

Integrated Transportation Assessment

Silverdale West

Proposed Plan Change

PREPARED FOR FLETCHER DEVELOPMENT LIMITED | March 2024





Revision schedule

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Executive Summary

The following Integrated Transportation Assessment (“ITA”) has been prepared by Stantec, on behalf of Fletcher Development Ltd (“Fletcher”) to inform a Private Plan Change (“the PPC” or “Silverdale West PPC”) request to rezone approximately 107 hectares of Future Urban zoned land in Silverdale West to a mix of Light Industrial and Open Space zones.

The PPC area is generally bounded by Dairy Flat Highway to the west and State Highway 1 to the east. Being located approximately 2km from the Silverdale Town Centre, 6km from Central Orewa, 11km from Albany Centre, and 25km from the Auckland CBD, the site is strategically well-located adjacent to the Auckland Northern Motorway as well as a planned Rapid Transit Network (“RTN”) corridor being investigated and considered by Supporting Growth Alliance (“SGA”) to further support the growing Silverdale and Milldale areas.

The PPC has been developed by Fletcher alongside other experts including land use planning experts, economists, and urban designers. The project’s expert team understand how the Silverdale West site can be sustainably designed and delivered. From a transportation perspective, the following ITA demonstrates how the existing and planned infrastructure including enhanced public transport features such as those being secured by SGA, can readily and efficiently contribute to the future employment and business outcomes for this area of North Auckland.

The PPC area is strategically well-located at the intersection of several major transport routes, such as SH1, Dairy Flat Highway, Pine Valley Road, and the nearby Hibiscus Coast Highway (to the west of the Silverdale Motorway interchange). Access to the region’s public transport facilities from the PPC land, centres on the site’s general proximity to the Hibiscus Coast Bus Station located on the eastern side of the Silverdale Interchange, as well as connection to the adjoining transport routes catering for existing (and likely future) public transport services. The growing Milldale suburb to the north of Dairy Flat Highway/Pine Valley Road includes the delivery of additional infrastructure upgrades and has also resulted in the establishment of a new Auckland Transport bus route (Route 989 Wainui/Milldale). The transport upgrades identified through the ITA’s transport modelling to inform the PPC, align readily and integrate with the Milldale development and its proposed Milldale North Plan Change. Key upgrades required to support the transportation outcomes of the 107 hectares of light industrial development within the PPC site include:

- improvements to the Dairy Flat Highway/Pine Valley Road intersection;
- two signal-controlled access intersections with Dairy Flat Highway along the frontage of the PPC;
- signalisation of the Wilks Road / Dairy Flat Highway and Wilks Road / East Coast Road intersections;
- upgrades to the Silverdale interchange, including a slip lane on the western approach to the interchange which connects to the northbound on-ramp, plus extending the length of the left turn slip lane on the southbound off-ramp with a proposed ramp meter on that off-ramp; and
- an upgrade to the roundabout at Argent Lane / Pine Valley Road (double-laning).

The proximity and accessibility to the existing and planned public transport facilities in Milldale/Silverdale (including the Hibiscus Coast Bus Station and planned RTN facility through Silverdale West and Milldale) provides an ideal platform for the business and employment activities and their future employees to be established. Recent co-ordination and participation in the public submission process between Fletcher and the SGA in relation to the planned RTN route shows the desire and commitment to integration of planned land use and transport in this part of Auckland’s growth sector.

Comprehensive and conservative traffic modelling has been undertaken using the SGA’s Northern Region model as a base. The modelling was undertaken out to a future year of 2034 and focused on determining how the PPC and other developments within Silverdale/Milldale can be accommodated within the surrounding network in the future. The transportation modelling undertaken has confirmed that there are appropriate thresholds of development and supporting external transport mitigation that will achieve an acceptable and supportable transport outcome not only for the PPC land, but also for the surrounding areas including at the Silverdale Interchange. The thresholds identified by the transport modelling have been framed around the modelling outcomes as well as consideration of the alignment with the existing Milldale development, and the forthcoming Milldale North Plan Change and associated transport works. Based on the modelling, it is considered that the Plan Change can be enabled from a traffic perspective given that the infrastructure needed to support future developments is to be implemented in a staged manner as the precinct grows.

In summary, the PPC will support a range of transport modes primarily through its proximity to key arterial transport routes including the Silverdale interchange and SH1 Northern Motorway, existing and planned public transport services as well as to the growing residential developments at Milldale, Millwater and Silverdale. In terms of the provision of local transport infrastructure upgrades, the PPC has taken a considered approach to delivering a specific suite of upgrades and modifications to the surrounding transport network. This approach ensures appropriate transportation performance across a range of travel modes, facilitates the delivery of business/light industrial opportunities and associated employment, and is accordingly, well aligned with the anticipated growth of a range of complementary urban activities in this northern sector of Auckland.



1 Introduction

Fletcher has engaged Stantec to provide an Integrated Transportation Assessment (“**ITA**”) to accompany the request for a PPC to facilitate the rezoning and subsequent development of the site at 1660 Dairy Flat Highway to Light Industrial activity. The area proposed for rezoning is approximately 107 ha in area within a region bounded by Dairy Flat Highway to the west and State Highway 1 to the east, with both links converging to the north of the site at the Silverdale Interchange.

The site is currently zoned Future Urban Zoned (“**FUZ**”) under the Auckland Unitary Plan Operative-in-Part updated 13 October 2023 (“**Unitary Plan**”).

The future light industrial development concept that is enabled by the Silverdale West PPC aligns closely with the transport-related policy documents and strategic transport and land-use planning for the Silverdale/Milldale area, and Auckland metropolitan area more generally. Given the proximity of new residential developments to the PPC site, the employment and business activities that will be facilitated by the PPC align well with the Government Policy Statement on Land Transport 2021, the Auckland Plan, and the Unitary Plan.

The PPC will provide employment and business activities in proximity to medium density residential development at Milldale (and other established residential areas such as Silverdale/Orewa) decreasing the overall commuting distances for residents who might otherwise leave the Silverdale/Milldale/Orewa area and travel to other parts of the city to the south. It will also maximise the use of existing and future alternative travel modes (such as the Hibiscus Coast Bus Station and planned Rapid RTN route through Silverdale West, as well as an opportunity for the recently approved Milldale bus service to be modified to serve the PPC site). The combination of the Silverdale West PPC and planned Milldale North Plan Change in close proximity to the planned RTN route through or adjacent to both Plan Change areas, underscores the optimal location and nature of activities proposed.

The purpose of this ITA is to assess transportation implications of the proposed re-zoning and subsequent development, and to identify potential measures to avoid, remedy or mitigate any identified adverse transportation effects.

This report will:

- Describe the existing transportation environment in terms of road networks, traffic volumes, walking and cycling networks, and public transport services;
- Describe the future transport environment, committed developments and established policy objectives;
- Describe the transportation characteristics of the indicative development and its alignment with the existing and planned strategic transport network in the surrounding area;
- Predict trip generation of the indicative development within the PPC area;
- Assess the expected impact of the additional vehicular trips on the transport networks under ‘with development’ and ‘future year’ scenarios; and
- Define any transport infrastructure upgrades necessary to support the development enabled by the PPC.

By way of overall summary, the following assessment has determined that several transportation upgrades are required in order to avoid, remedy, or mitigate the transportation implications of the proposed PPC. Based on the planned, staged delivery of these upgrades in accordance with the thresholds identified within the PPC zoning provisions, there are no transportation planning or traffic engineering reasons that would preclude the PPC from proceeding.

2 Existing Transport Context

2.1 Strategic Site Location

The Silverdale West PPC site is strategically well-located at the intersection of key transport routes. It enables ready access to the business and light industry activities from the surrounding areas of Silverdale, Millwater, as well as Orewa and Whangaparaoa further to the east. The PPC will provide services as well as employment opportunities to these communities.

Figure 1 illustrates the Silverdale West PPC area in relation to its surrounding environment¹. The area is generally triangular in shape approximately 1.7km along the eastern and western boundaries and around 1.3km across the southern boundary.



Figure 1: Proposed Silverdale West Plan Change Area

¹ Source: Nearthmap



The area to be re-zoned comprises of approximately 107 ha bounded by State Highway 1 (“SH1”) Northern Motorway to the east and Dairy Flat Highway to the west. The area is largely undeveloped and rural in nature. The site is positioned approximately:

- 2km from the Silverdale Town Centre,
- 6km from Central Orewa,
- 11km from Albany Centre,
- 27km from Warkworth and
- 25km from Auckland CBD.

To the north-east of the site across SH1, Silverdale Village comprises retail, industrial and recreational activities. The extensive Millwater residential subdivision lies to the north of Silverdale. To the north of the site the developing Milldale residential subdivision is now operational with the expectation that it will be fully built out by around 2028.

Overall, the site and the activities proposed complement the activities in the surrounding area. The site is strategically well-situated adjacent to the regionally significant SH1 Northern Motorway with appropriate access from the supporting Dairy Flat Highway arterial route.

2.2 Road Network

The classified road network surrounding the site as defined within AT’s “Future Connect” online system, is illustrated below in **Figure 2**, with the site extent shown with a dashed red line.

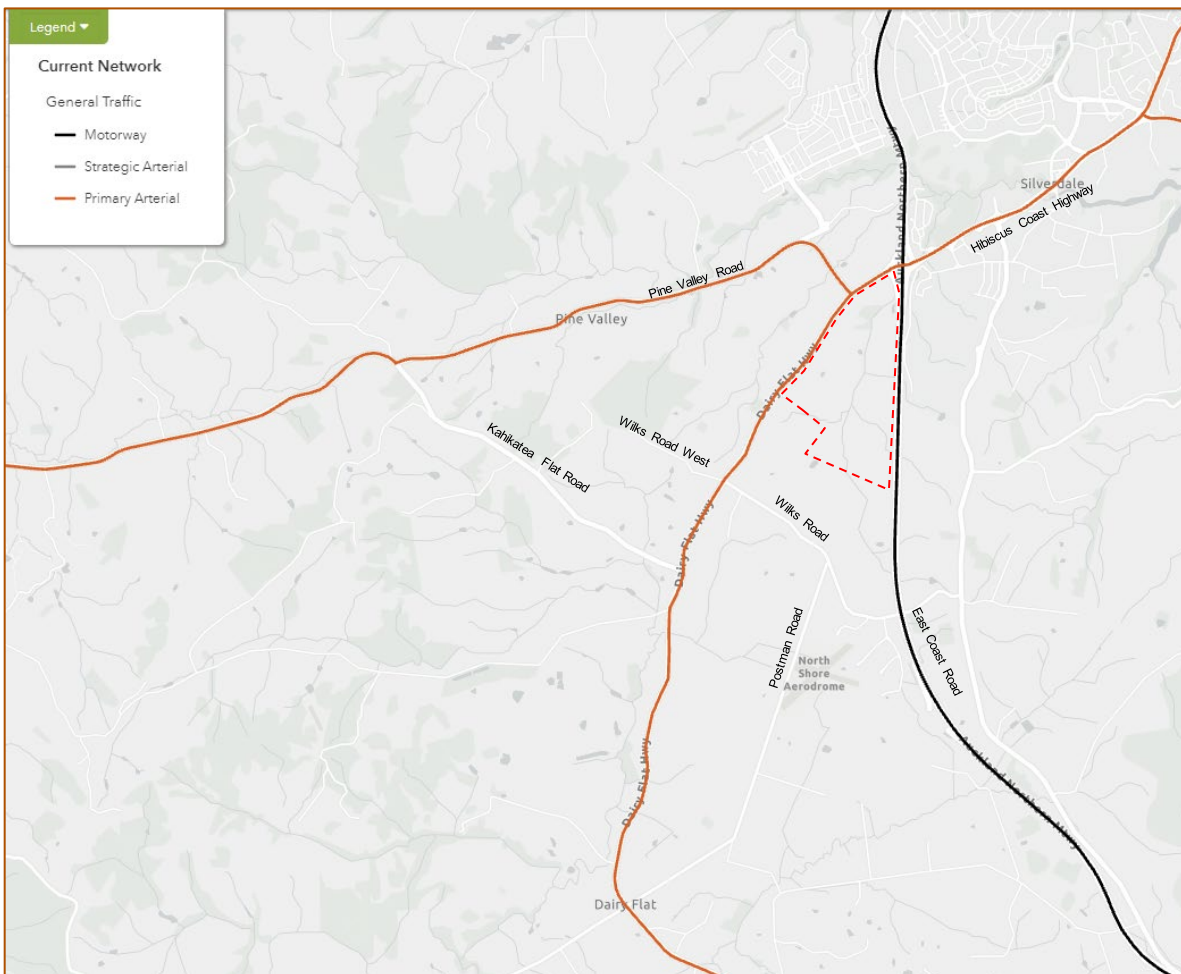


Figure 2: Road Network

2.2.1 State Highway 1

The Auckland Northern Motorway –**SH1** runs along the eastern boundary of the site. It is a key strategic route of national significance linking Auckland to Northland via Silverdale, Warkworth and Wellsford. The primary function of such strategic routes is to provide an efficient through-route for traffic, with no direct access to adjacent properties along the motorway section of the route. All access to the motorway within this section through to Warkworth (including the recently opened Puhoi – Warkworth section) are grade-separated interchange.

In the vicinity of the PPC site, SH1 comprises of two traffic lanes in each direction separated by a grassed median and wire fence.

The Road Controlling Authority for SH1 is New Zealand Transport Agency | Waka Kotahi (“**Waka Kotahi**”).

2.2.2 Arterial Routes

The following routes have been classified as arterial routes in the Unitary Plan and as Primary Arterial routes within AT’s Future Connect system:

- Dairy Flat Highway runs along the western boundary of the site and connects to SH1 and Hibiscus Coast Highway in the north via the Silverdale Interchange. It runs largely parallel to and west of SH1, connecting the Silverdale area to Albany in the south. Dairy Flat Highway is currently a two-way, two-lane road with a painted centreline and sealed shoulders, and a posted speed limit of 80 km/h.
- Pine Valley Road intersects with Dairy Flat Highway approximately 400m west of the Silverdale interchange and is currently classified as an arterial route in the Unitary Plan. Pine Valley Road generally runs in the east-west direction and intersects with Kahikatea Flat Road to the west and Dairy Flat Highway to the east. Pine Valley Road is a two-way, two-lane road with a painted centreline and sealed shoulders and a posted speed limit of 80 km/h.
- Hibiscus Coast Highway intersects with SH1 and Dairy Flat Highway just north of the site at the Silverdale Interchange. Hibiscus Coast Highway is a “gateway” route for travel between the Whangaparaoa Peninsula and the wider Orewa-Silverdale area. The road layout for Hibiscus Coast varies, but in the vicinity of the Silverdale Town Centre area, is a two-way, four lane road with a central median. It has a posted speed limit of 70 km/h.

2.2.3 Supporting Routes

Wilks Road to the south of the PPC land intersects with Dairy Flat Highway at its western end. At this point, it connects to Wilks Road West (currently unsealed) and terminates approximately 1km further to the west. The Wilks Road / Wilks Road West intersection is a priority controlled, four-leg intersection with Stop control for the Wilks Road approach and Give Way controls on the Wilks Road West approach. The eastern end of Wilks Road intersects with East Coast Road and is a priority controlled (Stop control) T-intersection.

Wilks Road crosses SH1 approximately 2.8km south of the Silverdale Interchange via an overbridge.

Wilks Road is a two-way, two-lane road with a marked centreline and a posted speed limit of 80km/h west of Postman Road and 100km/h east of Postman Road.

Postman Road is a two-way, two-lane road marked with a painted centreline. It intersects with Wilks Road approximately 500m west of SH1 controlled by means of Give Way priority controls for the T-intersection. At its southern extent, Postman Road intersects with Dairy Flat Highway / Black Bridge Road more than 3km to the south. Postman Road generally runs along the north-south axis and Postman Road has a posted speed limit of 80km/h.

2.2.4 Silverdale West Road Hierarchy

Figure 3 is a Concept Plan which has been prepared by Barker and Associates on behalf of Fletcher. It indicates the proposed roading hierarchy within the Silverdale West PPC area.



Figure 3: Proposed Development Concept Plan for Silverdale West

Within the PPC development area, the collector, local and reserve-edge roads provide appropriate levels of accessibility through the site and good connectivity to the surrounding transportation network.

Overall, the indicative roading structure is considered appropriate for the level of anticipated development. The internal hierarchy and its connection to the surrounding network appropriately reflects and complements the established hierarchy of the Silverdale West area (and its expected on-going development over coming years). The proposed network is generally based on a network of interconnected routes, together with the provision for some of these routes especially those along the southern boundary of the PPC area, to be continued into adjoining land as those areas are developed over coming years.

2.3 Public Transport Network

Figure 4 shows the Public Transport Network Map for current AT bus services in the vicinity of the site, together with the existing bus stop infrastructure.

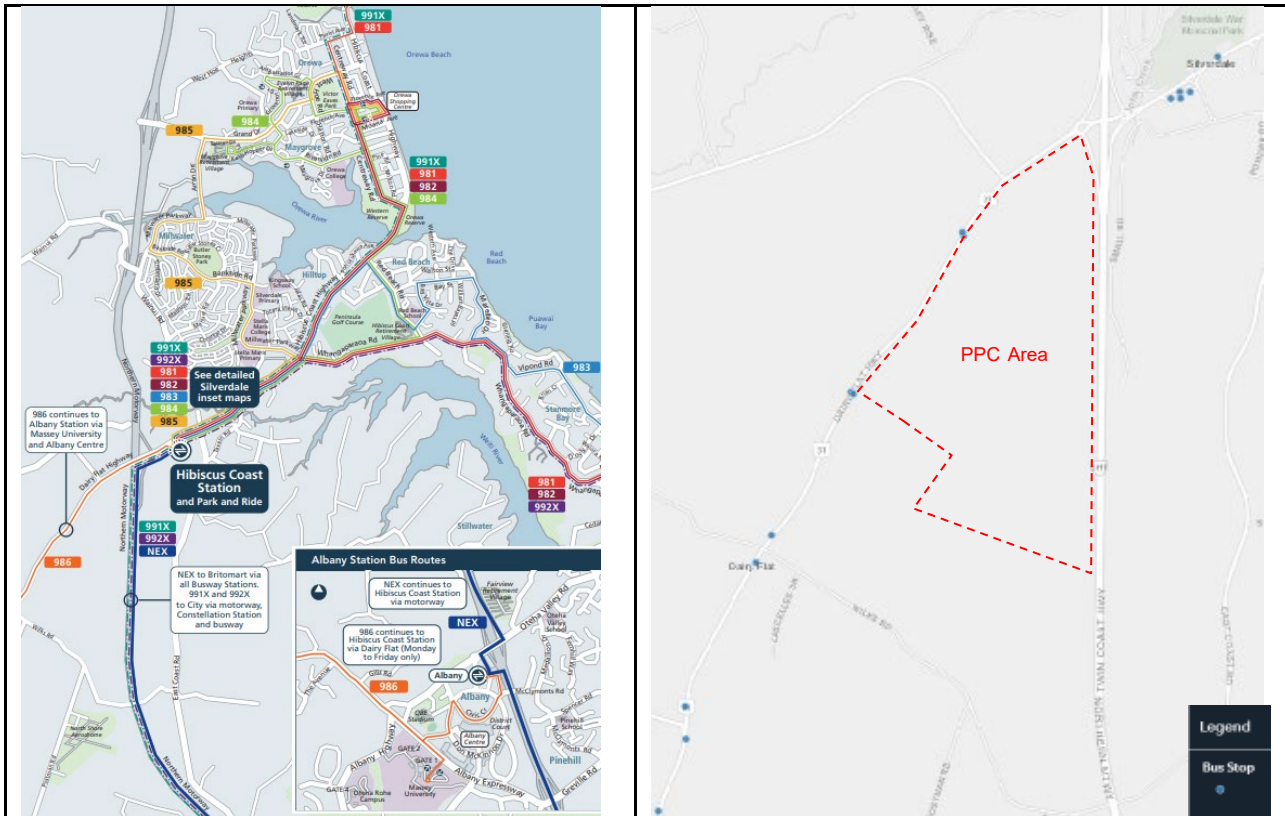


Figure 4: Hibiscus Coast Bus Routes (source Auckland Transport)

The bus services currently serving the Silverdale West area include the 986 bus-route on Dairy Flat Highway and the NX1/NX2 bus-routes along SH1/Northern Busway and Hibiscus Coast Highway.

The 986 bus-route connects the Hibiscus Coast Bus Station with the Albany Bus Station via Dairy Flat Highway. The service operates on weekdays only, at 60min frequency.

A number of bus routes connect via the Hibiscus Coast Bus Station including:

- Northern Express services from Auckland City Centre, and
- other local and connector routes which provide connectivity to Silverdale-Orewa, Whangaparaoa Peninsula, Waiwera and Warkworth.

Connector services are defined by AT as those services which operate at least every 30 minutes, 7am – 7pm, 7 days a week. Frequencies and timings for local services vary.

The Northern Busway services – the NX1 and NX2 routes - each operate at a much higher frequency, particularly during the weekday peak periods. The NX1/NX2 services connect the City Centre with the Hibiscus Coast Bus Station via the Albany Bus Station and other sections of the Northern Busway. Service frequencies are every 3-10 minutes during the AM and PM peak periods, and between 10-15 minutes during interpeak periods (with lower frequencies on weekends and evenings).

As of November 2022, a new bus route has commenced operation connecting the Milldale Precinct with the Hibiscus Coast Bus Station via Argent Lane. This route could be extended to cover the Silverdale West area, providing connectivity between the residential catchment of Milldale with the employment area within the Silverdale West PPC area, whilst also connecting both areas with the Hibiscus Coast Bus Station for onward connections to other parts of the Auckland metropolitan area.

AT is currently investigating the establishment of an RTN busway corridor to better serve the northern part of the Auckland region. The currently-preferred option for this new, bus rapid transit corridor (effectively an extension of the Northern Busway) is a route alignment extending from the SH1 corridor to the south of Silverdale West and continuing northwards slightly to the west of Dairy Flat Highway into Milldale. Whilst this route is unlikely to be complete by 2034 (being the

anticipated future forecast year for the full buildout of the PPC area), it does provide options for future public transport integration for Silverdale West and the PPC area into the future.

The classifications applying to the surrounding roads within the current road network as defined within AT's Future Connect² relating to Public Transport, are shown in **Figure 5**.

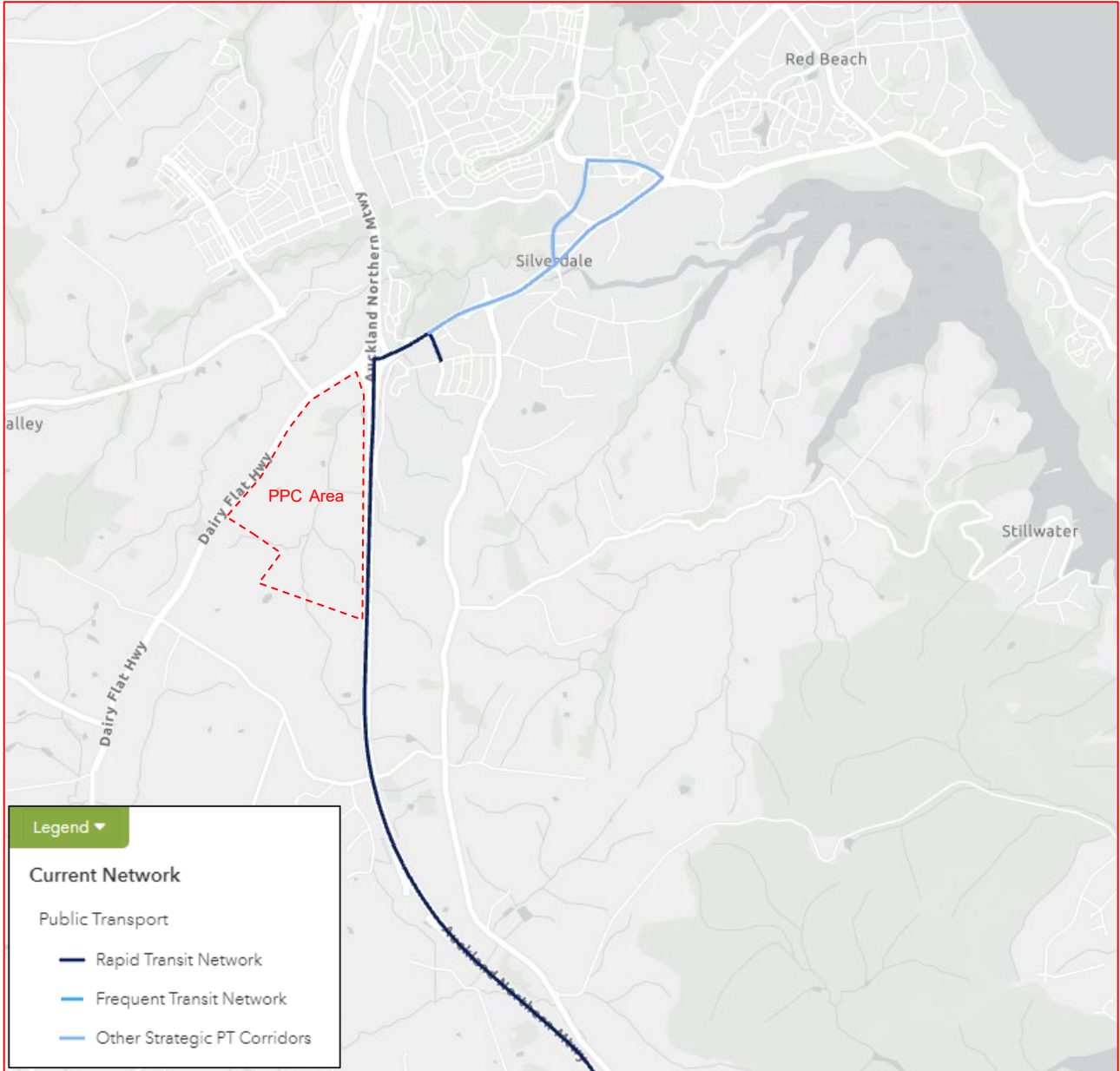


Figure 5: Future Connect – Public Transport Network (Current)

As shown, SH1 and Hibiscus Coast Highway (between the Silverdale Interchange and the Hibiscus Coast Bus Station) are classified as “Rapid Transit Network”, while to the east of the Bus Station, Hibiscus Coast Highway is classified as “Other Strategic PT Corridors”.

The Future Connect ‘First Decade’ network for public transport is shown in **Figure 6**.

² Auckland Transport’s network plan for all transport modes



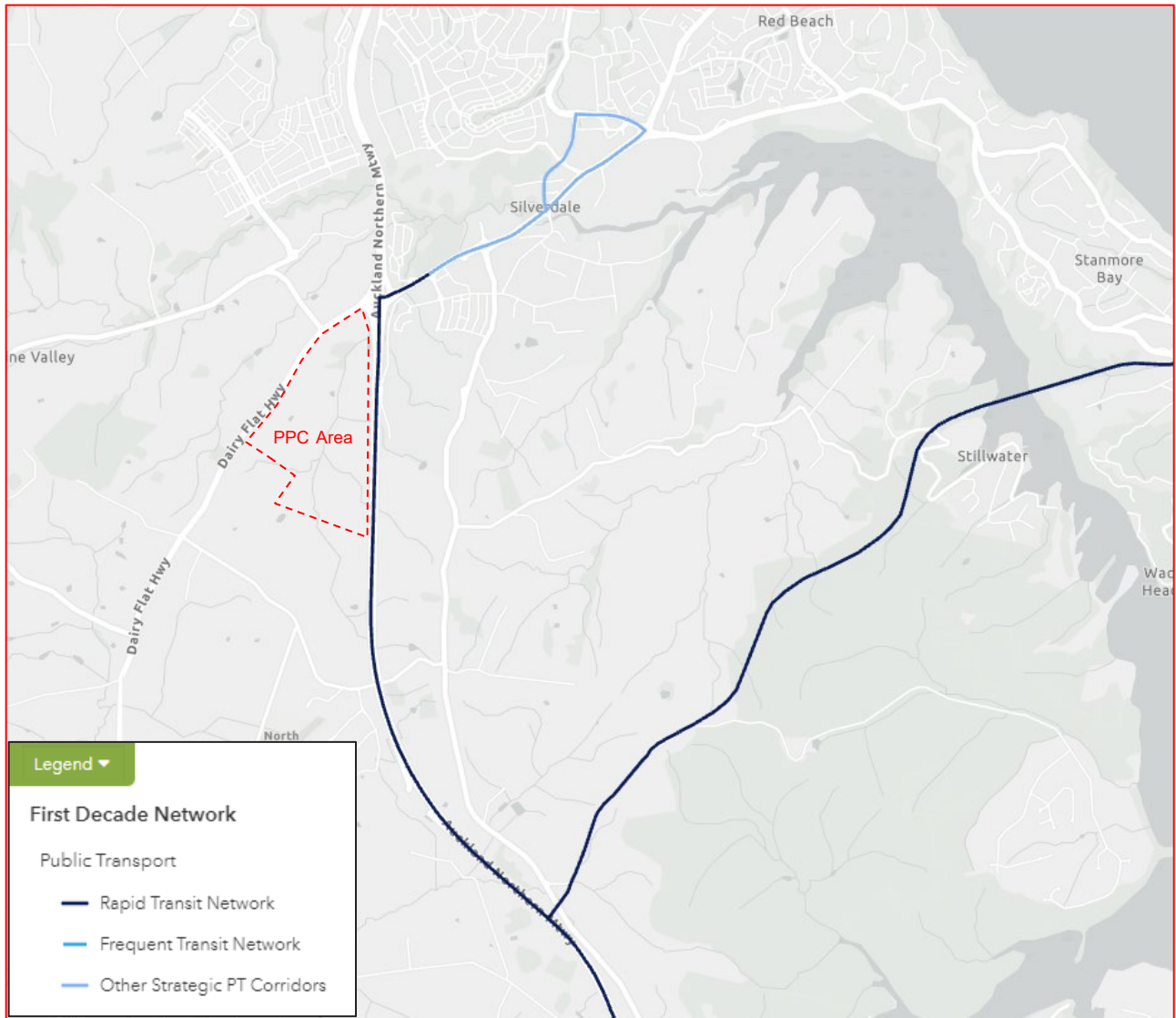


Figure 6: Future Connect – Public Transport Network (First Decade)

As indicated, the O Mahurangi-Penlink (“**Penlink**”) route is included in the First Decade of AT’s Future Connect programme. This route will help ease some of the pressure currently experienced along Hibiscus Coast Highway and particularly at the Hibiscus Coast bus station.

Overall, whilst public transport infrastructure in the immediate area is currently limited, these facilities are likely to be progressively improved in the future as the surrounding area becomes further developed and urbanised.

2.4 Cycling and Micro-mobility Network

The current classifications for the surrounding routes as defined within AT's Future Connect system for the Cycling and Micro-mobility Network are shown in **Figure 7**.

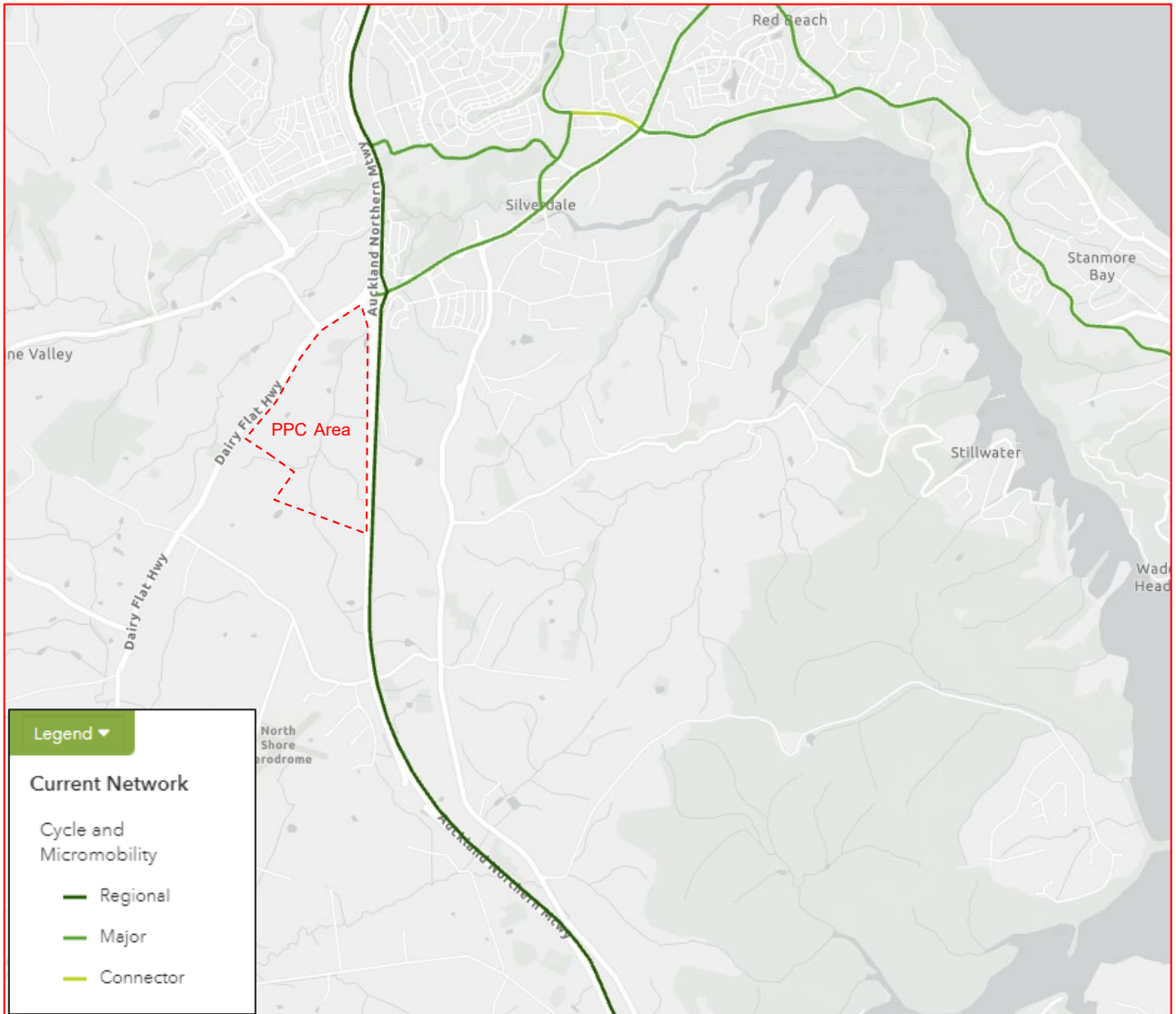


Figure 7: Future Connect – Cycle and Micro-mobility (Current)

SH1 is classified as a route with “Regional” significance for cycling and micro-mobility while Dairy Flat Highway and Hibiscus Coast Highway are both classified as routes with “Major” significance.

Future Connect has identified the deficiencies and opportunities which exist within the current cycle and micro-mobility network, and these are illustrated in **Figure 8**.

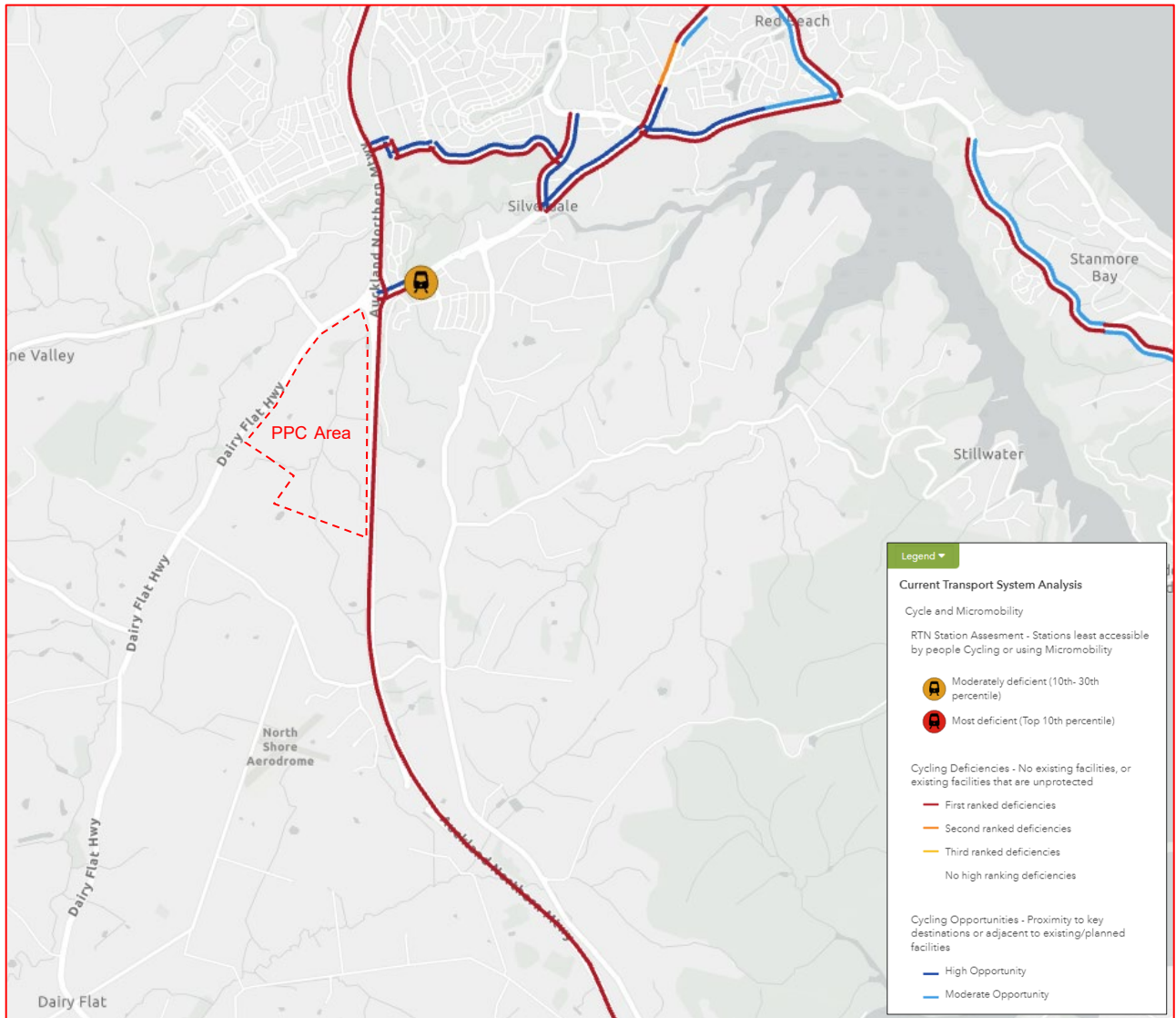


Figure 8: Future Connect – Cycle and Micro-mobility (Deficiencies and Opportunities)

As illustrated, a large proportion of roads which currently make up the current Cycle and Micro-mobility Network have been identified with a first ranked deficiency with high opportunities for improvement. This indicates that there is currently a lack of safe and efficient transport infrastructure for cycling and micro-mobility. This is understandable given the current nature of the transport environment.

The Future Connect 'First Decade' network for cycle and micro-mobility is shown in **Figure 9**.

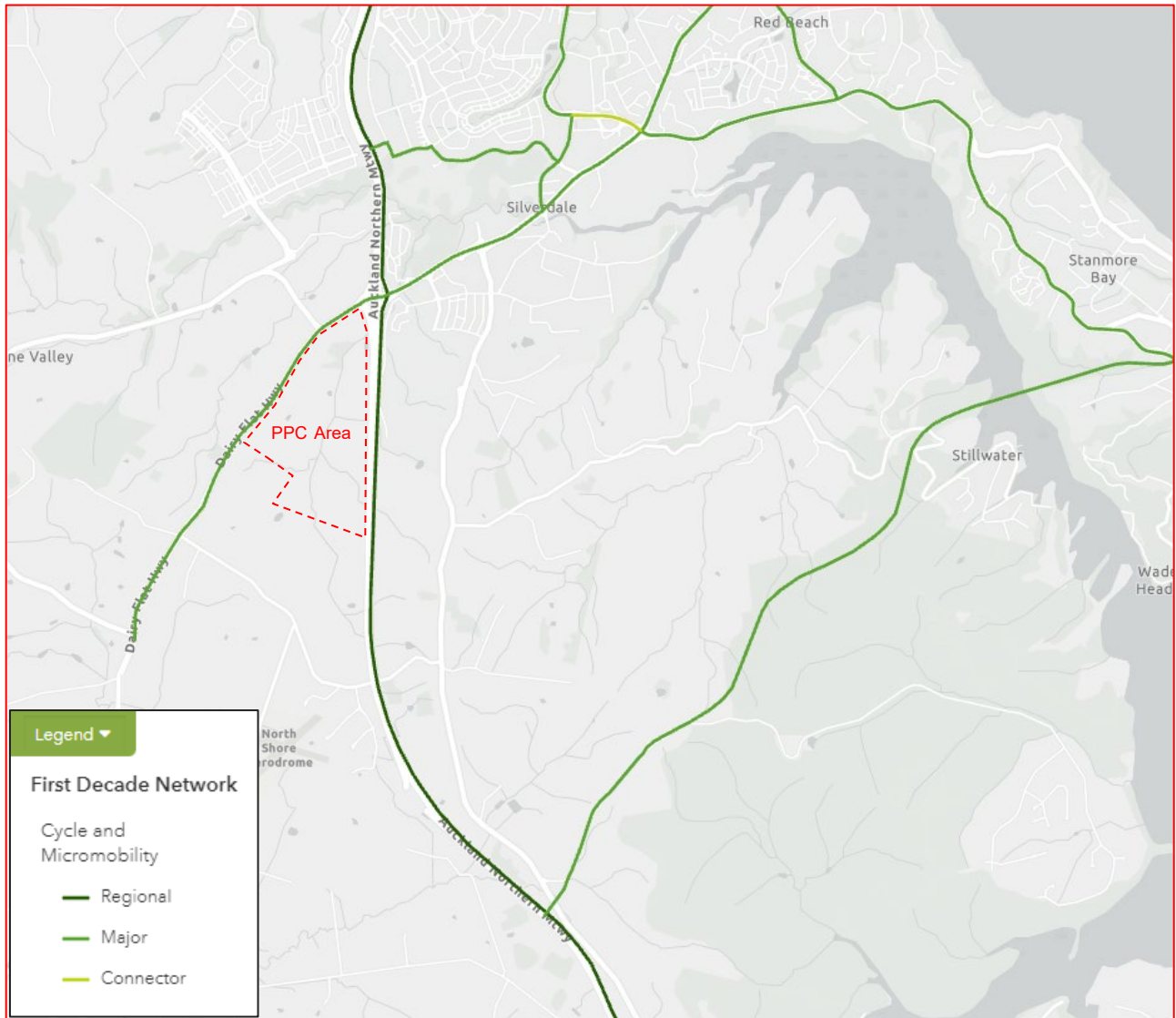


Figure 9: Future Connect – Cycle and Micro-mobility Network (First Decade)

As indicated, Penlink will provide a new major cycle and mobility route within the next ten years. The first decade network also includes an extension of the Hibiscus Coast Highway route along Dairy Flat Highway, running adjacent to the western boundary of the Silverdale West PPC area.

Whilst current cycle and micro-mobility infrastructure in the area is limited, as part of the Plan Change package of upgrades, the Dairy Flat Highway / Pine Valley Road intersection will be signalised, with advance cycle boxes included in the design. In addition, a two-way cycle path is proposed along the southern edge of Dairy Flat Highway between the northern access to the PPC and Pine Valley Road and off-road cycle lanes are proposed along Pine Valley Road between Dairy Flat Highway and Argent Lane. These cycle provisions will tie into existing cycle paths on Argent Lane and also connect to the comprehensive cycle network which currently exist within the Milldale Precinct. Furthermore, the new Highgate Over-bridge, extending from the eastern end of John Fair Drive, and connecting to Highgate Parkway across SH1, will include off-road cycle paths. This over-bridge which is due for completion in 2024 will connect Milldale with the areas to the east of the motorway (such as Highgate and Millwater).

Within the PPC area itself, all roads will be designed with cycle routes throughout the central public open space areas.

As such, the cycle and micro-mobility connectivity will be progressively enhanced within the Silverdale/Silverdale west area as it is urbanised.

2.5 Walking Network

Classifications for the surrounding routes as defined within AT Future Connect for the current Walking Network are shown in **Figure 10** below.

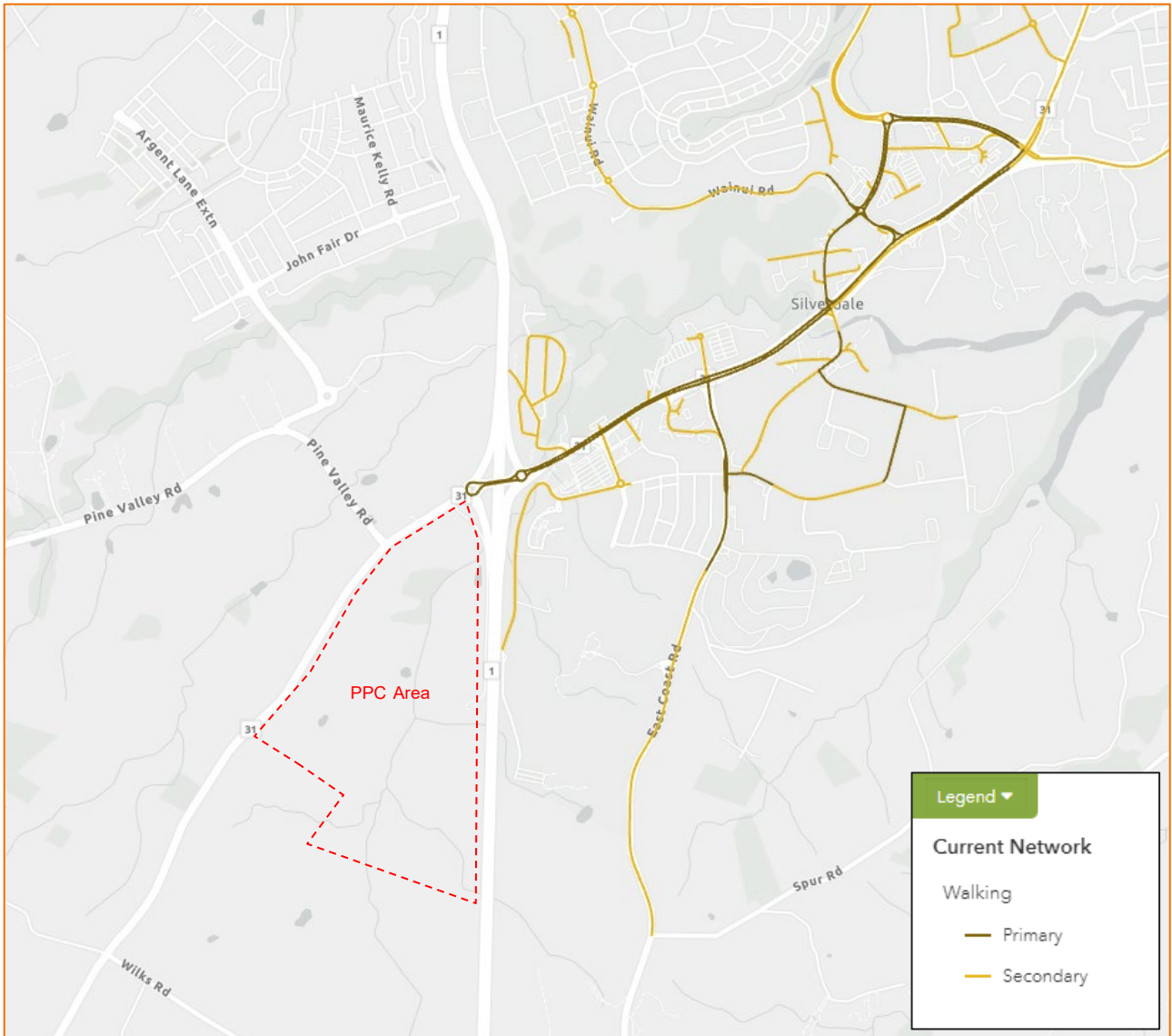


Figure 10: Future Connect– Walking Network (Current)

The “Primary” classification is given to parts of Hibiscus Coast Highway and East Coast Road in the vicinity of Silverdale and the Silverdale Interchange. West of SH1.

Figure 11 which follows, illustrates the deficiencies and opportunities identified by Future Connect which exist within the current Walking Network.

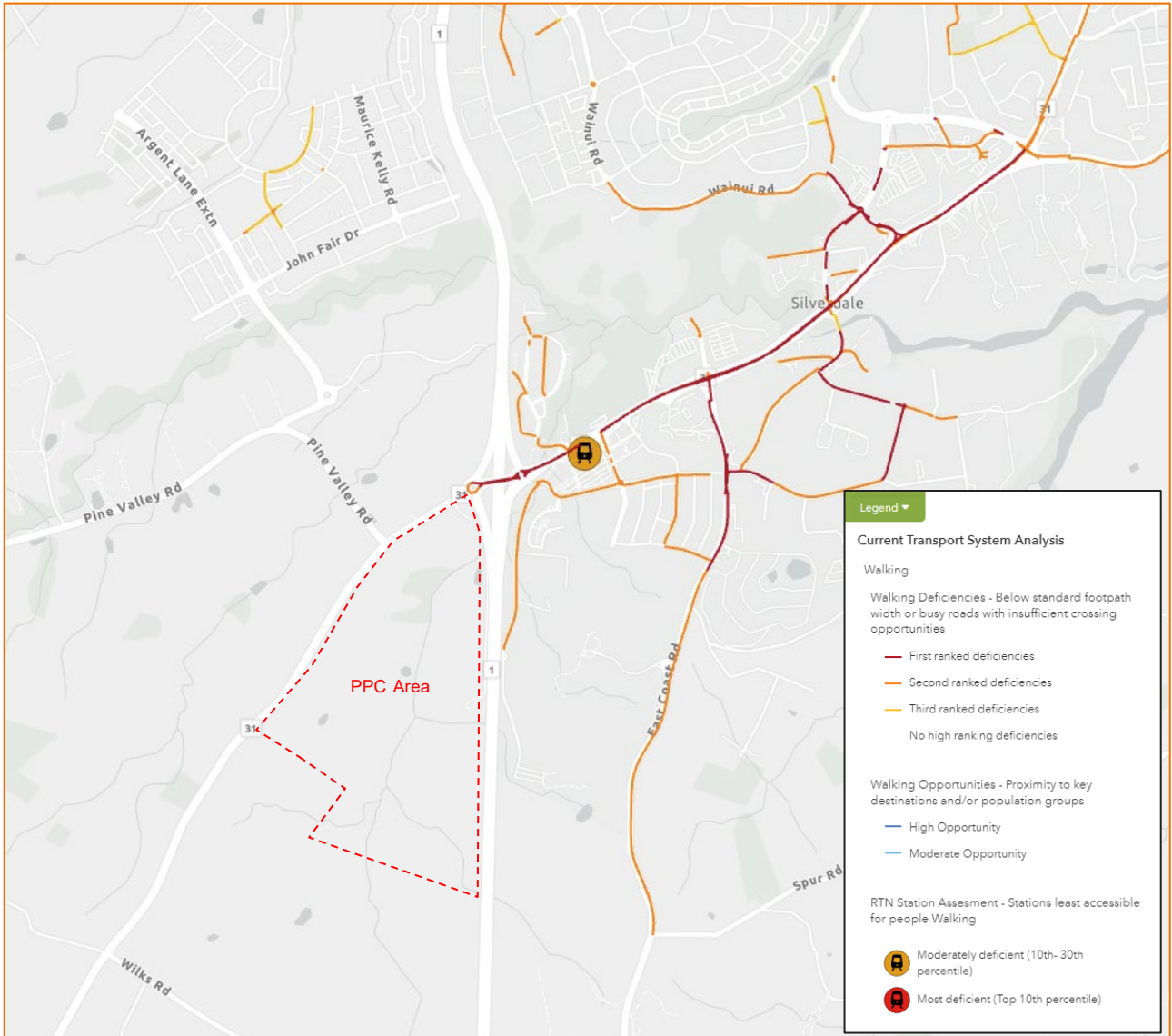


Figure 11: Future Connect– Walking Network (Deficiencies and Opportunities)

First-ranked deficiencies have been identified by Future Connect along Hibiscus Coast Highway and East Coast Road, and second-ranked deficiencies identified on the secondary network. It is noted that there are no deficiencies noted on the western side of the Silverdale interchange. However, as part of this Plan Change proposal, additional pedestrian and cycle infrastructure is proposed on Pine Valley Road which links the PPC area to the residential catchments to the north.

In the vicinity of the PPC land, the existing pedestrian infrastructure is limited. There are no footpaths provided along any of the adjacent roads including Dairy Flat Highway, Wilks Road, Postman Road, or Pine Valley Road. Similarly, there are no provisions for walking along the SH1 portion of the network, or across it. Notably, there are no provisions for pedestrians to navigate to or through the Silverdale Interchange.

However, considering the wider area, footpaths are provided along parts of Hibiscus Coast Highway (east of the Silverdale Interchange), as well as through parts of the Milldale and Millwater residential subdivisions. The Highgate overbridge will have footpaths on both sides providing additional permeability within the transportation network for walking. In addition, construction of the signals at the Pine Valley Road / Dairy Flat Highway intersection is due to begin soon and this intersection will include signalised pedestrian crossings.

Within the PPC area itself, all roads will be designed with footpaths. The PPC allows for a high degree of walking within the site, and these will tie in with other improvements which are planned and expected to be delivered within the surrounding and adjoining Silverdale West/Milldale area as they develop and become increasingly urbanised over coming years.

2.6 Existing Traffic Volumes

The average daily traffic (“ADT”) volumes carried by the roads in the vicinity of the PPC site as sourced from the AT Traffic Count Database and the Waka Kotahi State Highway Traffic Monitoring Service are shown in **Table 1**.

Road	Location	5-day-AADT (vpd)	7-day-AADT (vpd)	Source	Survey Date
SH1 NBD Off-ramp	Site: 01N40398	17,000	16,100	Waka Kotahi	2022
SH1 NBD Silverdale Interchange	Site: 01N20398	15,790	15,250	Waka Kotahi	2022
SH1 SBD Silverdale Interchange	Site: 01N10398	16,310	15,980	Waka Kotahi	2022
SH1 SBD On-ramp	Site: 01N30398	16,880	15,860	Waka Kotahi	2022
Dairy Flat Highway	Between Urban/Rural boundary and Kahikatea Flat Road	9,550	8,720	AT	25/08/2022
Dairy Flat Highway	SH1 on-ramp/off-ramp roundabout and Pine Valley Road	16,400	15,440	AT	16/08/2022
Wilks Rd (East)	Between Alpur Bridge and East Coast Road	2,960	2,530	AT	03/05/2021
Pine Valley Road	Between Pine Valley Road and Young Access Road	6,200	5,980	AT	25/08/2022
Postman Road	Between Dairy Stream Road and Wilks Road	1,500	1,400	AT	16/08/2022
Hibiscus Coast Highway	Between Whangaparaoa Road and Wainui Road	46,520	43,950	AT	06/11/2019

Table 1: Existing Traffic Volumes

As can be seen, and as expected for a road of national significance, SH1 and the ramps connecting to the Silverdale Interchange carry the highest volumes on the road network in the vicinity of the site. This is followed by the Hibiscus Coast Highway which forms the gateway for access to the wider Silverdale/Orewa area east of SH1 and the Whangaparaoa Peninsula.

Dairy Flat Highway, west of SH1 carries a moderate amount of traffic volume (some 9,000 to 16,000 vehicles per day (“vpd”)), with Pine Valley Road contributing to notable percentage of vehicle demand as Dairy Flat Highway intersects with the Silverdale Interchange. These volumes are similar to other primary arterial roads around Auckland, and as can be seen, the volumes to the south of Pine Valley Road are about half of those observed at its northern portion reflecting the dominance of the travel route between Silverdale Interchange and Pine Valley Road.

The supporting routes, Wilks Road and Postman Road, carry relatively low traffic volumes in the vicinity of 3,000 vpd or less.

Overall, the current traffic volumes on the roads in the vicinity of the PPC site are considered typical of the general nature and function of these roads within the road network from a transportation perspective.

2.7 Road Safety

A search was made of the Waka Kotahi Crash Analysis System (“CAS”) for all reported crashes in the vicinity of the subject site for the full five-year period from 2018 to 2022 including all available results from the 2023 partial reporting period.

The geographic extent of the CAS search area and a summary of crashes are shown in **Figure 12** below.

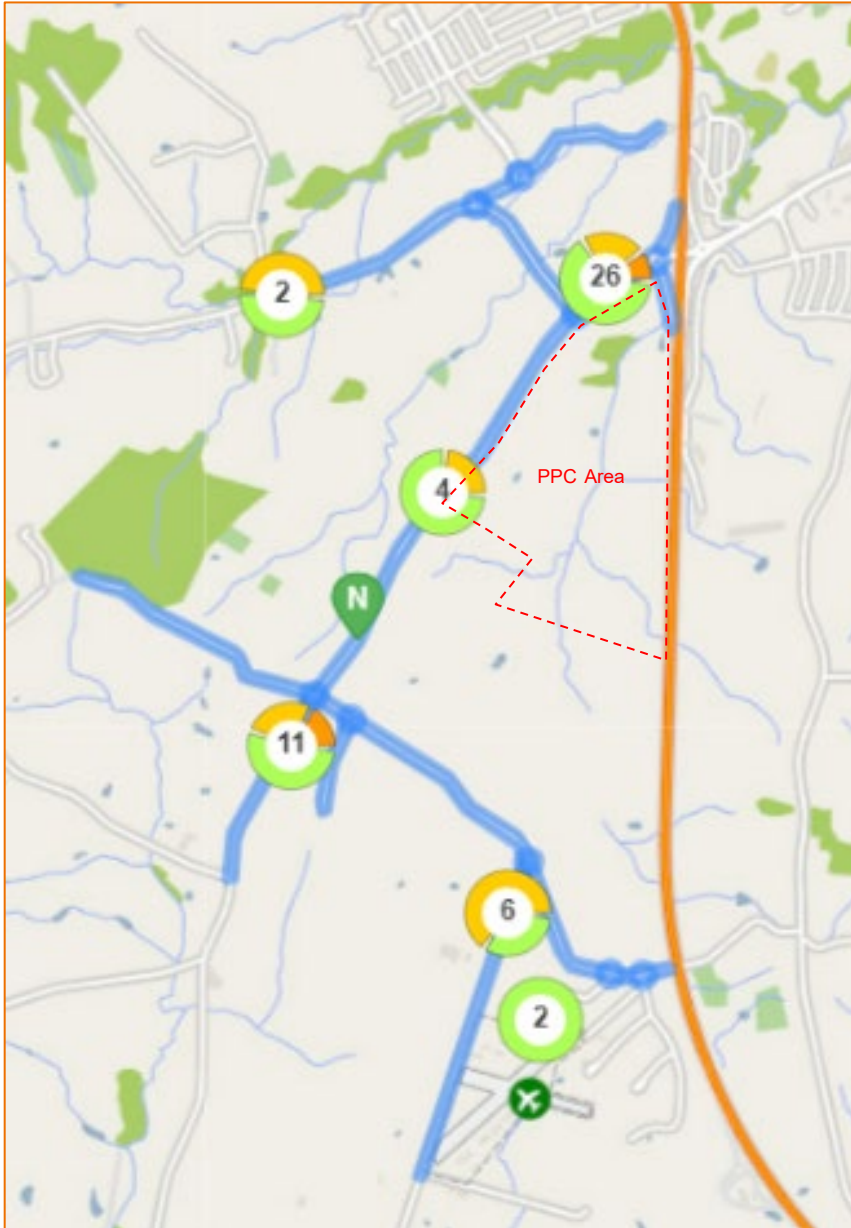


Figure 12: CAS Search Extent and Crash Summary

The search area comprised:

- Dairy Flat Highway between Kahikatea Flat Road and SH1;
- The western roundabout and motorway on/off ramps of the Silverdale Interchange;
- Pine Valley Road between Young Access and Dairy Flat Highway;
- Wilks Road between Dairy Flat Highway and SH1;
- Postman Road between Wilks Road and North Shore Airport; and
- The full lengths of Lascelles Drive, Wilks Road West and Old Pine Valley Road;

A 50m radius was applied around all intersections along the sections of road listed above. The search found that a total of 52 crashes have been reported within the defined study period and area, of which five resulted in serious injuries, 15 resulted in minor injuries and the remaining 32 involved property damage only. The crash locations and types are summarised in the following **Table 2**.



Location	Crash Type				Total
	F	S	M	N	
Dairy Flat Highway	0	2	5	20	27
Kahikatea Flat Road	0	0	0	1	1
Old Pine Valley Road	0	1	0	0	1
Pine Valley Rd	0	1	3	1	5
Postman Road	0	0	2	2	4
Silverdale Off/On-ramp	0	0	2	5	7
Wilks Road	0	1	3	3	7
Total	0	5	15	32	52

Table 2: Crash History Summary

The total number of crashes over the past five years is considered low to moderate given the large geographic extent of the crash search area. It is, however, generally reflective of the fringe urban and developing urbanisation nature of the area.

The most frequent crash type recorded over the search period was turning crashes (15) which includes crashes for vehicles turning into and out of driveways and intersections. Of these 15 crashes, eight occurred at the Wilks Road / Dairy Flat Highway intersection while the remaining occurred at private driveway locations and various other intersections in the search area.

There were also:

- nine crashes involving loss of control,
- seven rear-end type crashes,
- eight crashes where the driver struck a stationary object and
- seven relating to merging and overtaking type crashes.

Of the total recorded crashes:

- 21 (40%) occurred involving a failure to give way or not noticing the surrounding traffic environment before undertaking a manoeuvre;
- 9 (17%) occurred due to the driver losing control of the vehicle, and
- the remaining crashes can be attributed to a variety of other factors including following too closely (4), vehicle specific issues (4), road rage/mentally unstable/fatigued drivers (5), distracted drivers (7), speed (1) and other/miscellaneous (2).

Failure to give-way or not noticing surrounding environment crashes were most common at priority-controlled intersections and driveways, while loss of control type crashes was more common in the rural road environments. These crash types are typical for these respective locations.

Of the 27 crashes which occurred on Dairy Flat Highway, 13 occurred in the northern section adjacent the Silverdale on/off-ramp or while navigating the roundabout. The most common crash in these instances were merging and turning type crashes, which are typical for heavily trafficked roundabouts with multiple circulating lanes and approach lanes.

Across the search area, the nature of the crashes and their quantum are broadly typical of similar roads and environments around Auckland. It is also noted that the Dairy Flat Highway safety improvements (which came into effect in February 2019) included the reduction of posted speeds along Dairy Flat Highway from 100km/h to 80km/h, as well as upgrades at the Wilks Road and Pine Valley Road intersections. These safety improvements have contributed to a significant improvement in the number of crashes within the search area.

The number and severity of crashes recorded by year for the past five-years is shown below in **Figure 13**. The diagram shows the severity³ of reported crashes over the search period and indicates a significant reduction in total crashes, and severity of crashes recorded from 2019, when the speed limit changes were enacted (noting that at the time of this assessment no crashes were recorded for the partial 2023 record).

³ F=fatal, S=serious, M=minor, N=non-injury



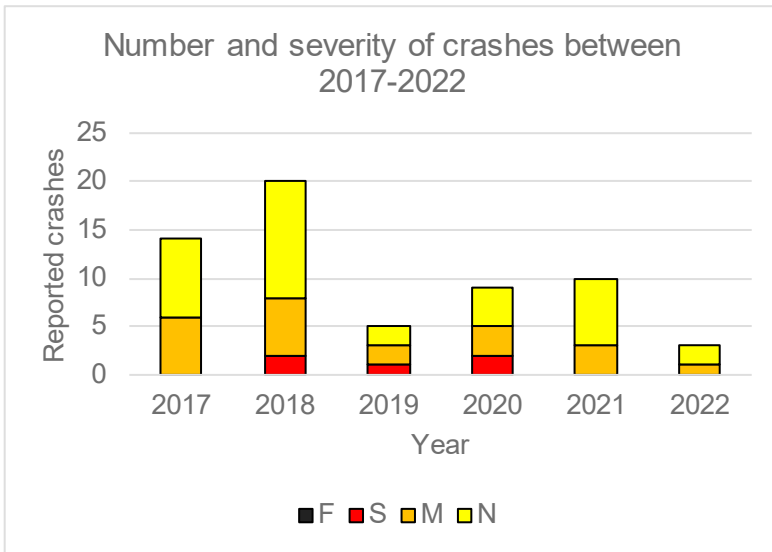


Figure 13: Crash Frequency Over the Past Five Years

The crash history over this period does not suggest any inherent or repeated road safety issues associated with the road network in the vicinity of the PPC site. The local safety and speed limit improvements undertaken in recent years have further improved the safety record of the surrounding network. On the basis of this crash history, it is considered that there are no repeated or significant issues that would be affected or affect the PPC.

3 Proposed Plan Change

3.1 Development Activity

The masterplan for the PPC area in Figure 3 provides an overview of the anticipated development pattern that could occur within the zoning sought through the PPC, the internal road network (including pedestrian and cycle provisions), and the proposed connections to the existing external transportation network.

The gross area of the PPC site is approximately 107 ha. CIVIX Ltd has undertaken a detailed assessment of the Land Available for Development (“LAD”) within the PPC area and has calculated this to be around 57% of the gross area which equates to around 61 ha. The anticipated estimate of Gross Floor Area (“GFA”) of the light industrial activities within the site is estimated to be around 40% of the LAD, or approximately 24 ha of light industrial GFA.

This GFA estimate has been used to inform the transportation modelling for the PPC.

3.2 Development Transport Elements

3.2.1 Site Access (Private Vehicles)

The principal vehicle connection points to the surrounding road network will comprise two signalised intersections with Dairy Flat Highway.

3.2.2 Site Access (Walking and Cycling)

Dedicated footpaths are proposed alongside all of the roads within the PPC area. Additionally, separate walking and cycling paths are proposed along the green corridor through the central spine of the PPC area. These paths connect to the Dairy Flat / Pine Valley Road signalised intersection to the north of the PPC area. The Dairy Flat / Pine Valley Road intersection has been designed to include pedestrian crossings and advance cycle boxes.

Beyond the PPC site itself, the Pine Valley Road corridor will be upgraded as part of the first stage of development of the Silverdale West PPC area to include cycle lanes and footpaths. An interim two-way cycle path is also proposed for the southern edge of Dairy Flat Highway between Pine Valley Road and the northern access for Silverdale West which will connect to the infrastructure on Pine Valley Road. These improvements will provide linkage between the Silverdale West PPC area and the cycle / walking network along Argent Lane, John Fair Drive and the soon-to-be-constructed Highgate Bridge.

Future provisions for Dairy Flat Highway also include separate cycle paths and footpaths which will tie in with the provisions at the Dairy Flat / Pine Valley Road intersection.

3.2.3 Site Access (Public Transport)

All collector roads within the PPC will be able to cater for buses. These roads will provide connectivity to Dairy Flat Highway which already serves buses in the Silverdale West area.

3.2.4 Indicative Road Typologies

An internal network of roads has been proposed within the PPC area with an indicative internal road hierarchy as shown previously in Figure 3.

The indicative masterplan indicates two north-south collector routes and two collector cross connections to Dairy Flat Highway. A network of local roads provide access to the individual industrial lots throughout the site. Indicative road typologies and cross-sections for the internal road and long-term provisions for Dairy Flat Highway along the frontage of the PPC area have also been developed by CIVIX Ltd and these are shown in **Figure 14** to **Figure 18**.

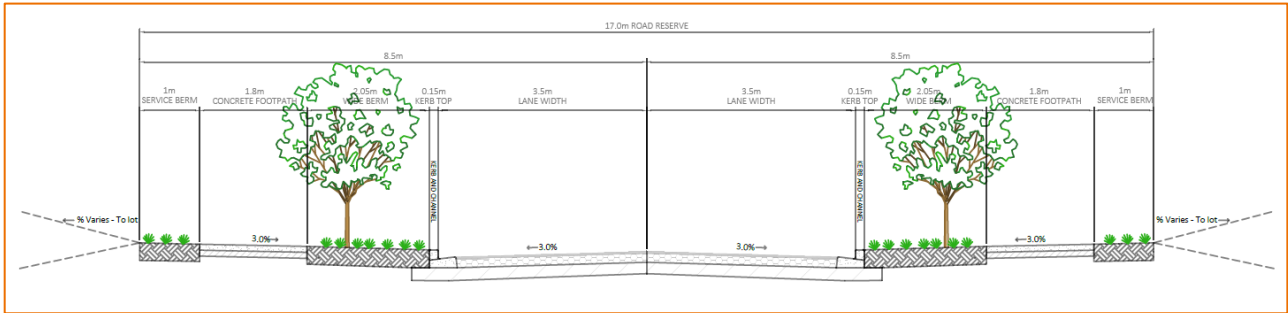


Figure 14: Indicative Cross Section – Local Road

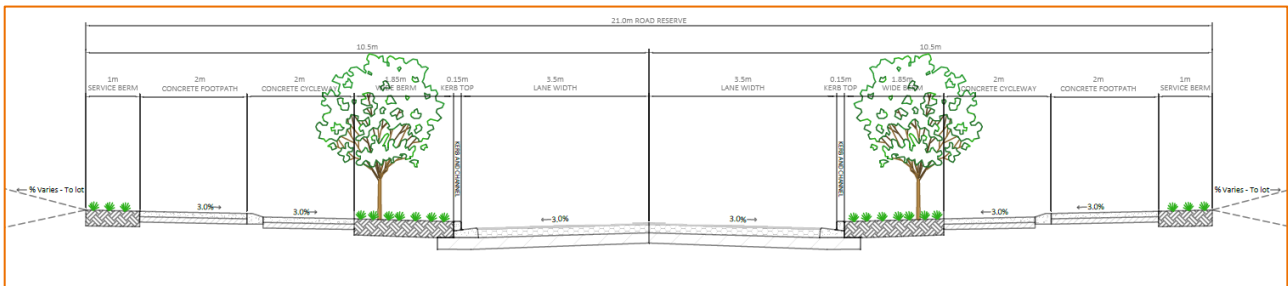


Figure 15: Indicative Cross Section – Collector Road

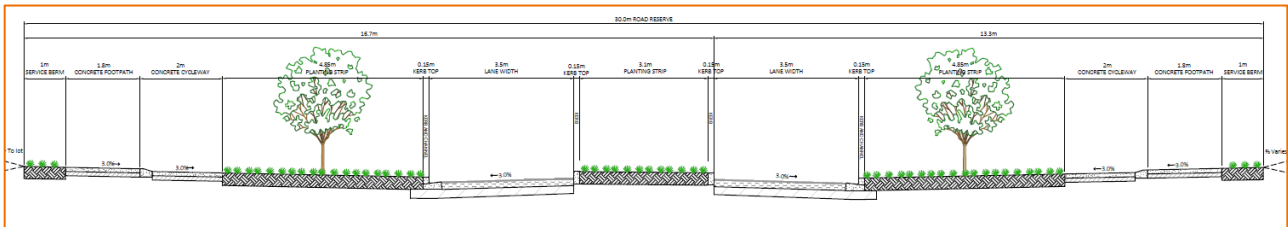


Figure 16: Indicative Cross Section – Two-lane Arterial

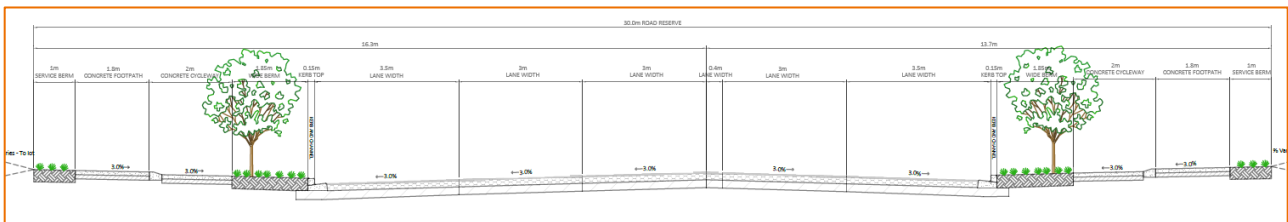


Figure 17: Indicative Cross Section – Four-lane Arterial with Right Turn Bay

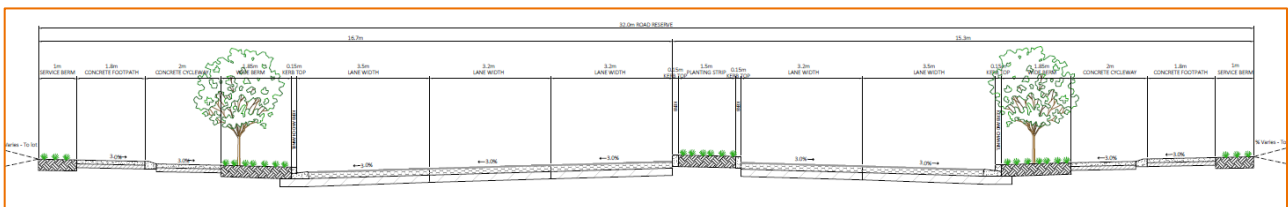


Figure 18: Indicative Cross Section – Four-lane Arterial with Right Turn Bay

Local roads are proposed to have a typical road reserve width of around 17m. This width is comprised of front and back berms, footpaths and 3.5m wide traffic lanes.

Collector roads within the PPC area are proposed to have an overall road reserve width of typically around 21m. This width accommodates berms, footpaths, segregated cycle lanes on both sides and 3.5m wide traffic lanes to cater for the larger vehicles accessing the light industrial area within the PPC.

The future road reserve width for Dairy Flat Highway is proposed to be protected as part of PPC up to a total of 30m for most of the frontage of the PPC area. This will allow for up to four traffic general traffic lanes plus a median separator or right turn bays and separated cycle lanes and footpaths/berms on both sides of the road. Additional localised widening within that corridor width will be required in the vicinity of the Dairy Flat Highway / Pine Valley Road intersection to cater for the left turn slip lane into Pine Valley Road. The 30m road reserve will provide future-proofing for the corridor to the south of the northernmost PPC access if four-laning is required in the future.

Internal intersection designs will be further developed at a later stage, however all cross-road intersections are likely to be roundabouts and as noted earlier, both of the connections to Dairy Flat Highway are proposed to be signalised.

All of the internal cross-sections within the PPC area have been reviewed and are considered appropriate as regards their intended function, form and the nature of the proposed development environment within the PPC area.

4 Transport Modelling Assessment

4.1 Background

A range of extensive transport modelling has been carried out to assess the effects of the PPC on the surrounding transport network. Traversal demands matrices (input traffic demands) were extracted by the Auckland Forecasting Centre (“AFC”) from the SGA’s region-wide, macro-scale Northern Region EMME transport model, to feed into the more local-scale and detailed AIMSUN⁴ operational micro-simulation traffic model.

The model used for the assessment is an extension of the model which was used to assess the Milldale development to the north of the site. The original model was separately reviewed and approved by representatives of AT and Waka Kotahi as part of the process for delivering the ITA for the Milldale development. The modelling assumes the full buildout (4,500 occupied dwellings plus 40,000sqm GFA of commercial/retail activities within the local centre) of the Milldale development by 2028.

The extent of the model includes the following:

- the section of SH1 from a point some 4.5km south of the Silverdale interchange to a point around 1.9km north of the Grand Drive interchange, inclusive of the Silverdale, Millwater, and Grand Drive interchange ramps;
- Hibiscus Coast Highway, between the Silverdale interchange and the Hibiscus Coast Highway / Whangaparaoa Road intersection;
- Wainui Road, between Silverdale Street and Cemetery Road;
- Dairy Flat Highway, between the Silverdale interchange a point around 500m south of the Kahikatea Flat Road intersection with Dairy Flat Highway;
- Wilks Road, and its intersections with Dairy Flat Highway and East Coast Road;
- Millwater-Parkway, between the Millwater interchange and Whangaparaoa Road;
- East Coast Road, between Hibiscus Coast Highway and a point around 650m south of Wilks Road;
- Milldale precinct and internal roads; and
- The proposed internal roading network for the Silverdale West Plan Change area.

The full model extent, with the PPC area outlined with a red border, is illustrated in **Figure 19**.

⁴ AIMSUN – Advanced Interactive Microscopic Simulator for Urban and Non-Urban Networks – Yunex Traffic Group. It is a traffic modelling software package which is in common usage by transportation engineers throughout New Zealand and globally.

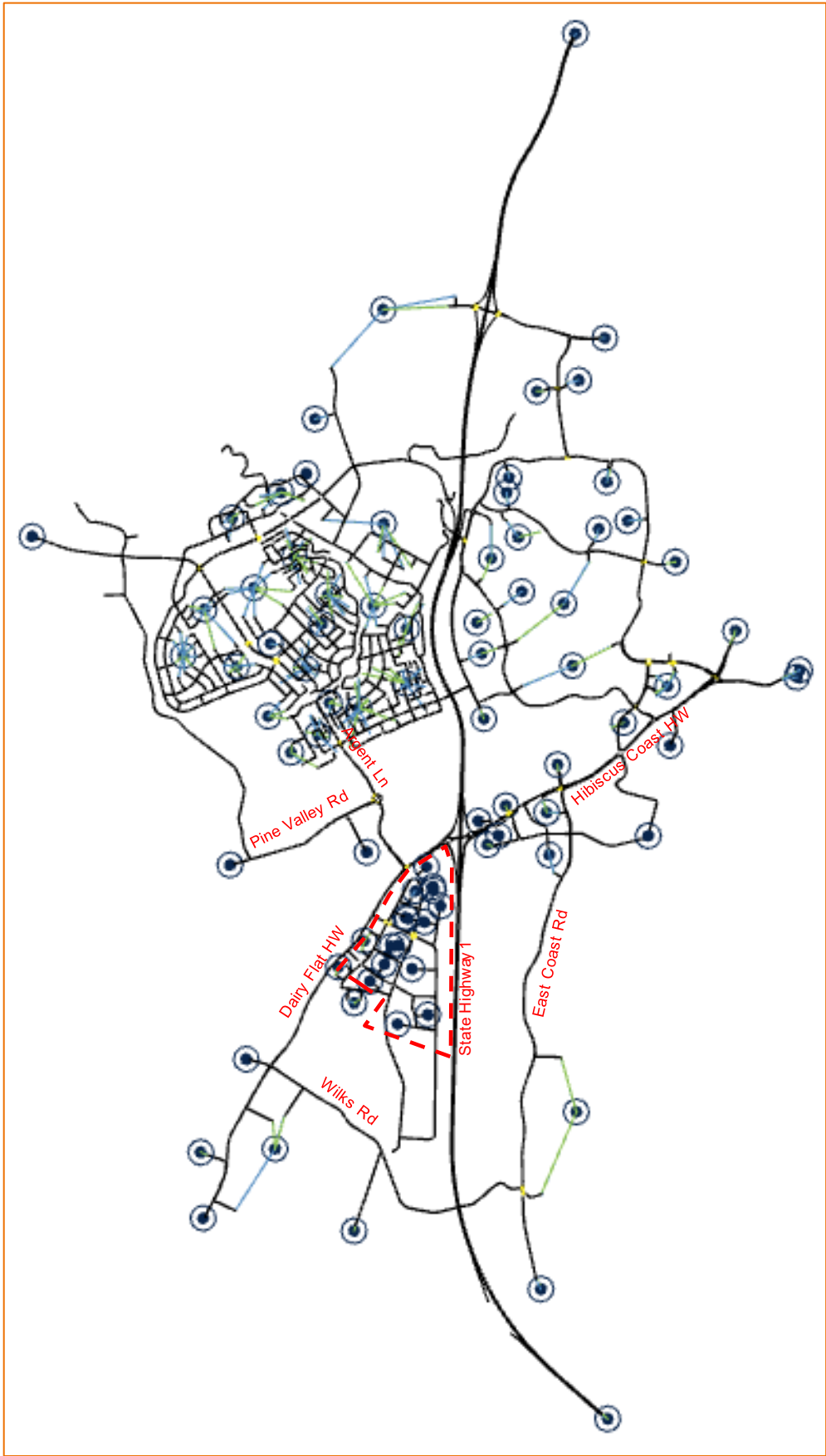


Figure 19: Model Extent



4.2 Future Land Use Forecast and Network Improvements

Modelling for Silverdale West is based upon the SGA Northern Regional Model, which includes forecast models for each decade from 2018 (i.e. 2028, 2038, 2048, and so on). Two future years were adopted from the SGA's Northern model for the Silverdale West PPC assessment, being 2028 and 2038. The future land use assumptions which informed the SGA's model are those detailed in the Scenario i11.6 land use (for 2028) and the Scenario i11.5 land use (for 2038)⁵.

For the purposes of this assessment and given the limitations of the 10-year gaps in the regional model, a 2034 forecast year was interpolated from the SGA's 2028 and 2038 forecast models and has been used as an approximate future year for when the Plan Change area within Silverdale is anticipated to be fully developed for light industry activities.

Other notable land uses in the area included within the model were:

- Highgate Business Park;
- Milldale Precinct (anticipated to be fully complete by 2028);
- Jack Hawken Lane development;
- Orewa 2 Precinct; and
- Ara Hills Development.

Some of these land uses have not been fully completed at this point in time.

Relevant wider road network improvements that have been assumed to be complete by 2028 include:

- An overbridge connecting John Fair Drive with Highgate-Parkway (Highgate Bridge, proposed as part of the Milldale development and to be built by Fulton Hogan Land Development Ltd ("**FHLDL**");
- Completion of the Argent Lane arterial route between Dairy Flat Highway and Wainui Road (to be built by FHLDL);
- Pine Valley Road upgrade from Argent Lane to Dairy Flat Highway (to be built by FHLDL);
- A roundabout at the Argent Lane / Wainui Road intersection;
- SH1 widening (SH18 to Oteha Valley Road) (now complete);
- Bus shoulder lanes on SH1 between Silverdale and Oteha Valley Road;
- O Mahurangi – Penlink project (including a new motorway interchange at Redvale); and
- The Puhoi to Warkworth improvements.

As advised by AFC, by 2038, SH1 is anticipated to be widened in the northbound direction between Oteha Valley Road and Redvale.

4.3 Future Site Demands and Generation

As set out above, the potential total developable area within the PPC area would be around 61 ha and the anticipated total Gross Floor Area ("**GFA**") of the resulting built development would be in the order of 24 ha (or 243,000sqm).

The Institute of Transportation Engineers ("**ITE**") Trip Generation Guideline provides the following peak hour trip rates (for the adjacent road network) for light industrial activities:

- General Light Industrial – 0.75 trips per 100sqm GFA (AM peak), 0.68 trips per 100sqm GFA (PM peak);
- Industrial park (defined as multiple industrial uses in a single area) – 0.43 trips per 100sqm GFA (AM peak), 0.43 trips per 100sqm GFA (PM peak);
- Manufacturing – 0.67 trips per 100sqm GFA (AM peak), 0.72 trips per 100sqm GFA (PM peak);
- Warehousing – 0.18 trips per 100sqm GFA (AM peak), 0.20 trips per 100sqm GFA (PM peak)

Property and Retail Economics Ltd ("**PE**") have advised that the bulk of the activity within the PPC area would be associated with warehousing / distribution / logistics given the proximity of the area to the motorway and less expensive land prices. In terms of the developable land, PE has assessed the following breakdown:

- General industrial 20%
- Industrial park 15%
- Manufacturing 15%
- Warehousing / Distribution / Logistics 50%

⁵ The Scenario i11.5 land use was used for the 2038 future year due to an error identified in the SGA model household projections assumed within the Milldale Precinct for the 2038 i11.6 land use.

On average, this equates to around a total of approximately 990 trips for the AM and PM peak hours of the adjacent road network for the fully developed PPC area.

It is also acknowledged that FHLDL is currently preparing a Private Plan Change for areas to the north of Wainui Road and west of Argent Lane (“**Milldale North**”), anticipating around 300 dwellings in 2028 and fully built out to 2,540 dwellings in 2038 (1,620 dwellings estimated by 2034).

The modelling that has been undertaken for this assessment has assumed a generally uniform buildout within the Silverdale West PPC and Milldale North development areas between 2028 and 2034. The following **Table 3** provides the approximate buildouts within the Silverdale West PPC and Milldale North areas adopted for the purposes of modelling.

Year	Silverdale West			Milldale North (Dwellings)
	Gross Area (ha)	LAD (ha)	Approx GFA (sqm)	
2028	20	11	45,400	300
2029	35	20	79,400	520
2030	50	28	113,400	740
2031	65	37	147,400	960
2032	80	45	181,400	1,180
2033	95	54	215,500	1,400
2034	107	61	243,500	1,620

Table 3: Forecast Buildouts

Two scenarios have been undertaken for the assessment: one representing the full buildout of 107 ha (gross area) within the PPC area, and a sensitivity test scenario for an intermediary stage (halfway between 2028 and 2034) corresponding with the gross buildout at that stage anticipated to be around 65 ha, or the equivalent of 147,400sqm GFA being operational within the PPC area. Based on the trip generation rates noted above, this equates to around 600 trips per hour for both the AM and PM peak hours.

The results of the modelling are summarised in the following section of the report.

5 Traffic Effects

5.1 Development Trip Distribution

The trip distribution of the trips associated with the activities within the PPC area have been taken directly from the SGA Northern model. It should be noted that the SGA Northern model already assumes some level of development within the PPC area, but for the purposes of this assessment, the demands have been factored in accordance with the anticipated buildout of the PPC area.

5.2 Key Performance Measures

The operation of the key intersections in the area has been analysed for two future years (2031 and 2034). The overall intersection performance is summarised in this section in terms of the average delay in seconds and the Level of Service (“LOS”). **Table 4** describes traffic flow operation for each of the LOS scales, including a brief description of likely performance at a basic level.

LOS	Description of operation
A	Free flow conditions; little interaction between vehicles
B	Reasonably free flow condition; speeds similar to LOS A but some movement is restricted due to interaction between vehicles within traffic streams
C	Stable flow conditions; ability to manoeuvre within traffic streams is notably restricted but roads remain below capacity
D	Approaching unstable flow; freedom to manoeuvre is much more limited and driver comfort levels decrease. This is the common level for urban streets during peak hours of travel
E	Unstable flow; operating at capacity; drivers comfort level becoming poor. This would be a more common standard in larger urban areas where some congestion is inevitable during peak hours
F	Forced or breakdown flow; vehicle movement very constrained; traffic demand generally higher than capacity

Table 4: LOS description

A full set of the results, which includes traffic volumes and maximum 95th percentile queue outputs is attached in **Appendix A**.

5.3 Proposed Mitigation

The proposed mitigation for the PPC includes the pedestrian/cycle linkages identified earlier in Section 3.2.2 of this report, specifically cycle lanes and footpaths along Pine Valley Road between Dairy Flat Highway and Argent Lane and an interim bi-directional cycle path and footpath along the southern edge of Dairy Flat Highway between Pine Valley Road and the northern access to the Silverdale West PPC area. These will be implemented and in place at the time of occupation of the activities within the PPC area.

The proposed active mode linkages are illustrated in **Figure 20**.

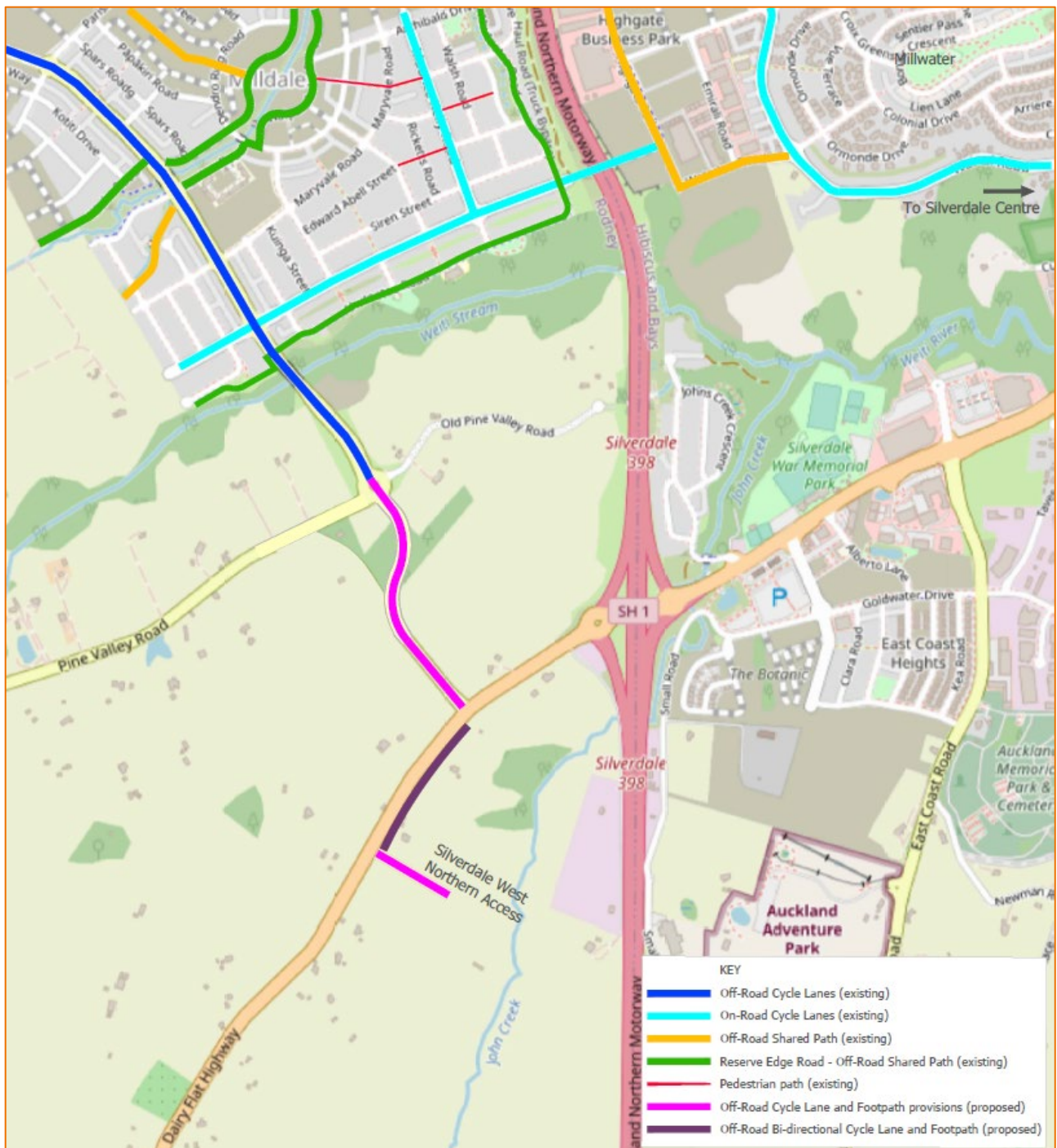


Figure 20: Proposed Active Mode Linkages

As indicated, the proposed infrastructure will effectively connect the Silverdale West PPC area with existing active mode infrastructure within Milldale and Millwater.

In addition, the modelling indicates that various other transport network mitigation upgrades are needed to support the full buildout of the Silverdale West PPC area. These upgrades are set out below:

1. One signalised intersection connecting the Silverdale West PPC area to the external road network via Dairy Flat Highway. This is required to connect the PPC area to the surrounding transport network.
2. Upgrade of the Pine Valley Road / Dairy Flat Highway intersection to include a second right turn short bay from the east (turning into Pine Valley Road) (approximately 135m). This upgrade is necessary to improve the performance of the intersection and mitigate the potential for queuing back to the Silverdale interchange.
3. Signalisation of the Wilks Road / Dairy Flat Highway intersection. The modelling indicates that this priority intersection comes under pressure as traffic volumes on Dairy Flat Highway increase as a consequence of traffic associated with the Silverdale West PPC, the Milldale North PPC and general background traffic growth, which then affects traffic turning right out of Wilks Road. Signalisation is necessary to manage queues, delays and improve safety.
4. Signalisation of the Wilks Road / East Coast Road intersection. The modelling indicates that this priority intersection comes under pressure as traffic volumes on East Coast Road increase as a consequence of traffic associated with the Silverdale West PPC, the Milldale North PPC and general background traffic growth, which then affects traffic turning right out of Wilks Road onto East Coast Road. Signalisation is necessary to manage queues, delays and improve safety at the intersection.
5. Provision of a slip lane on the western approach to the Silverdale interchange which connects to the northbound on-ramp. This upgrade is required to control queuing on the western approach to the interchange through providing a separate lane for northbound vehicles and removing the necessity for these vehicles to travel through the western roundabout at the interchange.
6. Extending the length of the left turn slip lane on the southbound off-ramp at the Silverdale interchange to around 150m and introducing a ramp meter for the AM peak. During the AM peak there are notable volumes exiting the motorway from the north in order to access the Hibiscus Coast Park and Ride Station and other parts of the wider Silverdale area. The proposed upgrade provides extra capacity for this southbound off-ramp and also helps to prevent queues extending to the motorway mainline.
7. Provision of a second signalised intersection off Dairy Flat Highway to service the Silverdale West PPC area. A second access to the PPC area is required to help spread the traffic load as development intensifies within Silverdale West.
8. Upgrading the Argent Lane / Pine Valley Road roundabout to a roundabout with two circulating lanes. This upgrade is required as the interaction increases between the residential areas of the north and the employment opportunities within the Silverdale West PPC area.

For Scenario 1 (buildout to 65 ha gross within the Silverdale West PPC area) it has been assumed that upgrades 1 through 4 (above) will be operational.

For Scenario 2 (full buildout to 107 ha gross within the Silverdale West PPC area), upgrades 5 through 8 (above) have been assumed to be operational.

Indicative layouts for the improvements listed above are illustrated in **Appendix B**. These improvements are included in the analyses for the two future years in the following section.

In addition, specific thresholds for the upgrades have been identified and these are provided in **Appendix C**.



5.4 Traffic Effects Summary

5.4.1 AM Peak Hour

The performance of the key intersections for the AM peak hour are provided in **Table 5**. Within the table, the LOS is reported in parentheses after the average intersection delay (in seconds/vehicle).

Intersection	65ha (gross) in Silverdale West PPC	107ha (gross) in Silverdale West PPC
Hibiscus Coast Highway / Whangaparaoa Road	25 (C)	25 (C)
Hibiscus Coast Highway / East Coast Road	22 (C)	21 (C)
Hibiscus Coast Highway / Painton Road	19 (B)	23 (C)
Silverdale Interchange (Eastern roundabout)	15 (B)	18 (B)
Silverdale Interchange (Western roundabout)	9 (A)	13 (B)
Dairy Flat Highway / Pine Valley Road	19 (B)	32 (C)
Dairy Flat Highway / Silverdale West (Northern access)	28 (C)	34 (C)
Dairy Flat Highway / Silverdale West (Central access)	NA	17 (B)
Argent Lane / Pine Valley Road	17 (B)	6 (A)
Argent Lane / John Fair Drive	12 (B)	16 (B)
Argent Lane / Maryvale Road	10 (A)	12 (B)
Millwater interchange (off-ramp)	5 (A)	5 (A)
Wainui Road / Sidwell Road	5 (A)	6 (A)
Wainui Road / Millwater-Parkway	17 (B)	19 (B)
Millwater interchange (on-ramp)	5 (A)	5 (A)
Wilks Road / Dairy Flat Highway	26 (C)	30 (C)
Wilks Road / East Coast Road	20 (B)	28 (C)

Table 5: Intersection Performance (AM Peak Hour)

The modelling predicts that all key intersections are expected to operate at LOS C or better for the AM peak for both the interim and full-buildout scenarios, which is considered acceptable and appropriate.

5.4.2 PM Peak Hour

The performance of the key intersections for the PM peak hour are provided in **Table 6**. Within the table, the LOS is reported in parentheses after the intersection delay (in seconds/vehicle).

Intersection	65ha (gross) in Silverdale West PPC	107ha (gross) in Silverdale West PPC
Hibiscus Coast Highway / Whangaparaoa Road	33 (C)	35 (D)
Hibiscus Coast Highway / East Coast Road	29 (C)	35 (D)
Hibiscus Coast Highway / Painton Road	14 (B)	15 (B)
Silverdale Interchange (Eastern roundabout)	8 (A)	15 (B)
Silverdale Interchange (Western roundabout)	33 (C)	19 (B)
Dairy Flat Highway / Pine Valley Road	19 (B)	24 (C)
Dairy Flat Highway / Silverdale West (Northern access)	20 (B)	29(C)
Dairy Flat Highway / Silverdale West (Central access)	NA	22 (C)
Argent Lane / Pine Valley Road	17 (B)	10 (B)
Argent Lane / John Fair Drive	9 (A)	11 (B)
Argent Lane / Maryvale Road	6 (A)	6 (A)
Millwater interchange (off-ramp)	6 (A)	6 (A)
Wainui Road / Sidwell Road	4 (A)	5 (A)
Wainui Road / Millwater-Parkway	18 (B)	19 (B)
Millwater interchange (on-ramp)	4 (A)	4 (A)
Wilks Road / Dairy Flat Highway	28 (C)	32 (C)
Wilks Road / East Coast Road	27 (C)	43 (D)

Table 6: Intersection Performance (PM Peak Hour)

The modelling predicts that all key intersections are expected to operate at LOS D or better for the PM peak for the interim and full-buildout scenarios and this is considered appropriate and acceptable.

5.5 Other Transport Modes

5.5.1 Walking and Cycling

Section 3.2.2 of this report discusses the pedestrian/cycle network that is proposed for Silverdale West, while Section 3.2.4 provides the proposed road cross-sections. As indicated, all roads will provide footpaths on both sides of the road with either berms or indented parking bays separating footpaths from the live traffic lanes.

The cycle route and pedestrian path through the 'green corridor' along the spine of the Plan Change area provides walking/cycling connectivity between the proposed development area to the Pine Valley Road / Dairy Flat Highway signalised intersection, from where connections can be made to the wider, surrounding parts of Silverdale/Milldale area.

A designation is currently in place along Pine Valley Road to include footpaths and cycle paths which connect through to John Fair Drive and to the wider Milldale area via separated cycle paths adjacent to Argent Lane. As noted earlier, the construction of these footpaths and cycle paths will be included as part of the mitigation measures proposed for the redevelopment of the Silverdale PPC area. As an interim measure, prior to the full widening of Dairy Flat Highway as the surrounding area becomes further urbanised, a two-way cycle path and footpath is proposed along the southern edge of Dairy Flat Highway between Pine Valley Road and the northern signalised access to the Silverdale West PPC area. These improvements, together with the pedestrian facilities integrated within the Pine Valley Road / Dairy Flat Highway signalised intersection, helps provide active mode connectivity (and safety) for movements between the PPC area and the existing active mode infrastructure illustrated previously in Figure 16.



The cross-section of John Fair Drive already comprises on-road cycle lanes which connect to the new Highgate over-bridge which also is designed to have footpaths and separated cycle lanes on both sides. This will provide direct connectivity between the site and Silverdale Centre and from there, frequent bus services (approximately every 15 minutes) connect the Centre with the Hibiscus Coast Bus Station.

5.5.2 Public Transport

At this stage of the PPC process, the specific planning and design for possible future public transport infrastructure through the site has not been fully detailed. However, it is anticipated that on-going discussions will continue with the AT Metro team to ensure that a good level of integration is provided. As noted earlier, all the collector roads within the PPC area will be capable of accommodating buses if required.

Notwithstanding this, there are other options which could be considered:

- As all collector roads within the PPC area are capable of accommodating buses, the main collector spine road could be integrated with the current bus service which uses Dairy Flat Highway, providing a lineal link to the Hibiscus Coast Bus Station;
- As noted earlier, a new public bus service has recently started operating between Milldale and the Hibiscus Coast Bus Station with recent patronage figures indicating a relatively good uptake of the service by Milldale residents. This route could be extended to cover the PPC area (with a dedicated station provided in the PPC area) to provide connectivity for Silverdale West with the Hibiscus Coast Bus Station; and
- A central pick-up / drop-off station could be established within the PPC area to take advantage of the good pedestrian/cycle links proposed. From there, a dedicated shuttle service could be provided which directly links the PPC area with the Hibiscus Coast Bus Station. This service would loop between Silverdale West and the Hibiscus Coast Bus Station and given the relatively short distance, could be a frequent service at peak times.

These options could provide an integrated pedestrian/cycle and public transport system for the PPC area.

5.6 Vehicle Kilometres Travelled Assessment

In terms of Vehicle Kilometres Travelled (“VKT”), this cannot be simply assessed as an absolute figure as VKT is inherently a relative measure for the pattern of activity connecting (generally) households and workplaces. If industrial land was freed up in another area, say for argument’s sake in Penrose, workers would need to travel a much longer distance to/from work if they lived in the northern areas. This can be seen from the Waka Kotahi Commuter⁶ Map for Penrose (indicated by the green shaded area) shown below in **Figure 21**.

6

<https://commuter.waka.app/> - an on-line application graphically describing travel data from the 2018 Census..



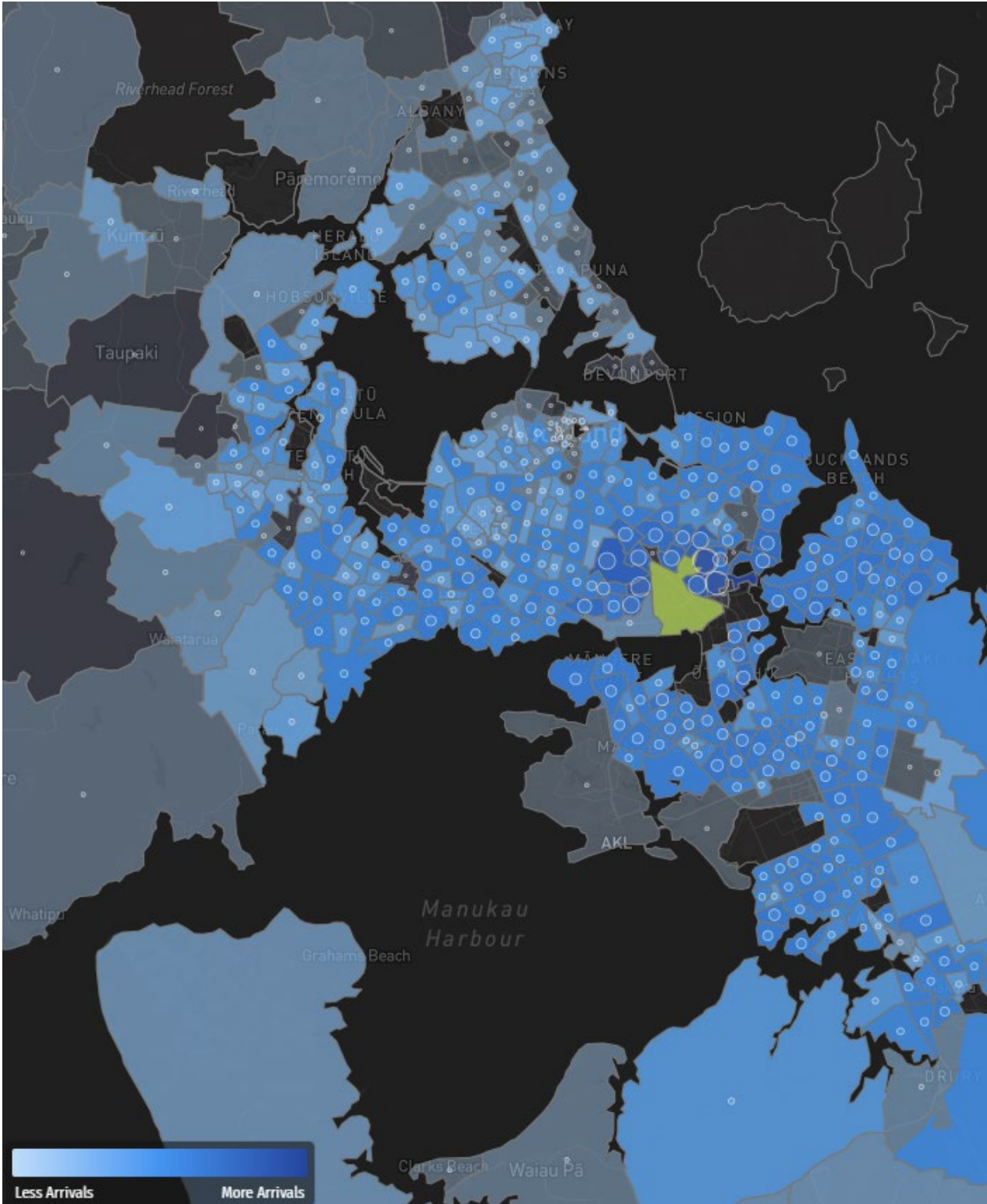


Figure 21: Commuter Patterns (Penrose)

The illustration above, where the different shades of blue represent the relative number of trips originating from respective areas, indicates that Penrose draws workers from all over the isthmus, including Hibiscus Coast.

By contrast the Commuter app pattern derived for Silverdale (indicated by the greenish yellow shaded area) is shown in **Figure 22**.

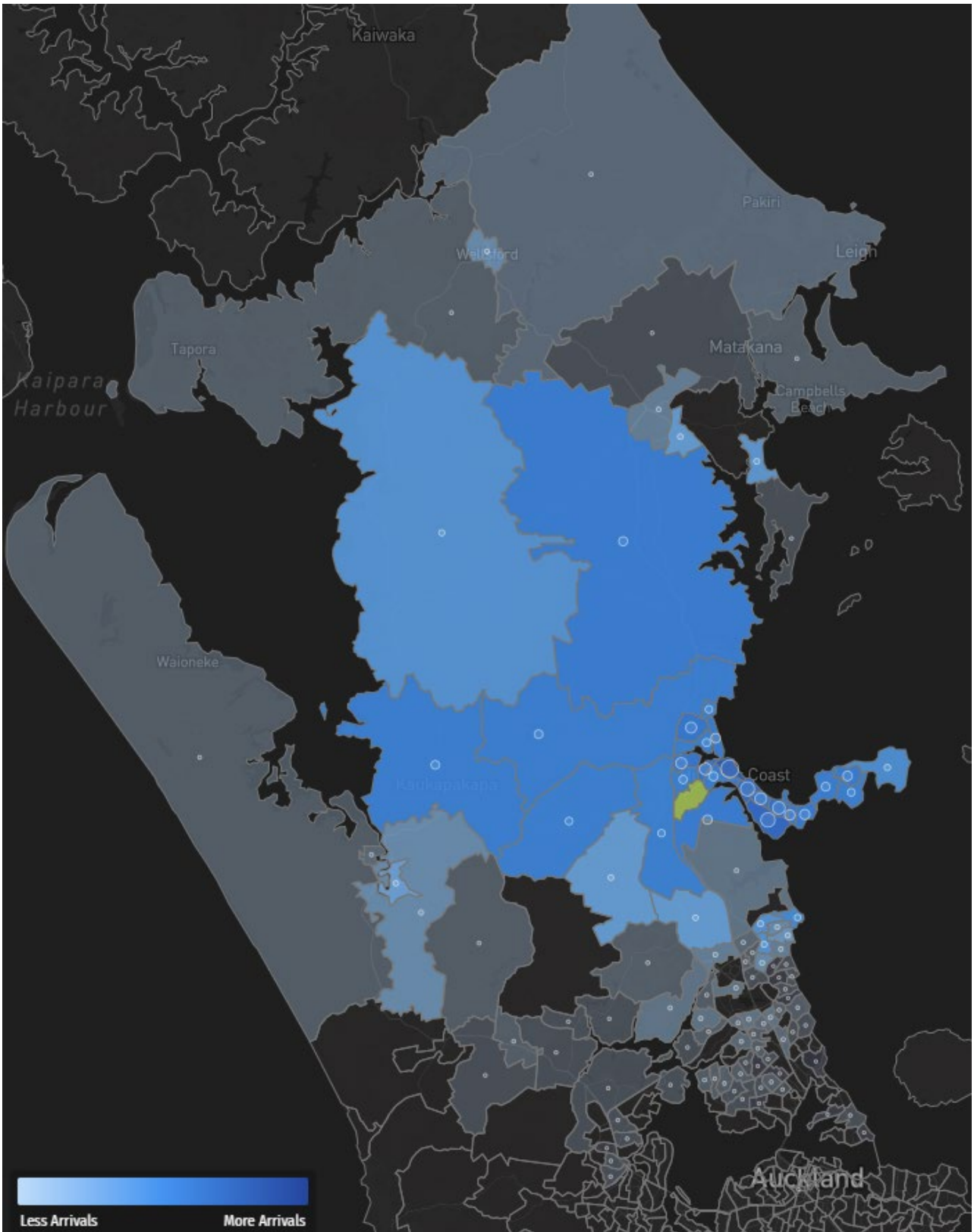


Figure 22: Commuter Patterns (Silverdale)

The vast majority of workers employed within the existing Silverdale industrial/commercial area unit have residential origins in the surrounding northern suburbs as indicated by the blue and light grey shaded statistical units of residential origin, more pertinently, north of the Harbour Bridge. The Silverdale West PPC area is effectively an extension of the Silverdale industrial area, and it is accordingly anticipated that future employees within the PPC area will also be drawn from a similar residential catchment. This will focus vehicular travel within the northern area of Auckland with an accompanying reduced reliance for travel across the Harbour Bridge.

It is highly likely that the Silverdale West PPC area and the Milldale North PPC area will effectively complement each other. This will enable on average, shorter trips between the two Plan Change areas (one as the residential origin and the other as the employment destination) and result in a lower overall VKT measure for private vehicles for both Silverdale West and Milldale North. In addition, with the areas being in close proximity to each other and developing within the same timeframe, this will promote the use of active modes of travel and, as noted previously, there are very good active mode provisions within Milldale, Milldale North and Silverdale West to benefit workers and other walkers/cyclists in the vicinity. This will also help reduce private vehicle VKT during peak times as well as off-peak times. Finally, good public transport infrastructure provision and connectivity (as provided for within and connecting to the PPC area) is another catalyst for lowering VKT in this area.

Overall, it is considered that the Silverdale West PPC area is well-placed geographically to minimise VKT in the northern region.



6 Infrastructure Proposals in the Region

6.1 O Mahurangi – Penlink

Penlink is a proposed transportation link between the Whangaparaoa Peninsula and the wider Auckland area. The project features a 7km transport corridor between the Whangaparaoa Peninsula and SH1 with a new interchange at the SH1 end and local road connectivity to East Coast Road, Stillwater, and Whangaparaoa Road. The project also seeks to establish a separated shared path for pedestrian and cyclist connectivity along the corridor.

The link is expected to improve transport capacity and thereby reliability and journey experiences along the network for public transport and private vehicles. The provisions for active mode travel along the corridor will seek to enable mode choice and help improve climate outcomes influenced by transportation. Additionally, the link will enable the safe and efficient development of new homes and activities in the wider area, including in Silverdale-Dairy Flat, needed to support Auckland's growing population.

The expected timeframe for completion of this project is late 2026.

The southern end of the Penlink corridor will connect with SH1 and East Coast Road approximately 3km south of the PPC site. Once completed, the route is expected to carry a significant portion of trips between Whangaparaoa and Auckland, that previously would have had to navigate the Silverdale Interchange and its surroundings. This means SH1 in the vicinity of the site and the surrounding road network should experience less congestion thereby allowing the Silverdale West area to become more readily accessible via Silverdale and SH1.

Construction of this project has commenced, and it is noted that the traffic modelling for Silverdale West assumes that Penlink will be constructed and become operational.

6.2 Northern Busway Extension

The Northern Busway currently terminates at the Albany Station with buses sharing the SH1 carriageway with general traffic for the remainder of the journey between the Albany Station and the Hibiscus Coast Station. However, investigation is currently underway for the potential extension of the busway to Silverdale with funding from Waka Kotahi.

The extension of the busway to Silverdale will provide an enhanced range and more reliable travel choices for travel to and from the area from the wider Auckland region. As a result, public transport modes are expected to become a more attractive travel option to and from any development at Silverdale West. A number of supporting infrastructure upgrades would be required to supplement the busway and the PPC area is well placed to contribute to the overall delivery of the project as well as adding to the catchment areas that will be served by the busway.

6.3 Te Tupu Ngātahi – Supporting Growth Alliance

Supporting Growth Alliance (“SGA”) has also outlined a long-term strategic transport network⁷ for Silverdale, Dairy Flat, Wainui and Orewa in the North Auckland area with a number of infrastructure proposals including:

- Rapid Transit corridor extending from Albany to Milldale via the new growth area;
- Bus shoulder lanes from Albany to Silverdale (interim) and high frequency bus route connecting Orewa and Silverdale with the Rapid Transit corridor;
- Strategic walking and cycling corridors;
- Additional managed motorway capacity between Albany and Silverdale interchange;
- Upgrade Pine Valley Road, Wainui Road, Dairy Flat Highway and Bawden Road to urban standards including walking and cycling;
- Improved Silverdale interchange;
- New connection from Dairy Flat Highway to Penlink via Jackson Way;
- New full interchange at Redvale (Penlink);
- New motorway interchange at Wilks Road;
- Upgrade East Coast Road from Silverdale to Redvale interchange;
- Upgrade southern section of Dairy Flat Highway;

⁷ <https://supportinggrowth.govt.nz/growth-areas/north-auckland/>

- Safety improvements on Kahikatea Flat Road, Coatesville-Riverhead Highway, East Coast Road and Awanohi Road; and
- Penlink.

These infrastructure proposals are currently at various stages of investigation/implementation. All projects, if completed, will provide a well-connected, safer, and more efficient transport network in the region including any travel associated with the proposed PPC development area and its activities. It should be noted that the mitigation measures proposed as part of the PPC will also have a wider benefit to travelling public and would complement these SGA projects.

7 Transport Planning and Policy

The following sections provide a review of established policy and plans in relation to the development enabled by the Silverdale West PPC. The documents reviewed comprise:

- Government Policy Statement
- Auckland Plan
- Auckland Unitary Plan
- Auckland Transport Alignment Project
- Auckland Regional Land Transport Plan
- Auckland Regional Public Transport Plan
- Future Urban Land Supply Strategy and Future Development Strategy
- Supporting Growth Alliance

These documents provide the principal framework to support long term growth throughout the Auckland region.

7.1 Government Policy Statement

The Government Policy Statement on Land Transport 2021 (“GPS”) sets out the government’s desired outcomes and priorities for land transport investment over a 10-year period. The GPS also specifies how funding from the National Land Transport Fund (“NLTF”) will be spent on the various activity classes. The GPS is updated every 3 years, with the latest version being GPS 2021, issued in September 2020.

The GPS 2021 document outline four strategic priorities for land transport investment:

- Safety – developing a transport network where no-one is killed or seriously injured;
- Better Travel Options – Providing people with better transport options to access social and economic opportunities;
- Climate Change – Developing a low carbon transport system that supports emissions reductions, while improving safety and inclusive access; and
- Improving Freight Connections – Improving freight connections for economic development.

The GPS aims to prioritise land transport investment which aligns with the above strategic priorities and enables the Transport Outcome Framework to be realised. This framework includes Inclusive access, Economic Prosperity, Resilience and Security, Environmental Sustainability and Healthy and Safe People.

The internal collector roads proposed provide two access locations off Dairy Flat Highway and the collector roads are supported by an internal network of local roads which will service the future industrial activity within the PPC area.

- Safety – The design of the access locations and internal road network does not exacerbate any existing safety issues on the road network and limits the risk of road users being involved in serious injury or fatal incidents within and around the site.
- Climate Change – The internal road network for the site is designed to prevent severe congestion and enable safe and efficient connections to the adjacent road network. The reduction in congestion improves journey time reliability while reducing the impact of the transportation system on the environment.
- Improving Freight Connections – The industrial nature of the site and the design of the road network for connectivity to the adjacent road network means that the new freight connections will be created within the site and contribute to a more connected and efficient freight network and promote economic development.
- Better Travel Options – The inclusion of provisions for active mode travel and public transport in the development provides greater travel choice options for the development. Additionally, the proposed site will be a notable employment hub and provide opportunity for substantial economic development and opportunities for those in the Silverdale-Orewa area as well as the wider Auckland region.

The PPC is therefore considered to align with the overarching strategic priorities of the GPS.

7.2 Auckland Plan

The Auckland Plan 2050 is Auckland Council’s long-term strategy to ensure that growth in the region occurs in a way that considers the challenges and opportunities that the city faces. The original Auckland Plan was produced in 2012, with the Auckland Plan 2050, a revised version, being adopted in June 2018. The Auckland Plan 2050 sets the direction that will be needed to face the challenges of the city’s future.

The Auckland Plan 2050 comprises six outcomes targeting specific focus areas where strategic direction is provided. One of these outcomes; Transport and Access, focuses on creating an environment where Aucklanders will be able to get where they want to go more easily, safely, and sustainably. The Transport and Access outcome provides three directions:



1. Create an integrated transport system connecting people, places, goods and services;
2. Increase genuine travel choices for a healthy, vibrant and equitable Auckland; and
3. Maximise safety and environmental protection.

The Auckland Plan 2050 also includes seven focus areas for the transport and access outcome:

1. Make better use of existing transport networks;
2. Target new transport investment to the most significant challenges;
3. Maximise the benefits from transport technology;
4. Make walking, cycling and public transport preferred choices for many more Aucklanders;
5. Better integrate land use and transport decisions;
6. Move to a safe transport network, free from death and serious injury; and
7. Develop a sustainable and resilient transport system.

A high-quality industrial site in the Silverdale-Orewa area provides an opportunity for economic development and opportunities for those in the area. The activities will attract trips from the adjacent residential subdivisions and other catchment areas within the North Auckland area. The proximity of this site to these residential catchments and commercial activities means that travel between the trip generators and attractors will be on average, shorter and provide more accessible, economic opportunity closer to areas of population growth. Furthermore, the location adjacent SH1 and the Silverdale interchange allows for traffic related to industrial activity on the site to easily access the State Highway Network and hence the wider Auckland Region to and from key trip generators and attractors. The location and proximity to the Interchange means that the number of freight vehicles on the local road network is reduced and the number of kms travelled by these vehicles is minimized, thereby contributing to a more sustainable transport system while making use of the existing transport network and functions of the surrounding routes by considering land-use and transport together.

As discussed before the internal road network design and its connectivity to the adjacent road network minimises the likelihood of serious injury or fatal crashes. The development area is proposed to include walking and cycling infrastructure and connectivity to the existing micromobility network allowing for more sustainable transport options.

Overall, the proposed development aligns well with the strategic direction and outcomes specified in the Auckland Plan.

7.3 Auckland Unitary Plan (Operative in Part)

The Auckland Unitary Plan lists the following objectives in Chapter E27 (Transport) relating to the regions' transport infrastructure:

1. Land use and all modes of transport are integrated in a manner that enables:
 - a. the benefits of an integrated transport network to be realised; and
 - b. the adverse effects of traffic generation on the transport network to be managed.
2. An integrated transport network including public transport, walking, cycling, private vehicles and freight, is provided for. Parking and loading supports urban growth and the quality compact urban form;
3. The provision of safe and efficient parking, loading and access is commensurate with the character, scale and intensity of the zone;
4. Pedestrian safety and amenity along public footpaths is prioritized; and
5. Road/rail crossings operate safely with neighbouring land use and development.

As noted above, the location of the site relative to the SH1 and Silverdale interchange as well as complementary local activities provides a well-integrated site. While current public transport and active mode provisions are currently limited, the anticipated growth in Silverdale West and the wider Silverdale-Orewa area will create more demand and the ability to introduce more supporting infrastructure will become feasible. The development area also proposes a number of walking and cycling elements which will provide additional transport choice and connectivity with the existing infrastructure.

Overall, the proposed development is considered to align with the transport objectives of the Unitary Plan.

7.4 Auckland Transport Alignment Project

The Auckland Transport Alignment Project (“**ATAP**”) provides strategic direction for alignment of transport objectives and outcomes set out by Government and Auckland Council. ATAP 2021-2031 investment package is the most recent iteration which outlines the planned investment in Auckland over the next decade.

The direction of ATAP is based upon the latest GPS and Auckland Plan and focuses on outcomes such as mode shift, employment accessibility, congestion, and safety. ATAP identifies several key projects that align with these outcomes and have been prioritised for investment. The projects which affect this proposal include:

Rapid transit:

- Northern Busway extension from Constellation to Albany (including a new Rosedale station); and
- Initial further enhancements to Northern Busway, such as station upgrades or city centre optimisation.



Strategic and local road network:

- Penlink;
- Additional Waitemata Harbour Connections ('planning for the future');
- Ara Tūhono Puhoi-Warkworth motorway; and
- Northern Corridor Improvements.

Rapid transit infrastructure upgrades to the north shore provide opportunity for more competitive and attractive public transport connectivity between Silverdale West and Auckland. The busway has recently been extended to Albany Station and provides more reliable bus travel times and improved connectivity. The busway is proposed to be further extended to Hibiscus Coast Station in the future to accommodate growth in the area.

As discussed in Section 8.1, Penlink will have a significant impact on the Silverdale area by providing a more direct route between Whangaparaoa and SH1 thereby significantly reducing congestion at the Silverdale interchange and adjacent routes. The capacity created by this project will be able to absorb the traffic expected to be generated as part of the development of the PPC area.

ATAP 2021 allocates funding for a more detailed investigation for additional Waitematā Harbour Connections including road and rapid transit improvements. The Government's recent announcements regarding work towards route protection for additional tunnel crossings of the harbour catering for rapid transit, as well as general traffic modes emphasises the importance of this connection for the region as a whole. An additional harbour crossing(s) would provide for enhanced, resilient connections across the harbour with improved efficiency, more reliable travel times, and provisions for active modes and public transport.

The recently opened section of the Northern Motorway Puhoi-Warkworth now provides a full access-controlled, motorway standard connection north of the Silverdale West area into Northland. It enables a more efficient and safer route for travel connecting both the wider city area and the Northland region. The additional capacity enabled by the motorway will accommodate development-related traffic and allow for safer journeys and more reliable travel times.

The Northern Corridor Improvements seek to improve several connections between SH18 and SH1, completed the final link between both motorways for continuous travel between the west and north. These improvements also include a shared walking and cycling path adjacent the motorway that will be integrated with the Northern Busway – Albany extension.

The ATAP package is intended to support growth across Auckland. These projects will serve the proposed development at Silverdale West allowing for more efficient and safe travel in and around the area.

7.5 Regional Land Transport Plan

The Regional Land Transport Plan ("RLTP"), a collaborative effort by Auckland Transport, Waka Kotahi NZ Transport Agency and KiwiRail identifies several transport-projects in the region prioritised for investment over a 10-year period. The most recent version of the RLTP 2021-2031 sets out the following strategic objectives:

- Enabling and supporting Auckland's growth, focusing on intensification in brownfield areas, and with some managed expansion into emerging greenfield areas.
- Providing and accelerating better travel choices for Aucklanders
- Better connecting people, places, goods and services
- Improving the resilience and sustainability of the transport system, significantly reducing the GHG emissions the system generates
- Making Auckland's transport system safe by eliminating harm to people
- Ensuring value for money across Auckland's transport system through well-targeted investment choices.

The development in Silverdale West complements the managed greenfields growth in the wider Silverdale-Orewa area allowing for employment and commercial activities to be in proximity to residential growth. As noted previously, the location of the site relative to the SH1 and Silverdale interchange allows for a more efficient and safe transport system for goods and services. The internal road network and the connectivity to Dairy Flat Highway are designed so that the potential for harm to road users is minimised and allows for better travel choices via the proposed walking and cycling infrastructure.

The development proposed therefore supports the objectives of the RLTP.

7.6 Regional Public Transport Plan

The Regional Public Transport Plan ("RPTP") which is anticipated to be finalised in November 2023, seeks to create a safer, more accessible and reliable public transport system in Auckland. The plan sets out the overarching vision and what actions can enable that vision to be realised.

The vision of the RPTP for Auckland's public transport is "a system with seamless end-to-end customer journeys that are safe, accessible and reliable".



To achieve this vision, the public transport system will need to deliver:

- A continuously improving customer experience;
- Services that integrate with surrounding, and planned, land uses and contribute to placemaking;
- Affordable and equitable travel;
- An increasingly safe, secure and sustainable system; and
- Improved monitoring and value for money.

A number of public transport infrastructure and service improvements are planned for area including the expansion of park and ride facilities at the Hibiscus Coast Station and Investigation for the extension of the Northern Busway. These measures will provide public transport options that are more attractive and shift some of the private vehicle demand for travel to and from Auckland City to Silverdale.

The development proposed at Silverdale West will create additional demand and offer the opportunity for expansion of the existing bus network to the area with increased bus frequencies and routes to service the development and its surroundings.

7.7 Future Urban Land Supply Strategy and Future Development Strategy

The 2017 Auckland Future Urban Land Supply Strategy document describes the primary purpose of the Future Urban Land Supply Strategy (“**FULSS**”) as identifying the sequencing and timing of future urban land for development readiness over 30 years. The FULSS places development in the Silverdale West area in the contracted or planned stage (2018-2022). The timing of the proposed PPC therefore generally aligns with the timing set out in the FULSS.

A draft of the Auckland Future Development Strategy (“**FDS**”) was released for public submission and consultation earlier this year. It aims to set the direction for urban growth across the city by seeking to reduce urban sprawl, focus growth in existing urban areas and make the best use of existing and planned infrastructure. It signals the desire by Auckland Council to support the co-location or at least shorter distances between, employment and living locations. From a transportation perspective, the proposed PPC aligns with the intent of the FDS with respect to providing an employment area which is located in close proximity to the adjacent residential catchments in the north, particularly the rapidly growing Wainui Precinct.

7.8 Supporting Growth Alliance

SGA is a collaborative programme between AT, Auckland Council and Waka Kotahi which seeks to investigate and plan for transport projects that would be able to support urban growth in Auckland over the next 30 years. The Unitary Plan expects that 30% of new growth in the region will be on greenfield sites which have been zoned as ‘Future Urban’. SGA seeks to plan for transport infrastructure that will serve these new growth areas and to advance and secure the necessary designations for additional and modified transport facilities in support of that growth. The SGA programme recognises that growth areas for Auckland are focussed in:

- Warkworth;
- Silverdale, Dairy Flat, Wainui and Orewa in the North;
- Kumeū-Huapai, Redhills, Whenuapai and Riverhead in the North West; and
- Takanini, Ōpāheke, Drury, Paerata and Pukekohe in the South.

Of relevance to the PPC area, Silverdale, Dairy Flat, Wainui and Orewa areas are expected to accommodate some 400,000 new homes and over 600 hectares of new business land. The following long-term projects have been proposed by SGA to support growth in this area:

- A new 16km rapid transit corridor from Albany via Dairy Flat and onto Milldale providing efficient, frequent, high-quality public transport;
- Improved public transport connections for the wider area with bus priority on key routes including a high frequency bus route connecting Orewa and Silverdale;
- 25km of new walking and cycling paths across North Auckland; and
- Improvements to SH1 including additional space to cater for more people moving around in the future, upgraded interchanges at Redvale and Silverdale and a new interchange at Wilks Road.

In July 2019 the SGA released the Indicative Strategic Transport Network map for North Auckland. This is shown in **Figure 23**.



NORTH INDICATIVE STRATEGIC TRANSPORT NETWORK

JULY 2019

Projects described in these maps have been identified by indicative business cases and will require further technical investigation, engagement with communities and landowners and statutory approvals before their final detail, location or land requirement is confirmed. They are also yet to be prioritised for funding for delivery over the next 10-30 years.

NEW RAPID TRANSIT CORRIDOR

- 1 Rapid Transit corridor extending from Albany to Milldale via new growth area

NEW OR IMPROVED PUBLIC TRANSPORT CORRIDOR

- 2 Bus shoulder lanes from Albany to Silverdale (interim)
- 3 High frequency bus route connecting Orewa and Silverdale with the Rapid Transit corridor

NEW WALKING AND CYCLING CORRIDOR

- 4 Strategic walking and cycling corridors

NEW OR IMPROVED TRANSPORT CORRIDOR

- 5 Additional managed motorway capacity between Albany and Silverdale interchange
- 6 Signalisation of Silverdale Street and Hibiscus Coast Highway intersection (with safety treatment) and improvements to Wainui Road for buses
- 7 New connection between Milldale and Grand Drive
- 8 Upgrade Pine Valley Road, Wainui Road, Dairy Flat Highway and Bawden Road to urban standards including walking and cycling
- 9 Improved Silverdale interchange
- 10 New connection from Dairy Flat Highway to Penlink via Jackson Way
- 11 New connection between Bawden Road and SH1
- 12 New full interchange at Redvale (Penlink)
- 13 New SH1 crossing near Dairy Stream
- 14 New motorway interchange at Wilks Road
- 15 Upgrade East Coast Road from Silverdale to Redvale interchange
- 16 Upgrade southern section of Dairy Flat Highway

SAFETY IMPROVEMENTS

- 17 Safety improvements on Kahikatea Flat Road, Coatesville-Riverhead Highway, East Coast Road and Awanohi Road

OTHER PRIORITY PROJECTS

- 18 Penlink
- 19 New Argent Lane connection and Milldale to Highgate SH1 crossing



LEGEND

- New growth area (Future Urban Zone)
- Silverdale West Dairy Flat Industrial Area Structure Plan
- Existing urban area
- State Highway (SH)
- New or upgraded interchange
- New interchange – south facing ramps only
- New rapid transit corridor
- New public transport corridor
- Improved public transport corridor
- New walking and cycling corridor
- New transport corridor
- Improved transport corridor
- Safety improvements
- Other priority projects



New Zealand Government

Figure 23: Indicative Strategic Transport Network (North)



Of note, the plan includes several new or upgraded transport corridors that would complement the development of the PPC area. These upgrades will provide a greater level of accessibility and transport mode choice for the region.

The layout and zoning of the PPC area is consistent with these initiatives and in fact, the 2019 version assumed the PPC area to be zoned for industrial activity under the Silverdale West Dairy Flat Industrial Area Structure Plan. While the subsequent rezoning has not been sought by Council, this development aligns with the Structure Plan and supporting infrastructure planned for the PPC site and wider Silverdale West area.

Following a community consultation in August 2022, SGA has issued the following map shown in **Figure 24** for the northern region identifying the envisaged strategic transport network.

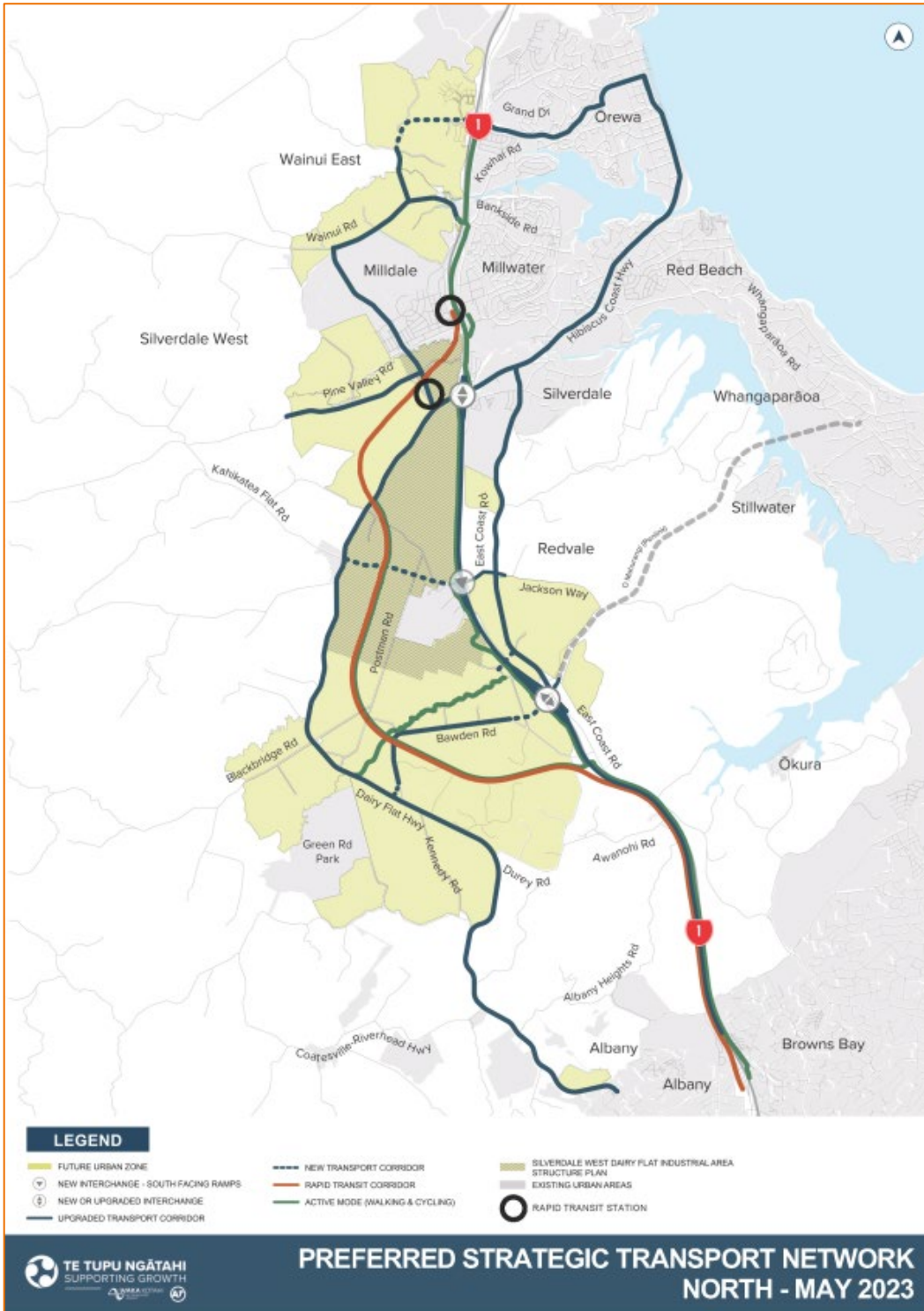


Figure 24: Strategic Transport Network (May 2023)

This diagram includes a number of transport infrastructure projects that would directly serve or affect the development area including a rapid transit corridor, active modes corridor, interchange upgrades and new/upgraded transport corridors.

SGA's website notes that the North Auckland Detailed Business Case process was completed in mid-2023 for consideration by the Boards of Auckland Transport and Waka Kotahi. This will be followed by the lodgement of the Notice of Requirement documentation in late 2023. At the time of writing there has been no further update to this process.

The proposed PPC and its supporting delivery of infrastructure aligns well with the timing and planned infrastructure for the region by SGA through freeing up FUZ land for industrial activity, protecting routes for the proposed RTN route and upgraded road corridors (including Dairy Flat Highway and East Coast Road), upgrade of the Silverdale interchange, provision of a new interchange at Wilks Road and enhancement of active mode infrastructure, thereby allowing for a well-integrated, safe and efficient transport network to be achieved.

7.9 Summary

Two key themes are observed across the various policy and strategy documents assessed:

- Safety, and
- Sustainable travel options.

The Silverdale West PPC will assist giving effect to these policy and strategy documents. The PPC will enable effective and efficient land-use and transportation integration; it will provide suitable transport alternatives and allows traffic across all modes to be safely and efficiently managed on the transport network both internally and externally to the PPC land.

Safe and sustainable travel are also key design and planning considerations within Silverdale West. The proposed PPC achieves this in two ways.

- The location and land-use integration of the development enabled by the PPC industrial development close to existing transport infrastructure such as SH1 allowing for freight trips serving the industrial area to be shorter and managed away from other activities. The proximity to the Hibiscus Coast Station also allows for private vehicle trips to be potentially shorter or replaced by alternative sustainable transport options. Additionally, the complementary activities in the wider surroundings will allow for some employment related travel to be shorter and able to be undertaken via active modes, taking into consideration that the residential area to the north of the PPC area is anticipated to accommodate in excess of 20,000 residents by 2038, as estimated by the SGA for that future forecast year.
- The PPC includes plans for safe and segregated walking and cycling infrastructure within the development and connecting to the surrounding traffic environment. The rezoning and development it will facilitate also includes provisions for bus stops that could serve the area. Together these provide safe sustainable transport options for the area that are likely to reduce private vehicle trips.

The PPC area will readily be able to realise the high-level policy goals for the Auckland region. It can deliver a development which supports safe and sustainable alternative travel modes within the area and integrates with wider area public transport infrastructure. An industrial development positioned as it is at the junction of SH1, Hibiscus Coast Highway and Dairy Flat Highway enables regional freight-related travel to be safer and more efficient. Freight vehicles will have shorter travel durations and distances on the region's roading network, thereby minimising conflict with other road users and allowing for economic development and employment opportunities in the area close to the growing residential, employee catchments of North Auckland.

8 Summary and Conclusions

An assessment of the transportation effects of a Private Plan Change comprising up to 107 ha (gross area) of light industrial activity at Silverdale West has been undertaken. The proposed Plan Change provides an opportunity to deliver much-needed employment to support the population growth in Auckland, particularly in the northern region.

The internal road network within the PPC area features complementary off-road walking and cycling paths, together with roading and an ability to accommodate public transport services in the future. Two new connections are proposed to the existing roading network to support the full Plan Change, these being the signalised intersections on Dairy Flat Highway which are to be the access points into and out of the PPC area. The proposed internal roads and new road connections ensure that the development is suitably integrated with the surrounding transport network for all modes of travel.

Detailed modelling has been undertaken to assess the likely effects of the development from a transportation perspective. The modelling has relied on outputs from the SGA's Northern model and supplemented with a more detailed micro-simulation model to assess the likely effects on the transportation network.

Improvements to the road network are recommended to ensure that the performance of the surrounding road network remains within acceptable levels. Active mode connectivity is proposed via cycle lane and footpaths along Pine Valley Road and a bi-directional cycleway plus footpath along the southern edge of Dairy Flat Highway between Pine Valley Road and the northern access to the Silverdale West PPC area. Crossing facilities will also be integrated into the Pine Valley Road / Dairy Flat intersection to facilitate the safe crossing of Dairy Flat Highway.

Approximately mid-way between 2028 and 2034, corresponding to the enablement of 65 ha (gross area) within the PPC area (and around 960 dwellings operational in Milldale North), circa 2031, will require:

1. One signalised intersection connecting the PPC area to the external road network via Dairy Flat Highway;
2. Upgrade of the Pine Valley Road / Dairy Flat Highway intersection to include a second right turn short bay from the east (turns into Pine Valley Road) (approximately 135m) and the inclusion of cycle lanes and footpaths along both sides of Pine Valley Road;
3. Signalisation of the Wilks Road / Dairy Flat Highway intersection; and
4. Signalisation of the Wilks Road / East Coast Road intersection.

For the full development of the PPC land (107ha gross area) at the 2034 future year (inclusive which also assumes the establishment of 1,620 dwellings in Milldale North) will require:

5. Provision of a slip lane on the western approach to the Silverdale interchange which connects to the northbound on-ramp;
6. Extending the length of the left turn slip lane on the southbound off-ramp at the Silverdale interchange to around 150m and introducing a ramp meter for the AM peak;
7. Provision of a second signalised intersection off Dairy Flat Highway to service the PPC area; and
8. Upgrading the Argent Lane / Pine Valley Road roundabout to a roundabout with two circulating lanes.

The results of the modelling indicate that with these mitigation measures in place (or with suitable planning provisions to ensure practical delivery of these measures in a timely manner), the operational performance of the surrounding arterial road network and motorway can be maintained at appropriate and acceptable levels.

The relevant transport policy documents directing transportation planning and delivery throughout Auckland have been reviewed, and it is considered that the PPC is consistent with the policies and objectives contained in them. The Silverdale West area is a location that has been specifically identified as a location for additional future industrial activity.

On the basis of the recommended roading infrastructure identified through the transport modelling in support of the PPC, and its delivery programmed accordingly to the threshold trigger levels identified, there are no transport planning or engineering reasons to preclude approval of the PPC.

Stantec New Zealand



APPENDICES

We design with community in mind



Appendix A

65ha Gross Buildout of Silverdale West

AM 2031_Avg
 (Silverdale West - 65ha Gross)

07:45 - 08:45

8

Intersection	Appr & Turn	Count	Mvmt Delay	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
HCH & Whangaparaoa (Signals)	S Left	903	4	14	B	5	25	C
	S Thru	292	41					
	S Right	8	58					
	E Left	3	4	33	C	8		
	E Thru	824	33					
	E Right	171	37					
	N Left	91	4	27	C	4		
	N Thru	70	23					
	N Right	253	37					
	W Left	7	6	30	C	7		
	W Thru	285	23					
	W Right	442	36					
HCH & East Coast (Signals)	S Left	59	14	32	C	4	22	C
	S Thru	10	28					
	S Right	340	35					
	E Left	280	3	21	C	12		
	E Thru	1292	25					
	E Right	25	50					
	N Left	3	6	42	D	1		
	N Thru	3	56					
	N Right	4	59					
	W Left	20	2	17	B	4		
	W Thru	608	9					
	W Right	305	35					
HCH & Painton (Signals)	S Left	155	9	13	B	1	19	B
	S Thru	0	0					
	S Right	16	52					
	E Left	221	23	30	C	13		
	E Thru	1098	31					
	E Right	1	63					
	N Left	2	6	34	C	1		
	N Thru	0	0					
	N Right	3	54					
	W Left	3	2	12	B	4		
	W Thru	959	2					
	W Right	733	26					
Silverdale Interchange East (Roundabout)	E Left	841	4	10	B	11	15	B
	E Thru	403	24					
	N Left	387	48	64	E	14		
	N Right	279	86					
	W Thru	1299	2	2	A	1		
	W Right	650	3					
Silverdale Interchange West (Roundabout)	S Left	367	5	7	A	3	9	A
	S Right	558	8					
	E Thru	619	1	1	A	1		
	E Right	64	2					
	W Left	201	12	13	B	8		
	W Thru	1391	13					
Dairy Flat & Pine Valley (Signals)	E Thru	682	18	22	C	5	19	B
	E Right	302	32					
	N Left	1176	15	17	B	7		
	N Right	376	26					
	W Left	117	4	20	B	4		
	W Thru	412	24					
Dairy Flat & SW1 (Signals)	S Thru	411	9	15	B	4	24	C
	S Right	147	34					
	E Left	63	15	23	C	2		
	E Right	120	27					
	N Left	401	24	29	C	12		
	N Thru	653	33					
Argent & Pine Valley (Roundabout)	S Left	129	9	9	A	2	17	B
	S Thru	290	8					
	S U-Turn	0	0					
	N Thru	1258	22	22	C	13		
	N Right	67	23					
	N U-Turn	0	0					
	W Left	46	5	5	A	3		
	W Right	298	5					
	W U-Turn	0	0					

AM 2031_Avg
(Silverdale West - 65ha Gross)

07:45 - 08:45

8

Intersection	Appr & Turn	Count	Mvmt Delay	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
Argent & John Fair (Roundabout)	S Left	13	5	5	A	1	12	B
	S Thru	188	5					
	S Right	134	6					
	S U-Turn	0	0					
	E Left	293	29	29	C	7		
	E Thru	6	28					
	E Right	25	30					
	E U-Turn	0	0					
	N Left	57	8	9	A	4		
	N Thru	987	9					
	N Right	1	10					
	N U-Turn	0	0					
	W Left	1	3	5	A	1		
	W Thru	9	4					
	W Right	50	5					
	W U-Turn	0	0					
Argent & Maryvale (Roundabout)	S Left	12	4	5	A	1	10	A
	S Thru	186	5					
	S Right	16	6					
	S U-Turn	0	0					
	E Left	102	30	29	C	3		
	E Thru	8	25					
	E Right	19	26					
	E U-Turn	0	0					
	N Left	33	8	9	A	3		
	N Thru	915	9					
	N Right	28	9					
	N U-Turn	1	9					
	W Left	9	2	3	A	1		
	W Thru	7	2					
	W Right	24	4					
	W U-Turn	0	0					
Argent & TC1 (Roundabout)	S Left	8	3	3	A	1	5	A
	S Thru	154	3					
	S Right	37	4					
	S U-Turn	0	0					
	E Left	150	7	7	A	3		
	E Thru	6	6					
	E Right	13	7					
	E U-Turn	0	0					
	N Left	11	5	6	A	3		
	N Thru	595	6					
	N Right	1	6					
	N U-Turn	0	0					
	W Left	5	2	3	A	1		
	W Thru	8	3					
	W Right	48	3					
	W U-Turn	0	0					
Argent & TC2 (Roundabout)	S Left	35	4	5	A	1	5	A
	S Thru	134	5					
	S Right	4	5					
	S U-Turn	0	0					
	E Left	17	5	5	A	1		
	E Thru	19	5					
	E Right	37	5					
	E U-Turn	0	0					
	N Left	14	5	5	A	3		
	N Thru	458	5					
	N Right	4	5					
	N U-Turn	0	0					
	W Left	6	2	2	A	1		
	W Thru	21	2					
	W Right	132	2					
	W U-Turn	0	0					
Argent & Wainui (Roundabout)	S Left	0	0	7	A	3	5	A
	S Thru	157	7					
	S Right	10	6					
	S U-Turn	0	0					
	E Left	62	7	8	A	3		
	E Thru	8	8					
	E Right	217	8					
	E U-Turn	0	0					
	N Left	230	2	3	A	2		
	N Thru	381	3					
	N Right	7	3					
	N U-Turn	0	0					
	W Left	12	3	3	A	1		
	W Thru	14	3					
	W Right	0	0					
	W U-Turn	0	0					

AM 2031_Avg
 (Silverdale West - 65ha Gross)

07:45 - 08:45

8

Intersection	Appr & Turn	Count	Mvmt Delay	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
Wainui & MN_West (Priority)	E Thru	378	1	4	A	1	6	A
	E Right	7	4					
	N Left	51	4					
	N Right	28	3	6	A	1		
	W Left	15	6					
	W Thru	571	3					
Wainui & Waiwai (Roundabout)	S Left	38	1	1	A	1	3	A
	S Thru	12	1					
	S Right	9	1					
	S U-Turn	0	0					
	E Left	7	4					
	E Thru	208	4					
	E Right	15	4	4	A	1		
	E U-Turn	0	0					
	N Left	79	2					
	N Thru	30	2					
	N Right	43	3					
	N U-Turn	0	0					
	W Left	3	2	2	A	1		
	W Thru	237	3					
	W Right	13	3					
	W U-Turn	0	0					
Wainui & Lysnar (Roundabout)	S Left	51	2	2	A	1	4	A
	S Thru	19	2					
	S Right	17	2					
	S U-Turn	0	0					
	E Left	24	4					
	E Thru	170	4					
	E Right	39	5	4	A	1		
	E U-Turn	0	0					
	N Left	83	3					
	N Thru	35	4					
	N Right	8	4					
	N U-Turn	0	0					
	W Left	3	5	5	A	1		
	W Thru	292	5					
	W Right	31	5					
	W U-Turn	0	0					
Wainui & Upper Orewa (Priority)	E Thru	156	1	6	A	1	7	A
	E Right	21	6					
	N Left	39	5					
	N Right	74	7	7	A	2		
	W Left	55	2					
	W Thru	334	1					
Wainui & MillOff (Roundabout)	S Left	161	4	5	A	3	5	A
	S Thru	104	5					
	N Right	378	5					
	W Left	72	3					
Wainui & Sidwell (Roundabout)	S Left	15	2	2	A	1	5	A
	S Right	374	2					
	S U-Turn	0	0					
	E Left	111	3	3	A	1		
	E Thru	57	4					
	E U-Turn	0	0					
	W Thru	503	8					
	W Right	37	7					
	W U-Turn	0	0					
Wainui & Millwater (Signals)	S Left	15	2	26	C	3	17	B
	S Thru	191	28					
	N Thru	84	17					
	N Right	154	30	25	C	1		
	W Left	734	13					
	W Right	146	16					
Millwater & MillOn (Roundabout)	S Left	536	6	6	A	3	5	A
	S Thru	386	7					
	S Right	5	8					
	S U-Turn	0	0					
	E Left	1	2	4	A	1		
	E Thru	31	4					
	E Right	9	4					
	E U-Turn	0	0					
	N Left	5	2					
	N Thru	237	3					
	N Right	263	3	3	A	1		
	N U-Turn	1	3					

AM 2031_Avg
 (Silverdale West - 65ha Gross)

07:45 - 08:45

8

Intersection	Appr & Turn	Count	Mvmt Delay	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
East Coast Road & Wilks (Signals)	S Left	168	10	14	B	2	20	B
	S Thru	297	17					
	S Right	2	58					
	E Left	6	27	27	C	1		
	E Thru	3	23					
	E Right	8	29					
	N Left	6	16	24	C	3		
	N Thru	350	22					
	N Right	53	39					
	W Left	57	15	22	C	2		
	W Thru	2	11					
	W Right	163	24					
	Postman Road & Wilks (Priority)	S Left	81	6	6	A		
S Thru		142	6					
N Thru		150	2	4	A	2		
N Right		83	4					
W Left		60	3	3	A	1		
W Thru		72	0					
Dairy Flat Highway & Wilks (Signals)	S Left	34	24	25	C	3	26	C
	S Thru	348	22					
	S Right	102	37					
	E Left	60	17	25	C	2		
	E Thru	16	24					
	E Right	117	30					
	N Left	132	21	26	C	5		
	N Thru	418	24					
	N Right	169	35					
	W Left	101	18	24	C	2		
	W Thru	14	27					
	W Right	33	38					

PM 2031_Avg
(Silverdale West - 65ha Gross)

16:30 - 17:30

7

Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
HCH & Whangaparaoa (Signals)	S Left	456	2	21	C	6	34	C
	S Thru	315	46					
	S Right	8	64					
	E Left	12	9	41	D	7		
	E Thru	399	40					
	E Right	201	45					
	N Left	208	15	31	C	5		
	N Thru	133	29					
	N Right	251	46					
	W Left	33	7	37	D	18		
	W Thru	773	42					
	W Right	1173	35					
HCH & East Coast (Signals)	S Left	102	7	36	D	9	30	C
	S Thru	16	49					
	S Right	688	40					
	E Left	207	3	21	C	9		
	E Thru	679	23					
	E Right	94	51					
	N Left	261	22	32	C	4		
	N Thru	45	47					
	N Right	132	46					
	W Left	141	11	31	C	15		
	W Thru	1309	32					
	W Right	73	52					
HCH & Painton (Signals)	S Left	433	11	16	B	5	13	B
	S Thru	0	0					
	S Right	212	27					
	E Left	7	10	20	B	11		
	E Thru	959	20					
	E Right	1	57					
	N Left	4	5	22	C	1		
	N Thru	0	0					
	N Right	3	45					
	W Left	2	5	8	A	5		
	W Thru	1375	6					
	W Right	180	27					
Silverdale Interchange East (Roundabout)	E Left	603	3	12	B	17	8	A
	E Thru	784	20					
	N Left	230	9	19	B	6		
	N Right	246	28					
	W Thru	1338	1	2	A	1		
	W Right	336	3					
Silverdale Interchange West (Roundabout)	S Left	525	11	29	C	15	34	C
	S Right	935	39					
	E Thru	737	5	5	A	16		
	E Right	295	6					
	W Left	356	68	67	E	24		
	W Thru	738	66					
Dairy Flat & Pine Valley (Signals)	E Thru	443	7	19	B	7	19	B
	E Right	822	26					
	N Left	351	10	17	B	3		
	N Right	153	34					
	W Left	423	10	21	C	8		
	W Thru	721	27					
Dairy Flat & SW1 (Signals)	S Thru	793	17	20	B	13	20	C
	S Right	61	55					
	E Left	151	19	24	C	7		
	E Right	353	26					
	N Left	135	9	17	B	7		
	N Thru	461	20					
Argent & Pine Valley (Roundabout)	S Left	276	17	19	B	4	17	B
	S Thru	978	19					
	S U-Turn	0	0					
	N Thru	310	4	4	A	2		
	N Right	54	5					
	N U-Turn	0	0	27	C	13		
	W Left	84	26					
	W Right	192	27					
	W U-Turn	0	0					

PM 2031_Avg
(Silverdale West - 65ha Gross)

16:30 - 17:30

7

Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
Argent & John Fair (Roundabout)	S Left	82	9	10	B	6	9	A
	S Thru	631	10					
	S Right	352	11					
	S U-Turn	0	0					
	E Left	108	3	4	A	3		
	E Thru	34	5					
	E Right	130	5					
	E U-Turn	0	0					
	N Left	89	6	6	A	3		
	N Thru	238	6					
	N Right	2	10					
	N U-Turn	0	0					
	W Left	2	10	11	B	1		
	W Thru	15	11					
	W Right	18	11					
	W U-Turn	0	0					
Argent & Maryvale (Roundabout)	S Left	48	6	6	A	2	6	A
	S Thru	702	6					
	S Right	13	6					
	S U-Turn	0	0					
	E Left	9	3	3	A	1		
	E Thru	14	3					
	E Right	15	2					
	E U-Turn	0	0					
	N Left	8	5	5	A	2		
	N Thru	300	5					
	N Right	36	6					
	N U-Turn	0	0					
	W Left	25	6	6	A	1		
	W Thru	13	6					
	W Right	19	7					
	W U-Turn	0	0					
Argent & TC1 (Roundabout)	S Left	42	4	4	A	2	4	A
	S Thru	480	4					
	S Right	165	5					
	S U-Turn	0	0					
	E Left	45	3	3	A	1		
	E Thru	15	2					
	E Right	13	3					
	E U-Turn	0	0					
	N Left	22	4	5	A	2		
	N Thru	254	5					
	N Right	3	4					
	N U-Turn	0	0					
	W Left	6	5	6	A	1		
	W Thru	7	6					
	W Right	13	6					
	W U-Turn	0	0					
Argent & TC2 (Roundabout)	S Left	147	5	5	A	1	4	A
	S Thru	330	5					
	S Right	22	5					
	S U-Turn	0	0					
	E Left	5	3	2	A	1		
	E Thru	20	2					
	E Right	9	2					
	E U-Turn	0	0					
	N Left	18	3	4	A	1		
	N Thru	222	4					
	N Right	15	5					
	N U-Turn	0	0					
	W Left	5	2	3	A	1		
	W Thru	12	3					
	W Right	53	3					
	W U-Turn	0	0					
Argent & Wainui (Roundabout)	S Left	0	0	11	B	5	6	A
	S Thru	288	11					
	S Right	17	11					
	S U-Turn	0	0					
	E Left	43	7	7	A	4		
	E Thru	23	6					
	E Right	375	7					
	E U-Turn	0	0					
	N Left	210	2	2	A	1		
	N Thru	211	2					
	N Right	17	2					
	N U-Turn	0	0					
	W Left	12	8	8	A	1		
	W Thru	14	9					
	W Right	0	0					
	W U-Turn	0	0					

PM 2031_Avg
(Silverdale West - 65ha Gross)

16:30 - 17:30

7

Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS			
Wainui & MN_West (Priority)	E Thru	645	1	4	A	1	5	A			
	E Right	30	4								
	N Left	17	4	4	A	1					
	N Right	23	3								
	W Left	35	5	5	A	1					
	W Thru	419	2								
Wainui & Waiwai (Roundabout)	S Left	24	1	1	A	1	3	A			
	S Thru	57	1								
	S Right	23	2								
	S U-Turn	0	0								
	E Left	26	3	4	A	1					
	E Thru	401	4								
	E Right	6	5								
	E U-Turn	0	0								
	N Left	16	2	2	A	1					
	N Thru	32	2								
	N Right	14	3								
	N U-Turn	0	0								
	W Left	9	2	3	A	1					
	W Thru	196	3								
	W Right	35	3								
	W U-Turn	0	0								
	Wainui & Lysnar (Roundabout)	S Left	98	4	5	A			2	5	A
		S Thru	55	5							
		S Right	12	5							
		S U-Turn	0	0							
E Left		42	5	6	A	2					
E Thru		331	6								
E Right		194	6								
E U-Turn		0	0								
N Left		56	3	3	A	1					
N Thru		21	3								
N Right		6	3								
N U-Turn		0	0								
W Left		10	4	5	A	2					
W Thru		214	5								
W Right		10	5								
W U-Turn		0	0								
Wainui & Upper Orewa (Priority)	E Thru	467	2	5	A	2	9	A			
	E Right	31	5								
	N Left	22	6	9	A	2					
	N Right	99	9								
	W Left	90	2	2	A	1					
	W Thru	191	1								
Wainui & MillOff (Roundabout)	S Left	470	7	7	A	4	6	A			
	S Thru	396	7								
	N Right	210	4	4	A	1					
	W Left	102	4								
Wainui & Sidwell (Roundabout)	S Left	15	1	2	A	1	4	A			
	S Right	154	2								
	S U-Turn	0	0								
	E Left	295	5	5	A	3					
	E Thru	88	6								
	E U-Turn	0	0								
	W Thru	473	4	4	A	3					
	W Right	205	5								
W U-Turn	0	0									
Wainui & Millwater (Signals)	S Left	63	4	21	C	3	18	B			
	S Thru	230	26								
	N Thru	73	9	23	C	3					
	N Right	321	26								
	W Left	508	12	13	B	12					
	W Right	125	19								
Millwater & MillOn (Roundabout)	S Left	262	4	5	A	1	4	A			
	S Thru	454	6								
	S Right	26	6								
	S U-Turn	0	0								
	E Left	0	0	4	A	1					
	E Thru	8	4								
	E Right	3	5								
	E U-Turn	0	0								
	N Left	10	2	3	A	1					
	N Thru	396	3								
	N Right	116	3								
	N U-Turn	0	0								

PM 2031_Avg
(Silverdale West - 65ha Gross)

16:30 - 17:30

7

Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
East Coast Road & Wilks (Signals)	S Left	185	14	21	C	2	26	C
	S Thru	473	23					
	S Right	4	67					
	E Left	3	35	46	D	1		
	E Thru	4	52					
	E Right	7	47					
	N Left	13	34	35	D	4		
	N Thru	279	32					
	N Right	89	46					
	W Left	80	20	26	C	3		
	W Thru	4	25					
	W Right	190	29					
	Postman Road & Wilks (Priority)	S Left	112	7	7	A		
S Thru		169	6					
N Thru		180	2	5	A	3		
N Right		85	5					
W Left		76	4	4	A	1		
W Thru		90	0					
Dairy Flat Highway & Wilks (Signals)	S Left	36	23	28	C	4	28	C
	S Thru	481	27					
	S Right	75	42					
	E Left	89	20	29	C	4		
	E Thru	22	28					
	E Right	122	36					
	N Left	140	22	28	C	5		
	N Thru	323	25					
	N Right	153	39					
	W Left	244	22	25	C	4		
	W Thru	29	32					
	W Right	51	40					

107ha Gross - Full Buildout of Silverdale West

AM_2034_Avg

07:45 - 08:45

8

(Silverdale West - 107 ha (Gross))

Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
HCH & Whangaparaoa (Signals)	S Left	908	4	13	B	5	25	C
	S Thru	296	40					
	S Right	7	56					
	E Left	5	4	35	C	9		
	E Thru	868	34					
	E Right	170	40					
	N Left	87	3	28	C	4		
	N Thru	56	23					
	N Right	216	40					
	W Left	14	5	31	C	7		
	W Thru	329	23					
	W Right	458	37					
	HCH & East Coast (Signals)	S Left	62	13	36	D		
S Thru		4	37					
S Right		398	39					
E Left		308	4	22	C	14		
E Thru		1309	26					
E Right		26	47					
N Left		3	11	38	D	1		
N Thru		1	77					
N Right		4	47					
W Left		29	2	17	B	5		
W Thru		672	9					
W Right		313	36					
HCH & Painton (Signals)		S Left	159	9	13	B	1	21
	S Thru	0	0					
	S Right	15	61					
	E Left	250	26	34	C	14		
	E Thru	1084	36					
	E Right	0	0					
	N Left	3	2	31	C	1		
	N Thru	0	0					
	N Right	4	52					
	W Left	1	1	13	B	5		
	W Thru	1029	2					
	W Right	804	27					
	Silverdale Interchange East (Roundabout)	E Left	803	4	16	B	12	
E Thru		457	37					
N Left		482	18	40	D	11		
N Right		373	69					
W Thru		1339	5	6	A	6		
W Right		643	7					
Silverdale Interchange West (Roundabout)	S Left	415	15	14	B	4	12	B
	S Right	566	14					
	E Thru	771	2	2	A	1		
	E Right	72	3					
	W Left	112	0	16	B	10		
	W Thru	1429	16					
Dairy Flat & Pine Valley (Signals)	E Thru	882	27	31	C	8	30	C
	E Right	309	42					
	N Left	1162	28	34	C	10		
	N Right	470	49					
	W Left	161	4	19	B	5		
	W Thru	499	24					
Dairy Flat & SW1 (Signals)	S Thru	515	7	12	B	4	32	C
	S Right	96	36					
	E Left	32	22	28	C	2		
	E Right	143	30					
	N Left	575	37	41	D	9		
	N Thru	780	44					
Dairy Flat & SW2 (Signals)	S Thru	577	9	19	B	6	18	B
	S Right	161	54					
	E Left	81	29	32	C	2		
	E Right	36	38					
	N Left	59	13	16	B	7		
	N Thru	754	16					
Argent & Pine Valley (Roundabout)	S Left	140	9	8	A	1	6	A
	S Thru	331	7					
	S U-Turn	0	0					
	N Thru	1360	5	5	A	1		
	N Right	63	6					
	N U-Turn	0	0					
	W Left	47	3	5	A	1		
	W Right	268	5					
	W U-Turn	0	0					

AM_2034_Avg

07:45 - 08:45

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(Silverdale West - 107 ha (Gross))

Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
Argent & John Fair (Roundabout)	S Left	18	6	6	A	1	15	B
	S Thru	216	6					
	S Right	145	6					
	S U-Turn	0	0					
	E Left	262	49	50	D	7		
	E Thru	7	43					
	E Right	13	67					
	E U-Turn	0	0					
	N Left	38	11	10	B	5		
	N Thru	1099	10					
	N Right	2	9					
	N U-Turn	0	0					
	W Left	1	4	5	A	1		
	W Thru	6	5					
	W Right	59	5					
	W U-Turn	0	0					
Argent & Maryvale (Roundabout)	S Left	10	4	5	A	1	12	B
	S Thru	204	5					
	S Right	16	6					
	S U-Turn	0	0					
	E Left	101	47	47	D	3		
	E Thru	8	36					
	E Right	12	54					
	E U-Turn	0	0					
	N Left	31	9	10	B	3		
	N Thru	1022	10					
	N Right	32	11					
	N U-Turn	0	0					
	W Left	9	1	3	A	1		
	W Thru	5	2					
	W Right	17	4					
	W U-Turn	0	0					
Argent & TC1 (Roundabout)	S Left	8	3	3	A	1	6	A
	S Thru	160	3					
	S Right	44	4					
	S U-Turn	0	0					
	E Left	161	9	9	A	4		
	E Thru	5	7					
	E Right	18	9					
	E U-Turn	0	0					
	N Left	10	5	6	A	3		
	N Thru	672	6					
	N Right	1	3					
	N U-Turn	0	0					
	W Left	6	2	3	A	1		
	W Thru	7	2					
	W Right	47	3					
	W U-Turn	0	0					
Argent & TC2 (Roundabout)	S Left	28	4	5	A	1	5	A
	S Thru	151	5					
	S Right	4	5					
	S U-Turn	0	0					
	E Left	17	7	7	A	1		
	E Thru	16	8					
	E Right	39	6					
	E U-Turn	0	0					
	N Left	22	5	6	A	4		
	N Thru	549	6					
	N Right	3	6					
	N U-Turn	0	0					
	W Left	5	2	2	A	1		
	W Thru	18	2					
	W Right	116	2					
	W U-Turn	0	0					
Argent & Wainui (Roundabout)	S Left	0	0	8	A	3	6	A
	S Thru	176	8					
	S Right	15	7					
	S U-Turn	0	0					
	E Left	61	10	10	A	4		
	E Thru	8	9					
	E Right	265	10					
	E U-Turn	0	0					
	N Left	246	3	3	A	2		
	N Thru	486	4					
	N Right	9	4					
	N U-Turn	0	0					
	W Left	10	4	5	A	1		
	W Thru	10	6					
	W Right	0	0					
	W U-Turn	0	0					

AM_2034_Avg

07:45 - 08:45

8

(Silverdale West - 107 ha (Gross))

Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS			
Wainui & MN_West (Priority)	E Thru	439	1	6	A	1	7	A			
	E Right	11	6								
	N Left	70	6								
	N Right	48	5	7	A	1					
	W Left	29	7								
	W Thru	669	3								
Wainui & Waiwai (Roundabout)	S Left	51	1	1	A	1	3	A			
	S Thru	31	1								
	S Right	4	1								
	S U-Turn	0	0								
	E Left	8	3								
	E Thru	237	4								
	E Right	8	4	4	A	1					
	E U-Turn	0	0								
	N Left	51	2								
	N Thru	44	2								
	N Right	45	3								
	N U-Turn	0	0								
	W Left	10	2	2	A	1					
	W Thru	236	3								
	W Right	22	3								
	W U-Turn	0	0								
	S Left	37	2						2	A	1
	S Thru	11	1								
S Right	1	3									
S U-Turn	0	0									
E Left	4	4									
E Thru	199	5									
E Right	33	5	5	A	1						
E U-Turn	0	0									
N Left	51	3									
N Thru	33	3									
N Right	16	4									
N U-Turn	0	0									
W Left	5	4	3	A	1						
W Thru	226	4									
W Right	59	5									
W U-Turn	0	0									
E Thru	239	2				7	A	1			
E Right	11	7									
N Left	34	7									
N Right	84	9									
W Left	66	2									
W Thru	408	1									
Wainui & MillOff (Roundabout)	S Left	150	5	6	A	3	5	A			
	S Thru	147	6								
	N Right	444	5								
	W Left	105	3								
Wainui & Sidwell (Roundabout)	S Left	8	2	4	A	2	10	A			
	S Right	464	4								
	S U-Turn	0	0								
	E Left	96	3								
	E Thru	96	4	4	A	1					
	E U-Turn	0	0								
	W Thru	547	17								
	W Right	48	17								
W U-Turn	0	0	17	B	10						
S Left	21	2									
S Thru	191	32									
N Thru	74	17									
N Right	171	35									
W Left	889	15									
W Right	128	20	15	B	17						
S Left	677	7									
S Thru	397	8									
S Right	3	6									
S U-Turn	0	0									
E Left	1	5									
E Thru	26	5	5	A	1						
E Right	8	5									
E U-Turn	0	0									
N Left	7	2									
N Thru	247	3									
N Right	288	3									
N U-Turn	0	0	3	A	1						

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8

(Silverdale West - 107 ha (Gross))

Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
East Coast Road & Wilks (Signals)	S Left	226	12	17	B	2	25	C
	S Thru	311	20					
	S Right	2	58					
	E Left	7	33	37	D	1		
	E Thru	2	39					
	E Right	9	39					
	N Left	7	28	33	C	4		
	N Thru	401	30					
	N Right	80	49					
	W Left	72	16	24	C	3		
	W Thru	1	30					
	W Right	189	27					
	Postman Road & Wilks (Priority)	S Left	118	6	6	A		
S Thru		189	6					
N Thru		165	4	7	A	3		
N Right		136	7					
W Left		90	4	4	A	1		
W Thru		97	0					
Dairy Flat Highway & Wilks (Signals)	S Left	33	26	30	C	3	31	C
	S Thru	432	27					
	S Right	117	40					
	E Left	65	20	31	C	3		
	E Thru	23	24					
	E Right	171	37					
	N Left	181	26	31	C	5		
	N Thru	444	29					
	N Right	212	41					
	W Left	143	22	28	C	2		
	W Thru	25	35					
	W Right	41	42					

PM_2034_Avg
(Silverdale West - 107 ha (Gross))

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Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
HCH & Whangaparaoa (Signals)	S Left	435	2	21	C	7	35	D
	S Thru	326	44					
	S Right	7	59					
	E Left	13	8	42	D	9		
	E Thru	436	40					
	E Right	228	46					
	N Left	276	13	30	C	5		
	N Thru	117	31					
	N Right	233	49					
	W Left	32	9	41	D	7		
	W Thru	726	50					
	W Right	1139	35					
HCH & East Coast (Signals)	S Left	71	10	51	D	11	37	D
	S Thru	22	43					
	S Right	755	56					
	E Left	250	3	23	C	9		
	E Thru	640	25					
	E Right	111	52					
	N Left	266	27	37	D	4		
	N Thru	49	53					
	N Right	129	51					
	W Left	150	18	40	D	15		
	W Thru	1322	41					
	W Right	85	58					
HCH & Painton (Signals)	S Left	486	21	25	C	6	18	B
	S Thru	1	22					
	S Right	225	34					
	E Left	9	10	31	C	14		
	E Thru	908	32					
	E Right	2	43					
	N Left	3	6	25	C	1		
	N Thru	0	0					
	N Right	3	37					
	W Left	4	5	8	A	5		
	W Thru	1370	6					
	W Right	168	29					
Silverdale Interchange East (Roundabout)	E Left	591	3	25	C	20	14	B
	E Thru	811	41					
	N Left	235	7	27	C	5		
	N Right	288	44					
	W Thru	1318	1	2	A	1		
	W Right	416	3					
Silverdale Interchange West (Roundabout)	S Left	530	12	29	C	14	26	C
	S Right	830	40					
	E Thru	770	3	3	A	7		
	E Right	328	5					
	W Left	450	0	48	D	16		
	W Thru	902	48					
Dairy Flat & Pine Valley (Signals)	E Thru	560	8	23	C	9	24	C
	E Right	739	34					
	N Left	404	18	25	C	5		
	N Right	194	39					
	W Left	555	12	25	C	11		
	W Thru	967	33					
Dairy Flat & SW1 (Signals)	S Thru	981	32	33	C	25	29	C
	S Right	12	87					
	E Left	25	31	35	D	10		
	E Right	519	35					
	N Left	180	10	19	B	8		
	N Thru	572	22					
Dairy Flat & SW2 (Signals)	S Thru	910	21	26	C	11	24	C
	S Right	85	78					
	E Left	219	30	33	C	5		
	E Right	73	41					
	N Left	20	11	17	B	7		
	N Thru	574	18					
Argent & Pine Valley (Roundabout)	S Left	265	13	12	B	2	10	B
	S Thru	1032	12					
	S U-Turn	0	0					
	N Thru	405	4	4	A	1		
	N Right	79	5					
	N U-Turn	0	0					
	W Left	81	7	11	B	2		
	W Right	197	12					
	W U-Turn	0	0					

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16:30 - 17:30

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(Silverdale West - 107 ha (Gross))

Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
Argent & John Fair (Roundabout)	S Left	78	18	20	B	6	14	B
	S Thru	683	19					
	S Right	353	22					
	S U-Turn	0	0					
	E Left	144	4	5	A	3		
	E Thru	35	5					
	E Right	136	6					
	E U-Turn	0	0					
	N Left	90	6	7	A	3		
	N Thru	326	7					
	N Right	3	8					
	N U-Turn	0	0					
	W Left	2	7	12	B	1		
	W Thru	9	13					
	W Right	17	12					
	W U-Turn	0	0					
Argent & Maryvale (Roundabout)	S Left	50	6	6	A	3	6	A
	S Thru	753	6					
	S Right	17	7					
	S U-Turn	0	0					
	E Left	15	4	3	A	1		
	E Thru	14	3					
	E Right	9	4					
	E U-Turn	0	0					
	N Left	13	5	5	A	2		
	N Thru	382	5					
	N Right	37	5					
	N U-Turn	0	0					
	W Left	26	6	7	A	1		
	W Thru	13	6					
	W Right	23	7					
	W U-Turn	0	0					
Argent & TC1 (Roundabout)	S Left	50	4	5	A	1	5	A
	S Thru	500	4					
	S Right	177	5					
	S U-Turn	0	0					
	E Left	49	3	3	A	1		
	E Thru	12	3					
	E Right	12	3					
	E U-Turn	0	0					
	N Left	12	4	5	A	2		
	N Thru	333	5					
	N Right	1	8					
	N U-Turn	0	0					
	W Left	6	7	6	A	1		
	W Thru	6	6					
	W Right	13	5					
	W U-Turn	0	0					
Argent & TC2 (Roundabout)	S Left	145	5	5	A	2	4	A
	S Thru	357	5					
	S Right	17	5					
	S U-Turn	0	0					
	E Left	4	3	3	A	1		
	E Thru	33	3					
	E Right	11	3					
	E U-Turn	0	0					
	N Left	19	4	4	A	1		
	N Thru	297	4					
	N Right	11	4					
	N U-Turn	0	0					
	W Left	7	3	3	A	1		
	W Thru	21	3					
	W Right	45	4					
	W U-Turn	0	0					
Argent & Wainui (Roundabout)	S Left	0	0	13	B	6	8	A
	S Thru	326	13					
	S Right	12	12					
	S U-Turn	0	0					
	E Left	42	9	8	A	4		
	E Thru	22	7					
	E Right	413	9					
	E U-Turn	0	0					
	N Left	208	2	3	A	1		
	N Thru	284	3					
	N Right	14	4					
	N U-Turn	0	0					
	W Left	9	10	11	B	1		
	W Thru	14	12					
	W Right	0	0					
	W U-Turn	0	0					

PM_2034_Avg
(Silverdale West - 107 ha (Gross))

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Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS			
Wainui & MN_West (Priority)	E Thru	701	1	6	A	1	6	A			
	E Right	48	6								
	N Left	29	4	4	A	1					
	N Right	35	4								
	W Left	55	5	5	A	1					
	W Thru	478	3								
Wainui & Waiwai (Roundabout)	S Left	31	1	2	A	2	3	A			
	S Thru	91	2								
	S Right	10	2								
	S U-Turn	0	0								
	E Left	22	3	4	A	1					
	E Thru	422	4								
	E Right	7	5								
	E U-Turn	0	0								
	N Left	8	2	2	A	1					
	N Thru	39	2								
	N Right	25	3								
	N U-Turn	0	0								
	W Left	9	2	3	A	1					
	W Thru	191	3								
	W Right	35	3								
	W U-Turn	0	0								
	Wainui & Lysnar (Roundabout)	S Left	57	3	3	A			1	5	A
		S Thru	29	3							
S Right		1	6								
S U-Turn		0	0								
E Left		14	5	5	A	1					
E Thru		380	5								
E Right		128	6								
E U-Turn		0	0								
N Left		24	2	3	A	1					
N Thru		14	3								
N Right		14	4								
N U-Turn		0	0								
W Left		10	4	5	A	1					
W Thru		184	5								
W Right		15	4								
W U-Turn		0	0								
Wainui & Upper Orewa (Priority)		E Thru	674	3	6	A	3	16	C		
		E Right	31	6							
	N Left	24	9	16	C	3					
	N Right	101	16								
	W Left	97	2	2	A	1					
	W Thru	223	1								
Wainui & MillOff (Roundabout)	S Left	467	8	8	A	6	7	A			
	S Thru	474	9								
	N Right	244	4	4	A	1					
	W Left	232	5								
Wainui & Sidwell (Roundabout)	S Left	14	1	2	A	1	5	A			
	S Right	161	2								
	S U-Turn	0	0								
	E Left	247	6								
	E Thru	219	7	7	A	4					
	E U-Turn	0	0								
	W Thru	479	4								
	W Right	233	5								
W U-Turn	0	0	5	A	3						
Wainui & Millwater (Signals)	S Left	76	5	23	C	4	20	B			
	S Thru	240	28								
	N Thru	76	10	24	C	4					
	N Right	391	26								
	W Left	505	14	16	B	12					
	W Right	134	21								
Millwater & MillOn (Roundabout)	S Left	294	4	5	A	1	4	A			
	S Thru	431	6								
	S Right	21	6								
	S U-Turn	0	0								
	E Left	0	0	4	A	1					
	E Thru	5	4								
	E Right	8	4								
	E U-Turn	0	0								
	N Left	11	2	3	A	1					
	N Thru	467	3								
	N Right	113	3								
	N U-Turn	0	0								

PM_2034_Avg

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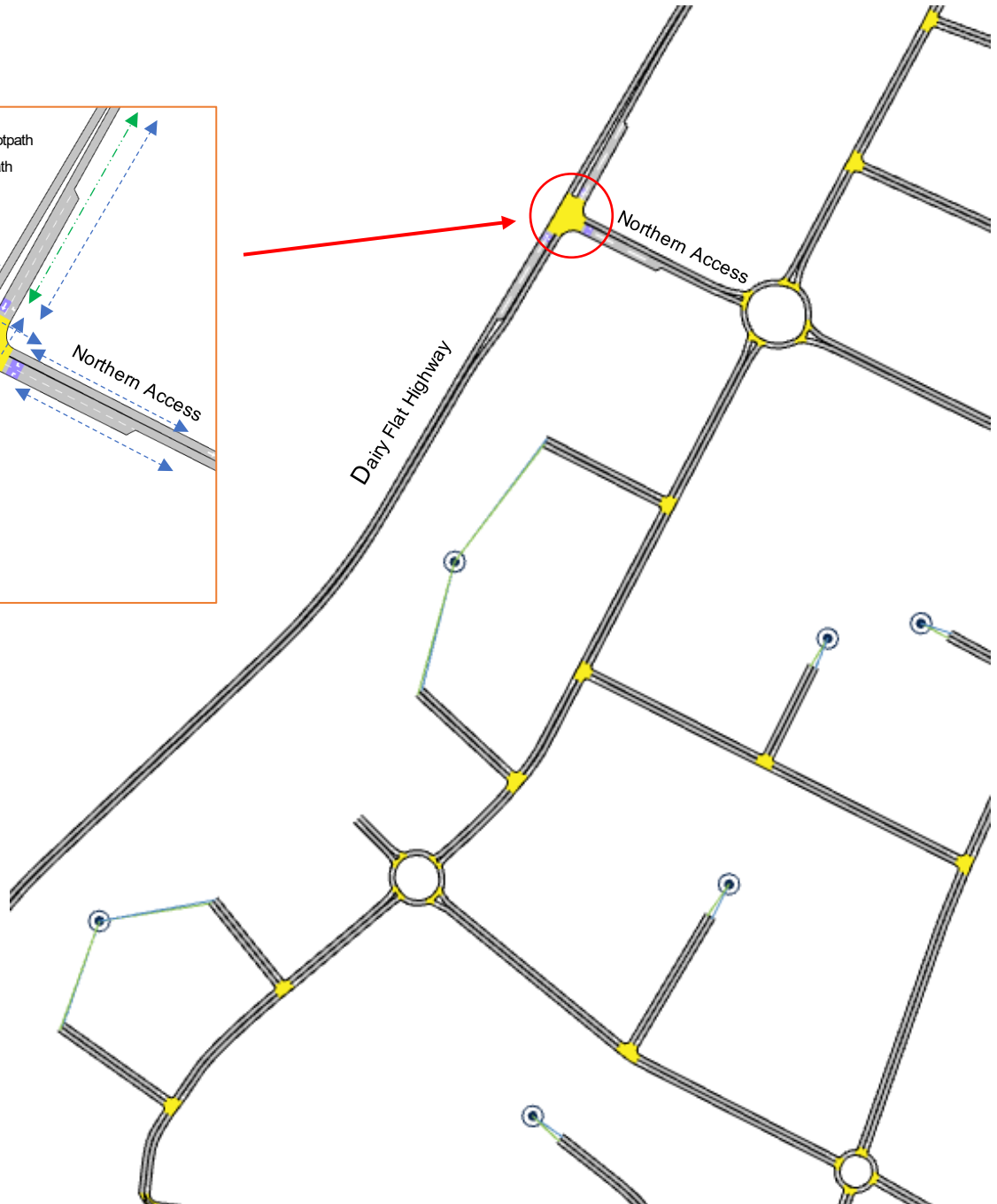
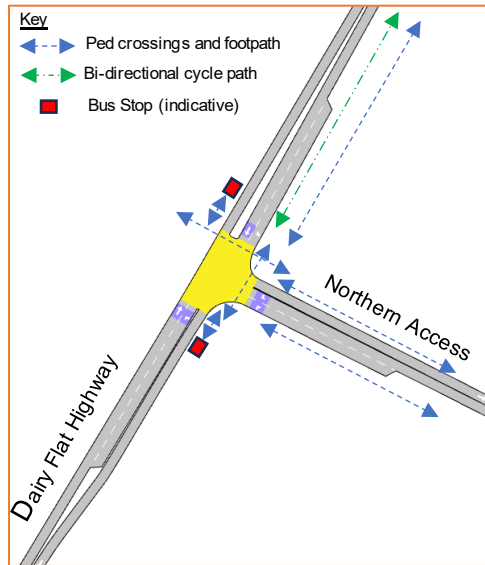
(Silverdale West - 107 ha (Gross))

Intersection	Appr & Turn	Count	Mvmt Delay (s/veh)	App Delay (s/veh)	App LOS	App 95% Q (veh)	Int Del (s/veh)	Int LOS
East Coast Road & Wilks (Signals)	S Left	192	33	39	D	2	50	D
	S Thru	518	41					
	S Right	5	87					
	E Left	3	31	50	D	1		
	E Thru	3	51					
	E Right	6	59					
	N Left	11	60	67	E	5		
	N Thru	293	62					
	N Right	124	78					
	W Left	156	59	50	D	4		
	W Thru	4	35					
	W Right	233	45					
	Postman Road & Wilks (Priority)	S Left	162	7	7	A		
S Thru		159	7					
N Thru		249	4	7	A	4		
N Right		139	7					
W Left		92	4	4	A	2		
W Thru		138	0					
Dairy Flat Highway & Wilks (Signals)	S Left	46	26	31	C	5	32	C
	S Thru	556	29					
	S Right	107	46					
	E Left	66	24	36	D	4		
	E Thru	24	33					
	E Right	139	42					
	N Left	196	24	30	C	6		
	N Thru	403	28					
	N Right	194	42					
	W Left	286	29	36	D	7		
	W Thru	43	59					
	W Right	63	49					

Appendix B – Upgrades

Upgrade 1

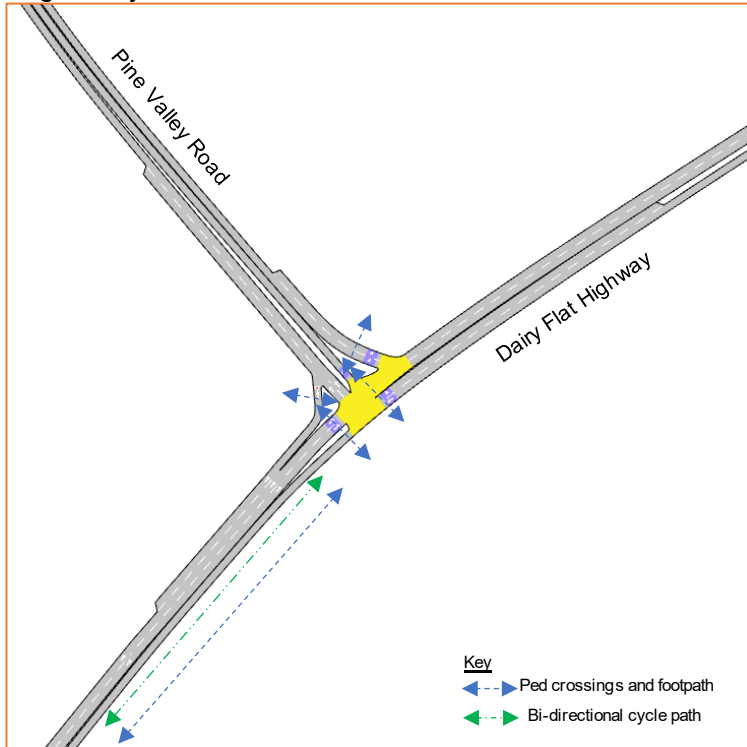
- One signalised intersection connecting the PPC area to the external road network via Dairy Flat Highway
 - signalised pedestrian crossings incorporated within the intersection layout
 - advance cycle boxes assumed for all approaches
 - footpaths connecting to the indicative bus stop locations



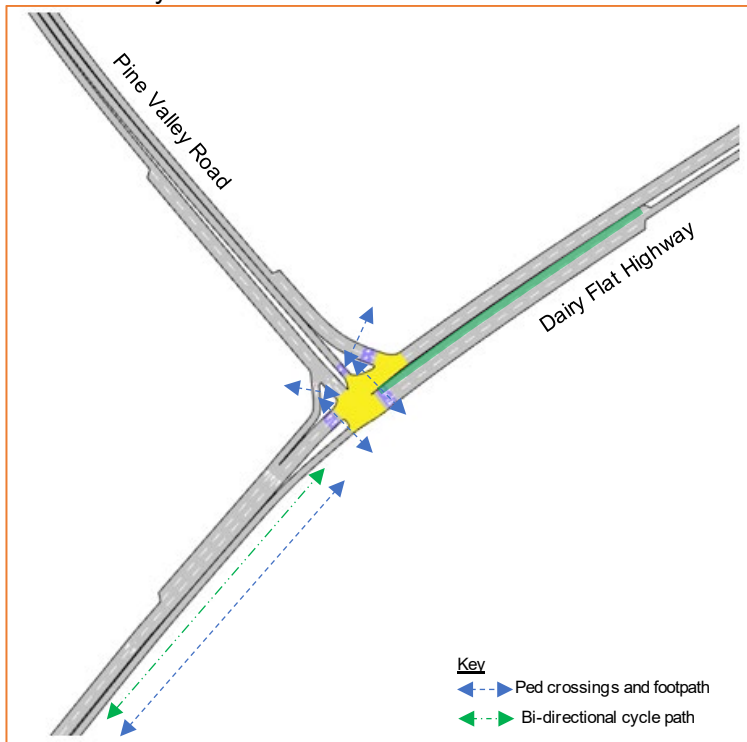
Upgrade 2 (Table IX.6.7.1 (b) of the Precinct Provisions)

- Upgrade of the Pine Valley Road / Dairy Flat Highway intersection to include a second right turn short bay from the east (turns into Pine Valley Road) (approximately 135m)
 - formal pedestrian crossings incorporated within the intersection layout, plus advance cycle boxes

Original layout:



Amended layout:



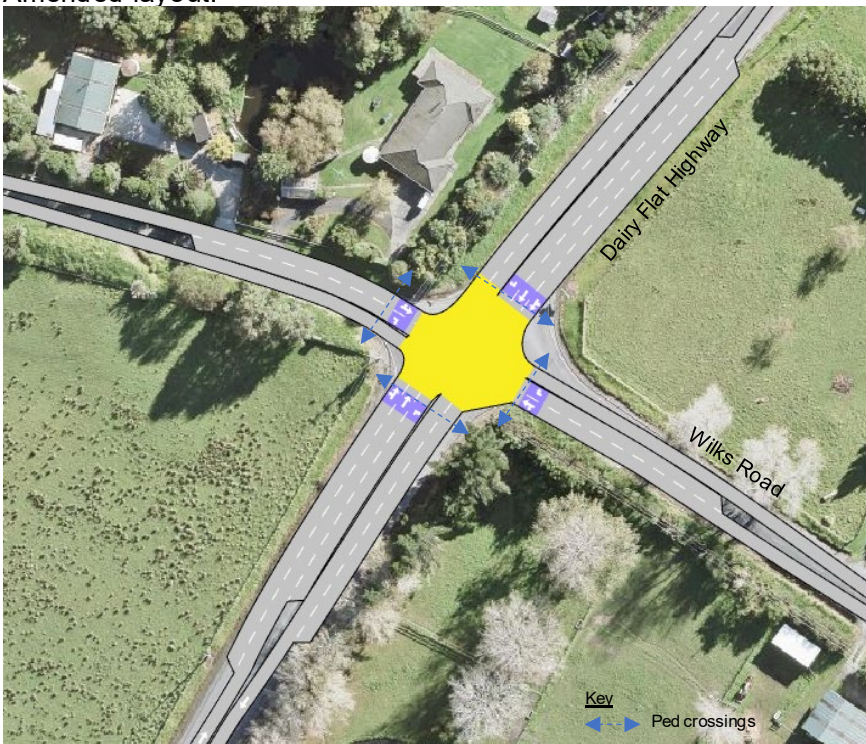
Upgrade 3 (Table IX.6.7.1 (c) of the Precinct Provisions)

- Signalisation of the Wilks Road / Dairy Flat Highway intersection
 - signalised pedestrian crossings incorporated within the intersection layout
 - advance cycle boxes assumed

Original layout:



Amended layout:



Upgrade 4 (Table IX.6.7.1 (c) of the Precinct Provisions)

- Signalisation of the Wilks Road / East Coast Road intersection
 - signalised pedestrian crossings incorporated within the intersection layout
 - advance cycle boxes assumed

Original layout:



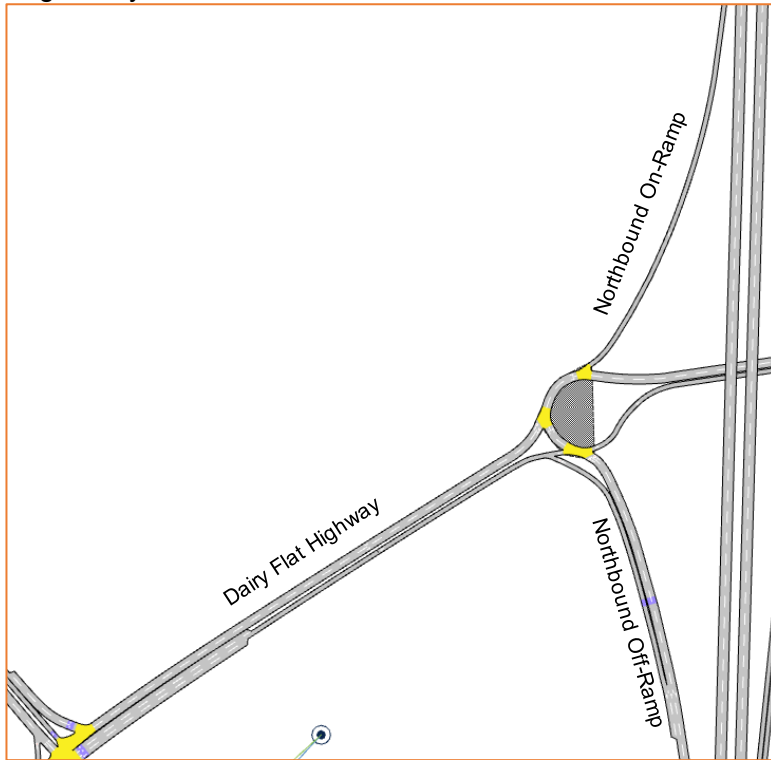
Amended layout:



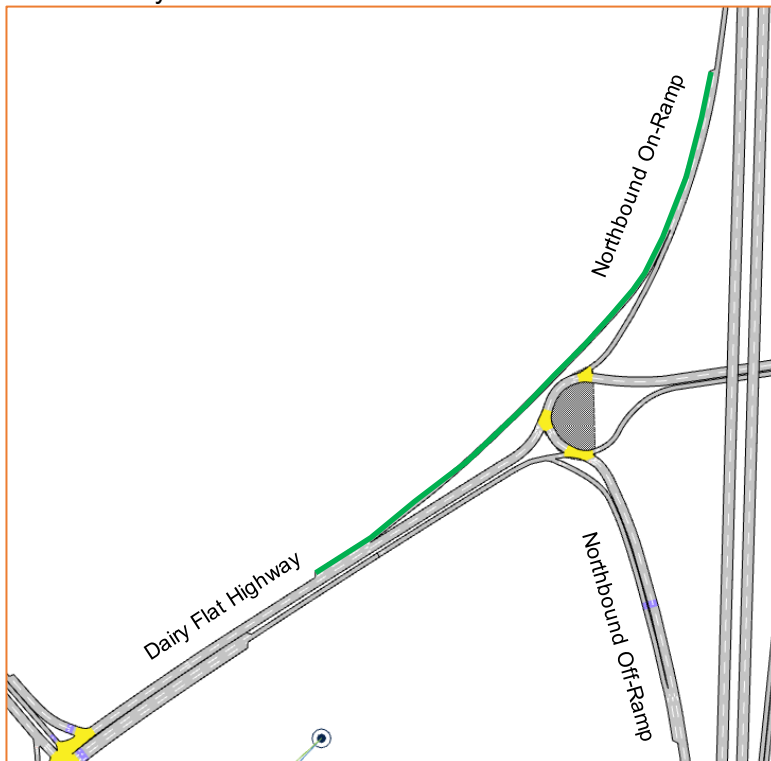
Upgrade 5 (Table IX.6.7.1 (d) of the Precinct Provisions)

- Provision of a slip lane on the western approach to the Silverdale interchange which connects to the northbound on-ramp

Original layout:



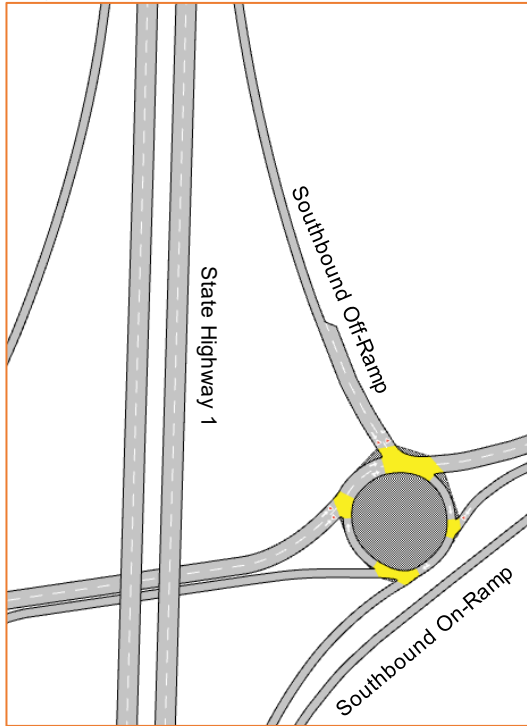
Amended layout:



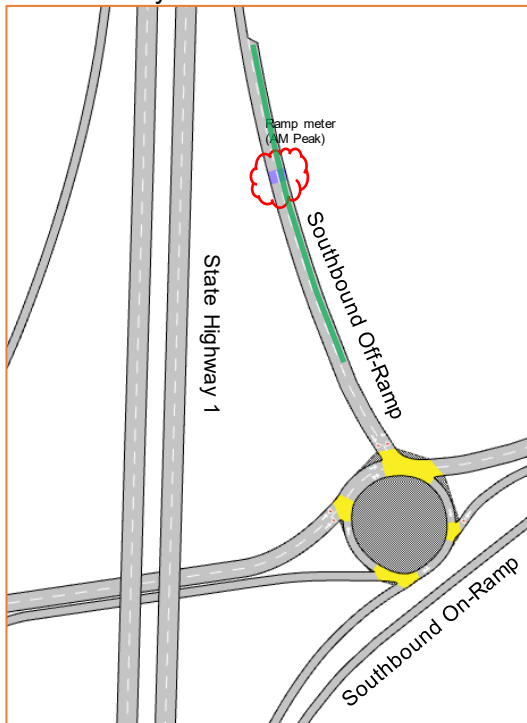
Upgrade 6 (Table IX.6.7.1 (d) of the Precinct Provisions)

- Extending the length of the left turn slip lane on the southbound off-ramp at the Silverdale interchange to around 150m and introducing a ramp meter for the AM peak

Original layout:

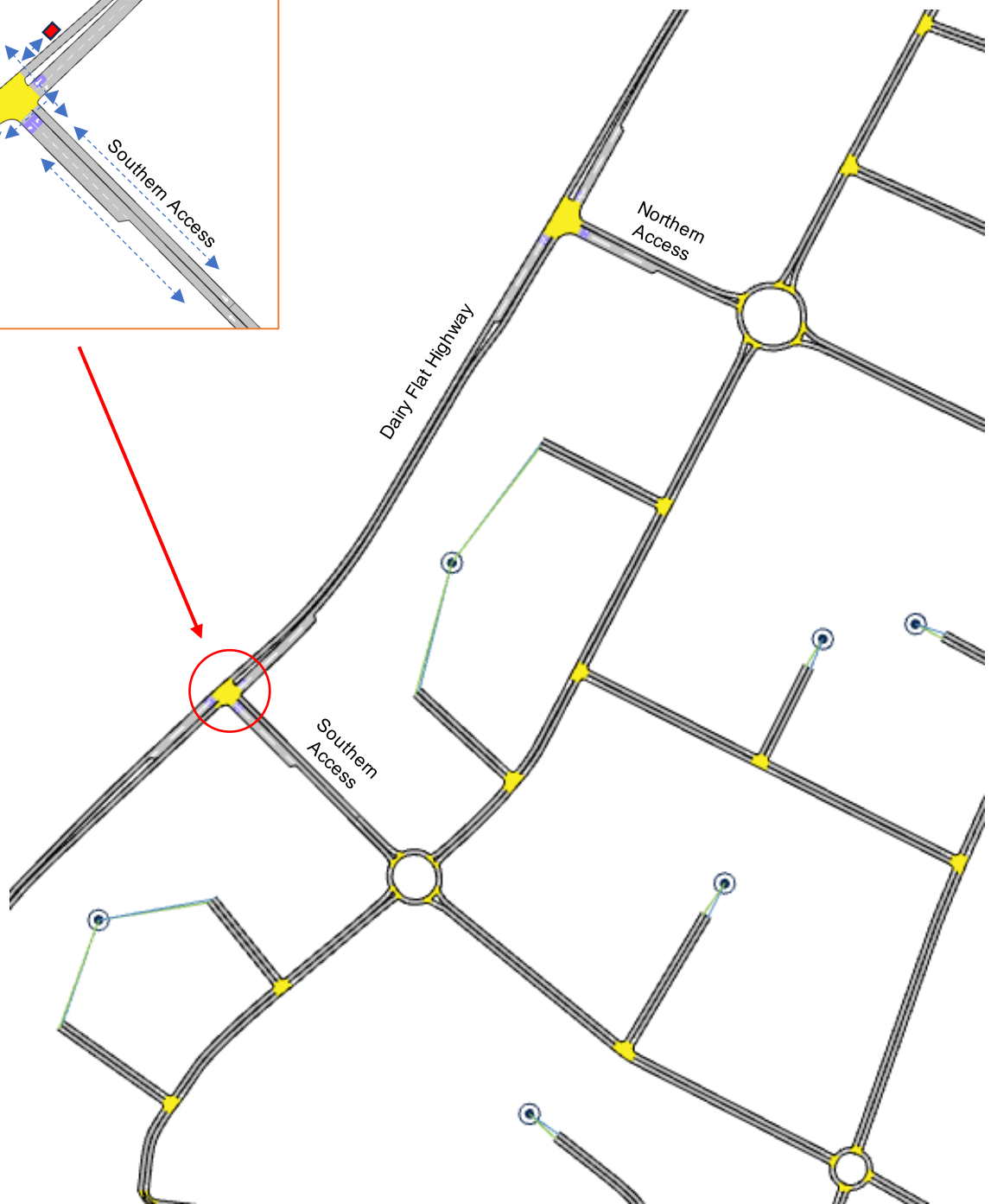
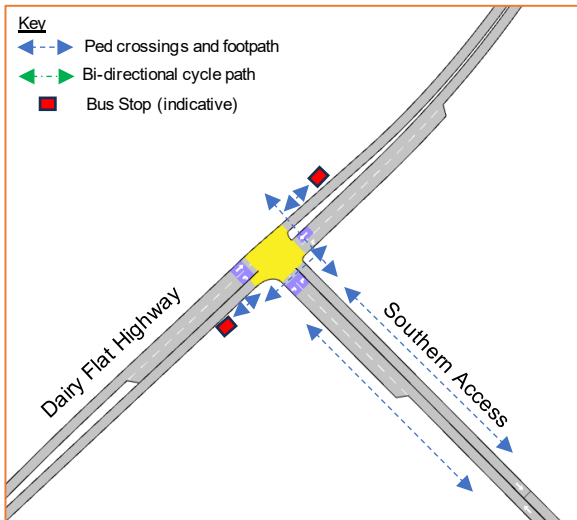


Amended layout:



Upgrade 7

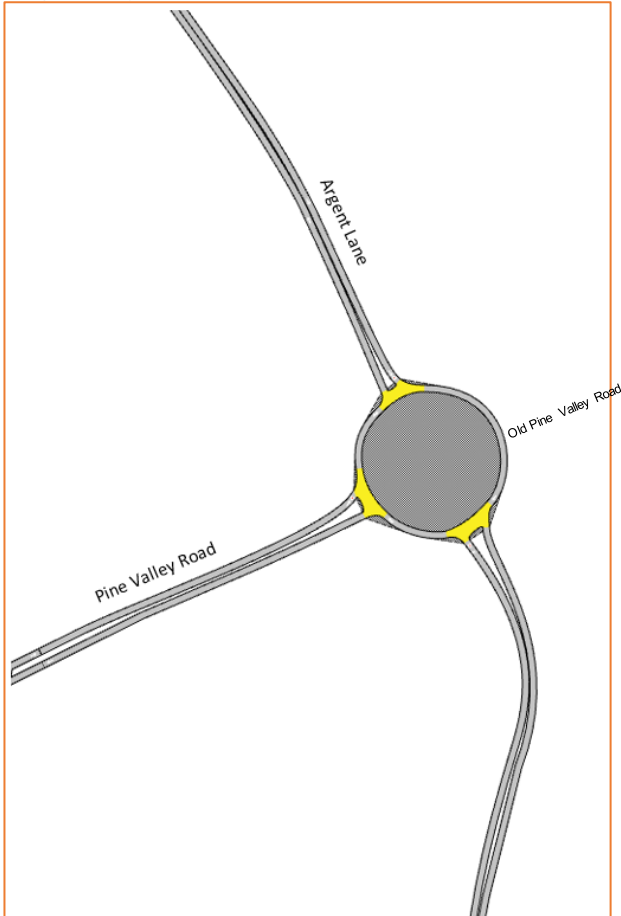
- Provision of a second signalised intersection off Dairy Flat Highway to service the PPC area
 - signalised pedestrian crossings incorporated within the intersection layout
 - advance cycle boxes assumed for all approaches
 - footpaths connecting to the indicative bus stop locations



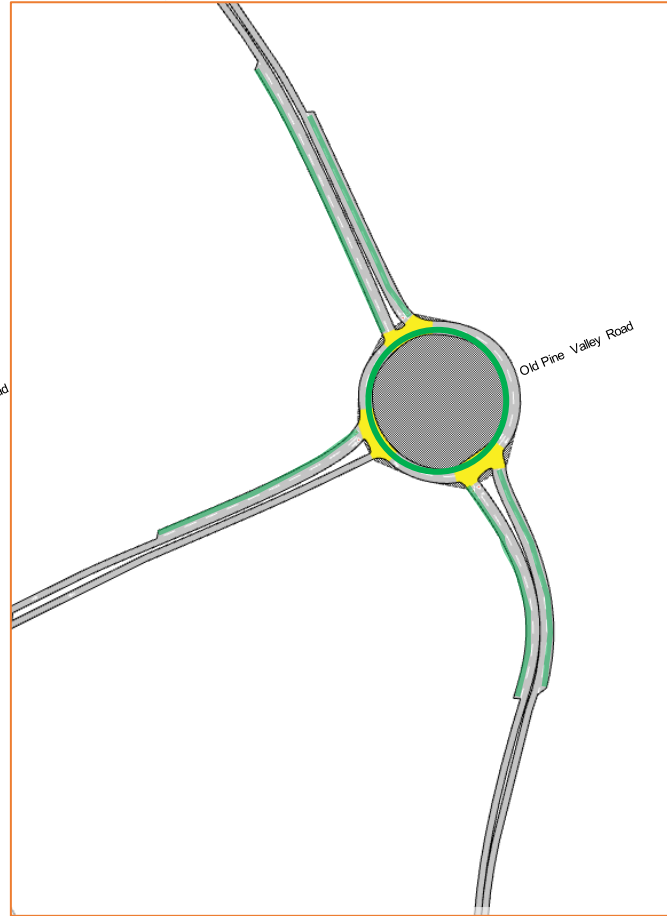
Upgrade 8 (Table IX.6.7.1 (e) of the Precinct Provisions)

- Double-laning of the Argent Lane / Pine Valley Road roundabout

Original layout:



Amended layout:



It should be noted that Old Pine Valley Road has not been specifically included in the model as it is a no-exit road with only a small number of properties accessing it. It can be included once a notable level of future development along the road is identified.

Appendix C

Upgrade Thresholds

Threshold	Upgrade
<p>Prior to any subdivision or development within Silverdale West</p>	<ul style="list-style-type: none"> ▪ Highgate Overbridge constructed and operational ▪ Pine Valley Road / Dairy Flat Highway signalisation ▪ Pine Valley Road upgrade from Argent Lane to Dairy Flat Highway completed; and ▪ Argent Lane completion from John Fair Drive to Wainui Road ▪ Provision of one signalised intersection connecting Silverdale West with Dairy Flat Highway
<p>Prior to the occupation of any buildings associated with the activities proposed for Silverdale West</p>	<ul style="list-style-type: none"> ▪ Provision of a bi-directional cycle lane and footpath along the southern edge of Dairy Flay Highway extending between Pine Valley Road and the northern access to Silverdale West ▪ Provision of cycle lane and footpath infrastructure on Pine Valley Road between Dairy Flat Highway and Argent Lane
<p>More than 28.4ha of Land Available for Development (LAD) being enabled in Silverdale West and up to 36.9ha of LAD being enabled (Table IX.6.7.1 (b) of the Precinct Provisions)</p>	<ul style="list-style-type: none"> ▪ Interim upgrade to Dairy Flat Highway / Pine Valley Intersection (additional right-turn lane into Pine Valley Road from Dairy Flat Highway)
<p>More than 36.9ha of LAD being enabled in Silverdale West and up to 45.4ha of LAD being enabled (Table IX.6.7.1 (c) of the Precinct Provisions)</p>	<ul style="list-style-type: none"> ▪ Signalisation of the Wilks Road / Dairy Flat Highway Intersection; and ▪ Signalisation of the East Coast Road / Wilks Road intersection
<p>More than 45.4ha of LAD being enabled in Silverdale West and up to 53.9ha of LAD being enabled (Table IX.6.7.1 (d) of the Precinct Provisions)</p>	<ul style="list-style-type: none"> ▪ Upgrade to Silverdale Interchange ▪ Provision of a second signalised intersection connecting Silverdale West with Dairy Flat Highway

<p>More than 53.9ha of LAD being enabled in Silverdale West (Table IX.6.7.1 (e) of the Precinct Provisions)</p>	<ul style="list-style-type: none">▪ Upgrade to the Argent Lane / Pine Valley intersection to a roundabout to two circulating lanes
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