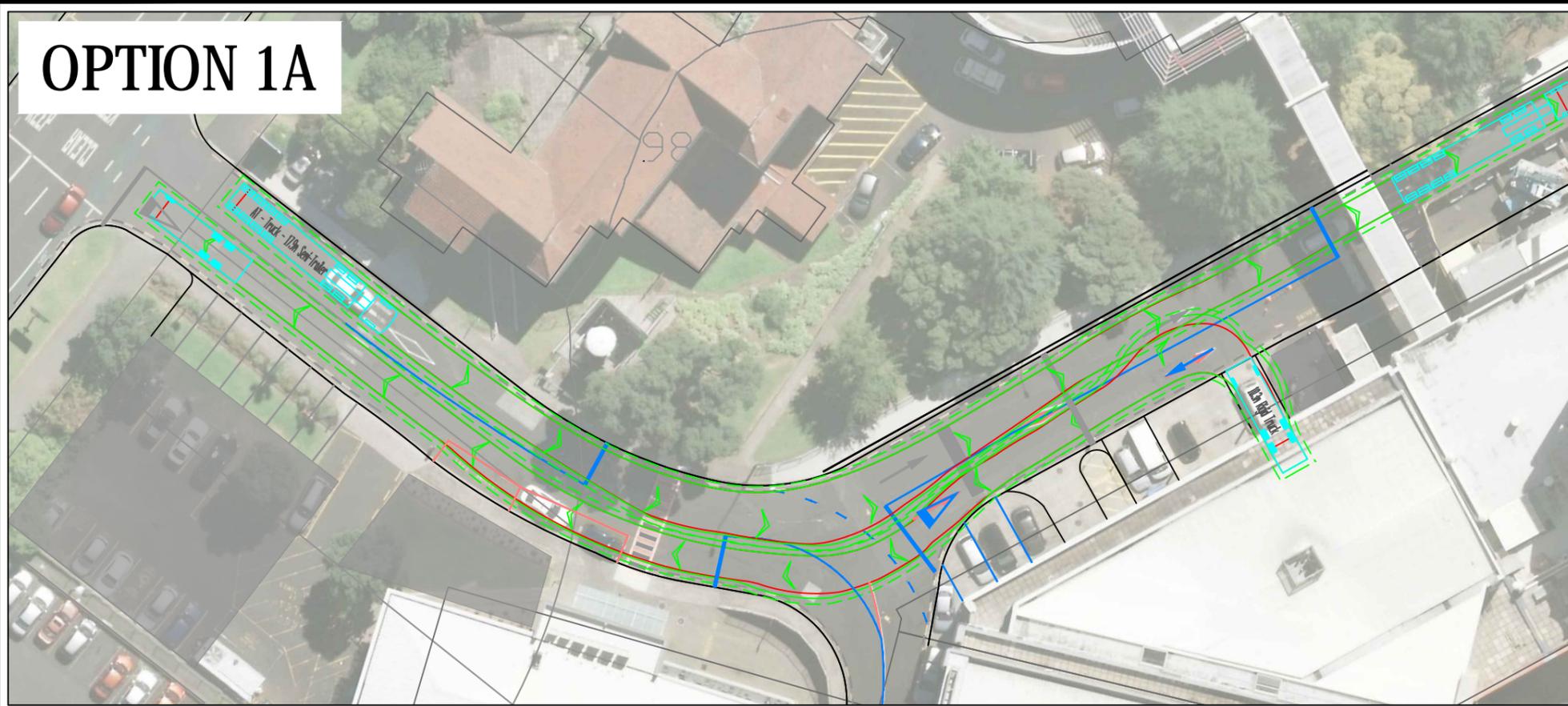
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revision: 0	checked: ho

rev	status	issued
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Auckland Hospital Traffic Operations Option 1A Loading Dock Tracking

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OPTION 1A



vehicle tracking key:

- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

Semi Trailer
 vehicle width: 2.50m
 lock to lock time: 6.00s
 track width: 2.50m
 turning radius: 10.0m
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION

vehicle tracking key:

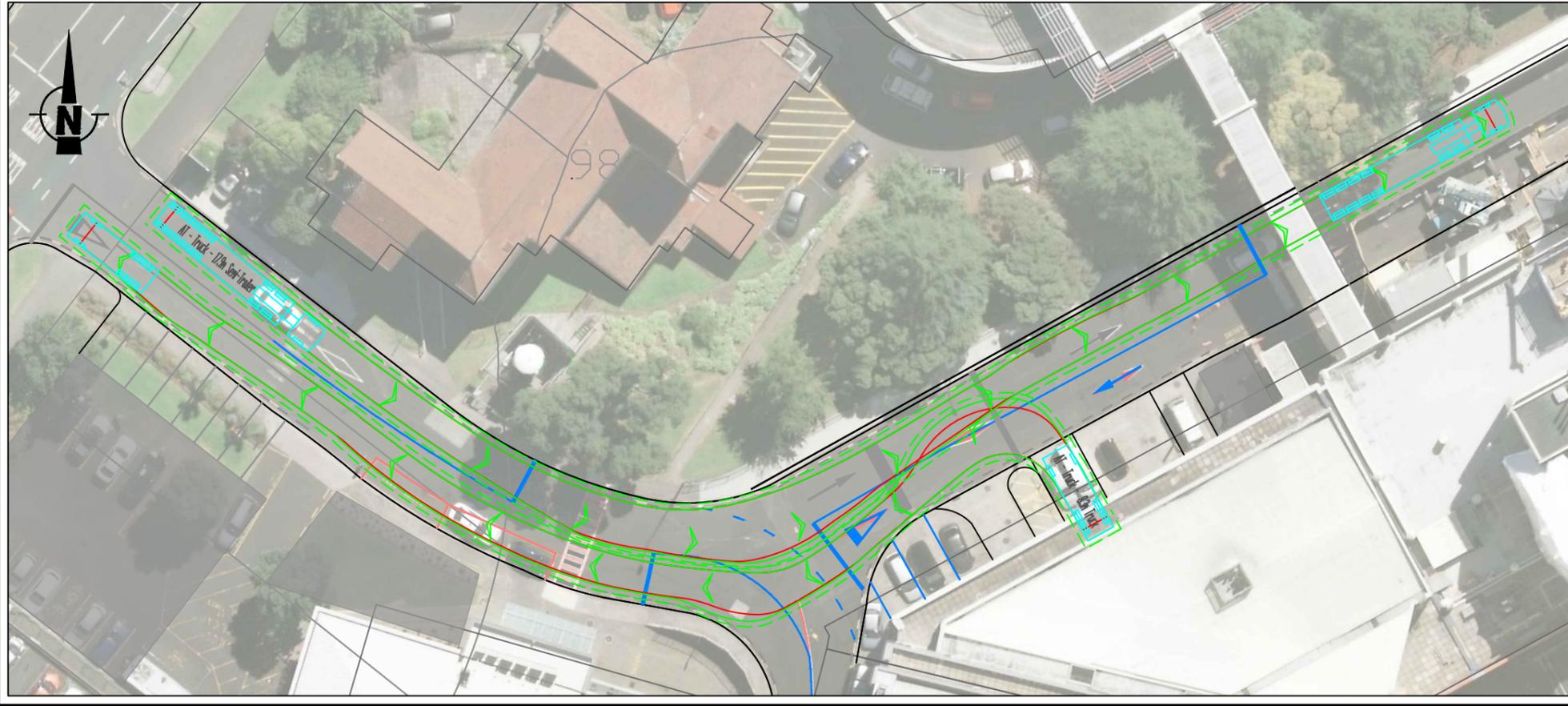
- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

10.3m Truck
 vehicle width: 2.50m
 lock to lock time: 6.00s
 track width: 2.50m
 turning radius: 47 degrees
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION



vehicle tracking key:

- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

Semi Trailer
 vehicle width: 2.50m
 lock to lock time: 6.00s
 track width: 2.50m
 turning radius: 10.0m
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION

vehicle tracking key:

- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

AT 8.3m Truck
 vehicle width: 2.55m
 lock to lock time: 6.00s
 track width: 2.55m
 max steering angle: 40.2 degrees
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION



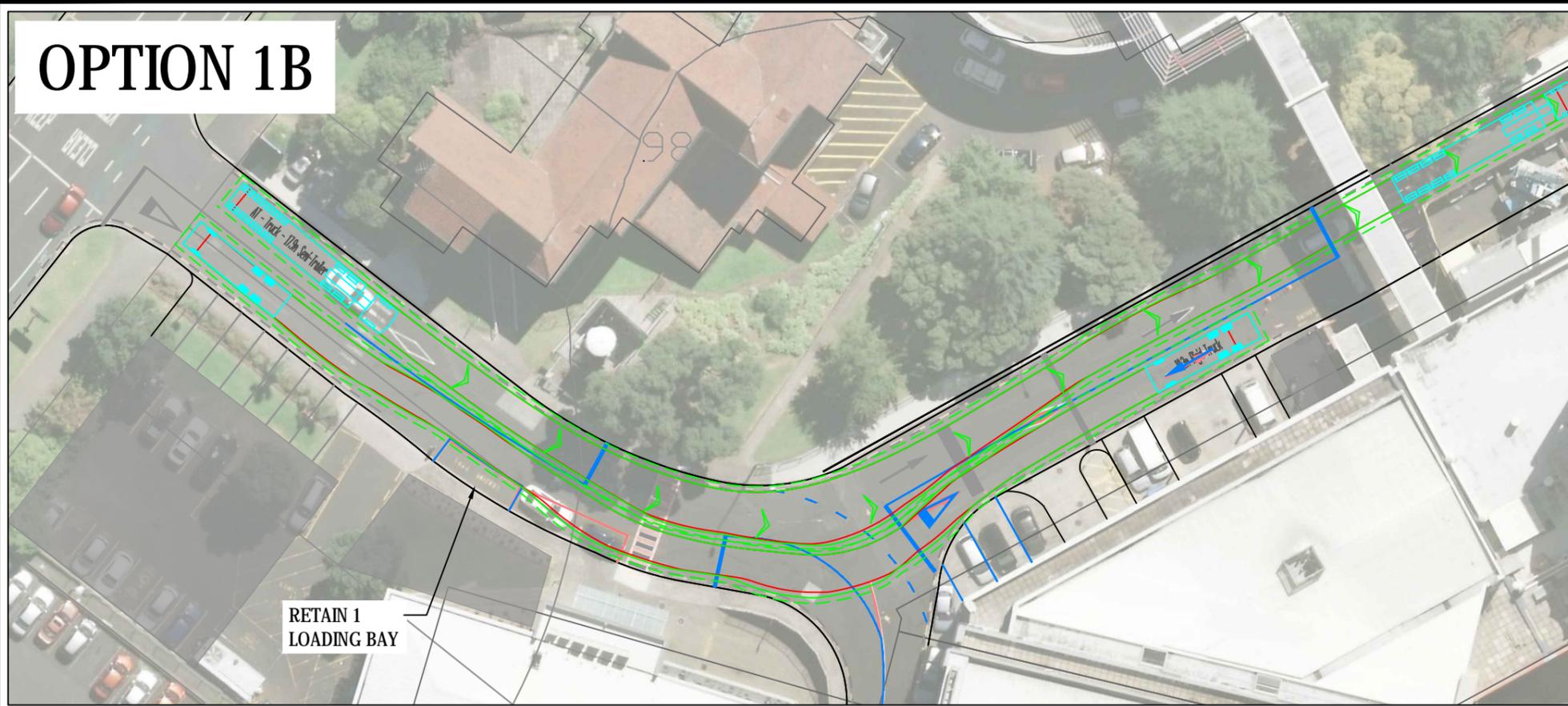
11 of 13 sheets

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ref: D-002 Options	drawn: cs
revision: 0	checked: ho

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Auckland Hospital Traffic Operations Option 1A Tracking of Semi Trailer

OPTION 1B



vehicle tracking key:

- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

Semi Trailer
 vehicle width: 2.50m
 lock to lock time: 6.00s
 track width: 2.50m
 turning radius: 10.0m
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION

vehicle tracking key:

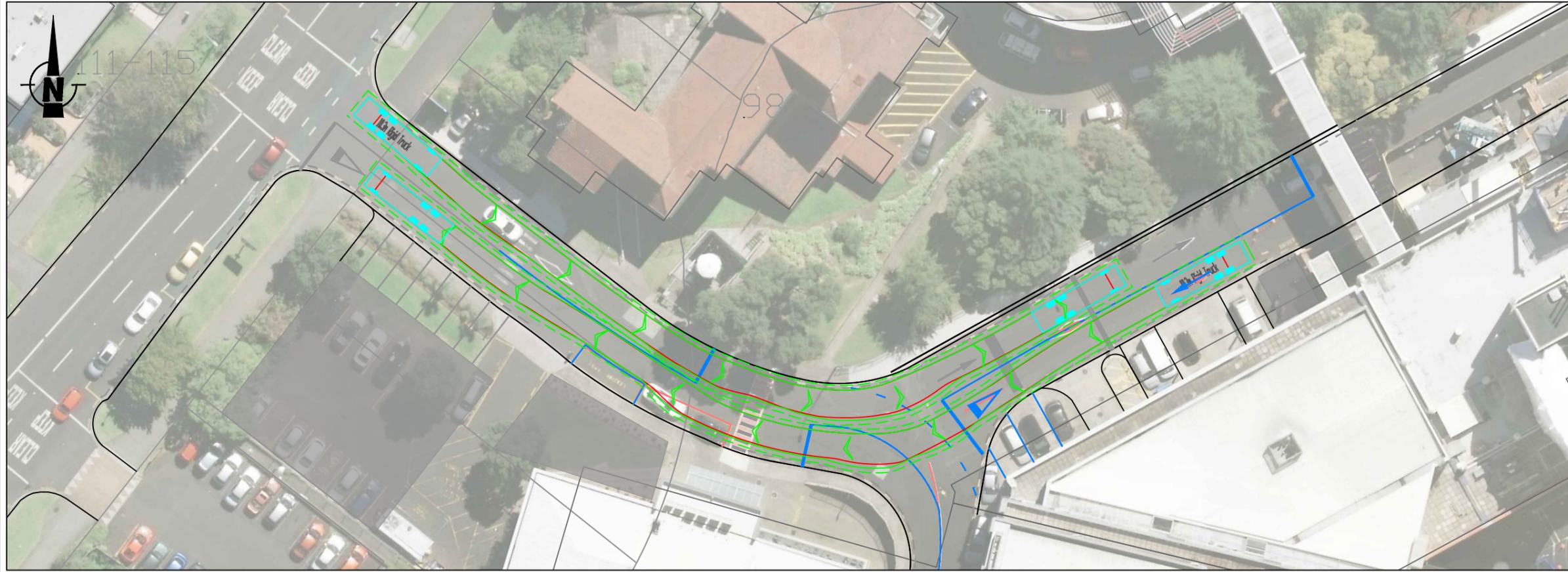
- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

10.3m Truck
 vehicle width: 2.50m
 lock to lock time: 6.00s
 track width: 2.50m
 turning radius: 47 degrees
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION



vehicle tracking key:

- vehicle chassis outline (forwards)
- vehicle chassis outline (reverse)
- overhang of vehicle (forwards)
- overhang of vehicle (reverse)
- - - 500mm clearance (forwards)
- - - 500mm clearance (reverse)

vehicle specs:

10.3m Truck
 vehicle width: 2.50m
 lock to lock time: 6.00s
 track width: 2.50m
 turning radius: 47 degrees
 vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION



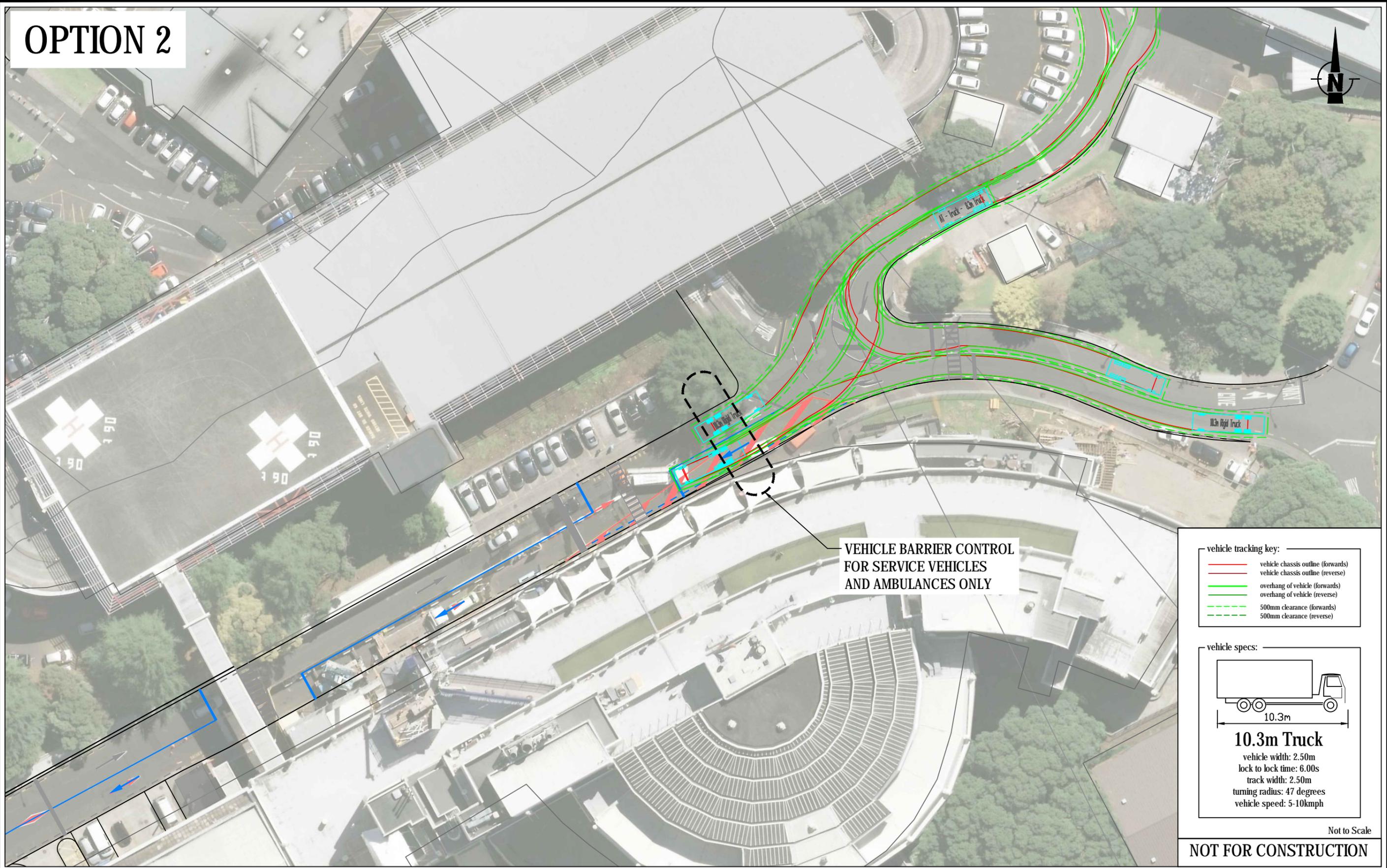
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ref: D-002 Options	drawn: cs
revision: 0	checked: ho

rev	status	issued
0	First Issue	07/07/2021

Auckland Hospital Traffic Operations Option 1B Tracking

OPTION 2



**VEHICLE BARRIER CONTROL
FOR SERVICE VEHICLES
AND AMBULANCES ONLY**

vehicle tracking key:

	vehicle chassis outline (forwards)
	vehicle chassis outline (reverse)
	overhang of vehicle (forwards)
	overhang of vehicle (reverse)
	500mm clearance (forwards)
	500mm clearance (reverse)

vehicle specs:

10.3m Truck
vehicle width: 2.50m
lock to lock time: 6.00s
track width: 2.50m
turning radius: 47 degrees
vehicle speed: 5-10kmph

Not to Scale

NOT FOR CONSTRUCTION



13 of 13 sheets

scale: 1:1,000 @A3	design: cs
ref: D-002 Options	drawn: cs
revision: 0	checked: ho

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Auckland Hospital Traffic Operations Option 2 Tracking