



**Horsham Rail Bypass Planning
Report**
Final Report

Reference: 233162
Prepared for: Horsham
Rural City Council
Revision: 3
12 June 2013

Document Control Record

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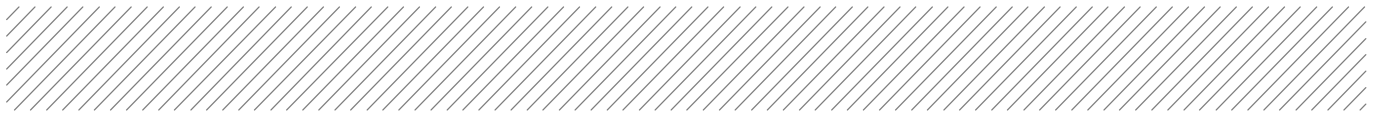
Document control						aurecon	
Report Title		Horsham Rail Bypass Planning Report - Final Report					
Document ID		233162-RPT-002	Project Number		233162		
File Path		P:\RLS\233162 Horsham Rail Bypass Project\3. Project Delivery\340 Deliverables\7. Final Report Rev 3\Horsham Rail Bypass Planning Report - Rev 3.docx					
Client		Horsham Rural City Council	Client Contact		John Martin		
Rev	Date	Revision Details/Status	Prepared by	Author	Verifier	Approver	
0	1 February 2013	Draft issued for client comment	HR	JPW / ST	GCH	JEB	
1	13 March 2013	Final report incorporating HRCC and project team comments	HR	JPW / ST	GCH	JEB	
2	17 May 2013	Revised final report expanded to include Road over Rail grade separation option, limited economic assessment	JPW	JPW	GCH	JEB	
3	12 June 2013	Report updated to address HRCC comments including similar signalling costs for the passing loop for both options	JPW	JPW	GCH	JEB	
Current Revision		3					

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Contents

Abbreviations and Acronyms	6
1. Introduction	7
1.1 Background	7
1.2 Project objectives	8
1.3 Purpose	8
2. Existing conditions	9
2.1 Existing land use	9
2.2 Existing rail corridor	9
3. Project inputs and key issues	10
3.1 Land use planning requirements	10
3.2 Engineering and operational requirements	10
3.2.1 Current rail operations	10
3.2.2 Engineering design assumptions	11
3.2.3 Road crossing grade separation assumptions	11
3.3 Rail infrastructure requirements	13
3.3.1 Design standards	13
3.3.2 Reference documents	13
3.3.3 Main line track design parameters	14
3.4 Key drivers	15
4. Urban regeneration options	15
4.1 Overview	15
4.2 Option A – residential focussed development	17
4.3 Option B – commercial hub / innovation park	17
4.4 Green cycle / pedestrian link	18
4.5 Land value considerations	18
4.6 Public consultation, planning scheme amendment and land acquisition	19
4.7 Summary	19
5. Rail alignment options	20
5.1 Overview	20
5.2 Discarded options	21
5.3 Rail corridor option 1	21
5.4 Rail corridor option 1A	22
5.5 Rail corridor option 2	22
5.6 Rail corridor option 2A	23



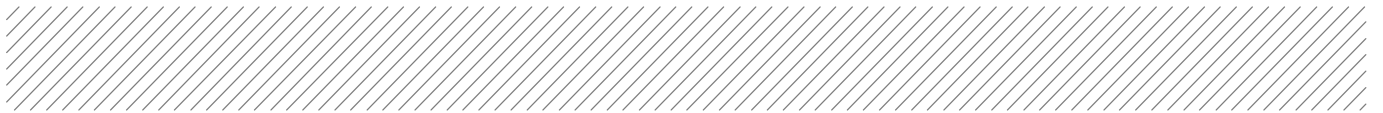
5.7	Rail corridor option 3	24
5.8	Rail corridor option 3A	24
5.9	Rail corridor option 4	25
5.10	Proposed rail corridor option	25
5.11	Cost estimate – Road over rail grade separation	29
5.12	Cost estimate – Rail over road grade separation	31
6.	High level benefits	33
6.1	General	33
6.2	Benefit evaluation framework	38
6.3	Results and conclusions	39
6.4	Other items	40
6.5	Benefits of combined road and rail projects	40
7.	Areas for further development	41
8.	Conclusion	42

List of Figures

Figure 1.1: Study Area	7
Figure 2.1: Proposed Area for Regeneration	9

List of Tables

Table 3.2: Engineering Design Assumptions	11
Table 3.3: Road over Rail Parameters	12
Table 3.4: Rail over Road Parameters	12
Table 3.5: Main Line Track Design Parameters	14
Table 3.6: Key Drivers Summary	15
Table 4.1: Indicative Landuse Split	15
Table 4.2: Contamination Remediation Costs	16
Table 5.1: Rail Corridor Options Route Summary	20
Table 5.2: Rail Corridor Options Assessment Criteria	27
Table 5.3: Indicative Road over Rail Cost Estimate for Route 1A (2013 costs)	29
Table 5.4: Indicative Rail over Road Cost Estimate for Route 1A (2013 costs)	31
Table 6.1: Benefits Associated with Option 1A	33
Table 6.2: Key CBA Modelling Assumptions	38
Table 6.3: CBA Results (7% discount rate)	39
Table 7.1: Areas for Further Development	41



Appendix A

Land Use and Urban Design Related Sketches

Appendix B

Land Valuation

Appendix C

Appendix C1

Proposed Rail Cross Section (minimum footprint)

Appendix C2

Proposed Rail Cross Section (maximum footprint)

Appendix D

Concept Alignment Options

Appendix E

Rail Alignment Option Comparison Summary Table

Appendix F

Appendix F1

Cost Estimate – Road over rail

Appendix F2

Cost Estimate – Rail over road

Appendix G

ARTC Master Train Plan

Abbreviations and Acronyms

ARTC	Australian Rail Track Corporation
BCR	Benefit Cost Ratio
CBA	Cost Benefit Analysis
CoP	Code of Practice
HRCC	Horsham Rural City Council
MCA	Multi Criteria Analysis
NPV	Net Present Value
PPRZ	Public Planning and Recreation Zone
PTV	Public Transport Victoria
PV	Present Value
PVB	Present Value of Benefits
PVC	Present Value of Costs
RAS	Route Access Standards
SG	Standard Gauge
The Overland	Passenger train operating between Melbourne and Adelaide
VicRoads	Victorian Road Authority
WIFT	Wimmera Intermodal Freight Terminal

1. Introduction

1.1 Background

Horsham Rural City Council (HRCC), in conjunction with the Department of Transport, has engaged with Aurecon (in association with SJB, Aquenta, and Wigg & Partners) to undertake an investigation and prepare a feasibility report assessing the benefits of realigning the Melbourne – Adelaide railway line to bypass central Horsham, in Victoria’s Wimmera Southern Mallee Region.

The study area in question extends from Dahlen rail siding in the west to the Wimmera Intermodal Freight Terminal (WIFT) in the east and from Dooen School Road in the north to just south of the existing Horsham township. The study area is illustrated in orange and the existing rail corridor is illustrated in blue dashed line in Figure 1.1.



Figure 1.1: Study Area



1.2 Project objectives

The key objectives of the assignment for the Horsham Rail Bypass Planning Project are:

- To identify shorter alignment options for the Melbourne - Adelaide railway line to bypass Horsham to the north
- To compare the different rail alignment options against a range of criteria
- To identify a proposed alignment option and identify the estimated high level cost of this option
- Undertake a high level benefits review for the proposed option
- Identify potential land uses for the existing railway land made available following the relocation of the railway line
- To inform major infrastructure planning (including both the Victorian Road Authority (VicRoads and Australian Rail Track Corporation (ARTC)) in regard to future network planning in the area
- To provide VicRoads with the best possible information to inform its Western Highway Bypass route decision
- To highlight issues to ARTC in their planning of the national freight business
- To inform HRCC for land use planning
- To inform HRCC's growth management strategy, including any further refinement of the completed precinct structure plan for the Wimmera Intermodal Freight Terminal site at Dooen

1.3 Purpose

The purpose of this report is to present the findings of the study, including the following:

- i. A proposed rail alignment and its anticipated high level cost
- ii. The possible land uses for the redundant railway land in Horsham following removal of the railway line
- iii. Benefits associated with the new rail alignment and the redundant railway land both in relation to Horsham and the proposed Western Highway Bypass project

The document comprises eight main sections, as follows:

- Introduction
- Existing conditions
- Project inputs and key issues
- Urban regeneration options
- Rail alignment options
- High level benefits
- Areas for further development
- Conclusion

2. Existing conditions

2.1 Existing land use

The Melbourne to Adelaide rail line (for both freight and passenger services) currently bisects Horsham. The Horsham North Urban Design Framework (completed by SJB Urban) states that the rail corridor contributes to Horsham North's status as a significantly disadvantaged area with a lack of economic, educational and social opportunities, cohesion and prosperity. This study highlights the opportunity to relocate the rail line and regenerate this central part of Horsham. The proposed area for regeneration is illustrated in Figure 2.1.

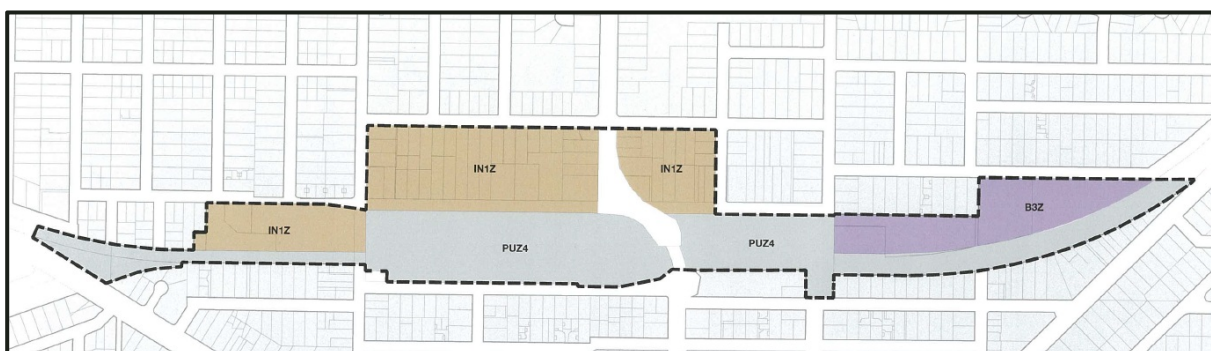


Figure 2.1: Proposed Area for Regeneration

The proposed area for regeneration (including road reserve) has an area of approximately 27 hectares and is comprised of Public Use Zone 4 (Rail), Industrial 1 Zone and Business 3 Zone. The existing rail line to the northeast and northwest of the proposed regeneration area is discussed further under Section 2.2 of this report.

The existing rail corridor, existing freight terminal and peripheral industrial properties are approximately 250m at their widest point creating a swathe of unused and rundown industrial land. The regeneration area tapers at its eastern and western ends as the rail corridor narrows to only accommodate the rail line. A large portion of the Industrial 1 zoned land in the study area is already utilised for residential purposes.


The land to the north of Horsham (where the new rail line could be located) predominantly comprises large (square mile) cropping blocks forming a distinct grid pattern across the land. The Horsham Aerodrome is located approximately 3km north of the Riley Road / Western Highway intersection and a distance of 5.6km from the town centre.

2.2 Existing rail corridor

The Melbourne to Adelaide rail corridor comprises a single bi-directional Standard Gauge (SG) track within a corridor varying in width between approximately 10 metres (towards west of Horsham) to 30 metres (towards east of Horsham). Within the township a passing loop of 1600 metres (clear) is provided for train passing and to provide operational flexibility.

Currently the existing rail corridor passes through Horsham north between the Western Highway and Henty Highway. Horsham Railway Station is located within central Horsham along Railway Avenue between Wawunna Road and Horsham-Kalkee Road and services The Overland train passenger rail service.

The section of rail corridor being investigated lies between the Wimmera Intermodal Freight Terminal (WIFT) located northeast of Horsham, and Dahlen, located northwest of Horsham.



Within the study area, there are existing level crossings at Henty Highway, Wail-Dooen Road, Aerodrome Road, Gatehouse Road, Rasmussen Road, Edith Street, Hazel Street, Geodetic Road, and Moores Road.

3. Project inputs and key issues

3.1 Land use planning requirements

The land use planning requirements for the study cover two parallel work streams: the regeneration of the redundant rail corridor and the establishment of the future rail corridor.

The planning outcomes for the regeneration of the redundant rail corridor will consider the design and development options following the removal of rail services through Horsham. Additionally the relevant planning, acquisition, environmental and cultural issues will be detailed at a high level for each of the future rail alignment options to the north of Horsham.

The land use planning considerations for both the work streams will be informed by several studies that have been, or are currently being, completed. The key planning related documents were identified along with the key limitations / parameters / considerations in the Functional Requirements Working Paper and include:

- Draft Horsham North Urban Design Framework
- Horsham Growth Management Framework. Part A – Background Report and Part B – Vision and Objectives Statement for the City of Horsham
- Horsham Central Activities District Strategy 2012
- Horsham 2040 – A Strategy for Growth Management
- Draft Wimmera Southern Mallee Regional Growth Plan
- Draft Wimmera Intermodal Freight Terminal Precinct Structure Plan (now finalised)
- Horsham Heritage Study (June 2012)

In addition to having regard to the above strategies, the rezoning and / or acquisition of both the urban study area and the new rail corridor will be undertaken in accordance with the Planning and Environment Act 1987 and the Land Acquisition and Compensation Act 1986.

3.2 Engineering and operational requirements

The purpose of this section is to detail the engineering and operational requirements associated with the Horsham Rail Bypass Project.

This section covers the following:

- Current rail operations
- Engineering design assumptions
- Road crossing grade separation assumptions

3.2.1 Current rail operations

Following a review of the ARTC Master Train Plan (effective 21st January 2013), the current operational train paths are summarised in Table 3.1. The number of train movements is defined by services that are timetabled to either arrive or depart Horsham. It is noted that, at times, scheduled train paths do not always represent an actual train movement, or additional operational movements may be required but not documented in the Master Train Plan; however they are considered suitably indicative for a study of this nature. An extract of the ARTC Master Train Plan (effective 21st January

2013) for the Melbourne (Mel) to Dimboola Loop (Dim) section is provided for information in **Appendix G**.

Table 3.1: Current Train Paths Operations

	Intermodal		Steel		General Freight		Passenger	
	Mel to Dim	Dim to Mel	Mel to Dim	Dim to Mel	Mel to Dim	Dim to Mel	Mel to Dim	Dim to Mel
Monday	4	3		1		1		1
Tuesday	5	5		1	1	1	1	
Wednesday	4	5		1	1	1		1
Thursday	6	6	1		1	1	1	
Friday	7	3	1	1	1	1		1
Saturday	2	4					1	
Sunday	3	5	1	1	1			

Future freight traffic from the Wimmera Intermodal Freight Terminal (WIFT) is predicted to grow. However given the uncertainty of future frequencies at this location, and for the purposes of this study, the existing operational frequency will be adopted, with passive provision for a future additional track.

3.2.2 Engineering design assumptions

Full details of the engineering design assumptions were provided in our previously issued Functional Requirements Working Paper (November 2012). The key engineering design assumptions are detailed in Table 3.2.

Table 3.2: Engineering Design Assumptions

Engineering Design Assumptions	
Component	Assumption
Number of Tracks	Corridor to allow for one track initially for freight and passenger services with provision for an additional track in the long term (total 2 tracks).
Passing Loop	New passing loop to be provided to match existing functionality. It is assumed that at the time of future main line track duplication the passing loop would no longer be required and would not be replaced.
Waterway Crossings	Grade separated with bridges over waterway
Horsham Aerodrome	Provision to be made for future extension of North South runway. If the road bypass runs along the southern edge of the airport, then the northern edge will need to be kept clear and vice versa.
Farm Access	Consideration of farm access (including between blocks in the same ownership). Potential allowance for alternate access.
Wimmera Intermodal Freight Terminal (WIFT)	Provision continued to be made for access at both ends of WIFT. Any bypass options to commence beyond WIFT.
Structural Clearance	In accordance with VRIOGS 0001 Structural Gauge Envelopes / ARTC CoP Section 7: Clearances / VicRoads Road Design Guidelines Part 2

3.2.3 Road crossing grade separation assumptions

The crossing of existing and potential future roads poses an engineering challenge to the delivery of the Horsham Rail Bypass Project. All new rail / road crossings within the study area would be required to be grade separated or the road closed in accordance with the State Planning Framework (Amendment 18.01-2) which states that no new level crossings may be constructed without specific Government level approval. This approval has not previously been granted for similar projects.

For the purposes of this study, it has been assumed that a number of existing roads can either be closed or substantially realigned with the potential for bypass roads to be provided either side of the rail corridor. Any changes to the local road network would need to allow for an equivalent level of access. This would require further investigation.

As part of this study 'road over rail' and 'rail over road' grade separation forms have been considered. Both options have relative advantages and disadvantages and should be considered in the future as part of the development of the project.

Road over rail (road on elevated structure, rail at grade)

Road over rail grade separations are preferred in comparison to rail over road grade separations as the steeper grades allowed for roads result in a shorter overall length of earthworks on the approaches to the bridge spanning across the tracks (nominally 150m each side) than a corresponding rail over road grade separation. Key vertical clearance requirements are presented in Table 3.3.

Table 3.3: Road over Rail Parameters

Vertical Clearance	Basis	Comments
7.1m	VRIOGS 0001-2005	Allowance for future double-stacked container freight on freight tracks

However, the grade separation of existing roads can be disruptive for residents who typically use the impacted road as during the construction phase temporary road closure may be necessary.

In order to construct grade separations of this form, a reduced rail corridor width can be accommodated; refer to drawing 233162-SK-TC-C1011 in **Appendix C2** for the indicative drawing. A minimum corridor width of 30m has been assumed, making allowance for a total of two tracks (one now, one in the future) located at or around existing ground level, maintenance access track and provision for drainage and signalling / communications conduits.

This grade separation method may also be preferable where roads are to be constructed in the future, and would minimise initial construction costs for the rail tracks as they could be constructed at grade with the new road constructed over, at a later date (if required).


Road over rail grade separation method will also maximise accessibility for oversized farm machinery such as the Bourgault Model 7950 Air Seeder, typical of the type of machinery used in the Horsham area.

Rail over road (rail on elevated structure, road at grade)

Rail over road (rail on new structure) grade separation at the interface location would likely be achieved with the track supported on a bridge structure spanning across the road, with the tracks constructed on a soil embankment on the approach to the crossing point (nominally 750m each side) due to the flat grades required for the tracks. Key vertical clearance requirements are presented in Table 3.4.

Table 3.4: Rail over Road Parameters

Vertical Clearance	Basis	Comments
5.4m	VicRoads Road Design Guidelines Part 2	Arterial Road. Allowance for 5.3m clearance + 0.1m allowance to resurface roadway.



In order to construct grade separations of this form, an expanded corridor footprint is required; refer to drawing 233162-SK-TC-C1010 in **Appendix C1** for the indicative drawing. As part of this grade separation form a maximum corridor width of 74m has been assumed, in order to make allowance for a total of two tracks (one now, one in the future) located on high soil embankments on approach and departure to assumed rail road grade separations, maintenance access tracks on both sides of the corridor and provision for drainage and signalling / communications conduits.

Alternatively, the approaches to the crossing point may be constructed on a viaduct type structure. Whilst the construction cost is likely to be considerably higher for a viaduct than constructing a soil embankment, the footprint of the structure will be significantly less than the embankment and would require less land to be reserved for the rail corridor.

This method of road / rail grade separation is unlikely to require substantial modification to existing roads, and will likely allow construction of the rail alignment to occur with minimum disruption to road users with potentially only short duration isolated road closures required

Summary

In summary, 'road over rail' and 'rail over road' grade separated crossings have been considered and costed up (under Option 1A). During the further development of the project it may be necessary to consider provision of a corridor of varying width to take into account existing topographical, environmental or engineering factors.

As the road over rail has a lower cost with less land acquisition, it is recommended that this option be taken forward as the preferred grade separation form.

3.3 Rail infrastructure requirements

The purpose of this section is to detail the performance, technical and functional requirements associated with the track components in relation to the Horsham Rail Bypass Project.

This section covers the following:

- Design standards
- Reference documents
- Main line track design parameters

3.3.1 Design standards

The most recent editions, revisions and amendments of standards and codes to be referenced in the design shall include but not be limited to the following:

- ARTC Track and Civil Code of Practice (CoP), Section 4: Ballast
- ARTC Track and Civil Code of Practice (CoP), Section 5: Track Geometry

3.3.2 Reference documents

The most recent editions, revisions and amendments of documents to be referenced in the design shall include but not be limited to the following:

- ARTC Route Access Standards (RAS) – Laverton – Wolseley

3.3.3 Main line track design parameters

The main line track design parameters being adopted are illustrated in Table 3.5 below.

Table 3.5: Main Line Track Design Parameters

Item	Parameter / Value (Typical)	Basis
Track Gauge / Loading	Standard Gauge 1.435m designed for 25 tonne axle loads	ARTC Track and Civil CoP Section 5.1.1
Design Speed	115 km/hr	ARTC Route Access Standards (RAS) – Laverton - Wolseley
Horizontal Curves	60m desirable minimum length of straight between horizontal curves.	ARTC Track and Civil CoP Section 5.1.1 (e)
Cant	Applied cant = 125mm maximum Cant deficiency = 75mm maximum Equilibrium cant = 200mm maximum (derived)	ARTC Track and Civil CoP Section 5.1.1, Table 5.2A
Vertical Curves	7200m minimum vertical curve radius	ARTC Track and Civil CoP Section 5.1.1 Table 3 (100-119km/hr) (desirable)
	15m minimum vertical curve length	ARTC Track and Civil CoP Section 5.1.1 (c)
Longitudinal Track Grades	1:100 (1%) maximum	ARTC Track and Civil CoP Section 5.1.1
Track Spacing (Track Centres)	4.5m minimum	ARTC Standard Drawing TA3.01.106
Passenger Station	Provision for low patronage station with limited facilities (one platform)	Assessment

3.4 Key drivers

The key project drivers identified in consultation with HRCC that were considered as part of the design are summarised in Table 3.6 below.

Table 3.6: Key Drivers Summary

Driver
New alignment
Providing flexibility for growth of Horsham Aerodrome
Severance of existing land lots into constrained parcels
Severing of north - south local access roads
Regeneration of redundant corridor
Provision of passenger rail station to service the existing (or expanded) passenger services
Land contamination in and around the existing freight terminal
The Horsham Passenger Train Station is listed as a heritage item in the Stage 1 Heritage Study
Provision for future population growth to the north of Riley Road (acknowledging that this is not forecast in existing Horsham studies)

4. Urban regeneration options

4.1 Overview

The realignment of the passenger and freight rail services line to a position north of Horsham creates significant urban regeneration opportunities within Horsham, which will help facilitate the reconnection of the areas of Horsham either side of the current railway corridor thereby supporting the reversal of the current social and economic isolation experienced in Horsham North.

Two regeneration options have been developed; one with an emphasis on residential development around a central park and the other with the emphasis on a commercial hub interspersed with generous green spaces. The indicative landuse split for each of the options is illustrated in Table 4.1.

Table 4.1: Indicative Landuse Split

Option A: Proposed Zones and Approximate Areas		Option B: Proposed Zones and Approximate Areas	
Public Park and Recreation Zone (25%)	66,000m ²	Public Park and Recreation Zone (25%)	72,000 m ²
Residential 1 Zone (65%)	174,000 m ²	Residential 1 Zone (50%)	128,000 m ²
Business 3 Zone (10%)	23,000 m ²	Business 3 Zone (25%)	62,000 m ²

Both options are anticipated to have a 30 – 50 year development horizon, which is particularly important when considering the planned growth of commercial development as set out in the Horsham Central Activities District Strategy 2012.

Both options seek to improve connectivity, both in terms of bridging the social and economic divide created by the rail corridor and improved physical connectivity with roads, greenways and open spaces.

Several analysis plans were prepared that lay the foundations for the two regeneration options, specifically:

- A “Site Connections” plan showing how existing connections can be extended to vastly improve connectivity
- A “Site Interfaces” plan showing the nature of the existing landuses interfacing with the proposed area for regeneration
- A “Views and Key Features” plan showing key sightlines and features that can be emphasised through the development of the proposed regeneration area
- A series of “Public Park Comparisons”, which are a common urban analysis technique used to demonstrate and communicate the size of a parcel of land from an urban scale or structural viewpoint. Using a ‘recognisable’ place as a comparison provides a familiarity to understand the area of land being dealt with

Copies of the above referenced plans are provided in **Appendix A**.

It is noted that a key limitation of developing the area for regeneration is potential land contamination as a result of prolonged industrial land uses in the area. The Council has advised that they are yet to commence a land contamination study. Notwithstanding this, a very high level summary of the potential remediation costs for the area based on hypothetical scenarios of 25% and 75% levels of contamination has been prepared, as illustrated in Table 4.2.

Table 4.2: Contamination Remediation Costs

Contamination Level		Potential Remediation Cost (25% contaminated)	Potential Remediation Cost (75% contaminated)
To the redundant existing track corridor (17.6km)			
A	Category C and B Excavation and disposal of Cat C material from the existing Rail Corridor to a borrow pit or discarded local quarry within 25km (Ballast Sub-ballast and Capping layer) is contaminated	\$5,669,505	\$11,309,310
City centre clean up			
B	Excavation and disposal of Cat C material from the City Centre Site to a borrow pit or discarded local quarry within 25km radius. It has been assumed 100% of the site excluding the Stabling Yard and track is to be excavated to 500mm and classified as Cat C. For the stabling yard, it has been assumed the Ballast and Sub-ballast is 100% contaminated. The remaining capping layer is 25% or 75% contaminated.	\$6,677,325	\$7,881,300
Total of (A+B)		\$12,346,830	\$19,190,610

4.2 Option A – residential focussed development

Option A seeks to regenerate the proposed area and integrate the northern and central areas of Horsham town using predominantly infill residential development of mixed densities. This would build on the surrounding residential fabric, including the industrial zoned land that is already utilised for residential purposes. The proposed residential use will provide for population growth within the town, rather than this growth occurring on the town fringe, which is more costly in terms of both vitality and infrastructure requirements.

Suitable zoning / planning controls could be adopted to achieve a range of densities, including medium density development which has found success in other parts of Horsham. The Council have noted that a high quality aged care facility is required in Horsham and this could be accommodated within the area for regeneration and designated through a rezoning of the land.

A key feature of the regeneration project is the central parkland, which would draw residents from all over Horsham and become a pivotal civic meeting point. To capitalise on this feature and ensure its citywide success, we recommend that the Council reference the site in an Open Spaces Strategy and develop an events programme for the reserve that would set out weekly, monthly or yearly events that would activate and draw people to the space on a regular basis.

The central parkland would be supported by three pocket parks; one at each end of the study area and one centrally located, as well as connect the pedestrian / cycle link that would utilise the rail corridor to the northeast and northwest of the area for regeneration within the city limits.


In addition, Option A includes a small amount of commercial land (approximately 23,000m²) to support both the local residents and the Central Activity District (located approximately 500m to the south of the Study Area). Suitable zoning / planning controls would limit the use of the land to civic uses (such as meeting places for group activities, a library) and local businesses (such as a medical centre, hairdresser, milkbar). If structurally sound, the Horsham Rail Station could be retained (in situ) and adaptively reused (as a café or civic meeting place).

The urban design analysis identified the urban design opportunities of this option as:

- *...reinforces the commitment to the Horsham North Urban Design Framework*
- *...removal of noxious land uses within the site and existing urban environment*
- *...creation of a green linear park and movement corridor from east to west through the site*
- *...provide new frontages and interfaces within the site, to both existing buildings and the public realm*
- *...provides amenity and sustainability of new housing stock*
- *...removal of the railway corridor for new development, and allows for the 'stitching' back together of the urban fabric*
- *...a threshold experience to the site*
- *...realignment of Horsham Kalkee Road at grade, removes a physical and visual barrier to pedestrian movement (subject to VicRoads approval)*
- *...freight traffic should be discouraged [and] instead use peripheral roads*
- *...a central parkland area and civic hub, with the adaptive reuse of the Station buildings.*

4.3 Option B – commercial hub / innovation park

Option B builds on the design opportunities of Option A, but has a longer term view to the commercial needs in Horsham. Like Option A, this option still seeks to integrate the communities north and south of the rail corridor.



Approximately half of the area for regeneration will be utilised for residential activity, with appropriate planning controls supporting a range of housing typologies and densities.

Green space will still be a pivotal feature of the development, although broken down into smaller areas rather than the large central park. Again, an events program will be required to capitalise on the space and ensure its citywide success. The east – west pedestrian / cycle link continues to be an integral part of the regenerated area.

This option identifies the use of the proposed commercial space (approximately 62,000m²) as a “green collar” / innovation hub, which was foreshadowed previously by SJB Urban in their Horsham North Urban Design Framework. The analysis notes that:

The size and location of this unique site in the heart of the town provides the opportunity for a new type of advanced employment cluster, which can accommodate research and industry, of state or nationwide significance.

This new type of economic development is much needed in Horsham and can provide associated longer term benefits from such employment opportunities including: training and education; urban renewal and investment from the private sector; boosts to the local economy and support to other local services; and encouraging sustainability initiatives in the wider township.

An additional benefit of Option B is the new streets and laneways around the commercial and green spaces, which will “provide new frontages and interfaces within the site, to both existing buildings and the public realm”. The smaller blocks increase the permeability of this area, which improves access and connectivity.

4.4 Green cycle / pedestrian link

A key feature of the regeneration project is a cycle / pedestrian link utilising the redundant rail corridor. The green link will run from the intersection of Riley Road and the Western Highway (at its western end) to the intersection of Rasmussen Road and the Henty Highway (at its eastern end).

The link will provide a safe and attractive connection drawing people to Horsham North and the area for regeneration. The new link also provides an attractive link to Police Paddock (a key ecological reserve of the area), an alternative to the walking tracks in the southern areas of Horsham.

In the event that the Western Bypass is constructed and cycle lanes are formed on Kalkee Road, then the proposed green link will connect well with this alternative cycle route through Horsham North


4.5 Land value considerations

The land identified within the Study Area is currently held in both public and private ownership; specifically the Public Use Zone is controlled by VicTrack and the industrial and commercial land is owned by a number of private entities and individuals.

Given that the rail corridor is already in public ownership it presents an ideal opportunity for redevelopment as the central park. This means that there is limited commercial value in this piece of land at present; rather the redevelopment of the rail corridor into a park will require considerable public investment.

In the event that a rezoning of the land results in an increased land value, both redevelopment options will afford the private landowners within the regenerated area the majority of this benefit.

A high level evaluation of the possible return values for land being rezoned to Residential or Commercial was completed. The current day value of the land was assessed as \$9,329,200 and



\$8,441,700 for Options A and B respectively. It is noted that these values are subject to a large number of assumptions and exclusions, which are discussed in full in the report included in **Appendix B**.

Option B will result in a portion of the land value going to Council (or VicTrack) as this option proposes a commercial use within the existing rail corridor (where Option A proposes minimal).

It would be possible to reconfigure the proposed rezoning, so there would be additional commercial value in the rail corridor, however this would be offset by the acquisition cost of the land held in private ownership to establish the open space (if the full area of open space proposed in Option A was still desirable). Conversely, the open space area could be reduced and additional residential or commercial zoned land provided as is depicted in Option B.

4.6 Public consultation, planning scheme amendment and land acquisition

Following Council's adoption of one of the regeneration options and the completion of the additional investigations (discussed below), it is recommended that the Council publically notify a draft of the adopted option for community comment. Additionally, more targeted consultation can be carried out with directly affected landowners (within the area for regeneration). In addition to the public notice, the Council could host information evenings explaining the benefits of the project to Horsham.

A Planning Scheme Amendment to identify the proposed zones and appropriate / necessary overlays will need to be formulated and notified in accordance with the Planning and Environment Act 1987. The Planning Scheme Amendment would be publically exhibited to enable the community to voice their concerns or support for the proposal.

Following the Planning Scheme Amendment, the Council (as the acquiring authority) may need to serve notice of acquisition on the relevant landowner(s) where the green spaces are proposed. Through the acquisition process the landowner will be compensated for any land required to be taken into public ownership. Following the development of the parks, the land subject to the Public Acquisition Overlay will be rezoned to the Public Park and Recreation Zone, which will enable the land to be used and developed for its intended purpose.

4.7 Summary

This analysis examined the urban regeneration opportunities associated with the redevelopment of approximately 27 hectares of land comprising the rail corridor and adjoining industrial and business zoned land.

Of the two redevelopment options, it is recommended that Option A (residential) be pursued, with a longer term view to incorporating the innovation hub in the future. This will require additional planning and design initially to ensure that up front development has the flexibility to readily evolve and accommodate subsequent development without incurring considerable retrofitting costs.

The green spaces will require considerable public investment (particularly given the size of the central park proposed in Option A). However, the removal of the rail corridor and the redevelopment of the area will have significant social and economic benefits as Horsham North is integrated back into the remainder of the town. An events program should be prepared and implemented to realise the full potential of the new open space(s).

The remainder of the land will be earmarked for residential and commercial development (in line with the new zoning) and the monetary value of this will largely be realised by the current (private) landowners rather than the Council. Should commercial retrofitting of the large central park be undertaken in the future then the Council may achieve some commercial gain at this time, as well as

reduce the operating costs of the open space and increase the vibrancy of the area with a higher number of employees.

Appropriate public consultation and amendments to the Horsham Planning Scheme will be required following the completion of additional complementary studies. Some acquisition of private land by the Council may be required to fully provide the open spaces and connectivity opportunities.

5. Rail alignment options

5.1 Overview

As part of this study, a number of possible rail alignment options located north and south of Horsham were considered.

Rail corridor options situated to the north of Horsham were selected for further investigation due to a variety of factors, including; comparable environmental benefits, removed requirement for VicRoads bypass options to cross possible rail corridor options, the ability to bypass Horsham, and the added benefit of reducing rail travel distance and time.

An illustrative summary of the rail corridor options developed can be found in **Appendix D**, and is summarised in Table 5.1 below.

Table 5.1: Rail Corridor Options Route Summary

Rail Corridor Option	Route Summary
Rail Corridor Option 1	From Melbourne, the rail alignment exits the existing rail corridor just east of Henty Highway and travels west towards the Western Highway adjacent to Francis Road. The rail alignment then connects back into the existing rail corridor just south of Dahlen siding.
Rail Corridor Option 1A	From Melbourne, the rail alignment exits the existing rail corridor just west of the existing rail crossing at Wail-Dooen Road. It then curves to the north to travel adjacent to Francis Road heading west towards the Western Highway. As per Rail Corridor Option 1, the rail alignment connects back into the existing rail corridor just south of Dahlen siding.
Rail Corridor Option 2	From Melbourne, the rail alignment exits the existing rail corridor southwest of Wail-Dooen Road and travels adjacent to Aerodrome Road towards the Western Highway. The rail alignment ties back into the existing rail corridor between Francis Road and Aerodrome Road.
Rail Corridor Option 2A	From Melbourne, the rail alignment exits the existing rail corridor southwest of Wail-Dooen Road and travels adjacent to Aerodrome Road towards the Western Highway. Just west of Horsham-Kalkee Road, the rail alignment curves northwest to abut with VicRoads Bypass Option 11 and connects back into the existing rail corridor just south of Dahlen siding.
Rail Corridor Option 3	From Melbourne, the rail alignment exits the existing rail corridor between Aerodrome Road and Gatehouse Road and abuts VicRoads Bypass Option B2 and VicRoads Hybrid Option adjacent to Gatehouse Road. The rail alignment continues west towards the Western Highway before connecting back into the existing rail corridor just west of Horsham Airport.
Rail Corridor Option 3A	From Melbourne, the rail alignment exits the existing rail corridor just south of Gatehouse Road. It then curves to the north abutting with VicRoads Bypass Hybrid Option and continues as per Option 3.
Rail Corridor Option 4	From Melbourne, the rail alignment exits the existing rail corridor just south of Gatehouse Road. It then curves northwest and abuts VicRoads Bypass Option 11 before connecting into the existing rail corridor just south of Dahlen siding.



Further detail on each of the options is provided in Sections 5.3 to 5.10 of this report.

5.2 Discarded options

In addition to the seven rail corridor options summarised in Table 5.1, three additional options were initially considered and discarded as they did not meet the project objectives. Specifically a “Do-Nothing” option, an alignment to the south of Horsham and an alignment along Riley Road (the northern limit of the town)

- a. Do Nothing
This option does not enable urban regeneration within Horsham and the reconnecting of areas in Horsham north and south of the existing railway. Furthermore, it intersects with the proposed VicRoads Bypass alignment and would result in a costly grade separation.
- b. Southern Alignment
This option was discarded for the same reasons that a southern highway bypass was not pursued. Specifically the environmental effects (identified during previous VicRoads studies) and costs to mitigate some of the environmental factors which appear too great to be viable.
- c. Riley Road Alignment
This option also intersected with the proposed VicRoads Bypass alignment and required a costly interchange. Furthermore, the close proximity to Horsham town meant that there was limited flexibility for future population growth to the north and if growth did occur in this direction then it would need to straddle the rail line, recreating the current problem.


5.3 Rail corridor option 1

Rail Corridor Option 1 is located furthest north from Horsham town centre and is capable of supporting all proposed VicRoads Bypass Options. It provides the most direct route between the Wimmera Intermodal Freight Terminal (WIFT) and Dahlen siding, reducing the travel distance by approximately 7 kilometres. At an assumed average speed of 80 km/hr, this may equate to a rail travel time saving in the order of five minutes. This rail corridor option is also located approximately 2 kilometres north of Horsham Airport, enabling possible airport expansion to either the north or south.

The alignment will intersect with Henty Highway, Wail-Dooen Road, Dooen South Road, Horsham-Kalkee Road, Flacks Road, Geodetic Road and Plowrights Road and will require either road and rail crossings to be grade separated or for the interface to be removed by road closure or realignment. As a minimum it is expected that Horsham-Kalkee Road will be grade separated. All existing level crossings between Henty Highway level crossing and Dahlen siding will no longer be used and removed.

Given the distance from all VicRoads Bypass Options, there is no foreseen potential for combined project land acquisition. All required land acquisitions for Rail Corridor Option 1 will be completely separate to the land required for any of the VicRoads Bypass Options.

The proposed rail corridor is located approximately 6 kilometres north of Horsham town centre. This significant distance will be beneficial for freight services by improving route efficiency, safety, and amenity for residents, however a potential passenger station along this alignment would have disadvantages to the community relating to increased travel time to and from the station. Although this rail corridor option is also the furthest away from town compared to all other rail corridor options this option will require acquisition of 11 existing property parcels.



Following a high level desktop investigation, this rail corridor option is expected to have minimal cultural heritage or environmental impacts.

5.4 Rail corridor option 1A

Rail Corridor Option 1A supports all proposed VicRoads Bypass Options and follows a similar route to Rail Corridor Option 1. It provides the second most direct route between WIFT and Dahlen siding, reducing the travel distance by approximately 6 kilometres. At an assumed average speed of 80 km/hr, this may equate to a rail travel time saving in the order of four to five minutes. The rail corridor is also located approximately 2 kilometres north of Horsham Airport, enabling possible airport expansion to both north and south of existing.

The alignment will intersect with Dooen South Road, Horsham-Kalkee Road, Flacks Road, Geodetic Road and Plowrights Road and will require either road and rail crossing to be grade separated or for the interface to be removed by road closure or realignment. As a minimum it is expected that Horsham-Kalkee Road will be grade separated. Rail Corridor Option 1A also traverses a minor unnamed road that appears to be used for private access from Wail-Dooen Road and consideration should be made to closing this road as other points of access to the property appear to be available. The existing level crossings at Henty Highway and Wail-Dooen Road will remain in service and may need to be upgraded. All other existing rail crossings between Wail-Dooen Road level crossing and Dahlen siding will no longer be used and removed.

Similar to Rail Corridor Option 1, Rail Corridor Option 1A is located approximately 6 kilometres north of Horsham Town Centre and will provide similar benefits and disadvantages for freight services and safety, amenity to Horsham and surrounding residents, and the possibility of implementing a future passenger station along the rail corridor.


The rail corridor is also located a significant distance away from all VicRoads Bypass Options. As a result there is no foreseen potential for combined project land acquisition, as all required land acquisitions for Rail Corridor Option 1A will be completely separate to the land required for any of the VicRoads Bypass Options.

Following a high level desktop investigation, this rail corridor option is expected to have minimal cultural heritage or environmental impacts.

Overall this option will require acquisition of 10 existing property parcels. Although the design has sought to minimise encroachment into existing properties by locating the new corridor adjacent to existing property boundaries, the alignment is likely to sever two property parcels resulting in areas of land unsuitable for farming use. A strategy in regard to these land areas will be required as part of any land acquisition process.

5.5 Rail corridor option 2

Rail Corridor Option 2 supports VicRoads Option 11 and VicRoads Hybrid Option. For VicRoads Option B2, this rail corridor option intersects the road bypass just east of Flacks Road. As a result, for this rail corridor option to occur, it will need to be grade separated with VicRoads Option B2 to comply with state government policies. The alignment will also intersect with Dooen South Road, Horsham-Kalkee Road, Flacks Road, Geodetic Road and Plowrights Road, and similarly will require road and rail crossings to be grade separated or the roads closed. As a minimum it is expected that Horsham-Kalkee Road will be grade separated. The existing level crossings at Henty Highway and Wail-Dooen Road will remain in service and may need to be upgraded. All other existing level crossings between Wail-Dooen Road level crossing and Dahlen siding will no longer be used and removed. The proposed



rail corridor option also traverses a minor unnamed road that appears to be used for private access and consideration should be made to closing this road as other accesses to the property are available.

This option reduces the travel distance between WIFT and Dahlen siding by approximately 5.5 kilometres, and is located approximately 4 kilometres north of Horsham Town Centre. At an assumed average speed of 80 km/hr, this may equate to a rail travel time saving in the order of four minutes. The significant distance from the town centre improves freight efficiency, safety, and amenity for residents, however a potential passenger station along this alignment would have disadvantages to the community relating to increased travel time to and from the station.

Rail Corridor Option 2 is also located approximately 0.5 kilometres north of Horsham Airport. Its close proximity to the north of Horsham Airport reduces flexibility and dictates that only southern expansion would be possible. It will also be feasible only in conjunction with VicRoads Option 11 as VicRoads Option B2 and Hybrid Option are located to the south of Horsham Airport. It should be noted that for both VicRoads Option 11 and Rail Corridor Option 2 to occur, a road and rail grade separation just east of Flacks Road will be required.

The rail corridor also does not run adjacent to any of the VicRoads Bypass Options and as a result there is no foreseen potential for combined project land acquisition as all required land acquisitions for Rail Corridor Option 2 will be completely separate to the land required for any of the VicRoads Bypass Options and will necessitate acquisition of 8 existing property parcels.

Following a high level desktop investigation, this rail corridor option is expected to have minimal cultural heritage or environmental impacts.

5.6 Rail corridor option 2A

Rail corridor option 2A follows a similar route to Rail Corridor Option 2 however is more flexible and capable of supporting all VicRoads Bypass Options.

The rail corridor is located approximately 4 kilometres north of Horsham Town Centre and provides similar benefits and disadvantages for freight operations, safety, amenity to Horsham residents, and the possibility of implementing a future passenger station along the rail corridor as per Rail Corridor Option 2. The rail corridor is also approximately 1.5 kilometres north of Horsham Airport, enabling the possible expansion of Horsham Airport in both north and south directions.

The rail alignment will intersect with Dooen South Road, Horsham-Kalkee Road, Flacks Road, Geodetic Road and Plowrights Road and will require either road and rail crossings to be grade separated or for the interface to be removed by road closure or realignment. As a minimum it is expected that Horsham-Kalkee Road will be grade separated. The existing level crossings at the intersection of Henty Highway and Creamery Road and at Wail-Dooen Road will remain in service and may need to be upgraded. All other existing rail crossings between Wail-Dooen Road level crossing and Dahlen siding will no longer be used and removed.

Rail Corridor Option 2A runs adjacent to a portion of VicRoads Option 11 between the Western Highway and Flacks Road. As a result, there is potential for consideration of combined project land acquisition via acquisition of a wider public transport corridor (to accommodate both road and rail projects) with the added benefit of potentially reducing costs and surrounding land impacts. In total acquisition of 9 existing property parcels will be required.

Following a high level desktop investigation, this rail corridor option is expected to have minimal cultural heritage or environmental impacts.



5.7 Rail corridor option 3

Rail Corridor Option 3 supports only VicRoads Option 11 and VicRoads Hybrid Option. It crosses VicRoads Option B just east of Horsham-Kalkee Road and will require a road and rail grade separation to comply with state government planning policy. This rail corridor option will also intersect with Dooen South Road, Horsham-Kalkee Road, Flacks Road, and Geodetic Road, and similarly will require road and rail crossings to be grade separated or be removed by road closure or realignment. As a minimum it is expected that Horsham-Kalkee Road will be grade separated. The existing level crossings at Henty Highway and Wail-Dooen Road will remain in service and may need to be upgraded. All other existing rail crossings between Wail-Dooen Road level crossing and Dahlen siding will no longer be used and removed.

The location of this rail corridor is situated approximately 3 kilometres north of Horsham Town Centre and is comparatively one of the closer proposed rail alignments to the residential areas. Due to its closer proximity to town, a future passenger station along the proposed rail corridor would be more accessible for surrounding residents.

The proposed corridor is also located approximately 1 kilometre south of Horsham Airport, providing considerable distance for the possible expansion of Horsham Airport in either the north or south directions. The proposed rail corridor also reduces the travel distance between WIFT and Dahlen siding by only an approximate 3.5 kilometres, the second least compared with all other proposed rail corridor options. At an assumed average speed of 80 km/hr, this may equate to a rail travel time saving in the order of two to three minutes.

Rail Corridor Option 3 abuts with VicRoads Option B2 and VicRoads Hybrid Option between the Western Highway and Dooen South Road. As a result, there is potential for combined project land acquisition with the added benefit of potentially reducing costs and surrounding land impacts. In total acquisition of 7 existing property parcels will be required.

Following a high level desktop investigation, this rail corridor option is expected to have minimal cultural heritage or environmental impacts.


5.8 Rail corridor option 3A

Rail Corridor Option 3A supports only VicRoads Hybrid Option. It intersects with VicRoads Option B2 and VicRoads Option 11 east of Horsham-Kalkee Road and east of Dooen South Road respectively, and will require road and rail grade separation to comply with state government planning policies. This rail alignment option will also intersect with the same roads and will require the same measures as per Rail Corridor Option 3. The existing level crossings at Henty Highway, Wail-Dooen Road, Aerodrome Road and Gatehouse Road will remain in service and may need to be upgraded. All existing level crossings between Gatehouse Road and the Western Highway will no longer be in use and removed.

This rail corridor option is situated approximately 3 kilometres north of Horsham Town Centre and is comparatively one of the closer proposed rail alignments to town. As per Rail Corridor Option 3, it will have the same benefits and disadvantages relating to amenity to surrounding residents, safety, and a possible passenger station.

The proposed corridor is also located approximately 1 kilometre south of Horsham Airport, providing considerable distance for the possible expansion of Horsham Airport in either the north or south directions.

This option also reduces the travel distance between WIFT and Dahlen siding by approximately 3 kilometres which is the least in comparison with all proposed rail corridor options. However an added benefit is this option also requires the least amount of new track works and may also potentially



reduce associated construction costs. At an assumed average speed of 80 km/hr, this may equate to a rail travel time saving in the order of two minutes.

Rail Corridor Option 3A runs adjacent to a portion of the VicRoads Hybrid Option between the Western Highway and Dooen South Road. As a result, there is potential for combined project land acquisition with the added benefit of potentially reducing costs and surrounding land impacts. In total acquisition of 10 existing property parcels will be required.

From high level assessment desktop investigations, this rail corridor option will have minimal cultural, environmental impact.

5.9 Rail corridor option 4

Rail Corridor Option 4 supports VicRoads Option B and VicRoads Hybrid Option. It intersects with VicRoads Option 11 just east of Horsham-Kalkee Road and will require a road and rail grade separation to comply with state government planning policy. The rail alignment will also intersect with Dooen South Road, Gatehouse Road, Horsham-Kalkee Road, Harris Road, Flacks Road, Geodetic Road, and Plowrights Road and will require either road and rail crossing to be grade separated or for the interface to be removed by road closure or realignment. As a minimum it is expected that Horsham-Kalkee Road will be grade separated. The existing level crossings at Henty Highway, Wail-Dooen Road, Aerodrome Road and Gatehouse Road will remain in service and may need to be upgraded. All existing level crossings between Gatehouse Road and the Western Highway will no longer be used and removed.

The proposed rail corridor is located approximately 3 kilometres north of Horsham Town Centre and is comparatively one of the closer proposed rail alignments to town. Similar to Rail Corridor Option 3 and Rail Corridor Option 3A, it will have the same benefits and disadvantages relating to amenity to surrounding residents, safety, and a possible passenger station.

The proposed rail corridor is also located approximately 1.5 kilometres north of Horsham Airport, and enables the possible expansion of the airport in both north and south directions.

The proposed rail corridor also reduces the travel distance between WIFT and Dahlen siding by approximately 3.5 kilometres – considerably lower compared to all other rail corridor options; however it will also require less new track works and may potentially reduce associated construction costs. At an assumed average speed of 80 km/hr, this may equate to a rail travel time saving in the order of two to three minutes.


Rail Corridor Option 4 also runs adjacent to a portion of VicRoads Option 11 between the Western Highway and Dooen South Road. As a result, there is potential for combined project land acquisition with the added benefit of potentially reducing costs and surrounding land impacts. In total acquisition of 14 existing property parcels will be required.

From high level assessment desktop investigations, this rail corridor option will have minimal cultural, environmental impact.

5.10 Proposed rail corridor option

Table 5.2 illustrates the qualitative assessment matrix, developed to summarise and comparatively compare and assess each of the rail corridor options. The intent of the assessment was to provide a high level subjective assessment, such that the proposed option to be taken forward for cost estimation had overall comparatively beneficial characteristics.

For each of the listed evaluation criteria, each rail corridor option was comparatively scored against the other options using an objective-based methodology. Corridor options that were assessed as



comparatively better than other options (for example options that had significantly less total land acquisition area compared to others) were awarded a positive score (designated by “✓”), whilst options that were comparatively worse (e.g. significantly more level crossings retained compared to other options) were awarded a negative point (designated by “x”). Where all options were comparable for a given criteria, each corridor was awarded as a neutral score (designated by “●”). Further details are provided for information in **Appendix E**.

Using a simple unweighted analysis it was noted that both corridor 1A and 3 that had the highest ratios of comparatively beneficial characteristics (designated by a “✓”) compared to comparatively non-beneficial characteristics (designated by “x”).

Corridor option 3 is unable to support VicRoads option B2 without construction of an additional grade separation, and should only be considered further if VicRoads option 11 or hybrid option are adopted. Accordingly Aurecon consider that corridor 1A should be considered the proposed corridor alignment and be taken forward for cost estimate.

Table 5.2: Rail Corridor Options Assessment Criteria

Criteria	Corridor Options						
	Option 1	Option 1A	Option 2	Option 2A	Option 3	Option 3A	Option 4
Ability to support VicRoads Option B2 without additional grade separation	✓	✓	x	✓	x	x	✓
Ability to support VicRoads Option 11 without additional grade separation	✓	✓	✓	✓	✓	x	x
Ability to support VicRoads Hybrid Option without additional grade separation	✓	✓	✓	✓	✓	✓	✓
Ability to support Airport Expansion	✓	✓	●	✓	✓	✓	✓
Approximate length of track between WIFT to Dahlen siding (reference section) including bypass	✓	✓	●	●	●	●	●
Approximate area required for the corridor based on typical cross section	x	x	●	●	✓	✓	●
Approximate rail transit time saving between WIFT to Dahlen siding (reference distance) in minutes	✓	✓	●	●	●	●	●
Number of grade separated crossings that will be required	●	●	●	●	●	●	●
Number of level crossings that will be retained between WIFT to Dahlen siding (reference section)	✓	✓	✓	✓	●	●	●
Number of properties that require acquisition (partial or in full)	●	●	✓	●	✓	●	x
Number of additional properties to be acquired (in addition to land acquisition for Western Hwy project)	x	x	●	●	✓	●	●
Number of Level Crossings Removed	✓	✓	✓	✓	●	●	●
Number of waterway crossings required	x	●	●	●	●	✓	●
Cultural Heritage Impacts	●	●	●	●	●	●	●
Environmental Impacts	●	●	●	●	●	●	●
Planning Impacts	●	●	●	●	●	●	●

For a given criteria

- ✓ Comparatively Better (e.g. least area of land acquisition)
- Comparable
- x Comparatively Worse (e.g. most level crossings retained)

NOTES:

- Preliminary only. Subject to review and revision as further information is made available.
- Refer to Aurecon Drawing 233162-SK-TC-0002 for options summary.
- WIFT to Dahlen siding (reference section) adopted for selection criteria (as shown) to be reflective of total distance travelled within study area (i.e. shortest bypass, is longest travel time)



In summary, the following key benefits of implementing Rail corridor option 1A include:

- The rail corridor option supports all VicRoads bypass options
- The rail corridor option supports possible expansion of Horsham Airport in both north and south directions
- The rail alignment reduces rail travel distance and time between WIFT and Dahlen siding
- The location of the rail alignment will improve freight efficiency, safety, and amenity to Horsham and surrounding resident

In addition, the proposed alignment will also necessitate the following:

1. In advance of any planning or acquisition requirements, we recommend that the Council conduct a broad public consultation programme aiming to gain the community's views on the merits of various options, to assist Council / ARTC / VicTrack in their consideration of a proposed route
2. A Planning Scheme Amendment to identify a Public Acquisition Overlay will need to be formulated and notified in accordance with the Planning and Environment Act 1987. The Overlay will follow the alignment of the proposed rail corridor as determined by the public consultation process. The Scheme Amendment would need to be publically notified to enable the community to voice their concerns and / or support
3. Following the Scheme Amendment, the Council (as the acquiring authority) will serve notice of acquisition on the relevant landowner(s), through which the land will be compensated for and subdivided
4. Following the construction of the rail line, the land subject to the Public Acquisition Overlay will be converted to a Public Use Zone 4 (Transport), which will enable the rail corridor to be used and developed for its intended purpose

5.11 Cost estimate – Road over rail grade separation

The indicative cost for the construction of a rail bypass of the township of Horsham based on corridor route 1A and the scope and assumptions listed has been estimated and is as detailed in Table 5.3 below.

Table 5.3: Indicative Road over Rail Cost Estimate for Route 1A (2013 costs)

Item	Amount (excluding GST)
Alternate construction costs	\$41,085,267
TOTAL DIRECT COSTS	\$ 41,085,267
Prelims at 20%	\$ 8,217,053
Overhead and profit at 12%	\$ 5,916,278
Design costs at 9%	\$ 3,697,674
TOTAL INDIRECT COSTS	\$ 17,831,006
TOTAL DIRECT AND INDIRECT COSTS	\$ 58,916,273
Contingency at 30%	\$ 17,674,882
TOTAL CONTINGENCY COSTS	\$ 17,674,882
Land acquisition (agricultural land)	\$140,938
Land acquisition (industrial land)	\$2,263,800
TOTAL LAND ACQUISITION COSTS	\$ 2,404,738
TOTAL PROJECT COSTS	\$ 78,995,892

Note: All costs in 2013 dollars, excluding GST.

A summary cost estimate and a breakdown of the cost estimate components for the bypass, including the proposed rail alignment, station infrastructure, grade separated crossing of the existing road network and rail infrastructure removal for the existing rail corridor is provided in **Appendix F1**.

For all options considered, the indicative total project cost range is estimated to range between \$70 and \$85 million based on total length of corridor and unit rates contained within **Appendix F1**.

The main scope items are set out below:

- The construction of approximately 11.1km of new main line track using 60Kg Rail and Precast Concrete Sleepers.
- One (1) road over rail grade separation
- Three (3) box culverts for storm water drainage
- A basic station, with a ticket office, two waiting shelters, toilets parking for 20 vehicles
- The construction of a new 180m long X 4m wide platform
- The removal of approximately 17.6km of the existing track, sleepers and ballast
- The establishment of a of 2km cycle path to the existing track
- Topsoiling and seeding to the new track and existing track corridors
- The construction of approximately 1.812km of new passing loop track including “low speed” turnouts at both ends, to match existing.
- Topsoiling and seeding to the new passing loop track.



Some key assumptions used to derive the costs include:

- Earthwork quantities derived based on typical cross section of 30m and assumption that the rail tracks are constructed at or around existing surface level
- Allowance has been made for one grade separated crossing of the existing road network. Crossings to be grade separated by road over rail grade separation form (rail at or around existing level in accordance with typical cross section of 30m)
- Estimated land acquisition costs have been included based on figures provided by Wigg and Partners
- No payments have been allowed for termination of leases etc. for third party facilities currently located on VicTrack land that may be impacted by the bypass
- No allowance has been made for any land allowance outside the proposed rail corridor
- It has been assumed that 80% of the required fill material can be procured free of charge via cut to fill ratio 'win' over the extent of works or from a local 'borrow pit' from the surrounding area. Allowance has been made to source the remaining 20% from the local area and transport by road at a rate of \$23m³
- Station costs do not include architectural treatment or other non-essential design components. The station has been assumed to comprise a single platform face with limited facilities.
- A provisional allowance of \$500,000 has been included for ticketing. Further advice would need to be sought from Public Transport Victoria to confirm their requirements if progressed.
- A nominal amount has been included for the alteration or relocation of services. A service investigation has not been undertaken
- The type and makeup of the existing ground conditions is unclear. The estimate is based upon typical ground conditions and makes no allowance for rock floaters or rock excavation. A geotechnical investigation will be necessary
- Construction costs include 30% contingency to allow for potential changes in scope as the result of further development of the design and potential changes in construction methodology that may be presented as part of a Tender
- Preliminaries & Other Costs include:
 - Contractor's Preliminaries (20% of Construction Costs)
 - Contractor's Overheads & Profit (12% of Construction Costs)
 - Contractor's Design (9% of Construction Costs)

Refer **Appendix F1** for detailed scope, assumptions and breakdown of costs.

5.12 Cost estimate – Rail over road grade separation

The indicative cost for the construction of a rail bypass of the township of Horsham based on corridor route 1A and the scope and assumptions listed has been estimated and is as detailed in Table 5.4 below.

Table 5.4: Indicative Rail over Road Cost Estimate for Route 1A (2013 costs)

Item	Amount (excluding GST)
Construction costs	\$ 51,583,914
TOTAL DIRECT COSTS	\$ 51,583,914
Prelims at 20%	\$ 10,316,783
Overhead and profit at 12%	\$ 7,428,084
Design costs at 9%	\$ 4,642,552
TOTAL INDIRECT COSTS	\$ 22,387,419
TOTAL DIRECT AND INDIRECT COSTS	\$ 73,971,333
Contingency at 30%	\$ 22,191,400
TOTAL CONTINGENCY COSTS	\$ 22,191,400
Land acquisition (agricultural land)	\$348,906
Land acquisition (industrial land)	\$2,263,800
TOTAL LAND ACQUISITION COSTS	\$ 2,612,706
TOTAL PROJECT COSTS	\$ 98,775,438

Note: All costs in 2013 dollars, excluding GST.

A summary cost estimate and a breakdown of the cost estimate components for the bypass, including the proposed rail alignment, station infrastructure, grade separated crossing of the existing road network and rail infrastructure removal for the existing rail corridor is provided in **Appendix F2**.

For all options considered, the indicative total project cost range is estimated to range between \$90 and \$105 million based on total length of corridor and unit rates contained within **Appendix F2**.

The main scope items are set out below:

- The construction of approximately 11.1km of new main line track using 60Kg Rail and Precast Concrete sleepers.
- Earthwork embankment
- Five (5) rail over road grade separations
- Three (3) box culverts for storm water drainage
- A basic station, with a ticket office, two waiting shelters, toilets parking for 20 vehicles
- the construction of a new 180 metre long X 4 metre wide platform
- The removal of approximately 17.6km the existing track, sleepers and ballast
- The establishment of a of 2km cycle path to the existing track
- Topsoiling and seeding to the new track and existing track corridors
- The construction of approximately 1.812km of new passing loop track including “low speed” turnouts at both ends to match existing; and
- Topsoiling and seeing to the new passing loop track.



Some key assumptions used to derive the costs include:

- Earthwork quantities derived based on typical cross section of 74m and assumption that track grade returns toward existing surface between grade separations at maximum grade
- Allowance has been made for five grade separated crossings of the existing road network Crossings to be grade separated by rail over road grade separation form (road at or around existing ground level). Rail corridor generally on high soil embankment in accordance with typical cross section of 74m
- Estimated land acquisition costs have been included based on figures provided by Wigg and Partners
- No payments have been allowed for termination of leases etc. for third party facilities currently located on VicTrack land that may be impacted by the bypass
- No allowance has been made for any land allowance outside the proposed rail corridor
- Large volumes of fill material are required to construct the grade separations and associated earthworks. It has been assumed that 80% of the required fill material can be procured free of charge from a local 'borrow pit' from the surrounding area in return for the construction of dams, drainage ditches and the occasional access track. Allowance has been made to source the remaining 20% from the local area and transport by road at a rate of \$23m³
- Station costs do not include architectural treatment or other non-essential design components. The station has been assumed to comprise a single platform face with limited facilities.
- A provisional allowance of \$500,000 has been included for ticketing. Further advice would need to be sought from Public Transport Victoria to confirm their requirements if progressed.
- A nominal amount has been included for the alteration or relocation of services. A service investigation has not been undertaken
- The type and makeup of the existing ground conditions is unclear. The estimate is based upon typical ground conditions and makes no allowance for rock floaters or rock excavation. A geotechnical investigation will be necessary
- Construction costs include 30% contingency to allow for potential changes in scope as the result of further development of the design and potential changes in construction methodology that may be presented as part of a Tender
- Preliminaries & Other Costs include:
 - Contractor's Preliminaries (20% of Construction Costs)
 - Contractor's Overheads & Profit (12% of Construction Costs)
 - Contractor's Design (9% of Construction Costs)

Refer to **Appendix F2** for detailed scope, assumptions and breakdown of costs.

6. High level benefits

6.1 General

This section of the report provides further details on the anticipated benefits associated with a diversion of the current railway line to the north of Horsham. It is high level and given many of the benefits are not directly quantifiable, in these instances, further commentary has been provided to identify the typical actions that would need to be performed as part of any future works should the proposed diversion be progressed further.

Additional sections are provided to outline some of the potential drawbacks associated with Option 1A as well as some of the benefits associated with a rail diversion in conjunction with the Western Highway Bypass project.

Aligned with the findings under Section 5 above, Option 1A has been selected for a review of the associated benefits and these are presented in Table 6.1 below. A preliminary assessment has been conducted of the high level benefits to determine which benefits can be easily monetised and input into Cost Benefit Analysis (CBA) modelling using endorsed CBA parameter values and guidelines. A commentary has been provided against each benefit item. Items 1 and 5 (highlighted in grey) represent those items that have been included in this round of CBA modelling:

Table 6.1: Benefits Associated with Option 1A

Item	Benefit	Commentary	CBA Monetisation (Yes or No)
Benefits associated with new rail alignment			
1	Safety benefits resulting from the removal of seven level crossings (risk of accident)	This would require a review of recent accident history followed by an assessment of the likelihood and consequence of future accidents assuming the rail bypass does not proceed. Normal practice is to assign a \$ value per fatality, thus allowing an overall \$ value to be produced. Other associated costs would need to be considered such as reputational damage costs, etc.	Yes Crash history including severity at the level crossings has been provided for the past 5 years. Data can be monetised on the basis of loss of life and injury involving car and train (using Austroads Treatment of Crash Locations) and then annualised and applied to the CBA model over the 50 year assessment period. Crash details DCA 903: one (1) crash where car hit train; injury only cost \$216,700 DCA 903: one (1) crash where car hit train; fatal cost (rural) \$2,102,000 Average annual crash cost \$463,700
2	Road traffic benefits associated with the removal of seven level crossings (increased vehicle	Existing traffic survey data could be assessed against predicted traffic models in order to establish	No, not at this time but could be further investigated under a separate study.

Item	Benefit	Commentary	CBA Monetisation (Yes or No)
	throughput and reduced travel time when crossing the former rail corridor)	the reduction in traffic volumes / journey times so that a \$ value could be assigned to this benefit based on reduced travel time.	Would require significant traffic modelling for Horsham That is traffic volumes, vehicle kilometres travelled (VKT) , vehicle hours travelled (VHT) and average speed needed to determine travel time savings for the existing network involving the seven (7) level crossings compared to new traffic environment with new rail alignment .
3	Benefit associated with pedestrian time savings with the removal of seven level crossings	Existing pedestrian volume survey could be assessed against predicted pedestrian volume models in order to establish the reduction in pedestrian journey times.	No, not at this time but could be further investigated under a separate study. Would require significant pedestrian modelling for Horsham That is pedestrian volumes, average delay time, to determine involved at the seven (7) level crossings compared to new traffic environment with new rail alignment.
4	Benefits associated with public transport (i.e. buses) time savings	The removal of existing level crossings may result in changes to bus routes with time saving benefits. This may be assessed by the number of scheduled week-day bus services by time of day against the average number of persons carried during each weekday time period.	No, not at this time but could be further investigated under a separate study. Would require significant traffic modelling for Horsham That is traffic volumes, bus kilometres travelled (VKT) , vehicle hours travelled (VHT) and average speed needed to determine travel time savings for the existing network involving the seven (7) level crossings compared to new traffic environment with new rail alignment .
5	Rail travel time journey reduction in the order of four to five minutes between WIFT and Dahlen siding	This could be quantified in terms of fuel savings to obtain a \$ value. Given the need for drivers and operational staff to work standard shifts it is unlikely there would be savings related to staffing costs. However this would need to be further investigated in association with ATRC.	No, not at this time but could be further investigated under a separate study. Would require available ARTC information. This could be quantified in terms of rail operations costs savings to obtain a \$ value. Given the need for drivers and operational staff to work standard shifts it is unlikely there would be savings

Item	Benefit	Commentary	CBA Monetisation (Yes or No)
			related to staffing costs. However this would need to be further investigated in association with ARTC.
6	Opportunity for improved passenger facilities /amenities at a new location	Passengers would potentially be willing to pay a premium for an enhanced level of service, whether through improved rail services or enhanced facilities at a new station. This could potentially be quantified by undertaking passenger surveys to understand what additional premium passengers would be willing to pay.	No
7	No need to construct two grade separated crossings (on new Western Bypass).	Should a Horsham Rail Bypass proceed at the same time as the Western Highway Bypass project, there is potential for direct benefit to the Western Highway Bypass project associated with the deletion of two grade separated crossings from project scope with information obtained from the Western Highway Bypass project to understand the potential savings.	Yes There is potential for direct benefit to the Western Highway Bypass project associated with the deletion of two (2) grade separated crossings from project scope at a total cost of \$20M (Memorandum HRCC to Aurecon dated 7 Feb 2013). Western highway Bypass benefit costs have been assumed to be realised in year 1 of the overall 50 year assessment period.
8	Reduced rail infrastructure maintenance costs associated with new infrastructure (compared to aging infrastructure)	Further work would be required with ARTC in order to fully quantify this benefit. Maintenance costs for the existing railway as well as estimated further maintenance costs (or a case study of a similar location) would need to be undertaken so that these could be compared against the estimated maintenance cost of the new railway infrastructure. The extent of this task will depend on the availability of asset information and ARTC maintenance figures.	No, not at this time but could be further investigated under a separate study. Would require available ARTC information Further work would be required with ARTC in order to fully quantify this benefit. Whole of life maintenance costs for the existing railway would be compared and netted against the estimated maintenance costs for the new alignment.
9	Reduced maintenance costs associated with the redundant alignment (rubbish removal, clean-up etc.)	These costs are likely to be relatively small but should lead to a minor saving as it could be argued that rubbish removal, clean-up costs of an extensive area of rail corridor in an urban environment would be greater than that of a relatively compact corridor in a rural environment. Further information on existing costs would be required from ARTC and HRCC in order to	No, not at this time but could be further investigated under a separate study. Would require ARTC's assistance Would combine with 6 above if monetized.

Item	Benefit	Commentary	CBA Monetisation (Yes or No)
		quantify potential savings.	
10	Benefit associated with the removal of noise, vibration, emissions of freight locomotives out of residential areas.	The reduction of noise, vibration, and emissions from the urban area to the rural area is likely to result in improvements to the health and welfare of local residents. Although there will be some transfer of the issues overall there will likely be a net benefit. Significant further work would be needed in this area in order to put a \$ value to these health benefits, including first understanding the number of people impacted and undertaking a review of existing research to help further quantify the benefits.	No, not at this time but could be further investigated under a separate study. Would require further work to compare existing residences impacted by railway to those residences impacted by proposed new alignment. There are standards that assign reduction values for noise, vibration, and emissions.
Benefits associated with redevelopment of the redundant rail corridor			
11	Significant urban regeneration opportunities within Horsham, which will help facilitate the reconnection of the areas of Horsham either side of the current railway corridor thereby supporting the reversal of the current social and economic isolation experienced in Horsham North.	The associated benefits could be quantified in terms of additional jobs created through regeneration opportunities.	No, not at this time but could be further investigated under a separate study. The new alignment would have to be supported by a local area plan or similar to identify potential for land value uplift. .
12	Improve connectivity, both in terms of bridging the social and economic divide created by the rail corridor and improved physical connectivity with roads, greenways and open spaces.	Specific benefits from this item will be difficult to quantify but a review of residents journey time savings could be undertaken to further quantify the benefits.	No
13	Opportunity to realign Horsham Kalkee Road at grade, removing a physical and visual barrier to pedestrian movement.	There would be a significant cost associated with this however it would need to be considered in line with future aspirations for the area as well as maintenance considerations associated with the existing structure. Visual amenity will not be easy to quantify, however pedestrian journey time savings could be calculated.	No
14	Opportunity for a new type of advanced employment cluster, which can accommodate research and industry, of state or nationwide significance.	The associated benefits could be quantified in terms of additional jobs created.	No, not at this time but could be further investigated under a separate study. Would require the associated benefits to be quantified in terms of additional jobs created and then by contribution to Gross Regional Product. Benefits will be driven by the assumptions underpinning the employment cluster

Item	Benefit	Commentary	CBA Monetisation (Yes or No)
15	Provision of new central parkland, which would draw residents from all over Horsham and become a pivotal civic meeting point.	This presents the opportunity to use this area for events and agreements could be made with various organising committees, thus generating income.	No
16	The new streets and laneways around the commercial and green spaces, which will “provide new frontages and interfaces within the site, to both existing buildings and the public realm”. The smaller blocks increase the permeability of this area, which improves access and connectivity.	Specific benefits from this item will be difficult to quantify but could be used to address any existing concerns over public access and mobility.	No
17	New pedestrian / cycle link.	This new asset can be used to increase the facilities available to residents in Horsham, increasing liveability ratings.	No It is possible to monetise the health impacts of cycling and walking but would require large numbers of cyclist and walkers to have a material impact
18	Sustainable reuse / adaption of existing land. The proposed residential use will provide for population growth within the town, rather than this growth occurring on the town fringe, which is more costly in terms of both vitality and infrastructure requirements.	In order to further quantify this, a review could be undertaken to compare the infrastructure costs associated with new development versus reuse of existing land.	No, not at this time but could be further investigated under a separate study. The new alignment would have to be supported by a local area plan or similar to identify potential for land value uplift.
19	Opportunity to achieve a range of densities, including medium density development in Horsham.	This has benefits in terms of maximising the efficiency of infrastructure by having more units per m2.	No, not at this time but could be further investigated under a separate study. This has benefits in terms of maximising the efficiency of infrastructure by having more units per m2. Also the new alignment would have to be supported by a local area plan or similar to identify potential for land value uplift.
20	Opportunity for a high quality aged care facility in Horsham within the area for regeneration and designated through a rezoning of the land.	This will help facilitate sustainable reuse of the existing land rather than greenfield construction. It also has the benefit of residents being close to the centre of town and facilitating north south interactions.	No
21	Reuse of the existing station maintaining its heritage value.	The existing station could be retained and put to use as an exhibition gallery, café, etc. Potential income from these uses could be quantified to establish the benefits.	No, not at this time but could be further investigated under a separate study. Lease fees will depend on the use of the old station.
22	Removal of contaminated land	Although there will be significant	No, not at this time but could

Item	Benefit	Commentary	CBA Monetisation (Yes or No)
	from the centre of Horsham	costs associated with this work there will be substantial benefits in particular reassurance to the community that the land is safe for future use.	be further investigated under a separate study as an economic cost and not a benefit.

6.2 Benefit evaluation framework

The Cost Benefit Analysis (CBA) is the principal evaluation tool used to assess the direct economic benefits and costs of the project investment when compared to a 'do nothing' Base Case. A Benefit Cost Ratio (BCR) greater than 1 and a positive Net Present value (NPV) indicate that the project is economically justified under the set of assumptions in the CBA. The CBA adopts discounted cash flows and the BCR and NPV are determined from aggregates of the Present Value (PV) of benefits and the PV of Costs (i.e. discounted benefits and costs respectively) over the project assessment period.

Other evaluation tools such as Multi Criteria Analysis (MCA) can be used when benefits and costs are primarily qualitative and cannot be monetised.

The following table outlines the assumptions that underpin the CBA modelling component of the evaluation framework:

Table 6.2: Key CBA Modelling Assumptions

Item	Assumption
Project case and capital cost	Route 1A bypass option with estimated project costs of between \$78,995,892 and \$98,775,438, depending on assumptions, with the cash flow assumed to be expended over one year
Base case	Existing 'do nothing' rail alignment through Horsham
Assessment period	Benefits will be projected across a 50 year assessment period and will assume a commencement from year 2 to year 51. The benefit assessment period of 50 years post construction represents the indicative average effective life of the key rail asset classes comprising the capital cost estimate as taken from the National Guidelines for Transport System Management in Australia (Australian Transport Council, 2006) namely: <ul style="list-style-type: none"> • Rail (100 years) • Turnouts (12 years) • Sleepers (20 years timber; 50 years concrete) • Ballast (60 years) • Rail signals and communications (10-20 years) • Concrete bridges (100 years) • Railway stations (50 years)
Discount rate	A discount rate of 7% is recommended by Infrastructure Australia. It is noted the use of a discount rate beyond 50 years decreases to insignificant levels and hence this is a further justification for limiting the assessment period to 50 years post construction.
Prices	All capital costs and cash flows will be in current 2013 prices in accord with CBA practices.

Item	Assumption
Investment decision outputs	<p>The following CBA decision outputs will be calculated:</p> <ul style="list-style-type: none"> Benefit-Cost Ratio (BCR): Ratio of the total present value of benefits over the present value of costs. BCR greater than 1.0 indicates that the project is economically justified under the set of assumptions in the CBA Net Present Value (NPV): Calculation of net value (i.e. total present value of benefits minus total present value of costs) over the 50 year assessment period. A positive NPV indicates that the project is economically viable Present value of benefits (PVB); Total value of discounted benefits over the 50 year assessment period. Present value of costs (PVC); Total value of discounted costs over the 50 year assessment period.

6.3 Results and conclusions

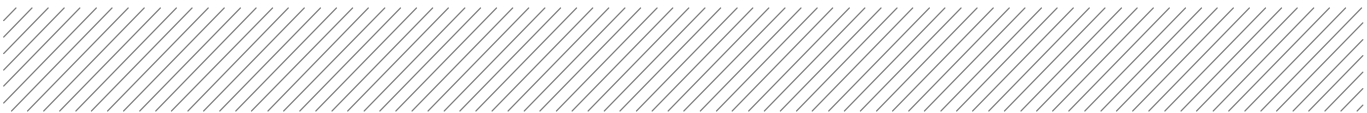
The summary results for the CBA for rail bypass Route 1A at a discount rate of 7% for the capital cost and highlighted benefits only are provided in Table 6.3:

Table 6.3: CBA Results (7% discount rate)

Investment Criteria	Route 1A Results	
	Cost estimate – Road over rail	Cost estimate – Rail over road
	1 X road over rail grade separation, minimum footprint	5 X rail over road grade separations, maximum footprint
Benefit Cost Ratio (BCR)	0.32	0.25
Net Present Value (NPV)	-\$53,904,345	-\$73,683,891
Present Value of Benefits (PVB)	\$25,091,547	\$25,091,547
Present Value of Costs (PVC)	\$78,995,892	\$98,775,438

The major conclusions that can be made are:

- The Route 1A BCR of 0.32, based on the cost estimate for road over rail grade separation, falls significantly short of the break-even BCR of 1.0 and the NPV is – minus \$53.9 M. These results are not surprising given that only two benefit streams of road safety and the capital offsets for not requiring two grade separations have been modelled.
- The Route 1A BCR of 0.25, based on the cost estimate for rail over road grade separation, falls significantly short of the break-even BCR of 1.0 and the NPV is – minus \$73.7M. These results are not surprising given that only two benefit streams of road safety and the capital offsets for not requiring two grade separations have been modelled.
- A number of other benefits have been identified in this technical note that could be monetised with additional and in most instances considerable further study. These other benefits will serve to improve the BCR and NPV, but the extent required to return a BCR greater than 1.0 cannot be deduced without further monetisation and CBA work.



The CBA modelling process and results are only a component of the process of evaluating the benefits of the project and should be considered alongside the major social, environmental, planning and budgetary considerations. It is important to understand that CBA of transport infrastructure projects such as the Horsham Rail Bypass do have limitations that are set by assumptions and the range of factors that can be monetised.

6.4 Other items

Aside from the costs associated with option 1A and outlined in section 5.11 of this report there are a number of other items that may present some drawbacks in relation to benefits. These items are identified as follows:

- Severance of existing land lots into constrained farming parcels
- Severing of north - south local access roads
- Land acquisition / transfer costs
- Removal of existing passenger services from Horsham Central adding transit time to existing passenger journeys
- Costs associated with preserving the existing Horsham station, which is listed as a heritage item in the Stage 1 Heritage Study
- Minor land acquisition to achieve the full extent of the open space identified
- Costs associated with formation of an open spaces strategy
- Operational costs of new open spaces

These items should be considered in more detail in any further development of the scheme.

6.5 Benefits of combined road and rail projects

A number of potential benefits are anticipated should the rail corridor option be taken forward in conjunction with the Western Highway Bypass project including:

- The potential for consolidated road rail planning and integration
- The potential opportunity for compatible infrastructure savings, e.g. reduced total number of rail / road grade separations
- The potential opportunity for shared overheads, land purchase costs, project management costs, and construction costs if the work were delivered by one party, particularly if both bypasses shared a corridor (for suitable options)
- The potential opportunity to use some of the redundant rail track formation material for a highway bypass if the construction works could be sequenced accordingly.

7. Areas for further development

As part of this study a number of items have been identified for further development as part of any future work. The key items and recommended follow on actions are summarised in Table 7.1 below.

Table 7.1: Areas for Further Development

	Areas for Further Development	Follow on Action
1	Creation of working group to review the status and potential integration between the Western Bypass and rail bypass projects.	Review and monitor.
2	Complete further investigation and further develop design for rail bypass Option 1A.	Review and refine cost estimate in conjunction with Western Highway Bypass project.
3	Undertake further work on Cost Benefit Analysis (CBA) for the benefits that can be quantified	In order to obtain a more realistic BCR it is recommended that additional work is undertaken to further quantify the benefits that can be quantified with additional work
4	Provision of passenger rail station to service the existing (or expanded) passenger services.	Investigate the most appropriate location for a rail station considering visitor appeal and ease of access for pickup and drop-off.
5	Land contamination in and around the existing freight terminal.	Prepare a contamination report investigating the existing contamination within the Study Area along with remediation actions and the cost to undertake the remediation work.
6	Potential to utilise contaminated material for rail embankment	In conjunction with the contamination report, investigate the possibility of utilising any / all of the contaminated land within the Study Area for the proposed rail embankment.
7	Consider sustainability initiatives for Study Area	Investigate the possibility of sustainable initiatives that can be adopted as a result of regenerating the Study Area. For example stormwater detention within the Study Area in the event that contaminated land is removed.
8	Open Spaces Strategy	It is recommended that HRCC develop an Open Spaces Strategy.

As part of any further development of the project, and outside of this commission, Aurecon recommend that a more robust evaluation framework is developed in order to further evaluate the rail bypass options. Such a framework may necessitate the incorporation of inputs from a range of specialist consultants.



8. Conclusion

The provision of a Horsham rail bypass beyond the developed areas of the township will be a catalyst for future land developments and regeneration of land previously occupied by aging rail infrastructure. The bypass will help unify and connect the township removing social and economic isolation and lead to enhanced productivity and liveability for the wider area.

This study has considered a number of shorter realignment options for the Melbourne - Adelaide railway line to bypass Horsham to the north.

In total, seven number options were identified and each reviewed against a number of criteria to rank them. Given each of these options have relative merit; it is recommended that all options identified be further assessed as part of a more robust evaluation framework in a further phase of the project.

Option 1A has been identified as the proposed option to be costed up following a high level preliminary assessment. Two scenarios were considered for option 1A, grade separation provided by road over rail and grade separation provided by rail over road.

The option 1A road over rail grade separation results in a railway at or around the existing ground level which minimises embankments and limits the required overall corridor width to approximately 30m. Under this scenario, allowance has been made for one road bridge over the railway. The total project costs associated with this option are around \$79M.

The option 1A rail over road grade separation results in a railway constructed on an embankment to allow roads to pass under the new railway. This scenario results in an extended overall corridor width of approximately 74m. Allowance has been made for five roads passing under the railway as part of this scenario. The total project costs associated with this option are around \$98.8M.

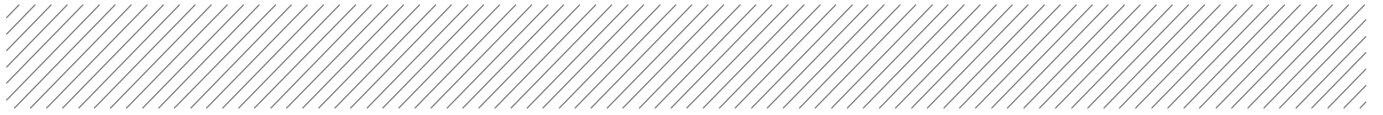
A high level cost benefit analysis was undertaken for the two cost scenarios and the benefits quantified where possible. Benefits, where information was readily available, and which have been quantified include the safety benefits associated with the removal of the existing level crossings and the elimination of the two number grade separated crossings associated with the Western Bypass project.

This resulted in a BCR of 0.32 for the option 1A road over rail grade separation and a BCR of 0.25 for the option 1A rail over road grade separation. Although these numbers fall significantly short of the break-even BCR of 1.0, some improvements could be made to the BCR in the future if further studies were undertaken to monetise the other identified benefits.

The removal of rail infrastructure from the centre of Horsham results in approximately 27 hectares of land freed up for future development. Two options for the regeneration of this land were considered within this report. In the short term Option A (with a focus on residential and open space land uses) should be pursued.

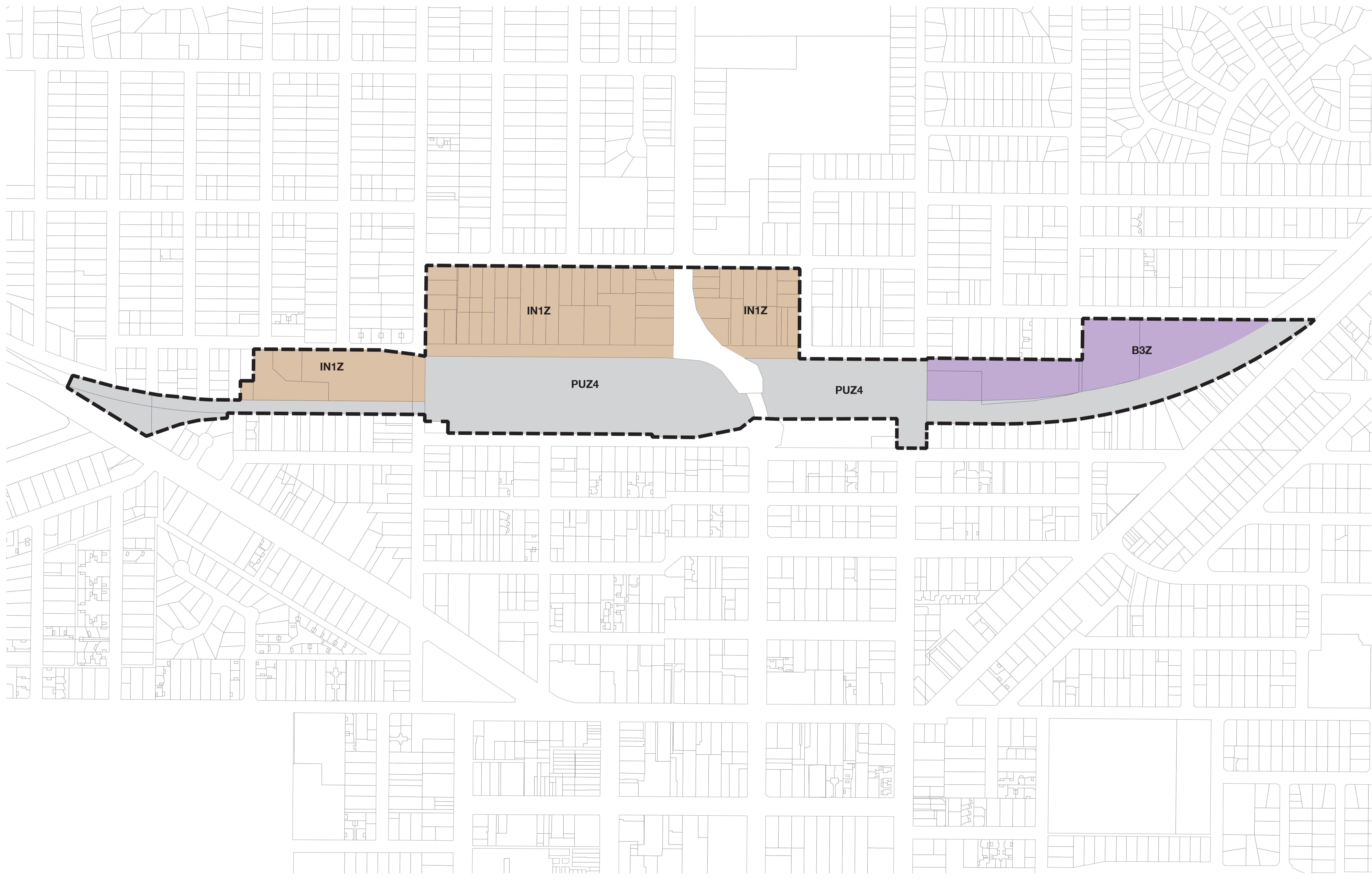
There are a number of areas that are recommended for further investigation including:

- Creation of working group to review the status and potential integration between the Western Bypass and rail bypass projects
- Completion of further investigation and further development of the design for all rail bypass options
- The provision of a passenger rail station to service the existing (or expanded) passenger services
- Use of contaminated land for rail embankment
- Consideration of sustainability initiatives for the study area
- Implementation of an Open Spaces Strategy
- Further work in relation to the high level benefits identified in this study



Appendix A

Land Use and Urban Design Related Sketches



PROJECT
66522_ Horsham Rail By-pass

DRAWING
Proposed Boundary

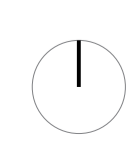
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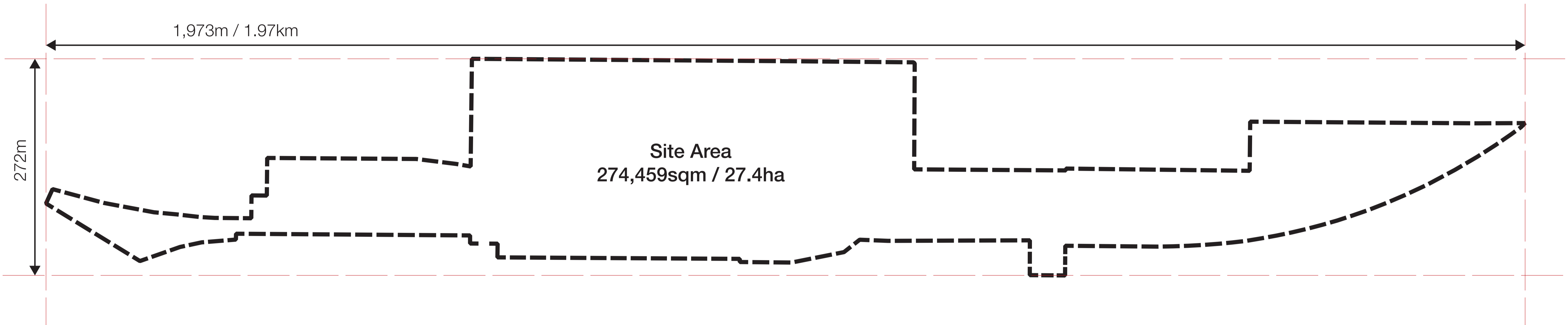
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PROJECT
66522_ Horsham Rail By-pass

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Site Dimensions

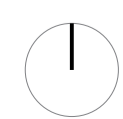
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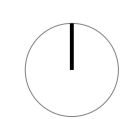
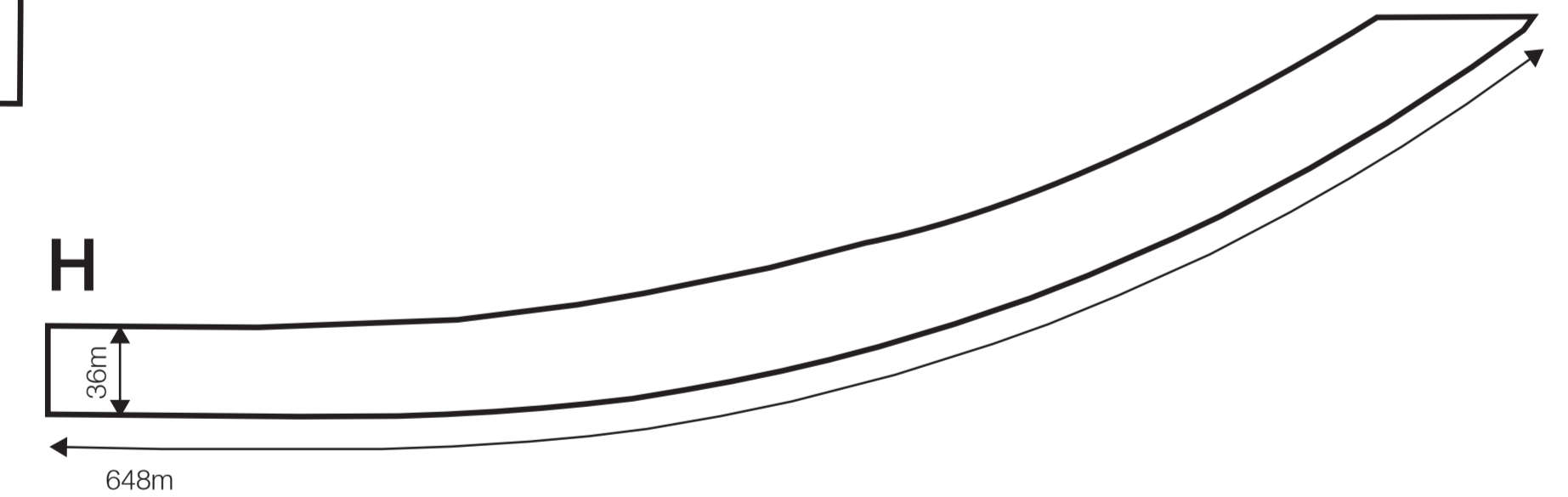
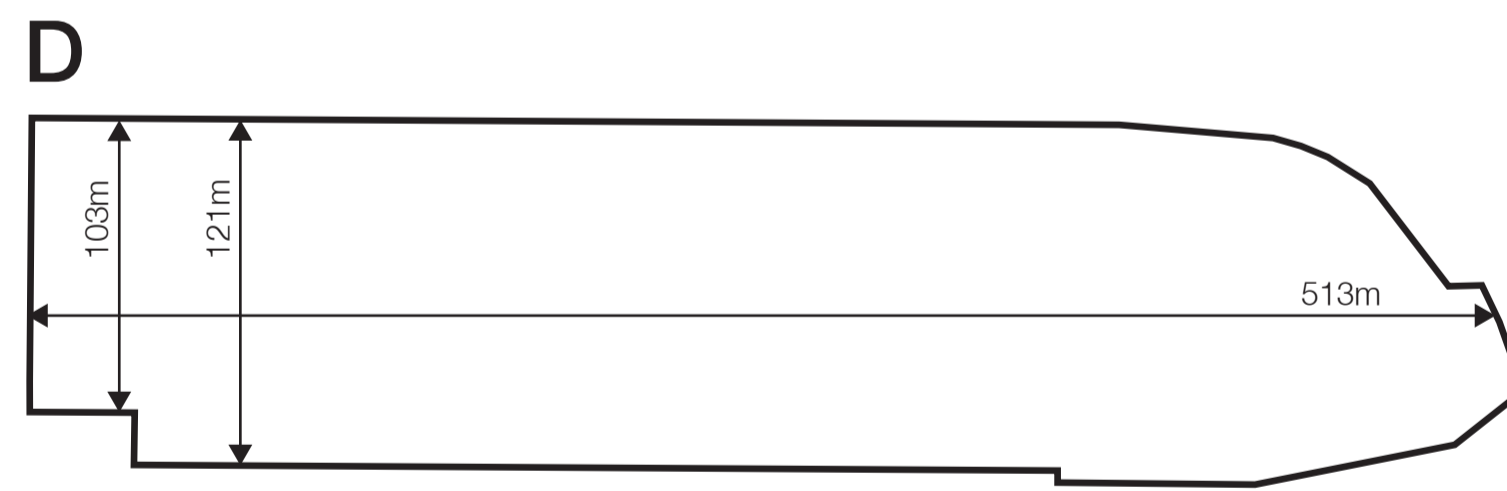
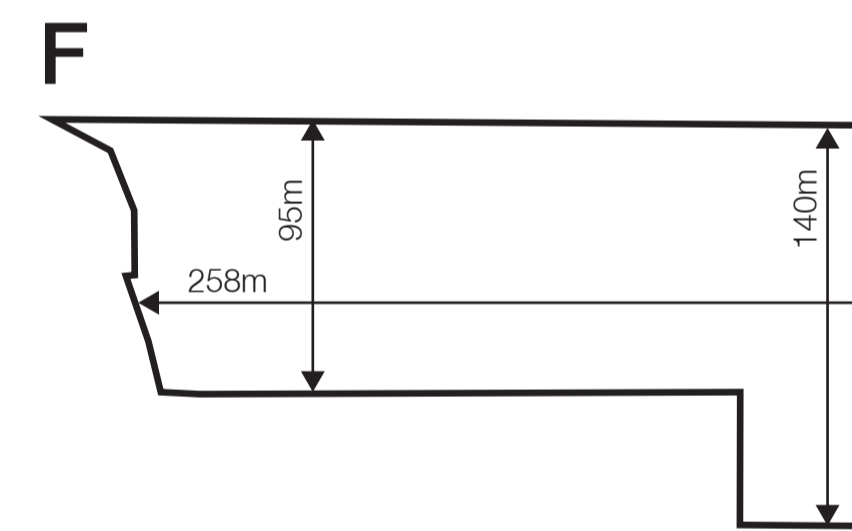
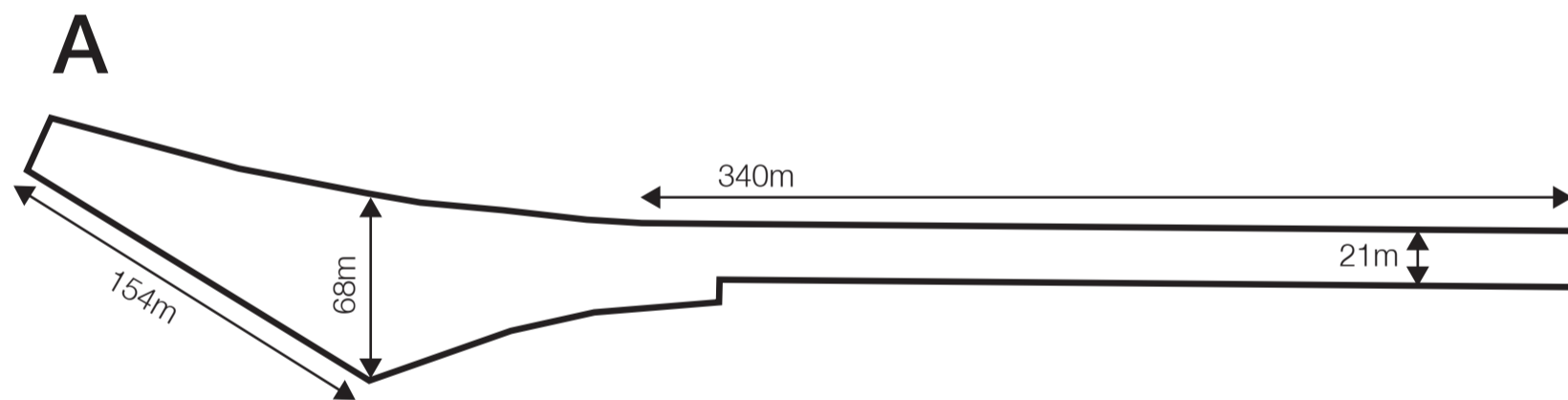
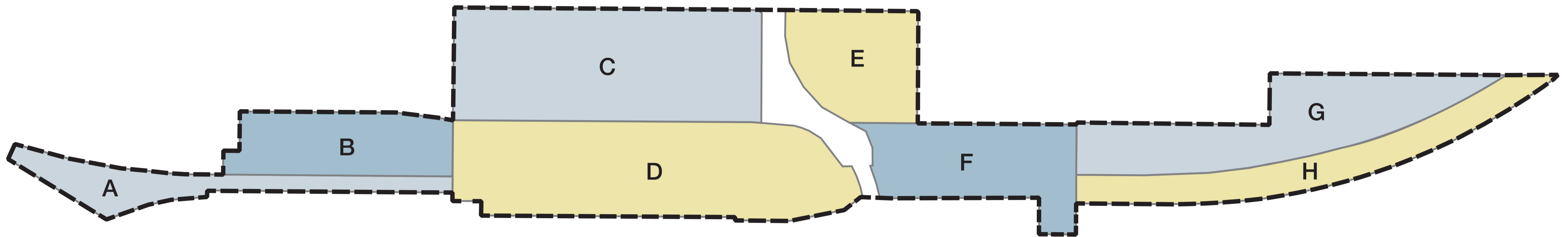
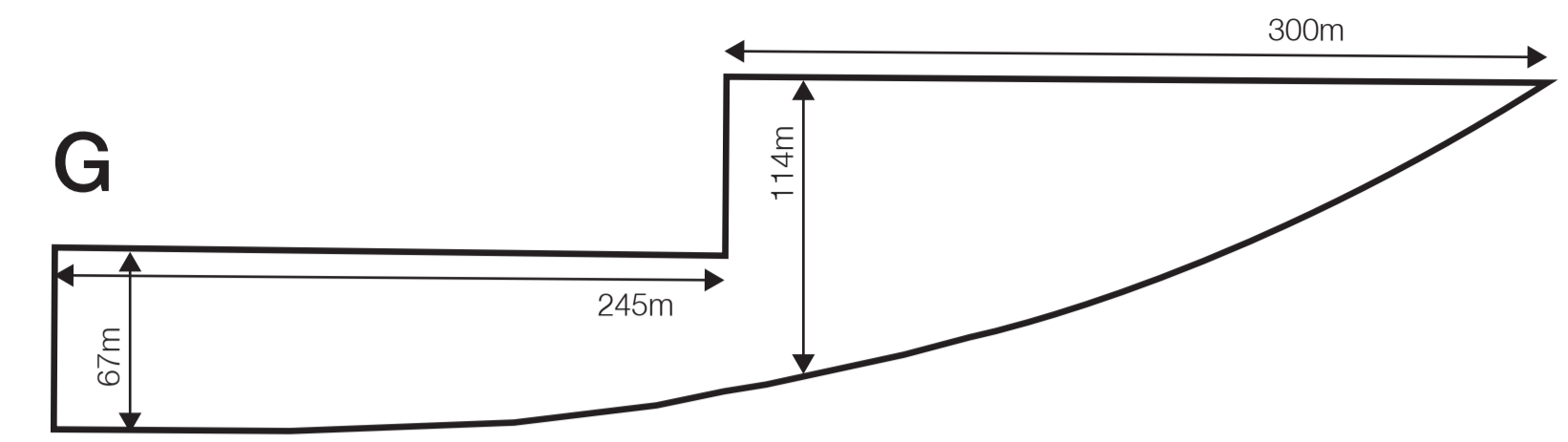
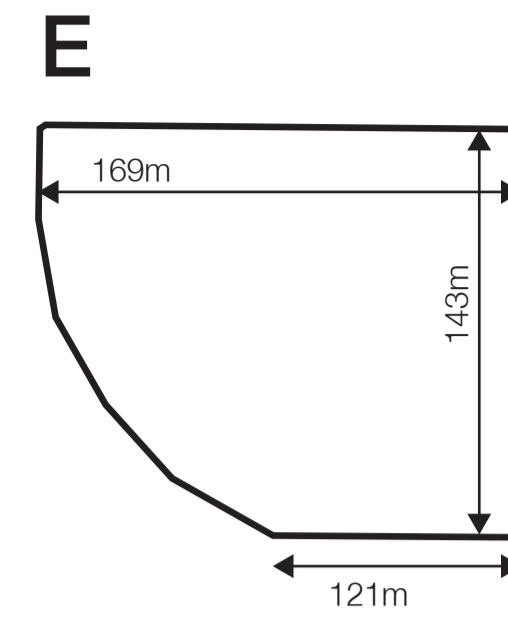
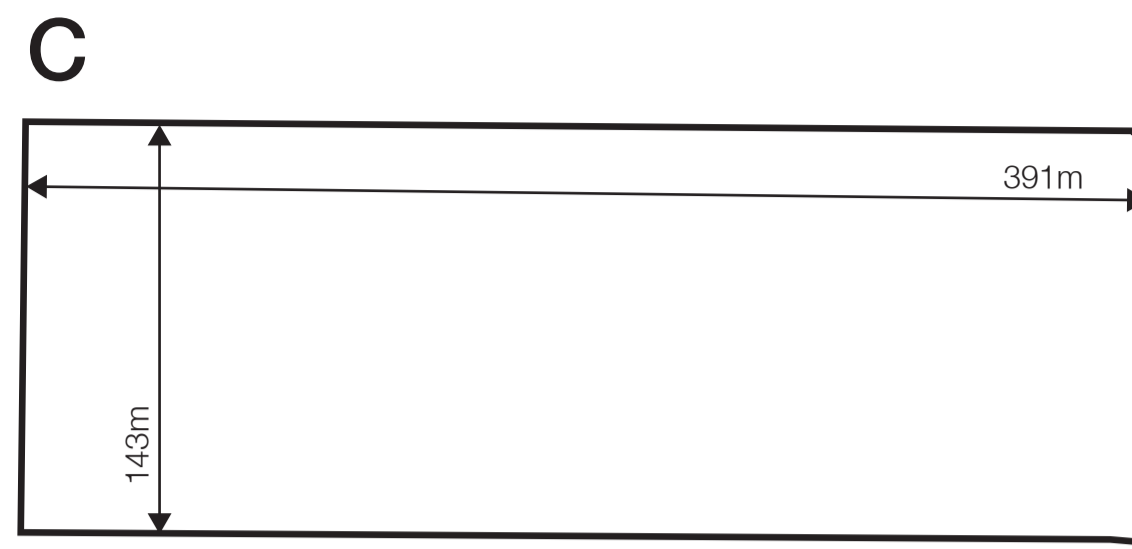
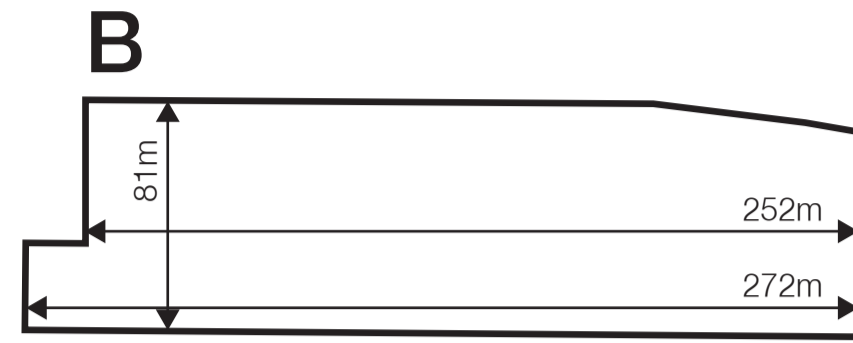
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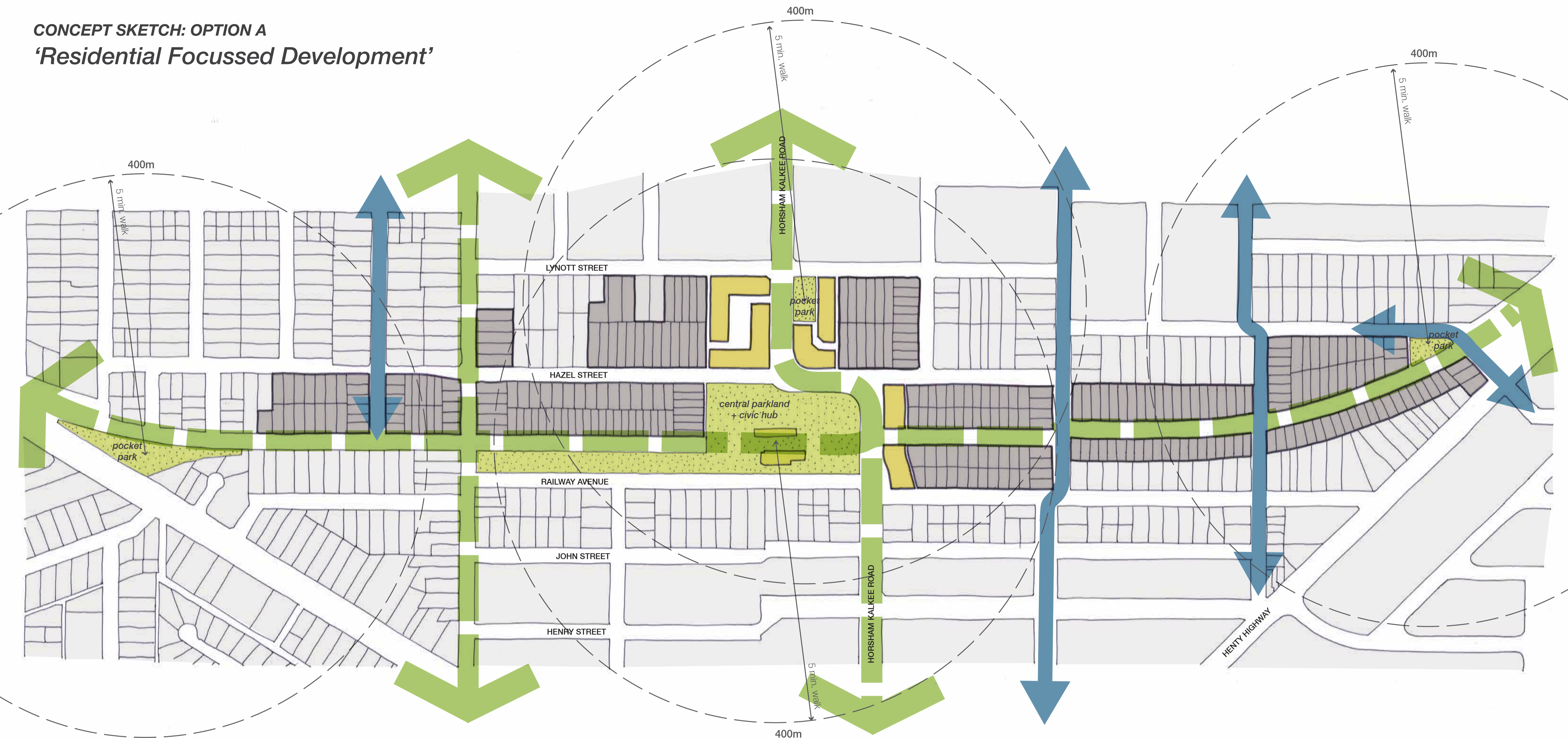
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CONCEPT SKETCH: OPTION A
'Residential Focussed Development'



Concept Strategy

The subject site is situated within an established urban environment, in-between Horsham North and Central Horsham. The proposed concept seeks to reconnect these two disjointed areas through new development.

This proposed strategic direction provides infill residential development, to reconnect and revitalise the existing industrial corridor through a neighbourhood based approach.

This pattern of infill renewal will 'stitch' the urban fabric of Horsham North and Central Horsham back together, with new road connections, frontages, and open spaces.

This residential renewal concept will provide a variety of densities to meet future housing requirements of local residents. Focussing population growth within the city, rather around the outer boundaries of the town, will help support local services and facilities, and encourage investment in local infrastructure.

Urban Design Opportunities

- _ this concept design reinforces the commitment to the Horsham North Urban Design Framework
- _ it identifies the removal of noxious land uses within the site and existing urban environment
- _ it proposes the creation of a green linear park and movement corridor from east to west through the site
- _ the new structure of streets and spaces provide new frontages and interfaces within the site, to both existing buildings and the public realm
- _ it provides amenity and sustainability of new housing stock
- _ it proposes the removal of the railway corridor for newdevelopment, and allows for the 'stitching' back together of the urban fabric
- _ new buildings create a threshold experience to the site
- _ the realignment of Horsham Kalkee Road at grade, removes a physical and visual barrier to pedestrian movement
- _ freight traffic should be discouraged from within the site, to instead use peripheral roads such as the highway
- _ the creation of a central parkland area and civic hub, with the adaptive reuse of the Station buildings

- existing development pattern
- proposed residential
- proposed commerical / civic buildings
- proposed green space / parkland
- new 'green way' streets to accomodate street trees, pedestrian paths and cycle facilities
- extensions to the road network streets are 'stitched' back together across the old railway corridor

PROJECT
66522_ Horsham Rail By-pass

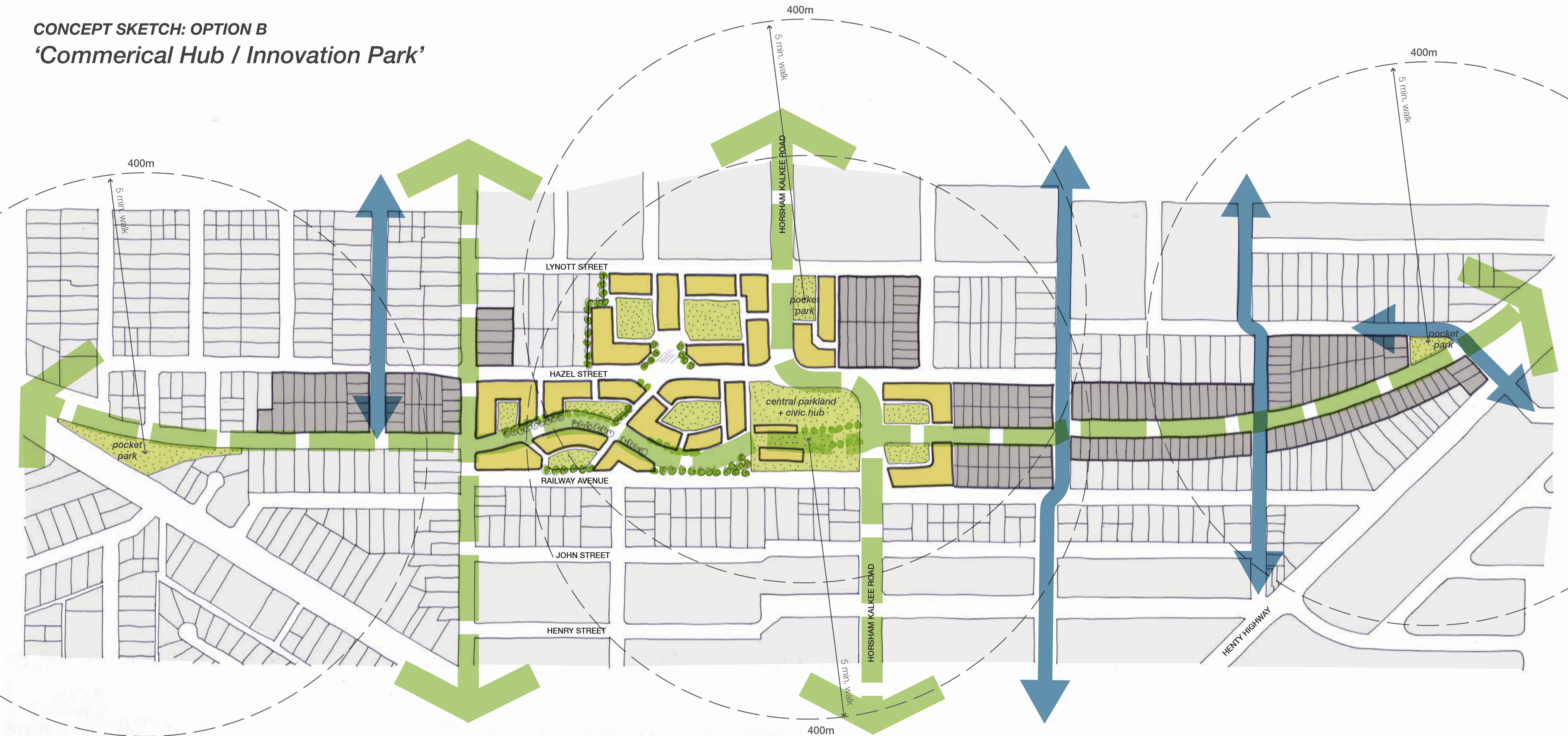
DRAWING
Concept Sketch Option A: Residential Focussed Development

CLIENT
Horsham Rural Council

DATE 05.11.2012 **SCALE** 1:2500 **SHEET** @A1 **VERSION** 01



CONCEPT SKETCH: OPTION B
'Commerical Hub / Innovation Park'



Concept Strategy

Concept Option B retains the principles and opportunities identified within Option A, however it proposes forward thinking land use for the future employment growth of the town.

This proposed strategic direction outlines the development opportunity for Horsham to have a new role as a 'green collar' innovation / employment zone.

The size and location of this unique site in the heart of the town provides the opportunity for a new type of advanced employment cluster, which can accommodate research and industry, of state or nationwide significance.

This new type of economic development is much needed in Horsham and can provide associated longer term benefits from such employment opportunities including: training and education; urban renewal and investment from the private sector; boosts to the local economy and support to other local services; and encouraging sustainability initiatives in the wider township.

Urban Design Opportunities

- _ this concept design reinforces the commitment to the Horsham North Urban Design Framework
- _ it identifies the removal of noxious land uses within the site and existing urban environment
- _ it proposes the creation of a green linear park and movement corridor from east to west through the site
- _ the new structure of streets and spaces provide new frontages and interfaces within the site, to both existing buildings and the public realm
- _ it provides amenity and sustainability of new housing stock
- _ it proposes the removal of the railway corridor for newdevelopment, and allows for the 'stitching' back together of the urban fabric
- _ new buildings create a threshold experience to the site
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- _ the creation of a central parkland area and civic hub, with the adaptive reuse of the Station buildings

- existing development pattern
- proposed residential
- proposed commerical / civic buildings
- proposed green space / parkland
- new 'green way'
streets to accomodate street trees, pedestrian paths and cycle facilities
- extensions to the road network
streets are 'stitched' back together across the old railway corridor

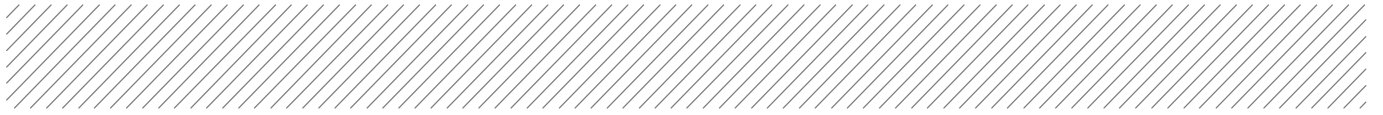
PROJECT
66522_ Horsham Rail By-pass

DRAWING
Concept Sketch Option B: Commercial Hub / Innovation Park

CLIENT
Horsham Rural Council

DATE 05.11.2012 **SCALE** 1:2500 **SHEET** @A1 **VERSION** 01





Appendix B

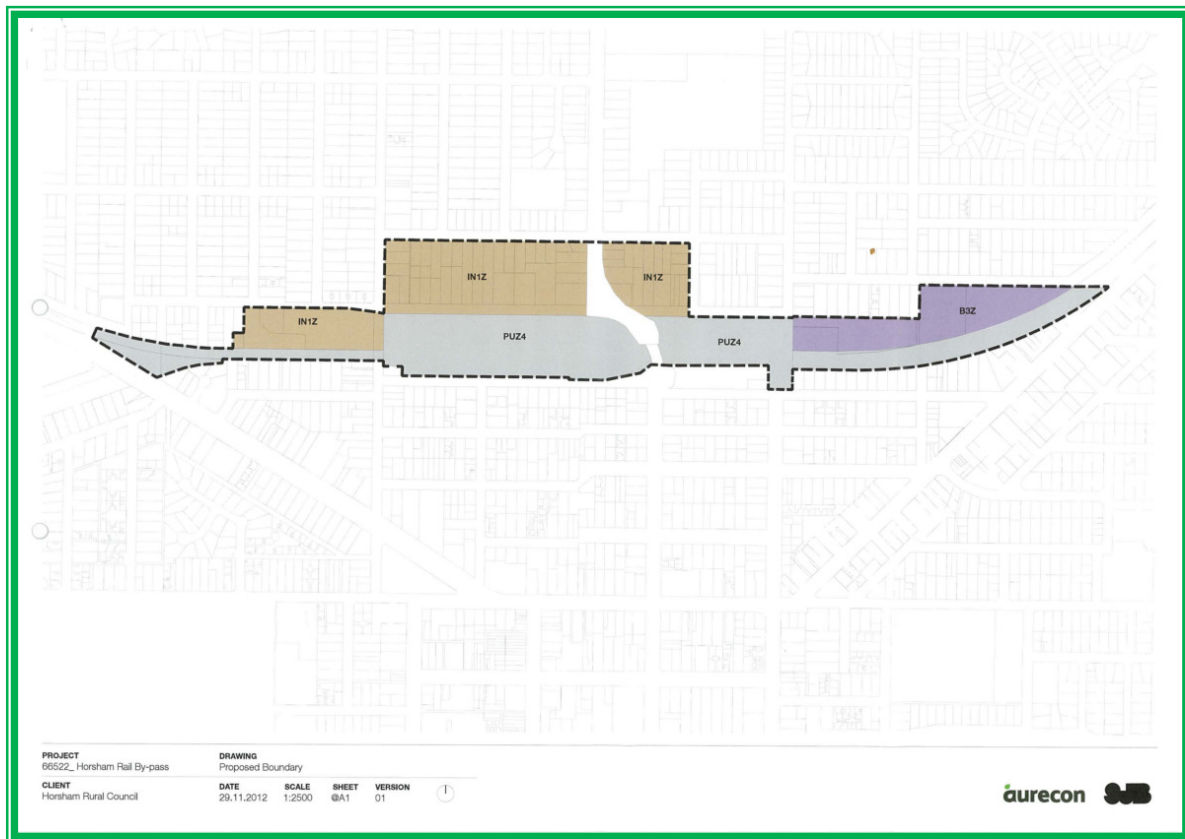
Land Valuation

consultancy report

horsham rail study

under instruction from

aurecon



january 2013

wigg & partners
property valuers

abn 36 818 667 101
32 Tuson Street, Ararat
p: (03) 5352 5959
f: (03) 5352 7230
m: 0409 345 046
e: peter@wiggandpartners.com.au

Liability limited by a scheme approved under Professional Standards Legislation



instructions and assumptions

Instructions:	Written instructions were received on the 17 th December, 2012 from Susannah Tait of Aurecon , to provide valuation advice relating to the Horsham Rail Bypass Study.
Scope of Works:	<p>To advise the value per sqm (or suitable industry equivalent) of saleable land for land areas provided by Aurecon.</p> <p>To advise the total current value of saleable land based on the land areas provided by Aurecon.</p> <p>To advise the total 30 year future value of saleable land based on the land areas provided by Aurecon.</p>
Valuation Date:	January 2013
Definition of Market Value:	The current market value is the estimated amount for which an asset should exchange on the date of valuation between a willing buyer and a willing seller in an arms length transaction, after proper marketing, wherein the parties have each acted knowledgeably, prudently and without compulsion.
Extension of Liability:	<p>This valuation advice may be relied upon by Aurecon for the purposes of preparing the Horsham Rail Bypass Study for the Horsham Rural City Council.</p> <p>This document is confidential and for the sole use of the persons it is provided to by Wigg & Partners P/L. If this document is relied upon by anyone other than Aurecon and is not authorised by Wigg & partners P/L, then Wigg & Partners P/L is not liable for any loss arising from unauthorised reliance. We invite other parties who may come into possession of this report to seek our written consent to them relying on this report. We reserve the right to withhold consent or to review the contents of this report in the event that our consent is sought.</p>
Information provided by Others:	The valuation advice provided herein is based on the instructions, and stated assumptions, and subsequent information supplied. We have assumed that the instruction and information provided contains a full and frank disclosure of all information that is relevant. The valuer has attempted to obtain all necessary information and verify the material and data provided,

however the client acknowledges that such verification is limited by the valuers expertise and scope of the undertaking which should form only part of a more extensive 'Due Diligence' investigation. The valuer and Valuation Firm does not accept any responsibility or liability whatsoever in the event that important information has been withheld or, the valuer has been provided with insufficient, false or misleading information.

Environmental Risks:

Whilst all reasonable enquiries have been made by the valuer, both as to any known contamination of the land, whether by the present or past occupants, or as to the existence of any clean-up order or like notice affecting the land, you are advised that no other investigation has been conducted by the valuer as to possible contamination of the land.

The use and occupation of the land at the time of valuation has been that of mixed use - comprising residential, and industrial related uses. At the date of inspection, we had no knowledge of any contamination of the land which may have resulted through that use. We point out that likelihood of contamination from the current use along with previous and surrounding (non-related) uses is considered possible.

If contamination of the land is, subsequent to our valuation, found to exist, this would seriously impact upon the assessed value resulting in a reduction of our valuation assessment. Our valuation has been based upon the assumption that the land is not contaminated.

Native Title:

Pursuant to the Native Titles Act (Cth) 1993 (as amended 30 September 1998), land with the exception of an "Exclusive Possession Grant" may be claimed as property of Indigenous Australians leading to the co-existence or likely co-existence of native title in relation to a particular piece of land, subject to the verification of a prior or continuing connection to the land.

Our inspection or investigations has not found any obvious presence of native title. It must be noted however that we are not experts in native title or the property rights resultant therefrom and we have not been provided with any further advice. Therefore, our valuation advice has been made subject to there being no native title claims pursuant to the land, or of which affects the marketability or potential use of the site.

Verification should be obtained by a qualified expert to confirm that the property is not subject to co-existing native title interests. We reserve the right to review this valuation should there be any native title issues arise.

project summary

Summary

The valuation advice provided herein forms part of a Rail Bypass Study being conducted by Aurecon and on behalf of the Horsham Rural City Council.

The information provided herein relates to two proposed re-development options for the existing railway and designated surrounding land as a result of the relocation of the existing rail network.

The subject land that forms part of this study has been divided into 8 different parcels and allocated proposed optional re-zonings. Each parcel has then been designed for use in accordance with the zoning provisions and overall road structure to interface with adjoining land.

The land included in the study is held under a variety of ownership structures. As outlined in the Scope of Works, we have provided valuation advice of all land included within the rail study area, and disregarded any issues relating to ownership of individual properties.

The valuation advice stated herein should not be construed as a concluded valuation. The information provided herein is limited and restricted by the information provided with our instructions, and the general nature of the proposed development options. In providing valuation advice on each development concept we have made the following valuation assumptions:

- The land is developed in accordance with the concept plans provided;
- Values have been placed on each designated parcel without any consideration given to ownership of individual properties;
- The values provided herein have been assessed on an individual parcel basis only;
- All valuation advice is based on an external inspection of the study area only;
- The 15 existing dwellings in Parcel C have been assessed at a notional amount of \$100,000 per property as part of the overall purchase price for the total parcel;
- Values assessed on a residential lot basis assume average prevailing development costs of generally between \$35,000 and \$50,000 per lot;
- Individual land values have been assessed based on a restricted sales analysis of relevant market transactions;
- No value has been allocated to PPRZ zoned land which we assume will be retained by the Horsham Rural City Council. PPRZ land will be appropriately landscaped and enhance the general amenity;
- No value has been assessed on existing Station buildings;
- No allowance has been made for demolition of existing buildings which would be required to allow for the proposed redevelopment;
- We note that part of the subject land has been used for fuel depot purposes and contamination is considered possible; however for valuation purposes we have assumed that the land is not contaminated;
- The cost of the re-development of the Horsham Kalkee Road rail overpass to ground level has not been included in our value assessments.

We provide general comments on each of the proposed development options below.

A copy of the proposed development plans for Option A and Option B are attached as an appendix to this report.

Concept A

This concept has a residential focus and seeks to provide residential development opportunities along the former rail line with a central parkland and civic hub.

The concept relies on a linear park/road network from east to west, together with the connection of various north/south roadways throughout the development.

The concept allows for the creation of a total of 285 residential allotments, which includes 15 existing dwellings. Lot sizes are not provided, however lot densities for each parcel have been considered and range from 361 sqm per lot for Parcel F to 1022 sqm per lot for Parcel C which incorporates the 15 existing dwellings. The design provides for a combination of new residential allotments with existing street frontages or newly constructed roads. The main east-west thoroughfare will provide access to a number of new allotments including the central parkland hub which we have assumed will not allow vehicle passage.

Concept B

This concept has similar road network and design to Concept A, however provides for more commercial activity around the central parkland and civic hub. The concept provides for 195 residential allotments including 13 existing dwellings.

Parcels A, B, E, G and H remain unchanged with the same design for residential development.

Parcel C provides for the creation of 5 new residential lots fronting Wawunna Road plus the retention of 13 of the existing dwellings. The remaining portion of the land has been designated for Business 3 related commercial development interspersed with public open space areas.

Parcel D provides for an equal mix of Business 3 commercial development and public open space which includes the central parkland and civic hub and adaptive use of the existing Station buildings.

Parcel F provides for slightly less residential development to allow for a larger commercial development site with central public open space area.

Future Value

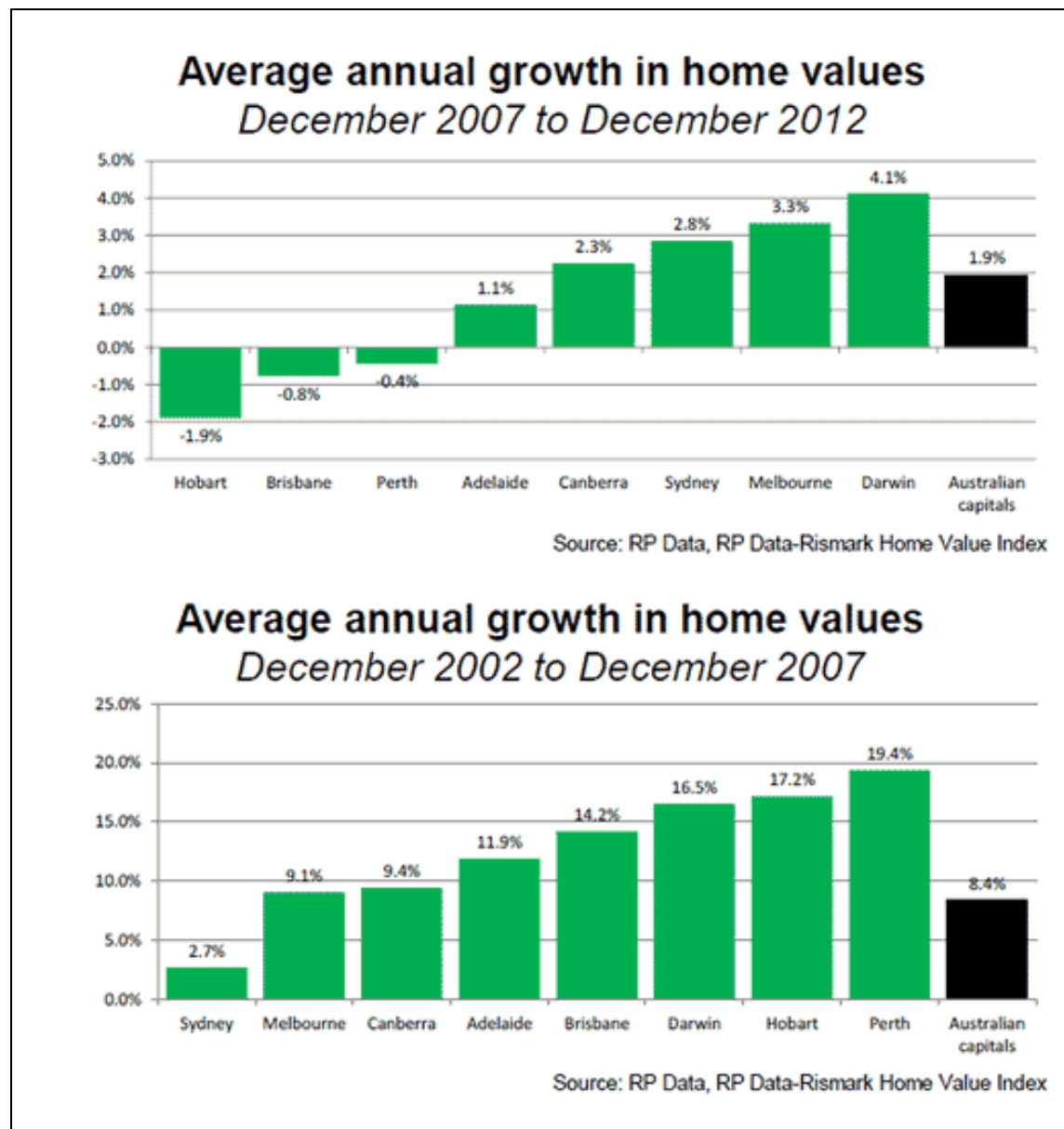
In accordance with our instructions we have provided a future value for each concept of the proposed rail study area. The future value is based on a 30 year horizon.

An analysis of the median sale price of residential properties within Horsham since Year 2000 indicates an average increase of 8.00% per annum over the 12 year period. Refer to table below.

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Median Sale Price	\$85,000	\$86,000	\$99,750	\$115,000	\$135,000	\$140,000	\$152,000	\$160,000	\$165,000	\$167,250	\$175,000	\$195,000
% Change		1.18%	15.99%	15.29%	17.39%	3.70%	8.57%	5.26%	3.13%	1.36%	4.63%	11.43%

The average growth in Australian Capital City property values over the past 10 year period has averaged 5.15%. (Source: RP Data). This figure was heavily influenced in the past 5 year period in

the wake of the global financial crisis which indicated a comparative average growth rate of just 1.9% p.a. Refer to graphs below.



In consideration of historic price movements and the uncertainty of future events, we have chosen to adopt an annual growth rate for the ensuing 30 year period of 5%.

valuation rationale

Option A

i) Current Market Value

Parcel	Proposed Zone	Land Area sqm	\$/sqm	No of Proposed Lots	\$/lot	No of Lots with Dwellings	\$/Dwelling	Value
A	PPRZ	17,470	\$0					\$0
B	R1Z	22,180		42	\$20,000			\$840,000
C	R1Z	41,920				15	\$100,000	\$1,500,000
	B3Z	13,970	\$60	26	\$40,000			\$1,040,000
								\$838,200
D	R1Z	23,540		49	\$20,000			\$980,000
	PPRZ	35,310	\$0					\$0
E	R1Z	14,325		22	\$40,000			\$880,000
	B3Z	4,775	\$100					\$477,500
F	R1Z	20,230		56	\$15,000			\$840,000
	B3Z	4,335	\$100					\$433,500
	PPRZ	4,335	\$0					\$0
G	R1Z	31,390		51	\$20,000			\$1,020,000
	PPRZ	3,490	\$0					\$0
H	R1Z	20,480		24	\$20,000			\$480,000
	PPRZ	5,120	\$0					\$0
Totals		262,870		270		15		\$9,329,200

PPRZ 65,725

R1Z 174,065

B3Z 23,080

ii) Future Value 30 Yr Horizon

Growth Rate	Value
6%	\$53,582,178
5%	\$40,320,265
4%	\$30,258,304

Option B

i) Current Market Value

Parcel	Proposed Zone	Land Area sqm	\$/sqm	No of Proposed Lots	\$/lot	No of Lots with Dwellings	\$/Dwelling	Value
A	PPRZ	17470	\$0					\$0
B	R1Z	22180		42	\$20,000			\$840,000
C	R1Z	22355				13	\$100,000	\$1,300,000
				5	\$45,000			\$225,000
	B3Z	22355	\$40					\$894,200
	PPRZ	11180	\$0					\$0
D	B3Z	29425	\$40					\$1,177,000
	PPRZ	29425	\$0					\$0
E	R1Z	14325		22	\$40,000			\$880,000
	B3Z	4775	\$100					\$477,500
F	R1Z	17340		38	\$15,000			\$570,000
	B3Z	5780	\$100					\$578,000
	PPRZ	5780	\$0					\$0
G	R1Z	31390		51	\$20,000			\$1,020,000
	PPRZ	3490	\$0					\$0
H	R1Z	20480		24	\$20,000			\$480,000
	PPRZ	5120	\$0					\$0
Totals		262870		182		13		\$8,441,700

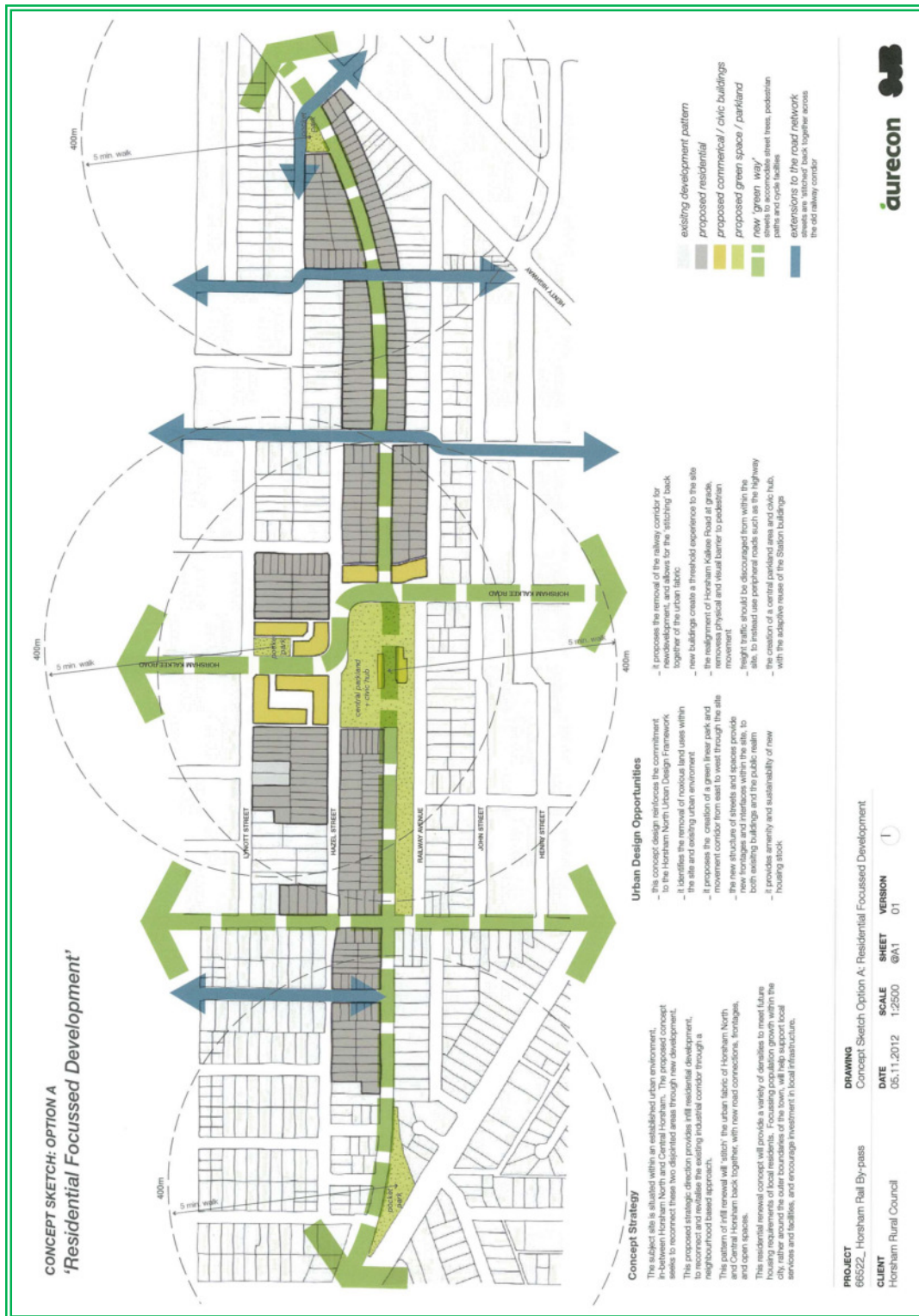
PPRZ	72,465
R1Z	128,070
B3Z	62,335

ii) Future Value 30 Yr Horizon

Growth Rate	6%	\$48,484,829
	5%	\$36,484,541
	4%	\$27,379,789

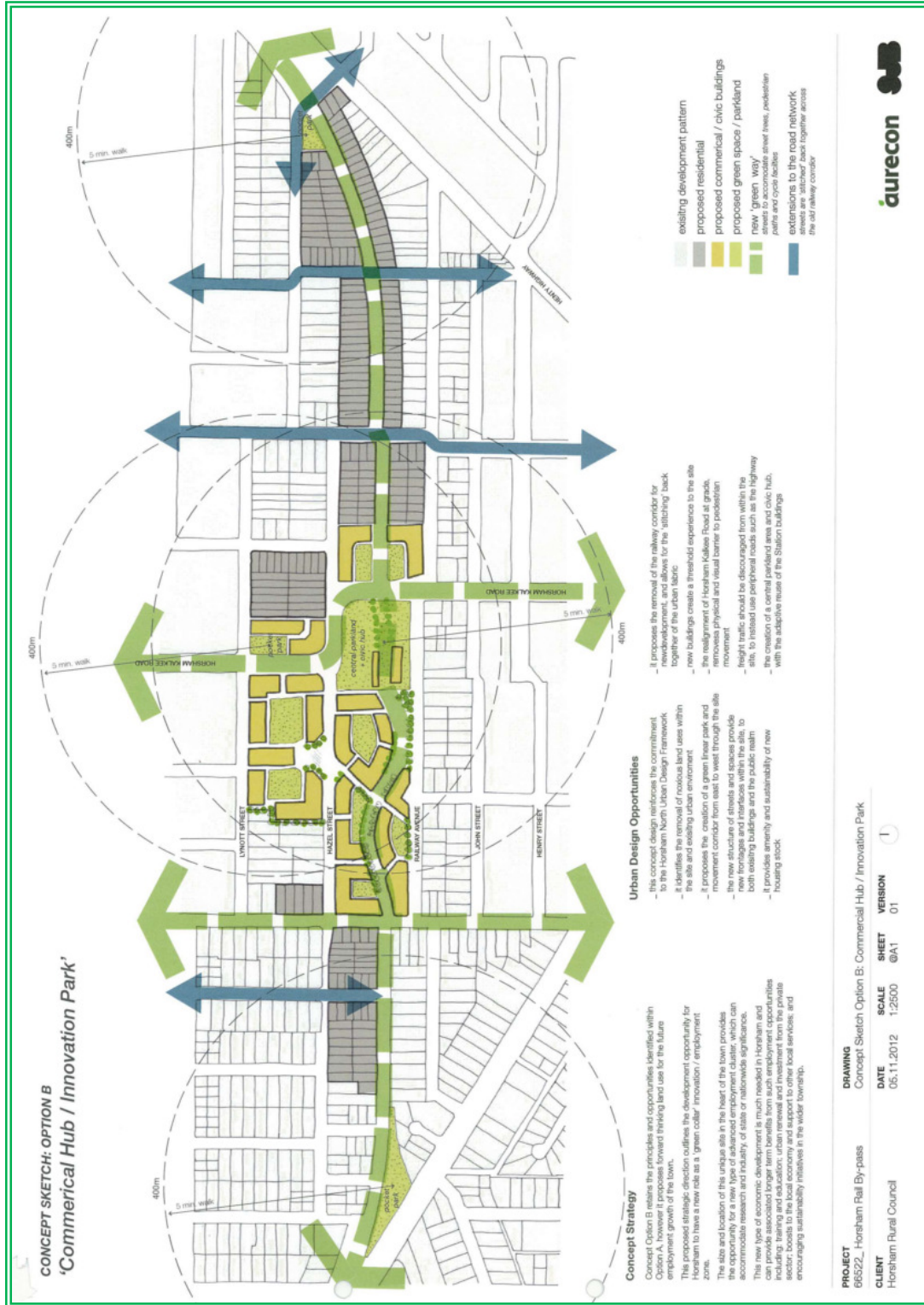
appendix i

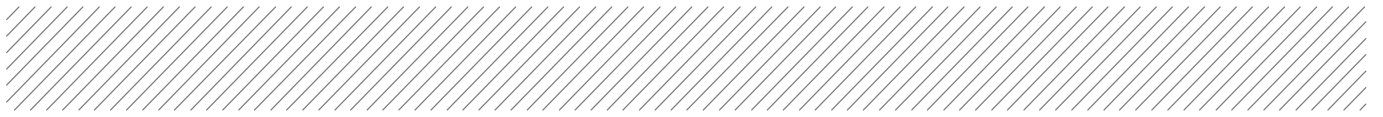
Concept A



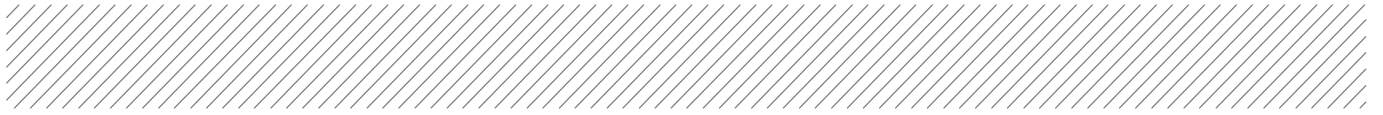
appendix ii

Concept B





Appendix C



Appendix C1

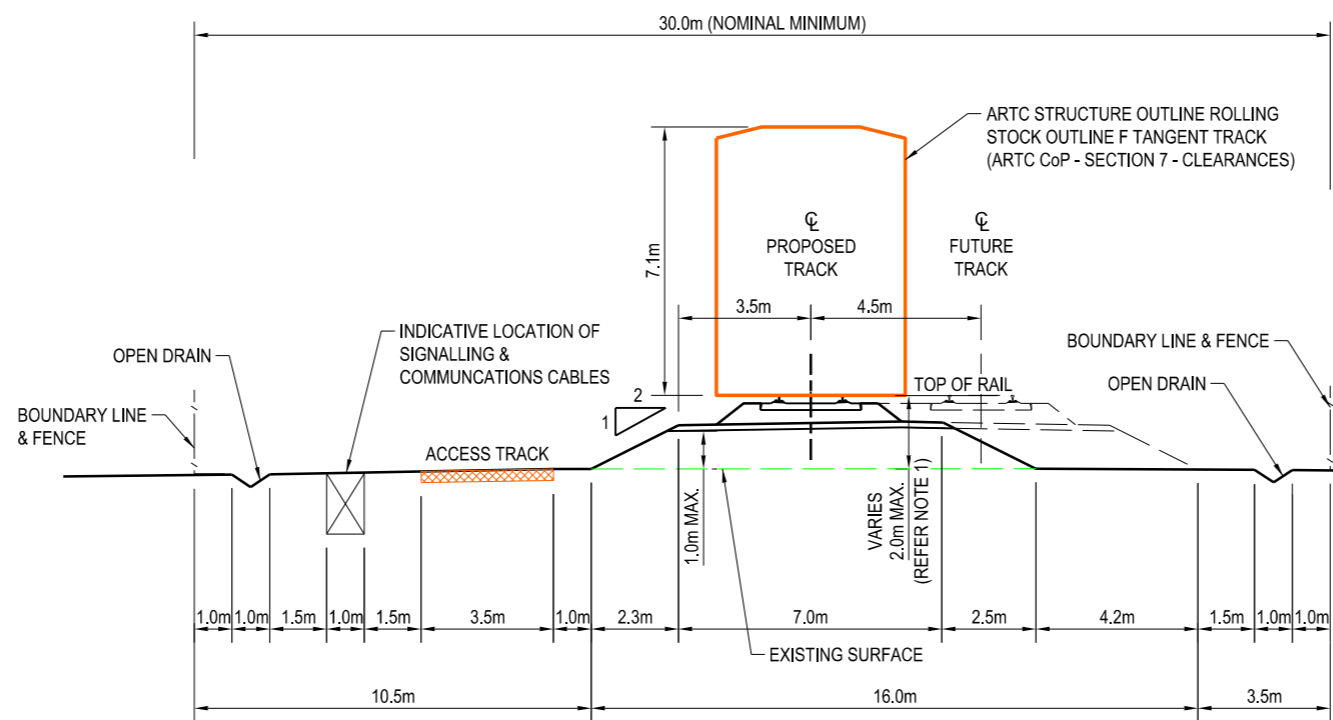
Proposed Rail Cross Section (minimum footprint)

(DATE)

(SIGNATURE)

(BLOCK LETTERS)

Certified By:



HORSHAM RAIL BYPASS PLANNING PROJECT
INDICATIVE RAIL CROSS SECTION AT GRADE
(MINIMUM FOOTPRINT)

NOTES:

1. TOP OF RAIL LEVEL ABOVE EXISTING GROUND VARIES.

PRELIMINARY DRAWING
(Not to be used for construction)

Project Drawing Number:
233162-SK-TC-C1011

2:44:21 PM

8/05/2013

Revised By	In Serv	Rev.	Date	Description	Designed	Checked	Ind. Rev.	Approv.
AURECON		P1	13/05/13	PRELIMINARY ISSUE	J.P.W	G.C.H.	J.E.B.	J.E.B.

Consultant
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Aurecon Australia Pty Ltd ABN 54 005 139 873 Telephone: +61 3 8683 1333
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Victoria 3205 Australia Email: melbourne@ap.aurecongroup.com

Franchisee / Lessee
Horsham Rural City Council
urban rural balance

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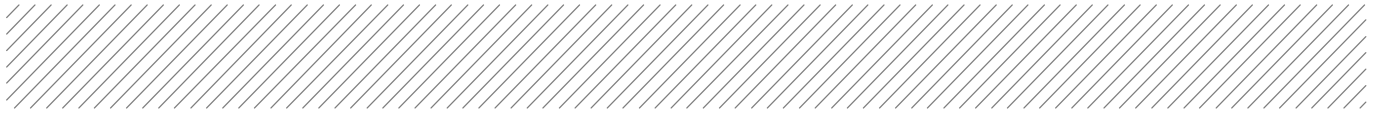
RAILWAY TRACK AND CIVIL		
HORSHAM		
RAIL BYPASS PLANNING PROJECT INDICATIVE RAIL CROSS SECTION AT GRADE (MINIMUM FOOTPRINT)		
Up Location East. North. ID#	Down Location East. North. ID#	Datum MGA Z55

VicTrack
ACCESS

File Name 233162-SK-TC-C1011.dgn
Sheet No. **01 of 01**
In Serv.
Scale 1:200 Sheet Size A3

Drawn By J. WILLIAMS	Designed By J.WILLIAMS
Checked By G.HOOD	Ind. Review
Approved J.BELCHER	Approval Date
Drawing Number	Revision P1

\$FILES



Appendix C2

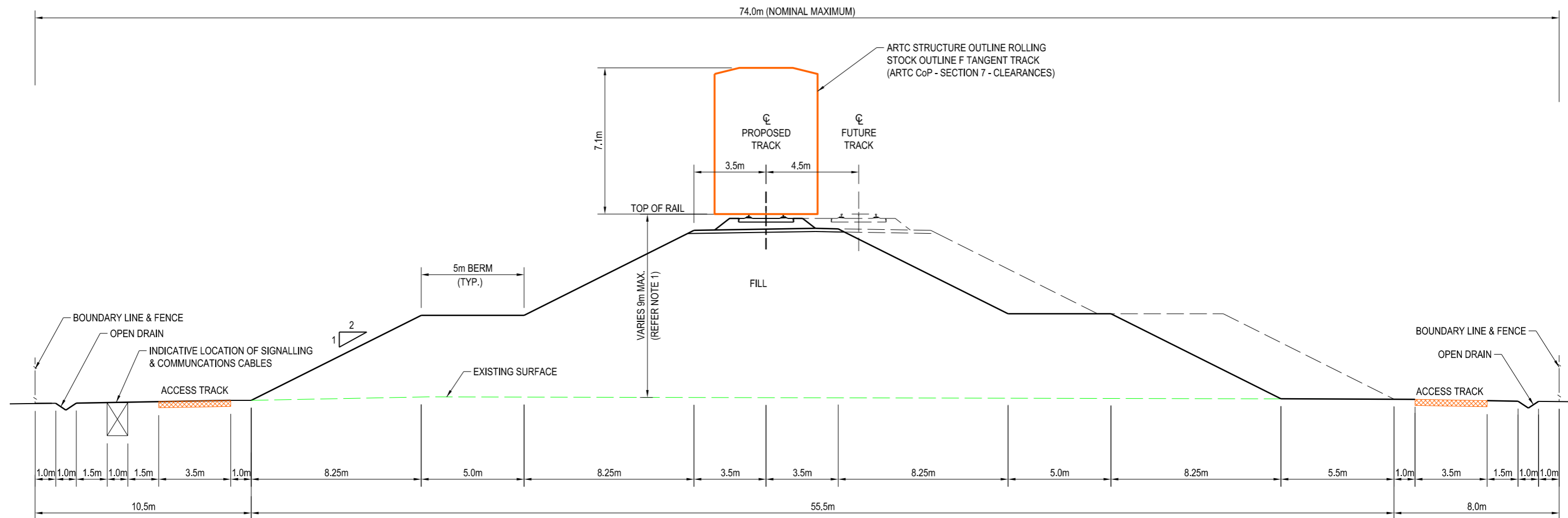
Proposed Rail Cross Section (maximum footprint)

(DATE)

(SIGNATURE)

(BLOCK LETTERS)

Certified By:



HORSHAM RAIL BYPASS PLANNING PROJECT
INDICATIVE RAIL CROSS SECTION ON FILL
(MAXIMUM FOOTPRINT)

- NOTES:
- TOP OF RAIL LEVEL ABOVE EXISTING GROUND VARIES.

PRELIMINARY DRAWING
(Not to be used for construction)

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AURECON		P1	30/11/12	PRELIMINARY ISSUE	J.P.W.	G.C.H.		

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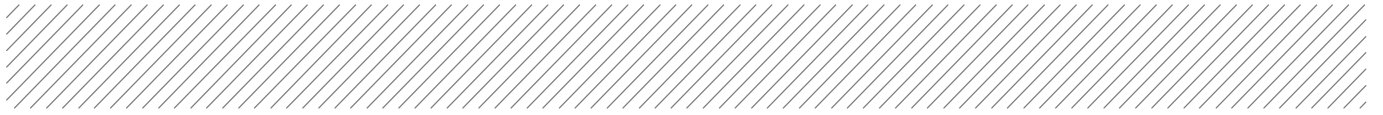
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HORSHAM		
RAIL BYPASS PLANNING PROJECT		
INDICATIVE RAIL CROSS SECTION ON FILL (MAXIMUM FOOTPRINT)		
Up Location East. North. ID#	Down Location East. North. ID#	Datum MGA Z55

VicTrack
ACCESS

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In Serv.
Scale 1:200 Sheet Size A3

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Checked By G.HOOD	Ind. Review
Approved J.BELCHER	Approval Date
Drawing Number	Revision P2

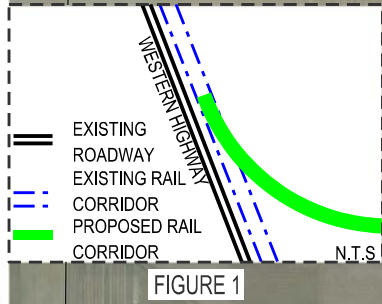
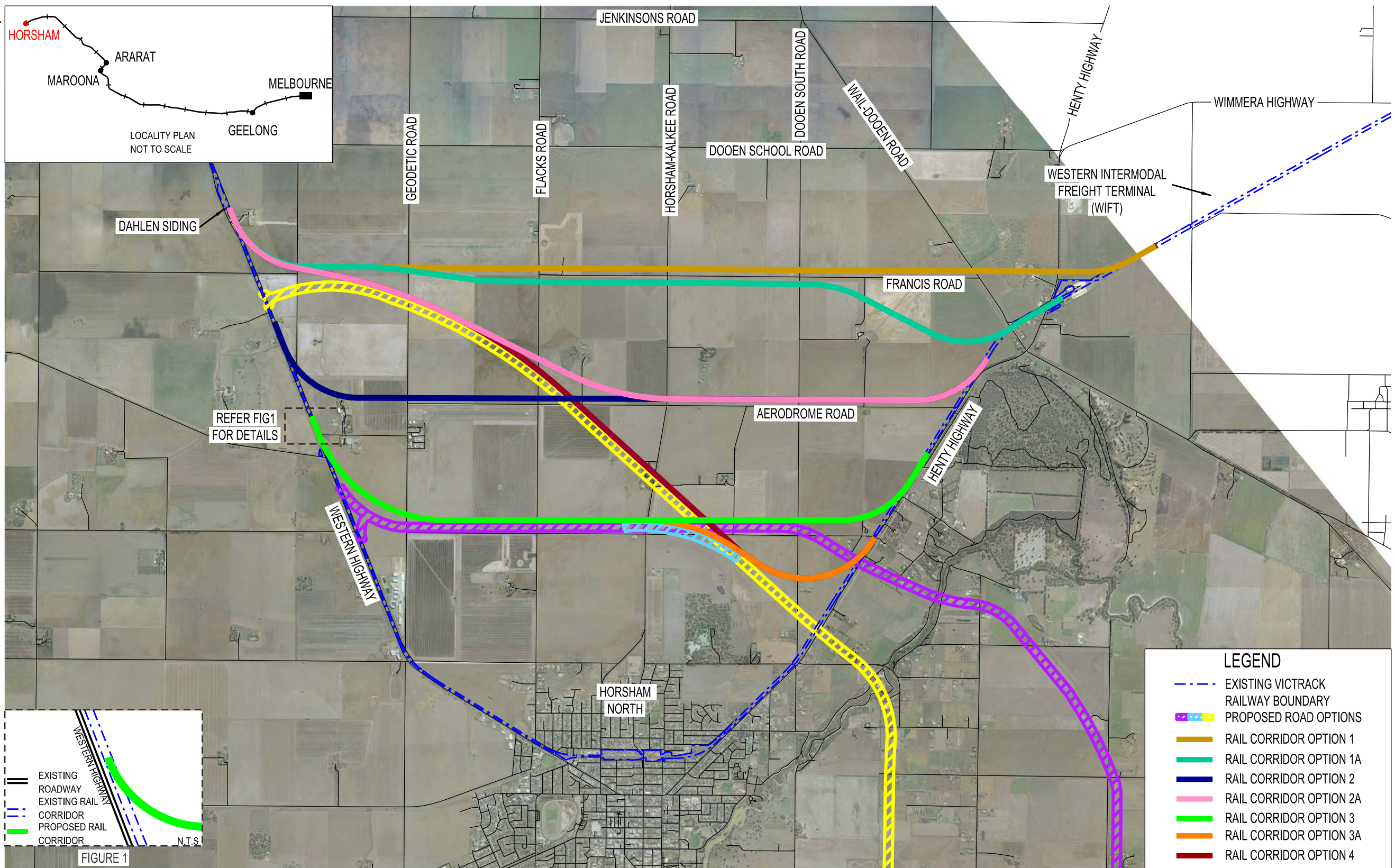
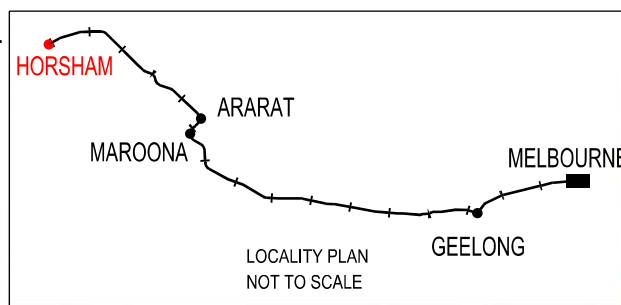
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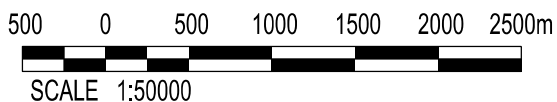
Appendix D

Concept Alignment Options

(DATE) _____
 (SIGNATURE) _____
 (BLOCK LETTERS) _____
 Certified By: _____
 \$TIMES _____
 \$DATES _____
 \$FILES _____



LEGEND	
	EXISTING VICTRACK RAILWAY BOUNDARY
	PROPOSED ROAD OPTIONS
	RAIL CORRIDOR OPTION 1
	RAIL CORRIDOR OPTION 1A
	RAIL CORRIDOR OPTION 2
	RAIL CORRIDOR OPTION 2A
	RAIL CORRIDOR OPTION 3
	RAIL CORRIDOR OPTION 3A
	RAIL CORRIDOR OPTION 4



NOTE: DATA REPRODUCED WITH PERMISSION OF VICTRACK

PRELIMINARY DRAWING
 (Not to be used for construction)

Project Drawing Number:
233162-SK-TC-C0002

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AURECON		P1	11/12/12	1ST PRELIMINARY ISSUE	S.S	G.C.H.		

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Franchisee / Lessee

Horsham Rural City Council
urban rural balance

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All written dimensions take precedence over scaled dimensions.

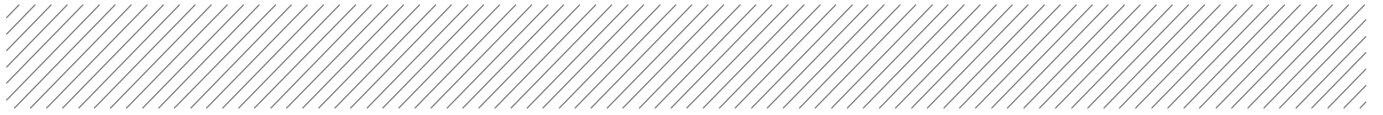
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RAILWAY TRACK AND CIVIL		
HORSHAM		
RAIL BYPASS PLANNING PROJECT		
ALIGNMENT OPTIONS		
PLAN		
Up Location	Down Location	Datum
East.	East.	MGA Z55
North.	North.	
ID#	ID#	

VicTrack
ACCESS

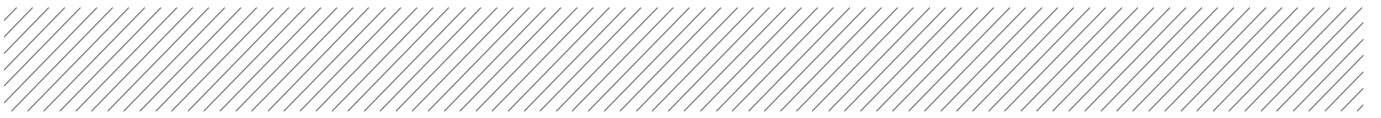
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Checked By G.HOOD	Approval Date
Approved	Approval Date
Drawing Number	Revision P2

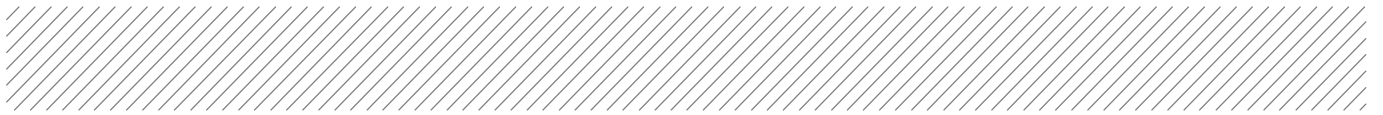


Appendix E

Rail Alignment Option Comparison Summary Table



Appendix F



Appendix F1

Cost Estimate – Road over rail

Gareth Hood
Senior Civil Engineer
Aurecon
Aurecon Centre Level 8
850 Collins Street
Docklands
Vic 3008

12 June 2013
REF 312178/1038

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A Q U E N T A . C O M . A U

Dear Gareth

HORSHAM RAIL BYPASS PLANNING PROJECT – OPTION COST ESTIMATE

Aquenta Consulting has been engaged by Aurecon to prepare a Concept Cost Estimate for the Horsham Rail Bypass Planning Project - Option.

Subject to the comments in this letter, Aquenta's estimate of the construction costs is in the order of \$78,995,892 (excluding costs for the disposal of contaminated soils to the existing railway track and Horsham City Centre).

This Report discusses the development of the construction and project costs along with a suitable allowance for contingency based on the following:

- The base date for the Estimate is January 2013.
- A Construct Only Contract delivery.

The construction costs include all allowances that a Contractor would make in a competitive tender for this Project to be delivered using the Construct Only delivery method. For the purposes of the preparation of the Estimate the design has been provided by Aurecon to Aquenta Consulting.

The Estimate is based on information collated from various sources including:

- Design drawings and information supplied to Aquenta.
- Email of scope options and changes and signalling cost dated 2 May 2013.

MAIN SCOPE ITEMS

The main scope items are set out below:

- The construction of approximately 11.1Km of new track using 60Kg Rail and Precast Concrete Sleepers.
- Three (3) box culverts for storm water drainage.
- A basic station, with a ticket office, two waiting shelters, toilets, and parking for 20 vehicles.
- The construction of a new 180 metre long X 4 metre wide platform.

- The removal of approximately 17.6 Km of the existing track, sleepers and ballast.
- The establishment of a of 2 Km cycle path to the existing track.
- Topsoiling and seeding to the new track and existing track corridors.
- The construction of approximately 1.812 Km of new passing loop track including "low speed" turnouts at both ends, to match existing.
- Topsoiling and seeding to the new passing loop track.
- Earthwork embankment changes.
- Exclude the five (5) rail over road grade separations previously included and replace with one (1) road over rail grade separation.

Code	Description	Quantity	UOM	Rate	Total
312178	HORSHAM RAIL BYPASS PLANNING PROJECT				
1	Earth Works	1	item	4,531,394	4,531,394
2	Roads	100	m	13,551	1,355,089
3	Rail Over Road Grade Separations	0	item	0	0
	Road over Rail Grade Separation	1	item	502,425	502,425
4	Culverts	1	item	146,160	146,160
5	Signaling, Communications and Control Systems	11.1	Km	640,378	7,108,195
6	Track	11.1	Km	1,046,955	11,621,205
7	Level Crossings	1	item	2,539,700	2,539,700
8	Groundcover to track corridors	131,046	m2	6	809,276
9	Fencing	22,400	m	7	164,416
10	Cycle Path	1,965	m	154	302,088
	New Basic Station				
11	Ticket Office	1	item	127,500	127,500
12	Waiting Shelter	1	item	50,000	50,000
13	Toilets	1	item	59,500	59,500
14	Services	1	item	60,000	60,000
15	Landscaping	1	item	237,289	237,289
16	Fencing	1	item	4,404	4,404
17	Electrical and HV Power Supply	1	item	1,135,475	1,135,475
18	ICT	1	item	80,000	80,000
	Subtotal - New Station			1,754,168	
19	Platform	180	m	6,112	1,100,176
20	Demolition	1	Item	2,922,090	2,922,090
21	Allowance Service Diversions	1	Item	500,000	500,000
22	Ticketing - Allowance Only	1	Item	500,000	500,000
23	Allowance for Possessions and Track Safety	1	Item	1,640,000	1,640,000
24	New Passing Loop Track including Signalling and Comms	1.81	Km	1,980,621	3,588,886
TOTAL OF DIRECT COSTS					41,085,267
	Prelims at 20%	1	Item	8,217,053	8,217,053
	Overhead and Profit at 12%	1	Item	5,916,278	5,916,278
	Design Costs at 9%	1	Item	3,697,674	3,697,674
TOTAL OF INDIRECTS COSTS					17,831,006
TOTAL OF DIRECTS AND INDIRECT COSTS					
	Contingency @ 30%	1.00	item	17,674,882	17,674,882
CONSTRUCTION CONTINGENCY					17,674,882
	Land Acquisition - Agricultural Land (Includes 25% Area Dispute and 10% solatium payment and 10% legal fees	1.00	item	140,938	140,938
	Land Acquisition - Industrial Land includes a 10% legal fee allowance	1.00	item	2,263,800	2,263,800
LAND AQUISION					2,404,738
TOTAL PROJECT COSTS					78,995,892

METHODOLOGY

The scheduled item costs for the construction estimate have been built up using a combination of First Principles and Standard Unit Rates and benchmarked against projects of a similar nature. The Estimate relies on details that have been provided to Aqenta by Aurecon, and with Aqenta's experience on similar projects in the past.

Aqenta was provided with signalling cost information (provided by ARTC). This cost information was derived from recent ARTC projects. Aqenta has based the signal cost per Km on an average of the Signals Direct cost for the 2 projects in 2013 dollars. Refer to Appendix for details of ARTC project costs.

Aqenta has collated the above information to establish the Project requirements and has provided the basis to generate the Concept Design Estimate.

MAIN ASSUMPTIONS

The following main assumptions have been made in the preparation of the Estimate:

BORROW PITS - The assumption has been made that material for the construction of the earth embankments can be procured locally with 80% of the imported material being sourced from a local borrow pit and the remaining 20% imported by road at the rate of \$ 23/m³.

GRADE SEPARATION AND CULVERTS - The design of the culverts and grade separation is based upon recently completed projects.

SIGNALLING - The cost information regarding signalling was derived from recent ARTC projects. Aqenta has assumed this to be correct and has based the signal cost per Km on an average of the Signals Direct cost for the 2 projects in 2013 dollars. Refer to Appendix for details of ARTC project costs. As advised by Aurecon, the cost for cable management systems is assumed to be included in the signalling cost per Km.

COMMUNICATIONS SYSTEMS - As noted in the detailed estimate.

TICKETING - A provisional allowance of \$500k has been included for ticketing. Aqenta suggest further advice is sought from the Transit Ticketing Agency to confirm their requirements.

GROUND CONDITIONS - The type and makeup of the existing ground conditions is unclear. Aqenta's estimate is based upon typical ground conditions and makes no allowance for rock floaters or rock excavation.

CONTAMINATED GROUND - There is no allowance within the estimate for the disposal of contaminated soils. Aqenta advise that additional work is carried out to establish the potential cost to this project.

SEQUENCING

It has been assumed that the new track will be constructed prior to the demolition of the existing track.

PROJECT CONTINGENCY

The contingency consists of risk allowances from planned and unplanned assessments of various elements of the Project. These elements are:

- Uncertainty on schedule quantities – planned risk
- Uncertainty on events affecting the Project – unplanned risk

Considering the level of design at this stage of the design development Aqenta believe a contingency of 30% is appropriate. Moving forward Aqenta recommend that a more detailed approach to risk identification and quantification be undertaken to give a more robust risk adjusted project cost.

OPPORTUNITIES

Aqenta believe there may be a number of opportunities to reduce costs. These opportunities are identified below:

- The use of recycled track and timber sleepers. Should they be available and comply with track specifications at the time the works are constructed.

MAIN RISKS

Aqenta suggest that additional work is carried out to identify and quantify the main risk to the project.

CONTAMINATED GROUND – Aqenta strongly recommend that additional work is carried out to establish the extent and suitable method of disposal of contaminated material. From experience gained on recent completed projects the existing track ballast, sub-grade and a percentage of the capping layer may be classified as Class B. If Class A to Class C is present onsite environmental legislation will either require disposal to a Licensed Landfill Site or treatment locally. The estimate makes no allowance for the treatment or disposal as the costs may run into the hundreds of millions for the latter.

ESCALATION

The base date for this estimate is January 2013. Escalation has not been applied to this estimate.

Subject to the comments in this letter, Aqenta believe the Cost Estimate for this Project is within the order of \$ 78,995,892.

Should you have any questions do not hesitate to contact us.

Yours sincerely

Aqenta Consulting



Sarah Benfield
Associate

Appendix 1: BUDGET COSTS ESTIMATE

312178 - HORSHAM RAIL BYPASS PLANNING PROJECT

Code	Description	Quantity UOM	Rate	Total	
312178	HORSHAM RAIL BYPASS PLANNING PROJECT				
1	Earth Works	1 item	4,531,394	4,531,394	
2	Roads	100 m	13,551	1,355,089	
3	Rail Over Road Grade Separations	0 item	0	0	Not required
	Road over Rail Grade Separation	1 item	502,425	502,425	
4	Culverts	1 item	146,160	146,160	
5	Signaling, Communications and Control Systems	11.1 Km	640,378	7,108,195	
6	Track	11.1 Km	1,046,955	11,621,205	
7	Level Crossings	1 item	2,539,700	2,539,700	
8	Groundcover to track corridors	131,046 m2	6	809,276	
9	Fencing	22,400 m	7	164,416	
10	Cycle Path	1,965 m	154	302,088	
	New Basic Station				
11	Ticket Office	1 item	127,500	127,500	
12	Waiting Shelter	1 item	50,000	50,000	
13	Toilets	1 item	59,500	59,500	
14	Services	1 item	60,000	60,000	
15	Landscaping	1 item	237,289	237,289	
16	Fencing	1 item	4,404	4,404	
17	Electrical and HV Power Supply	1 item	1,135,475	1,135,475	
18	ICT	1 item	80,000	80,000	
	Subtotal - New Station		1,754,168		
19	Platform	180 m	6,112	1,100,176	
20	Demolition	1 item	2,922,090	2,922,090	
21	Allowance Service Diversions	1 item	500,000	500,000	
22	Ticketing - Allowance Only	1 item	500,000	500,000	
23	Allowance for Possessions and Track Safety	1 item	1,640,000	1,640,000	
24	New Passing Loop Track including Signalling and Comms	1.81 Km	1,980,621	3,588,886	
TOTAL OF DIRECT COSTS				41,085,267	41,085,267
	Prelims at 20%	1 item	8,217,053	8,217,053	
	Overhead and Profit at 12%	1 item	5,916,278	5,916,278	
	Design Costs at 9%	1 item	3,697,674	3,697,674	
TOTAL OF INDIRECT COSTS				17,831,006	17,831,006
TOTAL OF DIRECTS AND INDIRECT COSTS				58,916,273	58,916,273
	Contingency @ 30%	1.00 item	17,674,882	17,674,882	
CONSTRUCTION CONTINGENCY				17,674,882	17,674,882
	Land Acquisition - Agricultural Land (Includes 25% Area Dispute and 10% solatium payment and 10% legal fees	1.00 item	140,938	140,938	
	Land Acquisition - Industrial Land includes a 10% legal fee allowance	1.00 item	2,263,800	2,263,800	
LAND AQUISION				2,404,738	2,404,738
TOTAL PROJECT COSTS				78,995,892	78,995,892

Comments

The Signalling costs are based upon cost data provided by ARTC. These costs are assumed to include cable management systems.

Below the line items

There is no allowance within the estimate for the disposal of contaminated soils. Aquenta advise that additional work is carried out to establish the potential cost to this project.

Risk Items

The quantities of imported fill for the earth embankments are based upon the details provided and any changes to the final levels could have a significant impact upon the Earthworks costs.

The rate of \$15m3 has been used for the imported fill to the track embankment. This assumes that suitable material can be obtained from a local borrow pit within an appropriate radius of the works.

The rate of \$23m3 has been used for imported fill to the earth embankments, this rate could fluctuate significantly depending on the availability of a suitable source.

Existing soil conditions. The type and make up of the existing ground conditions is unclear. Hence Aquenta's estimate is based upon typical ground conditions and makes no allowance for rock floaters or rock excavation.

312178 - HORSHAM RAIL BYPASS PLANNING PROJECT

Code	Description	Quantity	UOM	Rate	Subtotal	Factor	Total	Total	Comments
312178 HORSHAM RAIL BYPASS PLANNING PROJECT									
1	EARTH WORKS								
	Earthworks to New Rail Corridor								
	Site Preparation	177,600	m2	1.35	239,760		239,760		Assumed a corridor width of 16m
	Topsoil	18,470	m3	2.10	38,788		38,788		Assumed a corridor width of 16m
	Bulk Earthworks								
	Locally Imported Bulk Fill Material	132,237	m3	15.00	1,983,552		1,983,552		Assumed a local borrow pit can be established and fill material will be obtained locally.
	Imported Bulk Fill Material by road	33,059	m3	22.00	727,302		727,302		Assumed that 20% of suitable imported fill can be sourced locally and imported by road
	Extra over - Engineered subgrade 1.5m deep		m3	2.00	0		0		
	Cut and Fill to at grade	44,400	m3	16.00	710,400		710,400		
	MISC								
	Ground Water Management	1	item	30,000.00	30,000		30,000		Assumed to be approximately 1% of earthworks cost
	Allowance for environmental controls	1	item	100,000.00	100,000		100,000		Assumed to be approximately 3% of earthworks cost
	Open Drain	1	item		234,432		234,432		
	Earthworks to New Rail Passing Loop								
	Site Preparation	28,992	m2	1.35	39,139		39,139		
	Topsoil	3,015	m3	2.10	6,332		6,332		
	Bulk Earthworks								
	Locally Imported Bulk Fill Material	13,046	m3	15.00	195,696		195,696		
	Imported Bulk Fill Material by road	3,262	m3	22.00	71,755		71,755		
	Cut and Fill to at grade	7,248	m3	16.00	115,968		115,968		
	Open Drain	1	item	38,269	38,269		38,269		
	TOTAL EARTH WORKS				4,531,394		4,531,394		
2	ROADS								
	Roads								
	Access Track								
	*11.1km of crushed rock access track								
	Excavation	11,655	m3	9.00	104,895		104,895		
	Pavement crushed Rock								
	Allow for surface prep	38,850	m2	5.00	194,250		194,250		
	*300thk compacted crushed rock	11,655	m3	86.00	1,002,330		1,002,330		
	Geotextile	44,678	m2	1.20	53,614		53,614		
	TOTAL ROADS				1,355,089		1,355,089		
3	RAIL OVER ROAD GRADE SEPARATIONS								
	Rail Over Road Bridge								
	Assume the bridge deck is 12m long and 7m wide with a 1.2m wide Walkway	0	No.	394,200.00	0		0		Not required - Changed to road over rail
	ROAD OVER RAIL GRADE SEPARATIONS								
	Road over Rail Bridge								
	Assume bridge deck is 14.5m long and 7m wide with a 2no. x 1.5m wide walkways	1	No.	502,425.00	502,425		502,425		
	GRADE SEPARATIONS				502,425		502,425		
4	CULVERTS (STORM DRAINAGE)								
	Bridge Culvert								
	Bridge Culvert assumed to be 1m wide x 12m	3	Item	48,720.00	146,160		146,160		
	TOTAL CULVERTS				146,160		146,160		
5	SIGNALLING, COMMUNICATIONS AND CONTROL SYSTEMS								
	Signalling and Control								
	Communications Systems	1	Item	5,781.713	5,781.713		5,781.713		Based on ARTC cost information and assumed to include cable management system
	Cable Management Systems	1	Item	1,326,482	1,326,482		1,326,482		
		0	Item	0	0		0		
	TOTAL SIGNALING, COMMUNICATIONS AND CONTROL SYSTEMS				7,108,195		7,108,195		
6	TRACK								
	Track								
	New 60kg track, PCC Sleepers and Ballast	11,100	m	951.05	10,556,683		10,556,683		Possible cost saving if timber 2nd hand timber and rail is available
	*150mm capping layer - 20mm and fines	11,655	m3	55.30	644,522		644,522		
	Assume that (No. 2 x 4) 8 days for the delivery and off loading of track from the Melbourne area	8	dy	40,000.00	320,000		320,000		
	Allowance for connecting to existing track	1	item	100,000.00	100,000		100,000		
	TOTAL TRACK				11,621,205		11,621,205		
7	LEVEL CROSSINGS								
	Active Crossing								
	Allow new active level crossing to Wail Dooen Rd Henty Highway	1	item	2,500,000.00	2,500,000		2,500,000		Allowance - additional investigation required
	Existing boom barriers, hence, allowance to upgrade signage and line marking only								
	Signs	4	No.	500.00	2,000		2,000		
	Signs	2	No.	1,500.00	3,000		3,000		
	Line Marking	3	dys	900.00	2,700		2,700		
	Traffic management	2		1,400.00	2,800		2,800		
	Allowance for signage to road crossing stopped up	4	No.	5,000.00	20,000		20,000		Allowance for previous rail/road grade separations
	Line Marking - chevron markers	4	dys	900.00	3,600		3,600		
	Traffic management	4		1,400.00	5,600		5,600		
	TOTAL LEVEL CROSSINGS				2,539,700		2,539,700		
8	GROUND COVER								
	Ground cover								
	Top Soil and seed to:								
	New Track Corridor	88,800	m2	6.00	532,800		532,800		
	Existing Corridor	27,750	m2	6.00	166,500		166,500		
	Rail Passing loop	14,496	m2	6.00	86,976		86,976		
	Allowance for Tree Planting and tube stocks								
	New Corridor - (Approx 200No. Tube stocks)	2,000	No.	5.75	11,500		11,500		
	Existing Corridor - (Approx 2000No. Tube stocks)	2,000	No.	5.75	11,500		11,500		
	TOTAL GROUND COVER				809,276		809,276		
9	FENCING								
	Fencing								
	Rural wire fencing 1.2m high 5 strands to both sides of the track	22,400	m	7.34	164,416		164,416		No fencing has been allowed for the new passing loop track
	TOTAL FENCING				164,416		164,416		
10	CYCLE PATH								
	Cycle Path 2.5m wide								
	Plant and equipment set up costs	5	Item	2,900.00	14,500		14,500		
	*40thk Asphalt supply and sub base	4,913	m2	55.00	270,188		270,188		
	Traffic Management	5	dys	1,730.00	8,650		8,650		
	Signs	15	No.	500.00	7,500		7,500		
	Signs	5.00	No.	250.00	1,250		1,250		
	TOTAL CYCLE PATH				302,088		302,088		
11	NEW BASIC STATION TICKET OFFICE								
	Ticket office								
	Roof	30	m2	650.00	19,500		19,500		
	Say 5m Long x 6m Wide x 3mHeight	30	m2	2,650.00	79,500		79,500		
	Fit out ticket office	30	m2	950.00	28,500		28,500		
	TOTAL TICKET OFFICE				127,500		127,500		
12	WAITING SHELTER								
	Bus and Platform Waiting Shelter								
	Light weight waiting shelter	2	Item	25,000.00	50,000		50,000		

Code	Description	Quantity	UOM	Rate	Subtotal	Factor	Total	Total	Comments
312178	HORSHAM RAIL BYPASS PLANNING PROJECT								
	TOTAL WAITING SHELTER				50,000			50,000	
13	TOILETS								
	Toilets								
	Roof	14	m2	650.00	9,100		9,100		
	Say 5m Long x 6m Wide x 3mHeight	14	m2	2,650.00	37,100		37,100		
	Fit out ticket office	14	m2	950.00	13,300		13,300		
	TOTAL TOILETS				59,500			59,500	
14	SERVICES								
	Services								
	Allow Drainage	1	item	20,000.00	20,000		20,000		
	Allow Solar Hot Water	1	item	20,000.00	20,000		20,000		
	Allow rain Water Harvesting	1	item	20,000.00	20,000		20,000		
	TOTAL SERVICES				60,000			60,000	
15	GROUNDCOVER								
	Hard Landscaping								
	Allowance for asphaltting to Carpark	1,499	m2	101.00	151,399		151,399		
	Allowance Pedestrian pavement	120	m2	192.00	23,040		23,040		
	Allowance Kerb	285	m	120.00	34,200		34,200		
	Allowance for Drainage	1	item	15,000.00	15,000		15,000		
	STREET FURNITURE								
	Furniture								
	Benches	2	no.	1,200.00	2,400		2,400		
	Dust Bins	2	No.	700.00	1,400		1,400		
	Allowance for signs Large	2	No.	1,500.00	3,000		3,000		
	Medium	5	No.	500.00	2,500		2,500		
	Small	3	No.	250.00	750		750		
	Bollards	6	No.	600.00	3,600		3,600		
	TOTAL				237,289			237,289	
16	FENCING								
	Fencing to Station								
	Rural 5 strand chain link fence	600		7.34	4,404		4,404		
	TOTAL FENCING				4,404			4,404	
17	ELECTRICAL AND HV OVERHEAD SUPPLY								
	Station Electrical Works								
	Supply and install 11kv overhead line (2km)	2,000	m	480.00	960,000		960,000		
	Pole mount transformer	1	no.	35,440.00	35,440		35,440		
	Steel conduit cover to pole	1	no.	235.00	235		235		
	Trenching and backfill of trench from pole to building switchboard (20m)	20	m	65.00	1,300		1,300		
	Cable and conduit from transformer to switchboard	25	m	20.00	500		500		
	Installation of conduit and cable	1	item	1,360.00	1,360		1,360		
	Building Electrical								
	Switchboard	1	item	1,830.00	1,830		1,830		
	Main switch and C/B's	6	no.	890.00	5,340		5,340		
	Ticket machine feed and connection	1	no.	270.00	270		270		
	Power outlets	6	item	230.00	1,380		1,380		
	Internal lighting (fluoro light fittings)	4	no.	370.00	1,480		1,480		
	Comms power	1	item	200.00	200		200		
	External lighting	2	item	570.00	1,140		1,140		
	Miscellaneous Materials (tray, supports etc)	1	item	1,000.00	1,000		1,000		
	Allowance of pole mounted light columns	4	no.	8,500.00	34,000		34,000		
	Lighting to Platform	720	m2	125.00	90,000		90,000		
	ELECTRICAL AND HV OVERHEAD SUPPLY				1,135,475			1,135,475	
18	ICT								
	CCTV	1	item	20,000.00	20,000		20,000		
	Allowance for PID's	2	no.	30,000.00	60,000		60,000		
	ICT				80,000			80,000	
19	PLATFORM								
	New Platform								
	Platform 180m long and 4m wide								
	Piling	60	No.	4,000.00	240,000		240,000		
	Capping Beam, with PCC Slabs and Steel Framing, Coping Stone, Tactile, Asphalt Wearing Course	180	m	4,612.09	830,176		830,176		
	Access Ramp	1	item	10,000.00	10,000		10,000		
	Stair at ends of platform onto track	2	No.	10,000.00	20,000		20,000		
	TOTAL PLATFORM				1,100,176			1,100,176	
20	DEMOLITION								
	DEMOLITION								
	Existing Buildings to City Centre	1	item		345,040		345,040		
	Removal of existing track, ballast and sleepers	1	item		2,327,050		2,327,050		
	Allowance for decommissioning existing services	1	item		250,000		250,000		
	TOTAL DEMOLITION				2,922,090			2,922,090	
21	Allowance Service Diversions	1	item	500,000	500,000		500,000		500,000
22	Ticketing - Provisional Allowance	1	item	500,000	500,000		500,000		500,000
23	POSSESSIONS AND TRACK SAFETY								
	Possessions								
	Allowance for Possessions and Bussing	8	dys	200,000.00	1,600,000		1,600,000		
	Allowance Safety	8	dys	5,000.00	40,000		40,000		
	TOTAL POSSESSIONS AND TRACK SAFETY				1,640,000			1,640,000	
24	NEW RAIL PASSING LOOP TRACK								
	New 60kg track, PCC Sleepers and Ballast	1,812	m	951.05	1,723,307		1,723,307		Possible cost saving if timber 2nd hand timber and rail is available
	150mm capping layer - 20mm and fines	1,903	m3	55.30	105,214		105,214		
	Delivery and off loading of track from the Melbourne area	0	dy	40,000.00	0		0		Included as part of main track work
	Allowance for connecting to existing track	0	item	100,000.00	0		0		Included as part of main track work
	Allowance for "low speed" turnouts at either end of track including connecting to main track	2	item	300,000.00	600,000		600,000		Low speed turnouts assumed to be 40kph 1:9
	Rail Passing Loop Signals								
	Signalling and Control	1	Item		943,826		943,826		Based on ARTC cost information and assumed to include cable management system
	Communications Systems	1	Item		216,539		216,539		
	TOTAL NEW RAIL PASSING LOOP TRACK				3,588,886			3,588,886	
	SUBTOTAL							41,085,267	
	Prelims at 20%				8,217,053			8,217,053	
	Overhead and Profit at 12%				5,916,278			5,916,278	
	Design Costs at 9%				3,697,674			3,697,674	
	Total Construction Costs							58,916,273	
	Contingency @ 30%	1.00	item	17,674,881.76	17,674,882			17,674,882	
	Acquisition of Land								
	Agricultural Land	82.00	acre	1,250.00	102,500				Area and rate as advised by Aurecon - updated 4/6/2013
	Area dispute allowance at 25%				25,625				
	Solatium / Consultation Payment of 10%				12,813				
					<u>140,938</u>			140,938	
	Industrial Land acquisition costs	102,900.00	m2	20.00	2,058,000				Area and rate as advised by Aurecon
	Legal Fee Allowance				205,800				
					<u>2,263,800</u>			2,263,800	
	Total							20,079,619	
	TOTAL PROJECT COSTS							78,995,892	

Code	Description	Quantity	UOM	Rate	Subtotal	Factor	Total	Total	Comments
312178	HORSHAM RAIL BYPASS PLANNING PROJECT								

Below the Line Items

The following items are below the line items that are not included with in the estimate but require additional consideration

Ticketing

1 Aquenta have included a Provisional Allowance of \$500k in the estimate. Aquenta notes that further advice should be sought from the Transit Ticketing Agency to identify their requirements as the provisional sum allowed for in the estimate may not be sufficient.

Cat C and Cat B Ground Conditions

2 There is no allowance within the estimate for the disposal of contaminated soils. The cost impact to this project of treating contaminated soil could be significant and Aquenta advise that additional work is carried out to establish the potential cost to this project.

Risk Items

1 The estimate assumes that suitable spoil for the raised embankment can be obtained free of charge from a local "borrow pit" situated within an appropriate radius of the works. If the material is unavailable or unsuitable then cost may increase significantly.

2 Existing soil conditions. The type and make up of the existing ground conditions is unclear. Hence Aquenta's estimate is based upon typical ground conditions and makes no allowance for rock floaters or rock excavation.

The quantities of imported fill for the earth embankments are based upon the details provided and any changes to the final levels could have a significant impact upon the Earthworks costs

ARTC Recent Projects

	Year Delivered	Signals Direct (\$,000)	Civil and Track Direct (\$,000)	Materials Direct (\$,000)	General Directs (\$,000)	Design (\$,000)	Indirects (\$,000)	Other (\$,000)	Total (\$,000)
Passing Lane 4 - Tallarook (North East Victoria)	2008	\$ 2,229	\$ 6,217	\$ 2,491	\$ 3,136	\$ 2,257	\$ 3,736	\$ 1,677	\$ 21,743
Gerringhap to Maroona loops	2012	\$ 2,000	\$ 2,700	\$ 350	\$ 550	\$ 1,300	\$ 1,000	\$ 200	\$ 8,100

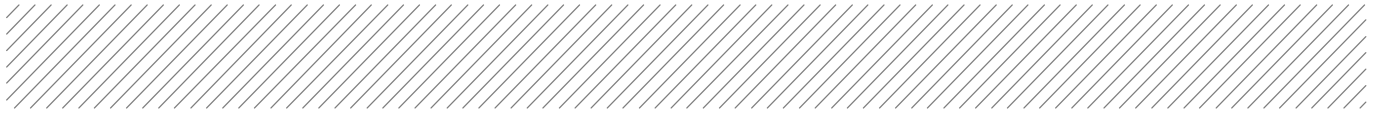
Signals ARTC

Project 1 = 6.8km
Project 2 = 2.2km

Escalation = 3.3%/yr

	2008	2009	2010	2011	2012	2013
Project 1 = 6.8km	2,229,000	2,302,557	2,378,541	2,457,033	2,538,115	2,621,873
Project 2 = 2.2km	2,000,000					2,066,000
						4,687,873
						520,875 \$/km

9 km = 6.8+2.2=9km



Appendix F2

Cost Estimate – Rail over road

Gareth Hood
Senior Civil Engineer
Aurecon
Aurecon Centre Level 8
850 Collins Street
Docklands
Vic 3008

12 June 2013
REF 312178/1038

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A Q U E N T A . C O M . A U

Dear Gareth

HORSHAM RAIL BYPASS PLANNING PROJECT CONCEPT COST ESTIMATE

Aquenta Consulting has been engaged by Aurecon to prepare a Concept Cost Estimate for the Horsham Rail Bypass Planning Project.

Subject to the comments in this letter, Aquenta's estimate of the construction costs is in the order of \$98,775,438 (excluding costs for the disposal of contaminated soils to the existing railway track and Horsham City Centre).

This report discusses the development of the construction and project costs along with a suitable allowance for contingency based on the following:

- The base date for the Estimate is January 2013
- A Construct Only Contract delivery

The construction costs include all allowances that a Contractor would make in a competitive tender for this Project to be delivered using the Construct Only delivery method. For the purposes of the preparation of the Estimate the design has been provided by Aurecon to Aquenta Consulting.

The Estimate is based on information collated from various sources including:

- Design drawings and information supplied to Aquenta.
- Email of scope options and changes and signalling cost dated 2 May 2013.

MAIN SCOPE ITEMS

The main scope items are set out below;

- The construction of approximately 11.1 Km of new track using 60Kg Rail and Precast Concrete Sleepers;
- Earthwork embankment;
- Five (five) rail over road grade separations;
- Three (3) box culverts for storm water drainage;

- A basic station, with a ticket office, two waiting shelters, toilets parking for 20 vehicles;
- The construction of a new 180 metre long X 4 metre wide platform;
- The removal of approximately 17.6 Km of existing track, sleepers and ballast;
- The establishment of a of 2 Km cycle path to the existing track;
- Topsoiling and seeding to the new track and existing track corridors;
- The construction of approximately 1.812 Km of new passing loop track including “low speed” turnouts at both ends to match existing; and
- Topsoiling and seeding to the new passing loop track.

Code	Description	Quantity	UOM	Rate	Total
312178	HORSHAM BYPASS PLANING PROJECT				
1	Earth Works	1	item	9,276,252	9,276,252
2	Roads	100	m	13,551	1,355,089
3	Rail Over Road Grade Separations	5	item	394,200	1,971,000
4	Culverts	3	item	243,600	730,800
5	Signalling, Communications and Control Systems	11.1	Km	640,378	7,108,195
6	Track	11,100	m	1,047	11,621,205
7	Level Crossings	1	item	2,510,500	2,510,500
8	Groundcover				
	Groundcover to track corridors	752,675	m2	6	4,539,050
9	Fencing	22,200	m	7	164,416
10	Cycle Path	1,965	m	154	302,088
	New Basic Station				
11	Ticket Office	1	item	127,500	127,500
12	Waiting Shelter	1	item	50,000	50,000
13	Toilets	1	item	59,500	59,500
14	Services	1	item	60,000	60,000
15	Landscaping	1	item	237,289	237,289
16	Fencing	1	item	4,404	4,404
17	Electrical and HV Power Supply	1	item	1,135,475	1,135,475
18	ICT	1	item	80,000	80,000
	Subtotal - New Station			1,754,168	
19	Platform	180	m	6,112	1,100,176
20	Demolition	1	Item	2,922,090	2,922,090
21	Allowance Service Diversions	1	Item	500,000	500,000
22	Ticketing - Allowance Only	1	Item	500,000	500,000
23	Allowance Possessions and Track Safety	1	Item	1,640,000	1,640,000
24	New Passing Loop Track including Signalling and Comms	1.81	Km	1,980,621	3,588,886
	TOTAL OF DIRECT COSTS				51,583,914
	Prelims at 20%	1	Item	10,316,783	10,316,783
	Overhead and Profit at 12%	1	Item	7,428,084	7,428,084
	Design Costs at 9%	1	Item	4,642,552	4,642,552
	TOTAL OF INDIRECTS COSTS				22,387,419
	TOTAL OF DIRECTS AND INDIRECT COSTS				
	Contingency @ 30%	1.00	item	22,191,399.73	22,191,400
	CONSTRUCTION CONTINGENCY				22,191,400
	Land Acquisition - Agricultural Land (Includes 25% Area Dispute and 10% solatium payment and 10% legal fees	1.00	item	348,906.00	348,906
	Land Acquisition - Industrial Land includes a 10% legal fee allowance	1.00	item	2,263,800.00	2,263,800
	LAND AQUISITION				2,612,706
	TOTAL PROJECT COSTS				98,775,438

METHODOLOGY

The scheduled item costs for the construction estimate have been built up using a combination of First Principles and Standard Unit Rates and benchmarked against projects of a similar nature. The Estimate relies on details that have been provided to Aquenta by Aurecon, and with Aquenta's experience on similar projects in the past.

Aquenta was provided with signalling cost information (provided by ARTC). This cost information was derived from recent ARTC projects. Aquenta has based the signal cost per Km on an average of the Signals Direct cost for the 2 projects in 2013 dollars. Refer to Appendix for details of ARTC project costs.

Aquenta has collated the above information to establish the Project requirements and has provided the basis to generate the Concept Design Estimate.

MAIN ASSUMPTIONS

The following main assumptions have been made in the preparation of the Estimate:

BORROW PITS – The assumption has been made that material for the construction of the earth embankments can be procured locally with 80% of the imported material being sourced from a local borrow pit and the remaining 20% imported by road at the rate of \$ 23/m3.

GRADE SEPARATION AND CULVERTS – The design of the culverts and grade separations is based upon recently completed projects.

SIGNALLING - The cost information regarding signalling was derived from recent ARTC projects. Aquenta has assumed this to be correct and has based the signal cost per Km on an average of the Signals Direct cost for the 2 projects in 2013 dollars. Refer to Appendix for details of ARTC project costs. As advised by Aurecon, the cost for cable management systems is assumed to be included in the signalling cost per Km.

COMMUNICATIONS SYSTEMS - As noted in the detailed estimate.

TICKETING – A provisional allowance of \$500k has been included for ticketing. Aquenta suggest further advice is sought from the Transit Ticketing Agency to confirm their requirements.

GROUND CONDITIONS - The type and makeup of the existing ground conditions is unclear. Aquenta's estimate is based upon typical ground conditions and makes no allowance for rock floaters or rock excavation.

CONTAMINATED GROUND– There is no allowance within the estimate for the disposal of contaminated soils. Aquenta advise that additional work is carried out to establish the potential cost to this project.

SEQUENCING

It has been assumed that the new track will be constructed prior to the demolition of the existing track.

PROJECT CONTINGENCY

The contingency consists of risk allowances from planned and unplanned assessments of various elements of the Project. These elements are:

- Uncertainty on schedule quantities – planned risk

- Uncertainty on events affecting the Project – unplanned risk

Considering the level of design at this stage of the design development Aquenta believe a contingency of 30% is appropriate. Moving forward Aquenta recommend that a more detailed approach to risk identification and quantification be undertaken to give a more robust risk adjusted project cost.

OPPORTUNITIES

Aquenta believe there may be a number of opportunities to reduce costs. These opportunities are identified below:

- The use of recycled track and timber sleepers should they be available and comply with track specifications at the time the works are constructed.

MAIN RISKS

Aquenta suggest that additional work is carried out to identify and quantify the main risk to the project.

CONTAMINATED GROUND – Aquenta strongly recommend that additional work is carried out to establish the extent and suitable method of disposal of contaminated material. From experience gained on recent completed projects the existing track ballast, sub-grade and a percentage of the capping layer may be classified as Class B. If Class A to Class C is present onsite environmental legislation will either require disposal to a Licensed Landfill Site or treatment locally. The estimate makes no allowance for the treatment or disposal as the costs may run into the hundreds of millions for the latter.

ESCALATION

The base date for this estimate is January 2013. Escalation has not been applied to this estimate.

Subject to the comments in this letter, Aquenta believe the Concept Budget Estimate for this Project is within the order of \$ 98,775,438.

Should you have any questions do not hesitate to contact us.

Yours sincerely

Aquenta Consulting



Sarah Benfield
Associate

Appendix 1: BUDGET COSTS ESTIMATE



312178 - HORSHAM RAIL BYPASS PLANNING PROJECT

Code	Description	Quantity UOM	Rate	Total	
312178	HORSHAM BYPASS PLANING PROJECT				
1	Earth Works	1 item	9,276,252	9,276,252	
2	Roads	100 m	13,551	1,355,089	
3	Rail Over Road Grade Separations	5 item	394,200	1,971,000	
4	Culverts	3 item	243,600	730,800	
5	Signalling, Communications and Control Systems	11.1 Km	640,378	7,108,195	
6	Track	11,100 m	1,047	11,621,205	
7	Level Crossings	1 item	2,510,500	2,510,500	
8	Groundcover				
	Groundcover to track corridors	752,675 m2	6	4,539,050	
9	Fencing	22,200 m	7	164,416	
10	Cycle Path	1,965 m	154	302,088	
	New Basic Station				
11	Ticket Office	1 item	127,500	127,500	
12	Waiting Shelter	1 item	50,000	50,000	
13	Toilets	1 item	59,500	59,500	
14	Services	1 item	60,000	60,000	
15	Landscaping	1 item	237,289	237,289	
16	Fencing	1 item	4,404	4,404	
17	Electrical and HV Power Supply	1 item	1,135,475	1,135,475	
18	ICT	1 item	80,000	80,000	
	Subtotal - New Station		1,754,168		
19	Platform	180 m	6,112	1,100,176	
20	Demolition	1 Item	2,922,090	2,922,090	
21	Allowance Service Diversions	1 Item	500,000	500,000	
22	Ticketing - Allowance Only	1 Item	500,000	500,000	
23	Allowance Possessions and Track Safety	1 Item	1,640,000	1,640,000	
24	New Passing Loop Track including Signalling and Comms	1.81 Km	1,980,621	3,588,886	
TOTAL OF DIRECT COSTS				51,583,914	51,583,914
	Prelims at 20%	1 Item	10,316,783	10,316,783	
	Overhead and Profit at 12%	1 Item	7,428,084	7,428,084	
	Design Costs at 9%	1 Item	4,642,552	4,642,552	
TOTAL OF INDIRECTS COSTS				22,387,419	22,387,419
TOTAL OF DIRECTS AND INDIRECT COSTS				73,971,332	73,971,332
	Contingency @ 30%	1.00 item	22,191,399.73	22,191,400	
CONSTRUCTION CONTINGENCY				22,191,400	22,191,400
	Land Acquisition - Agricultural Land (Includes 25% Area Dispute and 10% solatium payment and 10% legal fees	1.00 item	348,906.25	348,906	
	Land Acquisition - Industrial Land includes a 10% legal fee allowance	1.00 item	2,263,800.00	2,263,800	
LAND AQUISITION				2,612,706	2,612,706
TOTAL PROJECT COSTS				98,775,438	98,775,438

Comments

The Signalling costs are based upon cost data provided by ARTC. These costs are assumed to include cable management systems.

Below the line items

There is now allowance within the estimate for the disposal of contaminated soils. Aquenta advise that additional work is carried out to establish the potential cost to this project.

Risk Items

The quantities of imported fill for the earth embankments are based upon the details provided and any changes to the final levels could have a significant impact upon the Earthworks costs.

The rate of \$15m3 has been used for the imported fill to the track embankment. This assumes that suitable material can be obtained from a local borrow pit within an appropriate radius of the works.

The rate of \$23m3 has been used for imported fill to the earth embankments, this rate could fluctuate significantly depending on the availability of a suitable source.

Existing soil conditions. The type and make up of the existing ground conditions is unclear. Hence Aquenta's estimate is based upon typical ground conditions and makes no allowance for rock floaters or rock excavation.

312178 - HORSHAM RAIL BYPASS PLANNING PROJECT

Code	Description	Quantity	UOM	Rate	SubTotal	Factor	Total	Total	Comments
312178	HORSHAM RAIL BYPASS PLANING PROJECT								
1	EARTH WORKS								
	Earthworks to New Rail Corridor								
	Site Preparation	621,600	m2	1.35	839,160		839,160		Assumed a corridor width of 56m
	Topsail	64,680	m3	2.10	135,828		135,828		Assumed a corridor width of 56m
	Bulk Earthworks								
	Locally Imported Bulk Fill Material	298,304	m3	15.00	4,474,560		4,474,560		Assumed a local borrow pit can be established and fill material will be obtained locally.
	Imported Bulk Fill Material by road	74,576	m3	22.00	1,640,672		1,640,672		Assumed that 20% of suitable imported fill can be sourced locally and imported by road
	Extra over - Engineered subgrade 1.5m deep	133,200	m3	2.00	266,400		266,400		
	Cut and Fill to at grade	97,200	m3	16.00	1,555,200		1,555,200		Assumed 5400m x 9m wide and 1 m deep
	MISC								
	Ground Water Management	1	item	30,000.00	30,000		30,000		
	Allowance for environmental controls	1	item	100,000.00	100,000		100,000		
	Open Drain	1	item	234,432	234,432		234,432		
	TOTAL EARTH WORKS				9,276,252			9,276,252	
2	ROADS								
	Roads								
	Access Track								
	*1.1km of crushed rock access track								
	Excavation	11,655	m3	9.00	104,895		104,895		
	Pavement crushed Rock								
	Allow for surface prep	38,850	m2	5.00	194,250		194,250		
	300t/m compacted crushed rock	11,655	m3	86.00	1,002,330		1,002,330		
	Geotextile	44,678	m2	1.20	53,614		53,614		
	TOTAL ROADS				1,355,089			1,355,089	
3	RAIL OVER ROAD GRADE SEPARATIONS								
	Rail Over Road Bridge								
	Assume the bridge deck is 12m long and 7m wide with a 1.2m wide Walkway	5	No.	394,200.00	1,971,000		1,971,000		Assume the bridge deck is 12m long and 7m wide with a 1.2m wide Walkway
	TOTAL RAIL OVER ROAD GRADE SEPARATIONS				1,971,000			1,971,000	
4	CULVERTS (STORM DRAINAGE)								
	Bridge Culvert								
	Bridge Culvert assumed to be 2.4m wide x 12m	3	Item	243,600.00	730,800		730,800		
	TOTAL CULVERTS				730,800			730,800	
5	SIGNALLING, COMMUNICATIONS AND CONTROL SYSTEMS								
	Signalling and Control	1	Item		5,781,713		5,781,713		Based on ARTC cost information and assumed to include cable management system
	Communications Systems	1	Item		1,326,482		1,326,482		
	Cable Management Systems	0	Item		0		0		
	TOTAL SIGNALLING, COMMUNICATIONS AND CONTROL SYSTEMS				7,108,195			7,108,195	
6	TRACK								
	Track								
	New 60kg track, PCC Sleepers and Ballast	11,100	m	951.05	10,556,683		10,556,683		Possible cost saving if timber 2nd hand timber and rail is available
	*150mm capping layer - 20mm and fines	11,655	m3	55.30	644,522		644,522		
	Assume that (No. 2 x 4) 8 days for the delivery and off loading of track from the Melbourne area	8	dy	40,000.00	320,000		320,000		
	Allowance for connecting to existing track	1	item	100,000.00	100,000		100,000		
	TOTAL TRACK				11,621,205			11,621,205	
7	LEVEL CROSSINGS								
	Active Crossing								
	Allow new active level crossing to Wail Dooen Rd Henty Highway	1	item	2,500,000.00	2,500,000		2,500,000		Allowance - additional investigation required
	Existing boom barriers, hence, allowance to upgrade signage and line marking only								
	Signs	4	No.	500.00	2,000		2,000		
	Signs	2	No.	1,500.00	3,000		3,000		
	Line Marking	3	dys	900.00	2,700		2,700		
	Traffic management	2		1,400.00	2,800		2,800		
	TOTAL LEVEL CROSSINGS				2,510,500			2,510,500	
8	GROUND COVER								
	Ground cover								
	Top Soil and seed to:								
	New Track Corridor	532,800	m2	6.00	3,196,800		3,196,800		
	Existing Corridor	219,875	m2	6.00	1,319,250		1,319,250		
	Allowance for Tree Planting and tube stocks								
	New Corridor - (Approx 200No. Tube stocks)	2,000	No.	5.75	11,500		11,500		
	Existing Corridor - (Approx 2000No. Tube stocks)	2,000	No.	5.75	11,500		11,500		
	TOTAL GROUND COVER				4,539,050			4,539,050	
9	FENCING								
	Fencing								
	Rural wire fencing 1.2m high 5 strands to both sides of the track	22,400	m	7.34	164,416		164,416		
	TOTAL FENCING				164,416			164,416	
10	CYCLE PATH								
	Cycle Path 2.5m wide								
	Plant and equipment set up costs	5	Item	2,900.00	14,500		14,500		
	*40thk Asphalt supply and sub base	4,913	m2	65.00	270,188		270,188		
	Traffic Management	5	dys	1,730.00	8,650		8,650		
	Signs	15	No.	500.00	7,500		7,500		
	Signs	5.00	No.	250.00	1,250		1,250		
	TOTAL CYCLE PATH				302,088			302,088	
11	NEW BASIC TABALE								
	TICKET OFFICE								
	Ticket office								
	Roof	30	m2	650.00	19,500		19,500		
	Say 5m Long x 6m Wide x 3mHeight	30	m2	2,650.00	79,500		79,500		
	Fit out ticket office	30	m2	950.00	28,500		28,500		
	TOTAL TICKET OFFICE				127,500			127,500	
12	WAITING SHELTER								
	Bus and Platform Waiting Shelter								
	Light weight waiting shelter	2	Item	25,000.00	50,000		50,000		
	TOTAL WAITING SHELTER				50,000			50,000	
13	TOILETS								
	Toilets								
	Roof	14	m2	650.00	9,100		9,100		
	Say 5m Long x 6m Wide x 3mHeight	14	m2	2,650.00	37,100		37,100		
	Fit out ticket office	14	m2	950.00	13,300		13,300		
	TOTAL TOILETS				59,500			59,500	
14	SERVICES								
	Services								
	Allow Drainage	1	item	20,000.00	20,000		20,000		
	Allow Solar Hot Water	1	item	20,000.00	20,000		20,000		
	Allow rain Water Harvesting	1	item	20,000.00	20,000		20,000		
	TOTAL SERVICES				60,000			60,000	
15	GROUND COVER								
	Hard Landscaping								
	Allowance for asphaltting to Car	1,499	m2	101.00	151,399		151,399		
	Allowance Pedestrian pavement	120	m2	192.00	23,040		23,040		
	Allowance Kerb	285	m	120.00	34,200		34,200		
	Allowance for Drainage	1	item	15,000.00	15,000		15,000		
	STREET FURNITURE								
	Furniture								
	Benches	2	no.	1,200.00	2,400		2,400		
	Dust Bins	2	No.	700.00	1,400		1,400		
	Allowance for signs Larqe	2	No.	1,500.00	3,000		3,000		
	Medium	5	No.	500.00	2,500		2,500		
	Small	3	No.	250.00	750		750		

Bollards	6 No.	600.00	3,600	3,600	
TOTAL			237,289	237,289	
16 FENCING					
Fencing to Station					
Rural 5 strand chain link fence	600	7.34	4,404	4,404	
TOTAL FENCING			4,404	4,404	
17 ELECTRICAL AND HV OVERHEAD SUPPLY					
Station Electrical Works					
Supply and install 11kv overhead line (2km)	2,000 m	480.00	960,000	960,000	
Pole mount transformer	1 no.	35,440.00	35,440	35,440	
Steel conduit cover to pole	1 no.	235.00	235	235	
Trenching and backfill of trench from pole to building switchboard (20m)	20 m	65.00	1,300	1,300	
Cable and conduit from transformer to switchboard	25 m	20.00	500	500	
Installation of conduit and cable	1 item	1,360.00	1,360	1,360	
Building Electrical					
Switchboard	1 item	1,830.00	1,830	1,830	
Main switch and C/B's	6 no.	890.00	5,340	5,340	
Ticket machine feed and connection	1 no.	270.00	270	270	
Power outlets	6 item	230.00	1,380	1,380	
Internal lighting (fluro light fittings)	4 no.	370.00	1,480	1,480	
Comms power	1 item	200.00	200	200	
External lighting	2 item	570.00	1,140	1,140	
Miscellaneous Materials (trav, supports etc)	1 item	1,000.00	1,000	1,000	
Allowance of pole mounted light columns	4 no.	8,500.00	34,000	34,000	
Lighting to Platform	720 m2	125.00	90,000	90,000	
ELECTRICAL AND HV OVERHEAD SUPPLY			1,135,475	1,135,475	
18 ICT					
CCTV	1 item	20,000.00	20,000	20,000	
Allowance for PID's	2 no.	30,000.00	60,000	60,000	
ICT			80,000	80,000	
19 PLATFORM					
New Platform					
Platform 180m long and 4m wide					
Piling	60 No.	4,000.00	240,000	240,000	
Capping Beam, with PCC Slabs and Steel Framing.	180 m	4,612.09	830,176	830,176	
Coping Stone, Tactile, Asphalt Wearing Course					
Access Ramp	1 item	10,000.00	10,000	10,000	
Stair	2 No.	10,000.00	20,000	20,000	
TOTAL PLATFORM			1,100,176	1,100,176	
20 DEMOLITION					
DEMOLITION					
Existing Buildings to City Centre	1 item		345,040	345,040	
Removal of existing track, ballast and sleepers	1 item		2,327,050	2,327,050	
Allowance for decommissioning existing services	1 item		250,000	250,000	
TOTAL DEMOLITION			2,922,090	2,922,090	
21 Allowance Service Diversions	1 item	500,000	500,000	500,000	500,000
22 Ticketing - Provisional Allowance	1 item	500,000	500,000	500,000	500,000
23 POSSESSIONS AND TRACK SAFETY					
Possessions					
Allowance Possessions and bussing	8 dys	200,000.00	1,600,000	1,600,000	
Allowance Safety	8 dys	5,000.00	40,000	40,000	
TOTAL POSSESSIONS AND TRACK SAFETY			1,640,000	1,640,000	
24 NEW RAIL PASSING LOOP TRACK					
New 60kg track, PCC Sleepers and Ballast	1,812 m	951.05	1,723,307	1,723,307	Possible cost saving if timber 2nd hand timber and rail is available
*150mm capping layer - 20mm and fines	1,903 m3	55.30	105,214	105,214	
Delivery and off loading of track from the Melbourne area	0 dy	40,000.00	0	0	Included as part of main track work
Allowance for connecting to existing track	0 item	100,000.00	0	0	Included as part of main track work
Allowance for "low speed" turnouts at either end of track including connecting to main track	2 item	300,000.00	600,000	600,000	Low speed turnouts assumed to be 40kph 1:9
Rail Passing Loop Signals					
Signalling and Control	1 Item		943,826	943,826	Based on ARTC cost information and assumed to include cable management system
Communications Systems	1 item		216,539	216,539	
TOTAL NEW RAIL PASSING LOOP TRACK			3,588,886	3,588,886	
SUBTOTAL				51,583,914	
Prelims at 20%			10,316,783	10,316,783	
Overhead and Profit at 12%			7,428,084	7,428,084	
Design Costs at 9%			4,642,552	4,642,552	
Total Construction Costs				73,971,332	
Contingency @ 30%	1.00 item	22,191,399.73	22,191,400	22,191,400	
Acquisition of Land					
Agricultural Land	203.00 acre	1,250.00	253,750		Area and rate as advised by Aurecon - updated 4/6/2013
Area dispute allowance at 25%			63,436		
Solatum / Consultation Payment of 10%			31,719		
			<u>348,906</u>	348,906	
Industrial Land aquisition costs	102,900.00 m2	20.00	2,058,000		Area and rate as advised by Aurecon
Legal Fee Allowance			<u>205,800</u>		
			<u>2,263,800</u>	2,263,800	
Total				24,804,106	
TOTAL PROJECT COSTS				88,775,438	

Below the Line Items

The following items are below the line items that are not included with in the estimate but require additional consideration:

Ticketing

- 1 Aquenta suggest Provisional Allowance of \$500k is included and advice sought from the Transit Ticketing Agency to identify their requirements.

Cat C and Cat B Ground Conditions

- 2 There is no allowance within the estimate for the disposal of contaminated soils. The cost impact to this project of treating contaminated soil could be significant and Aquenta advise that additional work is carried out to establish the potential cost to this project.

Risk Items

- 1 The estimate assumes that suitable spoil for the raised embankment can be obtained free of charge from a local "borrow pit" situated within an appropriate radius of the works. If the material is unavailable or unsuitable then cost may increase significantly.
- 2 Existing soil conditions. The type and make up of the existing ground conditions is unclear. Hence Aquenta's estimate is based upon typical ground conditions and makes no allowance for rock floaters or rock excavation.
The quantities of imported fill for the earth embankments are based upon the details provided and any changes to the final levels could have a significant impact upon the Earthworks costs

ARTC Recent Projects

	Year Delivered	Signals Direct (\$,000)	Civil and Track Direct (\$,000)	Materials Direct (\$,000)	General Directs (\$,000)	Design (\$,000)	Indirects (\$,000)	Other (\$,000)	Total (\$,000)
Passing Lane 4 - Tallarook (North East Victoria)	2008	\$ 2,229	\$ 6,217	\$ 2,491	\$ 3,136	\$ 2,257	\$ 3,736	\$ 1,677	\$ 21,743
Create new 6.8km long passing lane with high speed (1:18.5) turnouts, 80km/h entry and exit. 6.8km of new track, on widened formation, new structures across waterways and existing rail over road bridges. Home signals, outer homes and distant signals with microtrax track circuits. Includes new mains power connections, generated backup to points and signals. New 60kg rail, concrete sleepers.									
Gerringhap to Maroona loops	2012	\$ 2,000	\$ 2,700	\$ 350	\$ 550	\$ 1,300	\$ 1,000	\$ 200	\$ 8,100
Create new 2.2km loop on existing mainline with 65km/h turnouts on newly widened formation. Minor culverts at location of existing waterways. New medium speed signalling on loop entry. Free issue serviceable rail and sleepers.									

Signals ARTC

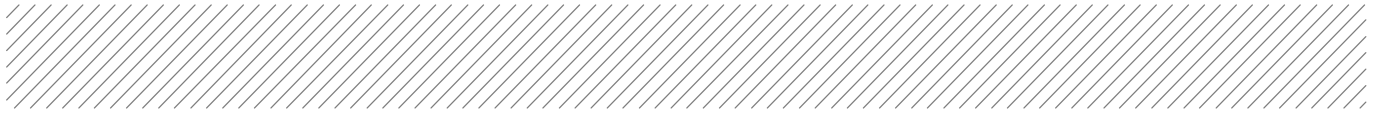
Project 1 = 6.8km
Project 2 = 2.2km

Escalation = 3.3%/yr

	2008	2009	2010	2011	2012	2013
Project 1 = 6.8km	2,229,000	2,302,557	2,378,541	2,457,033	2,538,115	2,621,873
Project 2 = 2.2km	2,000,000					2,066,000
						4,687,873
						520,875 \$/km

9 km

=6.8+2.2=9km



Appendix G

ARTC Master Train Plan

TRAIN NO	7768V	2MP9	9791V	D793V	1WX2	2MA5	2MP1	2MP5	3MP9	7770V
LENGTH (Metres)	520	1500	1500	1500	1500	1500	1500	1500	1500	520
DAYS	MON	MON	MON	MON	MON	MON	MON	MON	TUE	TUE
SCHEDULE	EXP	SFR	SFR	SFR	EXP	SFR	SFR	SFR	SFR	EXP
STATUS	M	M	M	M	M	M	M	M	M	M
OPERATOR	ELZ	SCT	INTR	INTR	PND	PNT	INTR	PNT	SCT	ELZ
COMMODITY	GENFRGT	INTERMODAL	INTERMODAL	LGHTENG	STEEL	INTERMODAL	INTERMODAL	INTERMODAL	INTERMODAL	GENFRGT
Tottenham	arr									
	dep		10:03	15:30	23:36	18:29	20:48	21:49		
ANZAC Siding	arr									
	dep		10:14	15:41	23:48	18:40	20:58	22:00		
SCT - Laverton Loop	arr		10:30	15:57						
	dep	17:00	-----	-----	00:06	18:55	21:13	22:15	19:25	
Manor Loop	arr									
	dep	17:20			00:14	19:03	21:21	22:23	19:45	
Elders Loop	arr	17:35								
	dep	17:51			00:28	19:17	21:35	22:37	19:59	
North Shore Platform	arr									
	dep	17:56			00:33	19:21	21:39	22:41	20:03	
Anakie Loop	arr									
	dep	18:00			00:37	19:25	21:43	22:45	20:07	
Moorabool Loop	arr									
	dep	18:03			00:40	19:28	21:46	22:48	20:10	
Gheringhap Loop	arr									
	dep	18:12			00:49	19:37	21:55	22:57	20:19	
Barwon Park Loop	arr									
	dep	18:30			01:08	19:55	22:13	23:15	20:37	
Wingeel Loop	arr									
	dep	18:38			01:17	20:03	22:21	23:23	20:45	
Berrybank Loop	arr									
	dep	19:01			01:47	20:26	22:44	23:46	21:08	
Vite Vite Loop	arr									
	dep	19:26			02:13	20:51	23:09	00:11	21:33	
Tatyoan Loop	arr									
	dep	19:54			02:45	21:19	23:37	00:39	22:01	
Maroona	arr									
	dep	01:41	20:04		02:58	21:29	23:47	00:49	22:11	01:21
Ararat Siding	arr									
	dep	01:59	20:17		03:16	21:42	00:00	01:02	22:24	01:39
Pyrenees Loop	arr									
	dep	02:03	20:24		03:21 04:08	21:49	00:07	01:09	22:31	01:43
Great Western Loop	arr									
	dep	02:18	20:37		04:24	22:02	00:20	01:22	22:44	01:58
Stawell	arr									
	dep	02:24	20:42		04:30	22:07	00:25	01:27	22:49	02:04
Deep Lead	arr	02:36								
	dep	02:59	20:52		04:41	22:17	00:35	01:37	22:59	02:15
Lubeck	arr									
	dep	03:19	21:07		05:00	22:32	00:50	01:52	23:14	02:34
Murtoa Station	arr	03:35								02:50
	dep	-----	21:18		05:15	22:43	01:01	02:03	23:25	-----
Murtoa Loop	arr									
	dep		21:22		05:20	22:47	01:05	02:07	23:29	
Wimmera Intermodal	arr									
	dep		21:29		05:30	22:54	01:12	02:14	23:36	
Horsham	arr									
	dep		21:36		05:38	23:01	01:19	02:21	23:43	
Pimpinio Loop	arr									
	dep		21:52		05:56 06:38	23:17	01:35	02:38	23:59	
Dimboola Station	arr									
	dep		22:03		06:51 06:57	23:29 23:34	01:47 01:52	02:50 02:55	00:11 00:16	
Dimboola Loop	arr									
	dep		22:07		07:03	23:39	01:57	03:00	00:21	
FORMS OR DESTINATION	TERM	PER	TERM	TERM	SJC	IFT	PER	PER	PER	TERM

TRAIN NO	9721V	9719V	9781V	3MA8	3MP4	D793V	9783V	3MA5	3MP1	3MP5
LENGTH (Metres)	800	700	1500	250	1500	1500	250	1500	1500	1500
DAYS	TUE	TUE	TUE	TUE	TUE	TUE	TUE	TUE	TUE	TUE
SCHEDULE	SFR	SFR	EXP	PAS	SFR	SFR	SFR	SFR	SFR	SFR
STATUS	M	M	M	M	M	M	M	M	M	M
OPERATOR	SBR	SPS	PNT	GSR	PNT	INTR	PNT	PNT	INTR	PNT
COMMODITY	GENFRGT	GENFRGT	INTERMODAL	GSR-PASS	INTERMODAL	LGHTENG	INTERMODAL	INTERMODAL	INTERMODAL	INTERMODAL
Tottenham	arr									
	dep									
ANZAC Siding	arr		05:32	08:28	13:54	15:30	16:36	18:29	20:42	21:49
	dep		05:57				17:00			
SCT - Laverton Loop	arr	01:28	-----	08:36	14:05	15:41	-----	18:40	20:53	22:00
	dep	06:07		08:46	14:20	15:57		18:55	21:08	22:16
Manor Loop	arr			08:56						
	dep	06:15		09:20	14:28			19:04	21:16	22:25
Elders Loop	arr	06:30								
	dep	06:48	02:05	09:32	14:42			19:19	21:30	22:39
North Shore Platform	arr			09:37						
	dep	06:53	02:09	09:42	14:46			19:23	21:34	22:43
Anakie Loop	arr									
	dep	06:57	02:13	09:47	14:50			19:27	21:38	22:47
Moorabool Loop	arr	07:00								
	dep	07:21	02:16	09:49	14:53			19:30	21:41	22:50
Gheringhap Loop	arr									
	dep	07:31	02:25	09:57	15:02			19:40	21:50	22:59
Barwon Park Loop	arr									
	dep	07:49	02:43	10:11	15:20			19:58	22:08	23:17
Wingeel Loop	arr									
	dep	07:57	02:51	10:18	15:28			20:06	22:17	23:25
Berrybank Loop	arr									
	dep	08:20	03:14	10:38	15:51			20:29	22:53	23:48
Vite Vite Loop	arr									
	dep	08:45	03:39	11:00	16:16			20:55	23:18	00:13
Tatyoan Loop	arr		04:08							
	dep	09:13	04:40	11:22	16:44			21:23	23:46	00:41
Maroona	arr		04:52							
	dep	09:23	05:26	11:29	16:54			21:34	23:56	00:51
Ararat Siding	arr			11:39						
	dep	09:36	05:40	11:41	17:07			21:48	00:10	01:05
Pyrenees Loop	arr	09:44								
	dep	10:05	05:47	11:45	17:14			21:55	00:17	01:12
Great Western Loop	arr									
	dep	10:19	06:00	11:56	17:27			22:08	00:31	01:26
Stawell	arr			12:02						
	dep	10:24	06:05	12:04	17:32			22:13	00:37	01:31
Deep Lead	arr									
	dep	10:34	06:15	12:14	17:42			22:23	00:48	01:42
Lubeck	arr	10:50								
	dep	11:11	06:30	12:27	17:57			22:38	01:04	01:58
Murtoa Station	arr									
	dep	11:23	06:41	12:37	18:08			22:49	01:16	02:10
Murtoa Loop	arr									
	dep	11:27	06:45	12:40	18:12			22:53	01:20	02:14
Wimmera Intermodal	arr	11:35								
	dep	-----		12:46	18:19			23:00	01:29	02:22
Horsham	arr		07:00	12:53						
	dep	-----	-----	12:55	18:26			23:07	01:36	02:29
Pimpinio Loop	arr									
	dep			13:08	18:42			23:23	01:52	02:48
Dimboola Station	arr			13:16	18:55			23:35	02:04	03:02
	dep			13:18	19:00			23:40	02:09	03:07
Dimboola Loop	arr									
	dep			13:22	19:05			23:45	02:14	03:12
FORMS OR DESTINATION	TERM	TERM	TERM	APT	PER	TERM	TERM	IFT	PER	PER

TRAIN NO	7768V	9721V	3MP7	3MA3	9719V	9791V	D793V	4MA5	4MP5	7770V
LENGTH (Metres)	520	800	1500	1500	700	1500	1500	1500	1500	520
DAYS	WED	WED	WED	WED	WED	WED	WED	WED	WED	THU
SCHEDULE	EXP	SFR	TRL	SFR	SFR	SFR	SFR	SFR	SFR	EXP
STATUS	M	M	M	M	M	M	M	M	M	M
OPERATOR	ELZ	SBR	PNT	PNT	SPS	INTR	INTR	PNT	PNT	ELZ
COMMODITY	GENFRGT	GENFRGT	INTERMODAL	INTERMODAL	GENFRGT	INTERMODAL	LGHTENG	INTERMODAL	INTERMODAL	GENFRGT
Tottenham	arr									
	dep		00:14	00:22	01:27	10:03	15:30	18:29	21:34	
ANZAC Siding	arr									
	dep		00:23	00:48	01:38	10:14	15:41	18:40	21:45	
SCT - Laverton Loop	arr									
	dep					10:30	15:57			
Manor Loop	arr	14:17	00:36	01:11	01:53			18:55	22:00	
	dep									
Elders Loop	arr	14:25	00:44	01:19	02:01			19:03	22:08	
	dep									
North Shore Platform	arr	14:39	00:55	01:33	02:15			19:17	22:23	
	dep									
Anakie Loop	arr	14:43	00:58	01:37	02:19			19:21	22:27	
	dep									
Moorabool Loop	arr	14:47	01:01	01:41	02:23			19:25	22:31	
	dep									
Gheringhap Loop	arr	14:50	01:03	01:44	02:26			19:28	22:35	
	dep									
Barwon Park Loop	arr	15:00	01:12	01:53	02:35			19:37	22:44	
	dep	15:21								
Wingee Loop	arr	15:40	01:29	02:11	02:53			19:55	23:02	
	dep									
Berrybank Loop	arr	15:48	01:36	02:19	03:01			20:03	23:10	
	dep	16:12								
Vite Vite Loop	arr	16:43	01:57	02:42	03:24			20:26	23:35	
	dep				03:50					
Tatyoona Loop	arr	17:09	02:19	03:07	04:25			20:51	00:01	
	dep				04:55					
Maroona	arr	17:37	02:44	03:35	05:25			21:19	00:30	
	dep				05:37					
Ararat Siding	arr	01:41	02:52	03:45	06:00			21:29	00:40	01:11
	dep									
Pyrenees Loop	arr	01:59	03:03	03:58	06:14			21:42	00:53	01:29
	dep									
Great Western Loop	arr	02:03	03:08	04:05	06:21			21:49	01:00	01:33
	dep			04:19						01:49
Stawell	arr	02:18	03:19	04:37	06:34			22:02	01:13	02:10
	dep									
Deep Lead	arr	02:24	03:24	04:43	06:39			22:07	01:18	02:17
	dep		03:35	04:54						
Lubeck	arr	02:35	04:15	05:09	06:49			22:17	01:28	02:28
	dep									02:48
Murtoa Station	arr	02:54	04:31	05:25	07:04			22:32	01:43	03:13
	dep	03:10								03:30
Murtoa Loop	arr	-----	04:41	05:36	07:15			22:43	01:54	-----
	dep				07:20					
Wimmera Intermodal	arr		04:44	05:40	07:44			22:47	01:58	
	dep	19:13								
Horsham	arr	-----	04:50	05:47	07:52			22:54	02:05	
	dep				08:00					
Pimpinio Loop	arr		04:55	05:54	-----			23:01	02:12	
	dep									
Dimboola Station	arr		05:09	06:10				23:17	02:28	
	dep		05:20	06:22				23:29	02:40	
Dimboola Loop	arr		05:25	06:27				23:34	02:45	
	dep							23:40		
	arr							23:58		
	dep		05:30	06:32				23:58	02:50	
FORMS OR DESTINATION	TERM	TERM	PER	PFL	TERM	TERM	TERM	IFT	PER	TERM

TRAIN NO	9721V	5MP9	3BA6	4WP2	9719V	9781V	5MA8	9791V	5MA6	D793V
LENGTH (Metres)	800	1500	1500	1500	700	1500	250	1500	1500	1500
DAYS	THU	THU	THU	THU	THU	THU	THU	THU	THU	THU
SCHEDULE	SFR	SFR	SFR	EXP	SFR	EXP	PAS	SFR	SFR	SFR
STATUS	M	M	M	M	M	M	M	M	M	M
OPERATOR	SBR	SCT	PNT	PND	SPS	PNT	GSR	INTR	INTR	INTR
COMMODITY	GENFRGT	INTERMODAL	INTERMODAL	STEEL	GENFRGT	INTERMODAL	GSR-PASS	INTERMODAL	INTERMODAL	LGHTENG
Tottenham	arr			11:06	01:27	05:32	08:28	10:03	14:15	15:30
ANZAC Siding	arr		09:43	11:18	01:38	05:57	08:36	10:14	14:26	15:41
SCT - Laverton Loop	arr					-----	08:46	10:30	14:42	15:57
Manor Loop	arr		10:07	11:36	01:53		08:56	-----	16:12	-----
Elders Loop	arr		10:15	11:44	02:01		09:20		16:21	
North Shore Platform	arr		10:30	11:58	02:15		09:32		16:35	
Anakie Loop	arr		10:43	12:03	02:19		09:37		16:39	
Moorabool Loop	arr		10:47	12:07	02:23		09:42		16:43	
Gheringhap Loop	arr		10:50	12:10	02:26		09:47		16:46	
Barwon Park Loop	arr		10:59	12:19	02:35		09:57		16:55	
Wingeel Loop	arr		11:17	12:38	02:53		10:11		17:13	
Berrybank Loop	arr		11:25	12:47	03:01		10:18		17:22	
Vite Vite Loop	arr		11:48	13:17	03:25		10:38		18:02	
Tatyoan Loop	arr		12:13	13:43	04:17		11:00		18:27	
Maroona	arr		12:41	14:16	05:23		11:21		18:55	
Ararat Siding	arr		12:51	14:30	05:40		11:28		19:05	
Pyrenees Loop	arr		13:04	14:49	06:04		11:38		19:18	
Great Western Loop	arr		13:11	14:53	06:11		11:45		19:25	
Stawell	arr		13:24	15:09	06:24		11:56		19:38	
Deep Lead	arr		13:29	15:15	06:29		12:02		19:43	
Lubeck	arr		13:39	15:26	07:00		12:04		19:53	
Murtoa Station	arr		13:54	15:45	07:16		12:14		20:09	
Murtoa Loop	arr		14:05	16:01	07:27		12:27		20:24	
Wimmera Intermodal	arr		14:09	16:06	07:32		12:37		20:36	
Horsham	arr		14:16	16:17	07:54		12:40		20:40	
Pimpinio Loop	arr		14:23	16:25	08:02		12:46		20:47	
Dimboola Station	arr		14:39	16:43	08:10		12:53		20:54	
Dimboola Loop	arr		14:51	16:55	-----		12:55		21:10	
	arr		14:56	17:00			13:08		21:22	
	arr		15:01	17:08			13:16		21:27	
	arr		01:23				13:18		21:32	
FORMS OR DESTINATION	TERM	PER	IFT	PER	TERM	TERM	APT	TERM	PFL	TERM

TRAIN NO	9783V	5MA5	5MP1	5MP5	7768V	6MP9	5WX2	5MP7	5MA3	9719V	
LENGTH (Metres)	250	1500	1500	1500	520	1500	1500	1500	1500	700	
DAYS	THU	THU	THU	THU	FRI	FRI	FRI	FRI	FRI	FRI	
SCHEDULE	SFR	SFR	SFR	SFR	EXP	SFR	EXP	TRL	SFR	SFR	
STATUS	M	M	M	M	M	M	M	M	M	M	
OPERATOR	PNT	PNT	INTR	PNT	ELZ	SCT	PND	PNT	PNT	SPS	
COMMODITY	INTERMODAL	INTERMODAL	INTERMODAL	INTERMODAL	GENFRGT	INTERMODAL	STEEL	INTERMODAL	INTERMODAL	GENFRGT	
Tottenham	arr										
	dep	16:36	18:29	20:45	21:44			11:08	00:04	01:05	01:42
ANZAC Siding	arr	17:00									
	dep	-----	18:40	20:56	21:56			11:20	00:13	01:20	01:53
SCT - Laverton Loop	arr								00:27		02:09
	dep		18:55	21:11	22:13	19:25	11:38	00:50	01:39		02:40
Manor Loop	arr								01:48		
	dep		19:03	21:19	22:21	19:45	11:46	00:59	02:15		02:49
Elders Loop	arr										
	dep		19:17	21:33	22:35	19:59	12:00	01:10	02:30		03:03
North Shore Platform	arr										
	dep		19:21	21:37	22:39	20:03	12:05	01:13	02:34		03:07
Anakie Loop	arr										
	dep		19:25	21:41	22:43	20:07	12:09	01:16	02:38		03:11
Moorabool Loop	arr										
	dep		19:28	21:44	22:46	20:10	12:12	01:18	02:41		03:14
Gheringhap Loop	arr										
	dep		19:37	21:53	22:55	20:19	12:21	01:27	02:50		03:23
Barwon Park Loop	arr										
	dep		19:55	22:11	23:13	20:37	12:40	01:44	03:08		03:41
Wingeel Loop	arr										
	dep		20:03	22:19	23:21	20:45	12:49	01:51	03:16		03:49
Berrybank Loop	arr										
	dep		20:26	22:42	00:05	21:08	13:29	02:12	03:39	04:13	05:10
Vite Vite Loop	arr										
	dep		20:51	23:08	00:31	21:33	13:56	02:34	04:05	05:37	05:58
Tatyoan Loop	arr										
	dep		21:20	23:36	00:59	22:01	14:28	03:00	05:10		06:27
Maroona	arr										
	dep		22:01	23:46	01:09	01:41	22:11	14:41	03:15	05:50	06:37
Ararat Siding	arr										
	dep		22:13	23:59	01:22	01:59	22:24	14:59	03:26	06:03	06:50
Pyrenees Loop	arr										
	dep		22:20	00:06	01:29	02:03	22:31	15:04	03:31	06:10	06:57
Great Western Loop	arr										
	dep		22:33	00:19	01:42	02:18	22:44	15:17	03:42	06:23	07:10
Stawell	arr										
	dep		22:38	00:24	01:47	02:24	22:49	15:33	03:47	06:28	07:15
Deep Lead	arr										
	dep		22:48	00:34	01:57	02:36	22:59	15:39	03:58	06:38	07:25
Lubeck	arr										
	dep		23:03	00:49	02:12	03:14	23:14	15:50	04:15	06:38	07:25
Murtoa Station	arr										
	dep		23:03	00:49	02:12	03:14	23:14	16:09	04:31	06:53	07:40
Murtoa Loop	arr										
	dep		23:14	01:00	02:23	-----	23:25	16:24	04:41	07:04	07:51
Wimmera Intermodal	arr										
	dep		23:18	01:04	02:27		23:29	16:29	04:44	07:08	07:55
Horsham	arr										
	dep		23:25	01:11	02:34		23:36	16:39	04:50	07:15	08:02
Pimpinio Loop	arr										
	dep		23:32	01:18	02:41		23:43	16:47	04:55	07:22	-----
Dimboola Station	arr										
	dep		23:48	01:34	02:57		23:59	17:04	05:09	07:38	08:10
Dimboola Loop	arr										
	dep		00:00	01:46	03:10		00:11	17:16	05:20	07:50	
	dep		00:05	01:51	03:15		00:16	17:21	05:25	07:55	
	arr										
	dep		00:10	01:57	03:20		00:21	17:27	05:30	08:00	
	dep		02:15								
FORMS OR DESTINATION	TERM	IFT	PER	PER	TERM	PER	SJC	PER	PFL	TERM	

TRAIN NO	9791V	6MP4	9783V	6MA5	6MP1	6MP5	9721V	7MP7	7MA8	D793V	
LENGTH (Metres)	1500	1500	250	1500	1500	1500	800	1500	250	1500	
DAYS	FRI	FRI	FRI	FRI	FRI	FRI	SAT	SAT	SAT	SAT	
SCHEDULE	SFR	SFR	SFR	SFR	SFR	SFR	SFR	TRL	PAS	SFR	
STATUS	M	M	M	M	M	M	M	M	M	M	
OPERATOR	INTR	PNT	PNT	PNT	INTR	PNT	SBR	PNT	GSR	INTR	
COMMODITY	INTERMODAL	INTERMODAL	INTERMODAL	INTERMODAL	INTERMODAL	INTERMODAL	GENFRGT	INTERMODAL	GSR-PASS	LGHTENG	
Tottenham	arr										
	dep	10:03	13:44	16:36	18:29	20:43	21:49		01:09	08:28	10:03
ANZAC Siding	arr			17:00							
	dep	10:14	13:55	-----	18:40	20:53	22:00		01:18	08:36	10:14
SCT - Laverton Loop	arr	10:30								08:46	10:30
	dep	-----	14:10		18:55	21:08	22:15	03:02	01:31	08:50	-----
Manor Loop	arr									09:00	
	dep		14:18		19:03	21:16	22:23	03:10	01:39	09:26	
Elders Loop	arr										
	dep		14:32		19:17	21:30	22:37	03:24	01:50	09:38	
North Shore Platform	arr									09:43	
	dep		14:36		19:21	21:34	22:41	03:28	01:53	09:48	
Anakie Loop	arr										
	dep		14:40		19:25	21:38	22:45	03:32	01:56	09:53	
Moorabool Loop	arr										
	dep		14:43		19:28	21:41	22:48	03:35	01:58	09:55	
Gheringhap Loop	arr				19:38						
	dep		14:52		19:50	21:50	22:57	03:44	02:07	10:03	
Barwon Park Loop	arr										
	dep		15:10		20:09	22:08	23:15	04:02	02:24	10:17	
Wingeel Loop	arr										
	dep		15:18		20:17	22:16	23:23	04:10	02:31	10:24	
Berrybank Loop	arr										
	dep		15:41		20:40	22:39	23:46	04:33	02:52	10:44	
Vite Vite Loop	arr										
	dep		16:07					04:59			
	dep		16:24		21:05	23:04	00:11	05:45	03:14	11:06	
Tatyoan Loop	arr										
	dep		16:53		21:33	23:32	00:39	06:14	03:39	11:28	
Maroona	arr										
	dep		17:03		21:43	23:42	00:49	06:24	03:47	11:35	
Ararat Siding	arr										
	dep		17:16		21:56	23:55	01:02	06:37	03:58	11:47	
Pyrenees Loop	arr										
	dep		17:23		22:03	00:02	01:09	07:33	04:03	11:52	
Great Western Loop	arr										
	dep		17:36		22:16	00:15	01:22	07:47	04:34	12:03	
Stawell	arr										
	dep		17:41		22:21	00:20	01:27	07:52	04:40	12:11	
Deep Lead	arr										
	dep		17:51		22:31	00:30	01:37	08:02	04:50	12:21	
Lubeck	arr										
	dep		18:06		22:46	00:45	01:52	08:17	05:05	12:34	
Murtoa Station	arr										
	dep		18:17		22:57	00:57	02:03	08:28	05:15	12:44	
Murtoa Loop	arr										
	dep		18:21		23:01	01:01	02:07	08:32	05:18	12:47	
Wimmera Intermodal	arr										
	dep		18:28		23:08	01:08	02:14	-----	05:24	12:53	
Horsham	arr										
	dep		18:35		23:15	01:15	02:21		05:29	13:02	
Pimpinio Loop	arr										
	dep		18:51		23:31	01:32	02:38		05:43	13:15	
	dep				23:43	01:45	02:45		05:43	13:15	
Dimboola Station	arr				23:43	01:45	02:58		05:54	13:23	
	dep		19:03		23:48	01:50	03:03		05:59	13:25	
	dep		19:08			01:56					
Dimboola Loop	arr					01:56					
	dep		19:13		23:53	02:12	03:08		06:04	13:29	
FORMS OR DESTINATION	TERM	PER	TERM	IFT	PER	PER	TERM	PER	APT	TERM	

TRAIN NO		7MP5	9721V	6BA6	6WP2	9719V	1MA3	1MP5			
LENGTH (Metres)		1500	800	1440	1500	700	1500	1500			
DAYS		SAT	SUN	SUN	SUN	SUN	SUN	SUN			
SCHEDULE		SFR	SFR	SFR	EXP	SFR	SFR	SFR			
STATUS		M	M	M	M	M	M	M			
OPERATOR		PNT	SBR	PNT	PND	SPS	PNT	PNT			
COMMODITY		INTERMODAL	GENFRGT	INTERMODAL	STEEL	GENFRGT	INTERMODAL	INTERMODAL			
Tottenham	arr										
	dep	21:14			11:06	17:02	20:19	21:34			
ANZAC Siding	arr										
	dep	21:25		09:44	11:18	17:13	20:30	21:45			
SCT - Laverton Loop	arr										
	dep	21:40	23:12	10:08	11:36	17:28	20:45	22:00			
Manor Loop	arr										
	dep	21:48	23:20	10:16	11:44	17:36	20:53	22:09			
Elders Loop	arr										
	dep	22:02	23:34	10:30	11:58	17:50	21:07	22:24			
North Shore Platform	arr										
	dep	22:06	23:38	10:34	12:03	17:54	21:11	22:39			
Anakie Loop	arr										
	dep	22:10	23:42	10:38	12:07	17:58	21:15	22:43			
Moorabool Loop	arr										
	dep	22:13	23:45	10:41	12:10	18:01	21:18	22:47			
Gheringhap Loop	arr										
	dep	22:22	23:55	10:50	12:19	18:10	21:27	22:50			
Barwon Park Loop	arr										
	dep	22:40	01:14	11:08	12:38	18:28	21:27	22:59			
Wingeel Loop	arr										
	dep	22:49	01:22	11:16	12:47	18:36	21:45	23:17			
Berrybank Loop	arr										
	dep	23:26	01:22	11:16	12:47	18:36	21:53	23:25			
Vite Vite Loop	arr										
	dep	23:50	01:45	11:39	13:17	19:30	22:16	23:49			
Tatyoan Loop	arr										
	dep	00:15	02:10	12:04	13:43	19:56	22:16	00:11			
Maroona	arr										
	dep	00:43	02:38	12:32	14:15	20:24	22:16	00:37			
Ararat Siding	arr										
	dep	00:53	02:48	12:42	14:28	20:35	22:36	01:05			
Pyrenees Loop	arr										
	dep	01:06	03:01	12:55	14:46	21:07	23:36	01:15			
Great Western Loop	arr										
	dep	01:13	03:09	13:02	14:50	21:28	23:56	01:28			
Stawell	arr										
	dep	01:26	03:29	13:02	14:50	21:28	23:56	01:35			
Deep Lead	arr										
	dep	01:31	03:48	13:20	15:11	21:46	23:36	01:48			
Lubeck	arr										
	dep	01:41	04:21	13:30	15:22	21:57	23:36	01:53			
Murtoa Station	arr										
	dep	01:56	04:37	13:45	15:41	22:19	23:36	02:03			
Murtoa Loop	arr										
	dep	02:07	04:48	13:56	15:56	22:35	23:36	02:18			
Wimmera Intermodal	arr										
	dep	02:11	04:52	14:00	16:01	22:50	23:36	02:29			
Horsham	arr										
	dep	02:18	05:00	14:07	16:11	22:57	23:36	02:33			
Pimpinio Loop	arr										
	dep	02:25	-----	14:14	16:19	-----	23:05	02:40			
Dimboola Station	arr										
	dep	02:41		14:30	16:36		01:01	02:47			
Dimboola Loop	arr										
	dep	02:54		14:42	16:48		01:08	02:47			
	dep	02:59		14:47	16:59		01:13	03:03			
	arr										
	dep	03:04		14:52	17:05		01:18	03:20			
FORMS OR DESTINATION		PER	TERM	IFT	PER	TERM	PFL	PER			

TRAIN NO	7922V	7769V	6PM9	6PM1	D992V	9794V	2AM8	7920V	6PM6	7769V	
LENGTH (Metres)	800	520	1500	1500	0	0	250	700	1500	520	
DAYS	MON	MON	MON	MON	MON	MON	MON	MON	MON	TUE	
SCHEDULE	SFR	EXP	SFR	SFR	SFR	SFR	PAS	SFR	SFR	EXP	
STATUS	M	M	M	M	M	M	M	M	M	M	
OPERATOR	SBR	ELZ	SCT	INTR	INTR	INTR	GSR	SPS	PNT	ELZ	
COMMODITY	GENFRGT	GENFRGT	INTERMODAL	INTERMODAL	LGHTENG	INTERMODAL	GSR-PASS	GENFRGT	INTERMODAL	GENFRGT	
Dimboola Loop	arr									13:01	
	dep		02:27	00:08						15:25	
Dimboola Station	arr		02:33	00:14						15:32	
	dep		02:41	00:20						15:37	
Pimpinio Loop	arr		02:55								
	dep		03:12	00:33						15:50	
Horsham	arr			00:48							
	dep		03:27	01:20				13:58	13:20	16:04	
Wimmera Intermodal	dep	15:25	03:34	01:28				14:04	13:28	16:11	
Murtoa Loop	arr										
	dep	15:34	03:42	01:36				14:11	13:36	16:19	
Murtoa Station	arr										
	dep	15:38	14:45	03:46	01:40			14:15	13:40	16:23	
Lubeck	arr			01:53						14:45	
	dep	15:50	14:58	03:58	02:24			14:25	13:52	16:35	
Deep Lead	arr										
	dep	16:08	15:18	04:16	02:43			14:39	14:10	16:53	
Stawell	arr									15:18	
	dep	16:20	15:32	04:28	02:55			14:49	14:22	17:05	
Great Western Loop	arr									15:32	
	dep	16:27	15:39	04:35	03:02			14:54	14:29	17:12	
Pyrenees Loop	arr									15:39	
	dep	16:45	15:59	04:53	03:20			15:12	14:47	17:30	
Ararat Siding	arr									15:59	
	dep	16:49	16:05	04:57	03:24			15:20	14:51	17:34	
Maroona	arr									16:05	
	dep	17:02	16:23	05:10	03:37			15:31	14:51	17:34	
Tatyoan Loop	arr									16:23	
	dep	17:12		05:20	03:47			15:42	15:04	17:47	
Vite Vite Loop	arr										
	dep	17:42		05:50	04:17			15:50	15:14	17:57	
Berrybank Loop	arr										
	dep	18:07		06:15	04:42			16:14	15:44	18:27	
Wingeel Loop	arr									18:53	
	dep	18:29		06:36	05:03			16:35	17:00	19:14	
Barwon Park Loop	arr									19:37	
	dep	18:46		06:46	05:13			16:56	17:22	20:08	
Gheringhap Loop	arr									20:19	
	dep	18:57		07:06	05:32			17:04	17:32	20:38	
Moorabool Loop	arr									20:50	
	dep	19:17		07:15	05:41			17:18	18:17	20:38	
Anakie Loop	arr									20:47	
	dep	19:56		07:18	05:44			17:26	18:27	20:47	
North Shore Platform	arr									20:50	
	dep	20:01		07:23	05:49			17:28	18:30	20:50	
Elders Loop	arr									20:55	
	dep	20:06		07:28	05:54			17:33	18:35	20:55	
Manor Loop	arr									21:00	
	dep	20:21		07:44	06:09			17:43	18:40	21:00	
SCT - Laverton Loop	arr									21:16	
	dep	20:33		08:00	06:21	11:00	16:35	17:55	19:24	22:35	
ANZAC Siding	arr									22:48	
	dep			06:21	06:21	11:00	16:35	18:05	19:37	22:48	
Tottenham	arr									23:04	
	dep			06:37	06:37	11:17	16:52	18:15	19:53	23:04	
	dep			06:45	06:45	11:25	17:00	18:22	20:01	23:12	
FORMS OR DESTINATION	CRT	CHP	TERM	DYS	DYS	DYS	DYS	SPE	WGS	SDY	CHP

TRAIN NO	7922V	7PM1	9782V	2AM5	2AM3	2XW4	9794V	7920V	9784V	7PM5
LENGTH (Metres)	800	1500	1500	1500	1500	1500	0	700	1500	1500
DAYS	TUE	TUE	TUE	TUE	TUE	TUE	TUE	TUE	TUE	TUE
SCHEDULE	SFR	SFR	SFR	SFR	SFR	EXP	SFR	SFR	SFR	SFR
STATUS	M	M	M	M	M	M	M	M	M	M
OPERATOR	SBR	INTR	PNT	PNT	PNT	PND	INTR	SPS	PNT	PNT
COMMODITY	GENFRGT	INTERMODAL	INTERMODAL	INTERMODAL	INTERMODAL	STEEL	INTERMODAL	GENFRGT	INTERMODAL	INTERMODAL
Dimboola Loop	arr			01:54						
	dep			02:07	07:49	09:48				14:47
Dimboola Station	arr	00:59		02:14	07:55	09:54				14:53
	dep	01:10		02:20	08:00	09:59				14:58
Pimpinio Loop	arr	01:24		02:34						
	dep	01:45		02:49	08:13	10:12				15:11
Horsham	arr	02:01								
	dep	02:35		03:04	08:27	10:28		12:05		15:25
Wimmera Intermodal	dep	23:59	02:43	03:11	08:34	10:36		12:13		15:32
Murtoa Loop	arr									
	dep	00:08	02:51	03:19	08:42	10:46		12:22		15:40
Murtoa Station	arr									
	dep	00:12	02:55	03:23	08:46	10:52		12:55		15:44
Lubeck	arr									
	dep	00:24	03:07	03:35	08:58	11:04		13:07		15:56
Deep Lead	arr	00:43								
	dep	00:59	03:25	03:53	09:16	11:24		13:25		16:14
Stawell	arr									
	dep	01:12	03:37	04:05	09:28	11:38		13:37		16:26
Great Western Loop	arr	01:20		04:13		11:46				
	dep	01:34	03:44	04:36	09:35	12:01		13:44		16:33
Pyrenees Loop	arr	01:54								
	dep	02:09	04:02	04:55	09:53	12:22		14:02		16:52
Ararat Siding	arr									
	dep	02:14	04:06	04:59	09:57	12:28		14:06		17:26
Maroona	arr									
	dep	02:27	04:19	05:12	10:10	12:46		14:19		17:39
Tatooon Loop	arr	02:38								
	dep	03:40	04:29	05:22	10:20	12:58		14:29		17:49
Vite Vite Loop	arr									
	dep	04:11	05:00	05:52	11:07	13:32		14:59		18:19
Berrybank Loop	arr							15:25		
	dep	04:36	05:25	06:17	11:33	13:59		16:07		18:44
Wingeel Loop	arr									
	dep	04:57	05:47	06:38	11:54	14:24		16:29		19:05
Barwon Park Loop	arr									
	dep	05:07	05:57	06:48	12:04	14:32		16:39		19:15
Gheringhap Loop	arr					14:55				19:35
	dep	05:26	06:17	07:07	12:23	15:10		16:58		20:24
Moorabool Loop	arr									
	dep	05:35	06:26	07:16	12:32	15:22		17:07		20:33
Anakie Loop	arr									
	dep	05:38	06:29	07:19	12:35	15:25		17:10		20:36
North Shore Platform	arr									
	dep	05:43	06:34	07:24	12:40	15:29		17:15		20:40
Elders Loop	arr									
	dep	05:48	06:39	07:29	12:45	15:34		17:20		20:45
Manor Loop	arr									
	dep	06:03	06:54	07:44	13:00	15:51		17:35		20:59
SCT - Laverton Loop	arr									
	dep	06:15	07:06	07:56	13:12	16:04	16:55	17:47		22:57
ANZAC Siding	arr									
	dep	07:22	07:35	08:12	13:28	16:20	17:12	18:03	18:55	23:13
Tottenham	arr	07:30	07:57	08:20	13:37	16:29	17:20	18:11	19:17	23:22
	dep									
FORMS OR DESTINATION	CRT	DYS	CNL	SDY	APD	PTK	DYS	WGS	SDY	SDY

TRAIN NO	1PM7	7769V	1PM9	3AB6	3AM5	D992V	3XW4	9794V	7920V	4AM8
LENGTH (Metres)	1500	520	1500	1500	1500	0	1500	0	700	250
DAYS	TUE	WED	WED	WED	WED	WED	WED	WED	WED	WED
SCHEDULE	TRL	EXP	SFR	SFR	SFR	SFR	EXP	SFR	SFR	PAS
STATUS	M	M	M	M	M	M	M	M	M	M
OPERATOR	PNT	ELZ	SCT	PNT	PNT	INTR	PND	INTR	SPS	GSR
COMMODITY	INTERMODAL	GENFRGT	INTERMODAL	INTERMODAL	INTERMODAL	LGHTENG	STEEL	INTERMODAL	GENFRGT	GSR-PASS
Dimboola Loop	arr		02:56	06:12	01:48					
	dep	17:11	03:18	06:37	02:19		10:20			13:25
Dimboola Station	arr	17:16	03:25	06:44	02:26		10:26			13:29
	dep	17:21	03:30	06:49	02:31		10:31			13:34
Pimpinio Loop	arr				02:45					
	dep	17:33	03:43	07:02	03:05		10:44			13:45
Horsham	arr									
	dep	17:46	03:57	07:16	03:20		11:00		12:25	13:58
Wimmera Intermodal	dep	17:53	04:04	07:23	03:27		11:08		12:33	14:04
Murtoa Loop	arr	18:01								
	dep	18:20	04:12	07:31	03:35		11:18		12:41	14:11
Murtoa Station	arr									
	dep	18:25	14:45	04:16	07:35	03:39	11:24		12:45	14:15
Lubeck	arr									
	dep	18:35	14:58	04:29	07:47	03:51	11:36		12:57	14:25
Deep Lead	arr									
	dep	18:50	15:18	05:00	08:05	04:09	11:56		13:15	14:39
Stawell	arr									
	dep	18:59	15:32	05:12	08:17	04:21	12:10		13:27	14:54
Great Western Loop	arr									
	dep	19:04	15:39	05:19	08:24	04:28	12:17		13:34	14:59
Pyrenees Loop	arr	19:19								15:12
	dep	19:39	15:59	05:37	08:42	04:46	12:37		13:52	15:20
Ararat Siding	arr									15:26
	dep	19:44	16:05	05:41	08:46	04:50	12:43		13:56	15:31
Maroona	arr									
	dep	19:57	16:23	05:54	08:59	05:03	13:01		14:09	15:42
Tatyoan Loop	arr									
	dep	20:06		06:04	09:09	05:13	13:13		14:19	15:50
Vite Vite Loop	arr	20:34								
	dep	21:38		06:34	09:39	05:43	13:47		14:49	16:14
Berrybank Loop	arr				10:05					
	dep	22:00		06:59	10:40	06:08	14:14		15:14	16:35
Wingeel Loop	arr								15:36	
	dep	22:21		07:20	11:02	06:29	14:39		15:58	16:56
Barwon Park Loop	arr									
	dep	22:29		07:30	11:12	06:39	14:47		16:09	17:04
Gheringhap Loop	arr	22:46								
	dep	23:03		07:49	11:31	06:58	15:09		16:28	17:18
Moorabool Loop	arr									
	dep	23:13		07:58	11:40	07:07	15:19		16:37	17:26
Anakie Loop	arr									
	dep	23:15		08:01	11:43	07:10	15:22		16:40	17:28
North Shore Platform	arr									17:33
	dep	23:19		08:06	11:48	07:15	15:26		16:45	17:38
Elders Loop	arr									
	dep	23:24		08:11	11:53	07:20	15:31		16:50	17:43
Manor Loop	arr				12:09					
	dep	23:37		08:26	12:31	07:35	15:47		17:05	17:55
SCT - Laverton Loop	arr		08:45		12:45					
	dep	23:47	-----		13:03	07:47	11:00	16:00	16:35	17:17
ANZAC Siding	arr									
	dep	23:59			13:28	08:03	11:17	16:16	16:52	17:33
Tottenham	arr	00:07				08:11	11:25	16:24	17:00	17:41
	dep									18:22
FORMS OR DESTINATION	SDY	CHP	TERM	ACR	SDY	DYS	PTK	DYS	WGS	SPE

TRAIN NO	1PM5	2PM1	2PM9	7922V	7769V	9782V	4AM5	D992V	4AM3	9794V
LENGTH (Metres)	1500	1500	1800	800	520	1500	1500	0	1500	0
DAYS	WED	WED	THU	THU	THU	THU	THU	THU	THU	THU
SCHEDULE	SFR	SFR	SFR	SFR	EXP	SFR	SFR	SFR	SFR	SFR
STATUS	M	M	M	M	M	M	M	M	M	M
OPERATOR	PNT	INTR	SCT	SBR	ELZ	PNT	PNT	INTR	PNT	INTR
COMMODITY	INTERMODAL	INTERMODAL	INTERMODAL	GENFRGT	GENFRGT	INTERMODAL	INTERMODAL	LGHTENG	INTERMODAL	INTERMODAL
Dimboola Loop	arr		02:38							
	dep	14:33	23:53	02:56				01:18	06:44	
Dimboola Station	arr	14:39	23:59	03:03				01:24	06:50	
	dep	14:44	00:05	03:07				01:30	06:55	
Pimpinio Loop	arr									
	dep	14:57	00:18	03:20				01:43	07:08	
Horsham	arr							01:58		
	dep	15:11	00:32	03:34				02:24	07:22	
Wimmera Intermodal	dep	15:18	00:39	03:41	06:10			02:32	07:29	
Murtoa Loop	arr									
	dep	15:26	00:47	03:49	06:19			02:40	07:37	
Murtoa Station	arr									
	dep	15:30	00:51	03:53	06:23	14:45		02:44	07:41	
Lubeck	arr									
	dep	15:42	01:03	04:05	06:35	14:58		02:56	07:53	
Deep Lead	arr									
	dep	16:00	01:40	04:23	06:53	15:39		03:14	08:11	
Stawell	arr									
	dep	16:12	01:53	04:35	07:05	15:54		03:26	08:23	
Great Western Loop	arr									
	dep	16:19	02:00	04:42	07:12	16:01		03:33	08:30	
Pyrenees Loop	arr									
	dep	16:37	02:18	05:00	07:30	16:21		03:51	08:48	
Ararat Siding	arr									
	dep	16:41	02:22	05:04	07:34	16:27		03:55	08:52	
Maroona	arr									
	dep	16:54	02:35	05:17	07:47	16:45		04:08	09:05	
Tatooon Loop	arr									
	dep	17:05	02:45	05:27	07:57			04:18	09:15	
Vite Vite Loop	arr									
	dep	18:13	03:15	05:57	08:27			04:48	09:45	
Berrybank Loop	arr									
	dep	18:38	03:40	06:22	08:52			05:13	10:11	
Wingeel Loop	arr									
	dep	18:59	04:01	06:43	09:13			05:34	11:06	
Barwon Park Loop	arr									
	dep	19:09	04:11	06:53	09:23			05:44	11:49	
Gheringhap Loop	arr									
	dep	19:29	04:30	07:13	09:43	10:02		06:03	12:09	
Moorabool Loop	arr									
	dep	19:57	04:39	07:22	10:02			06:03	12:49	
Anakie Loop	arr									
	dep	20:07	04:39	07:22	10:12			06:12	12:59	
Anakie Loop	arr									
	dep	20:10	04:42	07:25	10:15			06:15	13:02	
North Shore Platform	arr									
	dep	20:15	04:47	07:30	10:20			06:20	13:07	
Elders Loop	arr									
	dep	20:20	04:52	07:35	10:26	10:45		06:25	13:12	
Manor Loop	arr									
	dep	20:35	05:08	07:51	11:02	11:50		06:40	13:27	
SCT - Laverton Loop	arr									
	dep	20:47	06:09	08:05	12:03			06:53	13:39	16:55
ANZAC Siding	arr									
	dep	21:03	06:25				07:05	07:32	12:02	13:55
Tottenham	arr									
	dep	21:12	06:34				07:27	07:40	12:20	14:04
Tottenham	arr									
	dep									
FORMS OR DESTINATION	SDY	DYS	TERM	CRT	CHP	CNL	SDY	DYS	APD	DYS

TRAIN NO	9784V	7920V	2PM5	3PM7	2PM6	7769V	7922V	3PM1	5AM5	D992V
LENGTH (Metres)	1500	700	1500	1500	1500	520	800	1500	1500	0
DAYS	THU	THU	THU	THU	THU	FRI	FRI	FRI	FRI	FRI
SCHEDULE	SFR	SFR	SFR	TRL	SFR	EXP	SFR	SFR	SFR	SFR
STATUS	M	M	M	M	M	M	M	M	M	M
OPERATOR	PNT	SPS	PNT	PNT	PNT	ELZ	SBR	INTR	PNT	INTR
COMMODITY	INTERMODAL	GENFRGT	INTERMODAL	INTERMODAL	INTERMODAL	GENFRGT	GENFRGT	INTERMODAL	INTERMODAL	LGHTENG
Dimboola Loop	arr							23:57		
	dep		14:04	19:12	18:04			00:15	02:09	
Dimboola Station	arr		14:10	19:17	18:10			00:22	02:15	
	dep		14:15	19:22	18:15			00:27	02:20	
Pimpinio Loop	arr		14:29						02:34	
	dep		14:50	19:34	18:28			00:40	03:05	
Horsham	arr							00:55		
	dep	13:05	15:05	19:47	18:42			01:30	03:20	
Wimmera Intermodal	dep	13:13	15:12	19:54	18:49		14:25	01:38	03:27	
Murtoa Loop	arr									
	dep	13:21	15:20	20:01	18:57		14:34	01:46	03:35	
Murtoa Station	arr									
	dep	13:25	15:24	20:05	19:01	15:40	14:38	01:50	03:39	
Lubeck	arr		13:38	15:37		15:54		02:03		
	dep		14:10	16:00	20:15	16:15	14:50	02:22	03:51	
Deep Lead	arr									
	dep	14:29	16:19	20:30	19:57	16:36	15:08	02:41	04:09	
Stawell	arr									
	dep	14:41	16:31	20:39	20:10	16:50	15:20	02:53	04:21	
Great Western Loop	arr		14:49				15:28			
	dep	15:25	16:38	20:44	20:17	16:57	15:48	03:00	04:28	
Pyrenees Loop	arr							03:19		
	dep	15:44	16:56	20:58	21:16	17:35	16:07	03:37	04:46	
Ararat Siding	arr									
	dep	15:48	17:00	21:02	21:21	17:42	16:11	03:42	04:50	
Maroona	arr			17:14						
	dep	16:01	17:38	21:15	21:34	18:00	16:24	03:55	05:04	
Tatyoan Loop	arr							16:35		
	dep	16:11	17:49	21:24	22:31		16:58	04:05	05:15	
Vite Vite Loop	arr									
	dep	16:41	18:43	22:07	23:30		17:29	04:35	05:45	
Berrybank Loop	arr									
	dep	17:06	19:09	22:47	23:56		17:54	05:00	06:10	
Wingeel Loop	arr									
	dep	17:27	20:07	23:26	00:32		18:15	05:21	06:30	
Barwon Park Loop	arr									
	dep	17:37	20:18	23:35	00:43		18:25	05:31	06:40	
Gheringhap Loop	arr									
	dep	17:56	20:37	23:51	01:02		18:44	05:50	06:59	
Moorabool Loop	arr									
	dep	18:05	20:46	00:00	01:37		18:53	05:59	07:08	
Anakie Loop	arr									
	dep	18:08	20:49	00:02	01:41		18:56	06:02	07:11	
North Shore Platform	arr									
	dep	18:13	20:54	00:06	01:46		19:01	06:07	07:16	
Elders Loop	arr									
	dep	18:18	21:38	00:11	01:51		19:24	06:12	07:21	
Manor Loop	arr									
	dep	18:33	21:54	00:24	02:06		19:41	06:27	07:36	
SCT - Laverton Loop	arr									
	dep	18:46	22:07							
	dep	19:16	22:51	00:34	02:18		20:13	06:39	07:48	11:45
ANZAC Siding	arr									
	dep	18:55	19:33	23:08	00:46	02:34		06:55	08:04	12:02
Tottenham	arr	19:17	19:41	23:16	00:54	02:42		07:04	08:12	12:20
	dep									
FORMS OR DESTINATION	SDY	WGS	SDY	SDY	SDY	ILK	CRT	DYS	SDY	DYS

TRAIN NO	3PW4	7920V	6AM8	9784V	3PM6	7922V	6AB6	6AM6	9794V	6AM3
LENGTH (Metres)	1500	700	250	1500	1500	800	1500	1500	0	1500
DAYS	FRI	FRI	FRI	FRI	FRI	SAT	SAT	SAT	SAT	SAT
SCHEDULE	EXP	SFR	PAS	SFR	SFR	SFR	SFR	SFR	SFR	SFR
STATUS	M	M	M	M	M	M	M	M	M	M
OPERATOR	PND	SPS	GSR	PNT	PNT	SBR	PNT	INTR	INTR	PNT
COMMODITY	STEEL	GENFRGT	GSR-PASS	INTERMODAL	INTERMODAL	GENFRGT	INTERMODAL	INTERMODAL	INTERMODAL	INTERMODAL
Dimboola Loop	arr									
	dep	09:31		13:25		16:33		02:08	01:03	09:26
Dimboola Station	arr	09:37		13:29		16:39		02:14	01:09	09:32
	dep	09:42		13:34		16:44		02:19	01:14	09:37
Pimpinio Loop	arr					16:58		02:33	01:28	
	dep	09:55		13:45		17:13		02:55	01:49	09:50
Horsham	arr								02:05	
	dep	10:11	12:20	13:58		17:28		03:10	02:26	10:04
Wimmera Intermodal	dep	10:19	12:28	14:04		17:35	20:10	03:17	02:34	10:11
Murtoa Loop	arr									
	dep	10:29	12:36	14:11		17:43	20:19	03:25	02:42	10:19
Murtoa Station	arr									
	dep	10:35	12:40	14:15		17:47	20:23	03:29	02:46	10:23
Lubeck	arr					18:00				
	dep	10:47	12:52	14:25		18:25	20:35	03:41	02:58	10:35
Deep Lead	arr									
	dep	11:07	13:10	14:39		18:44	20:53	03:59	03:16	10:53
Stawell	arr			14:49						
	dep	11:21	13:22	14:54		18:56	21:05	04:11	03:28	11:05
Great Western Loop	arr									
	dep	11:28	13:29	14:59		19:03	21:12	04:18	03:35	11:12
Pyrenees Loop	arr			15:12					03:54	11:31
	dep	11:48	13:47	15:20		19:21	21:30	04:36	04:08	11:59
Ararat Siding	arr			15:26						
	dep	11:54	13:51	15:31		19:25	21:34	04:40	04:13	12:04
Maroona	arr									
	dep	12:12	14:04	15:42		19:38	21:47	04:53	04:26	12:17
Tatooon Loop	arr		14:15							
	dep	12:24	14:34	15:50		19:48	21:57	05:03	04:36	12:27
Vite Vite Loop	arr					20:19				
	dep	12:58	15:05	16:14		21:45	22:27	05:33	05:06	12:57
Berrybank Loop	arr		15:31			22:12				
	dep	13:41	15:50	16:35		22:50	22:52	05:58	05:31	13:22
Wingeel Loop	arr					23:13	23:14			
	dep	14:07	16:12	16:56		23:33	23:34	06:19	05:52	13:43
Barwon Park Loop	arr									
	dep	14:15	16:22	17:04		23:44	23:45	06:29	06:02	13:53
Gheringhap Loop	arr									
	dep	14:38	16:41	17:18		00:03	00:04	06:48	06:21	14:12
Moorabool Loop	arr									
	dep	15:21	16:50	17:26		00:12	00:13	06:57	06:30	14:21
Anakie Loop	arr									
	dep	15:24	16:53	17:28		00:15	00:16	07:00	06:33	14:24
North Shore Platform	arr			17:33						
	dep	15:28	16:58	17:38		00:20	00:21	07:05	06:38	14:29
Elders Loop	arr									
	dep	15:33	17:03	17:43		00:25	00:26	07:10	06:43	14:34
Manor Loop	arr									
	dep	15:49	17:18	17:55		00:40	00:41	07:25	06:58	14:49
SCT - Laverton Loop	arr					00:53			07:11	
	dep	16:02	17:30	18:05		01:37	00:53	07:37	08:55	15:01
ANZAC Siding	arr									
	dep	16:18	17:46	18:15	18:55	01:54		08:01	09:12	15:17
Tottenham	arr			18:22	19:17	02:02			09:20	15:25
	dep	16:26	17:54						11:25	
FORMS OR DESTINATION	PTK	WGS	SPE	SDY	SDY	CRT	ACR	DYS	DYS	APD

TRAIN NO		4PM6	5PM9	7AM5	4PW4	5PM5	6PM5	6PM7			
LENGTH (Metres)		1500	1500	1500	1500	1500	1500	1500			
DAYS		SAT	SUN	SUN	SUN	SUN	SUN	SUN			
SCHEDULE		SFR	SFR	SFR	EXP	SFR	SFR	TRL			
STATUS		M	M	M	M	M	M	M			
OPERATOR		PNT	SCT	PNT	PND	PNT	PNT	PNT			
COMMODITY		INTERMODAL	INTERMODAL	INTERMODAL	STEEL	INTERMODAL	INTERMODAL	INTERMODAL			
Dimboola Loop	arr										
	dep	14:54	10:00	01:35	08:21	15:34	18:38	20:46			
Dimboola Station	arr	15:00		01:41	08:27	15:40	18:44	20:51			
	dep	15:05	10:05	01:46	08:32	15:45	18:49	20:56			
Pimpinio Loop	arr										
	dep	15:18	10:17	01:59	08:45	15:58	19:02	21:08			
Horsham	arr			02:14		16:13					
	dep	15:32	10:31	02:36	09:01	16:30	19:16	21:21			
Wimmera Intermodal	dep	15:39	10:38	02:44	09:09	16:38	19:23	21:28			
Murtoa Loop	arr										
	dep	15:47	10:46	02:52	09:19	16:46	19:31	21:35			
Murtoa Station	arr										
	dep	15:51	10:50	02:56	09:25	16:50	19:35	21:39			
Lubeck	arr										
	dep	16:03	11:02	03:08	09:37	17:02	19:47	21:49			
Deep Lead	arr										
	dep	16:21	11:20	03:26	09:57	17:20	20:05	22:04			
Stawell	arr										
	dep	16:33	11:32	03:38	10:11	17:32	20:17	22:13			
Great Western Loop	arr										
	dep	16:40	11:39	03:45	10:18	17:39	20:24	22:18			
Pyrenees Loop	arr										
	dep	16:58	11:57	04:03	10:38	17:57	20:42	22:50			
Ararat Siding	arr										
	dep	17:02	12:01	04:07	10:44	18:01	20:46	22:55			
Maroona	arr										
	dep	17:15	12:14	04:20	11:02	18:14	20:59	23:08			
Tatyoan Loop	arr		12:25								
	dep	17:25	12:45	04:30	11:14	18:24	21:09	23:17			
Vite Vite Loop	arr		13:17		11:49						
	dep	17:55	13:49	05:00	12:15	18:54	21:39	23:44			
Berrybank Loop	arr				12:44		22:05				
	dep	18:20	14:15	05:25	13:24	19:19	22:30	00:05			
Wingeel Loop	arr						22:53				
	dep	18:41	14:36	05:46	13:50	19:40	23:30	00:26			
Barwon Park Loop	arr										
	dep	18:51	14:46	05:56	13:58	19:50	23:41	00:34			
Gheringhap Loop	arr					20:10					
	dep	19:10	15:06	06:15	14:20	21:38	00:00	00:50			
Moorabool Loop	arr										
	dep	19:19	15:15	06:24	14:30	21:48	00:09	00:59			
Anakie Loop	arr										
	dep	19:22	15:18	06:27	14:33	21:51	00:12	01:01			
North Shore Platform	arr										
	dep	19:27	15:23	06:32	14:37	21:56	00:17	01:05			
Elders Loop	arr	19:33									
	dep	20:20	15:28	06:37	14:42	22:01	00:22	01:10			
Manor Loop	arr										
	dep	20:36	15:44	06:52	14:58	22:16	00:37	01:23			
SCT - Laverton Loop	arr	20:49	16:00	07:05							
	dep	21:47	-----	07:10	15:11	22:28	00:49	01:33			
ANZAC Siding	arr										
	dep	22:04		07:27	15:27	22:44	01:05	01:45			
Tottenham	arr	22:12		07:35	15:36	22:52	01:13	01:54			
	dep										
FORMS OR DESTINATION		SDY	TERM	SDY	PTK	SDY	SDY	SDY			



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