## **Baxter Electrification Preliminary Business Case**

July 2019



Department of Transport Prepared by the Major Transport Infrastructure Authority (LXRP) on behalf of the Department of Transport (Transport for Victoria), for the Australian Government

## **Glossary of Terms**

- ATAP Australian Transport Assessment and Planning
- BMP Benefit Management Plan
- DELWP Department of Environment, Land, Water and Planning
- DEDJTR Department of Economic Development, Jobs, Transport and Resources
- DTF Department of Treasury and Finance
- Frankston Frankston City Council local government area
- ILM Investment Logic Map
- KPI key performance indicators
- LGA local government area
- LXRA Level-Crossing Removal Authority
- MAC Metropolitan Activity Centre
- Mornington Peninsula Mornington Peninsula Shire local government area
- OD Origin and Destination
- PT Public Transport
- PTV Public Transport Victoria
- TfV Transport for Victoria
- VCC Value Capture and Creation Plan
- VITM Victorian Integrated Transport Model
- VKT Vehicle Kilometres Travelled

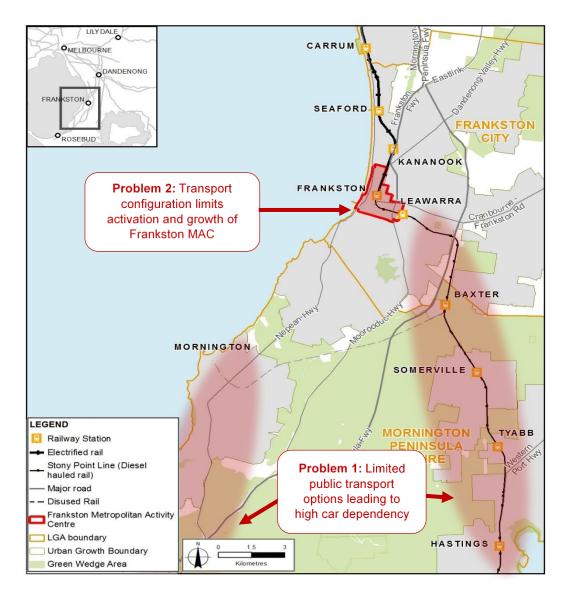
## **Executive summary**

This Preliminary Business Case investigates the need for electrification of the Frankston train line to Baxter. Poor access to public transport in areas around Frankston and the Mornington Peninsula, and poor transport configuration around Frankston Metropolitan Activity Centre, are addressed in this Preliminary Business Case.

## **Problem definition and context**

Frankston and Mornington Peninsula are located to the south east of Melbourne CBD. The area has high car dependency, driven by the lack of access to fast and reliable public transport options. The configuration of transport infrastructure and a lack of local services also limits the growth and activation of the Frankston Metropolitan Activity Centre.

Figure 1 Problem Summary map



## Problem 1: Limited public transport options and poor connections between the Peninsula, Frankston and the City results in increased car dependency

Less than three percent of residents use public transport in the Mornington Peninsula, and less than six percent in Frankston, which is exceedingly low when benchmarked against municipalities with similar characteristics.

The low proportion of commuters using public transport is indicative of several issues in the area, including accessibility, reliability and poor travel times. For residents in Frankston and the Peninsula, less than 10 percent of all jobs are accessible by public transport within an hour.

Frankston Station is the end of the line for all metro services. The Stony Point line continues further south, however offers very infrequent diesel services. As such, Frankston Station has a relatively high patronage, which causes significant constraints on commuter parking and accessing the rail line.

Figure 2 shows the areas of impact due to poor access to public transport, based on sociodemographic factors.

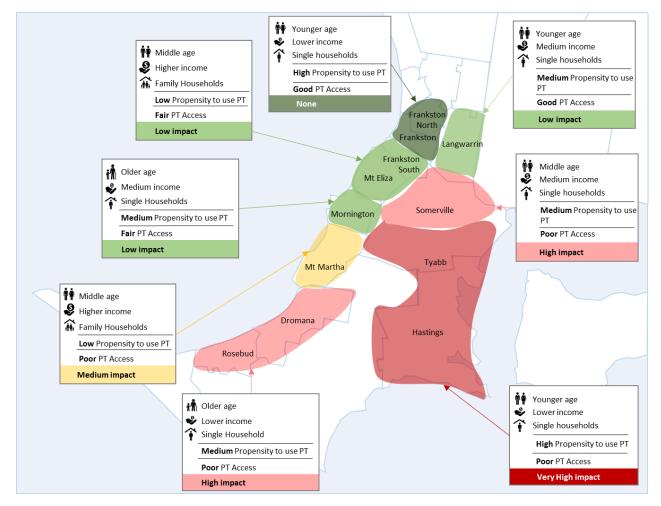
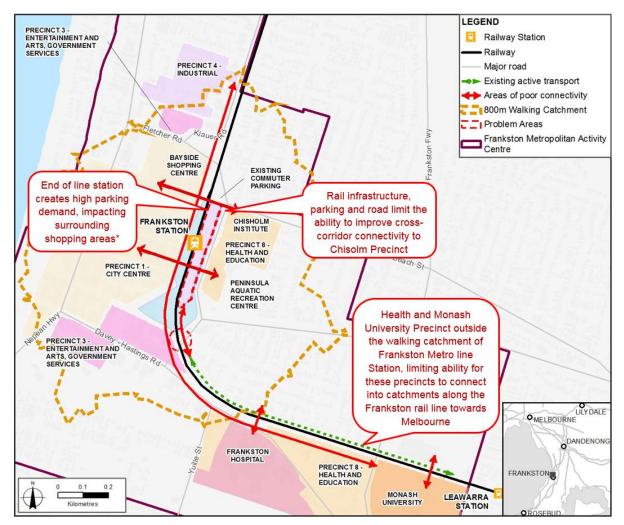


Figure 2 Sociodemographic factors affecting public transport use

## Problem 2: The current transport configuration limits activation and growth opportunities on the Frankston Metropolitan Activity Centre

Frankston is a Metropolitan Activity Centre (MAC) which has limitations on activation and growth, due the transport configuration as follows. Figure 3 provides an illustration of these issues

- Land use inefficiencies: Frankston's transport interchange includes a Park & Ride, terminus metro line station and an interchange for 22 bus routes. As it services a wide catchment, demand for commuter parking exceeds supply, and contributes to a crowded MAC already in high demand from local car parking for workers, shoppers and socialising.
- **Permeability:** transport hubs within MAC require a level of permeability for pedestrians and cyclist access to enhance activity in the area. This is currently limited by existing car parking, roads and rail infrastructure around Frankston Station.
- **Poor access to health & education precinct**: Frankston Hospital and Monash University are both situated outside of Frankston Station's walking catchment. This limits access to potential catchments north towards Melbourne for health and education.



#### Figure 3 Frankston Metropolitan MAC

This Preliminary Business Case has defined the qualitative problems associated with the Frankston MAC. The precise degree of impacts for the Frankston MAC, will be required to be fully quantified in the Full Business Case.

For example, the degree by which lack of commuter parking impacts on the Frankston MAC, is a complex issue that has various other contributing factors associated with on-street parking availability, and costs for all-day parking.

## **Benefits**

In order to address these problems, the project will need to achieve clear benefits as follows Table 1 Benefits and indicators

Benefits	Indicators
KPI 1 – Improve public transport for Frankston and the Peninsula	The increased service availability across the region
Frankston and the Peninsula	A reduction in car dependency.
KPI 2 – Improve social and	Precinct Outcomes
commercial activity in the Frankston area	Improved public transport access to Frankston East

This Preliminary Business Case includes a rapid assessment of benefits only. The degree of benefits will be fully measured in the Full Business Case for this project.

## Assessment and development of options

A strategic response to pursue reliable access to Frankston station was identified through an assessment process that compared key risks, dis-benefits, interdependencies, timeline and costs. This then informed the development of project options. Table 2 lists the project options and their relevant infrastructure and service provision.

## Table 2 Project option description

Project Option		Key infrastructure	Rail Services	Bus Services
Bus Only Option 2A		Bus priority lanes and intersections works Additional bus interchange at Frankston station		<u>Fast bus to Hastings</u> : 30 min. peak, 60 min. off peak <u>Fast bus to Rye</u> : 30 min. peak, 60 min. off peak
Stony Point Up (30 mins) Option 2B-SP30	lift	No electrification Passing loops along the Stony Point line New stations at Somerville and Bittern	Stony Point Line: 30 min. peak. 60 min. inter-peak Stony Point to Frankston	<u>Fast bus to Rye</u> 30 min. peak, 60 min off peak
Stony Point Uplift (20 mins) Option 2B-SP20		No electrification Passing loops along the Stony Point line New stations at Tyabb and Bittern	Stony Point Line 20 min. peak Hastings to Frankston 40 minute all day service, Stony Point to Frankston	<u>Fast bus to Rye</u> 30 min. peak, 60 min. off peak
Langwarrin Electrification	<b>1 Bus</b> Option 3A	Double track to Langwarrin New stations at Frankston East and Langwarrin Park & Ride at Langwarrin	Metro Line: 10 min. peak, 20 min. inter-peak metro services from Langwarrin	Fast bus to Hastings: 30 min. peak, 60 min. inter- peak
2 Buses Option 3B		3 level crossing removals Additional rail bridge over Peninsula link Stabling roads at Langwarrin	Stony Point Line: 60 min. peak, 90 min. inter-peak Stony Point to Langwarrin	<u>Hastings &amp; Rye Fast Buses</u> : 30 min. peak, 60 minute inter-peak
Baxter Electrification	1 Bus Option 3C	Double track to Baxter New stations at Frankston East, Langwarrin Park & Ride and Baxter Park &	<u>Metro Line</u> : 10 min. peak. 20 min. inter-peak metro services from Baxter	<u>Fast bus to Hastings:</u> 30 min, peak, 60 min. inter-peak
	2 Buses Option 3D	Ride 5 level crossing removals Additional rail bridge over Peninsula link Stabling roads at Baxter	<u>Stony Point Line:</u> 60 min. peak, 90 min. inter-peak Stony Point to Baxter	<u>Hastings &amp; Rye Fast Buses</u> : 30 min. peak, 60 min. inter- peak

Each project option was assessed against its ability to achieve the project objectives Table 3 below provides a summary of the options assessment.

#### Table 3 Options assessment summary

	Base Case	Bus Only	Stony Point Uplift	Stony Point Uplift	Langwarrin I	Electrification	Baxter Elec	trification	
		Option 2A	<b>(30 minutes)</b> Option 2B – SP20	<b>(20 minutes)</b> Option 2B – SP20	<b>1 Bus</b> Option 3A	2 Buses Option 3B	<b>1 Bus</b> Option 3C	2 buses Option 3D	
Benefit outcomes									
KPI 1.1 Increased PT Service Availability across Region	No benefits	Modest increase in availability. Minimal improvement in reliability/ freq.	Modest increase in availability. Modest improvement in reliability/ freq.	Modest increase in availability. Modest improvement in reliability/ freq.	Good increase in PT availability. Good improvement of reliability/ freq		Good increase PT availability. Good improvement of reliability/ freq		
KPI 1.2 Reduction in Car Dependency	No benefits	Minor reduction	Minor reduction	Minor reduction and good PT mode shift		tion and good PT e shift	Moderate reduction and good PT mode shift		
KPI 2.1 Precinct Outcomes	No Benefits	Low improvement	Some improvement in connectivity.	Some improvement in connectivity.	Diversion of so	Diversion of some car parking.		Diversion of some car parking.	
KPI 2.2 Improved PT access to Frankston East precinct	No Benefits	Low improvement	Some improvement in access.	Some improvement in access.	Good improvement in access for health/ education.		Good improvement in access for health/ education.		
Project outcomes									
Capital Cost	<b>\$</b> 0	\$9-10m	\$150-165m	\$190-210m	\$990m-\$1.1b	\$990m-\$1.1b	\$1.3-1.5b	\$1.3-1.5b	
Rolling Stock Costs	\$0	TBC	TBC	TBC	TBC	TBC	TBC	TBC	
Annual Opex Cost	\$0	\$5 m	\$10 m	\$12 m	\$7 m	\$10 m	\$10 m	\$13 m	
PV Benefits (7%)	\$0	\$16 m	\$72 m	\$125 m	\$463 m	\$450 m	\$531 m	\$544 m	
PV Costs (7%)	\$0	\$67 m	\$233 m	\$286 m	\$823 m	\$863 m	\$1,131 m	\$1,170 m	
NPV (7%)	\$0	-\$51 m	-\$162 m	-\$161 m	-\$361 m	-\$412 m	-\$600 m	-\$625 m	
Rapid BCR (7%)	0	0.24	0.31**	0.44**	0.56	0.52	0.47	0.47	
Time	N/A								
Risk	Reputational risk	Reputational risk	Risks around shared platform at Frankston	Risks around shared platform at Frankston	Acquisition of	property risks	Acquisition of pro groundwa		
Value Capture/ Creation Opportunity	N/A	Low	Low	Low	Marginal		Marginal		

	Base Case	Bus Only	Stony Point Uplift	Stony Point Uplift	Langwarrin I	Electrification	Baxter Elec	trification
		Option 2A	<b>(30 minutes)</b> Option 2B – SP20	<b>(20 minutes)</b> Option 2B – SP20	<b>1 Bus</b> Option 3A	2 Buses Option 3B	<b>1 Bus</b> Option 3C	2 buses Option 3D
Network outcomes								
Compliance with standards	Complies	Complies	Complies	Complies	Com	plies	Comp	lies
Protection of Future Assets	None	None	Potential future rolling stock issues/ platform mods	Potential future rolling stock issues/ platform mods	Future exten redundant th	stabling flexibility sions result in ird platform at warrin	Provides more sta however redundan	
Operational Performance	None	None	Potential reliability issues.	Potential reliability issues.	Good		Goo	od
Minimise impact								
Property Impacts	No impact	No impact	No impact	No impact	Residential prop	perty acquisition.	Residential prope	erty acquisition.
Land use Impacts	No impact	Minimal	Minor adverse impacts	Minor adverse impacts	Visual impac	ts Hillcrest Rd	Visual impacts Positive impac businesses. But pressure	ets to Baxter development
Environmental Impacts	No impact	Minimal impacts	Minor noise. Some flora and fauna impacts	Minor noise Some flora and fauna impacts		ite noise of native veg	Moderate Up to 10 ha o	
Temporary Impacts	No impact	Minimal	Minimal	Minimal	Mod	erate	Mode	rate
Traffic Impacts	No impact	Minimal impacts	Minor traffic impacts at level crossings	Minor traffic impacts at level crossings	Localised impac	ets at Langwarrin	Localised impa	cts at Baxter
Assessment result								
Recommendation	<u>Consider in</u> <u>Full Business</u> <u>Case</u>	Could consider in Full Business Case <u>with higher bus</u> <u>frequencies</u>	Could consider in Full Business Case	<u>Consider in Full Business</u> <u>Case</u> Indicative Preferred Option		in Full Business ase	Could consider ir Cas	

BCR calculations do not include the cost of any additional rolling stock requirements \*\* BCR is based on a wide error margin that will require further detailed modelling in the Full Business Case

## Recommendation

## Based on the initial analysis in the PBC, none of the investment options have demonstrated a strong economic case for priority investment.

• All investment options will provide public transport benefits for Frankston and the Mornington Peninsula. However, the economic costs of all options will exceed the benefits, in particular for the electrification options which require a large capital investment of stabling, stations, level crossing removals, and signalling works.

## Of the assessed investment options, the Stony Point Uplift (20 minutes) is the indicative likely preferred. This option:

- requires significantly less capital investment and has less impacts than the electrification options;
- provides additional rail services for population centres at Somerville and Hastings, which would not be provided under the electrification options;
- is estimated to realise a Benefit Cost Ratio (BCR) of 0.44. However, this is based on a wide error margin that will require further detailed modelling in the Full Business Case;
- provides a moderate improvement to rail services, with limited increases in station patronage at the Frankston East precinct. It is not expected to cause significant changes to parking demand at Frankston;
- does not include level crossing removals or significant stabling requirements, and therefore only has minor adverse property, environmental, business, traffic and land use impacts;
- will require further examination of key risks associated with operational issues, service reliability, rolling stock sourcing, timing and costs within the Full Business Case; and
- has the potential to be optimised by providing a 20-minute peak service to Hastings, with a 60-minute all day service from Stony Point. This refinement may offer a more cost-effective outcome while still addressing key needs.

## Other Investment options could be further considered in the Full Business Case

• Key findings on the other options are as follows: Table 3a: Findings on Other Options

Option	Key Findings
Bus Only	Has the lowest capital investment
	• Has the potential to be optimised to capture more benefits (e.g. a 15-minute service may produce better outcomes);
	• Provides some limited improvements to Frankston East, but is unlikely to reduce parking demand at Frankston station
	• Has little to no environmental or social impact and can be implemented much earlier than other options.
Stony Point (30 Minutes)	• A 30 minute peak service frequency is not attractive enough to impact significantly on mode share and reduce car travel. Even at full utilisation, there is still only a relatively small reduction in car travel when compared with other options.
	• By comparison, the Stony Point Uplift (20 minute) option, can realise a greater mode shift and benefits.

Option	Key Findings
Langwarrin Electrification	<ul> <li>Provides a metro service for the Frankston East precinct, significantly increasing station patronage in this area;</li> </ul>
	• Expected to provide a small reduction in parking demand at Frankston Station, however will also reduce bussing patronage at Frankston station;
	• Could also provide an additional bus service to Rye (under Option 3B) which will be further examined in the Full Business Case; and
	• Incorporates level crossing removals at three locations, including the Moorooduc Highway, which will require property acquisition. This option could be optimised by excluding level crossing removals for a more cost-effective outcome, which could be further examined in the Full Business Case.
Baxter Electrification	• Provides the greatest benefit but has the highest capital cost, which would therefore result in the poorest economic outcome (in Net Present Value terms)
	• Most of the benefits can still be realised by electrification to Langwarrin for less cost.
	• The stabling yards may have groundwater impacts. There could also be impacts on the neighbouring Baxter township.
	• The Mornington Peninsula local council supports electrification of the rail line, but not with Baxter as a terminus station. This is due to concerns over land use impacts and development pressure on Baxter, which is a small township adjacent to Green Wedge land.
	<ul> <li>Incorporates level crossing removals at five locations, including the Moorooduc Highway, which will require property acquisition. This option could be optimised by excluding level crossing removals for a more cost-effective outcome, which could be further examined in the Full Business Case.</li> </ul>

## **Next Steps**

The Full Business Case (FBC) will require following investigations to occur:

## **Problem Definition**

• Further evaluation on the extent of the Frankston car parking issue. In particular, evidence whether the capacity of station parking creates an impact on all-day parking availability and economic performance of the Frankston centre

## **Stony Point Uplift Options:**

- Improve the model validation for the diesel (Stony Point) services to provide a more accurate estimate of patronage levels and parking demand for the Stony point uplift option
- In conjunction with parking demand assessment, develop station precinct concept layouts for each station on the Stony Point Line.
- Further investigation to determine reliability and platform impacts
- Further investigation to prove / validate the operational viability of the proposed service plan, passing loop length and loop locations
- Further investigation of rolling stock sourcing, options and costs
- Full evaluation of level crossings and associated detailed safety assessments.
- Targeted flora and fauna studies to confirm the environmental risks and approvals required.
- Further optimisation of this option, including opportunities to reduce cost by removing the passing loop at Bittern and optimisation of the Service Plan

### **Electrification Options (if considered further):**

- Full evaluation of level crossing removal options, including input from stakeholders and community
- Targeted flora and fauna studies to confirm the environmental risks and approvals required. A particular focus will be on the area near Langwarrin
- Development of a basic Urban Design Strategy
- Further investigation of congestion issues in the Frankston MAC and assessment of traffic impacts resulting from new stations and/or additional parking at Frankston, Langwarrin Stations.
- Stakeholder and/or community consultation for level crossing removal options, particularly at Moorooduc Highway

#### **Bussing Option (if considered further):**

- Refined modelling to better understand the impacts and benefits of the express bus services, including their effect on car trips
- Optimisation of service planning, test increased frequency

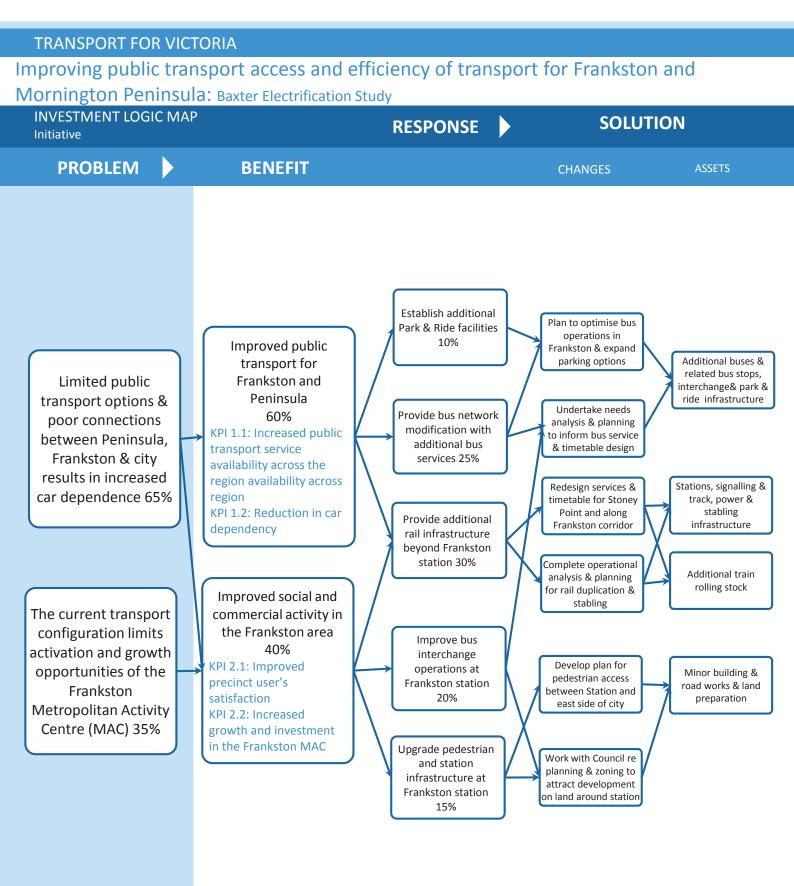
#### Demand Forecast Economic Modelling:

- Determine the impacts and potential synergies of the proposed Frankston Station car park
- Refine the patronage forecast for Frankston East (Leawarra) station, considering the position of the station and growth factors for the surrounding precinct
- Full update of the Cost-Benefit, Analysis, also consider quantifying 'reliability' benefits
- Consider undertaking a wider economic impact assessment to determine the potential positive business and employment impacts for Frankston and Baxter

#### Stakeholder Consultation

Stakeholder Consultation with Monash University, Frankston Hospital, Council, Transport operators

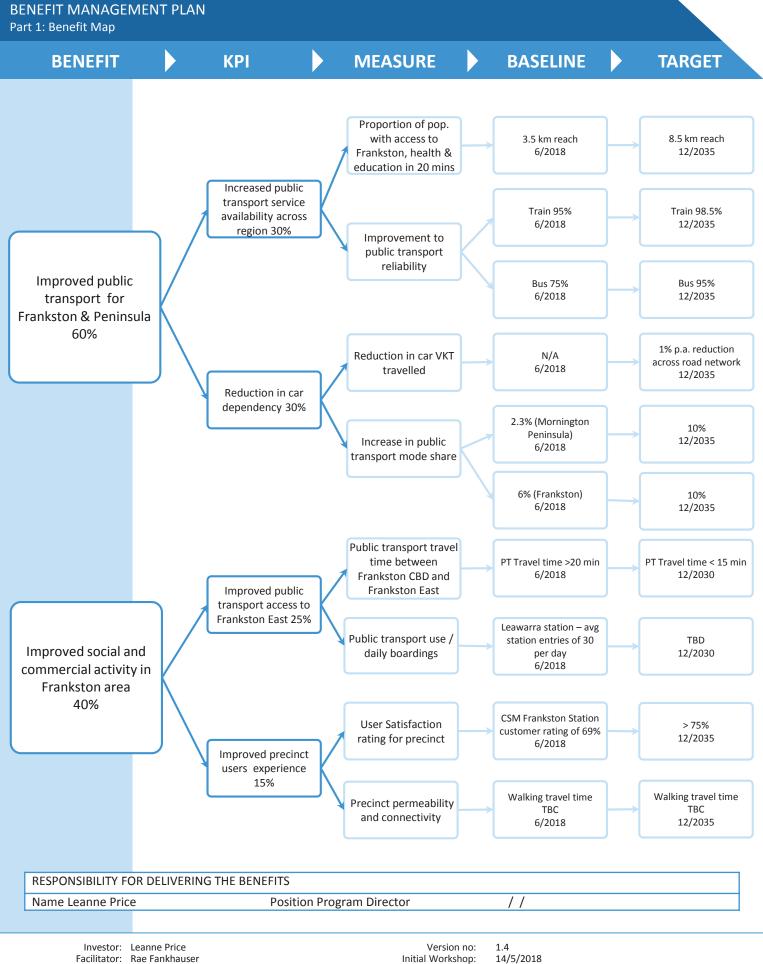
## Appendix A – Investment Management Standards Outputs



4.0 24/4/2018 Kate Jackson 10/10/2018 6.0

## TRANSPORT FOR VICTORIA

## Improving public transport access and efficiency of transport for Frankston and Mornington Peninsula: Baxter Electrification Study



Facilitator: Rae Fankhaus Accredited Facilitator: Yes Initial Workshop: Last modified by: Template version: 1.4 14/5/2018 Kate Jackson 25/01/19 6.0 **Appendix B – Project Scope Summaries** 



Version

Date

6/11/2018

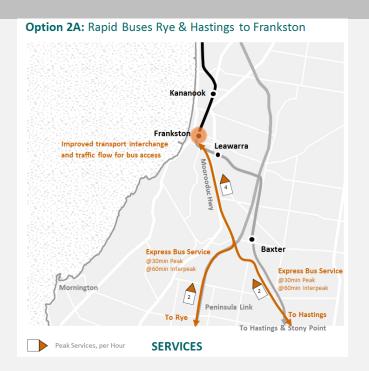
## SUMMARY

#### SERVICES

Bus Services from Frankston to Hastings:

- -express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

<u>Bus Services from Frankston to Rye:</u> -express bus every 30 min during peaks -express bus every 60 min during inter-peak -express bus every 60 min during off-peak



#### **INFRASTRUCTURE**

-Bus priority lanes -Premium bus stops -Signal technology upgrades Kananool -New signals -Intersection upgrades -Road signs/line marking Frankston -Reconfiguration of Frankston Station bus Leawarra stops/layover **Bus Infrastructure** Upgrades Baxter Limited Stops, Mornington **Direct Route** Peninsula Link **INFRASTRUCTURE** 



<u>Frankston</u>					CROSSING REMOVAL	
Version	Da	te	6/11	/2018		AUTHORITY
ELEMENTS						
Item	Description					References/ Assumptions
SERVICES						
Service Plan –						
Western Bus	Stop Location	2 Hour	rpeak	2 H	our peak	
		Starting	Total	Starting	Total	
	Frankston Station	4	4	4	4	
	Monash Health & Education Precinct	4	4	4	4	
	Frankston South	4	4	4	4	
	Baxter	4	4	4	4	
	Dromana	4	4	4	4	
	Rosebud	4	4	4	4	
	Rye	4	4	4	4	
Service Plan –						
Eastern Bus	Stop Location		2 Hour peak 2 Hour peak		-	
		Starting	Total	Starting	Total	
	Frankston Station	4	4	4	4	
	Monash Health & Education Precinct	4	4	4	4	
	Baxter	4	4	4	4	
	Somerville	4	4	4	4	
	Tyabb	4	4	4	4	
	Hastings	4	4	4	4	
Timetable  - Western Bus	<ul> <li>2 buses in each peaks</li> <li>1 bus per home</li> </ul>				AM and PM	
Timetable - Eastern Bus	peaks	uses in each direction per hour during the AM and PM aks us per hour during interpeak and off-peak				
Bus Fleet – Western Bus	• 5 buses to o	perate the A	AM 30 mir	nute peak se	ervice to Rye	
Bus Fleet – Eastern Bus	<ul> <li>3 buses to o Hastings</li> </ul>	perate the A	AM 30 mir	nute peak se	ervice to	

Date

Version



ELEMENTS					
ltem	Description	References/ Assumptions			
INFRASTRU	JCTURE				
Bus Stops	<ul> <li>Frankston Station</li> <li>Bus interchange and intersection modifications to assist bus services.</li> <li>Improved pedestrian access</li> <li>Shared Bus Stops (Both Services)</li> <li>Frankston Station (Fletcher Rd)</li> <li>Monash Health &amp; Education Precinct</li> <li>Frankston South (Debiasen Pd)</li> </ul>				
	<ul><li>Frankston South (Robinson Rd)</li><li>Baxter</li></ul>				
	<ul> <li>Frankston to Hastings Service</li> <li>Somerville</li> <li>Tyabb</li> <li>Hastings</li> </ul>				
	<ul> <li>Frankston to Rye Service</li> <li>Dromana</li> <li>Rosebud</li> <li>Rye</li> <li>New premium bus stops with PIDS at all of the above locations.</li> </ul>				

6/11/2018



Date

6/11/2018

ELEMENTS					
Item	Description	References/ Assumptions			
Major Civil Works	<ul> <li><u>Road Upgrades</u></li> <li>Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection <ul> <li>1 x bus interchange and intersection upgrade.</li> <li>5 x advanced bus detection and priority phasing</li> <li>1 x bus queue jump lane.</li> </ul> </li> </ul>				
	<ul> <li>Moorooduc Hwy/ Hastings Rd intersection to Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy).</li> <li>6 x advanced bus detection and priority phasing</li> <li>2 x roundabout metering &amp; advance bus detention.</li> </ul>				
	<ul> <li>Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy).</li> <li>/Mornington Peninsula Fwy to Frankston Flinders Rd/High St <ul> <li>1 x intersection modification and realignment and advanced bus detection and priority phasing</li> <li>1 x advanced bus detection and priority phasing.</li> <li>1 x intersection conversion (to signals).</li> </ul> </li> <li>Frankston/Flinders Rd/Mornington Peninsula Fwy (north of Fwy) to Point Nepean Rd/ Dundas St <ul> <li>15 x advanced bus detection and priority phasing.</li> </ul> </li> </ul>				
Noise	<ul> <li>15 x advanced bus detention and priority phasing.</li> <li>No further noise mitigation required</li> </ul>				
Urban Design	Urban design detail required at Frankston Station. Other locations TBC. This will be investigated further in the full business case				
Major Utilities	No major utility conflicts have been identified to date which could have a significant impact on cost/construction.				
OTHER SCOP	E				
Property & Land	Potential land acquisition for Eastern bus new roundabout (Frankston-Flinders Rd/Graydens Rd intersection)				
Integrated Development	No viable IDOs identified at this current time				
Environment- Flora & Fauna	To be determined. Current desktop investigations are limited to between Frankston and Baxter				
Environment- Heritage	To be determined. Current desktop investigations are limited to between Frankston and Baxter				
WAIVERS/ D	EVIATIONS FROM STANDARDS				



Version	Date	6/11/2018

ELEMENTS		
Item	Description	References/ Assumptions
Vertical Clearance	N/A	
Approach Sight Distance	N/A	
Line Speed	N/A	
Grade	N/A	
Power	N/A	
Stabling	N/A	
Maintenance Access	N/A	
DESIGN		
Design Report	Baxter Strategic Bus Routing Options Assessment Report	LXRA-DVPR-14-TR-RPT-023
Design Packages	High level concept design sketches covering the proposed bus routes are included.	LXRA-DVPR-14-TR-RPT-023



Version	1	Date	10-03-2018	
SUMMAR	Y			
SERVICES				
- express bu -express bus	every 60 mir	<u>con to Rye:</u> n during peaks n during inter-peak n during off-peak		Kananook

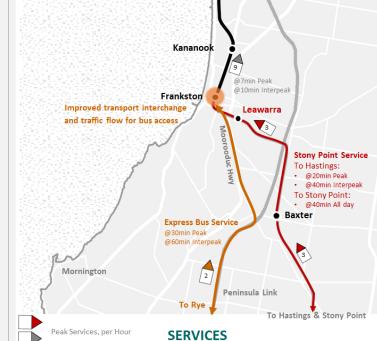
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#### Train services running from Frankston to Stony Point (through Leawarra and Baxter):

Date

**To Hastings** 

- 20 min peak service
- 40 min inter-peak service
- **To Stony Point**
- 40 min all day service



## **INFRASTRUCTURE**

#### **Rail Infrastructure**

-Assumed no new rail infrastructure required
at Frankston Station to accommodate the
Stony Point service uplift.
-New passing loop at Langwarrin
- New passing loop at Tyabb with two new
side platforms
-New passing loop at Bittern with additional
side platform.
Turnback siding & potential DMU stabling at
Hastings.
nastings.
-Potential power upgrade requirements for
new signalling (TBC)
-New signalling infrastructure associated with
passing loops
<ul> <li>Minor station upgrades (scope TBC)</li> </ul>



Version	1	Date	10-03-2018		
SUMMARY					
boom barrier following loca loops: -Robinsons Ro -Golf Links Ro Upgrade to po passive to con maze associat -Tyabb station <b>Bus Infrastru</b> -Bus priority I -Premium bus	ad edestrian level of mpliant active of ted with the pas n <b>cture Upgrades</b> anes s stops blogy upgrades upgrades	ghts at the d with passing crossings from cossing with using loops:	Mornington	Kananook Frankston Bus Infrastructure Upgrades Peninsula Link	Passing Loop at Langwarrin Baxter Passing Loops and station upgrades at Tyabb & Bittern e DMU g at
-	ion of Frankstor	n Station bus		Hasting	<u>7</u> 5

## **ELEMENTS**

Frankston

Somerville

Hastings

Stony Point

Item	Description					References/ Assumptions
SERVICES						
Service Plan -						
Rail	Station	2 Hou	r peak	2 H	our peak	
		Starting	Total	Starting	Total	

Option 2B-SP20: Stony Point Service Uplift Betwee Frankston & Hastings (with passing loops) & Fast

<u>Frankston & Hastings (with passing loops) & Fast</u> Bus to Rye – 20 minute peak service plan



Version	1	Date	10-03-2018

ELEMENTS						
ltem	Description					References/ Assumptions
Service Plan – Western Bus	Stop Location	2 Hour peak 2 Hour peak				
		Starting	Total	Starting	Total	
	Frankston Station	4	4	4	4	
	Monash Health & Education Precinct	4	4	4	4	
	Frankston South	4	4	4	4	
	Baxter	4	4	4	4	
	Dromana	4	4	4	4	
	Rosebud	4	4	4	4	
	Rye	4	4	4	4	
Timetable – Rail	<ul> <li>3 trains per</li> <li>1.5 train per</li> </ul>			ak		
Timetable - Western Bus	• 2 buses in ea peaks 1 bus per ho			r during the A -peak	M and PM	
Rolling Stock – Rail	4 x 2 car DMUs (	Sprinters)				
Bus Fleet – Western Bus	5 buses to operate the AM 30 minute peak service to Rye					
INFRASTRUC	TURE					
Rail Track	Passing Loops Langwa Tyabb Bittern Modify level cro Robinsc Golf Lin	<b>ssings at th</b> ons Road				

## Option 2B-SP20: Stony Point Service Uplift Betwee Frankston & Hastings (with passing loops) & Fast



Version	1	Date	10-03-2018	
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ELEMENTS	NTS					
ltem	Description	References/ Assumptions				
Stations	<ul> <li>Frankston Station</li> <li>New bus bays for the Rye fast bus on Fletcher Road with real time information (PIDS)</li> <li>Improved pedestrian access</li> <li>All stations between Leawarra and Stony Point</li> <li>Minor upgrades e.g. additional canopy coverage at higher patronage stations, formalising car parking areas to provide asphalt surface, signage, lighting and CCTV.</li> </ul>					
Bridges	N/A					
Rail Traction Power	N/A					
Rail Signalling	<ul> <li>Modify the following systems to support the track configuration and infrastructure changes (passing loops):</li> <li>Signals</li> <li>Train Control</li> <li>Existing communication network</li> <li>Signal Power</li> <li>Train Detection System</li> <li>Upgrade and/or new CSR</li> </ul>					
Stabling	<ul> <li>Assumed additional rolling stock for this improved service will be stabled and refuelled at Kananook. Additional Kananook infrastructure required: <ul> <li>Stabling for 4 x 2 car DMUs</li> <li>DMU refuelling point</li> <li>Second, futureproofed holding road may be required to be constructed for Day 1 of the new service due to operational constraints. TBC.</li> <li>Alternative option for DMU stabling at Hastings</li> </ul> </li> </ul>					

## Option 2B-SP20: Stony Point Service Uplift Betwee Frankston & Hastings (with passing loops) & Fast Bus to Rye – 20 minute peak service plan



Version	1	Date	10-03-2018

ELEMENTS					
Item	Description	References/ Assumptions			
Bus Stops	<ul> <li>Frankston Station</li> <li>Bus interchange and intersection modifications to assist bus services.</li> <li>Improved pedestrian access</li> <li>Frankston to Rye Service <ul> <li>Frankston Station (Fletcher Rd)</li> <li>Monash Health &amp; Education Precinct</li> <li>Frankston South (Robinson Rd)</li> <li>Baxter</li> <li>Dromana</li> <li>Rosebud</li> <li>Rye</li> </ul> </li> <li>New premium bus stops with PIDS at all of the above locations.</li> </ul>				

## Option 2B-SP20: Stony Point Service Uplift Betwee Frankston & Hastings (with passing loops) & Fast Bus to Rye – 20 minute peak service plan



Version	1	Date	10-03-2018

ELEMENTS					
ltem	Description	References/ Assumptions			
Major Civil Works	<u>Civil works including drainage associated with passing loops at</u> the following locations:				
	Langwarrin				
	• Tyabb				
	• Bittern				
	Modification of boom barriers and flashing light positions associated with level crossing upgrades at the following locations:				
	Robinsons Road				
	Golf Links Road				
	Road Upgrades				
	Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection				
	<ul> <li>1 x bus interchange and intersection upgrade.</li> <li>5 x advanced bus detection and priority phasing</li> <li>1 x bus queue jump lane.</li> </ul>				
	Moorooduc Hwy/Hastings Rd & to Frankston Flinders Rd/ Mornington Peninsula Fwy (east of Fwy).				
	<ul> <li>4 x advanced bus detection and priority phasing</li> <li>2 x roundabout metering &amp; advance bus detention.</li> </ul>				
	Nepean Hwy/Mornington Peninsula Fwy to Point Nepean Rd/ Dundas St				
	• 15 x advanced bus detection and priority phasing				
Noise	No further noise mitigation required				
Urban Design	Not required at this level of design				
Major Utilities	No major utilities conflicts currently identified				
OTHER SC	OPE				
Property & Land	No significant land acquisition has been identified to date.				

Option 2B-SP20: Stony Point Service Uplift Betwee Frankston & Hastings (with passing loops) & Fast Bus to Rye – 20 minute peak service plan



Version	1	Date	10-03-2018

ELEMENTS		
ltem	Description	References/ Assumptions
Integrated Development	No viable IDOs identified at this current time	
Environment- Flora & Fauna	To be determined. Current desktop investigations are limited to between Frankston and Stony Point	
Environment- Heritage	To be determined. Current desktop investigations are limited to between Frankston and Stony Point	
WAIVERS/ D	EVIATIONS FROM STANDARDS	
Vertical Clearance	To be determined in full business case	
Approach Sight Distance	To be determined in full business case	
Line Speed	To be determined in full business case	
Grade	To be determined in full business case	
Power	To be determined in full business case	
Stabling	To be determined in full business case	
Maintenance Access	To be determined in full business case	
DESIGN		
Design Report	Baxter Electrification – Rail Concept Design Report	LXRA-DVPR-14-RL-RPT-003
	Baxter Strategic Bus Routing Options Assessment Report	LXRA-DVPR-14-TR-RPT-023
	Stony Point Service Plan Uplift Report	LXRA-DVPR-14-RL-RPT-0005
Design Packages	Concept Design drawings covering the below design packages are available.	
	Rail Infrastructure, including track, civil, station platforms     and pedestrian crossings	



10-03-2018 1 Date Version

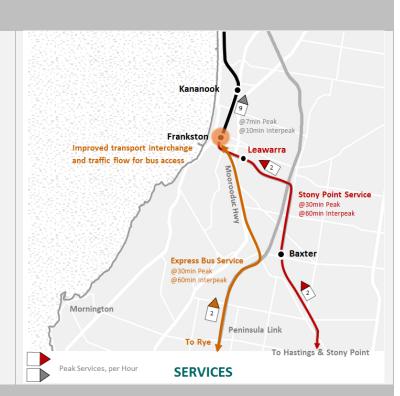
## **SUMMARY**

#### **SERVICES**

Bus Services from Frankston to Rye: -express bus every 30 min during peaks -express bus every 60 min during inter-peak -express bus every 60 min during off-peak

Train services running from Frankston to Hastings (through Leawarra and Baxter):

- every 30 min during peaks
- every 60 min during interpeak



#### **INFRASTRUCTURE**

#### **Rail Infrastructure**

-Assumed no new rail infrastructure required at Frankston Station to accommodate the Stony Point service uplift.

-New passing loop at Somerville with new side platform

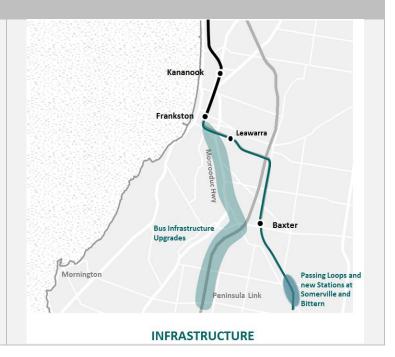
- New passing loop at Bittern with additional side platform

-Potential power upgrade requirements for new signalling (TBC) -New signalling infrastructure associated with

passing loops

-Minor station upgrades (scope TBC)

Level crossing modification to reposition the boom barriers and flashing lights at the



Option 2B-SP30: Stony Point Service Uplift Betwee Frankston & Hastings (with passing loops) & Fast Bus to Rye – 30 minute peak service plan



Version	1	Date	10-03-2018
SUMMARY			
loops: - Eramo	ions associa osa Road aart Crescent	ted with passing t	
passive to comp maze associate - Somer	pliant active	bassing loops:	
Bus Infrastructor -Bus priority lar -Premium bus s -Signal technolo -New signals -Intersection up -Road signs/line -Reconfiguratio stops/layover	nes stops ogy upgrade pgrades e marking	25	

ELEMENTS						
Item	Description					References/ Assumptions
SERVICES						
Service Plan - Rail	Station		r peak		our peak	
		Starting	Total	Starting	Total	

	Starting	Total	Starting	Total	
Frankston	4	4	4	4	
Somerville	4	4	4	4	
Hastings	4	4	4	4	
Stony Point	4	4	4	4	



Version	1	Date	10-03-2018

ELEMENTS						
Item	Description					References/ Assumptions
Service Plan – Western Bus	Stop Location	2 Hou	r peak	2 Ho	ur peak	
		Starting	Total	Starting	Total	
	Frankston Station	4	4	4	4	
	Monash Health & Education Precinct	4	4	4	4	
	Frankston South	4	4	4	4	
	Baxter	4	4	4	4	
	Dromana	4	4	4	4	
	Rosebud	4	4	4	4	
	Rye	4	4	4	4	
Timetable – Rail	<ul> <li>2 trains per l</li> <li>1 train per h</li> </ul>	-	-			
Timetable - Western Bus	• 2 buses in ea peaks 1 bus per ho			r during the A peak	M and PM	
Rolling Stock – Rail	4 x 2 car DMUs (S	Sprinters)				
Bus Fleet – Western Bus	5 buses to opera	te the 30 m				
INFRASTRUC	TURE					
Rail Track	Passing Loops Somervi Bittern Modify level cross Eramosa Urquhar	ssings at th	e followir	g locations:		

Option 2B-SP30: Stony Point Service Uplift Betwee Frankston & Hastings (with passing loops) & Fast



Version	1	Date	10-03-2018

ELEMENTS		
Item	Description	References/ Assumptions
Stations	<ul> <li>Frankston Station</li> <li>New bus bays for the Rye fast bus on Fletcher Road with real time information (PIDS)</li> <li>Improved pedestrian access</li> <li>All stations between Leawarra and Stony Point</li> <li>Minor upgrades e.g. additional canopy coverage at higher patronage stations, formalising car parking areas to provide asphalt surface, signage, lighting and CCTV.</li> </ul>	
Bridges	N/A	
Rail Traction Power	N/A	
Rail Signalling	<ul> <li>Modify the following systems to support the track configuration and infrastructure changes (passing loops):</li> <li>Signals</li> <li>Train Control</li> <li>Existing communication network</li> <li>Signal Power</li> <li>Train Detection System</li> <li>Upgrade and/or new CSR</li> </ul>	
Stabling	<ul> <li>Assumed additional rolling stock for this improved service will be stabled and refuelled at Kananook. Additional Kananook infrastructure required: <ul> <li>Stabling for 4 x 2 car DMUs</li> <li>DMU refuelling point</li> <li>Second, futureproofed holding road may be required to be constructed for Day 1 of the new service due to operational constraints. TBC.</li> <li>Alternative option for DMU stabling at Hastings</li> </ul> </li> </ul>	

Option 2B-SP30: Stony Point Service Uplift Betwee Frankston & Hastings (with passing loops) & Fast



Version	1	Date	10-03-2018

ELEMENTS		
ltem	Description	References/ Assumptions
Bus Stops	<ul> <li>Frankston Station</li> <li>Bus interchange and intersection modifications to assist bus services.</li> <li>Improved pedestrian access</li> </ul> Frankston to Rye Service <ul> <li>Frankston Station (Fletcher Rd)</li> <li>Monash Health &amp; Education Precinct</li> <li>Frankston South (Robinson Rd)</li> <li>Baxter</li> <li>Dromana</li> <li>Rosebud</li> <li>Rye</li> </ul> New premium bus stops with PIDS at all of the above locations.	

## Option 2B-SP30: Stony Point Service Uplift Betwee Frankston & Hastings (with passing loops) & Fast Bus to Rye – 30 minute peak service plan



Version	1	Date	10-03-2018

ELEMENTS					
Item	Description	References/ Assumptions			
Major Civil Works	<u>Civil works including drainage associated with passing loops at</u> the following locations:				
	Somerville				
	• Bittern				
	Modification of boom barriers and flashing light positions associated with level crossing upgrades at the following locations:				
	Eramosa Road				
	Urquhart Crescent				
	Road Upgrades				
	Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection				
	<ul> <li>1 x bus interchange and intersection upgrade.</li> <li>5 x advanced bus detection and priority phasing</li> <li>1 x bus queue jump lane.</li> </ul>				
	Moorooduc Hwy/Hastings Rd & to Frankston Flinders Rd/ Mornington Peninsula Fwy (east of Fwy).				
	<ul> <li>4 x advanced bus detection and priority phasing</li> <li>2 x roundabout metering &amp; advance bus detention.</li> </ul>				
	Nepean Hwy/Mornington Peninsula Fwy to Point Nepean Rd/ Dundas St				
	• 15 x advanced bus detection and priority phasing				
Noise	No further noise mitigation required				
Urban Design	Not required at this level of design				
Major Utilities	No major utilities conflicts currently identified				
OTHER SC	OPE				
Property & Land	No significant land acquisition has been identified to date.				
Integrated Development	No viable IDOs identified at this current time				

Option 2B-SP30: Stony Point Service Uplift Betwee Frankston & Hastings (with passing loops) & Fast



١	Version	1	Date	10-03-2018

ELEMENTS				
Item	Description	References/ Assumptions		
Environment- Flora & Fauna	To be determined. Current desktop investigations are limited to between Frankston and Baxter			
Environment- Heritage	To be determined. Current desktop investigations are limited to between Frankston and Baxter			
WAIVERS/ DI	EVIATIONS FROM STANDARDS			
Vertical Clearance	To be determined in full business case			
Approach Sight Distance	To be determined in full business case			
Line Speed	To be determined in full business case			
Grade	To be determined in full business case			
Power	To be determined in full business case			
Stabling	To be determined in full business case			
Maintenance Access	To be determined in full business case			
DESIGN				
Design Report	Baxter Electrification – Rail Concept Design Report	LXRA-DVPR-14-RL-RPT-003		
	Baxter Strategic Bus Routing Options Assessment Report	LXRA-DVPR-14-TR-RPT-023		
	Stony Point Service Plan Uplift Report	LXRA-DVPR-14-RL-RPT-0005		
Design Packages	Concept Design drawings covering the below design packages are available.			
	Rail Infrastructure, including track, civil, station platforms     and pedestrian crossings			



Version

Date

03-10-2018

#### SUMMARY

#### SERVICES

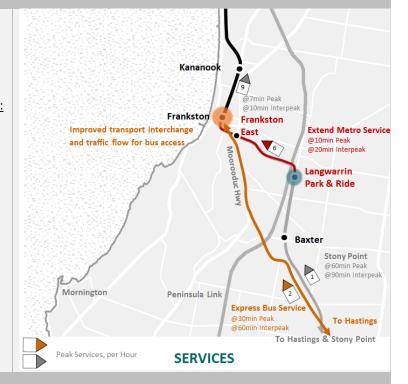
Bus Services from Frankston to Hastings:

1

- -express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

Metro services from Frankston to Langwarrin:

- every 10 min during peaks
- every 20 min during inter-peak
- every 20 min during off-peak



#### **INFRASTRUCTURE**

#### **Frankston Station:**

-Two additional platforms (island platform)
- Overpass and associated infrastructure and facilities for platform connectivity
- Re-signalling within the station limits with

existing computer based interlocking at Kananook modified to incorporate new Frankston configuration

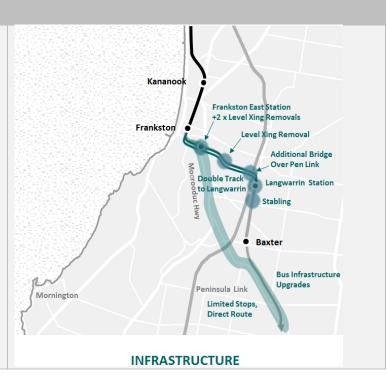
- Overhead traction power infrastructure associated with new station layout.

- Demolish the existing Frankston traction
- substation and construct new substation - Removal of redundant infrastructure e.g.

stabling sidings, mechanical signalling interlocking and timber signal box

#### Frankston East Station:

-New side platform host station and associated facilities and infrastructure





Version	1	Date	03-10-2018	AUTHORITY
SUMMARY	,			
-		nts to the SUPs to ss Moorooduc Hwy	4	
Langwarrin S - New 3 platf associated in - Park and ric associated in	orm premium frastructure le for up to 10			
Peninsula Lir -Additional ra		<sup>-</sup> Peninsula Link		
required) bet Stations:	el crossing rer ween Frankst d (road closur Hwy (road un	der rail)	n	
<b>Track and O</b> -Duplicate 6 I Langwarrin		<b>ture:</b> nd electrify to		
	tation and ass	Frankston and ne sociated power	w	
	ervices Route ute with diver d Langwarrin			
Substations: -1 x demolition of existing substation (at Frankston). -3 x new 4 megawatt substations (at Frankston, Frankston East and Langwarrin)				
Power: -22kv feeder traction pow		rrin zone sub to		
		roads for EMUs r DMUs		



1	Date	03-10-2018	
	· ·		
rastructur	e		
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nes			
stops			
ogy upgra	des		
pgrades			
e marking			
on of Fran	kston Station bus		
	rastructur sure: nes stops ogy upgra pgrades e marking	rastructure cure: nes stops ogy upgrades	rastructure sure: nes stops ogy upgrades pgrades e marking

ELEMENTS						
ltem	Description			References/ Assumptions		
SERVICES						
Service Plan - Rail	Station	2 Hou	r peak	2 H	our peak	
		Starting	Total	Starting	Total	
	Frankston	18	18	18	18	
	Langwarrin	12	12	12	12	
	Stony Point	2	2	2	2	
Service Plan –				1		
Eastern Bus	Stop Location	2 Hour peak		2 Hour peak		
		Starting	Total	Starting	Total	
	Frankston Station	4	4	4	4	
	Monash Health & Education Precinct	4	4	4	4	
	Baxter	4	4	4	4	
	Somerville	4	4	4	4	
	Tyabb	4	4	4	4	
	Hastings	4	4	4	4	
Timetable – Rail	<ul> <li>10 minute se</li> <li>20 minute se and off peak</li> </ul>	rvice to/fr	-	-	the peak. the interpeak	



Version	1 <b>Date</b> 03-10-2018	AUTHORITY
ELEMENTS		
ltem	Description	References/ Assumptions
Timetable - Eastern Bus	<ul> <li>2 buses in each direction per hour during the AM and PM peaks</li> <li>1 bus per hour during interpeak and off-peak</li> </ul>	
Rolling Stock – Rail	Additional 3 EMUs to operate the extended service to Langwarrin from Frankston.	
Bus Fleet	3 buses to operate the 30 minute peak service to Hastings	
INFRASTRUC	CTURE	
Rail Track	<ul> <li>Duplication         <ul> <li>Duplicate track from Frankston to Langwarrin (approximately 6 km)</li> </ul> </li> <li>Electrification/Modifications         <ul> <li>Electrify from Frankston to Langwarrin (approximately 5 km dual track)</li> </ul> </li> <li>Upgrade to level crossings at the following locations (should removal not be required):         <ul> <li>Clarendon St</li> <li>Moorooduc Hwy</li> <li>Hillcrest Rd</li> </ul> </li> </ul>	
Stations	<ul> <li>Frankston Station         <ul> <li>Two addition platforms (island platform)</li> <li>Improved pedestrian access/overpass/associated infrastructure to accommodate the new platforms</li> <li>New bus bays with real time information (PIDS) for Hastings fast bus</li> </ul> </li> <li>Frankston East Station:         <ul> <li>New host station with two side platforms and associated station facilities</li> </ul> </li> <li>Langwarrin Station:         <ul> <li>New 3 platform premium station and associated infrastructure</li> </ul> </li> </ul>	
Bridges	New bridge over Peninsula Link to accommodate the additional rail track	



Version	1 Date	03-10-2018	AUTHORITY
ELEMENTS			
Item	Description	References/ Assumptions	
Rail Traction Power	power substations	ostations varrin zone sub to traction re between Frankston and	
Rail Signalling	<b>U U</b>	-	
Stabling	with a minimum of:	-	
Bus Stops	services. Improved pedestrian access <u>Frankston to Hastings Service</u> Frankston Station (Fletc Monash Health & Educa Frankston South (Robin Baxter Somerville Tyabb Hastings	ation Precinct son Rd)	
	New premium bus stops with PI	DS at all of the above locations.	



/ Assumptions

Version	1	Date	03-10-2018	
ELEMENTS				
Item	Descriptio	on		References/
Major Civil Works	<ul> <li>Net</li> <li>State</li> <li>State</li> <li>Net</li> <li>Ot</li> <li>fixe</li> <li>Ret</li> <li>Ret<!--</th--><th>ed infrastructure moval of level cross des (opposite Frankston ion bus interchange and advanced bus detect bus queue jump lar Hwy/ Hastings Rd ir ton Peninsula Fwy ( advanced bus detect roundabout meteri linders Rd/Morningt n Peninsula Fwy to F intersection modifie vanced bus detectio</th><th>duplication ciated with substations and ings (if required). Station) to Moorooduc/ H d intersection upgrade. ction and priority phasing ne. htersection to Frankston Fl south of Fwy). ction and priority phasing ng &amp; advance bus detention con Peninsula Fwy (south of Frankston Flinders Rd/High cation and realignment and n and priority phasing ction and priority phasing</th><th>lastings inders in. f Fwy). St</th></li></ul>	ed infrastructure moval of level cross des (opposite Frankston ion bus interchange and advanced bus detect bus queue jump lar Hwy/ Hastings Rd ir ton Peninsula Fwy ( advanced bus detect roundabout meteri linders Rd/Morningt n Peninsula Fwy to F intersection modifie vanced bus detectio	duplication ciated with substations and ings (if required). Station) to Moorooduc/ H d intersection upgrade. ction and priority phasing ne. htersection to Frankston Fl south of Fwy). ction and priority phasing ng & advance bus detention con Peninsula Fwy (south of Frankston Flinders Rd/High cation and realignment and n and priority phasing ction and priority phasing	lastings inders in. f Fwy). St

At this stage it is assumed the no noise mitigation is required i.e.

No major utility conflicts have been identified to date which

could have a significant impact on cost/construction

To be detailed in full business case

noise walls/bunds

•

Noise

**Urban Design** 

**Major Utilities** 

**OTHER SCOPE** 



Version	1	Date	03-10-2018	AUTHORITY
ELEMENTS				
Item	Descriptio	on		References/ Assumptions
Property & Land	Langwarrin Property ac crossing rer • Mooro • Hillcres Potential ch crossing up increased n • Clarence	for new stabling quisitions will be movals at the foll oduc Hwy at Rd nange in ownersh grades (should re umber of tracks don St oduc Hwy	<ul> <li>of land acquisition required in association w lowing locations:</li> <li>nip of land associated with emovals not be required) a at the following locations:</li> </ul>	ith level level and
Integrated Development	No viable o	pportunities ider	ntified at this current time	
Environment- Flora & Fauna		mined. Current o ankston and Bax	desktop investigations are ter	limited to
Environment- Heritage		mined. Current of ankston and Bax	desktop investigations are ter	limited to
WAIVERS/ DI	EVIATIONS	FROM STANE	DARDS	
Vertical Clearance	To be deter	mined in full bus	siness case	
Approach Sight Distance	To be deter	mined in full bus	siness case	
Line Speed	No change	to line speeds		
Grade	No change	to grades propos		
Power	To be deter	mined in full bus		
Stabling	To be deter	mined in full bus	siness case	
Maintenance Access	To be deter	mined in full bus		
DESIGN				



Version	1	Date	03-10-2018	AUTHORITY
ELEMENTS				
ltem	Descriptio	References/ Assumptions		
Design Report		Electrification · Strategic Bus R	LXRA-DVPR-14-RL-RPT-003 rt LXRA-DVPR-14-TR-RPT-023	
•	s sign drawing ucture, inclue	Drawings referenced in relevant reports.		



Version

Date

03-10-2018

#### SUMMARY

#### SERVICES

Bus Services from Frankston to Hastings:

1

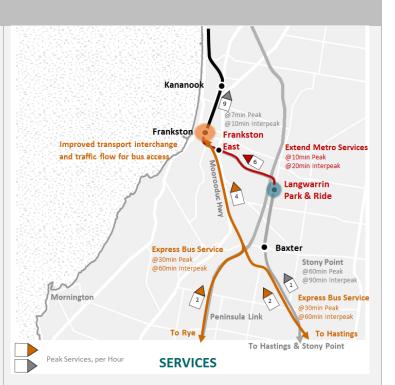
- express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

#### Bus Services from Frankston to Rye:

express bus every 30 min during peaks
express bus every 60 min during inter-peak
express bus every 60 min during off-peak

Metro services from Frankston to Langwarrin:

- every 10 min during peaks
- every 20 min during inter-peak
- every 20 min during off-peak



#### **INFRASTRUCTURE**

#### **Frankston Station:**

-Two additional platforms (island platform) - Overpass and associated infrastructure and facilities for platform connectivity

- Re-signalling within the station limits with existing computer based interlocking at Kananook modified to incorporate new Frankston configuration

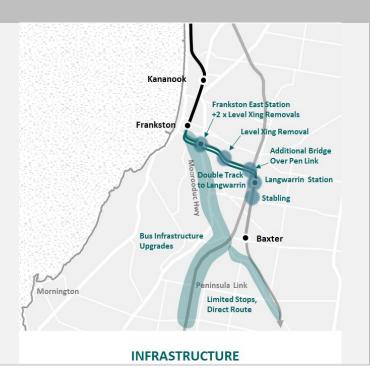
- Overhead traction power infrastructure associated with new station layout.

- Demolish the existing Frankston traction substation and construct new substation

- Removal of redundant infrastructure e.g. stabling sidings, mechanical signalling interlocking and timber signal box

#### Frankston East Station:

-New side platform host station and associated facilities and infrastructure





Version	1	Date	03-10-2018	AUTHORITY
SUMMARY	,			
		s to the SUPs to		
improve con	nectivity across	Moorooduc Hwy		
Langwarrin S	tation:			
- New 3 platf associated in	orm premium s frastructure	tation and		
- Park and rid	le for up to 100	0 cars and		
associated in	frastructure			
Peninsula Lin				
-additional ra	il bridge over P	eninsula Link		
Level Crossin	-			
	el crossing remo ween Franksto	ovals (TBC if n and Langwarrin		
Stations:				
	endon Rd (road prooduc Hwy (r			
	rest Rd (road o	-		
Track and OL	IW Infrastructu	10.		
	km of track and	-		
Langwarrin				
Signalling:				
	lling between F tation and asso	rankston and new		
upgrades as r				
Combined Se	ervices Route:			
	ite with diversi	ty between		
Frankston an	d Langwarrin			
Substations:				
-1 x demolition Frankston).	on of existing su	ubstation (at		
-3 x new 4 m	egawatt substa			
Frankston, Fr	ankston East ai	nd Langwarrin)		
Power:				
-22kv feeder power substa		e sub to traction		
Train Stablin	<b>g:</b> nber stabling ro	ads for EMUs		
	abling road for			



Version	1 [	Date	03-10	)-2018		AUTHORITY
SUMMARY						
-Associated in	ofrastructure					
-New signals -Intersection -Road signs/li	lanes s stops ology upgrades upgrades ine marking cion of Frankston St	tation bus				
ELEMENTS						
ltem	Description					References/ Assumptions
SERVICES						
Service Plan –				I		_ •
Rail	Station 2 Hour pe			23	Hour peak	
		Starting	Total	Starting	Total	
	Frankston	18	18	18	18	

ervice Plan –					
Vestern Bus Stop Location	2 Hou	ır peak	2 Hour peak		
	Starting	Total	Starting	Total	
Frankston Station	4	4	4	4	
Monash Health & Education Precinct	4	4	4	4	
Frankston South	4	4	4	4	
Baxter	4	4	4	4	
Dromana	4	4	4	4	
Rosebud	4	4	4	4	
Rye	4	4	4	4	

Langwarrin

**Stony Point** 



1 Date 03-10-2018					
iption		References/ Assumptions			
ocation	2 Hou	r peak	2 Ho	our peak	•
	Starting	Total	Starting	Total	
ston n	4	4	4	4	
sh Health cation ct	4	4	4	4	
r	4	4	4	4	
rville	4	4	4	4	
	4	4	4	4	
igs	4	4	4	4	
	rvice to/fro	-	arrin during t arrin during t	the peak. the interpeak	•
aks			<sup>-</sup> during the <i>i</i> nd off-peak	AM and PM	•
aks	ch directio ur during ir	AM and PM	•		
	rains to op Frankston.	vice to	•		
ouses to op	perate the	•			
ouses to op	perate the	•			
bu	ses to op	ses to operate the		ses to operate the 30 minute peak service	ses to operate the 30 minute peak service to Rye ses to operate the 30 minute peak service to Hastings



Date 03-10-2018 1 Version **ELEMENTS References/ Assumptions** Item Description Duplication **Rail Track** • Duplicate track from Frankston to Langwarrin (approximately 6 km) **Electrification/Modifications** • Electrify from Frankston to Langwarrin (approximately 5 km dual track) Upgrade to level crossings at the following locations (should removal not be required): Clarendon St Moorooduc Hwy Hillcrest Rd • **Frankston Station** Stations Two addition platforms (island platform) • Improved pedestrian access/overpass/associated infrastructure to accommodate the new platforms New bus bays with real time information (PIDS) for Hastings fast bus **Frankston East Station:** • New host station with two side platforms and associated station facilities Langwarrin Station: New 3 platform premium station and associated infrastructure New bridge over Peninsula Link to accommodate the additional **Bridges** rail track **Rail Traction** Provision of the following: Power Demolition of existing Frankston substation 3 x new 4 megawatt substations 22kv feeder from Langwarrin zone sub to traction substations New OHW infrastructure between Frankston and Langwarrin and for the associated stabling Full re-signalling of Frankston Station and station limits and **Rail Signalling** up to the interface with Kananook New signalling between Frankston and Langwarrin for •

extended electric services



03-10-2018

ELEMENTS		
ltem	Description	References/ Assumptions
Stabling	<ul> <li>Up to 22 no. new stabling roads to be constructed at Langwarrin, with a minimum of:</li> <li>5 No. 160m EMUs to replace the stabling lost at Frankston</li> <li>3 No. 160m EMU's to operate to Langwarrin</li> <li>1 No. 160m road for Stony Point DMUs</li> </ul>	
Bus Stops	Frankston Station         • Bus interchange and intersection modifications to assist bus services.         • Improved pedestrian access         Shared Bus Stops (Both Services)         • Frankston Station (Fletcher Rd)         • Monash Health & Education Precinct         • Frankston South (Robinson Rd)         • Baxter         Frankston to Hastings Service         • Somerville         • Tyabb         • Hastings         Frankston to Rye Service         • Dromana	
	<ul> <li>Dromana</li> <li>Rosebud</li> <li>Rye</li> </ul> New premium bus stops with PIDS at all of the above locations.	



Version	1 D	ate	03-10-2018	
ELEMENTS				
ltem	Description			References/ Assumption
Major Civil Works	Civil works incl New s Stablin New f Other fixed i Remov Road Upgrades Fletcher Rd (op Rd intersection 1 x bus 5 x adv 1 x bus Moorooduc Hw Rd/Mornington 6 x adv 2 x rou Frankston Flind /Mornington Pe 1 x into advance 1 x advance 1 x advance 1 x advance 1 x into	tations ng yard ormation for civil works as nfrastructure val of level cre posite Franks interchange vanced bus de s queue jump ry/ Hastings R Peninsula Fwy vanced bus de indabout met ers Rd/Morni eninsula Fwy ersection mor ced bus detect vanced	rossings (if required). ston Station) to Moorooduc e and intersection upgrade. etection and priority phasin o lane. Rd intersection to Frankston wy (south of Fwy). etection and priority phasin tering & advance bus deter ington Peninsula Fwy (sout to Frankston Flinders Rd/H dification and realignment ction and priority phasing etection and priority phasing inversion (to signals).	s and other uc/ Hastings e. sing on Flinders sing ention. uth of Fwy). High St it and sing.
Noise	• 15 x ad At this stage it i noise walls/bur			
Urban Design			ll business case	
Major Utilities			ve been identified to date v act on cost/construction	which



			REMOVAL	
Version	1	Date	03-10-2018	AUTHORITY
ELEMENTS				
Item	Descripti	on		References/ Assumptions
Property & Land	Langwarrin Property ac crossing re Moorc Hillcre Potential cl crossing up increased r Claren	for new stabling equisitions will b movals at the for oduc Hwy st Rd nange in owners grades (should r number of tracks don St oduc Hwy	y) of land acquisition require g e required in association wit llowing locations: whip of land associated with l removals not be required) ar at the following locations:	th level level
Integrated Development	No viable o	pportunities ide	ntified at this current time	
Environment- Flora & Fauna		rmined. Current rankston and Ba	desktop investigations are li xter	imited to
Environment- Heritage		rmined. Current rankston and Ba	desktop investigations are li xter	imited to
WAIVERS/ D	EVIATIONS	FROM STAN	DARDS	
Vertical Clearance	To be dete	rmined in full bu	siness case	
Approach Sight Distance	To be dete	rmined in full bu	siness case	
Line Speed	No change	to line speeds		
Grade	No change	to grades propo	sed	
Power	To be dete	rmined in full bu	isiness case	
Chall line	<b>-</b>			

Grade	No change to grades proposed	
Power	To be determined in full business case	
Stabling	To be determined in full business case	
Maintenance Access	To be determined in full business case	
DESIGN		



Version	1	Date	03-10-2018	
ELEMENTS				
Item	Descr	iption	References/ Assumptions	
Design Report	Baxter	Electrification – Rai	LXRA-DVPR-14-RL-RPT-003	
	Baxter	Strategic Bus Routi	LXRA-DVPR-14-TR-RPT-023	
Design Packages		<b>ncept Design</b> draw ckages are available	Referenced in relevant reports.	
	• Ra	il Infrastructure, ind	ower	
	• Ro			



Version

Date

03-10-2018

#### SUMMARY

#### SERVICES

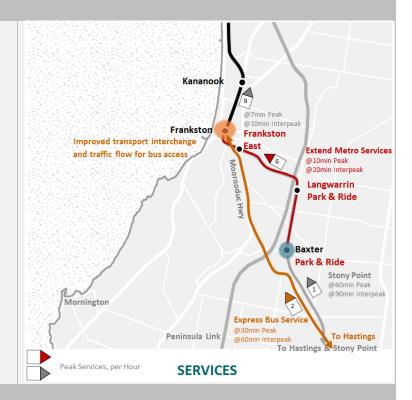
Bus Services from Frankston to Hastings:

1

- -express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

#### Metro services from Frankston to Baxter:

- every 10 min during peaks
- every 20 min during inter-peak
- every 20 min during off-peak



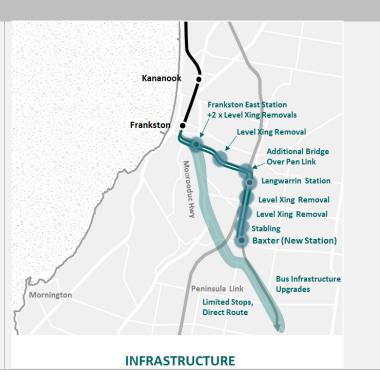
#### **INFRASTRUCTURE**

#### **Frankston Station:**

-Two additional platforms (island platform)
-Overpass and associated infrastructure and facilities for platform connectivity
-Re-signalling within the station limits with existing computer based interlocking at Kananook modified to incorporate new
Frankston configuration
-Overhead traction power infrastructure associated with new station layout.
-Demolish the existing Frankston traction substation and construct new substation
-Removal of redundant infrastructure e.g. stabling sidings, mechanical signalling interlocking and timber signal box

#### **Frankston East Station:**

-New side platform host station and associated facilities and infrastructure -Changes and enhancements to the SUPs to





Version	1	Date	03-10-2018	AUTHORITY
SUMMARY				
improve conne	ctivity			
Langwarrin Sta -New 2 platforr associate infras -Park and ride f associated infra TBC)	n premium st structure for up to 1000	cars and	d	
Baxter Station: -New 3 platform associate infras -Park and ride f associated infra	n premium st structure for up to 750 s			
Peninsula Link: -Additional rail		eninsula Link		
<ul><li>Moore</li><li>Hillcre</li><li>Robins</li></ul>	crossing remc een Frankstor don Rd (road	n and Baxter closure) oad under rail) ver rail) under rail)		
Track and OHV -Duplicate 8km			er	
Baxter Station				
Combined Serv -New CSR route Frankston and	e with diversit	y between		
Substations: -1 x demolition Frankston) -4 x new 4 meg Frankston, Fran Baxter)	awatt substat	ions (at		



				AUTHORITY
Version	1	Date	03-10-2018	Authoriti
SUMMAR	Y			
Power:				
-22kv feeder	r from Lang	warrin zone sub to		
		w buried cable rout	e	
within rail co	orridor			
Train Stablin	-			
-		ng roads for EMUs		
-1 number st	-			
-Associated	infrastructu	re		
Bus Infrastru	ucture:			
-Bus priority	lanes			
-Premium bu				
-Signal techr	nology upgr	ades		
-New signals				
-Intersection	n upgrades			
-Road signs/	line markin	g		
-Reconfigura	ation of Fran	nkston Station bus		
stops/layove	er			

ELEMENTS		
Item	Description	References/ Assumptions
SERVICES		
Service Plan -		

Service Plan - Rail	Station	2 Hou	r peak	2 Hour peak	
		Starting	Total	Starting	Total
	Frankston	18	18	18	18
	Langwarrin	12	12	12	12
	Baxter	12	12	12	12
	Stony Point	2	2	2	2

Date

1

Version



ltem	Description					References/ Assumptions				
Service Plan –										
Eastern Bus	Stop Location	2 HOU Starting	r peak	2 Ho Starting	ur peak					
	Frankston Station	4	4	4	4					
	Monash Health & Education Precinct	4	4	4	4					
	Baxter	4	4	4	4					
	Somerville	4	4	4	4					
	Tyabb	4	4	4	4					
	Hastings	4	4	4	4					
Timetable - Rail	<ul> <li>10 minute service to/from Baxter during the peak.</li> <li>20 minute service to/from Baxter during the interpeak and off peak.</li> </ul>									
Fimetable - Eastern Bus	peaks	<ul> <li>2 buses in each direction per hour during the AM and PM peaks</li> </ul>								
Rolling Stock – Rail		Additional 3 – 4 EMUs to operate the extended metro services to Baxter from Frankston.								
Bus Fleet	3 buses to operate the 30 minute peak service to Hastings									

03-10-2018

03-10-2018

Date

1

Version



ELEMENTS	ELEMENTS							
Item	Description	References/ Assumptions						
Rail Track	<ul> <li>Duplication <ul> <li>Duplicate track from Frankston to Baxter (approximately 8 km of total new track)</li> </ul> </li> <li>Electrification/Modifications <ul> <li>Electrify from Frankston to Baxter (approximately 8 km dual track)</li> </ul> </li> <li>Upgrade to level crossings at the following locations: (should removal not be required): <ul> <li>Clarendon St</li> <li>Moorooduc Hwy</li> <li>Hillcrest Rd</li> <li>Golf Links Road</li> <li>Robinsons Road</li> <li>Baxter-Tooradin Rd</li> </ul> </li> </ul>							
Stations	<ul> <li>Frankston Station         <ul> <li>New island platform with two platform faces</li> <li>Improved pedestrian access/overpass/associated infrastructure to accommodate the new platforms</li> <li>New bus bays with real time information (PIDS) for Hastings fast bus</li> </ul> </li> <li>Frankston East Station:         <ul> <li>New host station with two side platforms and associated station facilities</li> </ul> </li> <li>Langwarrin Station:         <ul> <li>New host station with two side platforms and associated station facilities</li> </ul> </li> <li>Baxter Station:         <ul> <li>New 3 platform premium station and associate infrastructure</li> </ul> </li> </ul>							
Bridges	New bridge over Peninsula Link to accommodate the additional rail track							
Rail Traction Power								



ELEMENTS							
Item	Description	References/ Assumptions					
Rail Signalling	<ul> <li>Full re-signalling of Frankston Station and station limits and up to the interface with Kananook</li> <li>New signalling between Frankston and Baxter for extended electric services</li> </ul>						
Stabling	<ul> <li>Up to 22 no. new stabling roads to be constructed at Baxter, with a minimum of:</li> <li>5 No. 160m EMUs to replace the stabling lost at Frankston</li> <li>3 No. 160m EMU's to operate to Langwarrin</li> <li>1 No. 160m road for Stony Point DMUs</li> </ul>						
Bus Stops	<ul> <li>Frankston Station</li> <li>Bus interchange and intersection modifications to assist bus services.</li> <li>Improved pedestrian access</li> </ul>						
	<ul> <li>Frankston to Hastings Service</li> <li>Frankston Station (Fletcher Rd)</li> <li>Monash Health &amp; Education Precinct</li> <li>Frankston South (Robinson Rd)</li> <li>Baxter</li> <li>Somerville</li> <li>Tyabb</li> <li>Hastings</li> </ul>						

Version <sup>1</sup>

Date

03-10-2018



1

Date

03-10-2018

Item	Description	References/ Assumptions
Major Civil	Civil works including drainage associated with:	
Works	New stations	
	Stabling yard	
	New formation for rail duplication	
	• Other civil works associated with substations and other fixed infrastructure	
	Removal of level crossings (if required).	
	Road upgrades	
	Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection	
	<ul> <li>1 x bus interchange and intersection upgrade.</li> <li>5 x advanced bus detection and priority phasing</li> <li>1 x bus queue jump lane.</li> </ul>	
	Moorooduc Hwy/ Hastings Rd intersection to Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy).	
	<ul> <li>6 x advanced bus detection and priority phasing</li> <li>2 x roundabout metering &amp; advance bus detention.</li> </ul>	
	Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy). /Mornington Peninsula Fwy to Frankston Flinders Rd/High St	
	<ul> <li>1 x intersection modification and realignment and advanced bus detection and priority phasing</li> <li>1 x advanced bus detection and priority phasing.</li> <li>1 x intersection conversion (to signals).</li> </ul>	
Noise	At this stage it is assumed the no noise mitigation is required i.e. noise walls/bunds	
Urban Design	To be detailed in full business case	
Major Utilities	No major utility conflicts have been identified to date which would have a significant impact on cost/construction	



Version	1	Date	03-10-2018	AUTHORITY
ELEMENTS				
ltem	Descrip	otion		References/ Assumptions
Property & Land		ares (approximate or new stabling	ly) of land acquisition requ	iired at
	(if requir • Moo • Hillo	v acquisitions in as red) and duplicatic prooduc Hwy crest Rd - Links Rd	-	
	crossing duplicati	l change in owner upgrades (should ion of track at the endon St		
	• Moo	prooduc Hwy crest Rd		
		inson Rd Links Rd		
	• Baxt	ter- Tooradin Rd		
Integrated Development	No viable	e opportunities ide	entified at this current time	e
Environment- Flora & Fauna		termined. Current Frankston and Ba	t desktop investigations are axter	e limited to
Environment- Heritage		termined. Current Frankston and Ba	t desktop investigations are axter	e limited to

#### WAIVERS/ DEVIATIONS FROM STANDARDS

Vertical Clearance	To be determined in full business case
Approach Sight Distance	To be determined in full business case
Line Speed	No change to line speeds
Grade	No change to grades proposed
Power	To be determined in full business case
Stabling	To be determined in full business case
Maintenance Access	To be determined in full business case



Version	1	Date	03-10-2018	AUTHORITY
ELEMENTS				
Item	Descriptio	on		References/ Assumptions
DESIGN				
Design Report	• Baxter	Electrification -	<ul> <li>Rail Concept Design Report</li> </ul>	LXRA-DVPR-14-RL-RPT-003
	Baxter	Strategic Bus R	outing Options Assessment	Report LXRA-DVPR-14-TR-RPT-023
Design Packages		<b>it Design</b> drawi es are available	gn <u>Referenced in relevant reports.</u>	
	Rail Infr	rastructure, inc	cluding track, civil and tractic	on power
	Roadwo	orks		



Version

Date

03-10-2018

#### SUMMARY

#### SERVICES

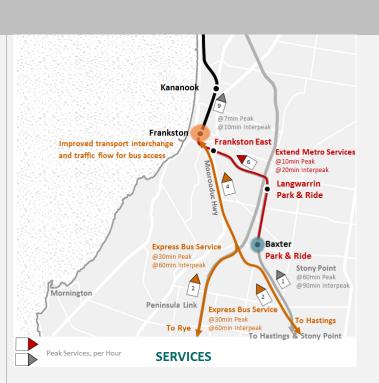
Bus Services from Frankston to Hastings:

1

- -express bus every 30 min during peaks
- express bus every 60 min during inter-peak
- express bus every 60 min during off-peak

#### Bus Services from Frankston to Rye:

- -express bus every 30 min during peaks
- express bus every 60 min during inter-peak express bus every 60 min during off-peak
- Metro services from Frankston to Baxter:
- every 10 min during peaks
- every 20 min during inter-peak
- every 20 min during off-peak



#### INFRASTRUCTURE

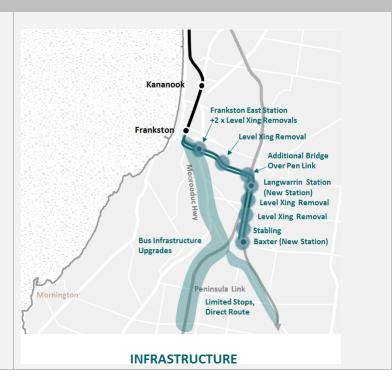
#### **Frankston Station:**

-Two additional platforms (island platform) -Overpass and associated infrastructure and facilities for platform connectivity -Re-signalling within the station limits with existing computer based interlocking at Kananook modified to incorporate new Frankston configuration

-Overhead traction power infrastructure associated with new station layout. -Demolish the existing Frankston traction substation and construct new substation -Removal of redundant infrastructure e.g. stabling sidings, mechanical signalling interlocking and timber signal box

#### Frankston East Station:

-New side platform host station and associated facilities and infrastructure -Changes and enhancements to the SUPs to improve connectivity





Version	1	Date	03-10-2018	AUTHORITY
SUMMAR	Y			
associate inf -Park and ric	orm premium s rastructure le for up to 100			
associated in -Park and ric	on: orm premium s ofrastructure le for up to 750 ofrastructure			
<b>Peninsula Li</b> -Additional r	<b>nk:</b> ail bridge over	Peninsula Link		
Potential lew required) be Stations: Clar Mo Hill Rot Gol	ng Removals: rel crossing rem tween Franksto rendon Rd (road orooduc Hwy (r crest Rd (road binsons Rd (road f Links Rd (road ter-Tooradin Re	on and Baxter d closure) road under rail) over rail) d under rail) l over rail)		
-Duplicate 8 Signalling:		ure: electrify to Baxter Frankston and new		
	Station and asso			
	<b>ervices Route:</b> ute with divers nd Baxter	ity between		
-4 x new 4 m	ion of existing negawatt substa			



Version	1	Date	03-10-2018	AUTHORITY
SUMMARY	1			
Power:				
-22kv feeder	from Lang	warrin zone sub to		
traction subs	stations			
Train Stablin	σ.			
	-	ng roads for EMUs		
-1 number st				
-Associated i	-			
Bus Infrastru	icture:			
-Bus priority	lanes			
-Premium bu	is stops			
-Signal techn	ology upgr	ades		
-New signals				
-Intersection	upgrades			
-Road signs/	line markin	g		
		nkston Station bus		
stops/layove	r			

ELEMENTS						
ltem	Description		References/ Assumptions			
SERVICES						
Service Plan - Rail						
	Station	2 Hour peak		2 Hour peak		]
		Starting	Total	Starting	Total	
	Frankston	18	18	18	18	
	Langwarrin	12	12	12	12	
	Baxter	12	12	12	12	
	Stony Point	2	2	2	2	
		•				-



Version	1 <b>Date</b> 03-10-2018					
ELEMENTS						
ltem	Description					References/ Assumptions
Service Plan –						•
Western Bus	Stop Location	2 Hou	r peak	2 Ho	our peak	
		Starting	Total	Starting	Total	
	Frankston Station	4	4	4	4	
	Monash Health & Education Precinct	4	4	4	4	
	Frankston South	4	4	4	4	
	Baxter	4	4	4	4	
	Dromana	4	4	4	4	
	Rosebud	4	4	4	4	
	Rye	4	4	4	4	
Service Plan – Eastern Bus	Stop Location 2 Hour peak 2 Hour peak					
		Starting	Total	Starting	Total	
	Frankston Station	4	4	4	4	
	Monash Health & Education Precinct	4	4	4	4	
	Baxter	4	4	4	4	
	Somerville	4	4	4	4	
	Tyabb	4	4	4	4	-
	Hastings	4	4	4	4	
Fimetable - Rail	<ul> <li>10 minute se</li> <li>20 minute se</li> </ul>				eak.	
Timetable - Western Bus	<ul> <li>2 buses in ea peaks</li> <li>1 bus per ho</li> </ul>	ich directio				



Version	1	Date	03-10-2018	AUHURIT
ELEMENTS				
Item	Descriptio	n		References/ Assumptions
Timetable - Eastern Bus	peaks		n per hour during the AM a terpeak and off-peak	and PM •
Rolling Stock - Rail	Additional 3 Baxter from		e the extended metro serv	vices to •
Bus Fleet – Western Bus	5 buses to o	perate the 30 mi	inute peak service to Rye	•
Bus Fleet – Eastern Bus	3 buses to o	perate the 30 mi	ings •	
INFRASTRUC	TURE			
Rail Track	km of to Electrification Electrify track) Upgrade to removal not Clarendo Mooroo Hillcrest Golf Link Robinso	tal new track) on/Modification from Frankston level crossings a t be required): on St duc Hwy Rd ss Road	nkston to Baxter (approxir s to Baxter (approximately a <b>t the following locations (</b>	8 km dual

03-10-2018

Date

1

Version



ELEMENTS							
Item	Description	References/ Assumptions					
Stations	<ul> <li>Frankston Station         <ul> <li>New island platform with two platform faces</li> <li>Improved pedestrian access/overpass/associated infrastructure to accommodate the new platforms</li> <li>New bus bays with real time information (PIDS) for Hastings fast bus</li> </ul> </li> <li>Frankston East Station:         <ul> <li>New host station with two side platforms and associated station facilities</li> </ul> </li> <li>Langwarrin Station:         <ul> <li>New host station with two side platforms and associated station facilities</li> </ul> </li> <li>Baxter Station:         <ul> <li>New 3 platform premium station and associated infrastructure</li> </ul> </li> </ul>						
Bridges	New bridge over Peninsula Link to accommodate the additional rail track						
Traction Power	<ul> <li>Provision of the following:</li> <li>Demolition of existing Frankston substation</li> <li>4 x new 4 megawatt substations</li> <li>22kv feeder from Langwarrin zone sub to traction substations</li> <li>New OHW infrastructure between Frankston and Baxter and for the associated stabling</li> </ul>						
Rail Signalling	<ul> <li>Full re-signalling of Frankston Station and station limits with existing computer based interlocking at Kananook modified to incorporate new Frankston configuration</li> <li>New signalling between Frankston and Baxter for extended electric services</li> </ul>						



Version	1	Date	03-10-2018	AUTHORITY
ELEMENTS				-
Item	Descriptio	on		References/ Assumptions
Bus Stops	bu Im Shared Bus Franksto Frankston t Frankston t So Ty: Ha <u>Frankston t</u> Ro Ry	s interchange and s services. proved pedestrian <b>Stops (Both Servic</b> on Station (Fletche Health & Educatio on South (Robinsor <u>o Hastings Service</u> merville abb stings <u>o Rye Service</u> omana sebud e	z <b>es)</b> r Rd) on Precinct	



/ersion					
ELEMENTS					
Item	Descriptio	on		References/ Assumptions	
Major Civil Works	Civil works including drainage associated with:				
	New stations				
	Stabling yard				
	• Ne	ew formation for			
		ther civil works a ed infrastructur	nd other		
	• Re	emoval of level c			
	Road Upgra	ides			
	Fletcher Rd (opposite Frankston Station) to Moorooduc/ Hastings Rd intersection			Hastings	
	<ul> <li>1 x bus interchange and intersection upgrade.</li> <li>5 x advanced bus detection and priority phasing</li> <li>1 x bus queue jump lane.</li> </ul>				
	Moorooduc Hwy/ Hastings Rd intersection to Frankston Flinders Rd/Mornington Peninsula Fwy (south of Fwy).			Flinders	
		advanced bus o roundabout me			
		inders Rd/Morr			
	ad ● 1×	intersection mo vanced bus dete advanced bus c intersection co			
		Flinders Rd/Mor pean Rd/ Dunda	of Fwy)		
	• 15 x advanced bus detention and priority phasing.				
Noise	At this stage it is assumed the no noise mitigation is required i.e. noise walls/bunds			ired i.e.	
Urban Design	To be detailed in full business case				
Major Utilities	-		ave been identified to date wh pact on cost/construction	ich	



Version	1	Date	03-10-2018	AUTHORITY	
ELEMENTS					
ltem	Description			References/ Assumptions	
Property & Land	<ul> <li>7.4 hectares</li> <li>Baxter for n</li> <li>Property acc (if required)</li> <li>Mooroot</li> <li>Hillcress</li> <li>Golf Lin</li> <li>Potential ch crossing upgeduplication</li> <li>Clarence</li> <li>Mooroot</li> <li>Hillcress</li> <li>Robinsot</li> <li>Golf Lin</li> </ul>	s (approximately ew stabling quisitions in asso and duplication oduc Hwy t Rd ks Rd ange in ownersh grades (should re of track at the fo lon St oduc Hwy t Rd	) of land acquisition require ociation with level crossing of track at the following lo hip of land associated with l emovals not be required) ar ollowing locations:	ed at removals ocations:	
Integrated Development	No viable op	oportunities ider			
Environment- Flora & Fauna	To be determined. Current desktop investigations are limited to between Frankston and Baxter				
Environment- Heritage	To be determined. Current desktop investigations are limited to between Frankston and Baxter				
WAIVERS/ D	EVIATIONS	FROM STAND	DARDS		
Vertical Clearance	To be deter	mined in full bus	iness case		
Approach Sight Distance	To be deter	mined in full bus	iness case		

Approach Sight Distance	To be determined in full business case				
Line Speed	No change to line speeds				
Grade	No change to grades proposed				
Power	To be determined in full business case				
Stabling	To be determined in full business case				



Version	1	Date	03-10-2018	
ELEMENTS				
Item	Description			References/ Assumptions
Maintenance Access	To be deter	mined in full bu		
DESIGN				
Design Report	Baxter Electrification – Rail Concept Design Report Baxter Strategic Bus Routing Options Assessment Report			LXRA-DVPR-14-RL-RPT-003ortLXRA-DVPR-14-TR-RPT-023
Design Packages	<b>Concept Design</b> drawings covering the below design packages are available.			gn <u>Referenced in reports</u>
	• Rail Infrastructure, including track, civil and traction power			on power
	Roadworks			