



Eltham / Beaver Road Cycle link scheme report

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Report prepared for



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1. Introduction

1.1. Project background and objectives

The project aims to improve and formalise the existing north-south walking and cycling route between the east-west Taylor River Path (a major route included on the New Zealand Cycle Trail) and southern neighbourhoods. As noted in the UCP programme, this (partially) separated path will offer a safer cycle route for the more than 500 students that attend Whitney Street School, Bohally Intermediate and Marlborough Girls College. It will also encourage more people to cycle to the Taylor River Reserve Path to reach the town centre and other destinations in the area. This route is expected to attract around 200 people each day.

The project has the following objectives:

- To provide a cycling environment between the Taylor River Path and Maxwell Street along Beaver and Eltham Road that is suitable for pupils attending Whitney Street Primary School.
- To retain as much parking as practicable.

This project is funded through the Urban Cycleway Programme (UCP) for Blenheim (NZ Transport Agency, 2015¹), along with the extensions to the Spring Creek shared path and the Taylor River Path.

1.2. Alignment with strategic objectives

The Marlborough Regional Land Transport Strategy (2015-2021)² aims to provide for the co-ordination of effective multimodal transport. Under this objective is a policy to facilitate walking and cycling:

- *...Encourage and support people in Marlborough to choose walking and cycling for an active and healthy lifestyle*
- *Develop a safe, convenient and attractive travel network for walking and cycling (p.40)*

The Marlborough Long Term Plan 2015-2025 aims to provide local accessibility that is safe and sustainable, including “healthy and sustainable alternative transport modes; access and mobility for non-drivers”.

¹<https://www.nzta.govt.nz/assets/Walking-Cycling-and-Public-Transport/docs/urban-cycleways/Cycling-fund-regional-factsheet-Blenheim.pdf>

²http://www.marlborough.govt.nz/Services/Parking-Roads-and-Transport/~/_media/Files/MDC/Home/Services/Parking%20Roads%20and%20Transport/FinalRLTPM arch2015_Marlborough.pdf



The Marlborough Urban Design Strategy³ proposes to “where possible, create separate shared cycle / walk paths off the mains roads that link into key areas of the town” and identifies the Eltham/Beaver Cycle Link as one such link.

2. The route

The route (shown with the thick red line in Figure 2-1) connects the Taylor River shared path at the north end to Maxwell Road at the south end.



Figure 2-1: Cycle route with school locations

2.1. Land use and road hierarchy

2.1.1. Beaver Road

Beaver Road is a 940 m long local road that features 6 intersections between White Road at the northern end and Carr Street at the southern end. It is principally a residential road although there are two sizable non-residential properties along Beaver Road; the Blenheim Baptist Church, which occupies the entire west side of the road between Alfred Street and High Street and the Aorangi Motel, which occupies the entire east side of the road between High Street and Charles Street.

Table 2-1: Beaver Road carriageway width

Block	Width
White (Taylor River) to Alfred	7.4 m
Alfred to High	8.2 m
High to Charles	7.5 m
Charles to Arthur	7.5 m
Arthur to George	7.6 m

³<http://www.marlborough.govt.nz/Your-Council/Growing-Marlborough/Blenheim-Town-Centre/Summary.aspx>

Block	Width
George to Monro	9.0 m
Monro to Dillon	8.8 m
Dillon to Carr	6.9 m

Beaver Road is a relatively narrow residential road, with varying carriageway and footpath widths. The width of the road is a key determination to travel speed, parking provision and space for cycling, for this reason the widths for the sections along Beaver Road are shown (Table 2-1). There are no street trees along the entire length of Beaver Road (Figure 2-2) apart from the eastern side between Dillon Street and Carr Street where there is no footpath.



Figure 2-2: existing view of Beaver Road

2.1.2. Eltham Road

Eltham Road is a 640 m long collector road with a 10.5 m kerb to kerb width for most of its length. It starts at a T junction with Dillon Street at the northern end and finishes at a wide median divided intersection at Maxwell Road at the southern end. Carr Street intersects on the east side and Brewer Street, Stratford Street and Rogers Street intersect on the west side. It is principally a residential road although Whitney Street School and the Blenheim Playcentre childcare centre occupy a significant street frontage on the eastern side between Carr Street and Stratford Street. The Marlborough Guides regional hall is located on the west side directly north of Rogers Street.

2.1.3. Carr Street

Carr Street is a relatively short street at 240 m long, linking Eltham Road to Percy Street at Tee intersections. The section between Eltham Road and Beaver Road is 70 m long and has residential properties on both sides of the street. It is relatively narrow at just over 7.2 m wide and there is no footpath on the south side of the road.

2.1.4. Dillon Street

Dillon Street is a secondary collector and 900 m long although the section between Eltham Road and Beaver Road used for the project is 70 m long. It serves single family residential land uses. There is a wide grass berm on both sides with a narrow footpath on the south side and a wider footpath against the boundary on the north side. The street



is relatively narrow at 9.0 m; when cars are parked on both sides there is only 5.0 m available for through traffic, which reduces Dillon Street to one lane where side by side parking occurs.

West of the Eltham Road intersection, Dillon Street at transitions from the relatively narrow road to 14.0 m wide road and forms part of the Lee Street / Eltham Road primary collector route.

2.2. School use of the route

There are three schools identified that will benefit from the cycleway (Figure 2-1); Whitney Street School (primary), Marlborough Girls College and Bohally Intermediate School. Eltham Road cycleway will provide direct access to Whitney Street School. The north – south aspect of the Eltham / Beaver cycleway route within the Blenheim street network indicates that this is a direct and coherent route and is likely to be used by pupils and caregivers accessing Whitney Street School, Marlborough Girls College and Bohally Intermediate School.

The transport mode share is an important measure of how people travel to and from school. The latest 2016 mode share data for Bohally Intermediate and Whitney Street schools have been provided by MDC. Data for Marlborough Girls came from their August 2012 school travel plan.

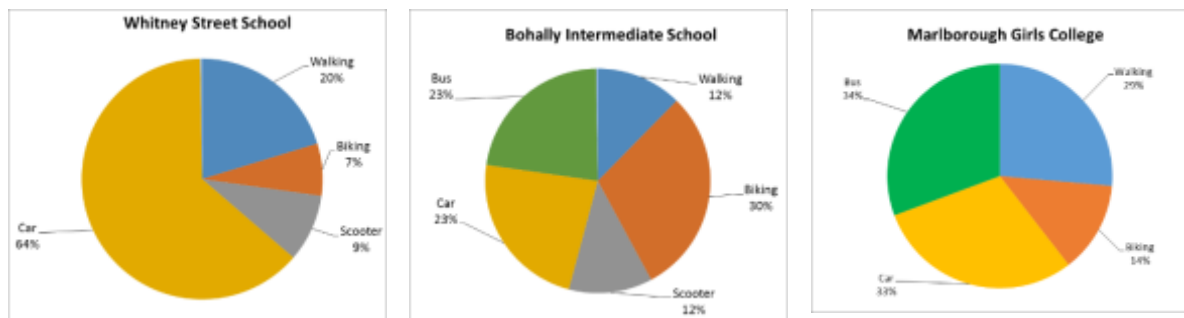


Figure 2-3: Travel mode split pie chart

The travel mode split results are summarised in Table 2-2.

Table 2-2: Travel mode split

School	Year	Walking	Biking	Scooter	Car	Bus	Total
Whitney Street	2016	20%	7%	9%	63%	0%	100%
Bohally	2016	12%	30%	12%	23%	22%	100%
Marlborough Girls	2012	29%	14%	0%	33%	34%	110%

Bohally Intermediate School has the highest biking (30%) and scooter (12%) mode share with the lowest walking (12%) and car use (23%) mode share. Whitney Street School has the lowest biking (7%) and the highest car use at (63%). Nevertheless, at least a dozen children are typically seen cycling and even more scooting to Whitney.

Marlborough Girls College is relatively evenly split between walking (29%) car use (33%) and bus (34%). 14% bike to school and no one comes by scooter.



A change in travel behaviour is expected with the implementation of a cycleway that is safe, convenient, attractive and integrated into the network⁴. It will be possible to measure any change in mode share to determine the use of the facilities and whether the project has been successful.

2.3. Traffic data

Traffic counts were undertaken for Marlborough Roads by J & T McDowell on Eltham Road and Beaver Road from Saturday 12 November to Friday 25 November. The traffic counters were located at number 11 Beaver Road and at 18b Eltham Road.

2.3.1. Beaver Road

The week day traffic flow on Beaver Road is very consistent, with a 5 day average of 607 vehicles per day (VPD). The vehicle counting equipment classified 94% of vehicles using Beaver Road as light vehicles and 3.4% as bicycles or motorbikes.

Table 2-3: Beaver Road average VPD

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Average VPD	584	567	625	603	656	541	458



Figure 2-4: Beaver Road average VPD graph

The hourly traffic count graph (Figure 2-5) indicates no morning peak but a consistent flow of 30 to 40 vehicles per hour between 8:00 am and 4:00 pm, when school cyclists are likely to use the road, with an increase to 50- 60 vehicles per hour in the afternoon peak between 4:00 pm & 6:00 pm.

⁴ Criteria taken from the adopted Marlborough Walking and Cycling Strategy 2010.

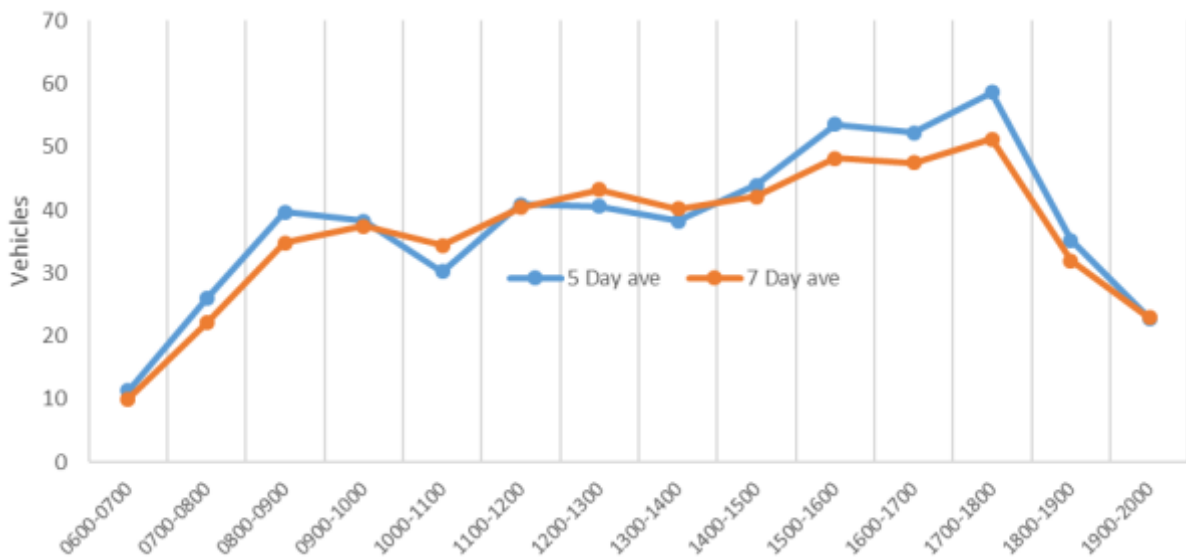


Figure 2-5: Beaver Road hourly traffic count

The key speed environment indicators for Beaver Road are noted in (Table 2-4).

Table 2-4: Beaver Road speed data

	85%	Median	Max.	Above 50km/h	Above 60 km/h
Speed	48.6 km/h	40.3 Km/h	96.4 Km/h	11.4%	1.1%

At 48.6 km/h, the 85th percentile speed is just below the posted speed limit of 50 km/h and indicates that the speed environment is appropriate for a residential road but is well above the recommended speed of 30 km/h for a neighbourhood greenway.

2.3.2. Eltham Road

As can be seen in (Table 2-5) and (Figure 2-6) the Monday to Friday week day traffic flow is very consistent, with a 5 day average of 4,449 VPD. The vehicle counting equipment classified 98% of vehicles using Eltham Road as light vehicles, with 1.2% bicycles or motorbikes.

Table 2-5: Eltham Road average VPD

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Average VPD	4,364	4,285	4,553	4,417	4,625	3,591	3,231

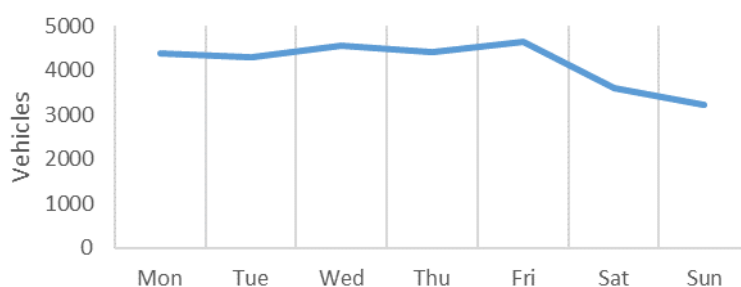


Figure 2-6: Eltham Road average VPD graph

The hourly traffic count graph (Figure 2-7) indicates a clear morning peak hour between 8:00 am & 9:00 am with a longer afternoon peak between 3:00 pm & 6:00 pm.



Figure 2-7: Eltham Road hourly traffic

The total number of vehicles recorded over the 14 days in the Eltham Road traffic count was 54,456. The key speed environment indicators are noted in Table 2-6.

Table 2-6: Eltham Road speed data

	85%	Median	Max.	Above 50km/h	Above 60 km/h
Speed	50.8 km/h	45.4 Km/h	116.6 Km/h	19%	0.8%

At 50.8 km/h, the 85th percentile speed is only just above the posted speed limit of 50 km/h and indicates that the speed environment is appropriate for a residential road.

Table 2-7 shows the number of vehicles recorded exceeding the posted speed limit categorised in 10 km/h bands. A review of the speed data that shows that the more extreme speeds are generally recorded late at night or very early morning. Of concern however, is that a number of the 414 vehicles recorded as travelling faster than 60 km/h were doing so during school hours.



Table 2-7: Eltham Road speed bands

	Speed bands (km/h)					
	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100	>100
Number exceeding	9916 (18.2%)	371 (0.7%)	35	3	3	2

2.4. Crash history

A search was undertaken of the NZTA Crash Analysis System (CAS) to identify recorded crashes on Eltham Road and Beaver Road in the preceding 5 year period. The crash reports are attached in Appendix A.

No crash patterns were apparent in either road, however we note that of a total of 19 crashes, 6 (32%) occurred at the Dillon Street intersections with Eltham and Beaver. Three occurred at the Beaver / Dillon intersection and all were a result of failure to give way. Three occurred at the Eltham / Dillon intersection with one a failure to give way, one a loss of control and one a rear end crash.

2.4.1. Beaver Road

There have been 10 crashes recorded on Beaver Road in the five-year search period with no obvious crash pattern. There have been no fatal or serious injury crashes, but two crashes resulted in minor injuries. As would be expected, nine of the 10 crashes occurred at intersections (*Figure 2-8*); three at Dillon Street, two at George Street, two at Arthur Street and one each at High Street and White Street. Failure to give way was causal in eight of the crashes.

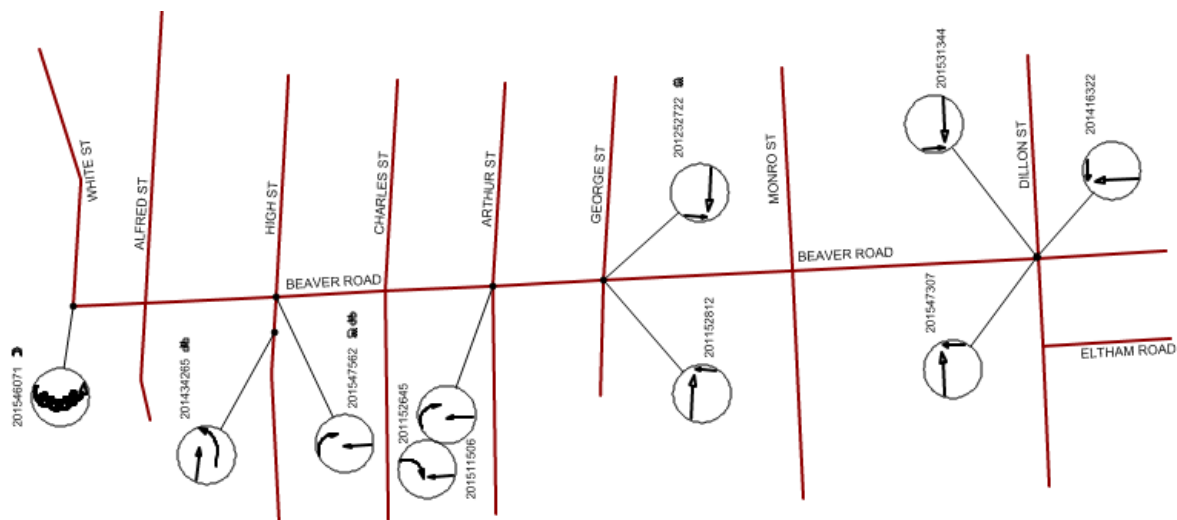


Figure 2-8: Beaver Road five year crash map

The non-intersection crash occurred on High Street, 30 metres west of Beaver Road, and involved a cyclist hit by a vehicle entering or exiting a driveway.

2.4.2. Eltham Road

There have been nine crashes recorded on Eltham Road in the five-year search period with no obvious crash pattern. There have been no fatal crashes, but one crash resulted in serious injury and two in minor injuries. The serious injury crash involved a cyclist eastbound on Maxwell Road hit by a vehicle turning right from Eltham Road and failing to give way.

Seven of the nine crashes occurred at intersections (Figure 2-9); three at Dillon Street and one each at Carr, Brewer, Stratford and Maxwell. Failure to give way was causal in three of the crashes and loss of control in two of the crashes. In the loss of control crashes, one was evading police and alcohol suspected as a factor in the other.

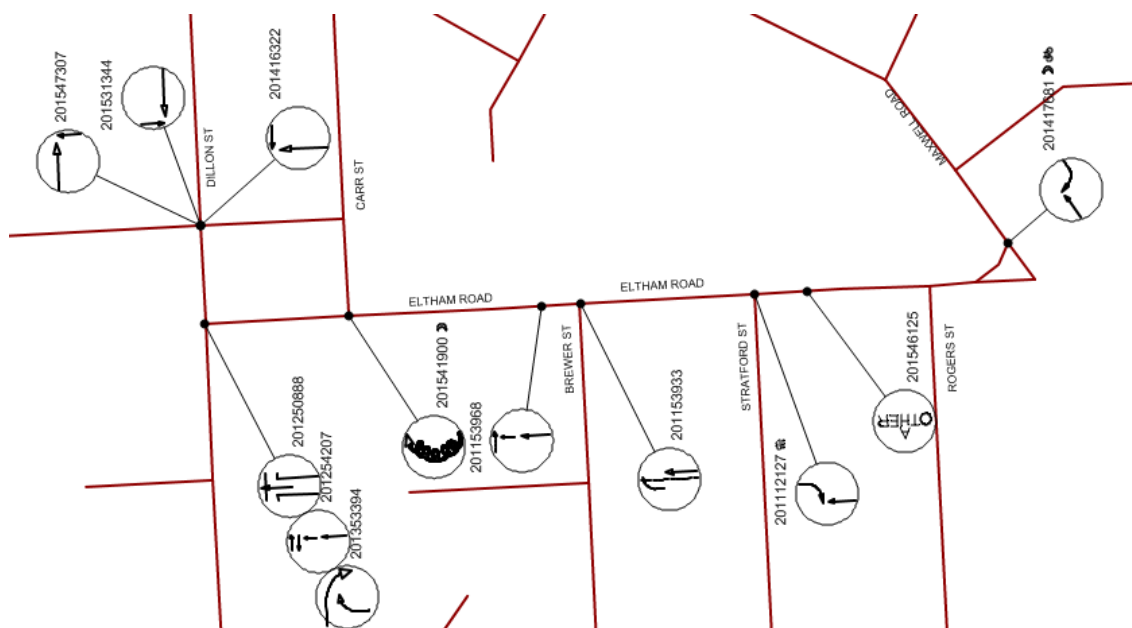


Figure 2-9: Eltham Road five year crash map

Both non-intersection crashes occurred on Eltham Road, one 30 m north of Brewer Street where a car that slowed for a pedestrian was rear ended and the other occurred 40 m south of Stratford Street and involved a northbound vehicle hitting a parked car.

2.5. On-street parking

A survey of parking availability and occupancy on Eltham and Beaver Roads was undertaken by MR staff on Thursday 22 September 2016. The surveyed roads were divided into segments, typically between intersecting side roads, and the number of available spaces in each segment identified. The actual number of vehicles parked in each segment was recorded in 30 minute intervals between 7:00 am and 7:00 pm.

2.5.1. Beaver Road

Beaver Road is a relatively narrow residential road, which the survey indicates has a low demand for parking. Apart from parking restrictions in the form of broken yellow lines (BYLs) outside the Blenheim Baptist Church between Alfred and High streets, there are no other parking restrictions. There are two sizable non-residential properties along Beaver Road that provide off street parking.



(Table 2-8) shows the number of available on-street parking spaces in each segment and the highest number of parked vehicles recorded in any 30 minute period between 7:00 am and 7:00pm. The only segment where parking demand exceeded 33% of available spaces was the west side of the Arthur / George segment. Of the seven available spaces, four were occupied although there were 10 spaces available on the east side of the road.

Table 2-8: Beaver Road parking demand

Segment	Side	Land use	Parking restrictions	Available parking	Maximum occupancy
Alfred/High	West	Baptist Church	BYLs	3	0 (0%)
	East	Residential	None	11	3 (27%)
High/Charles	West	Residential	None	9	3 (33%)
	East	Aorangi motel	None	8	1 (13%)
Charles/Arthur	West	Residential	None	9	2 (22%)
	East	Residential	None	10	0 (0%)
Arthur/George	West	Residential	None	7	4 (57%)
	East	Residential	None	11	1 (9%)
George/Monro	West	Residential	None	15	3 (20%)
	East	Residential	None	15	4 (27%)
Monro/Dillon	West	Residential	None	20	6 (30%)
	East	Residential	None	20	4 (20%)
Dillon/Carr	West	Residential	None	6	2 (33%)
	East	Residential	None	12	3 (25%)

2.5.2. Eltham Road

The Eltham Road entry to the Whitney Street School and the Blenheim Play Centre / Childcare Centre is located on the east side of Eltham Road just south of the Brewer Street intersection. As would be expected, parking demand is high here and peaks at school drop off and pick up times, with the highest demand at 3:00 pm when caregivers park and wait to collect children. The parking demand is centred around the zebra crossing which is located close to the school entrance. The survey also indicated high parking demand between 9:30 am and 11:30 am which is expected to be associated with dropping children off at the childcare centre.

Table 2-9 shows the parking availability and occupancy in the various segments of Eltham Road at 3:00 pm, the highest parking occupancy period.

Table 2-9: Eltham Road parking demand

Segment	Side	Land use	Parking restrictions	Available parking	Occupancy at 3 pm
Dillon/Carr	West	Residential	Bus stop	6	0 (0%)



Segment	Side	Land use	Parking restrictions	Available parking	Occupancy at 3 pm
Carr/School field	East	Residential	None	12	0 (0%)
	West	Residential	None	7	0 (0%)
	East	Residential	None	5	3 (60%)
School field/Brewer	West	Residential	None	11	8 (73%)
	East	School field	None	17	14 (82%)
Brewer/Stratford	West	Residential	30m BYLs 2 - P15 parks	9	7 (78%)
	East	Day care / school Residential	26m BYLs 6 - P15 parks	13	10 (77%)
Stratford/Rogers	West	Residential	None	12	0 (0%)
	East	Residential	None	14	2 (14%)
Rogers/Maxwell	West	Residential	None	5	0 (0%)
	East	Residential	None	6	1 (17%)

The following three diagrams graphically indicate the parking occupancy on Eltham Road at 8:30 am, 11:30 am and 3:00 pm. The segment between Brewer Street & Carr Street is split into two sections; the section in front of the school fields and the remainder to Carr Street.

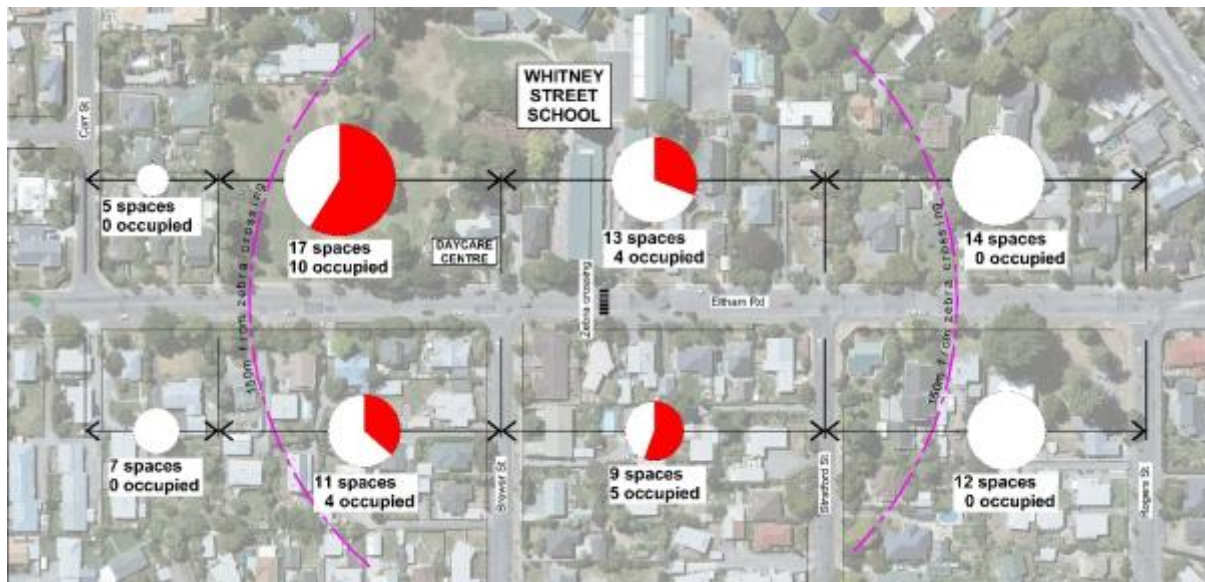


Figure 2-10: Eltham Road parking demand at 8:30 am



Figure 2-11: Eltham Road parking demand at 11:30 am

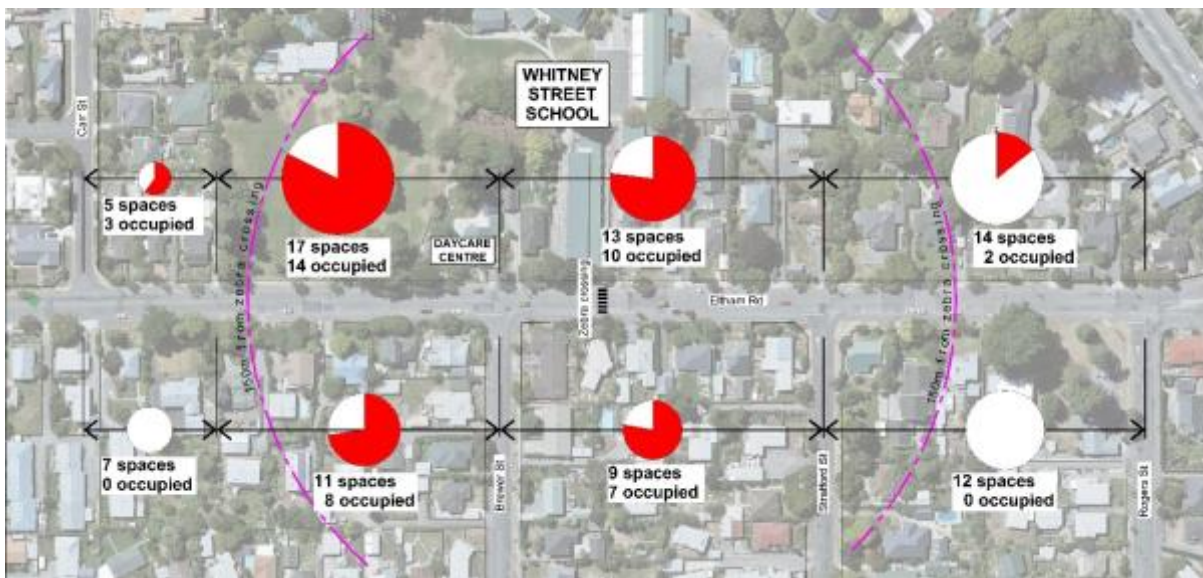


Figure 2-12: Eltham Road parking demand at 3:00 pm

Figure 2-10, Figure 2-11 and Figure 2-12 show that there is high parking demand on the east side of Eltham Road and any reduction in the parking availability will see these cars displaced to other locations (although some parents may choose to allow their children to use active travel modes as a result of the project). As can be seen there are other parking options within 150 m of the zebra crossing, in Eltham Road, Brewer Street and Stratford Street.

The parking occupancy in Brewer Street and Stratford Street has also been measured in the afternoon peak hour between 2:00 pm and 3:00 pm.

2.5.3. Stratford Street

The section of Stratford Street, from Eltham Road to No 8/10 Stratford Street has capacity for 25 parallel parked vehicles. During the survey, one car was parked on the south side

and three cars were parked on the north side. This indicates there is capacity for 21 more car parks in this street. Stratford Street is only 9.0 m wide which results in a 5.0 m wide carriageway when cars are parked on both sides. Should this street become fully parked with relocated vehicles from Eltham Road, the street will be reduced to one lane. This means drivers will need courtesy to pull into available space to allow another vehicle past. This should be monitored and parking restrictions considered as required.

2.5.4. Brewer Street

The section of Brewer Street (from Eltham Road to Argosy Street) has capacity for 28 parallel parked vehicles. During the survey, three cars were parked on the south side and two cars were parked on the north side. This indicates there is capacity for 25 more car parks in this street. Brewer Street is also 9.0 m wide and may have single lane flow during high parking demand. This may need to be monitored and parking restrictions considered if needed.

3. Option development

The options described in the following sections should be read in association with the relevant concept plans attached in Appendix B.

3.1. Overview

The proposed cycle route link between the Taylor River path and Maxwell Road is comprised of two different facility types; approximately 1 km of on-road cycling on Beaver Road and Carr Street and approximately 500 m of separated cycle path on the east side of Eltham Road. Sub options have been developed for both facilities that are considered interchangeable. Any Beaver Road option can be matched with any Eltham Road option. The options proposed in this report are based on the options discussed in the Eltham Road / Carr Street / Beaver Road Cycle Link report prepared by ViaStrada for MDC in January 2011, concepts refined in February 2017, and consultation undertaken during July 2017.

3.2. Costing

Rough order cost (ROC) estimates have been revised since the February options report, reflecting an increased level of certainty about project variables. A lower contingency (ranging from 0% to 20%) has been applied, however no survey has been undertaken and there is some risk in using these lower figures. Value engineering may be needed to remain within budget if there are unforeseen issues. In addition, the cost of the fencing work has been increased from a sum adequate for fence relocation (\$50 per metre) to a new fence (\$150 per metre).

3.3. Public engagement

Engagement was led by the Sport Tasman representative on the project team, with support from MDC's communications team. Key steps included:



- 26 April 2017 – open council meeting to consider concept report and seek approval for public engagement; followed by media reporting
- 27 April 2017 – meetings with Whitney school principal and a parent representative of the day care centre
- 28 June 2017 – meetings with Whitney school principal and board of trustees
- Late June and early July – residents affected by cycleway (invited by letter drop) and wider community (invited through MDC comms channels)
- 8 July 2017 – public ‘drop-in’ session at Whitney School with 26 members of the public attending
- 10 July to 1 August – three phone calls received

Three phone calls and 41 written responses were received (seven emails, 22 online response forms, six postal response forms, and six drop-in session response forms). Typical concerns included:

- Narrow width of general traffic lanes for options A and C
- Loss of parking on east side
- Impact on school field trees
- Concern from resident on the east side of Eltham Road at the corner with Maxwell Road about parking, access and safety

Of the 23 respondents who indicated a preference for Eltham Road options, two favoured option A, six option B, seven option C, and eight option D. The feedback has been incorporated into the design development for the Eltham Road segments.

The focus of the consultation was on Eltham Road, as only minor parking impacts (if any) are anticipated for the Beaver Road segments. Further engagement is recommended for Beaver Road residents when the detailed design and any changes of intersection priority are further developed.

4. Beaver Road options

4.1. Design options considered

A **shared path** may be feasible in some short sections of Beaver Road, but much of Beaver Road features narrow (2m) footpaths with no separation to property boundaries, multiple driveways and high fencing or hedges that restrict inter-visibility between vehicles exiting driveways and path users. Cyclists using the footpath would be required to cross the road at every intersection. This environment is not suitable for the footpath to operate as a shared path and this is not considered a feasible option for Beaver Road.

Cycle lanes would require a minimum kerb to kerb road width of 8.4 m, based on two 1.2 m cycle lanes and two 3.0 m traffic lanes and removal of all road side parking. Of the 8 segments that make up Beaver Road, only Dillon Street to Monro Street and Monro Street to George Street exceed 8.4 m in width. It is extremely unlikely that the Beaver Road residents in these segments would accept removal of all on street parking to allow the installation of cycle lanes. The average width of the remaining segments is 7.5 m and too narrow to accommodate cycle lanes. It would not be possible to create a coherent



route of cycle lanes along Beaver Road and this is not considered a feasible option for Beaver Road.

A **neighbourhood greenway** is proposed because the other two options are considered infeasible and it is appropriate given the low existing traffic volumes (600 vpd, refer section 2.3.1). As speed data indicates an 85th percentile of 48.6 km/h, traffic calming measures would further support the proposal (as per options B and C that follow). According to the NZTA⁵, neighbourhood greenways:

also known as 'quiet streets', 'slow streets' and 'bicycle boulevards', are streets with low volumes of motor traffic (preferably below 1,500 vehicles per day, with an upper limit of about 3,000 vehicles per day, depending on available width) travelling at low speeds (i.e. 30 km/h or slower), creating an environment where travel by cycle is pleasant without requiring specific cycle facilities. Neighbourhood greenways generally incorporate lower speed limits and, more importantly, physical measures to ensure low traffic speeds. Road markings (such as sharrow markings) may be used to indicate to cyclists and motorists that they are expected to share the same road space. Physical measures may be used to restrict the movements available to motorists in and out of a neighbourhood greenway, thus controlling vehicle volumes, while allowing permeability to people cycling.

Three options for a neighbourhood greenway have been developed for Beaver Road, as further described in the following sections:

- A. Do minimum (signs and markings only)
- B. Safer crossings plus signs and markings
- C. Traffic calming, safer crossings, signs and markings

4.2. Beaver Road option A: signs and markings

Refer plan C01 and C02, rough order cost (ROC) \$18,000

This do-minimum option is limited to warning signs (one per block in each direction) and sharrows installed at 70 m intervals. While the signs and markings would help, riders would need to cross Alfred Street, High Street, Monro Street, Dillon Street & Carr Street. In March 2009, traffic counts show that High Street carried 8,058 VPD which is a high number for interested but concerned cyclists to cross.

In all options considered for Beaver Road, signs and markings are proposed to highlight the route and promote courtesy. Sharrow markings (Figure 4-2) became legal road markings on 1 December 2016 and are proposed for Beaver Road and Carr Street. According to the NZTA⁶, sharrows:

- *Help reinforce that the carriageway is a valid place for cyclists to travel (reinforcing to other road users to act accordingly)*
- *Help to position cyclists on the street, clear of hazards like car doors and pinch points like kerb build outs and stormwater grates*

⁵ <https://www.nzta.govt.nz/walking-cycling-and-public-transport/cycling/cycling-network-guidance/designing-a-cycle-facility/between-intersections/neighbourhood-greenways/>

⁶ <https://www.nzta.govt.nz/assets/Walking-Cycling-and-Public-Transport/docs/cycling-network-guidance/Sharrows-R1E160203-Best-Practice-Guidance-Note-Feb-2016.pdf>

- Help the cyclist 'occupy' the traffic lane when it is safe and appropriate to do so.



Figure 4-1: PW-35 Cyclists sign



Figure 4-2: Sharrow marking

4.3. Beaver Road option B: safer crossings

Refer plan C03 and C04, ROC \$115,000

In addition to the option A signs and markings, median islands would be installed on High Street to assist with road crossing and Beaver Road would be given priority over Alfred, Monro & Dillon streets. This would improve the comfort and travel time for cyclists but may also result in higher motor vehicle speeds. There will be some loss of parking at the High Street intersection to accommodate the proposed median islands.



Figure 4-3: median refuges to aid crossing at High Street; please refer to full plans in Appendix B for balance of proposals along Beaver Road

4.4. Beaver Road option C: traffic calming

Refer plan C05 and C06, ROC \$170,000

Safer crossings and traffic calming: in addition to the features of options A and B, this option would include some form of traffic calming. Calming could include landscaping or street trees in kerb build-outs (Figure 4-4). This would improve the visual amenity and road safety for all residents and road users as well as the comfort of people riding bikes. However, some reduction in on-street parking would be required to install traffic calming features (refer to parking assessment in section 2.5.1).



Figure 4-4: Example of landscaped traffic calming with cycle bypass, Palmerston North

4.5. Beaver Road option D: Dillon Street

Refer plan C07, ROC \$125,000

Option D could be applied to any of the previous options and consists of a 2.4 m wide shared path and 0.3 m buffer along the north side of Dillon Street (between Beaver and Eltham roads) as well as additional crossing facilities usable for the general public at any time of day. It would cross Carr Street via a raised platform where it joins the Eltham Road separated cycleway described in section 5. This would also include the opportunity to install kerb build outs in the wider portion of Eltham Road for street trees and indented parking, making the entire Eltham Road corridor more continuous.



Figure 4-5: Dillon Street alternative route rather than Carr Street

4.6. Beaver Road option evaluation

As shown in Table 4-1, each option has been assessed against five main criteria. A negative outcome is assigned an "X", a neutral outcome a circle, and a positive outcome a



tick mark. Scores are 0, 1 or 2 respectively, with parking weighted double and safety weighted triple the other three criteria.

Table 4-1: Beaver Road option evaluation

	Stakeholder	Criteria					Total score
		Safety	Coherent	Attractive	Parking	Acceptance	
Option A	Cyclists	✗	✓	●	✗	✓	5
	Residents	●	●	●	●	●	8
	Community	●	●	●	●	●	8
Option B	Cyclists	●	✓	●	✗	✓	8
	Residents	✗	●	●	●	●	5
	Community	●	●	●	●	●	8
Option C	Cyclists	✓	✓	✓	✗	✓	12
	Residents	✓	●	✓	●	✗	11
	Community	●	●	✓	●	●	9
Dillon St alternative	Cyclists	✓	✓	✓	✓	✓	16
	Residents	✓	●	●	●	✓	12
	Community	✓	●	✓	●	✓	13
✗ indicates a negative outcome		● indicates a neutral outcome			✓ indicates a positive outcome		

The difference between Option B and Option C is the introduction of traffic calming (if required) to address poor compliance with the 30 km/h speed limit and the potential for the intersection priorities to induce “rat running”; both of which pose a safety concern for cyclists. MDC may prefer to construct Option B and monitor speed and traffic volumes in Beaver Road and introduce traffic calming if required. If Option B is constructed, then consideration should be given to including the Dillon Street alternative option as noted above.

Option C has the best outcome for cyclists, and also has the highest score for the other two stakeholder groups. The Dillon Street alternative (versus Carr Street, which may be chosen for any of the options) would deliver the highest scoring outcomes for all three stakeholder groups and can be added to any of the options either at the same time or as a future stage of work when funding is available.

Table 4-2 summarises the Beaver Road option costs.



Table 4-2: Beaver Road cost estimate summary

	Option A	Option B	Option C	Option D
ROC	\$18,000	\$115,00	\$170,00	\$125,000

These estimates include a variable contingency depending on the complexity of work and survey needs, and exclude GST. The cost of Option D would be additional to other option costs.

Given the constraints of the overall budget, it is recommended that MDC select option B and consider adding the features of options C and D in future if warranted by the data and subject to funding availability.

5. Eltham Road options

In the original options report, four options were developed for Eltham Road between Carr Street and Maxwell Road:

- A. 2.7 m cycleway and 2.8 m traffic lanes, no parking on east side
- B. 3.2 m cycleway and 3.0 m traffic lanes, no parking on east side; move west kerb
- C. as per option A, with parking for 10-12 cars on east side by using school grounds
- D. as per option B, with parking for 10-12 cars on east side by using school grounds

As a result of the consultation, a new combination option has been developed:

- E. 2.7 m cycleway and 3.0 m traffic lanes, parking for 10 cars on east side by using school grounds, indented parking on west side rather than full kerb realignment

In all options, the physical separation between the cycle lane and the general traffic lane would be achieved with vertical flexi-post bollards and/or a kerb separator with small, regular openings to facilitate stormwater drainage and larger openings at driveways. All options join a shared path through the median island about 20 m north of Maxwell Road.

Each of the options is summarised in the following sections.

5.1. Eltham Road option A

Refer plan C10, ROC \$150,000

A 2.7 m separated two-way cycle lane and 2.8 m general traffic lanes with no change to west side kerb.

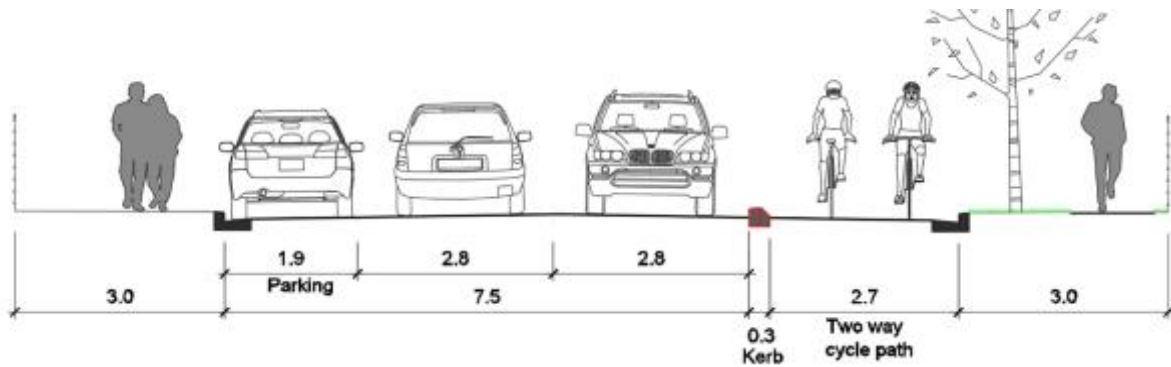


Figure 5-1: Eltham Road Option A cross section

5.2. Eltham Road option B

Refer plan C11, ROC 332,000

A 3.2 m separated two-way cycle lane and 3.0 m general traffic lanes; achieved by shifting west side kerb over 1.0 m (narrowing the existing footpath). Road widening on the west side requires new kerb, new dish channel, new seal & stormwater modifications.

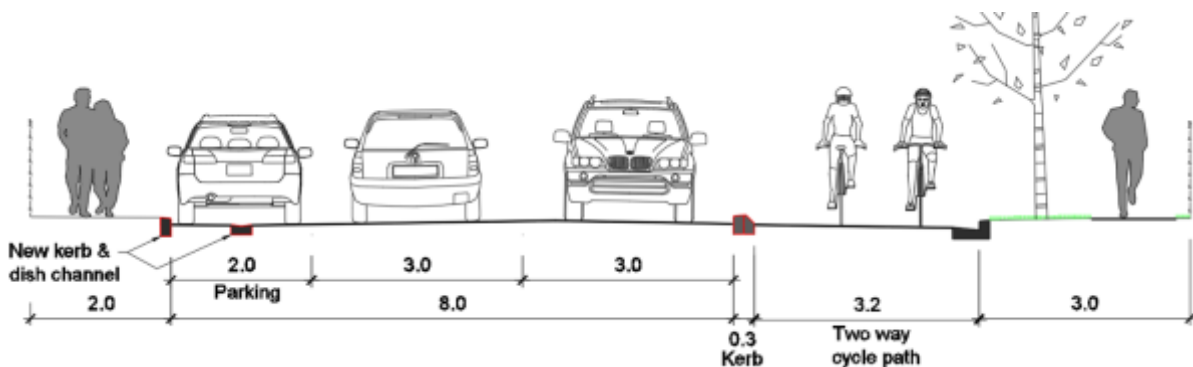


Figure 5-2: Eltham Road Option B cross section

5.3. Eltham Road options C and D using paths in school field

Adds \$31,000 to options A or B

For option C, refer plan C12, ROC total \$181,000

For option D, refer plan C13, ROC \$362,000

These options modify options A and B with a path along the school field to retain between 10 and 12 carparks on the east side near the school. The path would be designed to minimise the impact on existing trees and would not preclude future use of the area for other purposes. The land would not be acquired, but only used under an easement (whether formal or informal). The school board advised that the existing fence was consider insufficient and as it would need to be relocated, the project could help the school by replacing it with a similar fence that meets the school's requirements.

During the consultation process, three design variations were developed for the path through the school grounds. The full plans are provided in Appendix B. In summary, the three options are:

1. Option 1 is as per original design, with cycle path near kerb and footpath east of that; this has been discounted due to the impact on trees and potential conflicts with students embarking or disembarking from cars (plan C21)
2. Option 2 is a shared path to save space and limit impact on trees; this has been discounted due to the low level of service for both pedestrians and cyclists (plan C22)
3. Option 3 is the recommended option with a footpath near kerb for pickup and dropoff; this conserves space relative to option 1 and only requires a 'conflict zone' treatment at the two crossover points with the footpath (plan C23, with extract in Figure 5-3). This has the least encroachment into the school field.

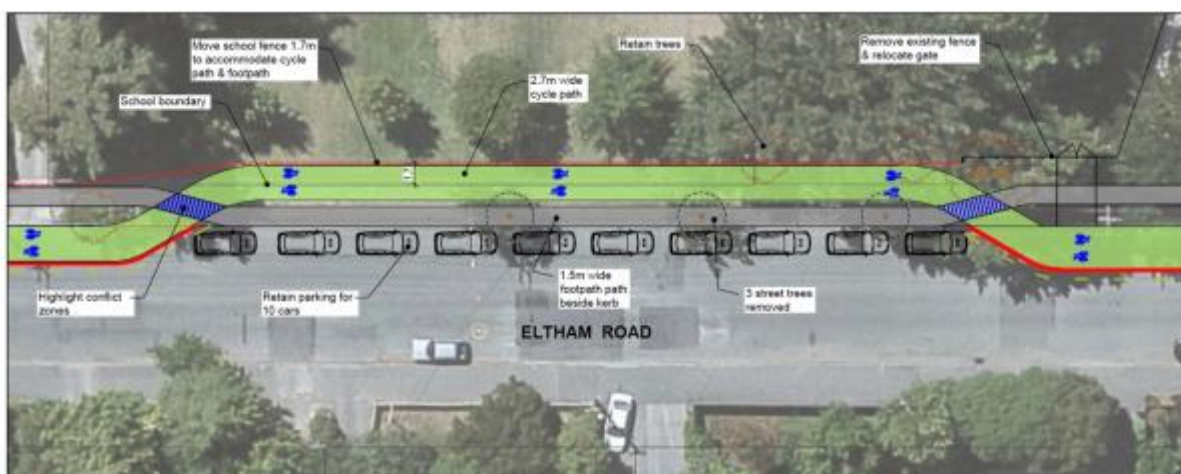


Figure 5-3: revised design for paths along school field (applies to options C, D, E)

5.4. Eltham Road option E

Variation of other options with cross sections as follows, ROC \$362,000

There are several impediments to fully shifting the west kerb as illustrated for option D – the existing kea crossing at the school entrance; several street trees; and various utilities. Concern was also raised about the constrained traffic lanes of options A and C. Therefore, a fifth option was developed during the consultation process as a hybrid of the previous options, with:

- 2.7 m separated cycle lane (as per option A)
- 3.0 – 3.25 m general traffic lanes (as per option B)
- parking on both sides of the road, achieved with the path along the school field (as per options C and D) and by indenting west side parking wherever possible, rather than shifting the entire west kerb.

Apart from the segment along the school field, this option requires 11.5 m of space (2.0 m for west side parking, 6.0 to 6.5 m for general traffic, 3.0 m for the two-way cycleway and separator). As there is only about 10.5 m of width between existing kerbs south of Carr Street, the indentation into the west kerb alignment would be about 0.5 to 1.0 m. All measurements are subject to a full survey and detailed design.

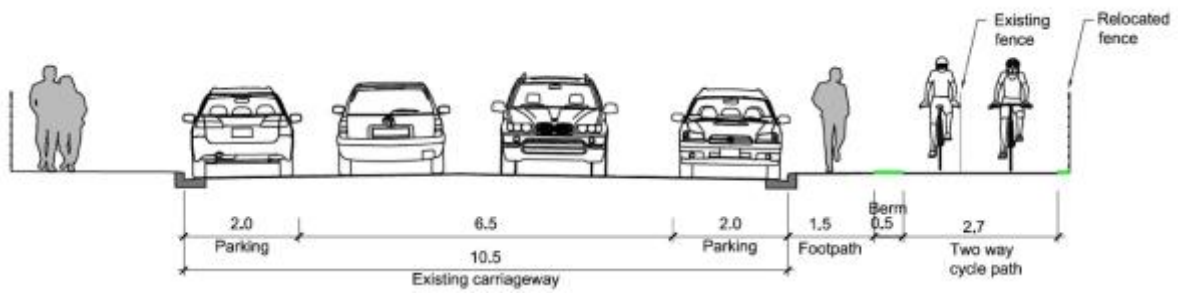


Figure 5-4: typical section at school field frontage

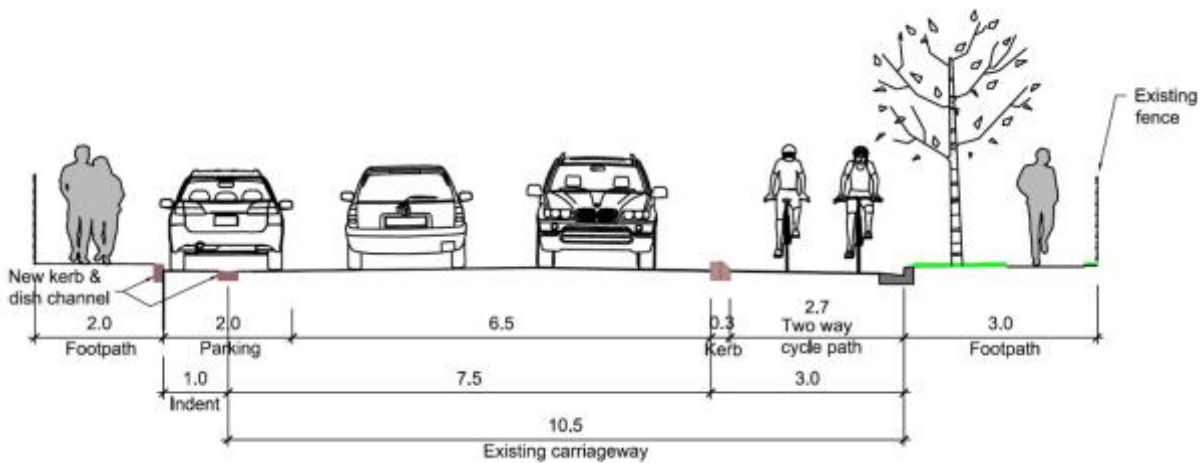


Figure 5-5: typical section with indented parking on west side (not along school field)

5.5. Eltham Road option evaluation

Using the same method as for Beaver Road (refer section 4.6), Eltham Road options have been assessed as shown in Table 5-1. Note that option E has been scored similarly to option D, as the design differences are relatively minor.



Table 5-1: Eltham Road option evaluation

	Stakeholder	Criteria					Score
		Safety	Coherent	Attractive	Parking	Acceptance	
Option A	Cyclists	✓	✓	✓	✓	✓	16
	Residents	✗	●	●	✗	✗	2
	Community	✗	●	●	✗	✗	2
Option B	Cyclists	✓	✓	✓	✓	✓	16
	Residents	●	●	✓	✗	✗	5
	Community	●	●	✓	✗	✗	5
Option C	Cyclists	✓	✓	✓	✓	✓	16
	Residents	✗	●	✓	✗	✗	2
	Community	✗	●	✓	✗	✗	2
Option D / E	Cyclists	✓	✓	✓	✓	✓	16
	Residents	●	●	✓	✗	✗	5
	Community	●	●	✓	✗	✗	5

All options provide the same excellent outcome for cyclists. Options B & D, with the wider carriageway, deliver the best outcome for residents and the community.

Options A and B have received a zero score under parking due to the removal of parking from the east side. Options C, D and E, with the cycle path routed along the school field, is able to retain approximately 10 to 12 car parks on the east side of Eltham Road close to the day care centre and school.

Table 5-2 summarises the Eltham Road option costs.

Table 5-2: Eltham Road cost estimate summary

	Option A	Option B	Option C	Option D or E
ROC	\$150,000	\$332,000	\$181,000	\$362,000

These estimates include a 15% contingency but exclude GST.

Option E is the preferred option for Eltham Road as it delivers the best outcome for cyclists, residents and the community and incorporates community input to the extent practicable.



6. Combined route implementation options

Three sets of combined options are proposed:

The **lowest cost** approach would select Beaver Road option A and Eltham option A (rough order cost (ROC) \$168,000). The main advantage to this approach is a roughly \$194,000 cost saving versus the budgeted \$361,000. However, this option has a relatively narrow cross section (about 5.6 m for two-way general traffic, adjacent to a 2.0 m parking 'lane' on the west side) on Eltham Road. The road would be unmarked (i.e., not include any parking, edge or centre lines) and it would meet the legislative 2.5 m minimum dimension for a traffic lane. However, such a cross section will feel tight and could increase peak hour congestion. This combined approach also does not address parking concerns or improve crossings along Beaver Road.

The **best option while remaining within budget** would select Beaver Road option B and Eltham Road option C (ROC \$296,000). Relative to the lowest cost approach, this option still saves money (approx. \$66,000), improves the crossings along Beaver Road, and provides for parking on both sides of Eltham Road near the school. However, the narrow cross section near Whitney school may still be an issue, and it would require an easement from the school for the path along the school field.

The **recommended approach** is Beaver Road option B with Eltham Road option E (ROC \$407,000). This would require a roughly \$116,000 budget augmentation. In addition to the aforementioned benefits of option C, this provides more generous traffic lanes and indented parking along the west side of Eltham Road. Although the two-way cycle facility is narrower (2.7 m) than the 3.2 m in options B and D, this helps balance the needs of all road users including pedestrians on the west side of Eltham Road.

If the recommended approach is approved, the next steps will include a survey and detailed design.



Appendix A Crash Reports

Beaver Road – crashes recorded in CAS 2011 - 2016

Plain English report, run on 20-Jan-2017 Page 1.

First Street	10 Second street (I or L hand)	Crash Number	Date	Day Time	Description of Events	Crash Factors	Road Weather	Weather Light	Junction	Chnl	Tot Inj
	Distance (ft)					(SEV - Environmental factors)					F A I L T R N
BEAVER ROAD	I ARTHUR ST	201152645	27/07/2011	Wed 1415	CAR1 HND ON BEAVER ROAD hit CAR2 turning right onto BEAVER ROAD from the left	CAR2 failed to give way at a priority traffic control	Dry	Bright	Fine	X Type Junction	Give way sign
BEAVER ROAD	I ARTHUR ST	201511506	25/02/2015	Wed 1816	CAR2 turning right hit by oncoming CAR1 HND on BEAVER ROAD	CAR2 failed to give way when turning to non-turning traffic. Did not check / notice another party	Dry	Overcast	Fine	X Type Junction	Give way sign
BEAVER ROAD	I GEORGE ST	201152812	20/07/2011	Wed 0859	CAR1 HND ON GEORGE ST hit VAM2 crossing at right angle from right	CAR1 failed to give way at a priority traffic control	Dry	Bright	Fine	X Type Junction	Give way sign
BEAVER ROAD	I GEORGE ST	201252722	01/06/2012	Wed 0510	CAR1 HND ON GEORGE ST hit CAR2 crossing at right angle from right	CAR1 failed to give way at a priority traffic control. Diverted while trying to find intersection	Wet	Overcast	Heavy Rain	X Type Junction	Give way sign
BEAVER ROAD	I HIGH ST	201507562	09/10/2015	Thu 1700	CYCLIST1 HND ON BEAVER ROAD hit VAM2 turning right onto BEAVER ROAD from the left	VAM2 failed to give way when turning to non-turning traffic. Did not check / notice another party	Wet	Overcast	Light Rain	X Type Junction	Give way sign
BEAVER ROAD	I WHITE ST	201506071	16/09/2015	Wed 2240	CAR1 HND ON BEAVER ROAD lost control turning left, CAR1 hit Fence	CAR1 alcohol suspected. Entering / on curve, lost control when turning	Dry	Dusk	Fine	T Type Hill	
DILLON ST	I BEAVER ROAD	201426322	13/10/2014	Wed 1550	CAR1 HND ON BEAVER ROAD hit CAR2 crossing at right angle from right	CAR2 failed to give way at a priority traffic control, attention diverted by cell phone	Dry	Bright	Fine	X Type Junction	Give way sign
DILLON ST	I BEAVER ROAD	201531344	03/02/2015	Tue 1510	CAR1 HND ON DILLON ST hit CAR2 crossing at right angle from right	CAR2 failed to give way at a priority traffic control, new driver / under instruction	Dry	Bright	Fine	X Type Junction	Give way sign
DILLON ST	I BEAVER ROAD	201507387	13/10/2015	Tue 1215	SUV1 HND ON DILLON ST hit CAR2 crossing at right angle from right	SUV1 failed to give way at a priority traffic control. Did not check / notice another party	Dry	Overcast	Fine	X Type Junction	Give way sign
HIGH ST	30B BEAVER ROAD	201424265	15/03/2014	Sat 0900	CYCLIST1 HND ON HIGH ST sideswiped by CAR2 turning left.	CYCLIST1 overtaking on left. SEV: entering or leaving private house / farm	Dry	Overcast	Fine	Driveway N/A	



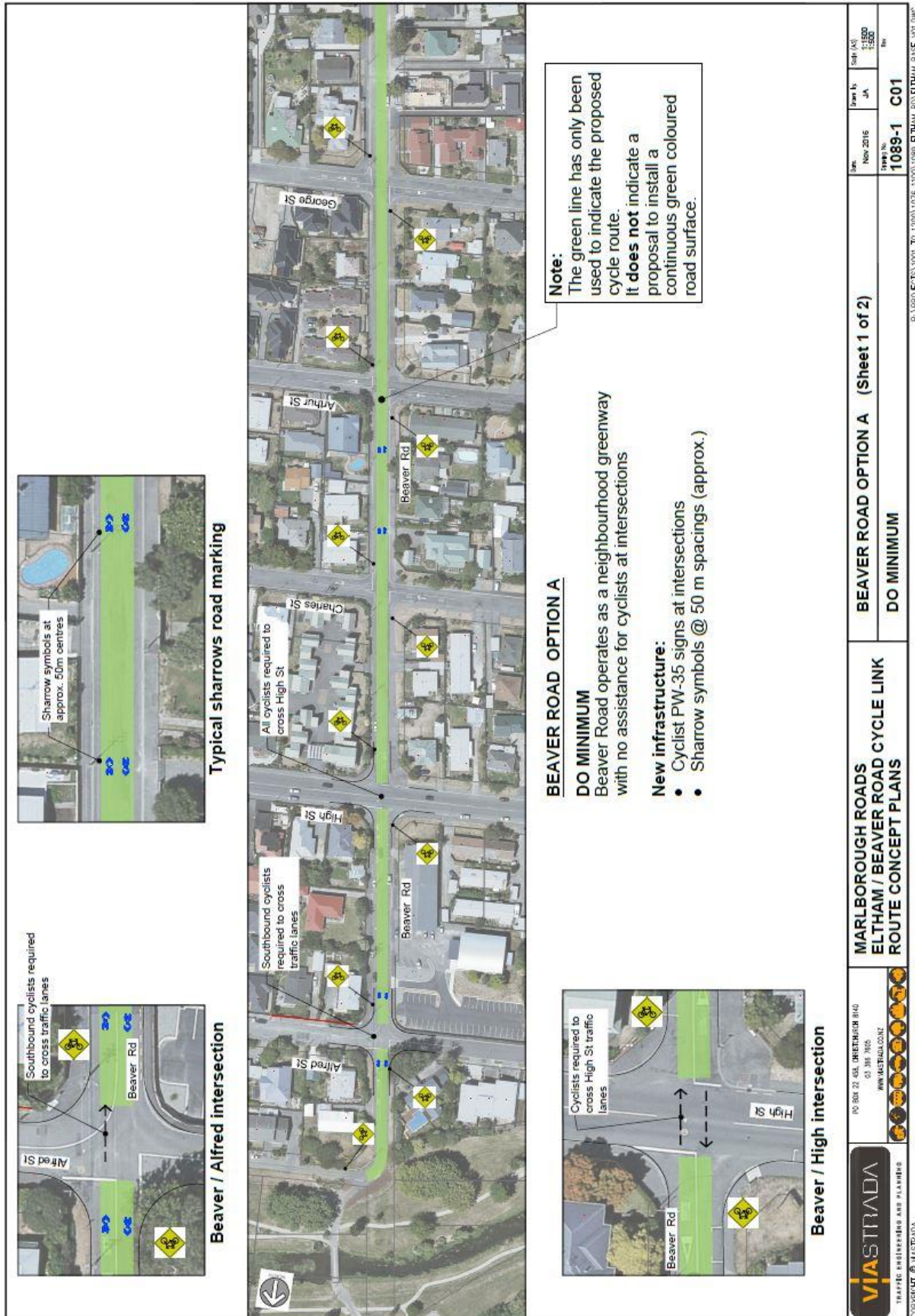
Eltham Road – crashes recorded in CAS 2011 – 2016

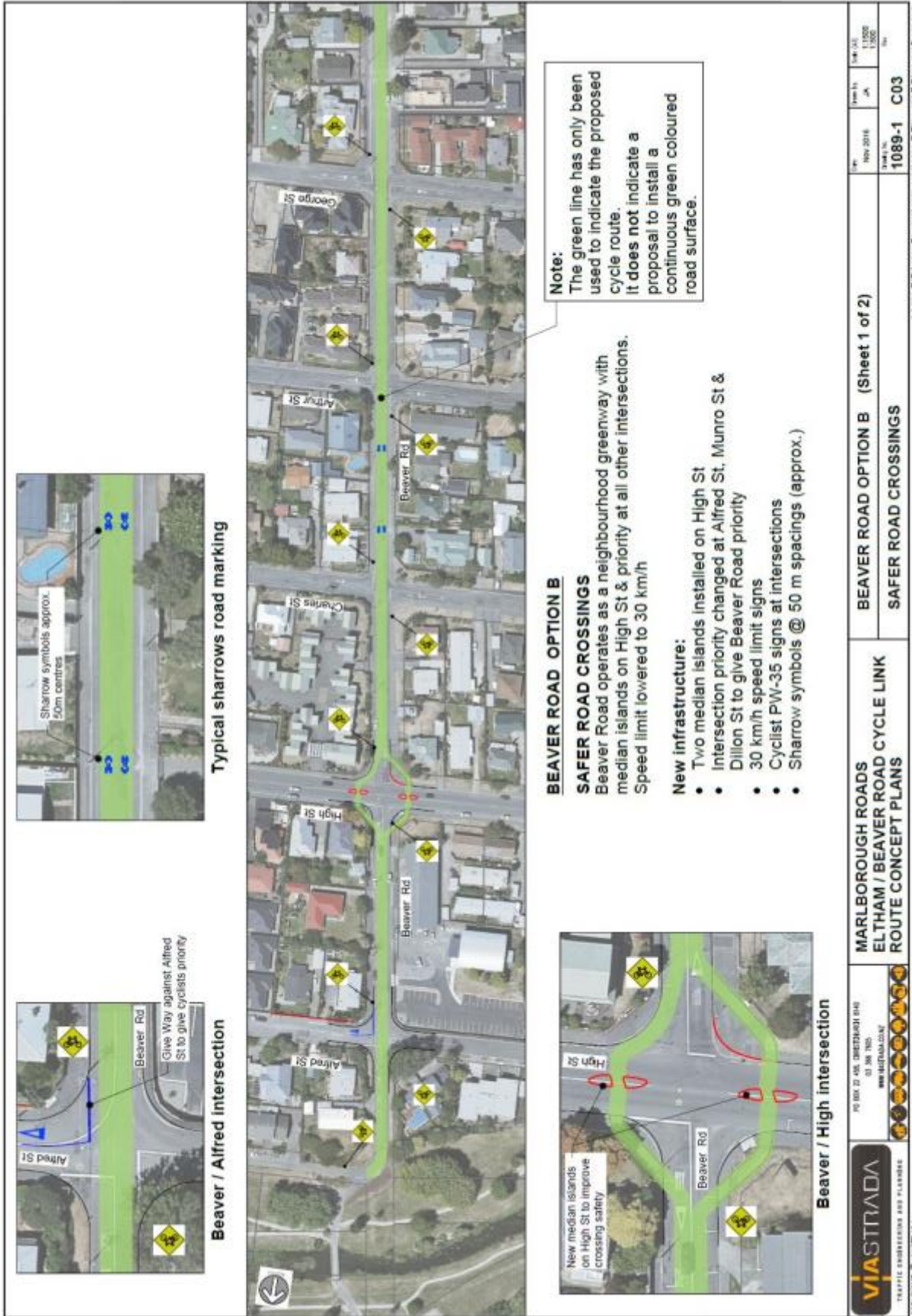
Plain English report, run on 20-Jun-2017 Page 1

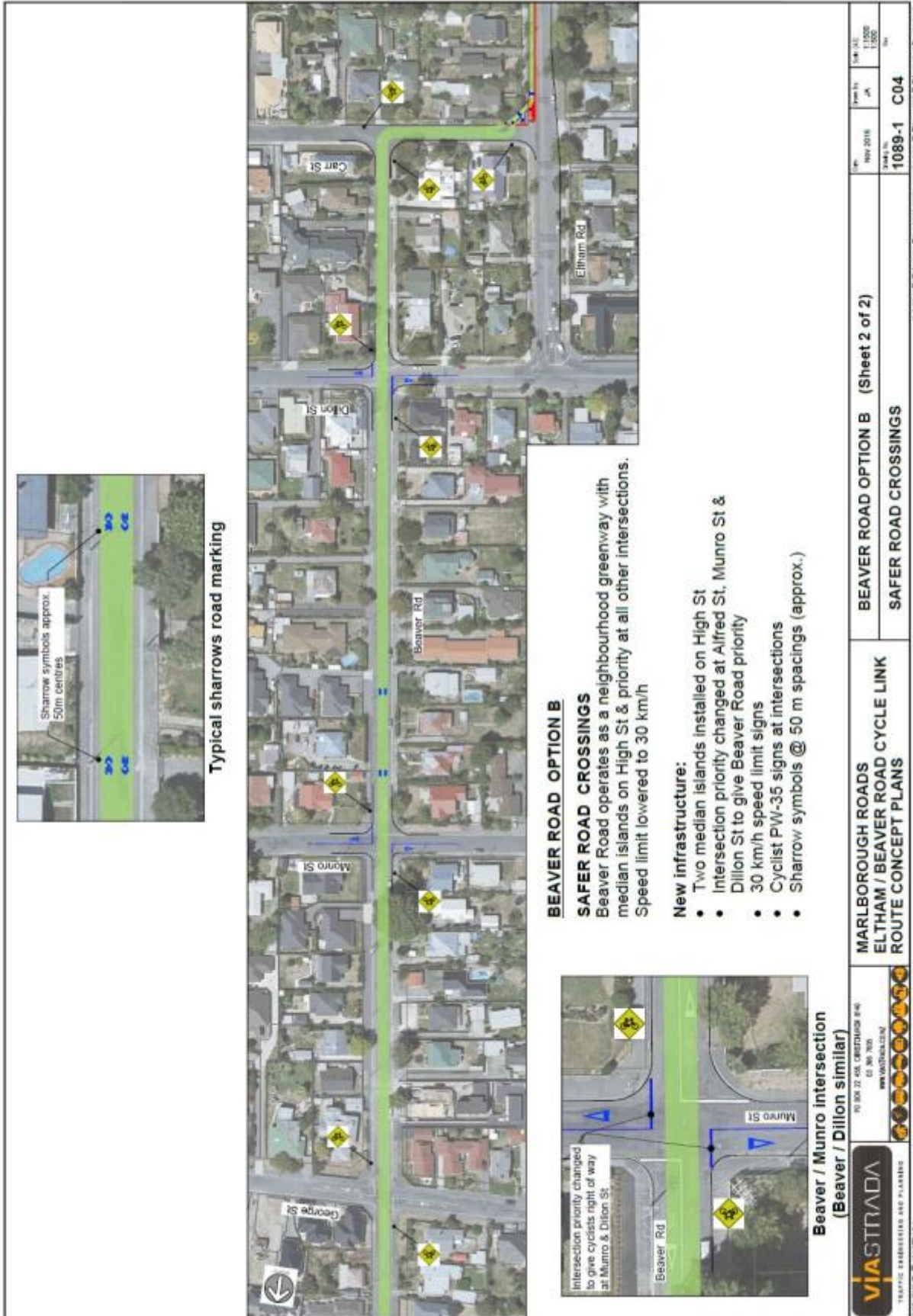
First Street	ID Second street (I) or landmark (Distance (R))	Crash Number	Date	Day Time	Description of Events	Crash Factors	Road	Weather	Junction	Control	Tot Inj Y S M A E I T R M
DILLON ST	I ELTHAM ROAD	201250808	06/04/2012	Fri 1430	CAR1 NED on ELTHAM ROAD missed inlets or end of road, CAR1 hit Kerb	(ENV - Environmental factors)	Dry	Bright	Fine	Give Way Sign	1
ELTHAM ROAD	308 BEAVER ST	201153968	30/09/2011	Fri 0850	CAR1 NED on ELTHAM ROAD hit rear end of CAR2 stop/slow for PEDESTRIAN		Dry	Bright	Fine	Unknown	Nil
ELTHAM ROAD	I BEAVER ST	201153933	23/08/2011	Tue 1515	CAR1 NED on ELTHAM ROAD overtaking hit SUV2 turning right		Dry	Bright	Fine	Driveway Nil	Nil
ELTHAM ROAD	I CARB ST	201541900	25/07/2015	Sat 2256	CAR1 NED on ELTHAM ROAD lost control when slight CAR1 hit fence, other on slight bend		Dry	Dark	Fine	Give Way Sign	1
ELTHAM ROAD	I DILLON ST	201254207	14/11/2012	Wed 1730	SUV1 NED on ELTHAM ROAD hit rear end of CAR2 stop/slow for CROSS traffic		Dry	Bright	Fine	Give Way Sign	1
ELTHAM ROAD	I DILLON ST	201353394	27/06/2013	Tue 1706	VAN1 NED on ELTHAM ROAD turning right hit CAR2 turning right into ELTHAM ROAD		Dry	Bright	Fine	Give Way Sign	1
ELTHAM ROAD	405 STANFORD ST	201546125	28/09/2015	Mon 1830	CAR1 NED on ELTHAM ROAD overtaking CAR2 CAR1 hit Parked Vehicle		Dry	Bright	Fine	Unknown Nil	Nil
ELTHAM ROAD	I STANFORD ST	201112127	10/06/2011	Fri 0845	CAR2 turning right hit by oncoming VAN1 NED on ELTHAM ROAD		Wet	Overcast	Light Rain	Give Way Sign	1
MAXWELL ROAD E	I ELTHAM ROAD	201417681	05/12/2014	Fri 0530	CAR2 turning right hit by oncoming Cyclist (Age 47) EMB on MAXWELL ROAD E		Dry	Twilight	Fine	Give Way Sign	1

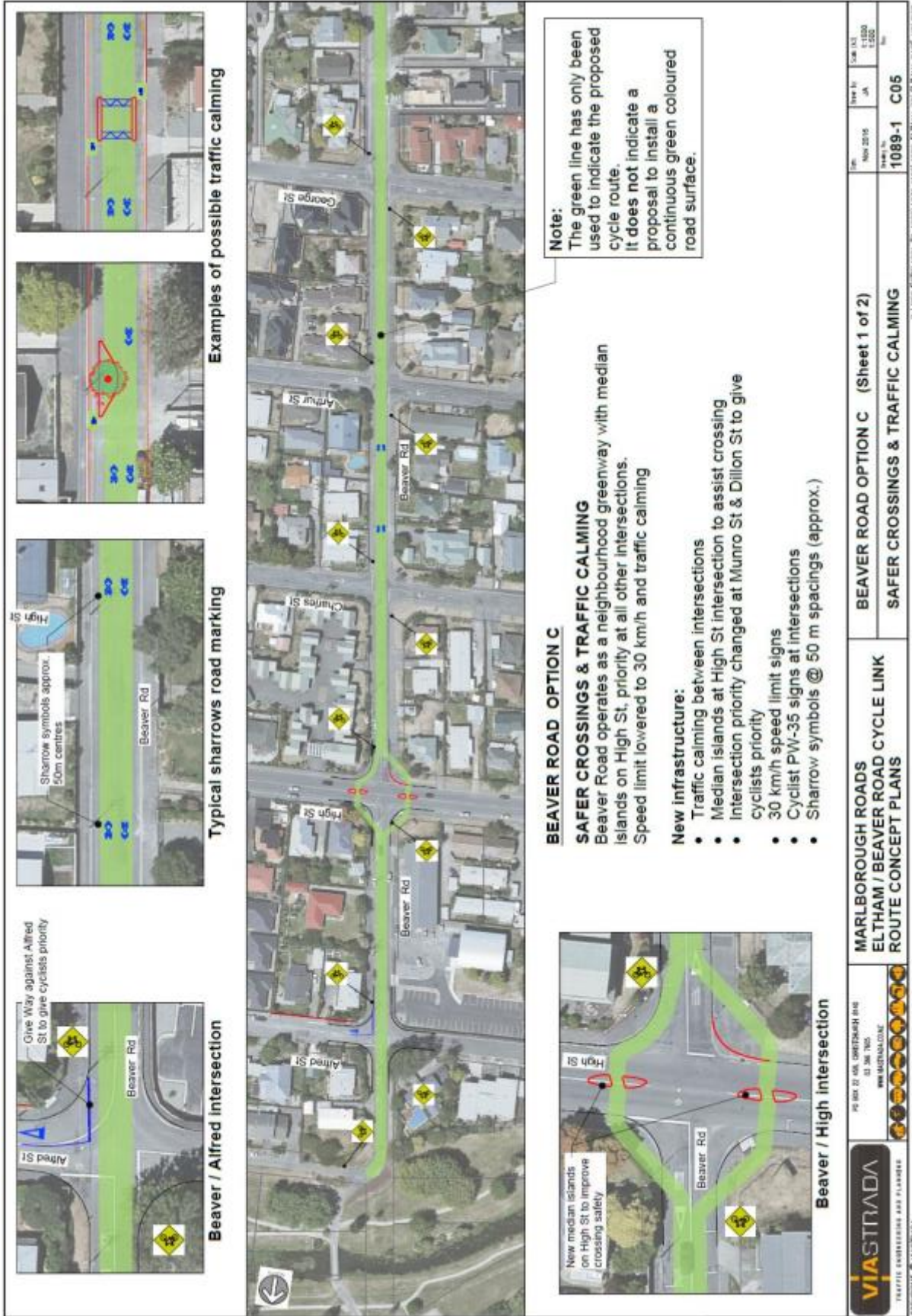


Appendix B Concept Plans

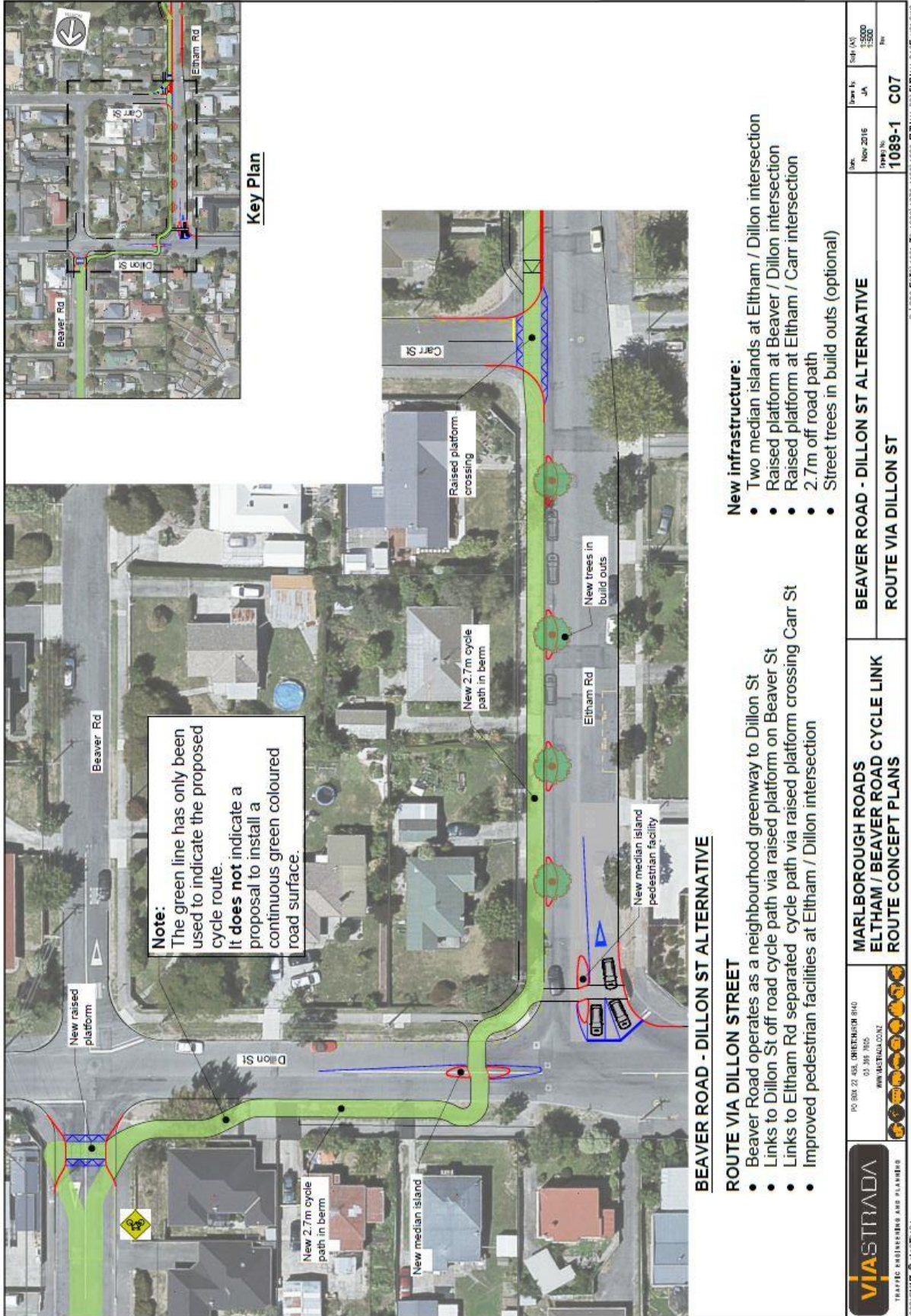








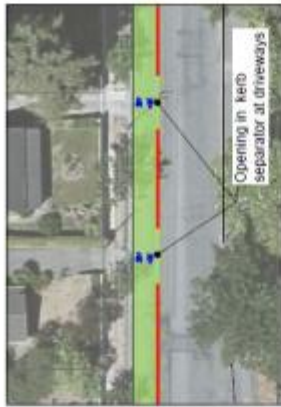
MARLBOROUGH ROADS ELTHAM / BEAVER ROAD CYCLE LINK ROUTE CONCEPT PLANS		DATE: 11/11/2016	SCALE: 1:1000
BEAVER ROAD OPTION C (Sheet 1 of 2)		NO: 1089-1	DATE: 11/11/2016
SAFER CROSSINGS & TRAFFIC CALMING		PROJECT: 1089-1	SCALE: 1:1000
		PROJECT NO: 1089-1 PROJECT NAME: ELTHAM RD/BEAVER RD PROJECT LOCATION: ELTHAM RD/BEAVER RD	



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	<p>DATE: Nov 2016</p> <p>PROJECT NO: 1089-1</p> <p>FILE NO: C07</p>	<p>PROJECTS \ 001 TO 1200 \ 1076-100 \ 1089 ELTHAM RD \ ELTHAM BASE \ 01.DWG</p>
<p>MARLBOROUGH ROADS ELTHAM / BEAVER ROAD CYCLE LINK ROUTE CONCEPT PLANS</p>	<p>BEAVER ROAD - DILLON ST ALTERNATIVE</p>	
	<p>ROUTE VIA DILLON ST</p>	



Eltham / Maxwell intersection



Typical detail at driveways



Eltham / Carr intersection



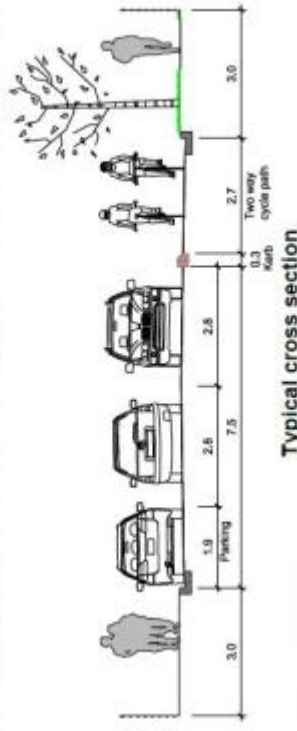
Note:
The green line has only been used to indicate the proposed cycle route. It does not indicate a proposal to install a continuous green coloured road surface.

ELTHAM ROAD OPTION A

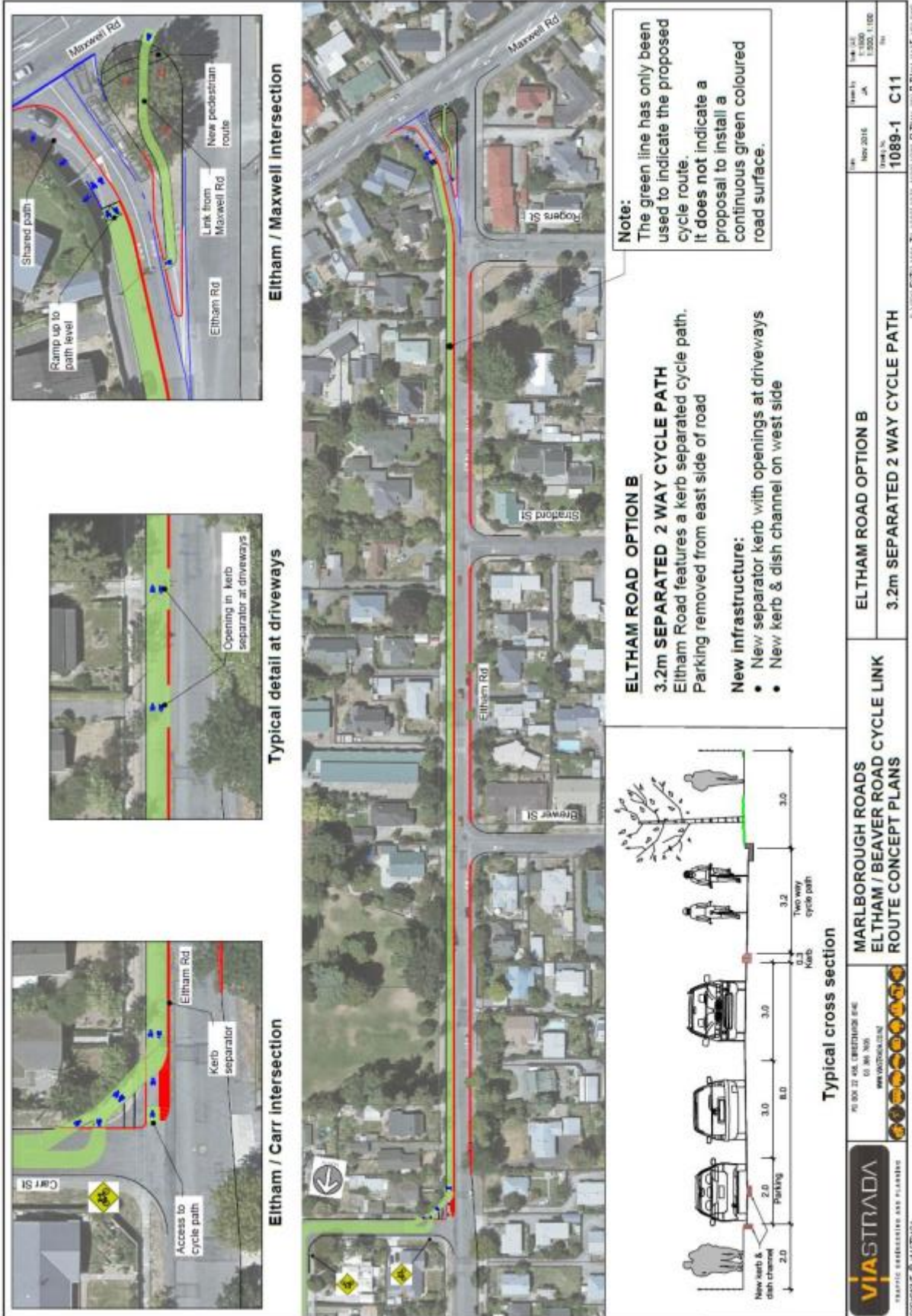
2.7m SEPARATED 2 WAY CYCLE PATH
Eltham Road features a kerb separated cycle path. Parking removed from east side of road

New infrastructure:

- New separator kerb with openings at driveways
- Some existing kerb modifications



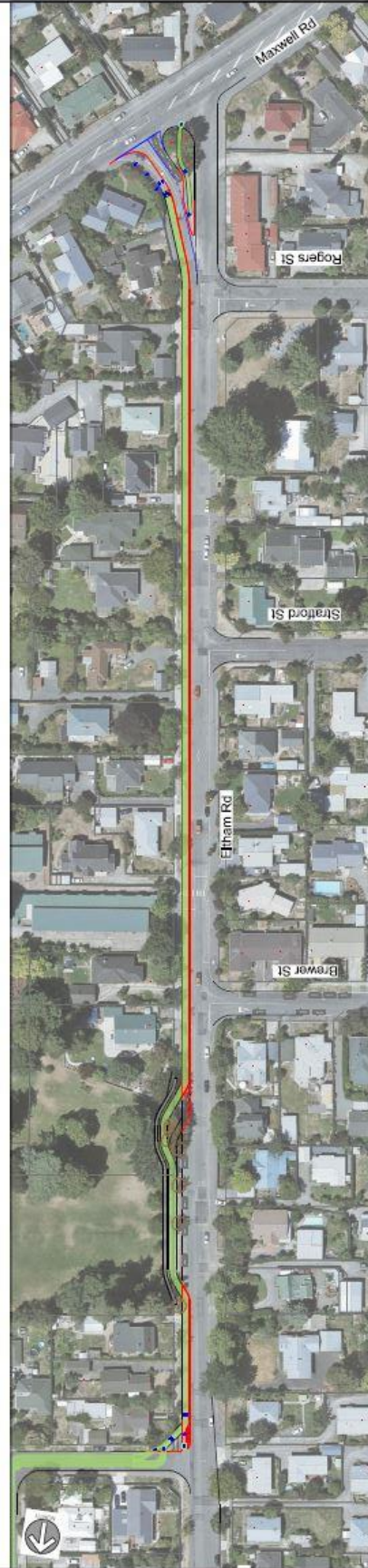
<p>TRAFFIC ENGINEERING AND PLANNING COPYRIGHT © VIASTRADA</p>	<p>PO BOX 27 WA, PERTH WESTERN AUSTRALIA 6150 08 9438 7855 WWW.VIASTRADA.COM.AU</p>	<p>MARLBOROUGH ROADS ELTHAM / BEAVER ROAD CYCLE LINK ROUTE CONCEPT PLANS</p>	<p>ELTHAM ROAD OPTION A 2.7m SEPARATED 2 WAY CYCLE PATH</p>	<p>NO. 1089-1 C10</p>	<p>DATE: NOV 2016</p>	<p>SCALE: E:1:500 S:1:500 T:1:100</p>	<p>PROJECTS \100 - 1000 \100-1089-008 ELTHAM RD / BEAVER RD</p>
	<p>DATE: NOV 2016</p>						





Note:
The green line has only been used to indicate the proposed cycle route. It **does not** indicate a proposal to install a continuous green coloured road surface.

Possible alternate cycle path route



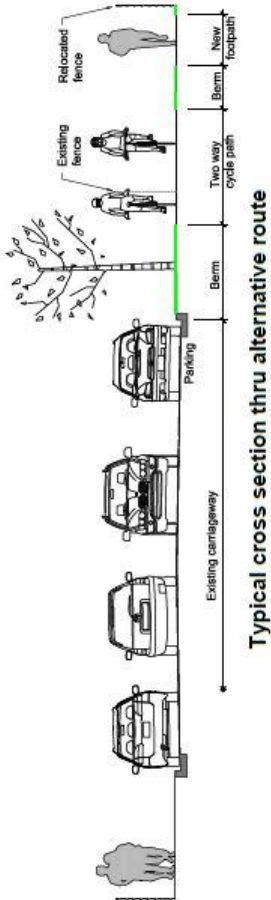
ELTHAM ROAD OPTION C

ALTERNATIVE CYCLE PATH ROUTE IN SCHOOL GROUNDS

- Take cycle path route in school grounds to retain 10 to 12 car parks.
- Remaining cycle path as Option A
- Diverted section could also be shared path
- Path routed to retain existing trees

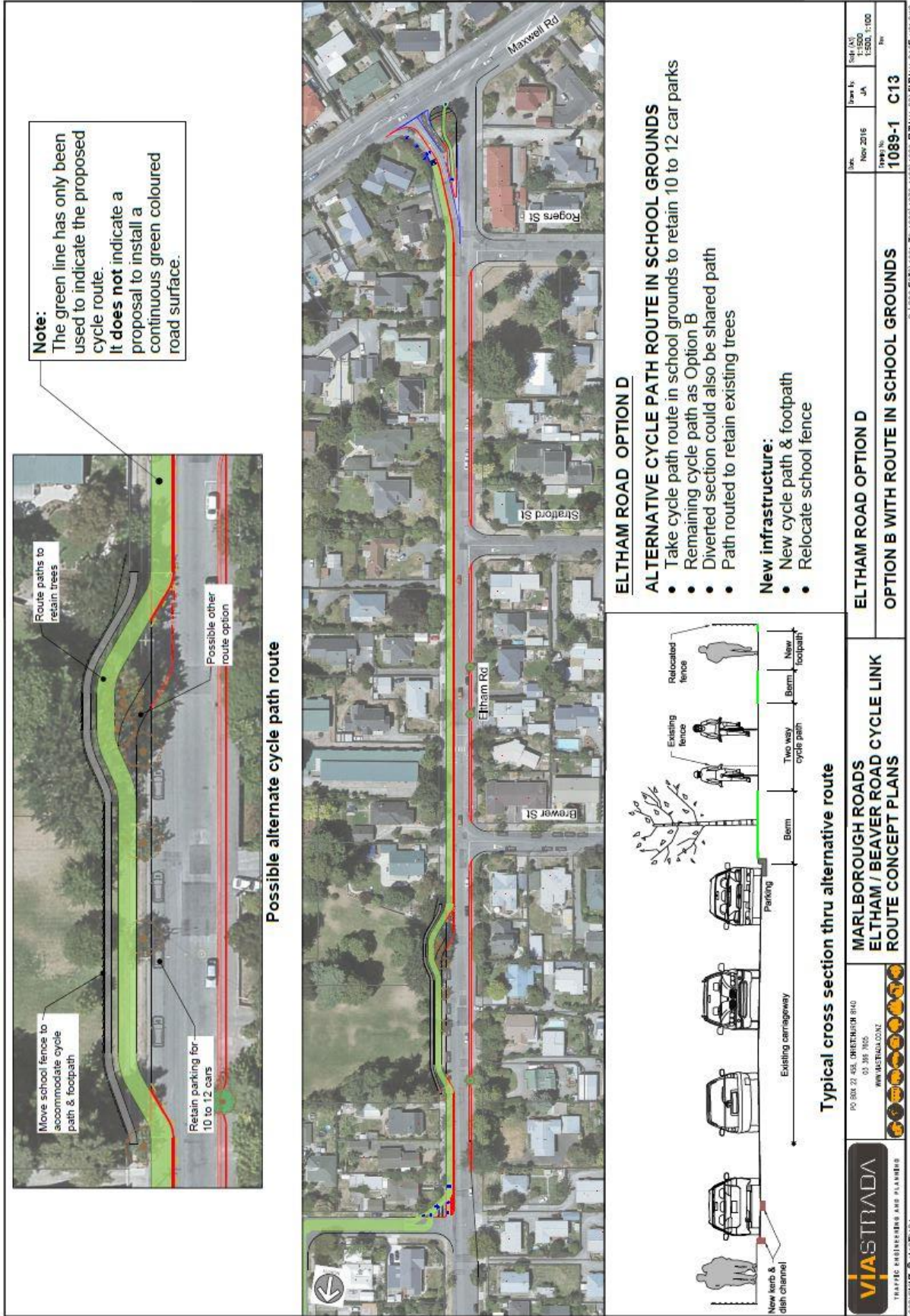
New infrastructure:

- New cycle path & footpath
- Relocate school fence

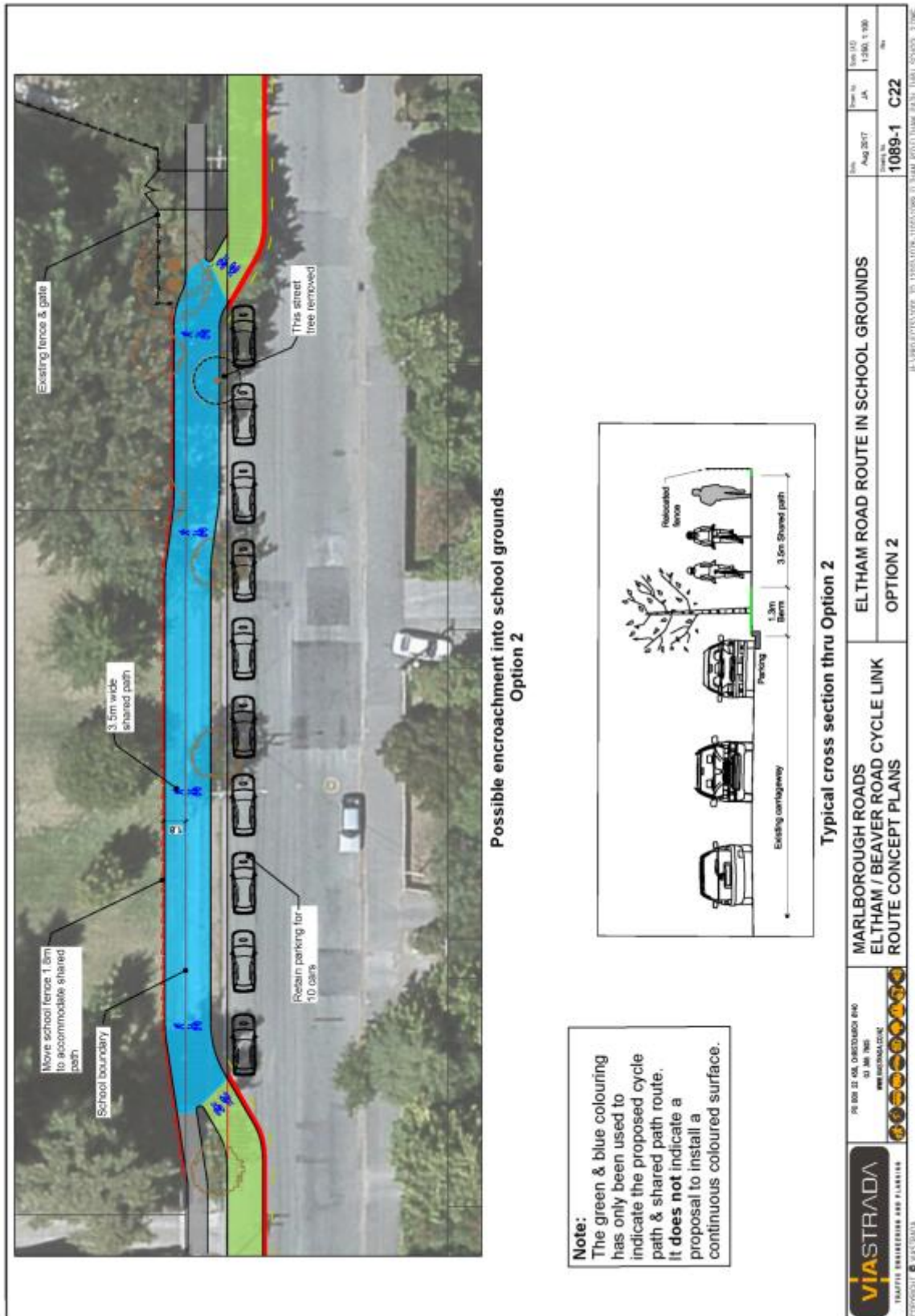


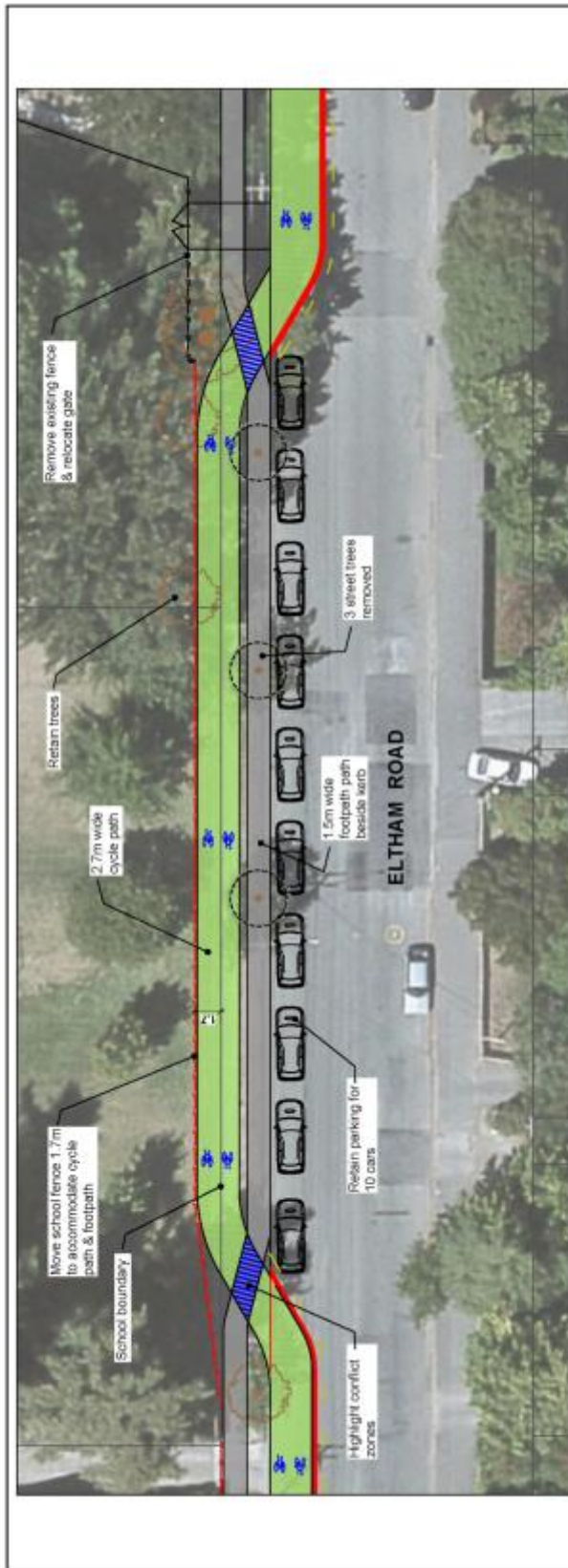
Typical cross section thru alternative route

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	ELTHAM ROAD OPTION C OPTION A WITH ROUTE IN SCHOOL GROUNDS			R:\PROJECTS\1001 TO 1200\1076-100\1089 ELTHAM RD\ELTHAM BASE_V01.DWG

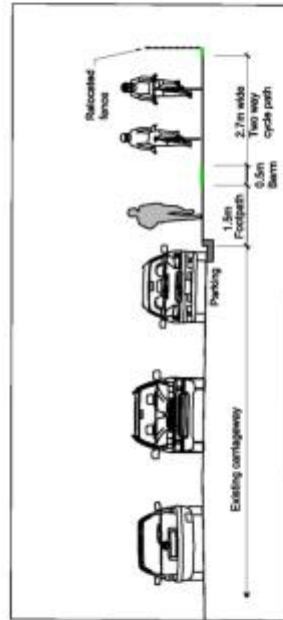








Possible encroachment into school grounds
Option 3



Typical cross section thru Option 3

Note:
The green colouring has only been used to indicate the proposed cycle path route. It does **not** indicate a proposal to install a continuous coloured surface.

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	<p>PROJECT LOCATION: 10-1260/1018-1126/1088 ELTHAM RD/BEAVER RD/1089-1090 SCHOOL ST/106</p>			