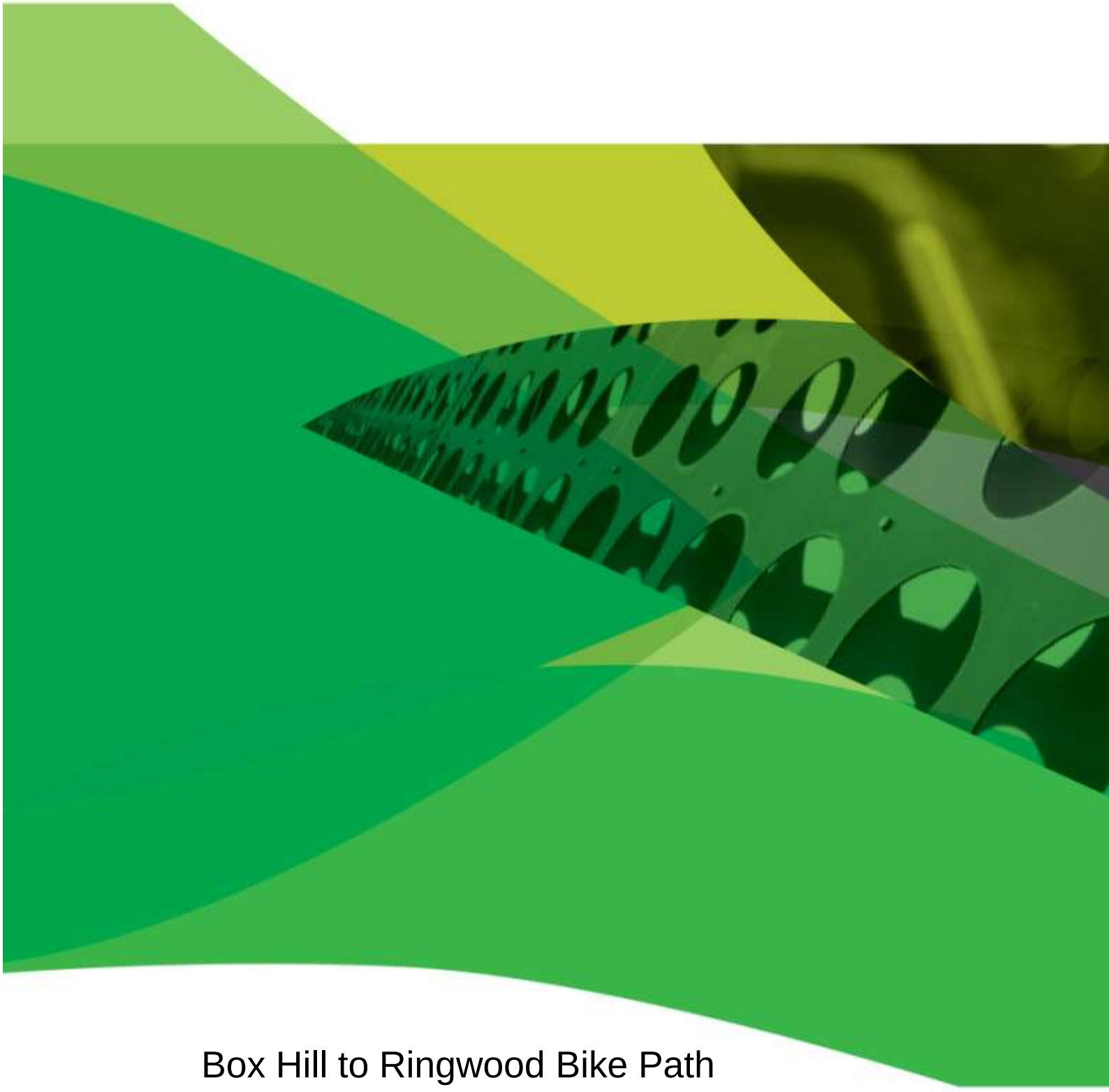

Box Hill to Ringwood Bike Path

Alignment Report

Version 3
Tue, 8 Mar 2016

Alignment Recommendations – Box Hill to Ringwood Bike Path

Executive Summary

The Box Hill to Ringwood Bike Path (the Bike Path) was identified as an opportunity in 1996 from a feasibility study for an Eastern Rail Trail initiated by stakeholders, including City of Whitehorse. In 2010 the local bicycle group produced a report detailing and costing route options for the rail trail, and rallied support with the local community (including a petition of more than 4,000 signatures), Members of Parliament and City of Whitehorse.

In 2012 a Business Case was prepared and the government announced more than $10 million to fund construction of the bike path. In the May 2015/16 State budget, the Government confirmed that funding of $14.8 million is allocated to the project. Further to this funding, level crossing removal projects along the corridor have contributed positive outcomes to the connectivity of the Bike Path.

There are no Australian standards for bicycle paths, only guidelines to assist with consistency in design. Desirable levels have been provided where possible; however it is key to note that the guidelines intend the use of Context Sensitive Design, allowing flexibility in brown-fields location where designs are heavily constrained by existing development.

The key to design is to balance the Bike Path project's needs with the many inputs received, to arrive at the most appropriate solution in consideration of user safety, project objectives, stakeholder needs, community opinion, conformance with design guidelines and project scope and budget.

This report presents VicRoads' final proposed alignment following significant design and investigations, stakeholder and community involvement, and consideration of feedback. Other alignment options are available; however they will provide path users a lower level of service.

This report seeks support, endorsement and approvals from Whitehorse and Maroondah City Councils as specifically recommended throughout the report regarding:

- The preferred route for the entire bike path alignment;
- The bike path being located on Council owned or managed land, roads and reservations;
- Council become the maintenance authority for the Bike Path for relevant sections of the path.
- Council entering into VicTrack Licence Agreements for the sections of path on VicTrack land.

Support for the recommendations in this report will enable the Box Hill to Ringwood Bike Path Project to move toward into detailed design and construction so that the project can be completed for the community in 2017.

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Document Information

Criteria	Details
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This document requires the following approval:

Name/Position	Action	Signature	Date
Craig Allan Team Leader Projects	Recommend		
David Lewis Manager Project Delivery	Recommend		
Frank De Santis Project Director Eastern Projects	Approve		

Document Control

Version	Name	Date
1	Final Draft	18 Feb 2016
2	Final Draft 2	24 Feb 2016
3	Final	8 Mar 2016

0. Introduction

The Box Hill to Ringwood Bike Path (the Bike Path) will see the development and construction of a 10 kilometre walking and cycling connection, including a combination of off-road shared use paths for cyclists and pedestrians, as well as on-road bike facilities. The path will run for most of its length within the Belgrave/Lilydale rail line reservation.

0.1. Purpose of this Document

The purpose of this document is to provide Council with a clear and concise discussion on the process undertaken by VicRoads to reach a preferred alignment for the Box Hill to Ringwood Bike Path, and provide subsequent recommendations to Council. The alignment has been determined with consideration of input from numerous stakeholders, community feedback, design experts and conformance with guidelines and meeting of project objectives.

Further detailed investigations, stakeholder interactions, designs and approvals will be undertaken once the path alignment is confirmed.

0.2. Project Objectives

The key objectives of the Box Hill to Ringwood Bike Path project are:

- To improve connectivity to local communities and services along the route;
- To provide a safer alternative to separate bicycles from vehicles where feasible;
- To promote active transport modes;
- To improve the health and well-being for the community;
- To promote a healthier environment.

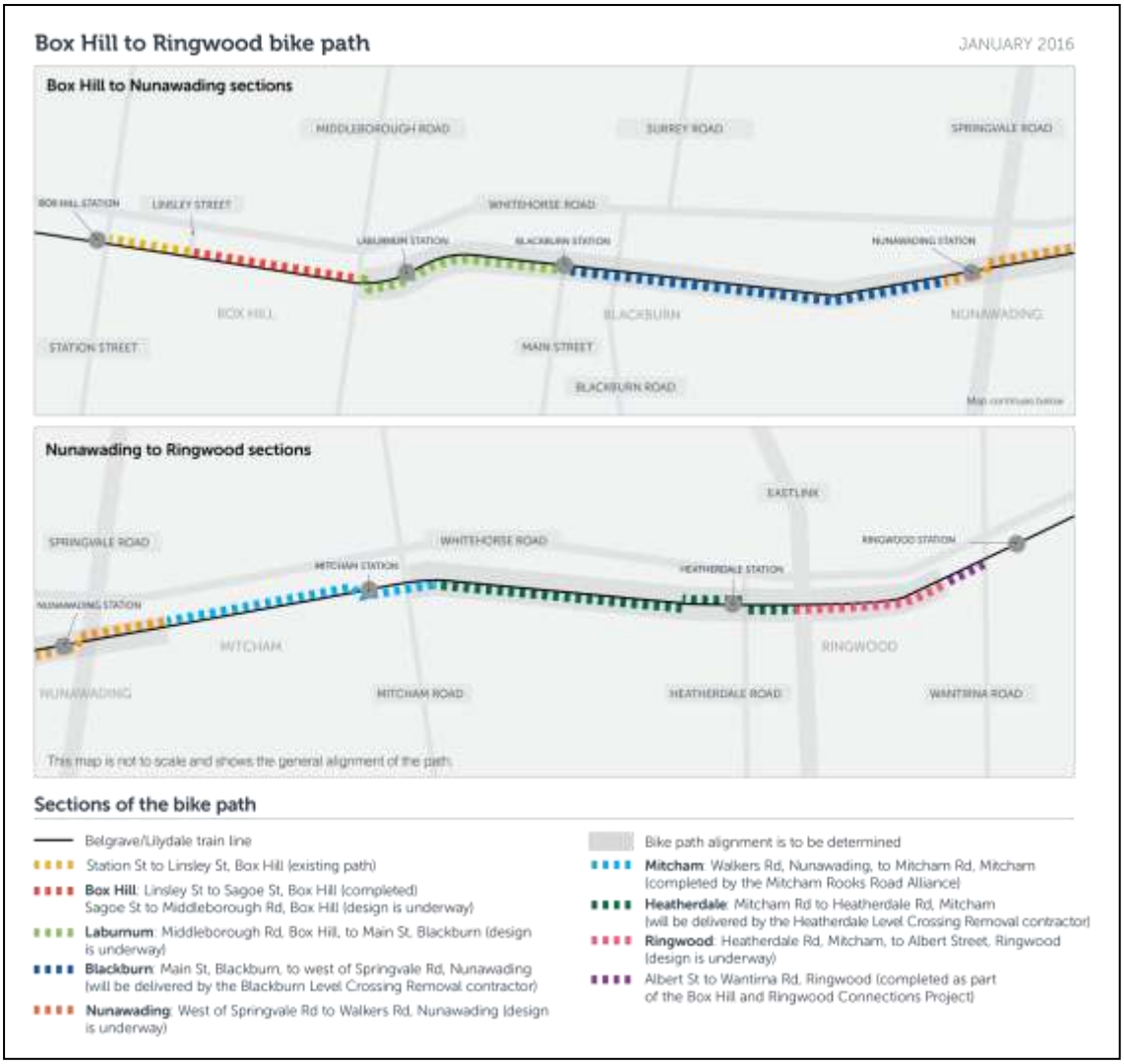
0.3. History of the Project

Whitehorse Cyclists Incorporated saw a need and an opportunity for a bike path that could connect the community and existing bike trails between Box Hill and Ringwood. A brief history of the Box Hill to Ringwood Rail Trail is shown below:

- **June 1996** – Early concept of the Box Hill to Ringwood Bike Path detailed in the *Feasibility Study for Eastern Rail Trail* by City of Boroondara, City of Whitehorse and Department of Sport and Recreation Victoria.
- **July 2010** – Whitehorse Cyclists release *The Box Hill to Ringwood Rail Trail Proposal* advocating for the City of Whitehorse and VicRoads to proceed with planning and construction of and cycling link from Box Hill to Ringwood.
- **November 2010** – Election commitment to provide $5 million funding for the Box Hill to Ringwood Bike Path
- **March 2011** – Victorian State Government announces $5 million funding for the Box Hill to Ringwood Rail Trail.
- **August 2011** – City of Whitehorse releases the *Box Hill to Ringwood Bicycle Path Connector Feasibility Study.*
- **January 2013** – Victorian Department of Transportation developed *Box Hill to Ringwood Bikeway Business Case.*
- **May 2014** – Victorian State Government announces $10 million plus funding for the Box Hill to Ringwood Bike Path to be included in the Mitcham and Rooks Roads Rail Grade Separation project.
- **July 2014** – Mitcham section of the bike path completed from Walkers Road to Mitcham Road.
- **May 2015** – Box Hill section of the bike path completed from Linsley Street to Sagoe Lane.

0.4. Locality Plan

Figure 1 – Box Hill to Ringwood Bike Path Locality Plan



0.5. Roles

This project is being led by VicRoads in consultation with a broad range of stakeholders including:

- Whitehorse and Maroondah City Councils;
- Department of Economic Development, Jobs, Transport and Resources (DEDJTR);
- Metro Trains Melbourne (MTM);
- VicTrack;
- Public Transport Victoria (PTV);
- Level Crossing Removal Authority (LXRA); and
- Local cycling groups and the community.

VicRoads is charged with the responsibility from the State Government for the planning, design and delivery of the Box Hill to Ringwood Bike Path.

VicTrack is the rail land and asset owner on behalf of the State. VicTrack and the relevant transport businesses may facilitate land to be available for an integrated project, such as a shared use path, under a licence agreement.

Metro Trains Melbourne (MTM) is the accredited Rail Transport Operator and franchisee that operates the metropolitan train services under the current Infrastructure Lease. MTM approvals will be required for the design and construction of the path within the leased area.

Whitehorse and Maroondah City Council's are the relevant local road authorities and land owners for sections of the preferred path alignment. VicRoads is seeking agreements with the Council's to maintain the path.

0.6. Design Philosophy and Documents

The design aim for the Box Hill to Ringwood Bike Path is to produce the highest standard path that contributes to meeting the objectives stated.

The function of the path is to serve multiple purposes for users to:

- Access local connections to shops, schools, railway stations, etc;
- Connect to activity areas at either end of the path; and
- Fill gaps in the wider bicycle network enabling longer trips for recreation or commuting.

There are no Australian standards for the design of shared paths or bicycle paths in Australia. There are two relevant guiding documents; the AustRoads series of guides for road design and traffic management, and VicRoads' suite of Cycle Notes.

The AustRoads and VicRoads documents are design guidelines only. They provide commentary on good practice for design and construction of bicycle facilities and state some desirable values and acceptable ranges for various path features. The guides provide aspirational guidance on new facilities in 'greenfield' corridors. 'Brownfield' locations where designs are heavily influenced by existing features and constraints provide complex challenges.

It is likely that there will be various locations or lengths where it will be impractical to achieve the 'desirable' level. The guidelines provide for a "context sensitive design" be adopted, based on the environment in which the path is being built, with "critical engineering judgement" to be applied with defensible evidence to support that judgement. Examples of this are not achieving a desirable maximum grade of 5% where a path follows the grade of an existing road which is steeper than 5%, or where the width between the rail line and property fences can only accommodate a 2.5m wide path, where the desirable width is 3m. Neither of these situations alone makes for an unsafe path and the context sensitive design approach can accommodate these deviations from guidelines with appropriate mitigation treatments providing acceptable outcomes.

VicRoads is committed to designing and constructing a path which is safe, providing an acceptable level of service to users.

To date, VicRoads approach has been to develop sufficient design detail to undertake a broad assessment of the route options. Once the preferred route has been agreed and adopted the relevant sections would proceed to procurement and the detailed design stage.

Through the design development process, VicRoads has been able to improve from 57% of the length of path off-road to above 90% off-road in the preferred alignment.

0.7. Design Criteria

0.7.1. General Principles and Requirements

The shared use path is to be designed as per the requirements outlined in AustRoads Part 6A: Pedestrian and Cyclist Paths. VicRoads Cycle Notes have also been used as a point of reference. Rail standards are derived from VicTrack guidelines and Victorian Rail Industry Operator Group Standards (VRIOGS).

The project is required to deliver no net loss to railway commuter parking throughout the alignment.

Acquisition of private land has been avoided to minimise community impact, ensure the project is achievable and delivered within project timeframes and budget.

Due to the nature of building in a brownfields environment, some impact to vegetation is unavoidable throughout the project. In determining the preferred alignment biodiversity studies have been undertaken, with designs altered to minimise impacts on vegetation. An arborists report will be obtained as part of the detailed design phase once the alignment has been decided on.

0.7.2. Civil Design

Speed Parameters

A design speed of 20km/hr has been adopted for the preliminary design due to the constrained nature of the existing terrain and the intersection of the cycle path with pedestrian, roads and trees.

Geometric Design

The path was designed in accordance with Part 6A of AGRD to determine cross sectional widths, horizontal curves, vertical gradients, clearance requirements and sight distance requirements.

Cross Section

The path cross-section was developed to meet minimum guidelines of AGRD. The main alignment was based on the elements described in Table 1.

Table 1 – Cross Section Element Criteria

Cross Section Element	Criteria
Desirable minimum width	3.0m
Minimum allowable width	2.5m
Separated one-way path desirable minimum width	1.5m
Separated one-way path minimum width	1.2m
Lateral clearance from hazards	1.0m desirable 0.5m minimum
Lateral clearance from fences and other smooth obstacles parallel to path	0.5m desirable 0.3m minimum
Standard cross fall	1%
Batter Slopes - Cut **Batter Slopes - Fill**	1 in 2 1 in 3

The clearances required in the rail corridor have been derived from VicTrack guidelines and VRIOGS standards. Table 2 lists these clearance requirements.

Table 2 – Clearance Requirements

Cross Section Element	Criteria
Minimum distance from centreline of nearest rail track to edge of path/fence (VicTrack)	8.0m
Minimum distance from centreline of nearest rail track to edge of path/fence (VRIOGS)	3m – Concrete sleeper track. Access not required for road vehicles. 4m – Non concrete sleeper track. Access not required for road vehicles. 6m – Access required for road vehicles.
Distance from the top of any cutting or toe of any embankment supporting the track to edge of path/fence (VicTrack)	5m
Distance from railway trunking and signaling cable (VicTrack)	1.5m
Clearance from aerial services (i.e. power lines) equipment and platforms (VicTrack)	5m
General Requirements (VicTrack)	Route should be as close as practicable to the boundary to minimise impact on VicTrack property Pathway is not to terminate at or pass through commuter car park Pathway fence to be provided on track side

Horizontal Alignment

AGRD was used to design the horizontal alignments. Minimum radii for the mid-block horizontal alignments are shown in Table 3.

Table 3 – Minimum Radii Values

Design Speed	Minimum Radius
20km/hr (Without Superelevation)	10.0m
20km/hr (With Superelevation)	9.0m

Vertical Alignment

Vertical grade values for the cycle path are shown in Table 4

Table 4 – Vertical Grades Values

	Grade
Desirable Maximum Grade	5.0%

Length of vertical curves shall be selected in accordance with Part 6A of AGRD. Minimum vertical curve lengths are as shown in Table 5.

Table 5 – Minimum Vertical Curve Lengths

Design Speed	Algebraic Change in Grade	Minimum Vertical Curve Length
20km/hr	2.0%	6.0m
	4.0%	6.0m
	6.0%	6.0m
	8.0%	6.0m
	10.0%	6.0m
	12.0%	6.7m
	14.0%	7.9m

Vertical Clearances

The minimum vertical clearances between the path surface and vertical constraints (e.g. tree branches, underpasses, sign structures and any overhead structure) within the project is 2.5m

Sight Distance Criteria

Table 6 lists the criteria for determination of sight lines.

Table 6 – Sight Distance Criteria

	Criteria
Eye Height	1.4m
Eye Location	Centre of lane
Object Height	0.0m
Object Location	Centre of lane
Reaction Time	2.5 seconds
Coefficient of Friction	0.25

Stopping Sight Distances (SSD) are as shown in Table 7.

Table 7 – Stopping Sight Distance Criteria

Design Speed	Gradient of Path	SSD for Uphill Travel	SSD for Downhill Travel
20km/hr	0.0%	20.2m	20.2m
	2.0%	19.7m	20.7m
	4.0%	19.3m	21.4m
	6.0%	19.0m	22.2m
	8.0%	18.7m	23.2m

0.8. Options Assessments

In the initial planning for the bike path, the identification and assessment of strategic options was undertaken through a series of professionally facilitated workshop sessions attended by DTPLI staff and key stakeholders including Whitehorse and Maroondah City Councils, local cyclist groups and Bicycle Network.

Criteria for assessing options included the extent to which they addressed the key objectives of the project, problems identified, value for money and practicability were generated from these workshops.

Multi criteria assessments to review each option individually against the key objectives and criteria, which are then compared and a preferred option is selected on balance across these assessments.

The criteria established for the assessment of the options is as follows:

- Ensures a safer environment for cyclists by separating bicycles from cars where feasible;
- Provides better connectivity for local communities to activity districts;
- Offers a low-cost transport alternative for commuters, local families and recreational cyclists and walkers;
- Improves connectivity to the many schools near the corridor, making it easier for people to walk and ride to their destinations; and
- Provides recreational opportunities for cyclists and walkers.

0.9. Community and Stakeholder Engagement

The development of the Box Hill to Ringwood Bike Path Project by VicRoads commenced in mid 2013 with the establishment of a stakeholder working group with City of Whitehorse, Maroondah City Council, Bicycle Network, VicTrack, MTM and Whitehorse Cyclists Incorporated. The working group helped guide VicRoads in its development of the route alignment and assessment criteria, identify issues and provide suggestions for improvement.

Throughout the project VicRoads has conducted extensive community consultation to understand community interests and concerns, and has used the feedback to help develop design options. This consultation has included:

- Community Information Sessions (December 2015);
- Elmore Walk Information Session (October 2015);
- Stakeholder Workshop (October 2015);
- Neighbourhood Door-knock (September/October 2015);
  - Residents abutting Laburnum Park, Laburnum Street, South Parade and Albert Street.
- Community Information Sessions (September 2014);
- Stakeholder Workshop (February 2014); and
- Council Briefings:
  - Council staff (2013 – 2016); and
  - Councillor briefings (3 August 2015, 19 October 2015. 14 Dec 2015 & 27 Jan 2016).
- Ongoing engagement with:
  - Local residents;
  - Cyclist groups;
  - Local traders; and
  - Community groups.

The project team has made every reasonable effort to ensure the immediate local community is aware of, and was able to provide feedback about the Box Hill to Ringwood Bike Path project. There are significant opportunities to develop further stakeholder relationships once the final path alignment has been confirmed. This includes extensive consultation on detailed design elements, for example how the path might interact with Laburnum Street.

Issues have been raised by the community around vegetation removal, security, safety and privacy, and every effort has been made by the project team to consider these concerns in project development. Alignment options have been investigated and assessed using a criteria based on the project objectives, including separation of cyclist from vehicles, safety of path

users, directness and connectivity, impacts on residents and businesses, community feedback and available funding.

The project team has received significant support from the community, and ongoing requests to complete the project.

0.10. Maintenance

The State has funded this project with the intention for the relevant local council to maintain the path once open to the public, except where the path integrates with key rail service areas such as train station precincts. VicRoads opinion is that Councils' are in the best position to maintain the path as it is part of their normal maintenance activities, i.e. to maintain footpaths on their own land and roads, and state managed arterials and highways. The path will be constructed through areas under council management or VicTrack land.

Council is requested to take on maintenance responsibility within areas it currently maintains.

Where the path is built within VicTrack land, a licence agreement is required between VicTrack and Council to enable Council to access and maintain the path within the VicTrack land. The exception to this would be in station precincts where Metro Trains Melbourne would maintain the path at the stations which are within its responsibilities under the Metro Train Infrastructure Lease. A Proposed Maintenance Responsibility Plan is attached in Appendix 3

0.11. Supporting Documents

The following reference documents have been used in the preparation of this report:

- Project Design Options Report by VicRoads Project Team;
- Furlong Main Blackburn Heatherdale Alliance design plans;
- VicRoads Preliminary Design Plans;
- Box Hill to Ringwood Shared User Path (SUP) Alternative alignment investigation report by Parsons Brinkerhoff;
- Safety Overview: Box Hill to Ringwood Bike Path by Malcolm Daff;
- Road Safety Audits;
- AustRoads Guide to Road Design;
- Cycling Aspects of AustRoads Guides; and
- VicRoads Cycle Notes

1. Box Hill Section

1.1. Overview

The Box Hill section of the bike path begins at Linsley Street (Box Hill) connecting with an existing shared use path, and runs along the north side of the rail corridor to Middleborough Road (Box Hill). From Linsley Street to Sagoe Lane, the path runs between private residential properties and the railway line. The remaining section runs behind Whitehorse Reserve and Box Hill High School, connecting with the existing pedestrian underpass of Middleborough Road. A map of the alignment is shown below in Figure 2.

Figure 2 – Box Hill Section Alignment

1.2. Section 1A – Linsley Street to Sagoe Lane - Complete

Section 1A of the bike path between Linsley Street and Sagoe Lane was completed in May 2015. Access to the cemetery has been greatly improved as part of these works. The section of path was previously endorsed by Whitehorse Council because it meets AustRoads guidelines for width, lateral clearance and grade. On 18 August 2014, Whitehorse Council resolved to maintain this section of path once constructed. VicRoads is currently managing maintenance and requests Council to enter into an agreement with VicTrack to take over the maintenance responsibility once resolved.

1.3. Section 1B – Sagoe Lane to Middleborough Road

The remaining section of the Box Hill section runs from Sagoe Lane to Middleborough Road. The final proposed alignment follows an existing gravel track along the north side of the railway line, behind Whitehorse Reserve and Box Hill High School down to Middleborough Road, predominately on VicTrack land. Constraints require the path to be less than 3m wide in some locations as detailed below and shown in Figure 3.

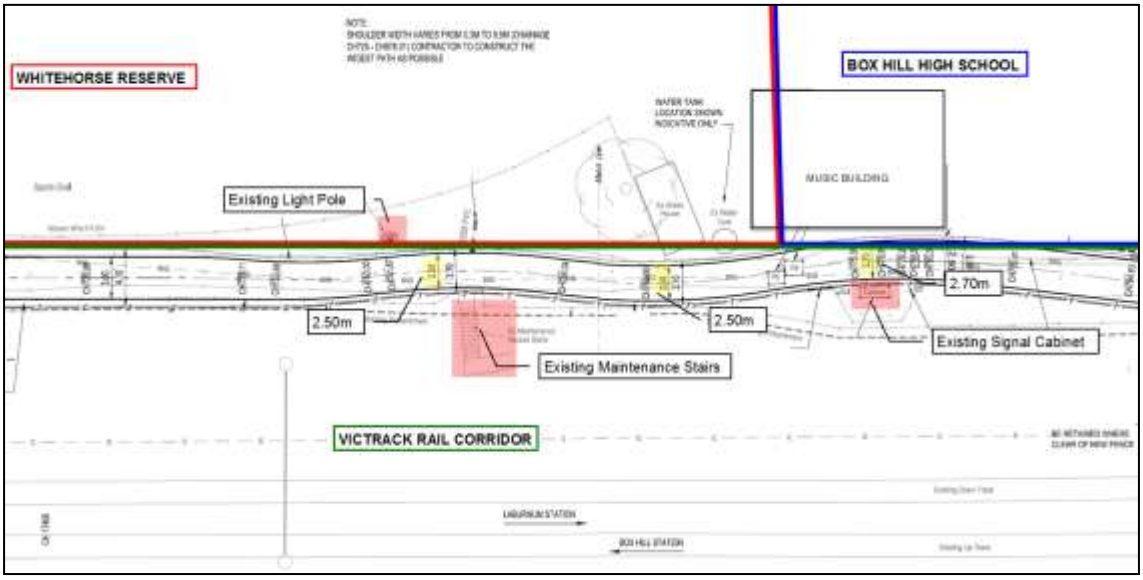
The boundary between rail land and crown land lies between the rail cutting and Whitehorse Reserve. Council manages Whitehorse Reserve on behalf of the State, while the Department of Education is also listed on the title as it uses the land for Box Hill High School activities. The path can be accommodated solely in rail land, but may require encroaching onto Whitehorse Reserve in a couple of locations to keep it 3m wide.

Along the path, there is a lighting pole for the sports oval, and on the south side of the path there are stairs to access the rail pit. These create some curves in the path which push it onto Whitehorse Reserve land if the 3m path width is to be retained. This requires consent from Council to locate the path on Whitehorse Reserve land as the responsible authority.

Between the light pole and the Box Hill High School music building, is a green house and a water tank which are on Whitehorse Reserve land. These can be avoided by narrowing the path. Alternatively, these can be relocated a little north to allow the path to remain 3m wide for longer. This requires endorsement from Council to allow the path to encroach onto Whitehorse Reserve.

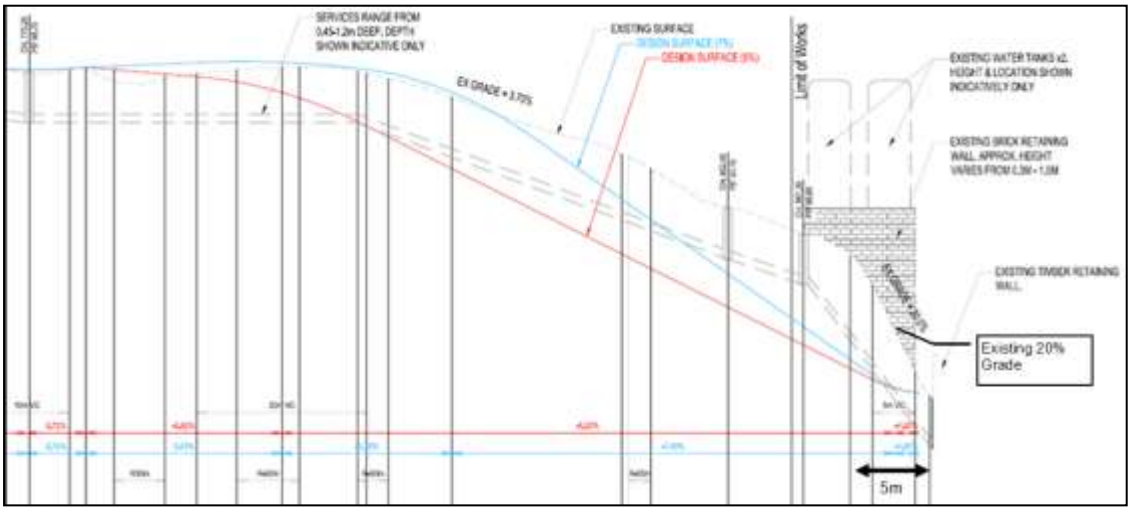
Due to the location of a rail signal control box behind Box Hill High School, the path cannot be 3m wide at this location within the rail corridor. Options to resolve this include moving the cabinet, splitting the path either side of the cabinet, or acquiring Department of Education land and putting the path between the cabinet and the school music building. MTM has advised that the cost of relocating the cabinet is in the order of $500k and requires a rail occupation over a weekend to cut over services. Splitting the path provides poor visibility to oncoming traffic and the risk of a collision. As shown in Figure 3 the path can be accommodated between the cabinet and the music building with land acquisition, providing good visibility and an acceptable path width of 2.7m and clearances. Without land acquisition, a path width of about 2.0m could only be achieved.

Figure 3 – Box Hill Section – Path Alignment without Encroachment on Whitehorse Reserve



As the path approaches Middleborough Road, the path follows an average grade of approximately 5% for 70m, and then drops at a gradient of 20% for the last 5m to Middleborough Road (Figure 4). There are rail services underground and rail pits at the crest of the slope. VicRoads has thoroughly investigated options for lowering the services and the pits to accommodate a flatter grade down to a desirable 5% grade. There is the minimum cover over the underground rail assets, and limited flexibility in the conduits to locally lower the services. VicTrack and MTM have estimated the lowering works to cost $845k including a weekend rail occupation to cut over the services.

Figure 4 – Box Hill Section – Grade line on Approach to Middleborough Road



However, lowering the path also results in cutting away at the land supporting the footings for the Box Hill High School gym. Therefore a structural retaining wall would also need to be built to support the building. This is estimated to cost in the order of $300k. Therefore the total cost of lowering the existing levels to meet the desirable 5% grade (see red line in Figure 4) is $1.25m, in addition to the path itself.

To address the short steep section of path we need to treat it as a localised hazard, rather than a length of path. Using the AustRoads guidelines, a context sensitive design approach is required to assess the risks and treatments applicable for this specific location. VicRoads will continue to work with Council, VicTrack, MTM, designers, road safety auditors and the community to detail the right treatment here.

The width of the path behind the Box Hill High School gym is also less than 3m, due to the retaining walls for the gym and Middleborough Road underpass ramps. Lowering the path and constructing structural retaining walls would further narrow the path width to approximately 2.7m.

The existing underpass structure will be used to cross under Middleborough Road. It is approximately 2.4m in width and was built to accommodate DDA requirements in 2006.

We expect that the underpass structure will become a VicTrack asset as it is located in rail land, however Council would take maintenance responsibility for the path on the structure.

1.4. Recommendation

VicRoads requests that the Whitehorse City Council:

1a) Accept maintenance responsibility, as previously advised, for the completed Section 1A, from Linsley Street to Sagoe Lane;
1b) Endorse section 1B, Sagoe Lane to Middleborough Road, along the north side of the rail corridor, including encroachment onto Whitehorse Reserve, where a 3m wide path cannot be accommodated on rail land;
1c) Provide in principle agreement to maintaining Section 1B; and
1d) Enter into a VicTrack Licence Agreement to maintain the path in the rail corridor.

2. Laburnum Section

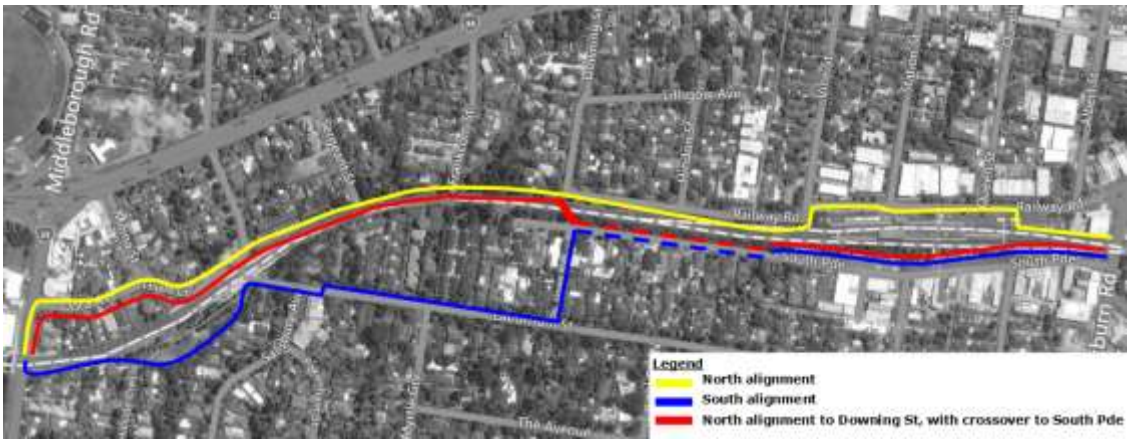
2.1. Overview

The Laburnum section of the bike path continues from the Box Hill section at Middleborough Road and finishes at Blackburn Road.

Options Considered

Three options have been considered in detail for this section, these being an alignment entirely to the north of the railway line, a south side alignment that mostly uses local streets, and a hybrid alignment that runs north of the railway line from Middleborough Road to Railway Road and crosses the rail line via a overpass or underpass to then run on South Parade on the south of the railway line (Figure 5).

Figure 5 – Laburnum Section Alignment



2.2. Option 1 – North of the Rail Corridor

This alignment consists of a widened path on Middleborough Road, and either an off-road or on-road bicycle facility shared zone along Dora Avenue and Thiele Court to provide a connection between Middleborough Road and Laburnum station. This route would require cyclists to ride through the station car park and cross the rail reserve via the footpath on the west side of Laburnum Street. Cyclists would cross Laburnum Street, north of the rail overpass, and travel along the rail maintenance access path, to Sergeant Street. The path would then travel within the rail reserve to the north side of Blackburn Station.

Middleborough Road nature strip has 3 power poles and a tree which require removal. This 50m length would be less than 3m wide. Power relocation here requires undergrounding through the rail bridge and is approximately $385k plus local house re-connection costs.

Dora Avenue and Thiele Court carry around 450 v/d at an average speed of 30 km/h, so an on-road sharrow solution would be appropriate here, similar to other locations in the City of Whitehorse, as shown in Figure 6.

Figure 6 – Existing Sharrows in Whitehorse

The Informal rail car park at Laburnum Station is on Council owned land, and is unsealed with no line marking. There is an existing ramp on the edge of rail land adjacent to Laburnum Station from Thiele Court to Laburnum Street which is 1.8m wide and DDA compliant with landings, however these landings are undesirable to cyclists. An option to ride through the car park without any change has been put forward by some members of the community, but generally authorities do not support this. VicRoads, VicTrack and Public Transport Victoria do not support informal bike paths through car parks due to the risks of motorists not expecting and therefore not looking for bikes, and being distracted by their commute. Therefore the path would need to be formalised and separated from the car park, preferably on the northern perimeter of Council's land to meet Laburnum Street as far as possible from the rail bridge. This route is proposed to separate commuters from path users, to better meet the objectives of removing conflicts where possible. More than 20 all day car parks would be lost undertaking this option.

Widening the existing station access ramp to accommodate the shared use path would provide a lower level of service with more conflicts and would encroach in part into Council's land.

At Laburnum Street various crossing treatment possibilities exist, such as a raised platform, median refuge, kerb outstands. While minimum sight distance can be achieved as per guidelines, other environmental factors, such as curve of the road and shadow from the bridge are likely to distract drivers from the crossing, requiring consideration during detailed design. It is likely that one or both car parks on the east side of Laburnum Street would need to be removed because of design requirements.

Rail Corridor – Laburnum Street to Downing Street – can provide an off-road solution. There are some locations where the path would need to narrow to 2.5m and require a number of trees to be either removed or significantly impacted. This route would require relocation of four rail stanchions, requiring rail occupations. Additionally Melbourne Water requires 24 hour access to the main drain inlet near the end of Frankcom Street. This means a boardwalk style ramp may not be viable, and therefore the path would need to narrow along the rail corridor and clashes with signal infrastructure would need to be addressed.

The path would require a planning permit for a Special Building Overlay due to this area being a retarding basin for flood events. The route would also impact on the reservation for a third rail track from Box Hill to Ringwood. If the proposed third track were built, these stanchions

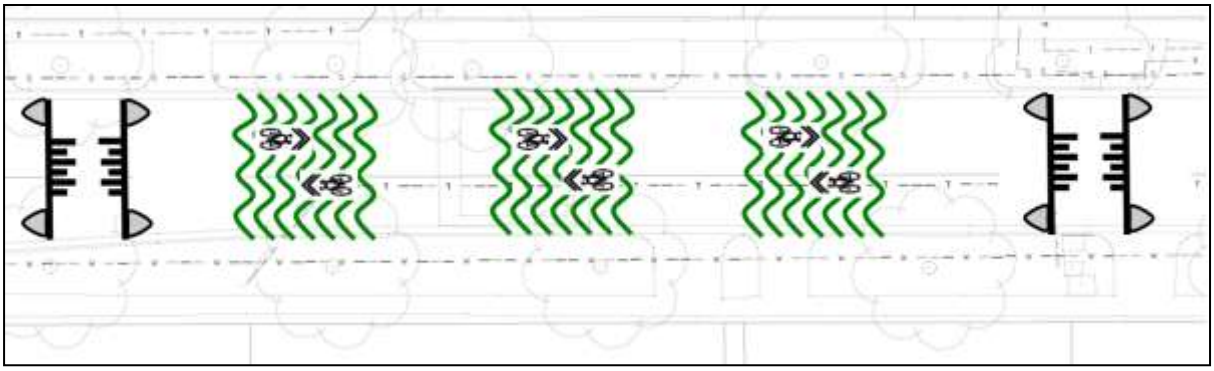
would again require relocation and the path would need to be rebuilt elsewhere to maintain the connection between communities.

Railway Road – Downing Street to Station Street - carries between 950 and 1550 v/d at mean speeds of 40 and 30 km/h at two different locations, respectively. Railway Road is 7.2m wide with permit parking on both sides. It has a footpath only on the north side and a treed nature strip on the south side abutting the rail land. To meet the objective of separating vehicles and bikes, an ideal solution for the path would be to clear the southern nature strip and build an off-road path here. However, this would require removal of more than 35 large trees and many smaller trees and shrubs, which we expect will be unacceptable to the adjacent residents and community, and reflects feedback from the local tree preservation society and other community members regarding vegetation impacts adjacent to South Parade, Glen Ebor Avenue and Morton Park as examples.

Therefore an on-road solution is the most feasible. Railway Road meets the speed and volume guidelines for a mixed traffic environment in Figure 2.2 of the Cycling Aspects of AustRoads Guides.

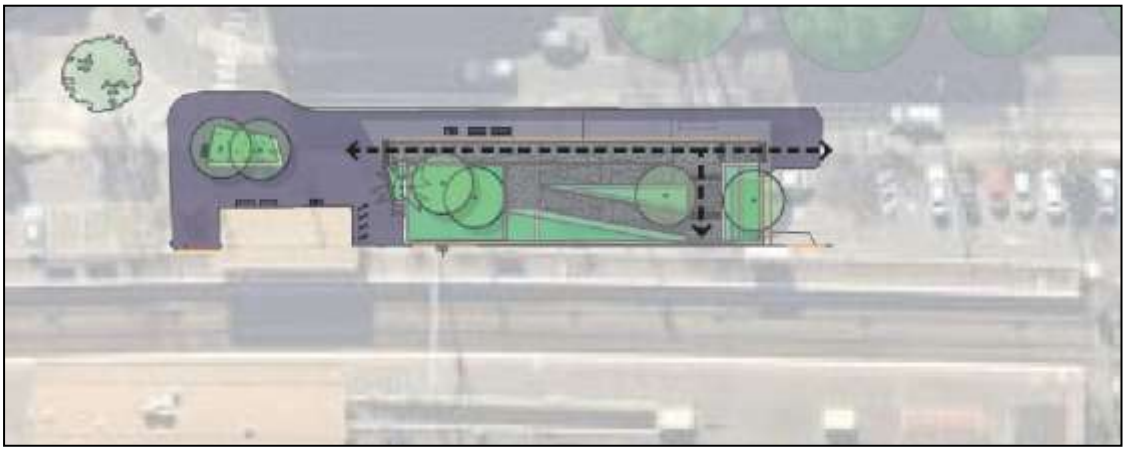
A gateway treatment would be more appropriate to meet the objectives of the project (see Figure 7) to clearly show the drivers that they have entered a shared zone using items like, but not limited to, threshold treatments, pavement stencilling, sharrows and reduced speed limits.

Figure 7 – Laburnum Section – Possible Gateway Style Treatment for Railway Road



Blackburn Station Northern Forecourt has limited space to accommodate the SUP with other users. There is approximately 13m available between the northern underpass opening and Railway Road. Three ramps are required to provide enough length at the maximum grade to rise from the underpass level to footpath level to be DDA compliant.

Figure 8 – Blackburn Station Northern Forecourt Schematic



To change this to two longer ramps would impact on car parking. This is not desirable for a shared use path and would also affect the station entrance. PTV and the Government require that there is no net loss of station parking for the project. With the three ramps, there is only a maximum of 4.5m available width to accommodate the footpath space, which is required for use by bus commuters, station commuters, SUP users, underpass users, power poles, bus shelters etc.

Blackburn Station to Blackburn Road would require the path to either go through the station car park, or widen the existing footpath which would require the removal of on-street parking, trees and power poles to provide a 3m shared use path with clearances. VicTrack, PTV, MTM and VicRoads do not support bike routes through car parks.

Blackburn Road can accommodate an at-grade crossing only. Drainage, underground services and the available width between the rail cutting and private property precludes an underpass. There is also an increased risk of pedestrian–cyclist accidents due to the north/south footpath and the east/west SUP having no visibility around existing buildings. The crossing of Blackburn Road north of the rail line would create a longer signalised intersection with South Parade, which would run less efficiently due to the extra length and adding additional signal phases.

2.3. Option 2 – South of the Rail Corridor

This option would run south of the railway line from Middleborough Road to Blackburn Station. From Middleborough Road the path would travel through Laburnum Park, via a separate new path to Laburnum Street. From here the path continues on-road down Laburnum Street to Elmore Walk, along Elmore Walk to South Parade and then on-road to Blackburn Station. The path moves off-road through the Blackburn Station precinct onto Blackburn Road.

Middleborough Road footpath on the bridge over the railway would be widened from 1.8m to 2.4m wide, the maximum that can be accommodated without widening the bridge.

The existing 2.5m wide asphalt path between Middleborough Road and Hillside Crescent would be replaced with a new 3m wide concrete path.

Laburnum Station Park is a local open space owned by Council with planting beds around the perimeter, and a playground and grassed space in its centre. There is an existing ramp on the edge of rail land adjacent to Laburnum Station from Hillside Crescent to Laburnum Street which is 1.8m wide and DDA compliant with landings., however these landings are undesirable to cyclists. A new path is proposed along the inside of the southern perimeter garden bed, offset from the trees to mitigate impacts. This route is proposed to separate commuters from path users, to better meet the objectives of removing conflicts where

possible. Two trees require removal for this path, and the existing bike locker near Laburnum Street requires relocation. It is expected that the impact to open space would be minimal and the playground can be separated from the path with a pool style fence, similar to at Blackburn Station.

Widening of the existing path to accommodate both the shared use path and commuters would be onto land owned and managed by Council, and would require removal of numerous trees, and relocation of rail lighting, hand rail and seats.

Laburnum Street – Laburnum Station to Elmore Walk - carries up to 3800 v/day, at a mean speed of 39 km/h, varies between 8.3m and 10.2m wide and has parking on both sides. It has footpaths and an avenue of trees on both sides. To meet one of the objectives of separating cyclists from vehicles, our recent proposal to introduce a widened footpath has been strongly rejected by the local community and residents.

Therefore an on-road solution is the most feasible option and Laburnum Street meets the speed and volume guidelines for this.

A parking study was undertaken in October 2015 showing that Laburnum Street parking was occupied up to 50% of the time as a whole, however occupancy was higher towards Laburnum Village and less near Main Street.

A further parking study has been undertaken in February 2016 detailing each parking space within at least 250m of the Myrtle / Laburnum intersection. On Laburnum Street, parking occupancy between Salisbury Avenue and Myrtle Grove reached a maximum of 80% between 12pm and 2pm, and between Myrtle Grove and Elmore Walk occupancy reached a maximum of 65% between 12pm and 2pm. Of these spaces, around 50% of vehicles overstayed the posted parking limits (including a number all day) indicating they have parking permits. We observed that Myrtle Grove had a maximum occupancy of 34% for its time restricted bays. Therefore, removal of parking on the north side of Laburnum Street in this section is possible without detriment to the community's parking needs, making available road space for other possible path options.

Possible options for an on-road facility could be a two-way separated bicycle facility or a gateway treatment as described in Option 1 for Railway Road, shown in Figure 7.

This level of detail will need to be explored in the detailed design phase with Council and in consultation with the immediate community if Option 2, the southern route, is accepted. Other details such as how and where the path transitions onto Laburnum Street around the Laburnum Village would form part of this further design detail.

Elmore Walk is well used by both pedestrians and cyclists alike as a preferred route to travel between Laburnum and Blackburn, as the alternatives are not as safe or enjoyable to use. Local community feedback has requested that we don't change Elmore Walk. This approach would not provide a facility that is consistent with project objectives, noting that this solution will generate a higher number of users along Elmore Walk than at present.

To improve safety for users of a shared path, the existing path could be widened to 2m, preferably 2.5m, with a sealed surface. To minimise visual impact this could be done with a coloured exposed aggregate concrete, for example. VicRoads internal advice is that a wider sealed path would unlikely impact the existing tree health as the existing path is cement stabilised minimising permeability and the trees have grown sourcing water away from the path. Our assessment of Elmore Walk as a 2.5m path was designed for a lower speed to reduce design curve radii to minimise tree removal and focussed on the retention of larger and more significant species at the expense of smaller non-natives as much as possible. The design would require removal of 11 out of 47 trees, four of which are dead. Further mitigations

such as posting a low speed limit and tightening curves or protecting close trees could reduce tree losses further.

This level of detail will need to be explored with Council and the immediate community if Option 2 and Elmore Walk are adopted as the bike path route. There was acceptance for a reduced impact style treatment from some of the community and all but one abutting resident when we had a drop in session at Elmore Walk in October 2015.

An alternative to adopting Elmore Walk as part of the route in this Option 2 is to continue cyclists on Laburnum Street to Main Street and follow it down to South Parade. The western footpath of Main Street has cafe trading, so the path would need to continue on-road. Main Street is busier than Laburnum Street, is a bus route with up to 10 services per hour and has parking on both sides. Cyclists would then need to cross South Parade to meet the Blackburn Station southern forecourt at an intersection where priority is not intuitive, and safe passage is a concern. This is a significantly poorer outcome for the bike path compared to Elmore Walk.

South Parade – Elmore Walk to retail sector - carries up to 130 v/d a mean speed of 34 km/h, is 7.1m wide and permits parking on the south side only. It has a footpath also only on the south side and a well vegetated linear reserve on the north side adjoining rail land. VicRoads initially proposed to use this linear reserve for an off-road path; however community feedback requested protection of the existing vegetation. We've reviewed traffic volumes and speeds along South Parade and concluded that an on-road path still meets the project objectives and design guidelines. Sharrows are an adequate treatment in this location given the very low traffic volume and speed.

Blackburn Station Southern Forecourt has 22m from the underpass opening to the kerb to accommodate a shared space. The redesigned underpass access enables an open space of 10m at the top of the ramps and stairs for rail and bus commuters, pedestrians and cyclists to interact. The path through the shared zone is at least 4m wide for the length of the bus bays, which are separated from the path with shelters and landscaping.

Figure 9 – Blackburn Station Southern Forecourt Schematic

There is space to accommodate a Parkiteer facility, opportunity to upscale in the future and direct access for users to the retail businesses along South Parade. The Blackburn Station Craft Market is accommodated in the new forecourt design, with a direct link to the market for members of adjacent communities.

Blackburn Road Crossing can be achieved via an underpass to avoid stopping at the road traffic signals, and both easterly and westerly connections are also provided to link with Blackburn Road and its function on the Principal Bicycle Network (PBN). Path users are separated from the north / south precinct connection and the traffic signals can run efficiently with the at grade crossing part of a standard intersection layout.

2.4. Option 3 – Hybrid North and South Side Combination

With community interest high we revisited our previous investigations and reached the same conclusion, as described in Option 1. However we saw that there was an opportunity to improve the level of service for the path if we could cross the railway from south to north at Laburnum Street and return to the south side of the tracks somewhere to link with South Parade. This would avoid the need to run the path along Laburnum Street and Elmore Walk or Main Street.

VicRoads concluded that crossing under the tracks at Laburnum Street is not appropriate due to lack of width on the footpath and road, and poor sight distance for a road crossing. We assessed it safer to access the northern alignment between Laburnum Street and Downing Street from Middleborough Road, rather than under the tracks at Laburnum Street, with Dora and Thiele carrying very low volumes and speeds.

Therefore, this hybrid option considers a combination of option 1 and 2, with a grade separated crossing in the vicinity of Downing Street to South Parade. The options for grade separation are detailed below, while the other parts of this route have already been discussed above.

Underpass Structure to cross the rail corridor between Downing Street and South Parade. Due to the level of this site, and location of a Melbourne Water drain, it is highly likely that the underpass would flood during rain events, and Melbourne Water may impose conditions that make underpass design unviable, e.g. flood immunity level may require raising of rail tracks. Significant tree removal would be required to allow the structure and associated ramps to be constructed, and the nature of an underpass would result in limited passive surveillance which may deter people from using the structure.

Overpass Structure is required if an underpass structure is not preferred. To meet appropriate height levels to cross the rail corridor, the structure would create a significant visual presence in the area and could result in visual intrusion into private properties. Railway infrastructure would require relocation, interrupting train services. A significant number of trees will require removal to allow for ramps to the overpass to be constructed. Additional funding would be required to maintain the structure.

VicRoads does not support the hybrid option due to security concerns, amenity, loss of trees, Melbourne Water requirements and a preliminary cost estimate of $5-10m to cross the railway which cannot be achieved within the project budget.

2.5. Option Costs

Northern Alignment – Option 1
The cost includes construction of the path, undergrounding of power on Middleborough Road, relocation of rail stanchions, boardwalk structure, service relocations at Blackburn Station north forecourt and changes to station car park is estimated to cost $2.0-2.5m.

Southern Alignment – Option 2
We estimate that the Southern Alignment would cost approximately $1.5m. Some higher cost items include a sensitive treatment for Elmore Walk and Laburnum Street, and Blackburn southern forecourt area.

Hybrid Alignment - Option 3
The construction of an underpass or overpass structure and additional maintenance, would cost approximately $5-10m.

2.6. Preferred Option

VicRoads recognises that this is an extremely difficult section, in a constrained environment and requires context sensitive design to achieve an acceptable outcome.

Table 8 provides the multi criteria options assessment for this section. It demonstrates that on balance, option 2 will achieve the most desirable outcome against the project objectives and criteria, while showing that each option faces its own challenges. The project funding constraints preclude the hybrid option, and on balance the southern option will provide a better level of service to path users, the community and commuters.

Table 8 – Laburnum Section – Options Assessment

Options Assessment Criteria	Option 1 – North Alignment	Option 2 – South Alignment	Option 3 – Hybrid North and South Side
Impact on community facilities			
Impact on private property and/or businesses			
Separation of SUP users and vehicles			
Design Guidelines conformance (path width, grade, hazards, visibility)			
Accessibility / connectivity/ directness			
Impact on rail services			
Impact on utility services			
Environmental Impact (Vegetation removal, etc)			
Cost			
Recommendation	✗	✓	✗

2.7. Recommendation

VicRoads requests that the Whitehorse City Council:

2a) Endorse the southern route (Option 2);
2b) Consent to build the shared use path on council owned land at Laburnum Station Park;
2c) Provide in principle agreement to maintain the path between Middleborough Road and Blackburn Station, except within the Laburnum Station and Blackburn Station precincts; and
2d) Enter into a VicTrack Licence Agreement for the path in the rail corridor.

3. Blackburn Section

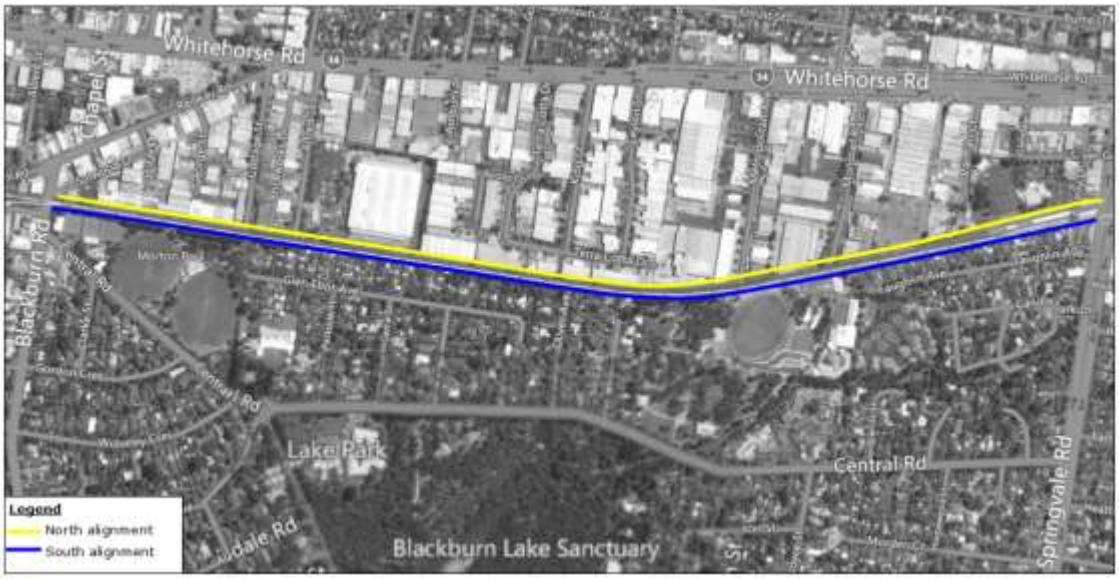
3.1. Overview

The Blackburn section of the bike path begins at Blackburn Road, continuing east along the rail corridor to Nunawading Station.

Options Considered

A north and south option for the Blackburn section of the project have been considered, both via the rail corridor. The use of Central Road and or Glen Ebor Avenue on the south side were explored early on in the project development, however with confirmation of the Blackburn Level Crossing Removal works they were discounted as a higher level of service can be provided by an off-road path within the rail corridor.

Figure 10 - Blackburn Section Alignment



3.2. Option 1 – North of the Rail Corridor

Option 1 runs along the north of the rail corridor from Blackburn Road to Springvale Road. At the eastern end of this section there is insufficient room in the rail corridor to build a path past an existing Boral concrete plant. There is no planning provision for VicRoads to compulsorily acquire a strip of land from Boral to accommodate the path. Additionally, Boral has submitted a planning application to the City of Whitehorse for redevelopment of the site to improve the operations of its concrete plant. Introducing planning provisions to acquire land for the shared use path could give rise to claims of business loss from Boral. Between the Boral site and Springvale Road is land owned by Council that accommodates various community facilities. There is no right of way provision on this land for the path to connect to Springvale Road and this would also need to be negotiated or acquired from the Council.

Aside from access at the east end, a path can be accommodated on the north side between Blackburn Road and Oliver Avenue where it would need to cross back to the south side to complete the journey to Nunawading. This does not preclude council or a separately funded project building a path as far as Moncrief Road in the future should the desire remain. So with the Northern route, the only additional connection would be to Alfred Street and connection to the Mega Mile will remain as exists via Cottage Street, Terracotta Avenue or Springvale Road. An underpass has also been flagged by some to cross the tracks from Moncrief Road to the south side; however there is an existing drain, track levels and construction challenges that make this option unviable.

The northern route requires the path to narrow in a number of locations to avoid some rail infrastructure such as the power substation and signal boxes, and numerous pits in the path, both solid and grated, to accommodate the rail underground services and drainage respectively. Given the available width, the grated drainage pits cannot be offset from the path. Maintenance vehicles would also block the path periodically throughout the year at the signal infrastructure, and the path is expected to flood in storm events due to the volume of overland flow this corridor collects.

To maintain a 20km/h design speed of the path to cross the railway at Oliver Avenue would require a longer, wider and therefore deeper skewed bridge to manage the curves at speed. This means a raised bridge deck level and longer ramps, a higher cost, more fill, more overlooking of private property and some minor land acquisition. Otherwise the currently proposed bridges would suffice, but they would be treated as intersections in the path meaning cyclist would need to slow and give way at the structure. These constraints mean that the path on the north side would provide a lower level of service compared to the south side and not meet the desirable criteria as set out in Section 0.7 for width and clearances.

3.3. Option 2 – South of the Rail Corridor

The option on the south side of the rail corridor is 3m wide with half metre clearance and grades of 5% or less, meeting the desirable criteria as set out in Section 0.7

It connects users with community facilities such as the South Parade Traders, Blackburn Station Craft Market, Blackburn Library, Morton Park, Blackburn Lake and the Nunawading Christian College if it wishes to have an access gate installed.

Community feedback to date has expressed concern that the southern alignment in this section will impact on vegetation. Detailed design with consideration of community feedback has meant that the southern SUP has very little, if any direct impact on vegetation. Construction access is the influencing factor on impacting vegetation. To construct the rail cutting, piling machines need to access the corridor to bore the holes and concrete then needs to be supplied to construct the rail cutting walls. To provide all weather access and stability for these vehicles, a temporary road is to be constructed along the southern side of the corridor comprising of approximately 500mm of compacted crushed rock after the topsoil is stripped from the ground. At the completion of the rail works:

- With no SUP, the full depth of crushed rock will be removed, with topsoil replaced; or
- With the SUP, just over out half of the crushed rock will be removed and then the path built on top.

The significant impact to vegetation is from building the construction access and will occur prior to the path construction.

The southern alignment will continue to connect to the Mega Mile via existing access across the rail line at Cottage Street, Terracotta Avenue and Springvale Road. This route does not preclude council or a separately funded project building a connector path as far as Moncrief Road in the future, should the need arise.

3.4. Option 3 – Hybrid

This option considers the north side option from Blackburn Road to Oliver Avenue, and then crosses to the south side option via the Oliver Avenue connection bridge to continue through to Nunawading. This has been considered as an option which avoids the land constraints at Boral and Silver Grove reserve on the north side. The challenges associated with this option are described in Options 1 & 2 above.

This option relies heavily on a northern option being adopted in the Laburnum Section; otherwise the path needs to cross from the south side to the north side at the Blackburn Road

Bridge. As a result the Blackburn Road underpass becomes redundant, and the Blackburn Road bridge structure and intersection design would need to change significantly. Modifications would also be required to the Oliver St Bridge to allow continuity of the path for users.

3.5. Option Costs

It is difficult to quantify the individual costs for the SUP on either the north side or the south side due to the nature of the broader level crossing removal project. As such some of the consequential impacts of building the shared path on either side are provided below:

Northern option:

Construction of larger drainage pipes, more pits, additional service relocations, relocation of station car parks, additional signalised crossing, and retaining walls at various locations. The cost and time implications of continuing to Springvale Road is a significant additional impact.

Southern Option:

Construction of the underpass of Blackburn Road, which has been incorporated into the Blackburn Road Level Crossing Removal Project design solution.

Hybrid option:

Modifications to the Oliver Street Bridge, and redundancy of the Blackburn Road underpass for shared use path users which is a key feature of the Blackburn Road Level Crossing Removal Project. No land acquisition is required.

3.6. Preferred Option

VicRoads recommends Option 2 as it provides better connectivity, safety and a more direct route than Option 1 or 3 due to the underpass of Blackburn Road, no additional intersections from rail crossings, connectivity with residents and community facilities, and achieving desirable widths and grades from Blackburn to Nunawading.

Table 9 provides the multi criteria options assessment for this section, demonstrating that on balance, Option 2 achieves the most desirable outcome against the project objectives and criteria.

Table 9 – Blackburn Section – Options Assessment

Options Assessment Criteria	Option 1 – North Alignment	Option 2 – South Alignment	Option 3 – Hybrid Alignment
Impact on community facilities			
Impact on private property and/or businesses			
Separation of SUP users and vehicles			
Design Guidelines conformance (path width, grade, hazards, visibility)			
Accessibility / connectivity/ directness			
Impact on rail services			
Impact on utility services			
Environmental Impact (Vegetation removal, etc)			
Cost			
Recommendation	✗	✓	✗

3.7. Recommendation

VicRoads requests that the Whitehorse City Council:

3a) Endorse the southern route (Option 2);
3b) Provide in principle agreement to maintain the path between Blackburn Road and Nunawading Station; and
3c) Enter into a VicTrack Licence Agreement for the path in the rail corridor.

4. Nunawading Section

4.1. Overview

The Nunawading section of the bike path connects from the west side of Springvale Road to the eastern end of Walkers Road, Nunawading.

Options considered

A number of options have been considered as summarised below:

- **An overpass:** It would require long ramps to get the height to clear Springvale Road, which occupy a large foot print of land not available, and would provide poor connectivity to Springvale Road itself.
- **An underpass:** It would be constructed on the alignment of the future third rail track, meaning it would require future removal. Construction of an extended bridge for Springvale Road would be disruptive to traffic and would need to be built to accommodate the third track, a significantly larger structure than required for a bike path. This portion would still have ramp constraints and poor connectivity with Springvale Road.
- **Via a new pedestrian crossing between the Nunawading station buildings:** New signals would compromise the traffic operation of Springvale Road, introducing a fourth set of signals in 400m where the level crossing was previously removed. Traffic signals close together also present serious safety risks with motorists experiencing a look through effect', meaning they may see a green traffic light ahead and miss the set of signals in front of them, resulting in vehicles running red lights against pedestrians and cyclists;
- **Via existing pedestrian crossing at Silver Grove or Market Street:** These have similar scenarios, however the path via Silver Grove traffic lights has a shorter, flatter overall route, with less side road crossings.

Figure 11 – Nunawading Section Alignment

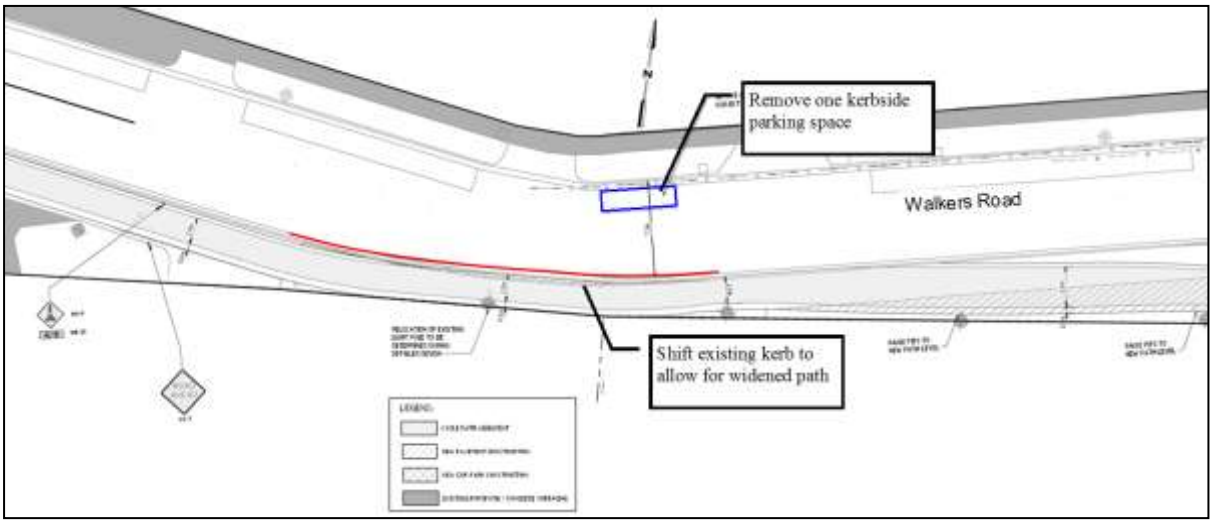
4.2. Preferred Option

The preferred option for this section is via the Silver Grove pedestrian signals. The path continues from the south side of the rail corridor into the Nunawading station precinct. It passes the Parkiteer cage and uses the existing pedestrian ramp to reach the Springvale Road forecourt. The path continues north along the Springvale Road western footpath to the existing pedestrian crossing south of Silver Grove. The footpath will be widened to a shared zone 3.8m wide by narrowing the existing parking bays from over 3m to 2.3m and slightly narrowing the Springvale Road traffic lanes, while still maintain a wide kerb side lane for on road cyclists. The pedestrian crossing will be upgraded with bicycle lanterns and other facilities to allow cyclists to legally use the crossing without dismounting.

On the east side of Springvale Road, the footpath will be widened to 3.0m, connecting to Walkers Road. An existing bus shelter requires removal. Details require approval from PTV; however the stop is not used to board passengers. Raised intersection treatments are proposed for the path to cross Oval Way and Walkers Road. The path continues on the south side of Walkers Road where the footpath will be widened and parking relocated to accommodate the widest path possible.

A pinch point on the curve of Walkers Road has the path less than 2m wide. We propose to remove one Council car park on the northern apex of the curve to allow moving the southern kerb to widen the path to 2.0m, as shown in Figure 12. A parking study completed in February 2016 Demonstrated that parking was not fully utilised in the vicinity on Walkers Road, indicating no adverse impact to the local community. We will work with Council to develop a detailed design.

Figure 12 – Nunawading Section – Impact on one car park along Walkers Rd



Along Walkers Road adjacent to Home HQ, we propose to shift all parking to the north to accommodate the path in the rail corridor, as shown in Figure 13. This puts rail parking on road, and shifts 4hr parking to indented bays. No parking is lost.

Figure 13 – Nunawading Section – Reallocation of Kerbside Parking at East End of Walkers Rd

Below in Table 10 is the multi criteria options assessment for this section. It demonstrates option 4 as achieving the most desirable outcome against the project objectives and criteria.

Table 10 - Nunawading Section – Options Assessment

Options Assessment Criteria	Option 1 – New Pedestrian Overpass/ Underpass	Option 2 – Existing Pedestrian Crossing at Market Street	Option 3 – New Pedestrian Crossing at Walkers Road	Option 4 – Existing Pedestrian Crossing at Silver Grove
Impact on community facilities				
Impact on private property and/or businesses				
Separation of SUP users and vehicles				
Design Guidelines conformance (path width, grade, hazards, visibility)				
Accessibility / connectivity/ directness				
Impact on rail services				
Impact on utility services				
Environmental Impact (Vegetation removal, etc)				
Cost				
Recommendation	✗	✗	✗	✓

4.3. Recommendation

VicRoads requests that the Whitehorse City Council:

4a) Endorse the route via Silver Grove pedestrian crossing and Walkers Road;
4b) Provide in principle agreement to maintain the path between Oval Way and the end of Walkers Road; and
4c) Enter into a VicTrack Licence Agreement for the path in the rail corridor.

5. Mitcham Section

5.1. Overview

The Mitcham section of the bike path was constructed under the Mitcham and Rooks Road level Crossing Removals Project. It runs in the rail corridor from Walkers Road to Mitcham Road, crossing from north to south at Simla Street and was opened in July 2014.

The path crosses Rooks Road and Mitcham Road at pedestrian and bicycle signals. VicRoads maintains the Mitcham Road signals and requests that Council maintain the Rooks Road pedestrian operated signals that have been installed specifically for the bike path. The path is generally 3m wide with 0.5m shoulders and grades less than 5%, however there are a couple of locations where the path is less in some attributes. These being around the rail stanchion legs east of Walkers Road (path width 2.7m), around the rail signal box east of Rooks Road (clearance 0.3m) and in front of Mitcham Station just west of Mitcham Road (grade up to 6.4%).

The path then continues off road along the northern side of Brunswick Road to just east of Creek Road. At the time of planning, Council required that VicRoads minimise land acquisition of the Community facilities along Brunswick Road, meaning the path could not fit in the rail corridor without significant impact on the Council owned facilities and the Mitcham Anglers Club. The path along Brunswick Road is 2.8-2.9m wide and has a grade of up to 9%, reflecting the grade of the existing road and footpaths. The road is narrow and indented parking was integrated with the path to maximise outcomes for parking and path users. The path exists today as a wide footpath, without line marking or signs to designate it as a share use path.

To date, Council has advised that it will not accept responsibility for this section of path as it does not achieve 3.0m width at a grade of 5% or less. This section of path is within the acceptable range of the AustRoads guidelines for various path attributes.

5.2. Recommendation

VicRoads requests that the Whitehorse City Council:

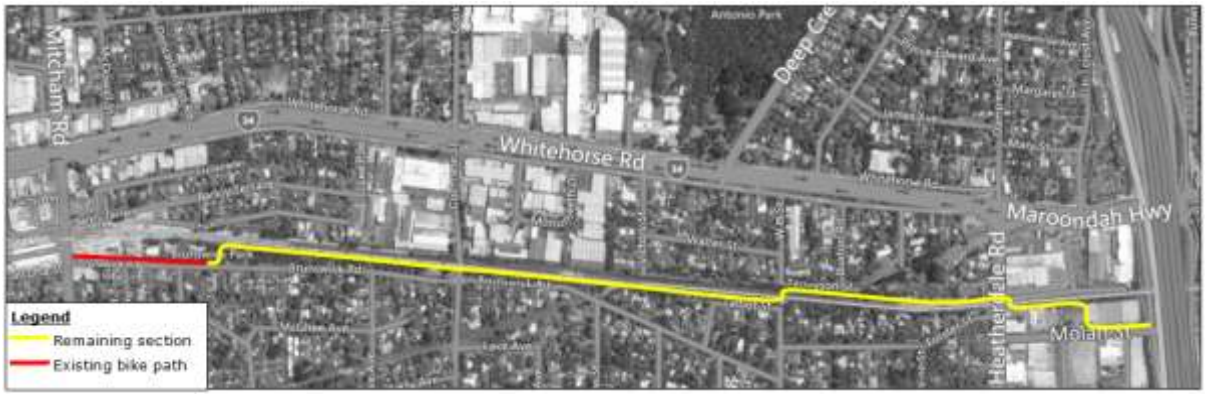
5a) Accept the Brunswick Road section of path from Mitcham Road to east of Creek Road as a Shared Use Path and permit signage and line marking to be installed;
5b) Accept maintenance responsibility for the completed path between Walkers Road and Creek Road, except in the Mitcham station precinct; and
5c) Enter into a VicTrack Licence Agreement for the path in the rail corridor.

6. Heatherdale Section

6.1. Overview

The Heatherdale Section of the bike path runs in the rail corridor from east of Creek Road to East Link.

Figure 14 – Heatherdale Section Alignment



Options considered

A number of options were considered prior to the Heatherdale level Crossing Removal Project, as summarised below:

- **Brunswick Park:** Initially the path was proposed to meander through Brunswick Park (council owned reserve). Council has resolved that the path cannot go through Brunswick Park. Options also investigated were to run the path both on-road or behind kerb along Brunswick Road, however within rail land is preferred.
- **Cochrane Street Crossing:** An at-grade crossing of Cochrane Street is undesirable due to steep grades on Brunswick Road and poor visibility of traffic on Cochrane Street. Traditional and signalised crossings of Cochrane Street were investigated however following design investigations and stakeholder feedback, a bridge is proposed to provide the best level of service for the path
- **North side of the rail corridor:** The span of the rail bridge at Cochrane Street is short and doesn't provide an opportunity for the path to swap sides. North east of Cochrane Street, factories and the rail embankment make it very difficult to accommodate a path
- **South side of the rail corridor:** The path could follow the south side between Cochrane Street and Purches Street, however the rail goes into cutting from Purches to Heatherdale Road and there isn't enough room for the path without land acquisition from the rear of properties next to the existing station.
- **Melbourne Water pipe track and Maroondah Highway:** This is not desirable as it crosses Heatherdale Road on a crest and very close to, or at Maroondah Highway intersection and doesn't connect directly to the station. There would be reduced widths, commercial driveways and the crossing of the EastLink interchange along Maroondah Highway.
- **Forster Street and Molan Street:** From Purches Street, the path was proposed to run on-road along Forster Street to Heatherdale Road as there was no space available in the rail corridor. It then followed widened footpaths on Heatherdale Road and Molan Street and continued to EastLink. Forster Street like Laburnum Street is narrow, has trees and parking on both sides, but also has a steep grade and is a bus route. Molan Street at the west end has a section that is approximately 15% grade for 50m, crossing a laneway with poor visibility. This was a poor outcome for the path, and has fortunately been avoided with the implementation of the Heatherdale Road Level Crossing Removal Project.

6.2. Preferred Option

The preferred option has the path running in the rail corridor from Creek Road to Molan Street. The path continues from the existing path in Brunswick Road which currently ends at the Mitcham Community House and will cross Brunswick Park at the west end to get to the rail corridor. The path also enters Brunswick Park slightly on the eastern end near Cochrane Street to avoid rail infrastructure and construct the fill embankment for the path. VicRoads requires confirmation that the path can be built in Council's reserve to cross to and from the rail corridor.

Figure 15 – Heatherdale Section – Brunswick Park Impact

The proposal provides for a bridge over Cochrane Street due to steep grades on Brunswick Road and poor visibility of traffic on Cochrane Street. We expect that the bridge will become a VicTrack asset as it is located on rail land, however Council would take maintenance responsibility for the path on the bridge. From Cochrane Street to Purches Street, the path is in rail land, hugging the boundary closely.

The Heatherdale Road level crossing removal team and the bike path team have been able to accommodate the bike path into the rail corridor with the new works, vastly improving the outcome for connectivity and safety for the community and path users alike.

A new bridge between Purches Street and Witt Street will be constructed to connect the north and south sides of the community, enabling the path to shift to the north side of the tracks through to Heatherdale Road. The north route retains vegetation on the south side and improves local access from the northern side of the tracks. Vegetation on the north side was required to be removed for the level crossing project to install rail services and drainage. The topography of the area falls towards Heatherdale Road through here and the path has a grade up to 8% in some locations, rather than cutting the path deep into the rail pit and isolating users between walls of concrete. Other mitigations will be considered during the detailed design phase and subject to road safety audit review.

The path crosses into Council land on either side of the Purches Street Bridge to allow the it to achieve design speeds and sight distance, and remains in the Tennyson Street road reserve until Buxton Road where it returns to the rail corridor.

A widened pedestrian and cyclist crossing will be relocated across Heatherdale Road, where the path returns to the south side of the tracks. Council currently shares responsibility with Maroondah Council for the maintenance of these traffic lights managed under VicRoads' traffic signals contract. This arrangement is proposed to continue with the upgraded crossing.

A shared ramp follows the rail corridor on the south side of the tracks next to the new Heatherdale Station to the bottom of the hill at a greatly improved maximum grade of 10%, with appropriate landings to enable the path to meet the AustRoads guidelines for SUP grades at this location. The path then follows the outside of the car park, crosses Molan Street and then continues along an upgraded footpath along the south side of Molan Street to EastLink.

Below is the multi criteria options assessment for this section. It demonstrates the rail corridor achieves the most desirable outcome against the project objectives and criteria.

Table 11 – Heatherdale Section – Options Assessment

Options Assessment Criteria	Prior to Heatherdale LCRP – via Forster and Molan Street	Current Proposal – Along Rail Corridor
Impact on community facilities		
Impact on private property and/or businesses		
Separation of SUP users and vehicles		
Design Guidelines conformance (path width, grade, hazards, visibility)		
Accessibility / connectivity/ directness		
Impact on rail services		
Impact on utility services		
Environmental Impact (Vegetation removal, etc)		
Cost		
Recommendation	✗	✓

6.3. Recommendation

VicRoads requests that the Whitehorse City Council:

6a) Endorse the preferred option ;
6b) Provide consent to the use of Council land for the path at the west and east ends of Brunswick Park to get to and from the rail corridor;
6c) Provide in principle agreement to maintain the path from Creek Road to Heatherdale Road; and
6d) Enter into a VicTrack Licence Agreement for the path in the rail corridor.

VicRoads requests that the Maroondah City Council:

6e) Endorse the preferred option ; and
6f) Provide in principle agreement to maintain the path along Molan Street.

7. Ringwood Section

7.1. Overview

The Ringwood Section of the bike path runs along Molan Street from EastLink to New Street, up New Street to Albert Street, then along the rail corridor to tie in with the existing path which leads to Wantirna Road.

Figure 16 – Ringwood Section Alignment

Options considered

A number of options have been considered as summarised below:

- **Melbourne Water pipe track and Maroondah Highway**: This is not desirable as it doesn't connect directly to the station and it crosses Heatherdale Road on a crest and very close to or at the Maroondah Highway intersection, interfering with traffic flow. There would be reduced widths, commercial driveways and the crossing of the EastLink interchange along Maroondah Highway. It is necessary to get back to the south side of the tracks at New Street, or beyond, but there is no room under the rail bridge and an overpass or underpass elsewhere is prohibitive.
- **Northern rail car park:** Paths through car parks are not supported and to formalise a path through the car park would result in significant loss of parking. If progressed, this would then connect to Maroondah Highway, as detailed above.
- **Rail corridor:** Either north or south of the tracks, the existing rail bridge cannot accommodate an SUP. Therefore a cantilever structure, or new structure would need to be built to cross EastLink, which is prohibitive.
- **Molan Street**: Molan Street can be used to cross EastLink with the footpath on the south side linking to the EastLink Bicycle Trail. The road space is busy with over 5500v/d and parking heavily utilised each side. The north side has many driveways and power poles, and a narrower path is more likely. Hence the south side of Molan Street is preferred.
- **Northern rail reserve**: The EastLink trail can be used to connect to the north side of the tracks, however this then needs to return to the south side to connect with the existing path, which is difficult as detailed above due to there being no room under the New Street rail bridge.

- **Southern rail reserve**: The EastLink trail can be used to link to the southern side of the rail reserve and behind Molan Street factories. The rail signalling is contained in an above ground service tray which divides this space, and would need to be undergrounded or relocated to accommodate this option. VicRoads is investigating possible options with the Heatherdale Level Crossing Removal Project regarding the opportunities here.
- **Industrial estates to the south of Molan Street**: Use EastLink trail heading south and then cross to New Street through power easements and private driveways / roads, but this requires mixing with commercial vehicles and increases travel distance by 400-500m.
- **New Street**: Traffic signals are proposed to cross New Street due to traffic volumes and high percentages of commercial vehicles.
- **Albert Street**: can be used to link to the existing section of path coming from Wantirna Road.

7.2. Preferred Option

The current preferred option for the Ringwood section is via an upgraded footpath along Molan Street, New Street and Albert Street.

From the new Heatherdale Station, the path utilises a new station car park access ramp to avoid the steep grade along Heatherdale Road at a greatly improved maximum grade of 10%, with appropriate landings to enable the path to meet the AustRoads guidelines for SUP grades at this location. The path then follows the outside of the car park, crosses Molan Street and then continues along an upgraded footpath along the south side of Molan Street to EastLink.

The Molan Street Bridge has an existing 2.4m footpath on the south side designed as a SUP by EastLink to provide a connection to the EastLink Trail ramp. It is not propose to alter the path over the bridge, with the exception of necessary signage and line marking.

The path will follow Molan Street on its southern side to New Street. The southern footpath crosses four commercial driveways, and available width is less than 3m from building line to kerb. To achieve a 3m facility the road would need to be narrowed slightly, possibly requiring some loss of parking due to driveway access requirements. Parking loss is highly undesirable to the local businesses as it is already at a premium, so a narrower path may be a preferable outcome. Due to the challenges of driveway crossings, car parking, road width, driveway heavy vehicle access and path user safety, the detailed design phase will need to explore appropriate treatments, in consultation with Council and the immediate community.

To cross to the eastern side of New Street, new bicycle/pedestrian operated signals are proposed. It is proposed that Council would be responsible for this site as it is on a local road. The path then continues north up New Street along an upgraded footpath to Albert Street, removing four trees.

A reconfigured intersection at Albert Street will allow the path to safely cross to the north side of Albert Street, where the path would continue along the rail reserve to join with the existing section of path recently constructed from Wantirna Road. Along Albert Street, 26 trees would be removed for this option.

Alternatively between EastLink and New Street, VicRoads is working with the Heatherdale Level Crossing Removal Project to investigate possible relocation of rail infrastructure on the south side of the rail reserve. The issues involved include agreements with EastLink and rail authorities, and the impacts and costs of relocating rail services. If successful, the path could then be built in rail land avoiding the use of Molan Street east of EastLink. The traffic signal location on New Street to the south side of the rail bridge will require careful consideration.

Table 12 – Ringwood Section – Options Assessment

Options Assessment Criteria	Maroondah Hwy	Molan St
Impact on community facilities		
Impact on private property and/or businesses		
Separation of SUP users and vehicles		
Design Guidelines conformance (path width, grade, hazards, visibility)		
Accessibility / connectivity/ directness		
Impact on rail services		
Impact on utility services		
Environmental Impact (Vegetation removal, etc)		
Cost		
Recommendation	✗	✓

Note: The southern rail corridor alternative will be added in the future if it becomes possible.

7.3. Recommendation

VicRoads requests that the Maroondah City Council:

7a) Note the current preferred option along Molan Street, and status of an alternative rail corridor option;
7b) Note the removal of trees along New Street and Albert Street;
7c) Provide in principle agreement to maintain the path from EastLink to Wantirna Road;
7d) Enter into a VicTrack Licence Agreement for the path in the rail corridor.

8. Appendices

1. Summary of Recommendations
2. Summary Table of the preferred options for each section
3. Proposed Maintenance Responsibility Plan

Appendix 1: Summary of Recommendations

Section	Recommendation
Whitehorse City Council	
1a	Accept maintenance responsibility, as previously advised, for the completed Section 1A, from Linsley Street to Sagoe Lane
1b	Endorse section 1B, Sagoe Lane to Middleborough Road, along the north side of the rail corridor, including encroachment onto Whitehorse Reserve, where a 3m wide path cannot be accommodated on rail land
1c	Provide in principle agreement to maintaining Section 1B
1d	Provide in principle agreement to maintaining the path envelope along the Middleborough Road underpass structure
1e	Enter into a VicTrack Licence Agreement to maintain the path in the rail corridor
2a	Endorse the southern route (Option 2)
2b	Consent to build the shared use path on council owned land at Laburnum Station Park
2c	Provide in principle agreement to maintain the path between Middleborough Road and Blackburn Station, except within the Laburnum Station and Blackburn Station precincts
2d	Enter into a VicTrack Licence Agreement for the path in the rail corridor
3a	Endorse the southern route (Option 2)
3b	Provide in principle agreement to maintain the path between Blackburn Road and Nunawading Station
3c	Enter into a VicTrack Licence Agreement for the path in the rail corridor
4a	Endorse the route via Silver Grove pedestrian crossing and Walkers Road
4b	Provide in principle agreement to maintain the path between Oval Way and the end of Walkers Road
4c	Enter into a VicTrack Licence Agreement for the path in the rail corridor
5a	Accept the Brunswick Road section of path from Mitcham Road to east of Creek Road as a Shared Use Path and permit signage and line marking to be installed
5b	Accept maintenance responsibility for the completed path between Walkers Road and Creek Road, except in the Mitcham station precinct
5c	Enter into a VicTrack Licence Agreement for the path in the rail corridor
6a	Endorse the preferred option
6b	Provide consent to the use of Council land for the path at the west and east ends of Brunswick Park to get to and from the rail corridor

6c	Provide in principle agreement to maintain the path from Creek Road to Heatherdale Road
6d	Enter into a VicTrack Licence Agreement for the path in the rail corridor
Maroondah City Council	
6e	Endorse the preferred option ; and
6f	Provide in principle agreement to maintain the path along Molan Street.
7a	Note the current preferred option along Molan Street, and status of an alternative rail corridor option;
7b	Note the removal of trees along New Street and Albert Street;
7c	Provide in principle agreement to maintain the path from EastLink to Wantirna Road;
7d	Enter into a VicTrack Licence Agreement for the path in the rail corridor.

Appendix 2: Route Summary Table

	Section						
	Box Hill	**Laburnum**	**Blackburn**	**Nunawading**	**Mitcham (complete)**	**Heatherdale**	**Ringwood**
Impact on council land: Reserves	Section of path passes through edge of Whitehorse Reserve to maintain 3m path width	New path through Laburnum Park (Middleborough Rd to Laburnum St). Upgraded path through Elmore Walk (Laburnum St to South Parade)	None	None	None	Path through Brunswick Park, from Brunswick Rd to rail corridor	
Roads	None	On-road treatment along Laburnum St, and South Parade	None	Narrowing of Walkers Rd and indenting of parking to allow space for path	None	Upgraded footpath along Brunswick Rd	
Car parks	None	Possible car parking removal to create gateway treatment along Laburnum Street if an on-road treatment is selected	None	Removal of one car park on Walkers Rd to allow for widened footpath	None	None	
Impact on vegetation	11 trees removed along rail corridor	15 trees removed in Laburnum park and Elmore Walk. (four are already dead)	No trees expected to be removed along rail corridor	None	None	62 trees removed due to level crossing construction works and/or bike path	
Impacts on private land (overlays exist)	Land transfer from Department of Education required		None		None		
Compliance with guidelines	20% grade for 5m on approach to Middleborough Rd Less than 3m wide path at selected locations if permission to use council and DoE land not granted	2.4m wide upgraded path along Middleborough Rd from underpass ramp to Laburnum park	3m width path with 0.5m clearances and grade of 5% or less	Some sections of path 2.0m wide along Walkers Rd	Some sections with less than 4m width, less than 0.5m clearances and greater than 5% grade	8% grade at some locations along rail corridor 10% grade along Heatherdale station	
Benefits for the options	Direct access from Sagoe Lane to Middleborough Rd		Off-road path for entire section			Underpass of Heatherdale road	
Issues for the option	Utilises existing narrow underpass of Middleborough Rd	Some on-road sections	At grade crossing at Blackburn Rd	At grade crossing of Springvale Rd			
Dollar values for option							
Maintenance							

Appendix 3: Proposed Maintenance Responsibility Plan