City of Launceston

Launceston Bus Mall

Traffic Modelling Report

July 2015

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1. Introduction

1.1 Background

GHD were engaged by City of Launceston to undertake traffic modelling of bus operations in Launceston, with a focus on three options for upgrading the Launceston Central Bus Interchange. This project follows on from previous work including:

- Launceston City Heart Project, Two-way Street Conversion, Preliminary Traffic Assessment, GHD 2014
- Launceston CBD Bus Interchange Study, Pitt & Sherry 2014

1.2 Project Scope

The project scope was as follows:

- Collection and review additional data from Metro Tasmania including arrival and departure times, and dwell times at relevant bus stops within the Launceston CBD, as well as publicly accessible timetabling and route information;
- Update of the most recent Launceston CBD Traffic Model (Paramics microsimulation model) to include bus timetabling and route information to form a new existing conditions model for the CBD;
- Traffic modelling of three (3) new scenarios (both AM and PM peak) which included some or all of the proposed City Heart Project changes and/or changes to bus routes and stop locations; and
- Extraction of bus travel time and other traffic network performance statistics from the models with the aim of comparing the proposed scenario against the existing conditions to determine any increase or decrease in service.

1.3 Purpose of This Report

The purpose of this report is to document the traffic modelling procedure and results, and to provide a discussion on the relevant performance metrics of each of the proposed options compared to the existing conditions.

1.4 Report Structure

This report is structured as follows:

- **Section 1** provides an introduction to the project.
- **Section 2** gives an overview of the existing conditions including current bus arrangements and development of base models for the purpose of options testing.
- **Section 3** outlines the design of option scenarios and traffic modelling results and provides a brief discussion on the findings of the modelling.
- **Section 4** succinctly outlines the findings of the assessment.

2. Existing Conditions

2.1 Existing Bus Arrangements

The existing Launceston Central Bus Interchange is located on St John Street, between Paterson Street and York Street. Almost all Metro services travelling to or from the city originate, terminate or pass through the Interchange.

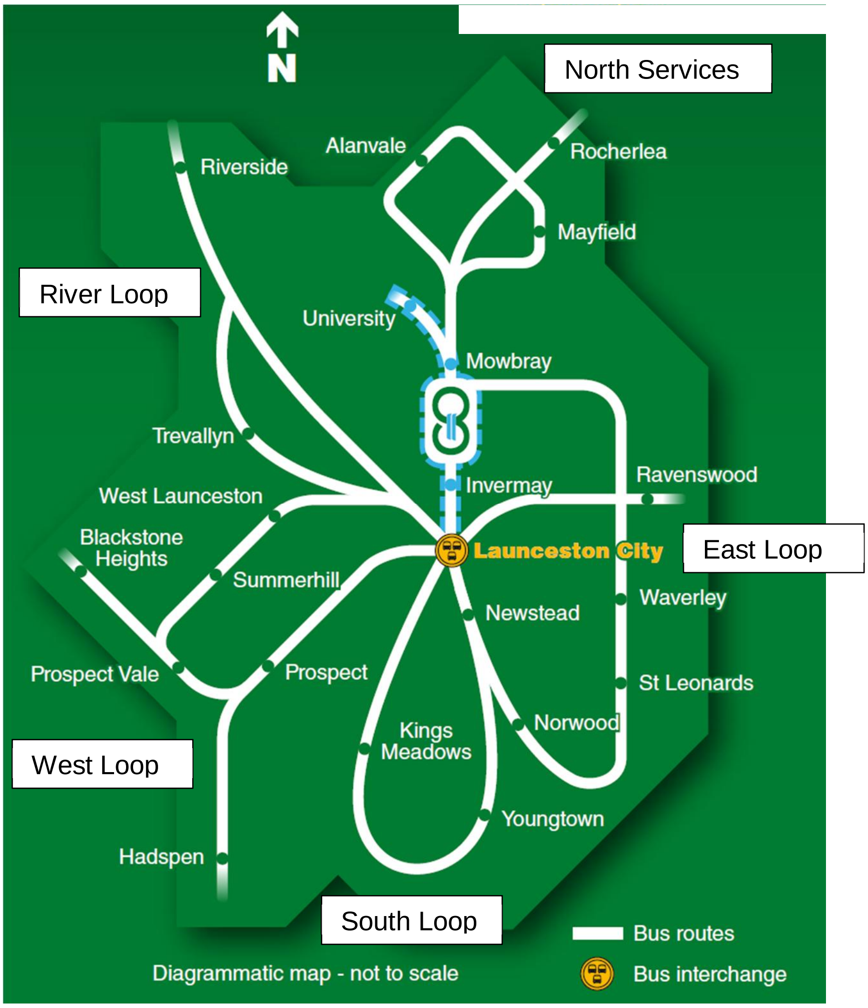
2.1.1 Bus Routes

Metro Tasmania is the primary provider of public transport in Launceston, with routes servicing the main areas of:

- Invermay, Newnham and Rocherlea via the Launceston North services;
- Ravenswood, Newstead and St Leonards via the Launceston East Loop;
- Kings Meadows and Youngtown via the Launceston South Loop;
- West Launceston, Prospect and Hadspen via the Launceston West Loop; and
- Riverside and Trevallyn via the Launceston River Loop;

A diagrammatical representation of Metro Tasmania services in Launceston is provided in Figure 1.

Figure 1 Metro Tasmania Service Area Diagram



Base image source: Metro Tasmania

In addition to regular services, Metro also provide the following:

- The Turn up and GO service, comprising routes 6, 7, 8 and 10, which combine to provide a high frequency service between Launceston CBD and the University via Invermay and Mowbray.
- Several school services between the Launceston CBD and schools throughout the Launceston area, with many of these services using the Launceston Central Bus Interchange.
- The FREE Tiger Bus service is a Council initiative, operated by Metro, which provides a high frequency commuter service between Inveresk and the city during the commuter peak periods, and a city/tourist loop throughout the remainder of the day.

Most streets in Launceston serve as bus routes for various services. A map showing existing bus routes through the city is provided in Figure 2.

2.1.2 Bus Interchange Design

The existing Launceston Central Bus Interchange consists of the following:

- Stops A, B and C located on St John Street (southbound) between Paterson Street and Brisbane Street and servicing primarily South and West routes;
- Stop D located on St John Street (southbound) north of Paterson Street and servicing the FREE Tiger Bus;
- Stops E and F located on St John Street (northbound) between York Street and Brisbane Street and servicing primarily North and East routes; and
- Stop H located on York Street between St John Street and Charles Street and servicing River (Trevallyn and Riverside) routes.

Note that Stop G, located along St John Street near Stops E and F, is currently disused. The design of the existing Interchange is presented in Figure 3.

2.1.3 Layover and Dead Runnings

There are four existing layover locations for Metro within the city including Paterson Street (Charles Street to St John Street), Elizabeth Street (George Street to St John Street), St John Street (Frederick Street to Elizabeth Street) and Cameron Street (George Street to St John Street).

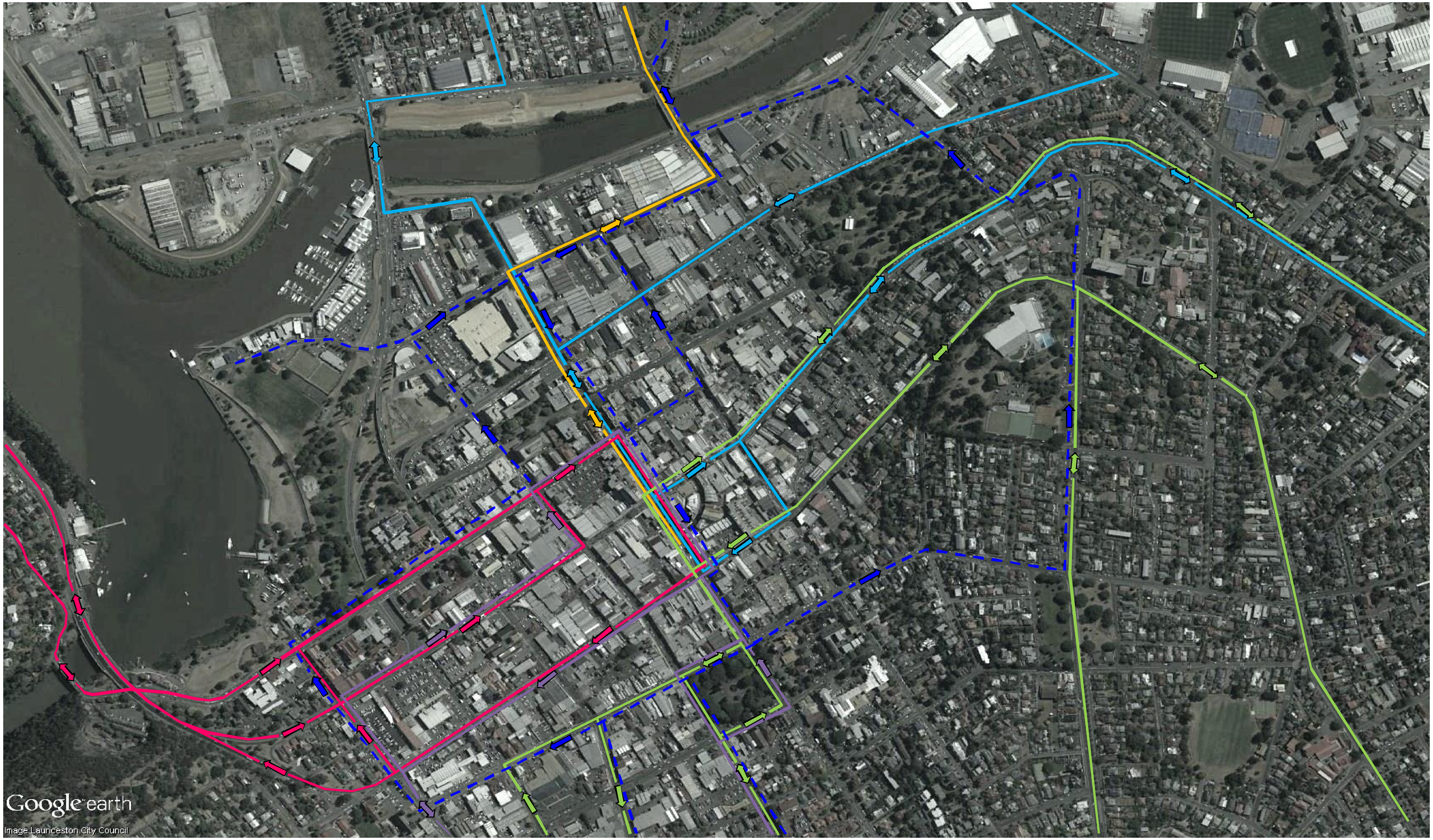
Current advice from Metro is that not all incoming services travelling along St John Street can immediately depart on a new route. For example, an incoming service stopping at Stop A, B or C may not necessarily have a departing service beginning at Stop A, B or C and therefore may need to circulate to Stop E, F or H, or alternatively, wait at a layover bay.

Buses that are not in service are known as ‘dead runnings’. These movements have also been included in the model and have been estimated on following basis:

- 20% of all incoming buses travel to layover after dropping passengers off;
- 40% of all incoming buses immediately move to Stops A, B and C to begin a new route;
- 27% of all incoming buses immediately move to Stops E and F to begin a new route; and
- 13% of all incoming buses immediately move to Stop H to begin a new route.

It is acknowledged that while this may not exactly represent current operation, it is considered to be a reasonable approximation for the purposes of comparing options. ‘Dead running’ routes are presented in Figure 4.

Figure 2 Existing Bus Routes



Legend

Launceston East Loop
Launceston North
Launceston River Loop
Launceston South Loop
Launceston West Loop
Free Tiger Bus

Figure 3 Existing Bus Interchange Design

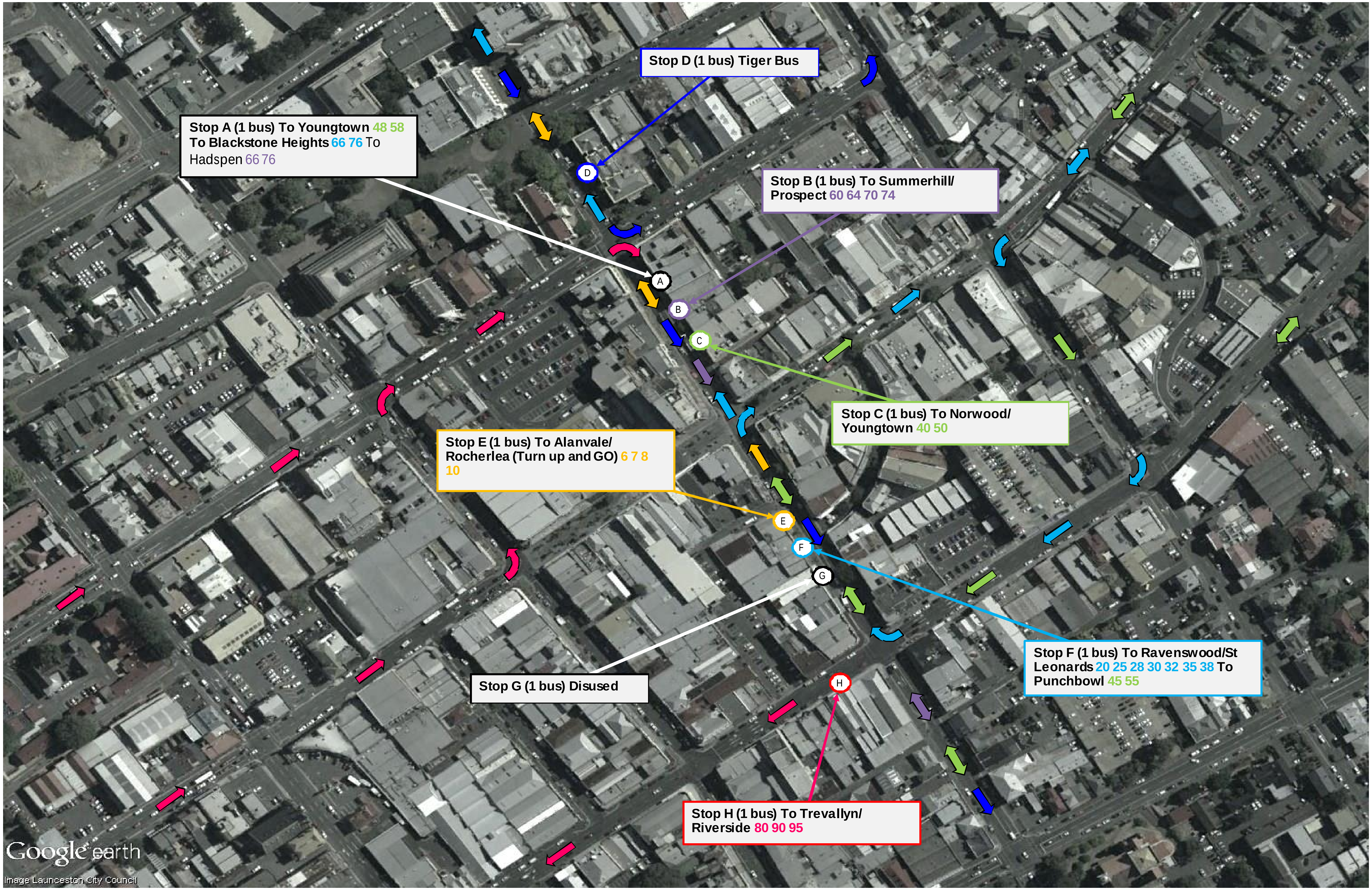
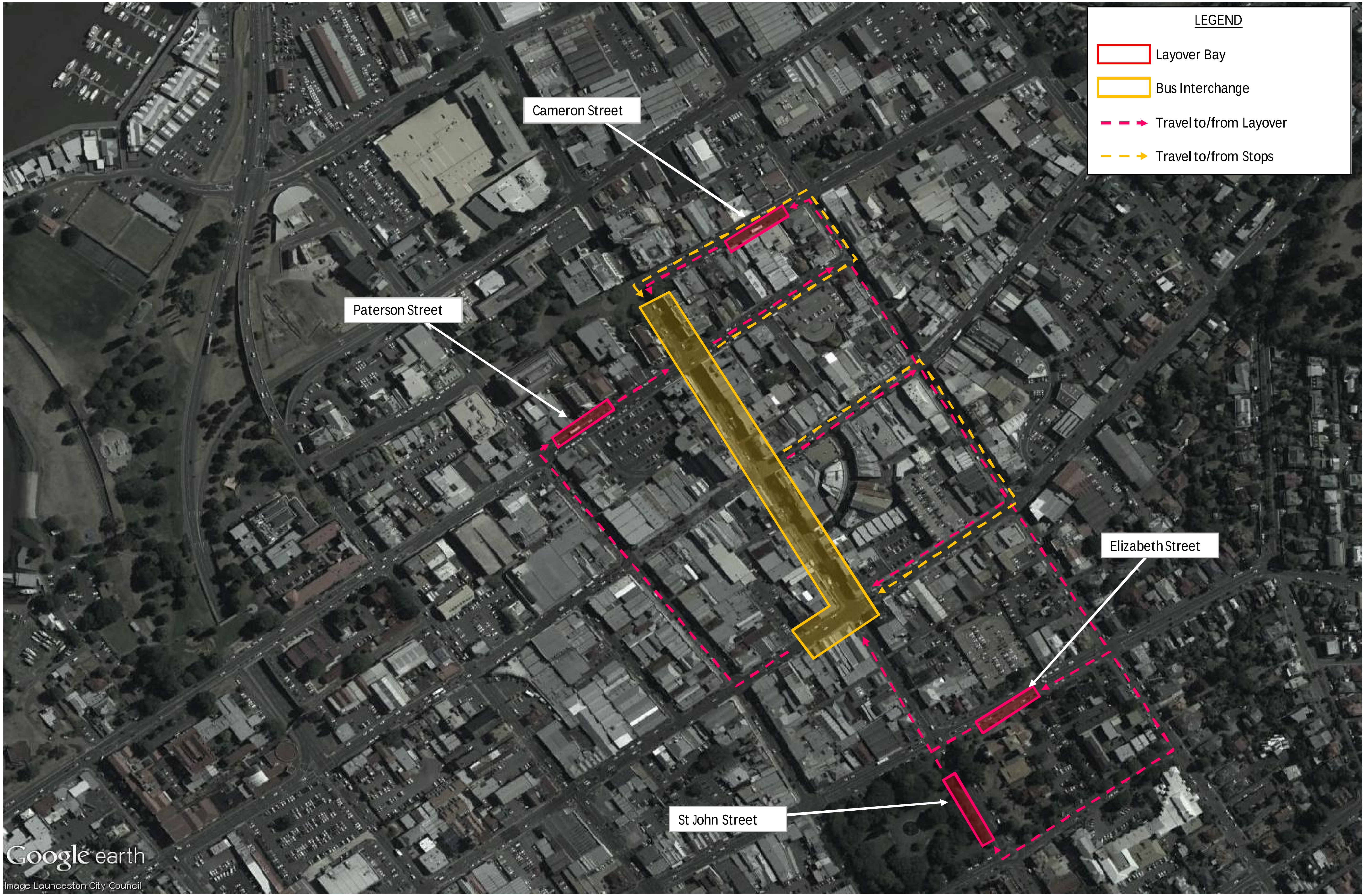


Figure 4 Existing 'Dead Runnings' Movements



2.2 Base Model Development

The Launceston CBD Model, most recently updated in 2014 as part of the Launceston City Heart Two-way Street Conversion project, was modified to form a new base model for the purpose of this assessment.

A range of information was obtained from Metro including publicly accessible route and timetable information, the locations of all bus stops within the model boundaries, dwell times at all stops and travel times along key routes.

2.3 Base Model Results

2.3.1 Network Statistics

Several broad performance metrics were used to assess the performance of the Launceston CBD traffic network under various scenarios including the following:

- Vehicle-km travelled (VKT) – a measure of the total distance travelled by vehicles within the model. The product of the total number of vehicles in the model and the average distance travelled by each vehicle.
- Vehicle-hours travelled (VHT) – a measure of the total time spent travelling by vehicles in the model. The product of the number of the total number of vehicles in the model and the average time spent travelling by each vehicle.
- Average speed – a measure of the average travel speed of vehicles in the model, including stops, and can be calculated by dividing VKT by VHT to obtain average speed in km/h.

The network statistics from the existing conditions models are summarised in Table 1.

Table 1 Network Statistics Existing

Statistic	Model Total	Buses Total	Dead Runnings
AM Peak (7:30 – 9:30)			
VKT	58,045 veh-km	259.2 bus-km	37.5 bus-km
VHT	1,756 veh-h	729.0 bus-min	117.6 bus-min
Average Network Speed	33.1 km/h	21.3 km/h	19.1 km/h
PM Peak (15:30 – 17:30)			
VKT	67,968 veh-km	316.4 bus-km	44.2 bus-km
VHT	2,369 veh-h	925.0 bus-min	149.5 bus-min
Average Network Speed	28.7 km/h	20.4 km/h	17.7 km/h

2.3.2 Travel Times

Bus travel times along several key routes, both outbound and inbound, were extracted from the model including:

- Invermay/Mowbray services via Invermay Road;
- East Launceston services via Elphin Road;
- Kings Meadows and Youngtown Services via Bathurst and Wellington Streets;
- Ravenswood services via Cimitiere Street; and
- Trevallyn/Riverside services via Bridge Road.

Note that route times are only measured within the model boundaries and therefore measure the time between the Bus Interchange and the entry or exit point to the model. Existing route times as extracted from the model are summarised in Table 2.

Table 2 Route Times Existing

Route	Outbound	Inbound
AM Peak (7:30 – 9:30)		
Invermay/Mowbray	6:19 ± 22	6:39 ± 27
East Launceston	5:06 ± 13	4:39 ± 19
Kings Meadows/Youngtown	6:30 ± 19	5:48 ± 25
Ravenswood	5:38 ± 31	5:50 ± 35
Trevallyn/Riverside	5:12 ± 22	3:59 ± 28
PM Peak (15:30 – 17:30)		
Invermay/Mowbray	6:18 ± 21	6:36 ± 22
East Launceston	5:09 ± 17	5:08 ± 17
Kings Meadows/Youngtown	7:31 ± 23	5:36 ± 20
Ravenswood	5:40 ± 24	5:30 ± 33
Trevallyn/Riverside	5:24 ± 19	5:00 ± 40

It should be noted that the model is run under 5 different seeds, which randomises traffic generation patterns, and each route runs multiple times within each of the seed runs, therefore there is possible variation in each of the route travel times. The mean is stated to within a 95% confidence level in the above table.

2.3.3 Junction Performance

The proposed options involve relocation of bus stops which would result in a significant change in the operation of the St John Street / Paterson Street intersection. Therefore, another key performance metric which has been extracted from the model is the delay and level of service at this junction. The existing intersection performance as extracted from the model is presented in Table 3.

Table 3 Intersection Delay Existing

Approach	AM Peak	PM Peak
St John Street S (northbound)	4.4 s [LOS A]	4.4 s [LOS A]
Paterson Street E (westbound)	-	-
St John Street N (southbound)	5.5 s [LOS A]	5.9 s [LOS A]
Paterson Street W (eastbound)	25.0 s [LOS C]	30.4 s [LOS C]
Intersection Average	***17.4 s [LOS B]***	***19.6 s [LOS B]***

3. Proposed Scenarios

3.1 Option Descriptions and Bus Routing

All options involved the following stop relocations:

- Stops E and F relocated to St John Street, north of Paterson Street;
- Stop H relocated to Paterson Street, west of St John Street; and
- Paterson Street layover relocated to St John Street north of Cameron Street.

There are three separate options for the operation of St John Street, between Paterson Street and Brisbane Street as follows:

- Option 1 – Two-way St John Street (as per existing),
- Option 2 – One-way St John Street southbound, and
- Option 3 – One-way St John Street southbound with contra-flow bus lane.

Bus routing, interchange design and dead running movements for each of the options are presented in Figure 5 to Figure 10.

3.2 Options Model Results

3.2.1 Network Statistics

The broad network statistics discussed in Section 2.3.1 of this report were extracted from each of the option models and are summarised in Table 4 for the morning peak and in Table 5 for the evening peak period.

Table 4 Network Statistics – AM Peak (7:30 – 9:30)

	Base	Option 1	Option 2	Option 3
Model Totals				
Model VKT	58,045 veh-km	58,036 veh-km	57,765 veh-km	57,786 veh-km
Model VHT	1,756 veh-h	1,768 veh-h	1,730 veh-h	1,767 veh-h
Average Speed	33.1 km/h	32.8 km/h	33.4 km/h	32.7 km/h
Bus Totals				
Bus VKT	259.2 bus-km	256.8 bus-km	264.4 bus-km	256.6 bus-km
Bus VHT	729.0 bus-min	724.0 bus-min	736.3 bus-min	727.1 bus-min
Average Speed	21.3 km/h	21.3 km/h	21.5 km/h	21.2 km/h
Dead Runnings Totals				
Dead Runnings VKT	37.5 bus-km	36.8 bus-km	39.3 bus-km	36.8 bus-km
Dead Runnings VHT	117.6 bus-min	112.4 bus-min	123.7 bus-min	113.7 bus-min
Average Speed	19.1 km/h	19.7 km/h	19.1 km/h	19.4 km/h

Table 5 Network Statistics – PM Peak (15:30 – 17:30)

	Base	Option 1	Option 2	Option 3
Model Totals				
Model VKT	67,968 veh-km	67,613 veh-km	67,311 veh-km	67,619 veh-km
Model VHT	2,369 veh-min	2,525 veh-min	2,700 veh-min	2,562 veh-min
Average Speed	28.7 km/h	26.8 km/h	24.9 km/h	26.4 km/h
Bus Totals				
Bus VKT	314.6 bus-km	316.4 bus-km	322.6 bus-km	317.4 bus-km
Bus VHT	925.0 bus-min	967.1 bus-min	1,013.1 bus-min	988.6 bus-min
Average Speed	20.4 km/h	19.6 km/h	19.1 km/h	19.3 km/h
Dead Runnings Totals				
Dead Runnings VKT	44.2 bus-km	42.8 bus-km	44.0 bus-km	42.8 bus-km
Dead Runnings VHT	149.5 bus-min	158.9 bus-min	165.6 bus-min	159.4 bus-min
Average Speed	17.7 km/h	16.2 km/h	16.0 km/h	16.1 km/h

Figure 5 Option 1 and 3 Bus Routes - Two-way St John Street

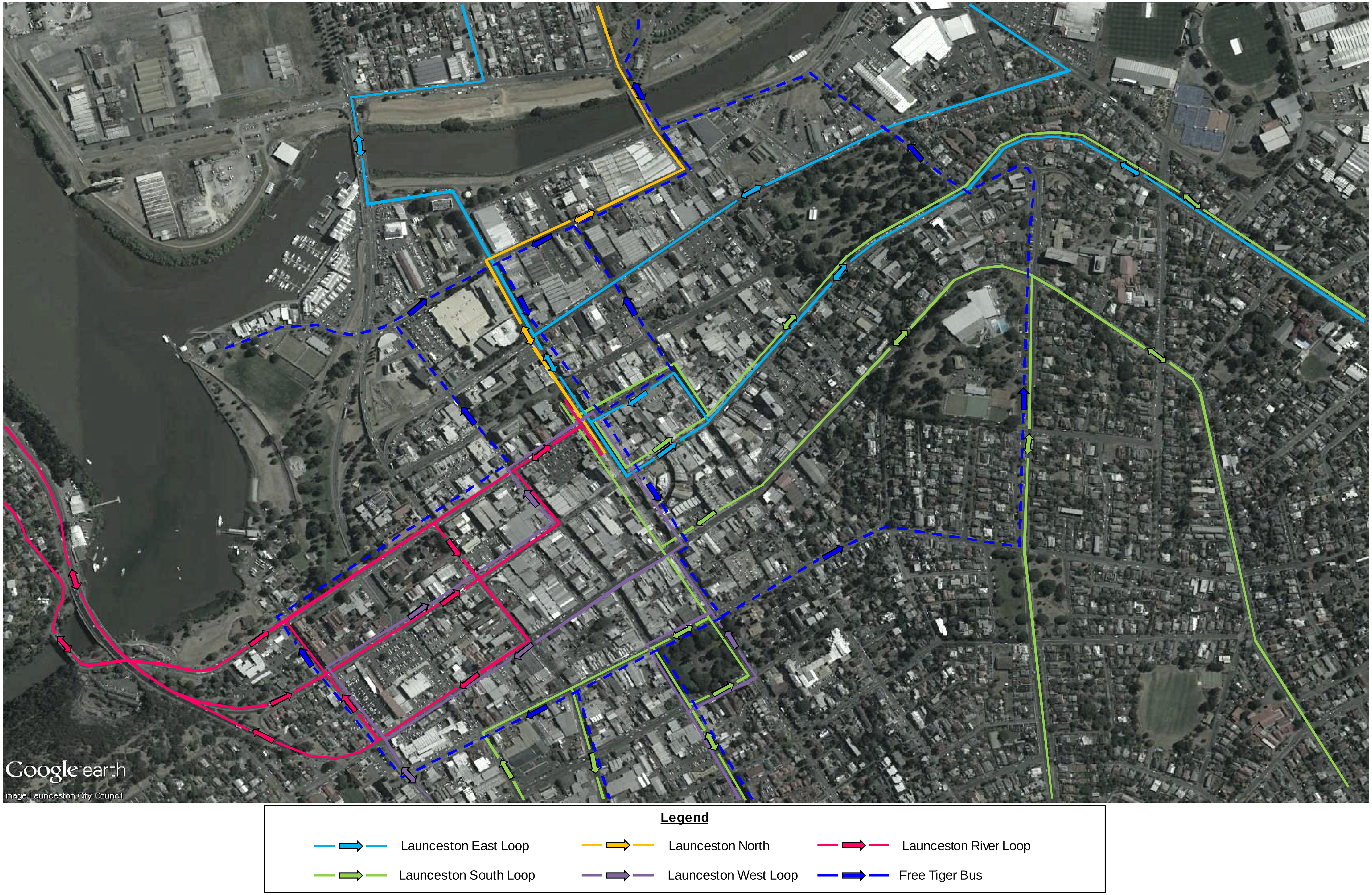


Figure 6 Option 1 and 3 Bus Interchange Layout - Two-way St John Street

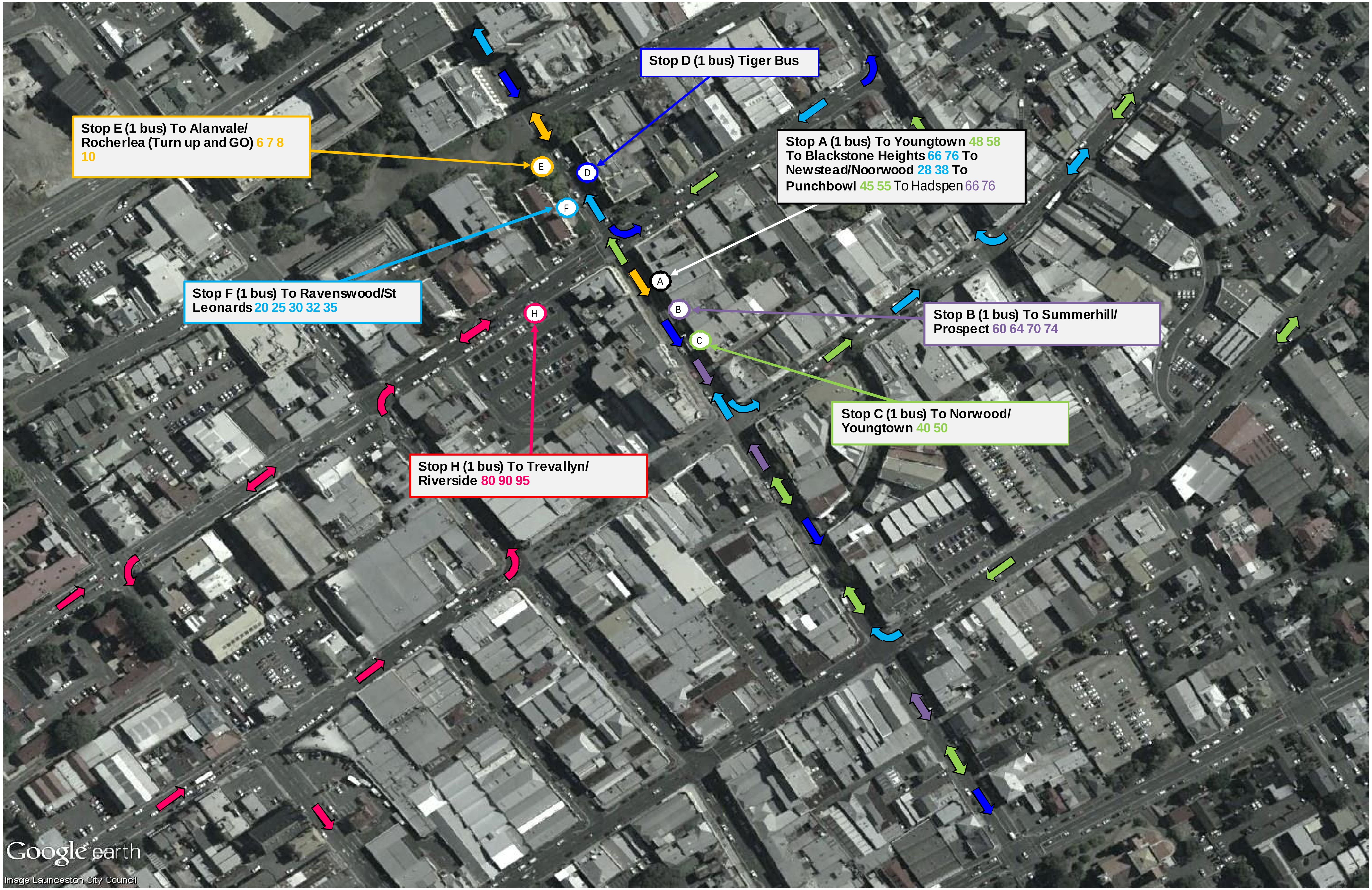


Figure 7 Option 1 and 3 Layover and 'Dead Runnings' - Two-way St John Street

Figure 8 Option 2 Bus Routes - One-way St John Street

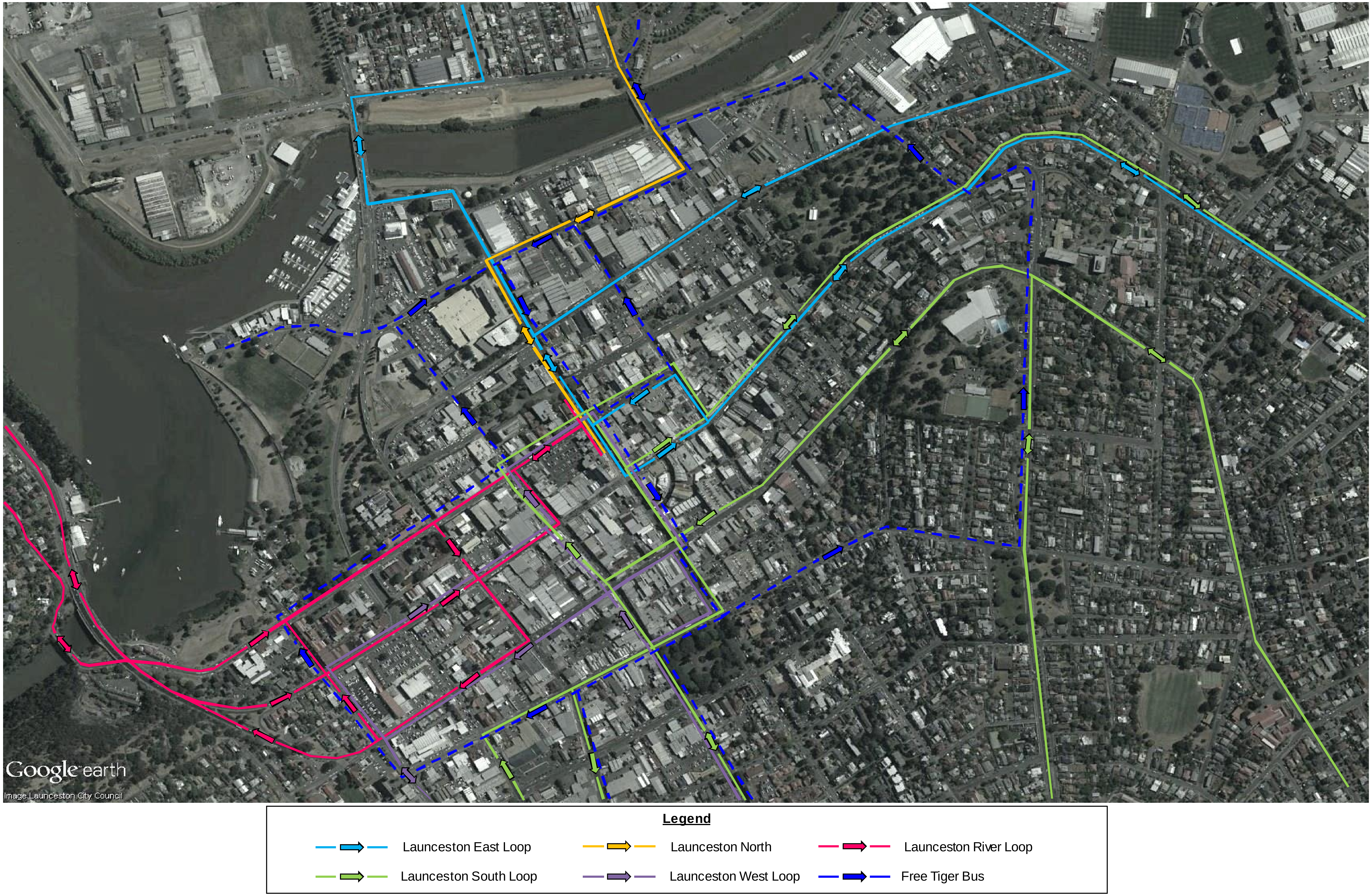


Figure 9 Option 2 Bus Interchange Layout - One-way St John Street

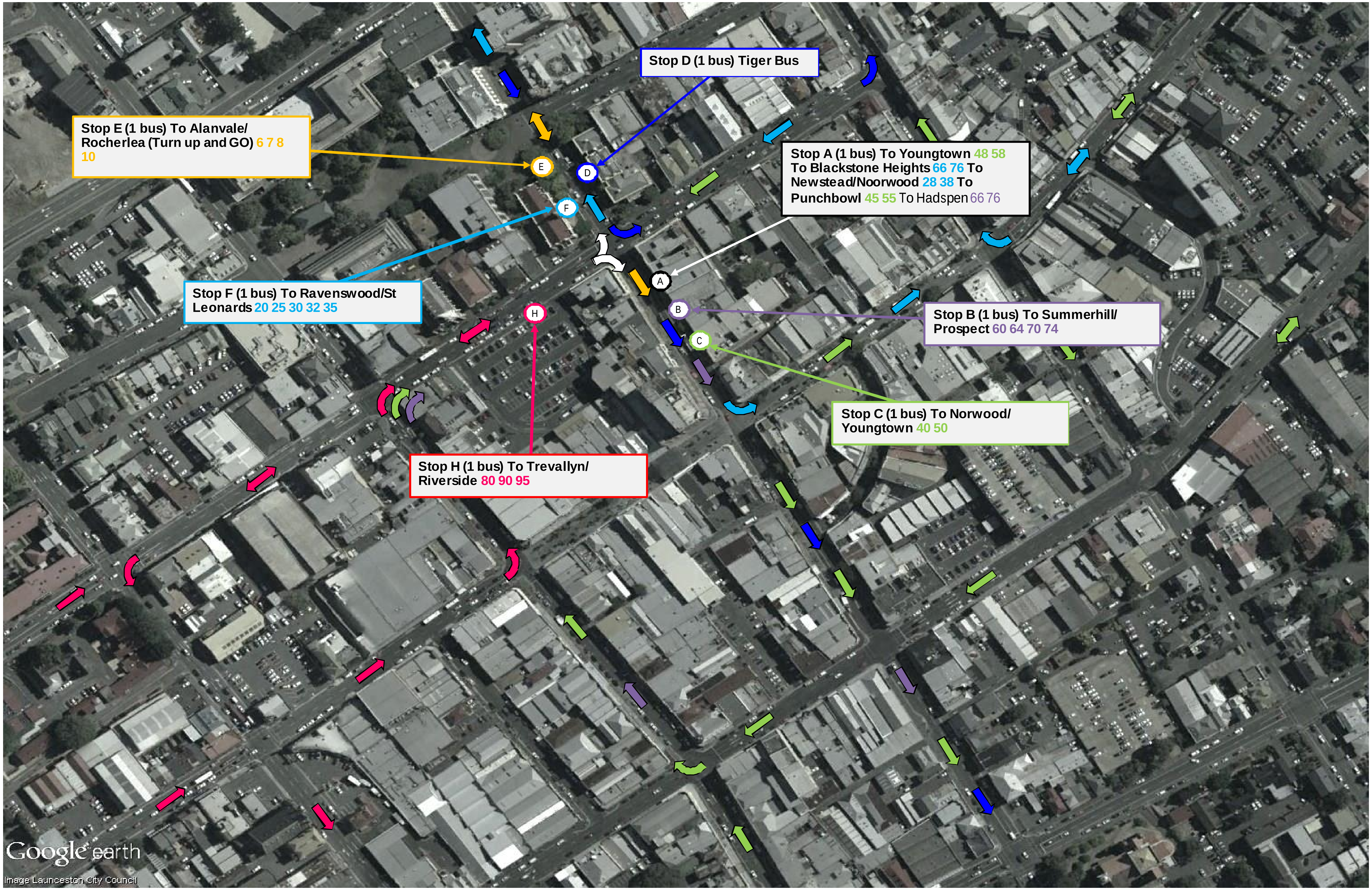


Figure 10 Option 2 Layover and 'Dead Runnings' - One-way St John Street

The morning peak models (Table 4) show a negligible change in overall network performance between the three options, with model VKT and VHT varying by around 1.0%, which is within the margin of error of the results. There is some change expected for in ‘dead runnings’ movements due to the relocation of layover bays and other traffic network restrictions which are discussed in Section 3.2.2.

Towards the end of the evening peak models, some congestion was observed to develop along Paterson Street, which influenced the overall results. This resulted in a general reduction in average vehicle speed experienced across the model which is reflected in Table 5. Further discussion on the evening peak conditions is provided in Section 3.3.

In both the morning and evening peak period, Option 2 resulted in a noticeable increase in the total distance travelled by buses compared to the other options. This is a direct result of converting St John Street to one-way, requiring additional circulation through the surrounding traffic network for some services. For example:

- Inbound services from East Launceston entering the model from either Elphin Road (Brisbane Street) or York Street would need to circulate via Charles Street and Paterson Street rather than simply turning right onto St John Street;
- Dead runnings coming from St John Street (south) or Elizabeth Street layovers would also need to circulate via Charles and Paterson Streets.

It is acknowledged, however, that some routes have significantly reduced trip distance including River Loop services travelling via Paterson Street and Bridge Road. Changes in route travel times are further discussed in Section 3.2.3.

3.2.2 Dead Runnings

The proposed changes to bus stops and layovers have a much larger impact on ‘dead runnings’ and out-of-service movements compared to the impacts on regular, scheduled services. For example, due to traffic movement restrictions along Charles Street, access to the new St John Street layover would require circulation using George Street, or potentially using Tamar Street or Bathurst Street.

The total trip distance and travel time for ‘dead running’ movements were extracted from the model separately and are summarised in Table 4 and Table 5. Note that the ‘dead runnings’ programmed into the model are estimated only and have been randomised based on the criteria outlined in Section 2.1.3 of this report and are therefore not optimised.

The models show that there is a general reduction in trip distance for ‘dead runnings’ in both the morning and evening peak models as a result of the proposed changes, compared to the existing conditions, with the exception of Option 2 which converts St John Street to one-way southbound between Paterson Street and Brisbane Street, thereby partially severing this link.

The proposal would provide an opportunity for Metro to optimise scheduling and use of layover in light of the proposed changes such that:

- Buses scheduled to depart next from Stops A, B, C or H could layover at St John Street (north) in preference to other bays; and
- Buses scheduled to depart next from Stops E, F or H could layover at St John Street (south) or Elizabeth Street in preference to St John Street (north).

The above would minimise the amount of circulation required for out-of-service buses, and would improve the statistics presented in Table 4 and Table 5.

3.2.3 Travel Times

Travel times along key routes are summarised in Table 6 and Table 7.

Table 6 Route Times – AM Peak (7:30 – 9:30)

Route	Base	Option 1	Option 2	Option 3
Outbound				
Invermay/Mowbray	6:19 ± 22	5:46 ± 22	5:53 ± 21	5:57 ± 20
East Launceston	5:06 ± 13	5:01 ± 14	5:06 ± 12	5:09 ± 10
Kings Meadows/Youngtown	6:30 ± 19	6:46 ± 24	6:50 ± 15	6:47 ± 22
Ravenswood	5:38 ± 31	5:28 ± 31	5:25 ± 25	5:41 ± 28
Trevallyn/Riverside	5:12 ± 22	1:51 ± 3	1:51 ± 3	1:52 ± 3
Inbound				
Invermay/Mowbray	6:39 ± 27	6:49 ± 23	6:49 ± 21	6:51 ± 28
East Launceston	4:39 ± 19	4:29 ± 16	4:20 ± 18	4:19 ± 17
Kings Meadows/Youngtown	5:48 ± 25	6:41 ± 13	7:29 ± 25	6:20 ± 21
Ravenswood	5:50 ± 35	5:38 ± 23	5:57 ± 33	5:57 ± 38
Trevallyn/Riverside	3:59 ± 28	3:54 ± 22	3:56 ± 27	3:51 ± 15

Table 7 Route Times – PM Peak (15:30 – 17:30)

Route	Base	Option 1	Option 2	Option 3
Outbound				
Invermay/Mowbray	6:18 ± 21	5:41 ± 21	5:55 ± 23	5:50 ± 21
East Launceston	5:09 ± 17	5:08 ± 12	5:08 ± 14	5:12 ± 12
Kings Meadows/Youngtown	7:31 ± 23	8:06 ± 27	7:45 ± 23	7:47 ± 27
Ravenswood	5:40 ± 24	5:40 ± 31	5:37 ± 21	5:33 ± 25
Trevallyn/Riverside	5:24 ± 19	3:03 ± 21	2:59 ± 16	3:07 ± 25
Inbound				
Invermay/Mowbray	6:36 ± 22	6:51 ± 20	6:54 ± 21	6:54 ± 24
East Launceston	5:08 ± 17	4:44 ± 16	4:32 ± 13	4:29 ± 17
Kings Meadows/Youngtown	5:36 ± 20	6:35 ± 37	8:56 ± 76	6:31 ± 28
Ravenswood	5:30 ± 33	5:07 ± 28	5:31 ± 30	5:59 ± 40
Trevallyn/Riverside	5:00 ± 40	5:54 ± 54	5:45 ± 63	5:50 ± 67

With reference to Table 6 and Table 7, the proposed relocation of bus stops will result in the following general impacts to route travel times:

- Reduced travel times for outbound northern buses due to relocating Stops E and F to north of Paterson Street;
- Significantly reduced travel time for outbound Trevallyn and Riverside services due to relocation of Stop H to Paterson Street;
- Reduced travel times for inbound East Launceston services due to two-way conversion of George Street; and
- Generally increased travel time for inbound south services (Kings Meadows/Youngtown) due to additional circulation around Charles Street and Paterson Street.

Note that there is some notable deterioration in modelled travel times for some services during the evening peak as a result of the observed congestion noted previously. This is reflected in the variation in travel time (up to ± 76 seconds) reported in Table 7. The effects of evening peak congestion are further discussed in Section 3.3 of this report.

3.2.1 Junction Performance

The intersection of Paterson Street and St John Street is located at the centre of the Launceston Central Bus Interchange under the proposed scenarios, with bus stops E, F and H being relocated to St John Street (just north of Paterson Street) and Paterson Street (just west of St John Street).

Additionally, Paterson Street is proposed to be converted to two-way traffic, thereby converting the east approach from a departure only to include a westbound approach. The model tested the junction under the configuration and signal phasing which was previously used in the Launceston City Heart Project Two-way Streets Assessment which included:

- A single approach lane on the Paterson Street (eastbound) approach;
- Two approach lanes on all other approaches providing separation between left-through and right turn traffic;
- A single departure lane on all approaches;
- Two phase control with filtering right turns.

The junction performance is summarised in Table 8 and Table 9 under each scenario.

Table 8 Intersection Delay – AM Peak (7:30 – 9:30)

Approach	Base	Option 1	Option 2	Option 3
St John Street S (northbound)	4.4 s [A]	17.9 s [B]	-	26.1 s [C]
Paterson Street E (westbound)	-	11.7 s [B]	10.8 s [B]	10.5 s [B]
St John Street N (southbound)	5.5 s [A]	22.0 s [C]	17.0 s [B]	18.7 s [B]
Paterson Street W (eastbound)	25.0 s [C]	23.5 s [C]	22.6 s [C]	21.5 s [C]
Intersection Average	***17.4 s [B]***	***21.8 s [C]***	***20.4 s [C]***	***20.2 s [C]***

Table 9 Intersection Delay – PM Peak (15:30 – 17:30)

Approach	PM Peak	Option 1	Option 2	Option 3
St John Street S (northbound)	4.4 s [A]	16.5 s [B]	-	23.3 s [C]
Paterson Street E (westbound)	-	12.5 s [B]	12.0 s [B]	13.5 s [B]
St John Street N (southbound)	5.9 s [A]	29.0 s [C]	19.7 s [B]	22.2 s [C]
Paterson Street W (eastbound)	30.4 s [C]	49.6 s [D]	45.3 s [D]	42.8 s [D]
Intersection Average	***19.6 s [B]***	***35.8 s [D]***	***33.3 s [C]***	***32.6 s [C]***

From Table 8, it can be seen that the junction would operate at a satisfactory level of service during the morning peak hour, with the average intersection delay reaching approximately 22 seconds (LOS C). Intersection performance was observed to deteriorate in the evening peak models due to developing congestion along Paterson Street towards the end of the modelled period.

It should be noted that in the first modelled hour in the evening peak, average intersection delays were in the order of 22 to 23 seconds (LOS C). Traffic volumes at the junction do not increase significantly for the second hour, and therefore wider network (upstream and downstream) effects are considered to be a contributing factor. Further discussion on this is provided in 3.3 of this report.

3.3 Discussion of Results

3.3.1 Bus Operation

The model results show that the proposal will have generally little impact on overall bus performance. Bus VKT and VHT typically varies by around 5-8 bus-km (on average 25-40 metres for each bus) and 10-20 bus-minutes (on average 3-6 seconds for each bus) over the 2 hour morning and evening peak periods compared to the existing scenario.

There would be some change to layover locations and circulation routes through the city, however the models show a minor improvement in 'dead runnings' activity with the out-of-service bus VKT typically improving by around 1 to 2 bus-km under the two-way St John Street options (Option 1 and Option 3).

It is likely that the model results show an 'average' with regard to 'dead runnings' as buses have been randomly assigned based on probabilities. The relocation of stops and layover provides an opportunity for Metro to optimise layover and out-of-service bus routes such that bus circulation around the city is minimised and actual bus travel distances and times could be further improved.

3.3.2 Evening Peak Congestion

As noted in previous sections, during some of the model runs[1], there was some increased congestion observed along Paterson Street during the last part of the evening peak period associated with the heavy right turn movement from Paterson Street into George Street. This

[1] PARAMICS microsimulation models are run a number of times (typically 5) using different 'seed' numbers. These seeds randomise traffic generation patterns to better predict day to day variation in actual traffic volumes. The results extracted from the models are generally an average measure of the 5 seed runs.

congestion influenced the results in some models as evidenced by the larger delays and variation in travel times.

It should be noted, however, that no iterative intersection or road network design was undertaken as it was outside of the scope of this project. It is possible that the network congestion observed could be cleared with some minor changes to signal phasing and/or intersection configuration.

While the traffic modelling undertaken in this project has determined that there would only be minor impacts on bus operations as a result of the proposed bus stop relocations, in light of the above network impacts it is recommended that further investigations be undertaken to confirm intersection design and signal phasing at the following locations:

- Paterson Street / George Street; and
- Paterson Street / St John Street.

The investigations should consider intersection operation under the two-way configuration both with the dominant Charles Street – Paterson Street – George Street circulation route as well as with a more balanced traffic flow as might be achieved in the future.

4. Conclusions

This report has documented the traffic modelling procedure and results of proposed changes to the Launceston Central Bus Interchange including:

- Relocation of Stops E and F;
- Relocation of Stop H; and
- Relocation of Paterson Street layover.

In addition to the above, three separate options were considered for the configuration of St John Street:

1. Two-way St John Street (as per existing);
2. One-way St John Street southbound; and
3. One-way St John Street with contra-flow bus lane.

The focus of the project was on bus operations and the following key findings were obtained from the modelling:

- The proposal resulted in only a minor change in bus trip distances and travel times, with Option 2 providing slightly reduced performance compared to Options 1 and 3.
  - Note that, for buses, Option 1 and Option 3 are essentially identical with the only difference being a small amount of private car traffic on St John Street (northbound) under Option 1 which is not present in Option 3.
- The total distance travelled by out-of-service buses (i.e. 'dead runnings') was found to improve slightly compared to the existing situation under Options 1 and 3, however Option 2 resulted in increased circulation required due to St John Street being converted to one-way southbound.

Additional congestion was observed towards the end of some of the evening peak models (after 5:00 pm) which was found to influence the results. This was determined to be a result of the heavy right turn movement from Paterson Street into George Street approaching capacity and causing additional delays and queuing along Paterson Street, through the new Bus Interchange.

In order to ensure that the network, and in particular these two intersections along Paterson Street, is capable of servicing the proposed changes to the Launceston traffic network and the Launceston Central Bus Interchange, it is recommended that further investigations be undertaken at the following locations:

- Paterson Street / George Street; and
- Paterson Street / St John Street.

The investigations should consider intersection operation under the two-way configuration both with the dominant Charles Street – Paterson Street – George Street circulation route as well as with a more balanced traffic flow as might be achieved in the future.

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