

Appendix 10: Traffic Assessment Report – Stantec

Te Rangihaeata

Waste Management NZ Resource Recovery Park

Traffic Engineering Report

PREPARED FOR WASTE MANAGEMENT NEW ZEALAND | DECEMBER 2022

We design with community in mind

Revision schedule

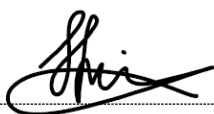
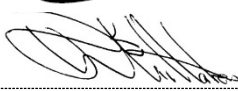
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Quality statement

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1 Introduction

Waste Management New Zealand (“WMNZ”) proposes to develop a new Resource Recovery Park on land sited between State Highway 2 (“SH2”) and the Hutt Rail Line, in Manor Park. The proposal site (the “Site”) is a portion of a larger property, for which an application to develop the parcel of land for use by three future tenancies has been made to Hutt City Council (“Council”). The proposed Resource Recovery Park will serve a number of functions including the repair and sale of second-hand goods, material recovery, as well as a waste transfer station. The facility will be used by a combination of WMNZ and contractors’ trucks, whilst the repair café, retail store and transfer station will be open to the public.

For context, this report should be read in conjunction with the ‘Te Rangihaeata Tenancy Development¹’ Transportation Assessment Report (“Te Rangihaeata TAR”), which describes the proposed wider property development, its supporting transport infrastructure, and associated roading improvements in connecting to the external network at Manor Park Road. These works are subject to a separate resource consent application.

The purpose of this Traffic Engineering Report (“TER”) is to set out and describe the Site-specific activities and operational arrangements for establishing the proposed Resource Recovery Park. In doing so, the TER sets out and describes the existing transport environment and proposed upgrades that form part of the wider Te Rangihaeata tenancy development consent application (described in more detail in the Te Rangihaeata TAR), the nature of the proposed WMNZ activity and associated trip generation (which forms a component of the traffic allowed for within the Te Rangihaeata TAR), the internal layout and traffic operation for the Site, and then provides an audit of the development against the key transport provisions of the City of Lower Hutt District Plan (“District Plan”).

Overall, this TER concludes that the traffic effects and operation associated with the proposed WMNZ facility can be appropriately accommodated within the Site, and can be absorbed by the adjacent road network with the proposed roading upgrades in place, as set out in full in the Te Rangihaeata TAR .

¹ Stantec's ‘Te Rangihaeata ‘Tenancy Development’ Transportation Assessment Report



2 Site Environment

2.1 Site Location

The WMNZ proposal Site is located at the southern end of the wider site, referred to as Te Rangihaeata, which is accessed via Benmore Crescent. **Figure 2-1** shows the location of the proposed Site in the context of the larger site and external road network.

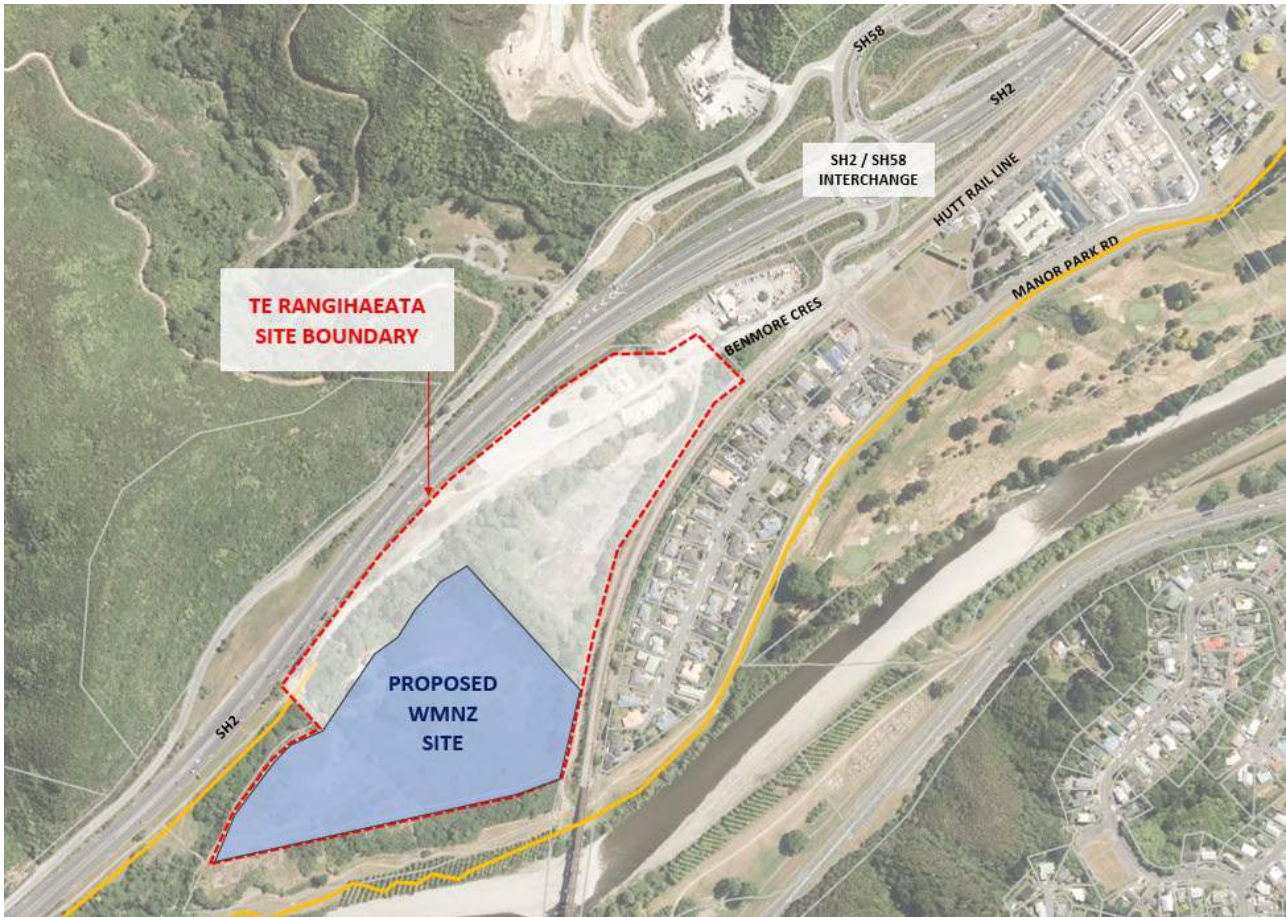


Figure 2-1 : Aerial Photograph of the Te Rangihaeata and WMNZ Proposal Site Extents

As shown, the development area is bounded by SH2 to the west and the Hutt Valley Rail Line to the east. Sole vehicle access to the development Site will be achieved via Manor Park Road / Benmore Crescent, and through the larger Te Rangihaeata site.

The northern extent of Manor Park Road connects with the SH2 / State Highway 58 ("SH58") grade separated interchange ("Interchange"), which affords access to the strategic / arterial road network. South of the interchange, Manor Park Road intersects with Benmore Crescent via a priority-controlled tee-intersection. Benmore Crescent itself is formed as a cul-de-sac, and under the proposed Te Rangihaeata Tenancy Development works is intended to extend southwards as a new common private road serving the new sites to be created, including the WMNZ Site.

The local roading arrangements are illustrated in the aerial photograph included at **Figure 2-2**, which shows the layout of the Benmore Crescent / Manor Park Road intersection adjacent to the Hutt Rail Line level crossing.

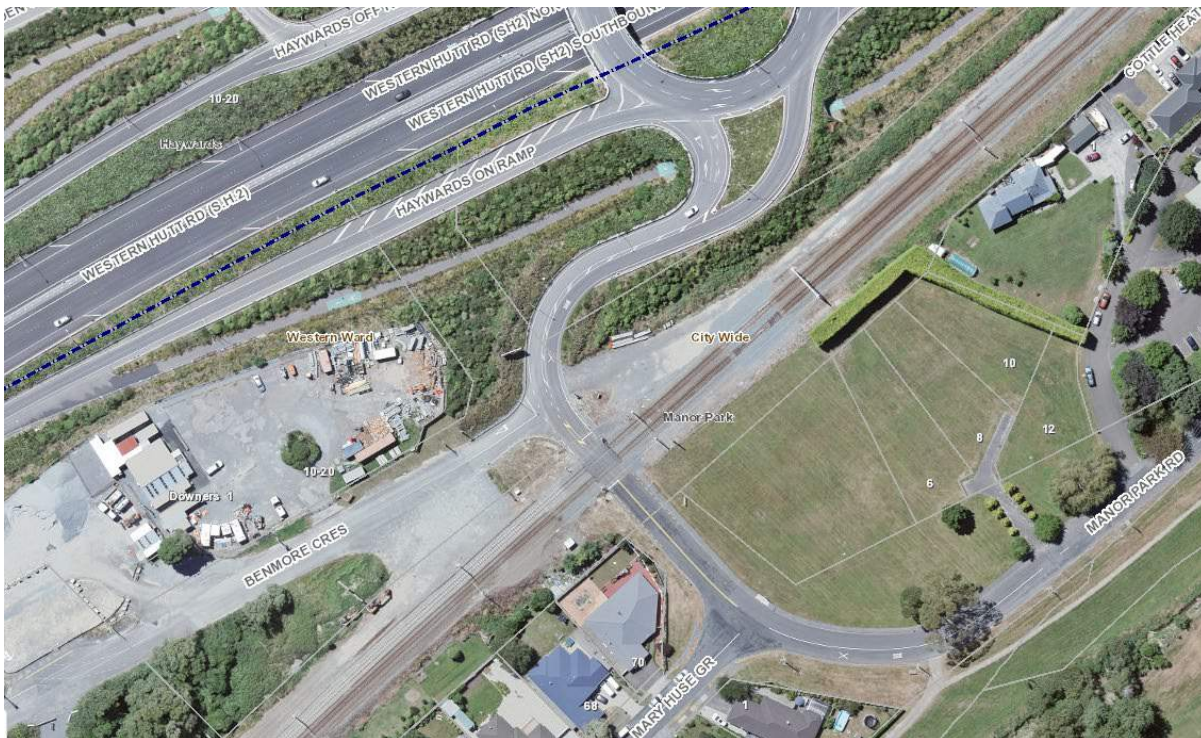


Figure 2-2 : Adjacent Roading Arrangements

Currently Benmore Crescent has a typical carriageway width of approximately 8-9m and, with the exception of the intersection with Manor Park Road, there is no kerb and channel or marked centreline. Downer Construction currently operate a yard immediately to the southwest of the intersection (evident in Figure 2-2), which is accessed from Benmore Crescent.

Benmore Crescent and its intersection with Manor Park Road and the adjacent rail level crossing are to be upgraded, as per the design detailed in the Te Rangihaeata TAR. If for some reason Council did not deem consent warranted to the wider site development, these upgrade works will form part of the preparatory works for the Resource Recovery Park.

2.2 Traffic Volumes

Further detail on the characteristics of the adjacent roads is summarised in **Table 2-1**.

Table 2-1 : Adjacent Road Characteristics

Characteristic	Manor Park Road	Benmore Crescent	State Highway 2 ²
Average Daily Traffic (ADT)	1,500	400	30,000
Road Hierarchy	Access Road	Access Road	Regional Road
Carriageway Width	9.2m	9m	20m
Speed Limit	50kph ³	50kph	100 kph

As shown, traffic volumes on Manor Park Road include existing flows of 1,500 vehicles per day ("vpd"), whilst Benmore Crescent carries an estimated 400vpd. Such volumes are commensurate with the 'Access Road' classifications for each and represent the primary property access function they serve.

A survey of all vehicle movements at the Benmore Crescent / Manor Park Road intersection was undertaken to determine current traffic patterns in this location, as illustrated in **Figure 2-3** and **Figure 2-4** which show the AM and PM peak hour periods, respectively.

² SH2 at Haywards Interchange

³ Some 15m east of the Level Crossing, Manor Park Road reduces to 40kph



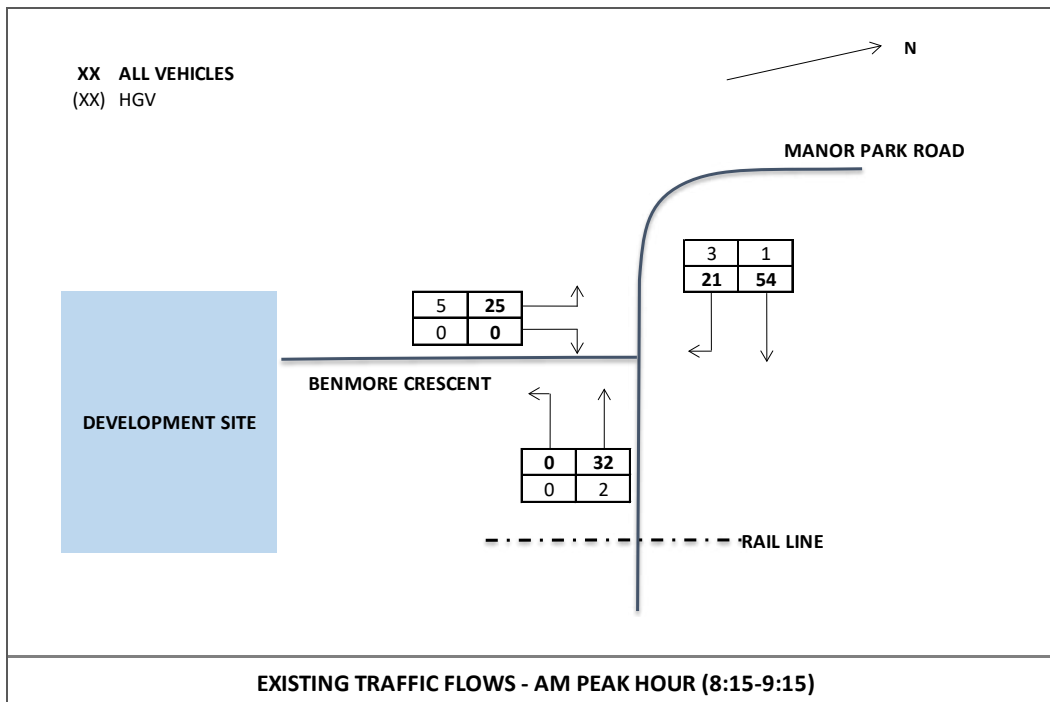


Figure 2-3 : Existing AM Peak Hour Traffic Flows

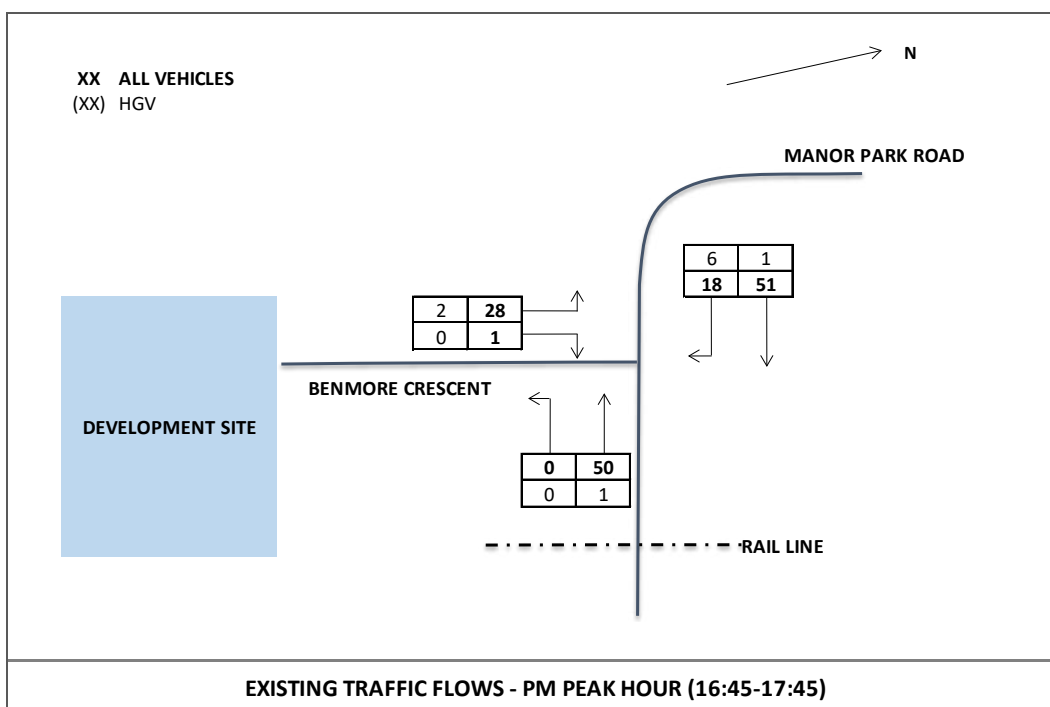


Figure 2-4 : Existing PM Peak Hour Traffic Flows

Traffic to and from Benmore Crescent is almost entirely associated with the existing Downer yard at present. As can be expected, almost all turning movements at Benmore Crescent are right turn in / left turn out trips to and from the Interchange.

2.3 Road Safety

A search of the Waka Kotahi NZ Transport Agency's 'Crash Analysis System' database has been undertaken for the purposes of reviewing the road safety in the vicinity of the site. The search area included Manor Park Road from the Interchange to 50m past the rail crossing inclusive of the Benmore Crescent intersection, for the most recent complete five-year period (2017-2021), plus available data for 2022.

Only one reported crash has been recorded in the search area and period, involving a vehicle turning into Manor Park Road off the Interchange losing control and colliding with the edge safety barrier. The crash was recorded as non-injury (i.e., damage only).

The crash record does not indicate there are any existing safety issues on the immediate road network in the vicinity of the Manor Park Road / Benmore Crescent intersection that provides access to the Site.

2.4 Sustainable Transport

While there is no direct connection to the bus network, the Site has good access to the key public transport train services on the Hutt Valley Line via the nearby Manor Park rail station. In this regard, the proposed upgrading of Manor Park Road and Benmore Crescent will provide a fully connected walking route between the Site and Manor Park station. This, in combination with the established shared path connections which link with the suburbs to the south and to the north (via the recently completed connection to Silverstream bridge), provide good opportunities for staff to travel to/from the Site by means other than private car.

3 Proposed Development

The proposal plans provide for the establishment and operation of a Resource Recovery Park. The proposal will replace an existing WMNZ site currently operating out of Seaview and offer a greater range of services. The development Site encompasses a total area of approximately 57,800m² and will include waste recovery, processing, waste transfer, and recycling activities. A repair café and second-hand goods store is also proposed. The components of the development will include:

- Entry / exit weighbridges and kiosk / gatehouse;
- 'Construction and demolition' materials handling facility;
- 'Refuse transfer station', open to both public and commercial customers;
- Recycling centre (drop-off area and retail shop);
- Bin /skip storage & repair area;
- Office & staff amenities building (55 staff workstations);
- Parking:
 - staff carparking = 145 spaces (to accommodate 55x office staff and 90x truck drivers) inclusive of 20x EV charging spaces and allocated mobility parks. This assumption allows for a worst-case scenario of all 145 staff driving independently to the Site, although in practice it is reasonable to assume parking demands will be less;
 - truck parking = 80 marked spaces (70x medium rigid truck parks and 10x truck and trailer parks) inclusive of 25x EV chargers 'plus' additional hardstanding;
 - cycling parking; and
- Separate 'truck' and 'bin' wash bays;
- Materials Recovery Facility' for the separation / recovery of materials in waste / recyclable streams;
- Workshop for maintenance of WMNZ trucks, including staff office and amenities;
- 2x 'Waste compactors'; and
- Additional EV chargers for truck parks provided in Stage 1.

The proposed Site development plans are included at **Appendix A**.

The Site is expected to operate between the hours of 6am and 7pm, Monday to Sunday. A small number of heavy vehicles (likely to be less than 5) will travel to the Site at night.

As shown within the proposal plans, the various on-site activities are purposefully distributed across the Site to ensure adequate circulation space is provided to accommodate safe and practicable manoeuvring of the larger vehicles that will visit the Site. In this regard, a clear wayfinding strategy will be developed post consent to safely direct public, private and WMNZ vehicles to the relevant locations within the Site. Further detail on the general internal arrangements is provided at Chapter 5, noting that a Traffic Management Plan ("TMP") will be prepared to manage traffic within the Site.

As described earlier, access to the Site will be achieved via the local road network of Manor Park Road and Benmore Crescent, this latter in turn being extended southwards as a new private road. Both the new private Te Rangihaeata road and Benmore Crescent are to be upgraded to a standard commensurate with their future function in accommodating development traffic. As such, each have been designed with regard to the industry standard NZS4404:2010 'Land Development and Subdivision Infrastructure' ("NZS4404") road type 'E17', to provide an 8.4m wide carriageway and footpath on the eastern side of the road.

In addition, the roading improvement works proposed as part of the wider Te Rangihaeata development include upgrading of the Benmore Crescent / Manor Park Road intersection, to provide a new right turn bay provision for traffic entering Benmore Crescent, along with provision of formal pedestrian route over the adjacent level crossing that will provide a safe and continuous footpath connection between the Site and Manor Park rail station.

These improvements, which are detailed further in the Te Rangihaeata TAR, will ensure the associated transport demands generated at the WMNZ Site and wider development activities can be safely and appropriately accommodated.



4 Site Traffic Generation

4.1 Traffic Generation

Details of the anticipated Site traffic generation have been provided by WMNZ, based on measured demands captured at established WMNZ facilities in Seaview⁴.

Once the Site is fully developed, (2024) it is anticipated it would generate in the order of 600 vehicle trips per day (300 in and 300 out). Allowing for future growth, it is forecast that traffic generation would reach approximately 870 vehicle trips per day (435 in and 435 out) by 2040, depending on the growth and demand for refuse and waste management services. **Table 4-1** summarises the trip generation forecasts associated with the various component demands.

Table 4-1 : Forecast Development Site Traffic Generation

Movement type	Vehicle(s)	Movements 2024	Movements 2040	Note
WMNZ – Office Staff	Light	34	50	Office based staff. On-site between 06:00-18:00 approx.
WMNZ – Operational Staff	Light	15	20	Workshop and processing staff. On-site between 06:00-1800 approx.
WMNZ Drivers	Light	55	80	-
Kerbside Collection and Commercial Customers	Heavy	145	210	Collection vehicles serving Hutt City and Porirua Councils, deliveries from commercial and other WMNZ customers
Internal Trucks to Landfill	Heavy	15	25	Hauling consolidated waste to landfill truck and trailer units
Other Hauling Operations	Heavy	100	145	Trucks currently tipping at other disposal sites instead tipping here for sorting / distribution of sorted materials to other destinations
WMNZ Trucks	Heavy	60	80	For overnight parking
General Public	Light	160	225	Light vehicles and trailers. General refuse and garden / green waste 07:00-17:00
Deliveries, Support vehicles and Visitors	Mostly Light	20	35	Office visitors, plus maintenance/ support deliveries, fuel deliveries etc
Total	-	604	870	-

This traffic volume would be spread over the course of the operating day, which is from 6am to 6pm Monday to Friday. Movements on Saturday and Sunday will be less and will involve primarily members of the public. Peak traffic generation periods for the Site will occur on weekdays in the early morning when drivers arrive to collect their vehicles and depart in trucks (either for refuse collection or distribution of sorted waste etc.), which will overlap with arrival of office and operational staff, and then again at the end of the day when trucks return and drivers depart in their own vehicles.

It is estimated that approximately 15-20% of the total daily movements would occur within the Site's AM peak hour, translating to around 90 to 120 movements initially.

4.2 Intersection Assessment

With all traffic associated with the WMNZ Site connecting with the wider road network via the Benmore Crescent / Manor Park Road intersection, detailed analysis of this tee-intersections performance with both the proposed upgrades in place and full Te Rangihaeata tenancy development traffic (including the forecast WMNZ traffic additions described above) has been undertaken, using the industry recognised SIDRA intersection analysis software. This analysis is described in detail in the Te Rangihaeata TAR, which is attached for reference at **Appendix B**.

⁴ At 97-99 Port Road and 27 Seaview Road



By way of providing a summary here, SIDRA models have been created for the 'base' (existing traffic volumes as shown earlier in Figure 2-3 and Figure 2-4) and the forecast full development of the wider site (described in the Te Rangihaeata TAR), including the WMNZ Site. This development traffic scenario has been modelled with the intersection improvements works described in Chapter 3 and the Te Rangihaeata wider site tenants in place.

The SIDRA software has a number of indicators of the expected performance of the intersection including the following: Level of Service⁵ (LoS), based on delay to motorists, graded A (excellent performance) to F (poor performance); and Average delay (seconds / vehicle), defining delay to the typical motorist.

The resultant LoS and delays by each approach is set out in **Table 4-2** and **Table 4-3**, for the weekday AM and PM peak hours, respectively. These tables mirror the same included at Section 8 of the Te Rangihaeata TAR.

Table 4-2 : SIDRA Traffic Modelling Summary AM Peak

Approach	Movement	Base		Development*	
		Delay (s)	LOS	Delay (s)	LOS
Manor Park Road (North)	Through	-	A	-	A
	Right	4.8	A	4.9	A
Benmore Crescent	Left	4.9	A	5.1	A
	Right	6.4	A	11.5	B
Manor Park Road (South)	Left	3.0	A	3.0	A
	Through	-	A	-	A

*2040 & Intersection Improvement Works in place

Table 4-3 : SIDRA Traffic Modelling Summary PM Peak

Approach	Movement	Base		Development*	
		Delay (s)	LOS	Delay (s)	LOS
Manor Park Road (North)	Through	0.1	A	-	A
	Right	5.1	A	5.4	A
Benmore Crescent	Left	4.8	A	4.8	A
	Right	6.5	A	11.6	B
Manor Park Road (South)	Left	3.0	A	3.0	A
	Through	-	A	-	A

*2040 & Intersection Improvement Works in place

The above analysis confirms Site observations that the intersection is currently operating well at LoS A on all approaches and turning movements during both the AM and PM peak hours, and will continue to perform well at equivalent Levels of Service under the proposed site traffic scenario, with no material change to delay or queuing.

Overall, the assessment shows that with full development of the Site to accommodate the proposed Resource Recovery Park and occupation of the wider site (as described in the Te Rangihaeata TAR), the intersection improvements as proposed will provide adequate capacity at the immediate connection to the external network to accommodate the

⁵ Level of Service (LOS) is a six-level grading system for intersection performance (A to F), where Level A represents totally uncongested operation with minimal delays and queues, and Level F represents highly congested operation with long delays and extensive queuing.

forecast development traffic, whilst maintaining good Levels of Service. With little delay or any associated queuing at the Site access intersection there will be will no knock-on effects of development traffic on the adjacent Interchange, which is expected to continue to perform well, as confirmed by Waka Kotahi.



5 Internal Site Design

5.1 Site Layout and Operation

It is understood that all vehicles arriving to the Site to deliver refuse or collect processed waste will need to be weighed on arrival. In this manner, the weighbridge has been sited well inside the entrance, to allow for any occasional queuing that may occur from vehicles arriving together to be accommodated internal of the Site, and clear of the external private road. Staff vehicles, which will account for the majority of trips in the AM and PM peaks, will not need to be weighed and will therefore bypass the weighbridge.

Once inside the WMNZ Site, vehicles will be directed (via signage and road markings) to the respective activities, with access to restricted areas (i.e. non-public) managed by gates/barrier arms. A number of dedicated heavy vehicle turning areas are provided within the Site (as shown in the proposal plans included at **Appendix A**) which will be clearly demarcated, to avoid drivers attempting inappropriate turning manoeuvres close to buildings and structures or near key through traffic or pedestrian routes.

As the Site will accommodate heavy vehicles as well as a variety of loading operations and associated plant, an internal Traffic Management Plan ("TMP") will be developed for the facility post consent, to manage the internal movement of vehicles, equipment and personnel, and to ensure appropriate safety measures are employed to mitigate conflict (particularly between pedestrians and vehicular traffic).

Where possible, parking locations have been provided close to buildings where there is a short and safe walk to offices or other work areas.

5.2 Parking

Recent changes to the National Planning Framework and District Plan have removed specific requirements to provide a minimum number of on-site car parks to support new developments. Accordingly, there is no specific requirement to provide car parking for the proposed Resource Recovery Park.

Notwithstanding, the proposal plans include provision for a total of 145 on-site parking spaces to accommodate office and operational staff, and parking for private vehicles associated with the 90 truck drivers that will operate from the Site. This proposed Site parking provision will adequately accommodate the anticipated demand, allowing for all associated vehicles to be contained on-site and without the need to rely on the external kerbside parking along the private road.

The District Plan notes that car parking facilities and spaces must comply with the requirements of the nationally recognised standard AS/NZS2890.1:2004 Parking facilities Part 1: Off-street Car Parking (NZS2890.1). Noting the ample space available within the Site, parking areas will be able to satisfy the design requirements in terms of parking stall and manoeuvre dimensions.

Where parking is provided within a site, the District Plan requires a minimum allocation of accessible parks, and for these to be designed in accordance with the industry standard 'NZS4121:2004 Design for Access and Mobility – Buildings and Associated Facilities ("NZS4121")'. With the 145 total parks proposed, at least 4 accessible car parks must be provided to satisfy NZS4121. Provision for this number of parks can be suitably accommodated with these spaces marked in accordance with the dimension requirements and located close to building entrances.

In addition to light vehicle parking, the nature of the proposed Resource Recovery Park means it will generate parking demand for approximately 80 trucks. Provision for this quantum of truck parking has been included in the development plans, with these parks designed to an appropriate length to accommodate the mixture of rigid and 'truck and trailer' truck types that will operate from the Site.

The District Plan sets out the requirement for minimum cycle parking at Chapter 14, Standard 4 (e) based on the number of staff on-site at any given time. In this manner, 1 cycle park for every 10 staff members is required to satisfy the standard, meaning a total of 15 cycle parks are needed for the 145 total staff anticipated to be employed by the WMNZ operations. This provision can be comfortably met, as can the specific requirements around position and standard of the cycle stands/facilities, to be detailed further post consent.

5.3 Loading and Servicing

The District Plan specifies a minimum loading and servicing bay provision based on the development site's Gross Floor Area ("GFA"). The WMNZ proposal plans indicate a 10,625m² total Site GFA (combined Stages 1 and 2), leading to a requirement for 1 loading space capable of accommodating Heavy Goods Vehicles (HGVs).

The nature of the proposed WMNZ facility is such that multiple (un)loading operations will be undertaken at the various activities included at the Site, and as such the servicing arrangements have been designed to accommodate these activities in an efficient and safe manner, which far exceed the minimum District Plan requirement. Accordingly,



dedicated (un)loading areas are provided across the facility, involving a mixture of internal 'drive-through' and external loading bays sized to accommodate the respective vehicles anticipated to be using them. In addition, adequate manoeuvring space is included within the Site in the form of dedicated 'turning areas', as illustrated by the proposal plan included at **Appendix A**.

6 District Plan Compliance

An assessment of the development proposal's compliance with the relevant transport rules and standards of the District Plan has been undertaken, as set out in **Table 6-1** below to add context to the assessment of traffic effects.

Table 6-1 : District Plan Transport Provisions Compliance Assessment

Reference	Rule / Standard	Assessment of Compliance
Chapter 14 General Rules		
14A Transport		
14A 5.1 (a)	Any activity is permitted if it: I. Complies with the standards listed in Appendix Transport 1; and II. Does not exceed the high trip generator thresholds identified in Appendix Transport 2	Refer to assessment of Appendix Transport 1 – Standards compliance below. Does not Comply. The proposed development triggers the high trip generator standard.
14A 5.1 (b)	Any activity is that does not comply with the standards listed in Appendix Transport 1 is a Restricted Discretionary Activity. Discretion is restricted to: I. The effects of the standard(s) not being met.	Refer to assessment of Appendix Transport 1 – Standards compliance below.
14A 5.1 (c)	Any activity that exceeds the high trip generator thresholds specified in Appendix Transport 2 is a Restricted Discretionary Activity. Discretion is restricted to: I. The effects of the activity on the transport network including impacts on on-street parking. An integrated Transport Assessment, prepared by a suitably qualified traffic engineer/planner, must be submitted within any resource consent application under this rule.	Since the proposed WMNZ plans provide for an Industrial Activity involving >5,000m ² GFA, it is considered a High Trip Generator, and this TER (and the associated Te Rangihaeata TAR) has been prepared accordingly to assess traffic and transport related impacts associated with the new development proposal.
Chapter 14A Transport – Appendix Transport Standards		
Standard 1	Standards for New Roads	
	(b) Engineering Standards All roads must be designed and constructed in accordance with NZS4404:2010 Land Development and Subdivision Infrastructure.	Technical Non-Compliance. The proposed upgrading to Benmore Crescent and new Te Rangihaeata site road have been designed to meet the standards set out in NZS4404 in terms of carriageway width, as described at Chapter 3 (and within the Te Rangihaeata TAR). Given the proposed lots will only front the eastern side of the road, a footpath is proposed on this side only, rather than on both sides as envisaged by NZS4404. The road and footpath design proposed have been developed in collaboration with the Council.
Standard 2	Site Access and Manoeuvring Area	
	(a) Vehicle Access (excluding separation distances from intersections) No more than two separate crossings for any front site. The total width of such crossings must not exceed 50% of the road frontage. There must be a separation distance of at least 1 meter between crossings measured at the kerb / carriageway edge.	Complies. The proposed WMNZ Site will be served by a single (two-way) vehicle access connecting off the southern end of the proposed new Te Rangihaeata private road. Complies. No other vehicle crossings are proposed within 1m of the development Site access.



Reference	Rule / Standard	Assessment of Compliance
	Site access must be designed and constructed in accordance with Section 3 of AS/NZS2890.1:2004 Parking facilities Part 1: Off-street car parking.	Can Comply. The proposed Site access can be designed to achieve the requisite dimension, gradient and formation standards of AS/NZS2890.1.
	(b) Separation Distances from Intersections and Rail Level Crossings. The distance between new vehicle accesses and all intersections must be at least: • National or Regional: 30m • Arterial or Primary Collector: 20m • Secondary Collector: 15m • Access Road: 10m The distance between new vehicle accesses and all rail level crossings must be at least 30m. These distances are to be measured between the intersecting points of the site boundaries as shown in Diagram 2-1 below, and also apply to new vehicle accesses on the opposite side of the road from an intersection. Diagram 2-1: Separation Distance from Intersection	Complies. There are no road intersections within 10m of the Site access. Does not Apply. There are no level crossings in the vicinity of the proposed Site access.
	(c) Manoeuvring Area Sufficient area must be provided for vehicles to stand and queue and make all necessary manoeuvres without using the public road reserve, and without using the area provided for parking, servicing, loading or storage purposes. Sufficient area must be provided to allow all vehicles to enter and exit the site in a forward direction except where the access is to a single dwelling and accesses an Access, Secondary Collector or Primary Collector Road.	Complies. As demonstrated within the proposal plans, the development includes sufficient on-site manoeuvring area to allow all vehicles including larger trucks, to turn on-site, without using areas set aside for parking loading or storage. Complies. All vehicles will be able to turn on-site, and therefore enter and exit in a forward direction to and from the external private road.
Standard 3	Minimum Sight Distances at Railway Level Crossings.	
	(a) Minimum Sight Distances at Railway Level Crossings New buildings, structures and activities that would obstruct drivers seeing approaching trains must be designed, located and constructed in accordance with New Zealand Transport Agency Traffic Control Devices Manual 2008, Part 9	Does not Apply. The nearest railway crossing to the development Site is on Manor Park Road; no site structures or activities will obstruct sightlines of drivers at the level crossing, noting the Benmore Crescent / Manor Park Road improvements works

Reference	Rule / Standard	Assessment of Compliance															
	Level Crossings and the Australian Level Crossing Assessment Model (ALCAM).	proposed as part of the Te Rangihaeata site will improve safety at the existing rail crossing.															
Standard 4	Car and Cycle Parking and End of Trip facilities																
	(b) Off-street parking for People with Disabilities Off-street car parking for people with disabilities must be provided in accordance with Section 5 of the NZS 4121:2004 Design for Access and Mobility – Buildings and Associated Facilities.	Can Comply. Provision of at least 4 accessible car parks can be provided on-site, with these designed to meet the dimension and marking requirements of NZS4121.															
	(d) Car Parking Design Standards. Car parking spaces and facilities must comply with the requirements of AS/NZS 2890.1:2004 Parking Facilities Off-street car parking.	Can Comply. Parking spaces will be marked to comply with the dimension requirements of AS/NZS2890.1 and will be formed to an appropriate surface.															
	(e) Cycle Parking and End of Trip Facilities For all activities in new buildings and developments (including the redevelopment of existing buildings), cycle parking and showers must be provided in accordance with the minimums stated in Table 4-2. Table 4-2: Minimum Cycle Parks and Showers <table border="1"> <thead> <tr> <th>Number of Staff Members</th><th>Number of Cycle Parks</th><th>Number of Showers</th></tr> </thead> <tbody> <tr> <td>1-5</td><td>0</td><td>0</td></tr> <tr> <td>6-10</td><td>1</td><td>1</td></tr> <tr> <td>10 or more</td><td>1 per 10 staff members</td><td>1 per 100 staff members</td></tr> </tbody> </table> * The number of staff members is the maximum number of full or part time staff members on the site at any one time.	Number of Staff Members	Number of Cycle Parks	Number of Showers	1-5	0	0	6-10	1	1	10 or more	1 per 10 staff members	1 per 100 staff members	Can Comply. The 145 staff expected on-site triggers a need for 15 on-site cycle parks, which can be readily provided along with a minimum of 2 showers. The cycle parks will be designed as per requirements stated under Standard 4(e).			
Number of Staff Members	Number of Cycle Parks	Number of Showers															
1-5	0	0															
6-10	1	1															
10 or more	1 per 10 staff members	1 per 100 staff members															
Standard 5	Loading and Unloading																
	a) Loading and Unloading Requirements for Non-Residential Activities. For non-residential activities the number of loading spaces to be provided on-site must not be less than that shown in Table 5-1. Table 5-1: Minimum Loading Space Requirements <table border="1"> <thead> <tr> <th>Gross Floor Area</th><th>Number of Spaces</th><th>Minimum Design Vehicle</th></tr> </thead> <tbody> <tr> <td>Up to 500m²</td><td>Nil</td><td>-</td></tr> <tr> <td>501 - 1000m²</td><td>1</td><td>Small Rigid Vehicle</td></tr> <tr> <td>1001 - 3000m²</td><td>1</td><td>Medium Rigid Vehicle</td></tr> <tr> <td>Greater than 3000m²</td><td>1</td><td>Heavy Rigid Vehicle</td></tr> </tbody> </table> Loading facilities must be designed, constructed, and maintained in accordance with AS 2890.2:2002 Parking facilities Part 2: Off-street commercial vehicle facilities, based on the minimum vehicle design stated in Table 5-1.	Gross Floor Area	Number of Spaces	Minimum Design Vehicle	Up to 500m ²	Nil	-	501 - 1000m ²	1	Small Rigid Vehicle	1001 - 3000m ²	1	Medium Rigid Vehicle	Greater than 3000m ²	1	Heavy Rigid Vehicle	Complies. The development proposal includes >5,000m GFA of industrial activity, and therefore is required to provide a loading bay capable of accommodating a Heavy Rigid Vehicle. The proposal plans include a number of on-site (un)loading areas designed to accommodate a variety of service vehicles (including HGVs and truck trailer units) that will visit the site, to match anticipated requirements and growth forecasts.
Gross Floor Area	Number of Spaces	Minimum Design Vehicle															
Up to 500m ²	Nil	-															
501 - 1000m ²	1	Small Rigid Vehicle															
1001 - 3000m ²	1	Medium Rigid Vehicle															
Greater than 3000m ²	1	Heavy Rigid Vehicle															

As shown, the proposal plans align well with the traffic and transport provisions of the District Plan in satisfying the relevant standards, noting that the proposed design for the Benmore Crescent and Te Rangihaeata site private road extension deviates from the NZS4404 typology in only providing a footpath on one side of the road (rather than two). This is considered appropriate since development sites will only front the roads eastern side (noting the only site to the west is separated from the road by an established stream), with these arrangements having been developed in collaboration with the Council.



Since the development plans provide for an industrial activity involving >5,000m² GFA, the proposal triggers the High Trip Generator Threshold under Rule 14A 5.1(c), and as such the preparation of a Transport Assessment is required to examine any traffic and parking impacts that may be generated by the development on the adjacent road network. This TER (and related Te Rangihaeata TAR) has been prepared to examine and describe the traffic operation of the proposed WMNZ development and its associated impacts on the adjacent transport network, and concludes the associated demands can be safely and appropriately accommodated with the proposed Te Rangihaeata roading infrastructure and associated improvements in place at the Manor Park Road intersection.

7 Conclusion

Waste Management New Zealand (“WMNZ”) proposes to develop a new waste handling and processing facility on one of the sites to be created from a consent application to establish three separate tenancies across the wider site referred to as ‘Te Rangihaeata’.

The proposed WMNZ Resource Recovery Park will serve a number of functions including as a waste transfer station and recycling processing operation and will be used by a combination of WMNZ and contractors’ trucks, as well as accommodating some public visits.

Access to the Site is proposed via a new private road that will be developed through the wider Te Rangihaeata site connecting off Benmore Crescent, with both these roads developed to a standard suitable for accommodating the full Te Rangihaeata traffic. The roading infrastructure will also provide a continuous footpath connection between the Site and the Manor Park rail station, as well as providing access to the adjacent Hutt River (walking and cycling) Trail.

The scale of traffic generated by the proposed facility (which draws from existing vehicle movement data at other established WMNZ sites), involves existing volumes of approximately 600 vehicles per day, with these volumes forecast by WMNZ to increase to 870vpd by 2040. An assessment of the impacts of these development trips on the adjacent Benmore Crescent / Manor Park Road tee-intersection shows that development Site traffic (plus traffic associated with the full build-out of the Te Rangihaeata site) can be adequately accommodated, with the roading upgrades proposed as part of the Te Rangihaeata transport infrastructure works.

The level of parking proposed at the Site will fully accommodate demands generated by the various on-site activities, without the need to rely on kerbside parking external to the Site.

Overall, it is assessed that there is no traffic engineering reason which would preclude the granting of consent for the proposed development.

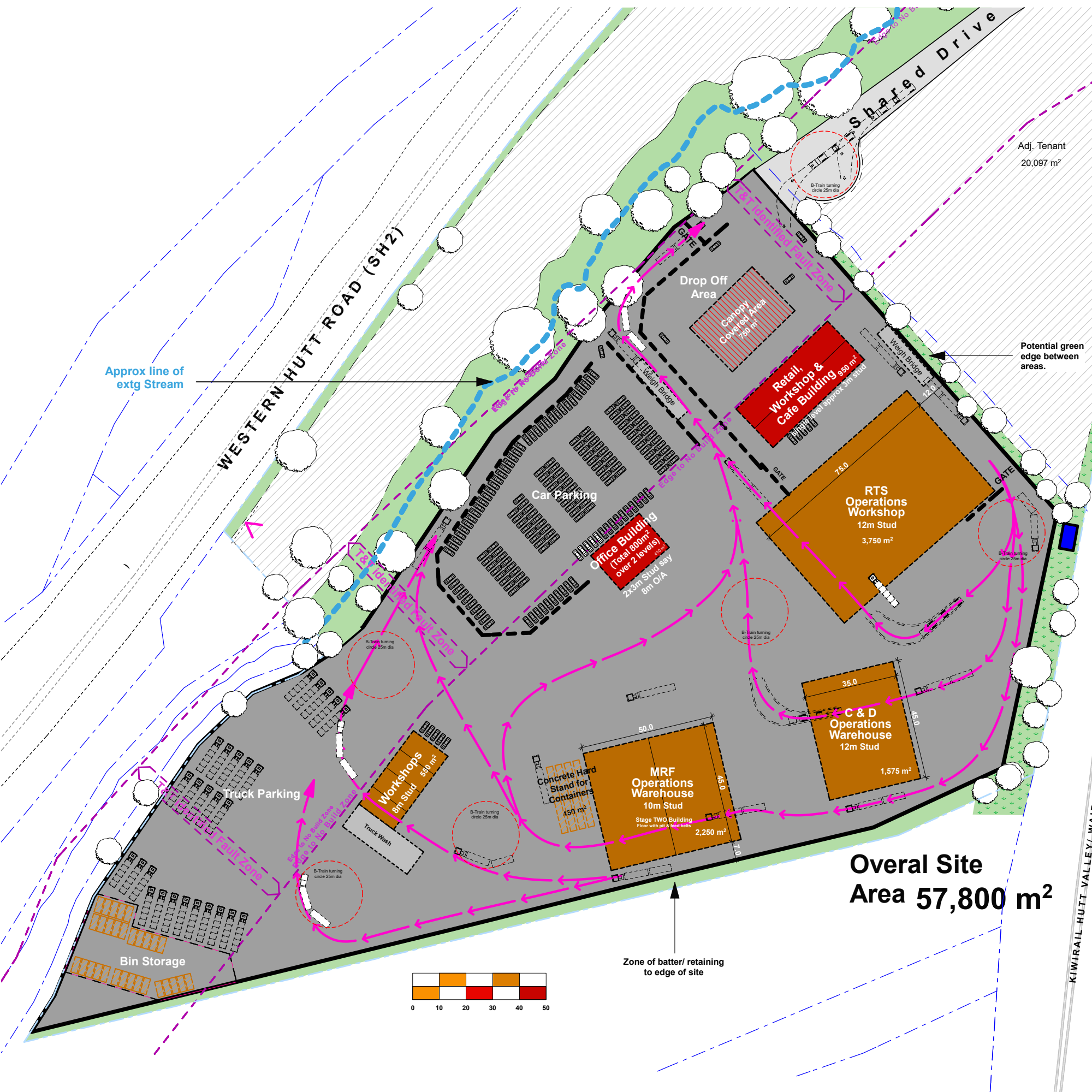
Appendices

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Appendix A Proposed WMNZ Site Layout







Waste Management®



ROSCO INDUSTRIAL



PROPOSED FACILITY

Te Rangihaeata
Benmore Cres - Manor Park - Hutt City
proposal for
Rosco Industrial & Ngāti Toa Rangatira

10 September 2022 Refer Bar Scale 2028 revC



HARRIS ARCHITECTS LIMITED
po box 24 120 wellington
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www.harch.nz

Ngāti Toa Rangatira

Overall Site Area 57,800 m²

Appendix B Te Rangihaeata 'Tenancy Development' Transportation Assessment Report



Te Rangihaeata 'Tenancy Development'

Transportation Assessment Report

PREPARED FOR ROSCO ICE CREAM LIMITED | NOVEMBER 2022

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Revision schedule

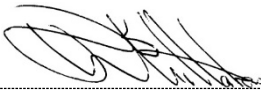
Rev No	Date	Description	Signature of Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by
0	26/10	Draft for Comment	SJ	JW	MGG	MGG
1	15/12	Final	SJ	JW	MGG	MGG



This document entitled 'Te Rangihaeata Tenancy Development Transportation Assessment Report' was prepared by Stantec New Zealand ("Stantec") for the account of Rosco Ice Cream Limited (the "Client"). The material in it reflects Stantec's professional judgment in light of the scope, the Client's brief (if any) and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published. In preparing the document, Stantec may have relied on information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. No liability is accepted by Stantec or any employee or sub-consultant of Stantec with respect to its use by a third party.

Quality statement

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1 Introduction

Rosco Ice-cream Limited is seeking consent to develop a parcel of land between State Highway 2 ("SH2") and the Hutt Rail Line, in Manor Park, for future tenancies. The proposal area extent (the "Site") has an overall footprint of approximately 13.2-hectares, and is intended to be developed for a least three tenants.

Whilst the current application seeks only to provide roading and civil infrastructure for the Site, this report includes detailed analysis of the likely future use of the Site (which includes a concurrent application for a resource recovery park on Area 1), to provide a robust assessment of the transport impacts and infrastructure improvements that are proposed to accommodate the anticipated Site traffic.

Vehicle and pedestrian access to the Site will be achieved via Benmore Crescent, which is an existing cul-de-sac connecting to the wider road network at its northern end via a priority-controlled tee-intersection with Manor Park Road. It is intended to upgrade the current Benmore Crescent formation and subsequent intersection with Manor Park Road, to a standard capable of accommodating the future traffic expected at the Site. Improvements to the adjacent Manor Park Road level crossing are also proposed, which have been developed in collaboration and agreement with KiwiRail.

This report considers the transportation effects of the activities envisaged to occupy the Site, and includes assessment of the Site connection arrangements to the external network, details of the proposed Site layout and internal movement network, expected Site traffic generation, a high-level review of the relevant Hutt City District Plan ("District Plan") provisions, and consideration of rail, walking and cycling connectivity. A full concept design of the upgraded Benmore Crescent / Manor Park Road intersection and adjacent rail crossing has been developed as part of this resource consent application, and is presented in this report.

Based on the assessment undertaken herewith, and subject to the proposed network improvement works being implemented on Benmore Crescent and Manor Park Road, it is concluded that the proposed development of land to provide for future permitted uses, a resource recovery park, and other activities that could reasonably obtain a discretionary resource consent at the Site, will not cause adverse safety or capacity effects on the local transport network that cannot otherwise be managed and mitigated. Further, the Site's location immediately adjacent to the regional SH2 road corridor and established grade separated interchange with State Highway 58 ("SH58"), and good established proximate rail link and active mode connectivity for staff commuting purposes, ensure a good transport outcome.



2 Site Location and Transport Environment

2.1 Site Location

Figure 2-1 shows the location of the Site, in the context of the surrounding transport environment.



Figure 2-1 : Aerial Photograph of Site

As shown in **Figure 2-1**, the development area is bounded by SH2 to the west and the Hutt Rail Line to the east. Access to the development area is achieved via Benmore Crescent, which is a no exit street running generally north-south through the Site and connects with Manor Park Road (to the north) via a priority tee-intersection. Manor Park Road in turn connects with the SH2 / SH58 grade separated interchange ("Interchange") to the north of the development Site.

The local roading arrangements are illustrated in the aerial photograph included at **Figure 2-2**, which shows the current layout of the Benmore Crescent / Manor Park Road intersection adjacent to the Manor Park Road level crossing.

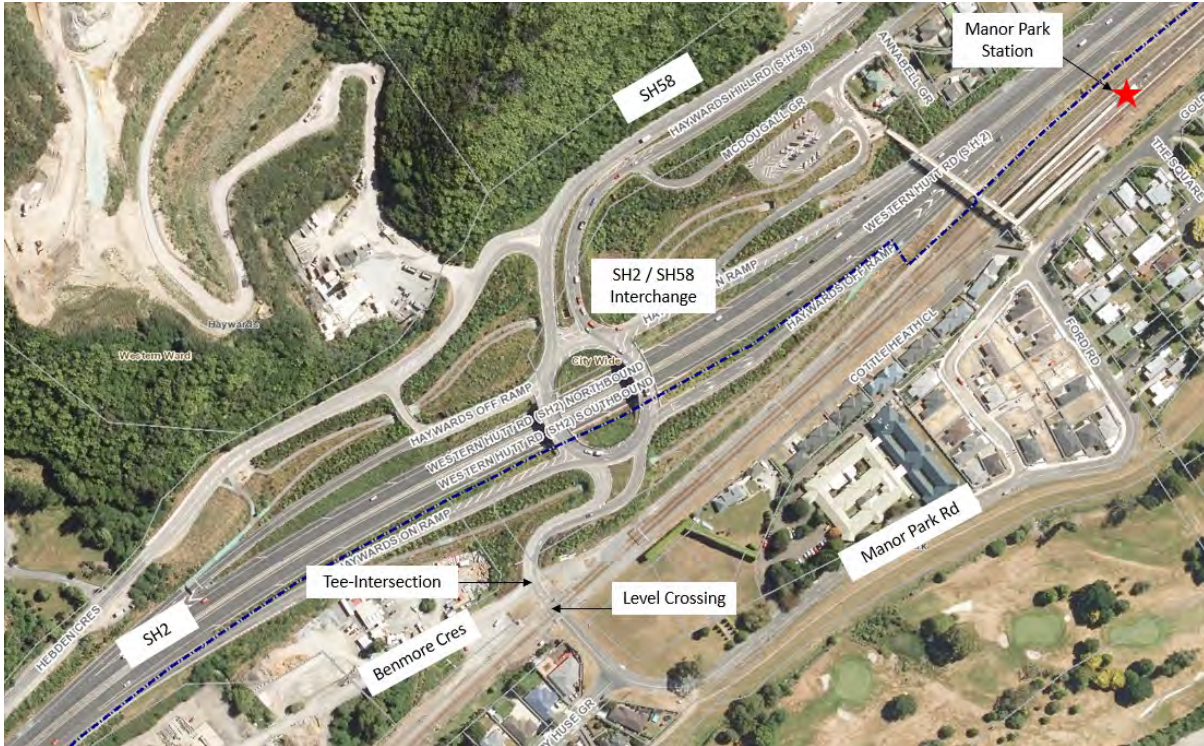


Figure 2-2: Adjacent Road Arrangements

Further characteristics of the adjacent roads are provided in **Table 2-1**.

Table 2-1: Adjacent Road Characteristics

Characteristic	Manor Park Road	Benmore Crescent	State Highway 2 ¹
Average Daily Traffic (ADT)	1,500	400	30,000
Road Hierarchy	Access Road	Access Road	Regional Road
Carriageway Width	9.2m	9m	20m
Speed Limit	50kph ²	50kph	100 kph

As shown, traffic volumes on Manor Park Road include existing flows of 1,500 vehicles per day ("vpd"), whilst Benmore Crescent carries an estimated 400vpd. Such volumes are commensurate with the 'Access Road' classifications for each and represent the primary property access function they serve.

The existing roading characteristics on Manor Park Road at the Benmore Crescent intersection are illustrated in the photograph included at **Figure 2-3**.

¹ SH2 at Haywards Interchange

² Some 15m east of the Level Crossing, Manor Park Road reduces to 40kph



Figure 2-3 : View South on Manor Park Road towards Benmore Crescent Intersection (Google Earth)

Sightlines for traffic turning at the intersection extend approximately 60m to the north (towards the Interchange) and >100m to the east (across the level crossing), thereby satisfying the minimum Stopping Sight Distance³ ("SSD") requirement of 55m for 50kph design speeds, noting that in practice operating speeds for vehicles approaching the Benmore Crescent intersection on Manor Park Road from the Interchange are less than the posted speed 50kph limit, given the radius of the bend evident in Figure 2-3.

The photograph provided at **Figure 2-4** below illustrates the carriageway environment on Manor Park Road to the east of the Benmore Crescent intersection and shows details of the adjacent level crossing.



Figure 2-4 : View along Manor Park Road over the Rail Level Crossing towards the Benmore Crescent Intersection

³ Austroads Guide to Road Design Part 3: Geometric Design, 2016 – Table 5.5, based on reaction time of 2-seconds

The Site is currently zoned 'General Rural' under the District Plan as illustrated in **Figure 2-5**, with the adjacent areas being zoned a mixture of General Business, General Recreation, with some Residential.



Figure 2-5 : Current District Plan Zoning

2.2 Existing Traffic Patterns

To inform the traffic analysis undertaken for this assessment, a full day classified turn count was undertaken at the Benmore Crescent / Manor Park Road intersection during a typical week (outside of school holidays) in July 2021, to capture the current traffic patterns on these adjacent streets. **Figure 2-6** illustrates these recorded daily traffic profiles.

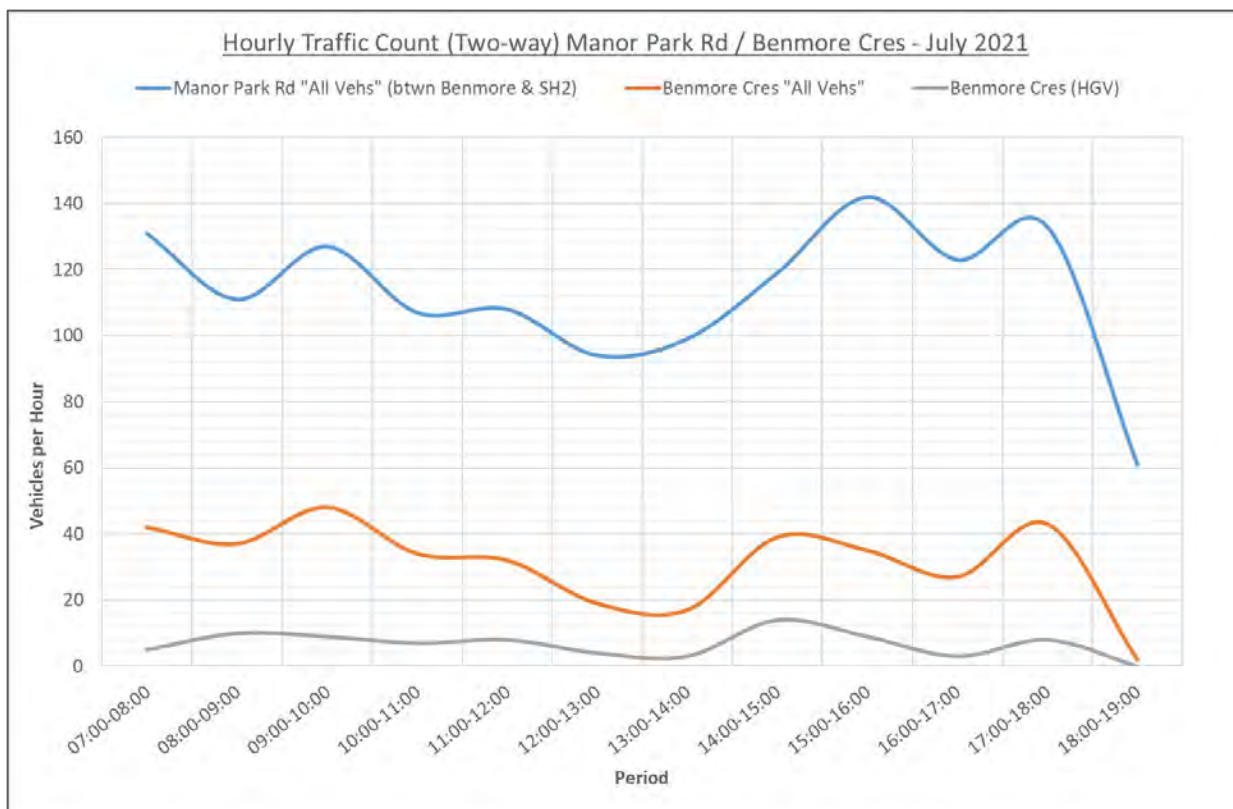


Figure 2-6 : Weekday Daily Traffic Volumes on Adjacent Road Network

As shown, volumes on Manor Park Road (between Benmore Crescent and the Interchange) peak at around 130-140 vehicles per hour ("vph") during the AM and PM peaks. By comparison, traffic volumes on Benmore Crescent indicate peaks of around 40-50vph, with approximately one third of this being Heavy Goods Vehicles ("HGVs"), reflecting the existing industrial nature of those activities currently served by Benmore Crescent. Overall, traffic generated by activities located along Benmore Crescent (primarily the Downer Group works depot) account for around a third of all traffic movements on Manor Park Road adjacent to the Interchange.

Further details of the peak hour turning movements at the Benmore Crescent / Manor Park Road intersection are illustrated in the diagrams included at **Figure 2-7** and **Figure 2-8**, for the AM and PM peak hours, respectively.

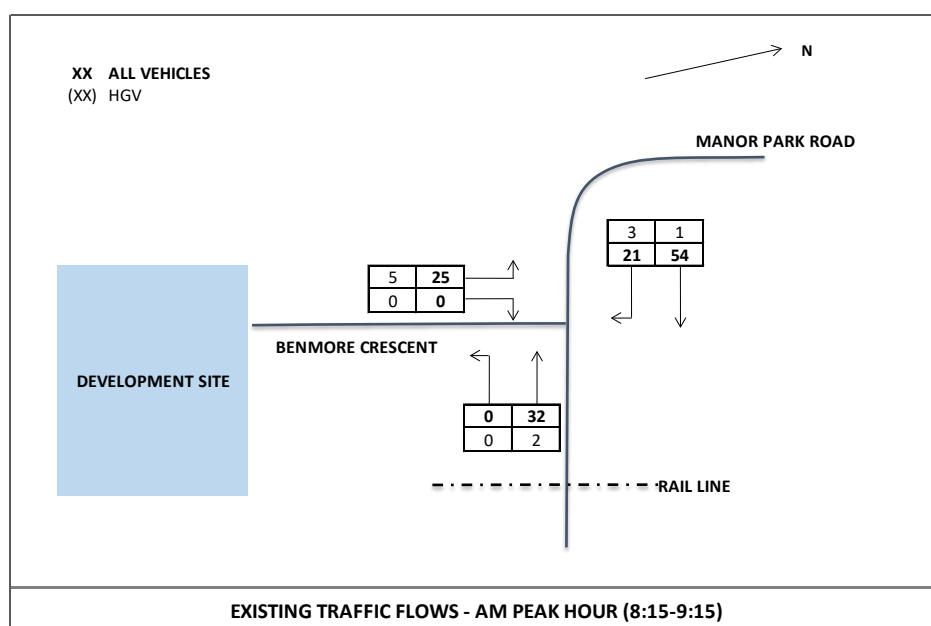


Figure 2-7 : Existing AM Peak Hour Traffic Flows

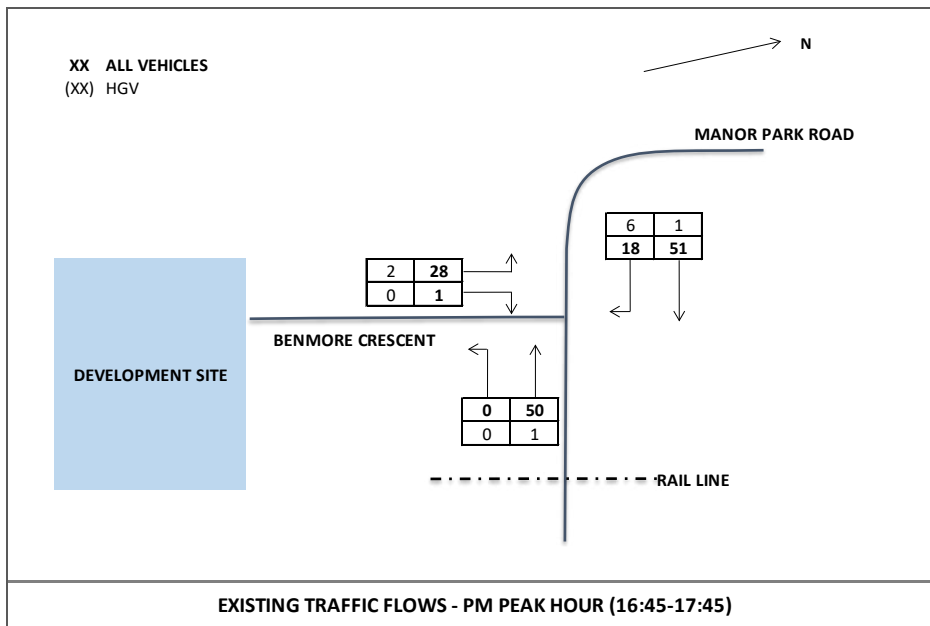


Figure 2-8 : Existing PM Peak Hour Traffic Flows

As can be expected, almost all turning movements at Benmore Crescent are right turn in / left turn out trips to and from the Interchange.

2.3 Road Safety

A search of the Waka Kotahi NZ Transport Agency's 'Crash Analysis System' ("CAS") database has been undertaken for the purposes of reviewing the road safety in the vicinity of the Site. The search area included Manor Park Road from the Interchange to 50m past the rail crossing, inclusive of the Benmore Crescent intersection, for the most recent complete five-year period (2017-2021). The search area is shown in **Figure 2-9** below.

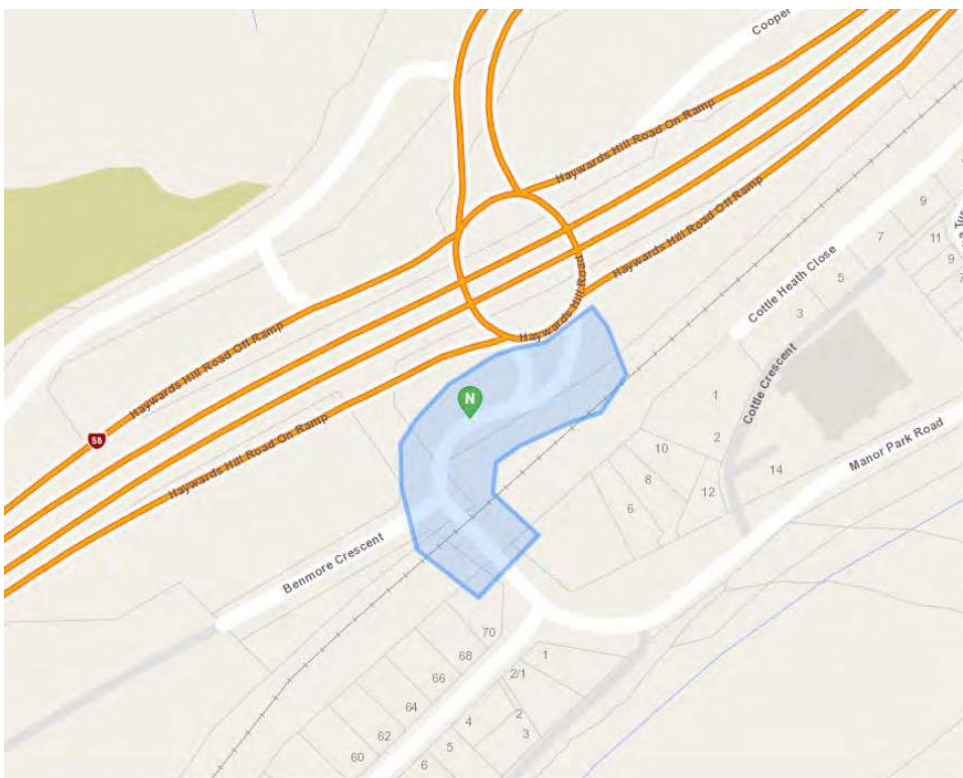


Figure 2-9 : Crash Study Area Extent

There has been one reported crash within the search area between 2017-2021, involving a vehicle turning into Manor Park Road off the Interchange losing control and colliding with the edge safety barrier. The crash was recorded as non-injury (i.e., damage only). A review of any accidents occurring to date in 2022 shows no reported crashes.

The crash record does not indicate there are any existing safety issues on the immediate road network in the vicinity of the Manor Park Road / Benmore Crescent intersection that provides access to the Site.

2.4 Sustainable Transport

The closest bus stops to the Site are located on the eastern side of the Hutt River, for which there are no local crossing opportunities to connect with the Site.

A footpath located on the northern side of Manor Park Road connects through to the Manor Park rail station, as shown by the green line within the detail of **Figure 2-10**. The Manor Park Station lies on the Hutt Valley Line (Wellington – Upper Hutt). Trains operate from this station at a 20-minute frequency between 6:20am to 6:30pm, and half hourly between 6:30pm and 11:30pm. As part of the Site development, it is proposed to construct a footpath along Benmore Crescent and pedestrian crossing facility on Manor Park Road across the railway line, which would enhance the pedestrian connection between the Site and the train station.

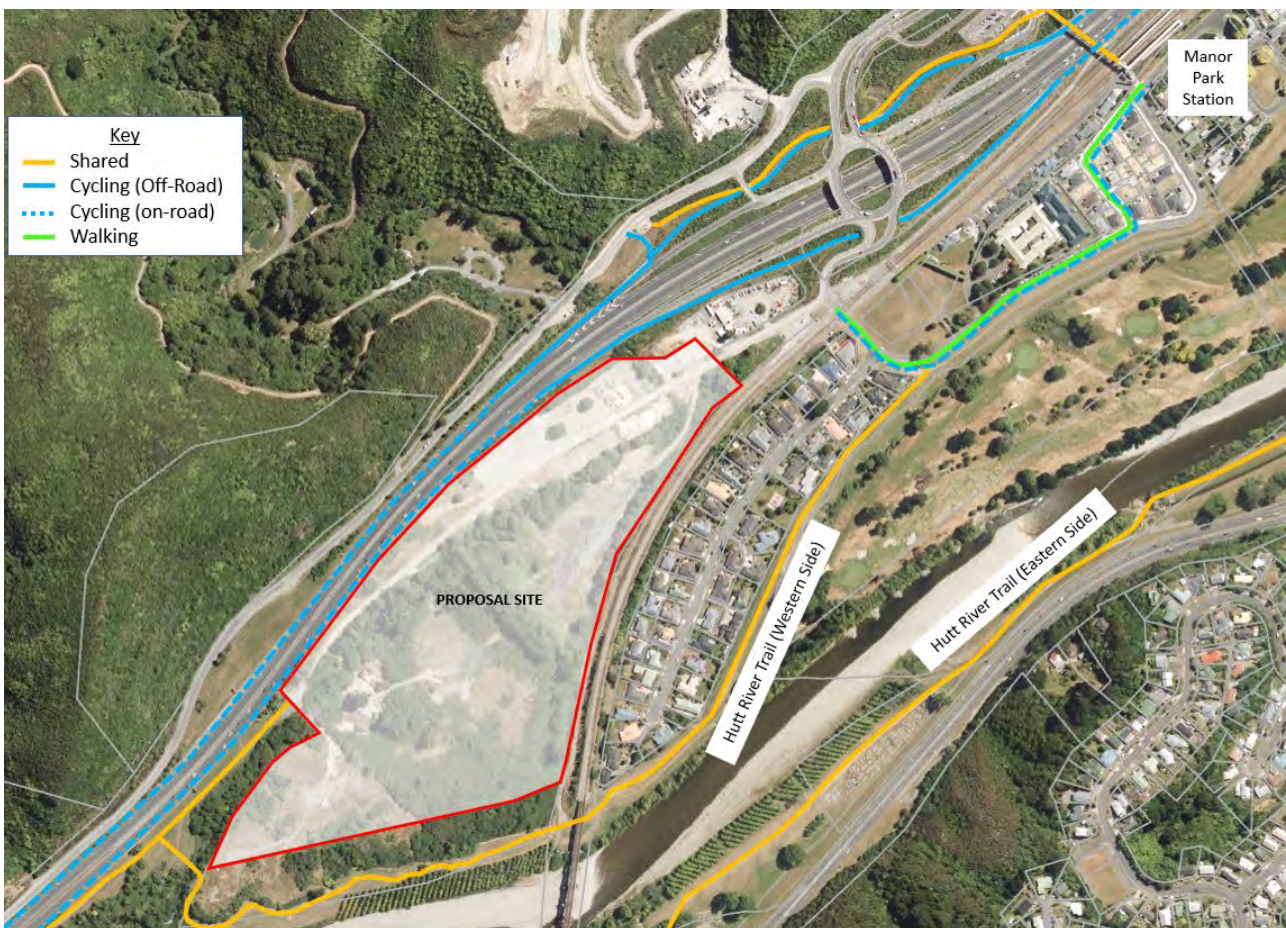


Figure 2-10 : Rail and Active Mode Connections in Transport Network

A series of cycle routes and shared paths serve the surrounding area, as shown in Figure 2-10. These include the Hutt River Trail (western side) immediately adjacent to the Site, which is an unsealed shared path that connects the end of Benmore Crescent with the Hutt Valley to the south.

Overall, the Site has good access to the key public transport train services on the Hutt Valley Line, via the nearby Manor Park rail station, and is served by established shared path connections which link with the suburbs to the south. These facilities provide good opportunities for staff to travel to/from the Site by means other than private car.

2.5 Recent Network Changes

Council has recently completed the Hutt Rail Trail (western side) connection from York Avenue (close to the Manor Park rail station) to Silverstream Bridge, to the north. This now facilitates walking and cycling connections between the Site and suburbs to the north and east (via the Silverstream Bridge).



3 Proposed Tenancy Development

The Site, comprising a total useable development area of approximately 10-hectares, is to be developed for three tenancy areas. Although tenants have not yet been confirmed for all areas, development of the Site for a range of permitted rural and some commercial activities is envisaged, including a resource recovery park (that is subject to a separate resource consent application).

The proposed access strategy for the Site includes the upgrade of the Manor Park Road / Benmore Crescent tee-intersection, along with improvements to the existing portion of Benmore Crescent that extends into the Site, to appropriately accommodate the increased traffic and heavy vehicle movements generated to and from the developed Site. A right-turn bay is proposed to be added on Manor Park Road with associated carriageway widening, along with improvements to the adjacent Manor Park Road level crossing.

A tenancy plan has been developed for the Site, as included at **Appendix A**, and provides details of the lease area boundaries and supporting transport infrastructure. In terms of Site access, the current Benmore Crescent carriageway is to be widened and upgraded, with a separate footpath provided to accommodate pedestrians. The section of Benmore Crescent between the Manor Park Road intersection and the Site boundary is proposed to remain as vested road, from which point the road will continue southwards at an equivalent formation as a 'common private road' through the Site and provide access to each of the tenancies.



4 Stakeholder Liaison

4.1 Waka Kotahi Transport Agency

Early discussions were held with Waka Kotahi regarding assessment of the associated transport impacts of the proposed Site development, on the operation of the State Highway Interchange. These discussions confirmed that on the basis there are no knock-on queuing effects arising from the increased traffic movements at the Manor Park Road / Benmore Crescent intersection, then no assessment or modelling of the Interchange operation would be required.

As set out in Chapter 8, the detailed SIDRA assessment of the upgraded Manor Park Road / Benmore Crescent intersection performance with the Site's future development traffic added, demonstrates there will be no material queuing or delays which could interact or cause queues to extend back to the Interchange.

4.2 KiwiRail

The Hutt Valley Line level crossing on Manor Park Road is situated approximately 10m east of the Benmore Crescent intersection. Whilst the development of the Site will not generate any material increase in vehicle trips over the level crossing itself, the proposed improvement works to incorporate a right turn bay at the adjacent Benmore Crescent tee-intersection requires widening of the Manor Park Road carriageway, which in turn will have an impact on the established layout of the level crossing.

Accordingly, Stantec has engaged with KiwiRail on both the land use changes triggered by the proposed Site development, as well as the proposed Manor Park Road intersection improvement works, in relation to the associated impacts on the adjacent level crossing. As part of this liaison, KiwiRail requested a 'Level Crossing Safety Impact Assessment' ("LCSIA") be undertaken, to determine the current and future risk.

The LCSIA subsequently completed by Stantec identified the existing level crossing arrangement fails to satisfy 'Criterion 1' (which requires all level crossings to achieve either a 'medium' or 'medium-low' risk). Notwithstanding, the LCSIA identified a series of recommended upgrades to improve the current crossing facility to mitigate future risk, including the provision of a formal pedestrian crossing facility that is currently lacking. With these improvements in place, the level crossing satisfies Criterion 1 with respect to pedestrians, but not for vehicles.

In any situation where a level crossing fails to meet Criterion 1, a requirement for a 'So Far As Is Reasonably Practicable' ("SFAIRP") assessment is triggered. This SFAIRP must demonstrate why compliance is not achievable, and that the design of the level crossing achieves as much as is 'reasonably practicable' to mitigate the associated risks of not satisfying Criterion 1.

The SFAIRP undertaken by Phil McQueen Consulting (independent of Stantec) in collaboration with KiwiRail and Council concluded that neither grade separation nor closure of the level crossing were reasonable or practicable measures, and that the design developed by Stantec that captured the recommendations set out in the LCSIA (and described in detail at Chapter 6), is appropriate. KiwiRail has subsequently accepted the SFAIRP conclusions and proposed intersection and level crossing upgrade design, and a signed copy of the report is included at **Appendix B**.

5 District Plan Assessment

Given the proposed development site is zoned 'General Rural' within the provisions of the District Plan, development of the Site for roading and infrastructure is considered a 'discretionary' activity. In addition, compliance is required with the underlying zonings permitted activity standards and the 'Engineering Design' provisions captured under 'Chapter 14A – Transport' (related to access and transport infrastructure).

An assessment of the proposed roading work's compliance with the relevant transport Rules and Standards is set out in **Table 5-1** below.

Table 5-1: District Plan Compliance Assessment

Reference	Rule	Assessment of Compliance
Chapter 14A Transport		
14A.5.1 (c)	Any activity that exceeds the high trip generator thresholds specified in Appendix Transport 2 is a Restricted Discretionary Activity. Discretion is restricted to: I. The effects of the activity on the transport network including impacts on on-street parking. An integrated Transport Assessment, prepared by a suitably qualified traffic engineer/planner, must be submitted within any resource consent application under this rule.	Since the proposed activities would exceed the 500 vehicle trips per day (for 'Any Activity not Listed Above' in the Appendix Transport 2 – High Trip Generator Thresholds) it is considered a High Trip Generator, and this TAR has been prepared accordingly to assess traffic and transport related impacts associated with the proposed Site development.
Chapter 14A Transport – Appendix Transport 1 Standards		
Standard 1	Standards for New Roads	
	(b) Engineering Standards All roads must be designed and constructed in accordance with NZS4404:2010 Land Development and Subdivision Infrastructure.	Technical Non-Compliance. The proposed upgrading of Benmore Crescent and new Site access road have been designed to meet the standards set out in NZS4404 in terms of carriageway width, as described at Chapter 8. Given tenancies 1 and 3 only front the eastern side of the road, a footpath is proposed on this side only, rather than on both sides as envisaged by NZS4404. Tenancy 2 will achieve its pedestrian access from the north end, with a crossing facility to the eastern footpath. These road and footpath design arrangements, as proposed, have been developed in collaboration with the Council
	(c) Service Lanes, Private Ways, Pedestrian Accessways and Walkways: Service lanes, private ways, pedestrian accessways and walkways must be designed and constructed in accordance with Section 3 of NZS 4404:2010 Land Development and Subdivision Engineering, except that Table 2-1 replaces the formation requirements for private ways detailed in NZS 4404. (Note: Table 2-1 refers to 'residential activities', and therefore does not apply to the proposed Site use).	Complies. The proposed new Accessways and active mode infrastructure has been designed to satisfy the requirements of NZS4404. Further detail on the proposed Site movement network



		arrangements is set out at Chapter 9.
Standard 2	Site Access and Manoeuvring Area	
	(a) Vehicle Access (excluding separation distances from intersections) No more than two separate crossings for any front site. The total width of such crossings must not exceed 50% of the road frontage. There must be a separation distance of at least 1 meter between crossings measured at the kerb / carriageway edge. Site access must be designed and constructed in accordance with Section 3 of AS/NZS2890.1:2004 Parking facilities Part 1: Off-street car parking. Where a vehicle access serves three or more dwellings, it must have a minimum width of 4 meters to allow for the service vehicles.	Existing Use Rights The Site has frontage to the end of Benmore Crescent and the formation extends into the Site as if it was an extension of the public road. Can Comply. Access to each individual tenancy will be designed to meet the standards set out in AS/NZS2890.1. Does Not Apply. No residential development will be provided for within the development.
	(b) Separation Distances from Intersections and Rail Level Crossings. The distance between new vehicle accesses and all intersections must be at least: - National or Regional: 30m - Arterial or Primary Collector: 20m - Secondary Collector: 15m - Access Road: 10m The distance between new vehicle accesses and all rail level crossings must be at least 30m. These distances are to be measured between the intersecting points of the site boundaries as shown in Diagram 2-1 below, and also apply to new vehicle accesses on the opposite side of the road from an intersection. Diagram 2-1: Separation Distance from Intersection	Can Comply. The proposed new vehicle crossings providing access to the individual tenancies can achieve the required 10m separation from the Benmore Crescent intersection at Manor Park Road. Does not Apply. No new vehicle accesses are proposed to Manor Park Road, which accommodates the closest level crossing to the Site.

	(c) Manoeuvring Area Sufficient area must be provided for vehicles to stand and queue and make all necessary manoeuvres without using the public road reserve, and without using the area provided for parking, servicing, loading or storage purposes. Sufficient area must be provided to allow all vehicles to enter and exit the site in a forward direction except where the access is to a single dwelling and accesses an Access, Secondary Collector or Primary Collector Road.	Can Comply. Provision can be made within each of the tenancies to ensure vehicles stand, queue and manoeuvre without using the access road or internal parking / loading areas, and to also enter / exit tenancies in a forward direction.
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As shown, the tenancy plan for the Site as proposed, has been designed to satisfy the relevant access and roading standard provisions of the District Plan, noting that whilst the proposed design for the Benmore Crescent and internal access road extension deviates from the NZS4404 typology in only providing a footpath on one side of the road (rather than two), this is considered appropriate since Area 2 to the west is separated from the road by an established stream and can be served by a crossing facility at its northern end to connect with the footpath on the eastern side of Benmore Crescent. These arrangements have been developed in collaboration with the Council.

Since the proposed Site development and future use will result in the generation of more than 500 vehicle trips per day (under the category 'Any activity not specifically listed above' in Appendix Transport 2 – High Trip Generator Thresholds), the proposal triggers the High Trip Generator Threshold under Rule 14A 5.1(c). As such, the preparation of a Transport Assessment is required to examine the transport impacts that may be generated by the development on the adjacent road network. This TAR has been prepared accordingly to assess the transport impacts of the proposed site development and associated effects on the adjacent transport network, and concludes that the demands can be safely and appropriately accommodated with the proposed roading infrastructure and associated improvements in place at the Manor Park Road intersection.

6 Site Access

6.1 Manor Park Road / Benmore Crescent Intersection

As described earlier at Section 2.1, access to the Site is achieved via the current Benmore Crescent tee-intersection with Manor Park Road. At present, vehicles turning right on Manor Park Road to access Benmore Crescent are required to wait within the through traffic lane, noting that with the modest traffic volumes currently turning at the intersection this is seen as an acceptable operation.

The development of the Site will trigger an increase in turning traffic volumes, such that it is appropriate to widen the carriageway in this location to provide for a dedicated right turn bay, to allow right turning vehicles to wait clear of through traffic on Manor Park Road.

Figure 6-1 below shows the proposed intersection upgrade which involves the widening of Manor Park Road to create a right turn bay for traffic accessing Benmore Crescent and the development Site, along with upgrades to the adjacent level crossing. Further details of the intersection upgrade are provided by the drawings included in **Appendix C**. These concept designs are currently being further developed to provide a package of engineering drawings for review and approval by Council, KiwiRail and Waka Kotahi, separately from this resource consent application, and for subsequent physical works tender.

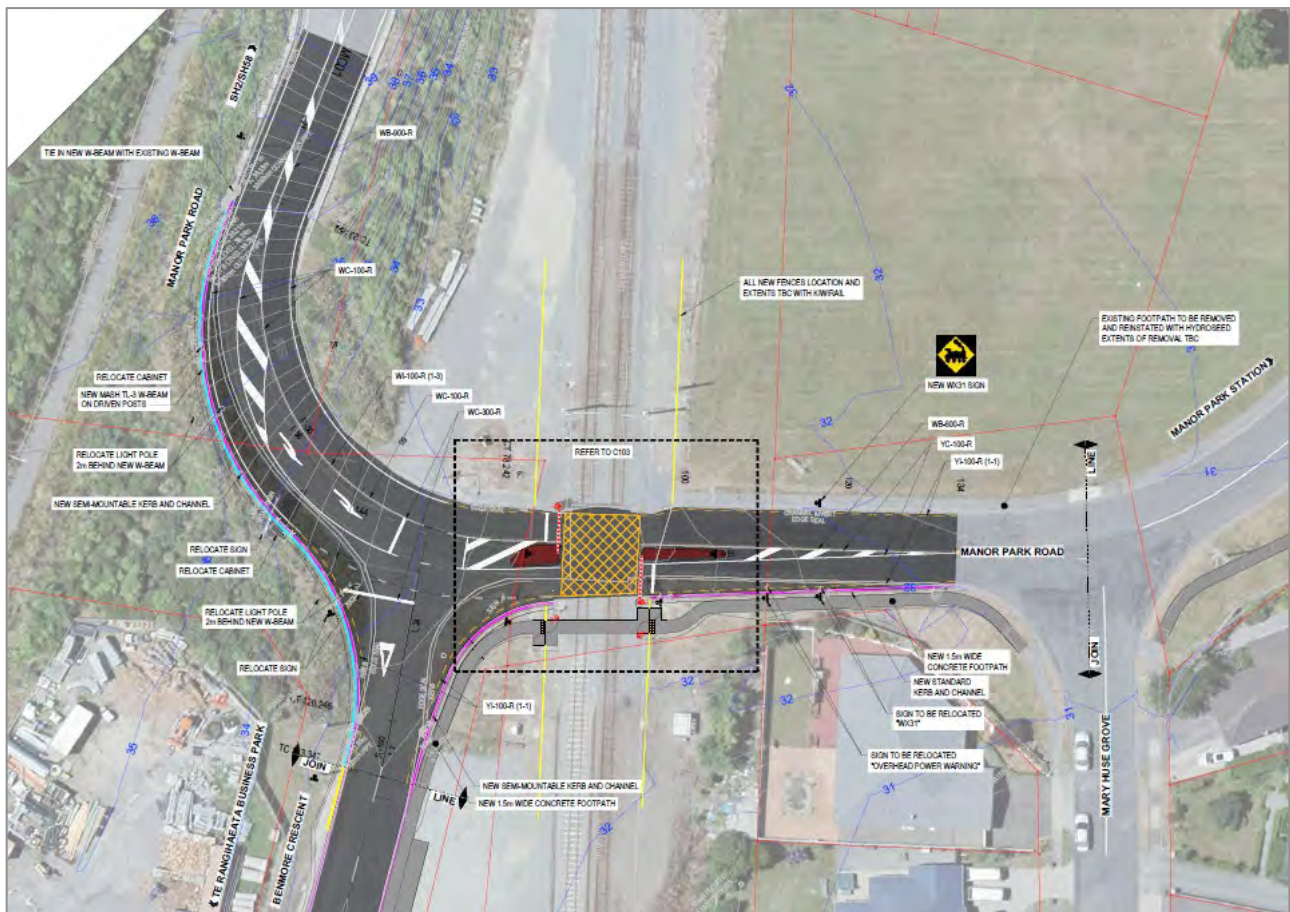


Figure 6-1: Manor Park Road/ Benmore Crescent intersection upgrade

Drawing from the detailed traffic modelling described later at Chapter 8, the design has been developed to provide sufficient queuing capacity to accommodate the forecast demand for right turning vehicles into Benmore Crescent at peak times, once the Site is fully developed. Accordingly, the proposed right turn bay and flush median allows for two semi-trailers to queue and wait without blocking the eastbound through lane on Manor Park Road. In addition to provisioning for the right turn bay, the proposed widening of Manor Park Road also allows for simultaneous right turn in/left turn out movements to/from Benmore Crescent.

6.2 Manor Park Road Level Crossing

As intimated earlier, Stantec has undertaken a LCSIA at the Manor Park Road level crossing. A number of associated recommendations were identified in the LCSIA, including:

- provision of a formal pedestrian path over the rail crossing on the southern side of Manor Park Road;
- provision of additional fencing along the rail corridor to prevent pedestrians crossing outside of the designated area; and
- installation of median islands on each of the Manor Park Road approaches, to prevent vehicles driving around the rail barrier arms.

These recommendations, which have been accepted by KiwiRail as part of the SFAIRP, have been incorporated into the proposed intersection design and stand as a significant improvement to the current arrangements.

In addition to improving safety for vehicles at the crossing, the upgrade works provide for the current Manor Park Road footpath to be extended to connect with Benmore Crescent, and will include a formalised safe pedestrian route across the rail crossing. A new section of footpath will also be constructed on the south side of Manor Park Road to the east of the level crossing that will connect with the Hutt River Trail, and also provide for those people who choose to walk between the Site and the nearby Manor Park rail station.

7 Forecast Site Traffic Generation

An assessment of the proposed Site traffic generation has been undertaken based on a combination of industry standard sources and operational data for anticipated rural ancillary or commercial type activities, including a resource recovery park (that is subject to a separate resource consent application) to be operated by Waste Management NZ ("WMNZ").

Whilst future tenants for all areas are yet to be confirmed, information provided by WMNZ who are expected to occupy Area 1 that comprises approximately 58,000m² (>50% of the development area), has been used to inform the overall development traffic forecasts. This WMNZ data, derived from a combination of their existing sites around the region includes a 20-year future growth allowance, and indicates peak hour and daily traffic generation (two-way) of 180vph and 870vpd (at year-20).

For the balance of the Site which comprises a total combined operational area of approximately 46,500m², trip generation rates reported for a combination of commercial activities (as defined in the District Plan) included in the industry standard NZTA Research Report 453 'Trips and Parking Related to Land Use' ("RR453") have been adopted, which indicates peak hour and daily generation of 410vph and 2,020vpd. It is considered these generations are at the upper end of what could be expected for future activities in this location and, as such, represent a generous level of traffic activity compared with other lesser uses that could establish on the Site.

The resultant forecast peak period and daily traffic generations for the total Site development, including expected HGV volumes, is summarised in **Table 7-1** below.

Table 7-1: Forecast Development Site Traffic Generation

AM		PM		Daily
Total	HGV	Total	HGV	
590	197	590	82	2,900

Under this scenario, peak hour flows in the order of 600vph and daily traffic movements of 2,900vpd are expected. These volumes have been carried forward to the traffic analysis presented in the next chapter.

7.1 Trip Distribution

With respect to trip distribution, it is anticipated Site traffic would route via a mixture of SH2 north / south and SH58, with the adjacent grade-separated interchange including more than adequate capacity to accommodate these movements, as confirmed through liaison with Waka Kotahi.

8 Assessment of Traffic Effects

With development traffic associated with the proposal Site connecting to the network at Manor Park Road, an assessment of the performance of the Benmore Crescent / Manor Park Road intersection has therefore been undertaken.

The intersection has been modelled using the industry-recognised SIDRA intersection analysis software, for the 'base' (existing traffic volumes as shown earlier in Figure 2-7 and Figure 2-8) and for the 'with Site development' traffic identified earlier at Table 7-1 added to the network. It is noted that the 'development' traffic has been modelled assuming the intersection improvements works described earlier at Chapter 6 are in place.

The SIDRA software analyses intersection capacities, vehicle delays and vehicle queuing, to give an indication of the expected intersection performance. It calculates a number of performance indicators including the following: Level of Service⁴ ("LoS"), based on delay to motorists, graded A (excellent performance) to F (poor performance); and average delay (seconds / vehicle), defining delay to the typical motorist.

The resultant LoS and delays by each approach is set out in **Table 8-1** and **Table 8-2**, for the weekday AM and PM peak hours, respectively.

Table 8-1 : SIDRA Traffic Modelling Summary AM Peak

Approach	Movement	Base		Development*	
		Delay (s)	LOS	Delay (s)	LOS
Manor Park Road (North)	Through	-	A	-	A
	Right	4.8	A	4.9	A
Benmore Crescent	Left	4.9	A	5.1	A
	Right	6.4	A	11.5	B
Manor Park Road (South)	Left	3.0	A	3.0	A
	Through	-	A	-	A

**Intersection Improvement Works in place*

Table 8-2 : SIDRA Traffic Modelling Summary PM Peak

Approach	Movement	Base		Development*	
		Delay (s)	LOS	Delay (s)	LOS
Manor Park Road (North)	Through	0.1	A	-	A
	Right	5.1	A	5.4	A
Benmore Crescent	Left	4.8	A	4.8	A
	Right	6.5	A	11.6	B
Manor Park Road (South)	Left	3.0	A	3.0	A
	Through	-	A	-	A

**Intersection Improvement Works in place*

⁴ Level of Service (LOS) is a six-level grading system for intersection performance (A to F), where Level A represents totally uncongested operation with minimal delays and queues, and Level F represents highly congested operation with long delays and extensive queuing

The above analysis confirms site observations that the intersection is currently operating well, at LoS A on all approaches and turning movements during both the AM and PM peak hours. The intersection continues to perform well with good Levels of Service with the proposed Site fully developed.

Sensitivity testing of the intersection performance with the proportion of heavy vehicle traffic to and from Benmore Crescent increased from 33% to 50%, showed no substantive change in the above results.

Overall, the assessment shows that with subsequent full development of the Site and the installation of intersection improvements as proposed, there will remain adequate capacity at the immediate connection to the external network to accommodate the forecast development traffic, whilst maintaining good Levels of Service. With little delay and queuing at this Site access intersection, there will be will no knock-on effects of development traffic on the adjacent Interchange which is expected to continue to perform well, as confirmed by Waka Kotahi.

9 Internal Site Design

9.1 Proposed Movement Network

Details of the proposed movement network for the Site are illustrated in the plan included at **Appendix A**. As shown, access to the Site will be achieved via Benmore Crescent, which is proposed to be upgraded to an appropriate standard that will accommodate the transport demands generated by the proposed Site development. The initial section of Benmore Crescent between the Manor Park Road intersection to the Site boundary is intended to remain vested as public road. From here, the road will continue as a common private road providing access to each of the proposed tenancy areas.

9.1.1 Road Formation

The current formation of Benmore Crescent includes an 8-9m wide carriageway and, apart from the section in the immediate vicinity of the Manor Park Road intersection, has no kerb and channel. A view of the existing Benmore Crescent formation is shown in **Figure 9-1** below.



Figure 9-1: Benmore Crescent, view from Manor Park Road

In determining a suitable carriageway cross-section for the proposed public section of Benmore Crescent and connecting private access road extension, the District Plan⁵ points to the industry standard NZS4404:2010 'Land Development and Subdivision Infrastructure' ("NZS4404"), which provides guidance on road formations depending on the land use activities they serve. Road Type 'E17' within Table 3.2 of NZS4404 indicates that for suburban 'Make and Move' development areas which include a primary freight access function, 2 x 4.2m wide traffic lanes and 1.5m wide footpaths on both sides of the carriageway are appropriate. Further detail of the NZS4404 road classification 'E17' is provided in **Figure 9-2** below.

⁵ Chapter 14A: Transport 'Standard 1 – Standards for New Roads' (b)

PLACE CONTEXT			DESIGN ENVIRONMENT				LINK CONTEXT				TYPICAL PLAN AND CROSS SECTION SEE APPENDIX E FOR LARGER VERSION OF FIGURES	FIGURE NUMBER
Area	Land use	Local attributes	Locality served	Target operating speed (km/h)	Min. road width (m)	Max. grade	Pedestrians	Passing, parking, loading, and shoulder	Cyclists	Movement lane (excluding shoulder)	Classification	
Notes	See 3.2.4, table 3.1 & 3.3.1.6	See table 3.1	See table 3.1	See 3.3.5	See 1.2.2, 3.3.1.9, & 3.4.16		See 3.3.11	See 3.3.6 & 3.3.1.4	See 3.3.1.5, 3.3.7, & 3.3.11.2	See 1.2.2, 3.3.1.1, 3.3.1.2, 3.3.1.3, 3.3.1.10, 3.3.11.3	See 3.2.4.2 & 3.3.1.6 (Typical max. volumes)	
Suburban	Make and move	Primary freight access	Industrial area	40	18	10%	1.5 m each side	Parking and loading bays both sides may be in the movement lane or recessed. See 3.3.6	Shared (in movement lane)	2 x 4.2	Local road (~2,000 vpd)	E17

Figure 9-2 : NZS4404 Road Classification

With the proposed internal road only sharing frontage to tenancy areas on its eastern side (noting Area 2 to the west is separated from the road by an established stream), it is assessed that the provision of a footpath on the eastern side of the road only would be appropriate in this case.

These road and footpath arrangements have been discussed with Council and deemed appropriate.

Accordingly, the tenancy plan provides for the current Benmore Crescent alignment to be upgraded to the NZS4404 standard 'E17' described above, with the private access road extending off this continuing at an equivalent formation to provide access to each of the tenancy areas. Approximately 40m south of the transition from Benmore Crescent to the new private access road, a formed access leg will serve Area 2. A 25m diameter turning head, to facilitate turning of traffic (including trucks), is proposed at the southern end of the new access road adjacent to the entrance to Area 1.

With the exception of the initial portion of the access road which negotiates a gentle bend in the vicinity of the Area 2 access leg, the roading alignment through the Site is generally straight and level, allowing for adequate sightlines to be achieved at the future accessways.

As identified earlier (and illustrated in Figure 2-10), a number of walking and cycling routes exist within the vicinity of the Site, including a footpath on Manor Park Road leading to the nearby rail station, and provision for access to the Hutt River Trail (western side) from Manor Park Road. As part of the recommended improvement works at the Benmore Crescent / Manor Park Road intersection and adjacent level crossing described earlier, the current Manor Park Road footpath is to be extended to connect with Benmore Crescent and will include a formal pedestrian route across the rail crossing.

The proposed redevelopment of Benmore Crescent and construction of the new access road through the Site will include a footpath along the full length, providing for access to and through the development area. Cyclists accessing the Site from Benmore Crescent will be able to share the carriageway, with the widened cross section formed to an appropriate width for cyclists to safely use the shoulder.

9.2 Individual Tenancy Access

The proposed Site layout has been designed with consideration of achieving appropriate access to each tenancy off the internal access road, noting these can be located to ensure adequate sightlines are achievable along the carriageway at driveway interfaces. Access to Area 2 will be able to be designed to intersect with the access road at an appropriate angle to ensure safe operation and appropriate sight distances for turning vehicles.

In addition, the District Plan provisions under Standard 2 that relate to minimum access separation from intersections; restricting accessways to no more than two per site; providing for vehicles to queue and stand clear of the road reserve; and enabling 'forward in' and 'forward out' manoeuvring (to remove the need for reversing to/from the street), can all be practically met and demonstrated at subsequent consent stage.

9.3 Parking Design and Demand

Recent changes to the National Planning Framework and District Plan have removed any requirements to provide on-site carparking. Notwithstanding this, given the larger area of the proposed tenancies relative to the typically lower density of staff anticipated to be employed by future activities, it is expected that provision for sufficient on-site parking will be achievable. Such details will be properly addressed at subsequent consent stages.

It is noted that within NZS2890.1 there are differing parking and manoeuvring dimension requirements depending on whether the car parking is to be assigned to casual (e.g. visitor) or regular (e.g. staff) users. Car parking areas can be designed in accordance with these varying standards.

The District Plan requires that parking for mobility permit holders should be provided and designed in accordance with Section 5 of NZS 4121:2004 Design for Access and Mobility – Buildings and Associated Facilities. There is no reason why sufficient space within the development areas to accommodate these requirements cannot be made, again with such details captured at resource consent.

9.4 Cycle Parking and End of Trip Facilities

Chapter 14, Standard 4 (e) of the District Plan sets out requirements for the provision of cycle parking and end of trip facilities. These requirements are based on the number of staff, and are summarised in **Table 9-1** below.

Table 9-1 : District Plan Cycle Parking Requirements

Number of Staff members	Number of Cycle Parks	Number of Showers
1-5	0	0
6-10	1	1
10 or more	1 per 10 staff members	1 per 100 staff members

Additionally, any cycle parking facilities must meet a series of minimum standards around design and location. As with car parking, there is sufficient space within the tenancy areas to achieve these requirements.

9.5 Loading and Servicing

Chapter 14, Standard 5 (b) of the District Plan sets out minimum requirements for on-site loading and unloading provision for non-residential activities, as shown in **Table 9-2**.

Table 9-2 : District Plan Loading Zone Requirements

Gross Floor Area	Number of spaces	Minimum Design Vehicle
Up to 500m ²	Nil	-
501 to 1,000m ²	1	Small rigid vehicle
1,001-3,000m ²	1	Medium rigid vehicle
Greater than 3,001m ²	1	Large rigid vehicle

Again, given the size of the tenancy areas created, sufficient provision to accommodate the required on-site (un)loading areas is achievable, as a minimum. In addition to the requirements identified above, it is recommended that during the design phase the specific loading requirements (e.g. frequency of loading operations, size of truck, etc) of each activity proposed are carefully considered so that appropriate loading and unloading facilities are provided. This consideration should also extend to internal circulation routes and driveways that heavy vehicles would be required to use. Such detail will again be appropriately captured at subsequent resource consent.

10 Conclusions

Rosco Ice-cream Limited is seeking consent to develop an approximately 13.2-hectare area of land between SH2 and the Hutt Rail Line in Manor Park for future tenancies. Subsequent future tenancies of the Site are intended to provide for a range of rural ancillary and commercial activities, including a resource recovery park.

Access to the Site is via Benmore Crescent, an existing cul-de-sac road connecting to the wider road network via a priority-controlled tee-intersection at Manor Park Road. As part of the development works it is intended to upgrade Benmore Crescent and its subsequent intersection with Manor Park Road, to provide the necessary widening to incorporate a right turn bay for traffic entering the Site (via Benmore Crescent), as well as deliver improvements to the adjacent level crossing, including providing a safe footpath connection between the Site and nearby Manor Park rail station.

Analysis of the proposed traffic generation and modelling of the Benmore Crescent / Manor Park Road intersection confirm that, with the proposed upgrade works in place, the intersection and immediate road network can appropriately accommodate the forecast traffic volumes associated with the Site's subsequent development and likely future activities.

The Site's proximity to the established grade-separated Interchange at SH2/SH58 provides an ideal connection to these regional transport corridors, whilst the location of the Manor Park rail station within walking distance of the Site provides a convenient public transport connection for staff, as an alternative to private vehicle travel.

The Site's internal movement network has been designed in accordance with the District Plan and the industry standard NZS4404, and to accommodate the quantum and type of transport demands expected to be generated by the future tenants.

Overall, and based on the assessment of the type of activities that would be established at the Site, the proposed Site development can be supported from a traffic engineering and transport planning perspective.

Appendices

We design with community in mind



Appendix A Tenancy Plan Layout



Appendix B SFAIRP Report



SAFETY, HEALTH AND ENVIRONMENT

ENTERPRISE-WIDE SHE TEMPLATE (Adapted for LCrag SFAIRP Process)

04-TEM-006-SHE SFAIRP STATEMENT REPORT

1. DOCUMENT DETAILS

Project Name:	Te Rangihaeata Business Park Development Project – adjoining Manor Park Rd Level Crossing, 23.19km, WL
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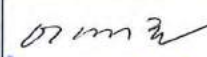
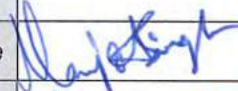
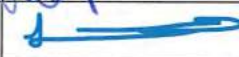
Project Stage:	Design ☒	Implementations/Closeout (Construction) ☐	Operations ☐
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Disciplines Covered:					
Track ☒	Civil ☐	Structures ☐	Signals & Comms ☒	Mechanical ☐	Traction/Elec ☐
Facilities ☐	Operations ☒	Rollingstock ☐	Network Services ☒	Ships ☐	
Others Please Specify:					

Document Control:		
DRAFT v1	For internal review by KiwiRail. Agreed by KiwiRail at internal review meeting 4 Oct 2022.	25/08/22
FINAL	Agreed at SFAIRP review meeting. Minor updates to cost proportionality calculations to include updated VoSL.	27/10/22

2. DOCUMENT APPROVAL

Project Assurance SFAIRP Due-diligence Declaration Confirming that:	Completed
1. SHE Risk Assessment has been implemented as intended and communicated to the key stakeholders and that the hazard/risks associated with project stage have been established, understood, and the relevant controls have been identified, implemented or planned.	☐
2. SFAIRP statement demonstrate a reasoned and supported arguments, that there are no other practical measures that could reasonably be taken to reduce risks further and that the controls implemented provide the highest level of protection that is reasonably practicable for these circumstances.	☐
3. Due diligence checks have been undertaken verifying that the identified controls are appropriate and documented evidence is available to confirm the risks have been mitigated to a degree consistent with KiwiRail systems and standards.	☐

Prepared by Author:	Phil McQueen Ltd	Signature		Date	28/10/22
Content Reviewed by:	Senior Level Crossings Engineer	Signature	E COOK	Date	28/10/2022
Technical Authority Approval:	Professional Head Signals and Telecommunications	Signature		Date	03/11/2022
Operations Approval:	GM Metros <i>(Manoj Singh on behalf of Jan Knight)</i>	Signature		Date	10/11/22
Zero Harm Approval:	Head of Safety Risk Assurance	Signature		Date	31/10/22

3. PURPOSE AND SCOPE OF THIS REPORT

The Manor Park Rd level crossing in the Hutt Valley adjoins a nearby business park development proposed by Roscoe Ice Cream Ltd. (The Te Rangihaeata Business Park Development Project).

The effects of the proposal on the level crossing and associated changes in risk have been analysed using the LCSIA process and risk controls have been identified.

The risk controls necessary to achieve criterion 1 for the road crossing are considered by the developer to be "not reasonably practicable". The risk controls that have been proposed will achieve criterion 2, but not criterion 1, hence triggering the requirement for a SFAIRP review for the road crossing.

The risk controls necessary to achieve criterion 1 for the proposed pedestrian crossing are planned to be implemented. As criterion 1 will be achieved there is no requirement for a SFAIRP review for the proposed pedestrian crossing.

Therefore, the SFAIRP Report considers the road crossing, but not the proposed associated pedestrian crossing.

The purpose of the SFAIRP Report is to review the analysis of the proposed risk controls and the conclusions about which controls are "reasonably practicable", by applying the process described in the LCRAAG (v5), Appendix 9.

The LCSIA report describes in detail the effects on Manor Park Rd level crossing, the associated changes in risk, and the proposed risk controls. Briefly:

- The business park development will drive modest increases in road and pedestrian traffic at the crossing.
- Population growth and other development growth in the general area is projected to drive increased road traffic volumes at the crossing, and to a greater degree than the business park development.

- The number of trains operating over the crossing is projected to increase but is not related to the business park development.
- Due to the projected increased traffic volumes driven by the business park development, the project was identified as causing a Change in Use effect on the crossing according to KiwiRail's level crossing risk assessment guidance (LCRAG).
- Stantec consultants have prepared an LCSIA report which considers the effect of the changes on the crossing and identified the required controls for the road crossing and for a proposed pedestrian crossing.
- The LCSIA report has found that criterion 1 cannot be achieved for the road crossing other than by grade separation or crossing closure, and that criterion 2 can be achieved by a combination of other controls.
- Grade separation or closure are considered "not reasonably practicable" by the developer, and the criterion 2 controls are proposed instead, hence triggering the requirement for this SFAIRP review.

The figures below show the existing and proposed arrangements and are extracted from the LCSIA report.



Figure 3-2: Manor Park Road Level Crossing Aerial (Source: Hutt City GIS)

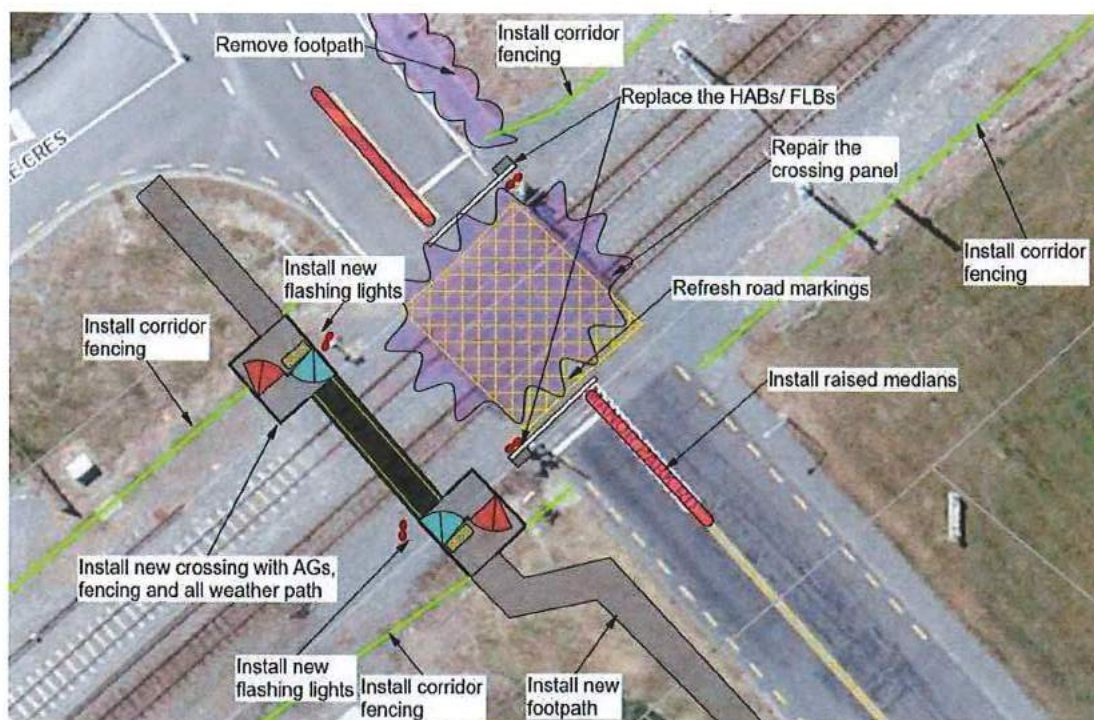


Figure 3-18: Recommendations for the Manor Park Road Level Crossing

4. APPLICABLE REGULATIONS, ACTS AND STANDARDS

Type	Description
KiwiRail Engineering Standards	KiwiRail Infrastructure has a comprehensive suite of engineering standards and supporting documents, including those applying to level crossings. In particular, the Signals and Telecommunication Standard: Active Level Crossings (S-ST-LC-2103), which specifies minimum levels of protection at crossings.
NZTA Traffic control devices manual (TCD manual) – Part 09: Level crossings	The TCD manual provides standards for traffic control devices including at level crossings.
Level crossing risk assessment	The <u>Level Crossing Safety Impact Assessment</u> (LCSIA) and <u>Australian Level Crossings Assessment Model</u> (ALCAM) are methods used in NZ for assessing level crossing risk and identifying appropriate risk controls. The <u>Level Crossing Risk Assessment Guide</u> (LCRAG), prepared jointly by KiwiRail and NZTA Waka Kotahi, provides guidance on risk assessment and describes the SFAIRP review process to be used if there are risk controls identified that are considered to be "not reasonably practicable" to implement.
Act	Railways Act 2005
Act	Health & Safety at Work Act 2015
Regulations	Health & Safety at Work Regulations 2016

5. KEY CONSTRAINTS, ASSUMPTIONS, AND DEPENDENCIES

The risk has been assessed, and risk controls proposed, using the LCSIA process.

This SFAIRP Report has been prepared using the process set out in LCRAG (v5) Appendix 9 and relies on the information contained in the reference documents listed in section 10, and where noted further information provided by Stantec.

6. STAKEHOLDER ENGAGEMENT

The Key Stakeholders are:

Stakeholder	Reason for Engagement
KiwiRail	The KiwiRail Lower North Island Region is responsible for the maintenance of the infrastructure and the rail operations at the level crossing. KiwiRail Engineering and Zero Harm groups are KiwiRail's technical authorities re level crossing design and safety risk. KiwiRail is a project partner for the P2P project.
Transdev Wellington	Transdev Wellington operates the suburban passenger trains at the level crossing.
Hutt City Council	Hutt City Council is the local Road Controlling Authority including for Manor Park Rd.
Roscoe Ice Cream Ltd	Roscoe Ice Cream Ltd is the developer of the proposed business park near Manor Park Rd.

Engagement with stakeholders took place as part of the LCSIA of the crossing and included all relevant parties including worker representatives. Details are in the LCSIA report.

7. RISKS BEING CONSIDERED

Risk/Hazard ID	System/Rail Network - Key Risks/Hazards Description
	The risk of harm caused by a train vs road vehicle collision at the level crossing for the future use cases.

The key factors driving this risk at Manor Park Rd crossing are the existence of a level crossing of road and rail, and the increased road and rail traffic volumes for the future use cases:

- Additional road and pedestrian traffic volumes generated by the proposed development.
- Additional road traffic volumes generated by forecast future population growth and development growth in the area.
- Additional rail traffic volumes generated by forecast future growth of freight and passenger services.

This risk is not new, as it exists to a degree today at the existing Manor Park Rd crossing. Neither is it novel, as the same risk exists in varying degrees at numerous other level crossing locations on the rail network. However, the proposed change of use at Manor Park Rd will result in increased traffic levels with an associated change in risk which must be considered, and appropriate controls identified.

8. SFAIRP JUSTIFICATION STATEMENT

KiwiRail currently manages this risk through a number of existing controls, selected and applied to each crossing site as appropriate, and which fall under KiwiRail's Safety Case and Licence to Operate. Therefore, this SFAIRP statement focuses on how existing controls will be applied at the crossing site.

It is considered that the safety risks associated with future use of the level crossing at the new Manor Park Rd road crossing, 23.19km WL, by projected additional road and rail traffic have been understood, the appropriate

controls have been identified and are planned to be implemented, and that it has been demonstrated that they will be effective through a review of the documentation provided internally and by consultants.

The Risk has been assessed and the following Hierarchy of Controls considered:

Controls Considered		Results
Elimination	Grade Separation Closure	Not Practicable
Substitution	N/A	N/A
Engineering	Flashing Lights & Bells and Half Arm Barriers. Road/rail intersection layout and design details and physical works.	To be Implemented
Administrative	Signs and road markings.	To be Implemented

The controls proposed to be implemented will achieve criterion 2, but not criterion 1. The controls reduce the risk SFAIRP and are fit for the future use of the level crossing by the projected additional road and rail traffic.

The following section "Controls Implemented / Considered" provides further detail on the controls proposed to be implemented and those that were considered and found to be not reasonably practicable.

It should be noted that this report is focused on the safety risk reduction aspects of the proposed solution at Manor Park Rd crossing and does not have scope to consider any wider amenity and development opportunities which might drive a different solution for other reasons as well as safety risk reduction.

9. CONTROLS IMPLEMENTED / CONSIDERED

Risk/Hazard ID	RISK DESCRIPTION	SFAIRP JUSTIFICATION	Hierarchy of Control IMPLEMENTED	Hierarchy of Control CONSIDERED
	The risk of harm caused by a train vs road vehicle collision at the level crossing for the future use cases.	Closure [Closure of Manor Park Rd crossing is considered in the LCSIA report which states that: "...Manor Park Road provides the only access between the wider road network and the suburb of Manor Park and hence closure of the level crossing would not be a practical option." "Manor Park suburb is experiencing steady residential development. The construction and occupation of new housing is likely to generate new trips, and the only connection to the wider road network is via Manor Park Road and over the level crossing." The current (July 2021) road traffic volume at the crossing is 1,500 vehicles per day and forecast in 2032 to grow to 1,830 vehicles per day. Closure of the crossing is a suitable control. However, it is not an available control as there is no alternative access across the railway for the Manor Park suburb which is bounded by the railway on one side and a golf course and the Hutt River on the other. Therefore, closure is not reasonably practicable.]		Elimination
	The risk of harm caused by a train vs road vehicle collision at the level crossing for the future use cases.	Grade separation Grade separation of Manor Park Rd crossing is briefly considered in the LCSIA report and Stantec have subsequently provided high level information on indicative costs for comparable grade separation projects. The indicative cost range advised is \$50 - 80m, noting that this is a wide range, but that the general observation can clearly be made that costs to achieve grade separation at Manor Park Rd are likely to be very substantial. As a clarification Stantec have also advised that the recent SH2/SH58 Haywards Hill interchange project area did not include Manor Park Rd level		Elimination

04-TEM-006-SHE

Uncontrolled when printed

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Risk/Hazard ID	RISK DESCRIPTION	SFAIRP JUSTIFICATION	Hierarchy of Control IMPLEMENTED	Hierarchy of Control CONSIDERED
		crossing so an upgrade at the crossing was unlikely to have been considered as part of that project. Considering cost proportionality: - The fatal return period (FRP) calculated by the ALCAM analysis for the updated existing assessment scenario is 404 years. This equates to 0.25 fatalities over 100 years (the assumed life of a grade separation structure). - The latest available Ministry of Transport VoSL (June 2021 update) is \$4.88M, so the value of the risk reduction is \$1.2M. - Based on the LCRAAG App 9 guidance, an ICAF ratio of greater than 10 will generally be considered grossly disproportionate. - Therefore, a cost of more than \$12M to build a grade separation would be considered grossly disproportionate. - Based on the information noted above, although no specific investigations have been made for Manor Park Rd, \$12M is likely to be unrealistically low for a grade separation in this location, with the indicative cost range for comparable projects being \$50 – 80m. Using \$50m, which is at the lower end of this range, gives an ICAF ratio of about 42, so a \$50m cost would be considered grossly disproportionate. As a comparator, repeating the above calculation using the FRP for the change in use scenario of 319 years (the worst case FRP scenario), gives an ICAF ratio of 33, so a \$50m cost would still be considered grossly disproportionate. Based on the information available, grade separation is a suitable control, it is assumed to be an available control, but the cost would be grossly disproportionate to the risk benefit. Therefore, grade separation is not reasonably practicable.]		
04-TEM-006-SHE	The risk of harm caused by a train vs road vehicle collision at	Flashing Lights & Bells and Half arm barriers. [Required to meet KiwiRail's minimum protection standard.]	Engineering	

Risk/Hazard ID	RISK DESCRIPTION	SFAIRP JUSTIFICATION	Hierarchy of Control IMPLEMENTED	Hierarchy of Control CONSIDERED
	the level crossing for the future use cases.	FLB/HAB already exist at this crossing, although the HABs are old having been installed in the 1960's. The proposal is to renew them.]		
	The risk of harm caused by a train vs road vehicle collision at the level crossing for the future use cases.	Road/rail intersection layout and design details to maximise effectiveness of controls and reduce hazard likelihood at this site. [Includes: - Install a median island to prevent vehicles driving around the barrier arm when lowered. - Reconfigure the signalling at Manor Park station so that stopped trains do not activate the HABs creating long barrier down times and driver frustration. - Repair the crossing panel to address minor surfacing and pavement defects.]	Engineering	
	The risk of harm caused by a train vs road vehicle collision at the level crossing for the future use cases.	Road/rail intersection layout and design details to maximise effectiveness of controls and reduce hazard likelihood at this site. [Includes: - Refresh all road markings. - Replace incorrectly installed road signage - install WX1R sign on Manor Park Road east approach, replace signage on Benmore Crescent with correct sign WXR5 sign. - Signs and road markings are being designed with due regard to the NZTA Traffic control devices manual (TCD manual) – Part 09: Level crossings, as confirmed by separate email from Stantec.]	Administrative	



Extract from LCSIA report summarising ALCAM outputs:

Table 3-13: Manor Park Road Level Crossing ALCAM Changes

Scored Items	Updated Existing	Change In Use	Proposed Design	Future Score
ALCAM risk band	High	High	High	High
ALCAM risk score % change	N/A	27%	-7%	+15%
Fatal return period	404 years	319 years	434 years	350 years

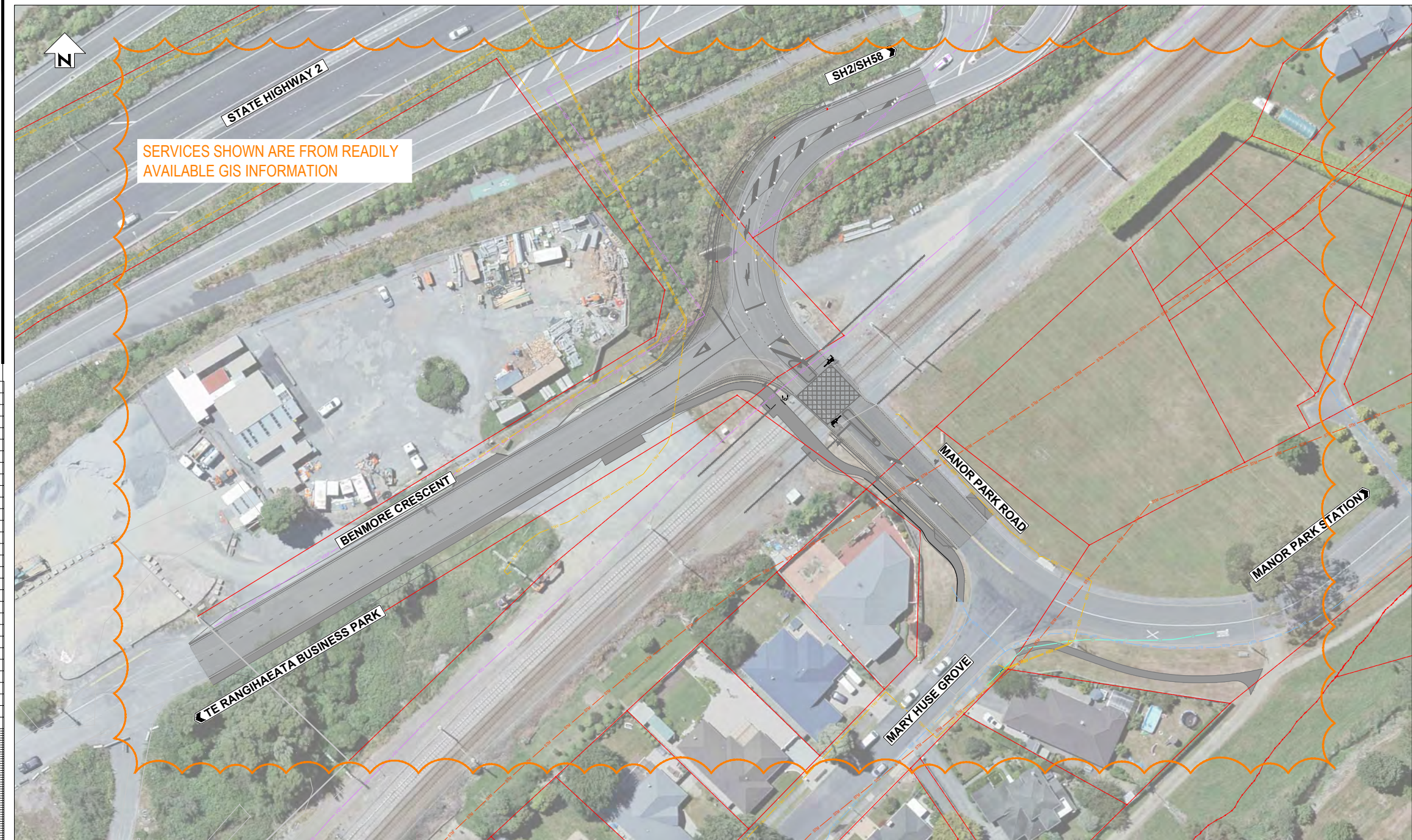
10. REFERENCE DOCUMENTS

1. Stantec report: Manor Park Road Level Crossing Safety Impact Assessment PREPARED FOR ROSCO ICE CREAM LIMITED | JUNE 2022, Rev A, 20/06/2022
2. Joint KiwiRail and Waka Kotahi publication: Level Crossing Risk Assessment Guide (LCRAG), v5.

Appendix C Benmore Crescent / Manor Park Road Intersection Upgrade



ORIGINAL SIZE A1
DO NOT SCALE - IF IN DOUBT, ASK



PLAN
SCALE 1 : 500 @ A1

NOTES
SURVEY
1. COORDINATES ARE IN TERMS OF NZGD 2000 (WELLINGTON).
2. HEIGHTS ARE IN TERMS OF WELLINGTON DATUM 1953.
3. ORIGIN OF LEVELS:
MARK NAME PIN I SO 497033.
REDUCED LEVEL 31.522m
SOURCE LINZ GDB
4. THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL SURVEY MARKS AND THEIR OFFSET POSITIONS.

SERVICES
1. PIPES, CABLES AND OTHER UTILITIES ON THIS DRAWING ARE BASED ONLY ON READILY AVAILABLE RECORD PLANS AND OTHER INFORMATION. THIS INFORMATION MAY NOT BE COMPLETE, ACCURATE NOR UP TO DATE. PRIOR TO CARRYING OUT ANY EXCAVATION OR OTHER PHYSICAL WORKS, CONTRACTORS SHALL OBTAIN THE LATEST INFORMATION FROM UTILITY PROVIDERS AND CARRY OUT DETAILED EXPLORATORY WORK, TRACING, LOCATING, PROTECTION AND ALTERATIONS AS ARE REQUIRED UNDER NZS 3910 CLAUSE 5.13.
2. FOR 'EXISTING SERVICES' PLEASE REFER TO C200 SERIES DRAWINGS.

GENERAL
1. CADASTRAL BOUNDARIES ARE INDICATIVE ONLY AND TO BE VERIFIED BY SURVEY.
2. ALL DIMENSIONS IN METRES UNLESS OTHERWISE NOTED.
3. WRITTEN DIMENSIONS TAKE PRECEDENCE OVER SCALED DIMENSIONS. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER.
4. ALL LOCATIONS OF HYDRAULIC STRUCTURES TO BE CONFIRMED ON SITE.

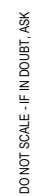
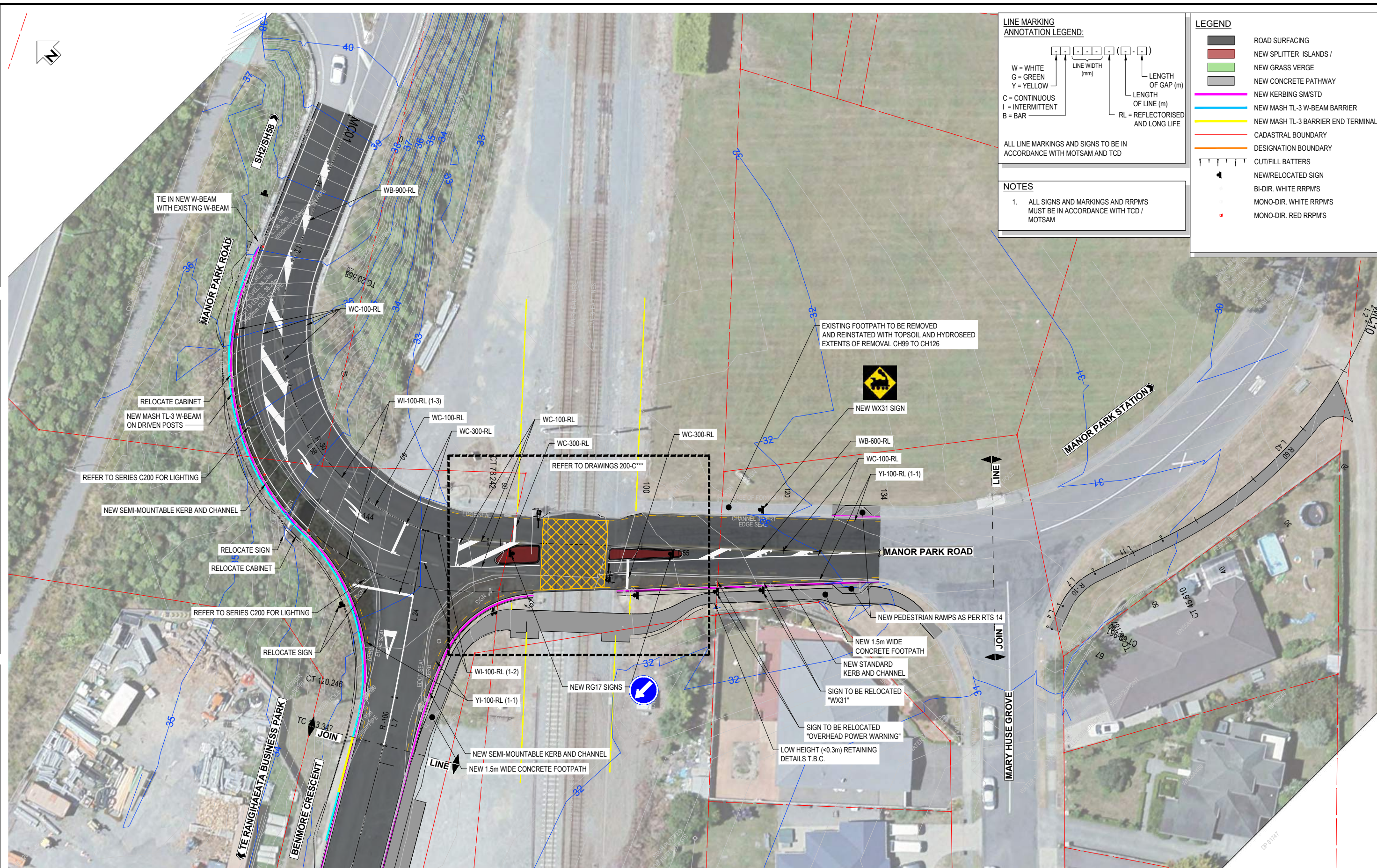
BARRIERS
1. ALL ROAD SAFETY BARRIER SYSTEMS ARE TO BE IN COMPLIANCE WITH NZTA M23 AND RELEVANT NZTA STANDARD DRAWINGS.
2. INSTALL ALL ROAD SAFETY BARRIER SYSTEMS IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS.
3. EXISTING ROAD SAFETY BARRIERS TO BE RECOVERED, CHECKED FOR DAMAGE AND REUSED WITH NEW FIXING HARDWARE AS APPROPRIATE.
4. REFER TO EXISTING SERVICE SERIES C200 FOR EXPECTED SERVICE LOCATIONS
5. ALL BARRIERS TO BE INSTALLED WITH ASSOCIATED DELINEATION IN ACCORDANCE WITH WAKA KOTAHĪ TM-2014

ROAD MARKINGS AND SIGNS
1. ALL SIGNS AND MARKINGS SHOULD BE IN ACCORDANCE WITH TCD / MOTSAM

SERVICES LEGEND	
	WELLINGTON ELECTRIC 400V
	WELLINGTON ELECTRIC 11kV
	VODACOM
	VODACOM (PLANNED) - POSSIBLY OBSOLETE
	SEWER TRUNK MAIN
	WATER
	POWERCO GAS
	CHORUS (INFO TO BE SOURCED)



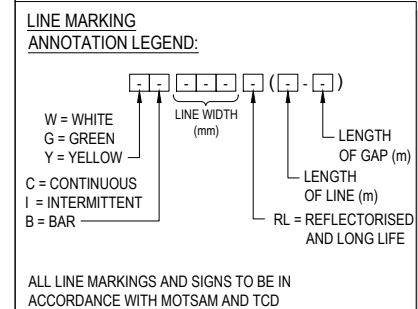
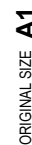
										SURVEYED		SPENCER HOLMES		08/2022			Client:	BENMORE CRESCENT										Status Stamp		WORKING PLOT	
										DESIGNED		Janco Jordaan		09/2022														Date Stamp			
										DRAWN		Janco Jordaan		09/2022				Scales		AS SHOWN											
										CAD REVIEW								Drawing No.		310204837-01-100-C100		Rev.		A							
										DESIGN CHECK																					
										DESIGN REVIEW																					
										APPROVED		NOT APPROVED																			
										PROF REGISTRATION:																					
REV										REVISIONS										DRN		CHK		APP		DATE					

ORIGINAL SIZE **A1**

PLAN
SCALE 1 : 250 @ A1

NOT FOR CONSTRUCTION

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<u>NOTES</u> 1. ALL SIGNS AND MARKINGS AND RRPMS MUST BE IN ACCORDANCE WITH TCD / MOTSAM	
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ORIGINAL SIZE A1
DO NOT SCALE - IF IN DOUBT, ASK

200 mm
150
100
90
80
70
60
50
40
30
20
10
0



LEGEND

- NEW ROAD PAVEMENT
- NEW CONCRETE ISLANDS/PATH
- NEW PAVEMENT/SURFACING OVER RAIL

NOTES

- PAVEMENT DESIGN AND EXTENTS ARE TO BE CONFIRMED

PLAN
SCALE 1 : 500 @ A1

NOT FOR CONSTRUCTION

REV	REVISIONS	DRN	CHK	APP	DATE

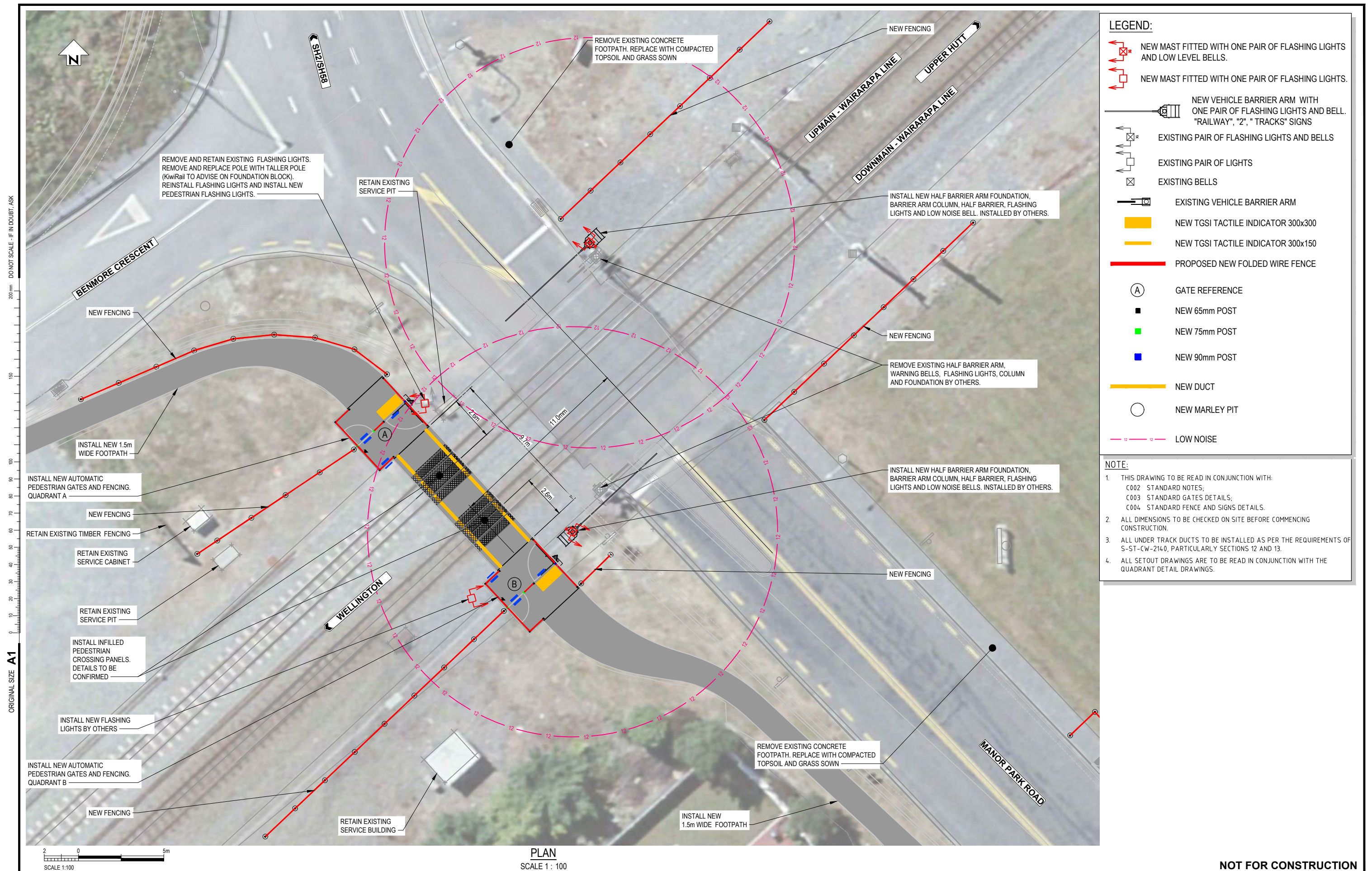
SURVEYED	SPENCER HOLMES	08.2022
DESIGNED	Janco Jordaan	09.2022
DRAWN	Janco Jordaan	09.2022
CAD REVIEW		
DESIGN CHECK		
DESIGN REVIEW		
APPROVED	NOT APPROVED	
PROF REGISTRATION:		

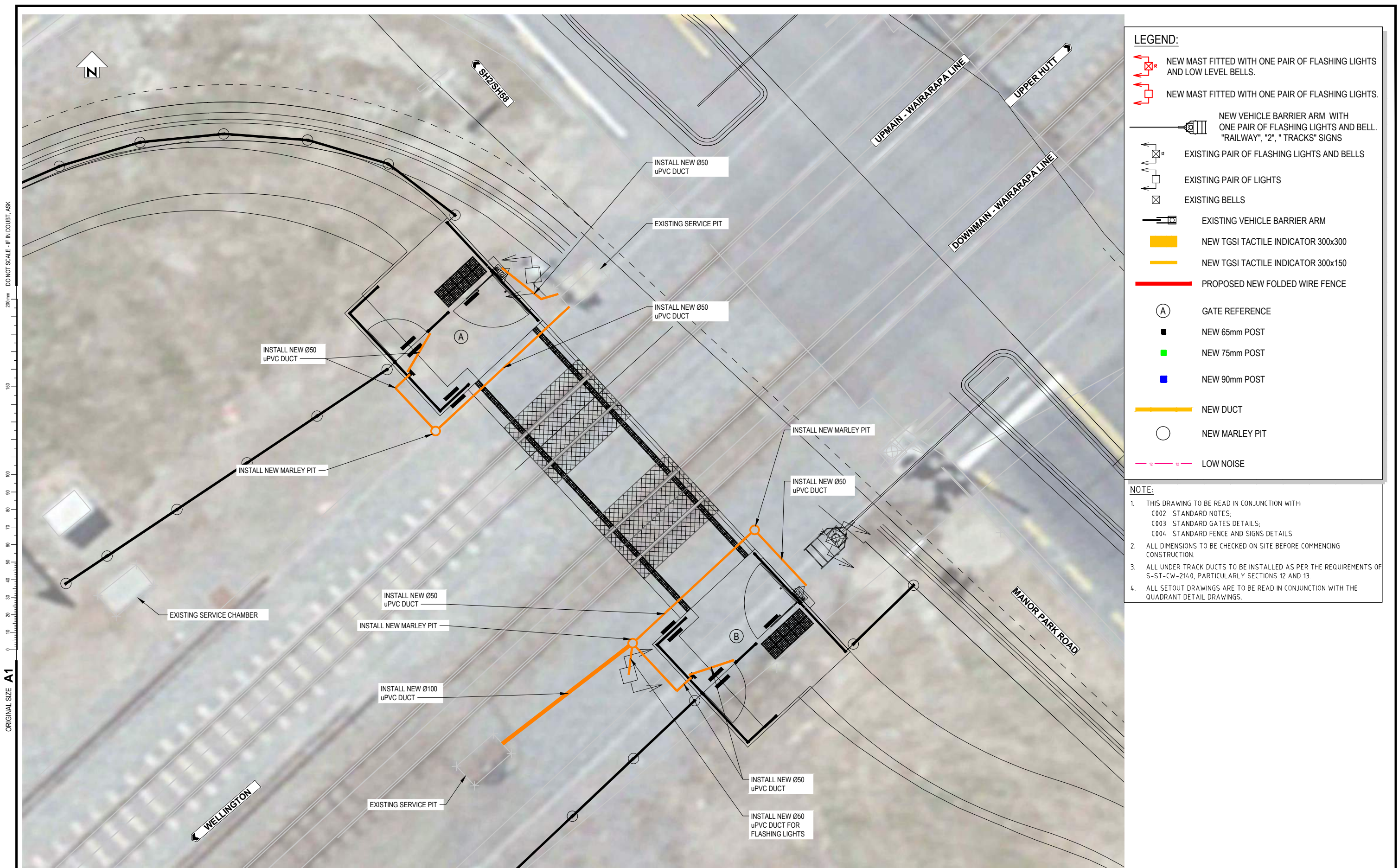


Client:	
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BENMORE CRESCENT
PAVEMENT PLAN

Status Stamp	WORKING PLOT
Date Stamp	
Scales	
Drawing No.	310204837-01-100-C600
Rev.	A

[illegible]



LEGEND:

NEW MAST FITTED WITH ONE PAIR OF FLASHING LIGHTS AND LOW LEVEL BELLS.

NEW MAST FITTED WITH ONE PAIR OF FLASHING LIGHTS.

NEW VEHICLE BARRIER ARM WITH ONE PAIR OF FLASHING LIGHTS AND BELL. "RAILWAY", "2", "TRACKS" SIGNS

EXISTING PAIR OF FLASHING LIGHTS AND BELLS

EXISTING PAIR OF LIGHTS

EXISTING BELLS

EXISTING VEHICLE BARRIER ARM

NEW TGSi TACTILE INDICATOR 300x300

NEW TGSi TACTILE INDICATOR 300x150

PROPOSED NEW FOLDED WIRE FENCE

GATE REFERENCE

NEW 65mm POST

NEW 75mm POST

NEW 90mm POST

NEW DUCT

NEW MARLEY PIT

LOW NOISE

- NOTE:
1.

THIS DRAWING TO BE READ IN CONJUNCTION WITH:
C002 STANDARD NOTES;
C003 STANDARD GATES DETAILS;
C004 STANDARD FENCE AND SIGNS DETAILS.
2.

ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCING CONSTRUCTION.
3.

ALL UNDER TRACK DUCTS TO BE INSTALLED AS PER THE REQUIREMENTS OF S-ST-CW-2140, PARTICULARLY SECTIONS 12 AND 13.
4.

ALL SETOUT DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE QUADRANT DETAIL DRAWINGS.

PLAN
SCALE 1 : 100

200 mm
150
100
90
80
70
60
50
40
30
20
10
0

2 0 5m
SCALE 1:100

REV	REVISIONS	DRN	CHK	APP	DATE	SURVEYED	DESIGNED	11.2022	DRAWN	11.2022	CAD REVIEW	DESIGN CHECK	DESIGN REVIEW	APPROVED	PROF REGISTRATION:

Client

BENMORE CRESCENT

MANOR PARK ROAD - PEDESTRIAN RAIL CROSSING
DUCTING LAYOUT PLAN

NOT FOR CONSTRUCTION

WORKING PLOT

Date Stamp

Scales AS SHOWN

Drawing No. 310204837-01-100-C307

Rev. A

DESIGN WITH COMMUNITY IN MIND

Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of place and of belonging. That's why at Stantec, we always design with community in mind.

We care about the communities we serve—because they're our communities too. This allows us to assess what's needed and connect our expertise, to appreciate nuances and envision what's never been considered, to bring together diverse perspectives so we can collaborate toward a shared success.

We're designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

Stantec trades on the TSX and the NYSE under the symbol STN.
Visit us at stantec.com or find us on social media.

Level 15, 10 Brandon Street, Wellington Central
PO Box: 13-052 Armagh, Christchurch 8141
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