Investigation into the Feasibility of Introducing School Routes into PTV Journey Planner

PBA Transit Planning for Bus Association Victoria

February 2022

Executive Summary

This report has been prepared to inform the Department of Transport (DoT) Victoria of the benefits and feasibility of expanding the current Public Transport Victoria (PTV) journey planning tools to include school route services.

Background and context

School service information is currently disjointed and at time incomplete, presenting a challenge for students and parents trying to plan their school trips. There is an opportunity to integrate this data into PTV's current journey planning tools and provide a single source of information

The scope of this project is to understand the challenges to source, create, validate, and process the information that would be required to expand these tools to include information for school bus services. The project does not seek to carry out the work to prepare data, but to inform decisions around the opportunities and challenges that implementation would present.

Project Vision development and validation

Currently there is low visibility of school services to passengers and parents trying to plan school trips, and inconsistent provision of this information when it is available. Schools and bus operators may provide this information on their websites, or directly to families at school. This is inconsistent with the vision of PTV as the coordinator of all public transport information.

The vision of this project itself, is **to provide consistency of passenger information across travel modes, expanding this to include school-focussed services not currently visible through PTV's journey planning tools.**

DoT has an established user panel from which they can elicit feedback on proposed and recent changes to the provision of services and information. This project has drawn on this resource to validate the project vision and understand where there still may remain some data gaps or preferences for levels of information.

The customer feedback exercise sought to understand how **desirable and useful** it would be to have the same level of information available for school route journey planning and navigation via the PTV app and website.

A series of questions was posed regarding school bus information, to understand the context and variables that will impact how **desirable** the info in the app is to the target audience. In order to understand service feasibility via a **usefulness** measure, the panel was asked if they would find usefulness in, and think they would use, the service for a range of journey planning scenarios.

The research found there is a strong appetite to have increased functionality on the PTV website and mobile app to include information (such as journey times, wait times and live updates) for public school routes.

A majority think that seeing public bus information on the PTV website and mobile app is relevant, useful and are likely to use it. This appetite stems from ease of **journey planning** and functionality that enables **monitoring the journey**.

Data requirements and gap analysis

Currently the PTV website and app provides information only for regular public route services as both static and real-time:

- Static route maps, timetables, routes available from a specific stop/nearby locations
- Real time departure information

In line with the project vision of providing consistent functionality, and meeting passenger expectations, the extension of real-time arrivals information for school bus services will require the same level of data from GPS tracking in each vehicle as regular passenger routes provide. In some regional centres without established real-time arrivals, this may not be necessary to roll-out as part of this project.

Within Metropolitan Melbourne, the majority of school bus services are provided by operators that also deliver other bus routes that require a substantial amount of route and timetable information to feed the Smartrak and myki systems. This data is held by both operators and DoT and will go a long way in enabling the provision of real-time service information across all bus route types.

Even where route data exists, it will need to be validated to ensure it remains current and has the required level of detail for journey planning applications. Where route data already exists within Smartrak, this will provide the starting point to prepare information for public-facing systems. There may be many cases where not all stops have been mapped into the system, as these are not required under current monitoring regimes. Stop locations will need to be confirmed with operators along with any publicised and anticipated passing times.

A decision for DoT will be how to clearly indicate School Routes from regular routes to signal to passengers that this service will not be available every weekday and for one or two trips per day. Route numbers starting with S and/or with 4 digits instead of the typical 3 used in Melbourne are commonly employed and would minimise the volume of transition to new route codes.

Outcomes and recommendations

The initial validation of the project's vision, understanding of the current data available to support PTV's journey planning tools, and sizing of the task to validate existing data and prepare new data to fill gaps provides a solid foundation to progress this investigation to the next level of detail.

To solidify support for the introduction of school route information into PTV's journey planner, the immediate next steps should include the actions summarised below.

#	Recommendation	Section
1	Expand user engagement and validation to include a greater sample size and representation of potential travellers and parents, including those from regional areas	6.1.1
2	Conduct further customer research regarding the clear delineation of school route services and how these may be presented	
3	Collate and prepare Service Specifications from CRUBS and metropolitan contracts to develop a clear baseline of what should be reflected in the data	6.1.2
4	Engage with other areas of DoT who will be required to support the next phase of effort	6.1.3
5	Conduct a pilot study to firm up data processing requirements and timelines	6.1.4
6	Incorporate lessons learnt from pilot study to wider roll-out of school bus data preparation and publication	6.1.5

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Glossary

In this document the following words and phrases have specific meanings with the aim of both simplifying language and providing clarity around concepts and stages of the options assessment process. These specific meanings are outlined in Table 1 below.

Table 1: Glossary

GENERAL TERMS	MEANING
BIIF	Bus Industry Innovation Fund
CRUBS	Country and Regional Urban Bus Services
DIVA	DIVA is the next evolution of the Transnet information platform, with improvements such as GIS interfaces to pinpoint stop locations on aerial images
HASTUS	Scheduling software package used to optimise timetables, vehicles, and crew movements. Operators with access to this system (via PBA) will provide route, timetable, and vehicle movement data from this software into DoT's systems.
Journey Planner	A catch-all term for the trip planning tools on PTV's website and the PTV smartphone applications
MBF	Melbourne Bus Franchise contract (and, in some contexts, the tender process to award this contract)
MBSC	Metropolitan Bus Service Contract – the main contracts under which Melbourne's bus services are delivered
myki	myki is the smartcard ticketing system used in Melbourne and major regional centres
NSC	Network Service Change team of DoT
SBP	School Bus Program (SPB) routes delivered on behalf of the Department of Education, provided fare-free to students who meet eligibility criteria
School Routes	School Day only routes in the context of metropolitan and CRUBS networks, subject to regular (myki/local) fares
Smartrak	Smartrak is the main platform used for GPS tracking of buses in Melbourne and key regional centres. This system feeds on-time running information provided to passengers and bus contract managers
STS	School Town Special (STS) runs in the context of Country and Regional Urban Bus Service networks, subject to local fare rules
Transnet	Transnet is DoT's repository of digital information for bus timetables and route information

Disclaimer

All opinions and interpretation of legislation and policy presented herein are those of the authors but are not intended as formal legal advice. Report recipients and relevant stakeholders must seek their own formal advice from the relevant local, State and Commonwealth agencies on the matters presented herein.

Whilst all reasonable steps have been taken to ensure the appropriateness of source documents to support the analysis in this report, the authors have not necessarily validated the accuracy of the information produced by third parties.

1 Background and Strategic Context

This report has been prepared to inform the Department of Transport (DoT) Victoria of the benefits and feasibility of expanding the current Public Transport Victoria (PTV) journey planning tools to include public school route services.

Buses have long been the workhorse of carrying students to and from school each day, linking train stations and local suburbs to both primary and secondary schools across Melbourne and regional centres. While many bus routes have been established for years, buses provide the flexibility to adapt to growing and shifting school populations, and to maximise the geographic coverage of the network.

School service information is currently disjointed and at time incomplete, presenting a challenge for students and parents trying to plan their school trips. There is an opportunity to integrate this data into PTV's current journey planning tools and provide a single source of information.

The scope of this project to understand the challenges to source, create, validate, and process the information that would be required to expand these tools to include information for school bus services. The project does not seek to carry out the work to prepare these data, but to inform decisions around the opportunities and challenges that implementation would present.

1.1 The Bus Industry Innovation Fund

DoT has established the "Bus Industry Innovation Fund" (BIIF) to support the Victorian bus industry to develop new innovations that will focus on improving network efficiency, patronage, customer experience, safety, and driver support.

1.2 Project Vision

Currently there is low visibility of school services to passengers and parents trying to plan school trips, and inconsistent provision of this information when it is available. Schools and bus operators may provide this information on their websites, or directly to families at school. This is inconsistent with the vision of PTV as the coordinator of all public transport information.

The vision of this project itself, is **to provide consistency of passenger information across travel modes, expanding this to include school-focussed services not currently visible through PTV's journey planning tools.**

The 'PTV Journey Planner' is often used a catch-all term for the trip planning tools on PTV's website and the PTV smartphone applications. This covers:

- Printed timetables and routes maps (in PDF form)
- Digital timetables
- Digital route maps
- Network maps
- Real-time service information
- The "A to B" journey planning tools
- Information provided by the PTV contact centre

1.3 Scope

This project is focussed on understanding the potential for integration of school bus information into PTV journey planning tools, the volume of routes that will require data preparation and validation, the volume of work required to prepare this information, and the processes and internal requirements to take things through to publicly available information.

Within the current scope it is not intended to perform this data preparation work, however this will set the foundation to begin this work in a pilot form or wider roll-out.

1.4 Deliverables

The project is strategic in nature and seeks to provide reports and information that enables DoT to make informed decisions around the feasibility and appropriateness of proceeding to the stage of trials and implementation.

Key deliverables of the project are to provide:

- This report, presenting an overall view of the investigations conducted and recommendations
- Regular engagement with relevant areas of DoT, via Reference Group meetings and others as required
- A final presentation of the project and its recommendations

1.5 Project overview

1.5.1 Project elements

The project followed the key steps and activities presented in Table 2 below. This report is presented in a similar structure to provide answers to the key questions posed by the project.

Table 2: Project overview

Tasks	Data / Inputs	Key contributors	Outcomes	Report section
Inception and establish reference group		All	Agree scope & approach Reaffirm outcomes, roles & next steps	1.5.2
Establish Project Scope, Vision and Goals	Journey Planning data specs / mandate Benchmark operators and other States	PBA DoT	Agree desired JP app functionality and user experience Data requirements to support school routes	2
Validate project vision	Vision outcomes and mock-ups	DoT, Bastion Research	Gather feedback from current users	2.5
Data requirements	Data / contract limitations	DoT	Understand requirements and obstacles to implementation	3
Baseline data assessment	Current school route data	PBA DoT	Gap analysis of baseline and goal	4

Tasks	Data / Inputs	Key contributors	Outcomes	Report section
Gap analysis and pathway development	Baseline information & gaps	PBA DoT	Initial assessment of options to address shortfall Understand effort required to create missing data	5
Reporting		PBA	Consolidated analysis and recommendations	

1.5.2 Project governance

A Project Reference group was established to guide the investigations and recommendations of the study, comprising members from various areas of DoT responsible for the creation, validation, management, and publishing of journey planning data.

Table 3: Project Reference Group

Name	Organisation / Unit	Role / Technical Area
Russell Lane	PBA Transit Planning	Project Leadership
Leigh Bromley	PBA Transit Planning	Project Management
Parry Serafim*	Bus Association Victoria	Strategic Industry Guidance
Stephen Ryan	Department of Transport	Project strategy
Fiona Xuereb	Department of Transport	Project strategy School Services Expertise
Sally Bieleny	Department of Transport	Journey Planning and Customer Experience
Stephan Vivekanantha	Department of Transport	Bus Data liaison
Tom McAdams	Department of Transport	Bus Data liaison
Simon Craig	Department of Transport	Bus Data liaison
Emma Voce	Department of Transport	Bus Contracts
Elizabeth James	Department of Transport	Bus Projects Coordination & Bus Planning

* Note: BAV representative updated during course of the project

2 Project Scope, Vision

2.1 Scope of routes and information

The Department of Transport contracts bus operators to provide a range of school-based routes, operating on school days only to carry the vast numbers of students across the network each morning and afternoon.

Currently there is low visibility of school service information to passengers and parents trying to plan school trips, and inconsistent provision of this information when it is available. Schools and bus operators may provide this information on their websites, or directly to families at school. This is inconsistent with the vision of PTV as the coordinator of all public transport information.

In metropolitan Melbourne and in larger regional centres, these school services complement the wider public bus network, providing 'targeted surge capacity' to meet this daily known demand for student travel.

In smaller regional centres, school routes may be the only form of public transport serving particular areas of town for much of the day. Providing clear information about the availability of these services has the potential to provide a valuable lifeline to some sections of these communities who may not be aware of their existence or availability.

An opportunity exists to provide increased functionality within the PTV Journey Planning tools to help passengers and parents see journey times, wait times and live updates for school services.

2.2 Scope of School Bus Routes in this study

'School Routes' may often be used to describe a range of public transport services, which can be confusing for passengers and parents, and may lead to confusion within the Department and industry. A recommendation of this study for DoT is to establish clear terminology as part of its bus reform efforts to minimise potential confusion. This report refers to 'School Routes' as those that are within the scope of Journey Planner investigations.

School Bus Routes can include 'School Specials' and school deviations on regular routes, in the context of metropolitan bus operators, 'School Town Specials' (STS) runs in the context of Regional Urban bus networks, and the free School Bus Program (SPB) routes delivered on behalf of the Department of Education.

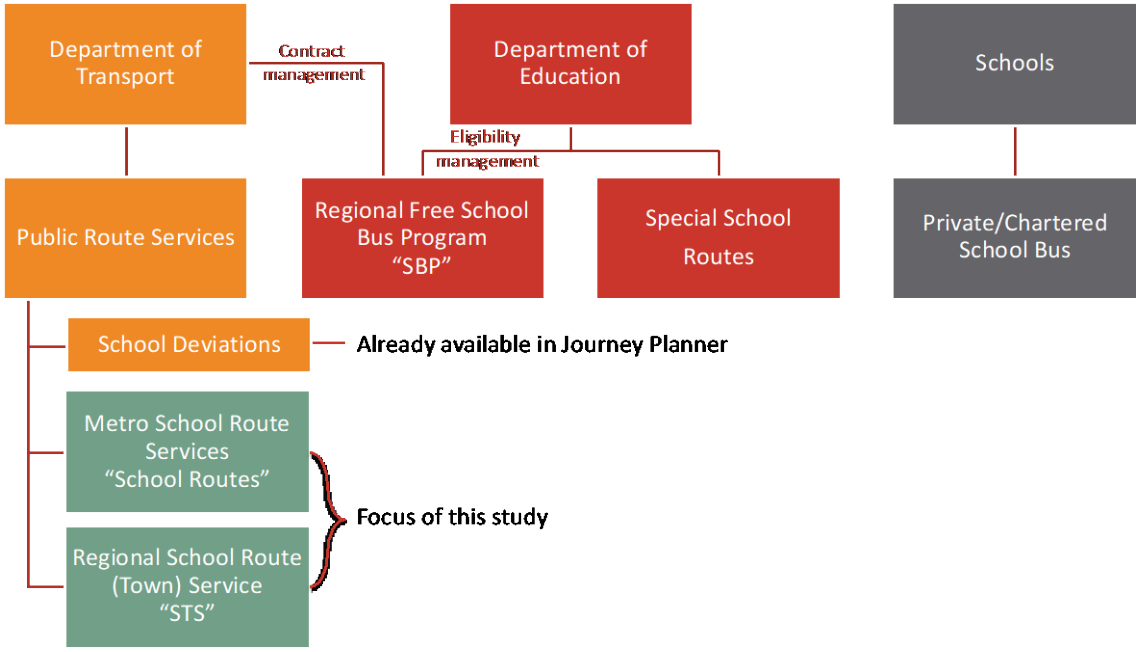
This project is limited to Metro School Routes and Regional/STS School Routes (shown in green in Figure 1) and excludes the SBP routes that are subject to travel eligibility criteria for students in regional areas to access their closest appropriate school. Many SBP routes exist on Melbourne's fringe, where once there was a need for free buses, but the expansion of housing and the regular route network has potentially surpassed this need. A program of work is underway withing DoT to review routes in these areas but is outside the scope of this project.

'Special School routes' typically refers to buses servicing Special Schools or other special needs education centres. Students accessing these services may require additional supervision or assistance in boarding, including wheelchair access. In addition to the driver, each service is staffed with a bus marshal to assist with the safe transport of these students. These services are also of interest to DoT to improve their routing efficiency, however these routes are again outside the scope of this project.

Some schools may also privately contract services to meet their own needs, which may require fares to be paid to the school, typically as an annual pass – these services are not part of this study. These may commonly be referred to as 'private school buses', adding another potential point of confusion over whether they serve private schools, or are privately contracted to serve any type of school.

Although Figure 1 provides a simplified view of responsibilities, there is an interplay between both departments and schools to plan, manage, contract, and deliver services.

Figure 1: Categories of School Bus Routes in Victoria and simplified responsibilities



This project does not seek to change the delivery of school bus services, only the way in which information is provided. There are no proposed changes to the eligibility of passengers to access certain types of bus services, i.e., SBP routes will remain accessible only by those students who qualify for access under either free travel or fare paying status.

Current rules for access to metro school routes and regional school routes (STS) will remain the same, such that members of the general public are able to access these routes for travel with payment of the required fare. This fact is often unknown or misunderstood, with a common belief that these services are also only available to students.

There is also an opportunity to improve the utilisation of public transport services by providing service information in a central, accessible way to a wider range of potential passengers. This includes the use of these services by all eligible passengers, i.e., any fare paying passenger.

2.3 Concurrent projects out of scope

There are a number of projects being undertaken by DoT at any one time in relation to bus services, and school bus services in particular. This Journey Planning information project does not intend to influence the outcomes of other pieces of work, but it recognises that changes and challenges may arise from different areas of DoT.

The project has noted, however, that the collection, revision, and preparation of school bus data to support Journey Planning may also be beneficial to these and other projects in establishing a new baseline of information that can be adopted for a range of works including route planning and network reviews.

Review of school bus routes on Melbourne's fringe

As Melbourne's suburbs continue to expand, new suburbs and schools change the landscape of student travel needs and obligations of the government to provide services for students to access their closest school. DoT is currently undertaking a review of services on Melbourne's fringe to ensure they continue to align with the needs of families in these areas, and provide efficient, effective networks for students to access the education that best meets their needs.

School Bus Centre Reviews

Annual review of changes to each centre's need. The SBP program is outside the scope of this work, however the expansion of urban routes in these areas may impact the SBP route needs.

School contract remeasuring

Establishing a clear baseline understanding with regional SBP operators regarding up-to-date routing information and travel times for their services. Again, while the SBP network is outside the scope of this project, there may be some overlap with the operators involved, and the process to confirm data using tools such as the iPad RouteMapper app.

2.4 Vision and benchmarking

The vision of this project itself, is **to provide consistency of passenger information across travel modes, expanding this to include school route services not currently visible through PTV's journey planning tools.**

The project conducted a high-level review of other Australian public transport authority websites and tools to understand if and how they provide school bus information and if or how these services are distinguished from other bus routes. These results are presented as an Appendix to this report.

2.5 Validation with users

DoT has an existing user panel from which they can elicit feedback on proposed and recent changes to the provision of services and information. This project has drawn on this panel to validate the project vision and understand where there still may remain some data gaps or preferences for levels of information.

The functionality provided to support customers in planning public transport journeys and navigating as they travel is existing and under continuous improvement based on customer feedback – this project will form one such point of feedback to drive improvements.

2.5.1 Objectives of customer research

The customer feedback exercise sought to understand how **desirable and useful** it would be to have the same level of information available for school route journey planning and navigation via the PTV app and website.

This exercise would also test the project hypothesis that the current wider PTV journey planning experience is useful and usable "as-is", and that there would be no need for additional functionality once public school route data was added to the data set.

A series of questions was posed regarding school bus information, to understand the context and variables that will impact how **desirable** the info in the app is to the target audience:

- How often would a parent or older student plan a different journey to-from school and for what reasons
- How do parents currently plan/monitor their child's travel (if at all) and why?
- What (if any) online tools parents/students use to navigate as they travel to-from school and why?
- How useful it would be to have public (but not private) school bus information included with other PT services to help with planning and navigating?
- Are there any concerns re: knowing whether or not a bus that forms part of their journey is a public school route?

In order to understand service feasibility via a **usefulness** measure, the panel was asked if they would find usefulness in and think they would use the service for:

- Planning a journey to/from school
- Future journey
- Next departure
- By timetable
- Navigating while traveling (or while monitoring travel)

2.5.2 Target user groups

Three key user groups for school bus services and, in particular, school bus service information were identified and targeted within the feedback exercise. The primary focus was on parents of school-age children planning for their children, whether they were travelling with their children on the bus or planning for their children to travel alone.

The two secondary-focus user groups covered older school age children planning their own means of travel and wider public transport customers who may end up on a public school route.

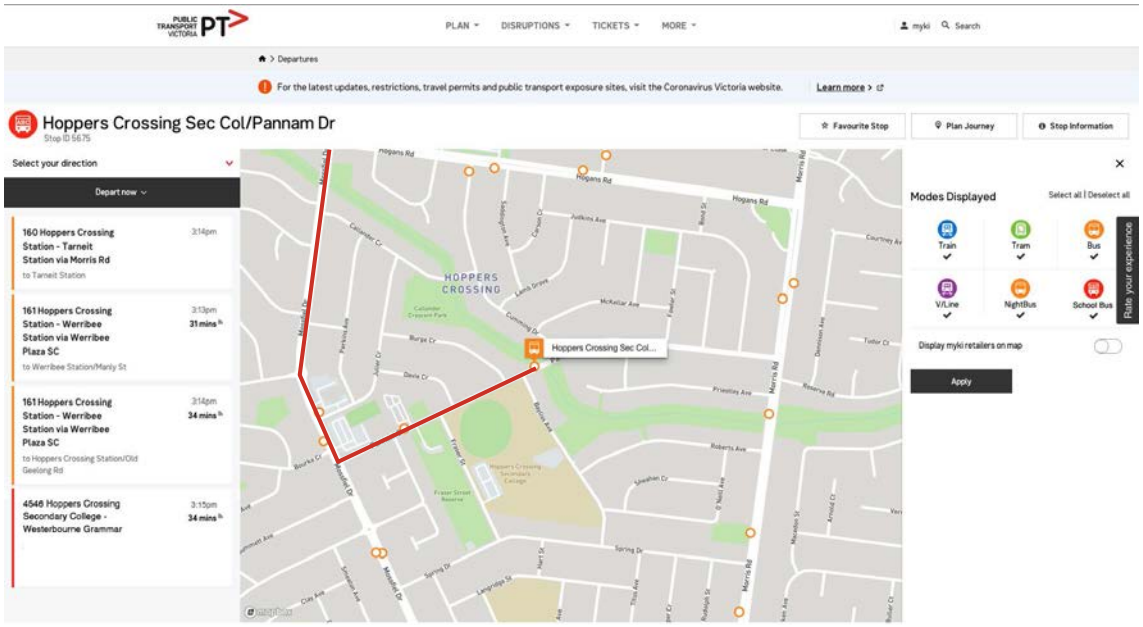
2.5.3 Mock-ups of potential functionality

To assist the Reference Group's discussion of potential end-state interfaces as part of the project visioning, some mock-ups of potential PTV website display of the ways in which school services may be distinguished separately from 'regular' passenger services were developed.

An initial intent of the project was to use these or similar mock-ups to assist user panel participants in understanding the potential interface they would use to access and explore school bus information. Although these mock-ups did not end up progressing to the user

panel exercise, Figure 2 provides an example that could be used in follow-up sessions. It is recommended that some form of static mock-ups are used in the next stage of investigations, or pending timing and budget, an interactive version/test environment website.

Figure 2: Mock-up of potential PTV website distinguishing school routes from regular routes



2.5.4 *Surveys and focus group conduct*

DoT engaged Bastion Insights to conduct a hybrid quantitative/qualitative online survey of the user group to understand bus journey planning benefits and desirability of including public school bus information with other public transport services to help with planning and navigating.

Specifically, feedback was gathered from:

- 30 parents who plan their child's bus journey to school (including a mix of children's ages and interconnection needs) and
- 10 students aged 16 and over who catch a bus to school and plan their own journey.

It was noted that the bus a child currently takes to school may either be: a private bus, a regular route bus or a public school route bus, or a combination of these. Additionally, it was unclear whether parents or students were able to accurately distinguish between a regular route bus and a school route bus. As such, when the research results refer to public buses this may be in reference to either a regular route bus or school route bus.

2.5.5 *Survey findings*

The research found there is a strong appetite to have increased functionality on the PTV website and mobile app to include information (such as journey times, wait times and live updates) for public school buses.

A majority think that seeing public bus information on the PTV website and mobile app is relevant, useful and are likely to use it. This appetite stems from ease of **journey planning** and functionality that enables **monitoring the journey**.

Overall having all bus information in one accessible place would save time and effort on behalf of parents planning and monitoring their child's journey or for students themselves planning their own journey and therefore thought to be beneficial by many.

Journey Planning

When it comes to journey planning respondents felt it would be useful to have all information accessible in one place, rather than having to go back and forth between several sources such as the school website. Comments received included:

- *"I have 2 school aged children. I need quick and easy access to all travel options for my children without having to ring the school."* Respondent with children in primary and high school, currently using private and public bus
- *"It could help easily find out information on the buses and schedules."* Responded has children in primary, currently takes private and public bus
- *"[There is benefit in] understanding all the possibilities."* Respondent with children in primary, currently takes public bus
- *"Planning routes can be difficult when the PTV app does not offer much, especially in terms of going to school."* Student, catches public bus
- *"This would save a lot of time and show me the most efficient route that I may not have even discovered yet."* Student, catches public bus

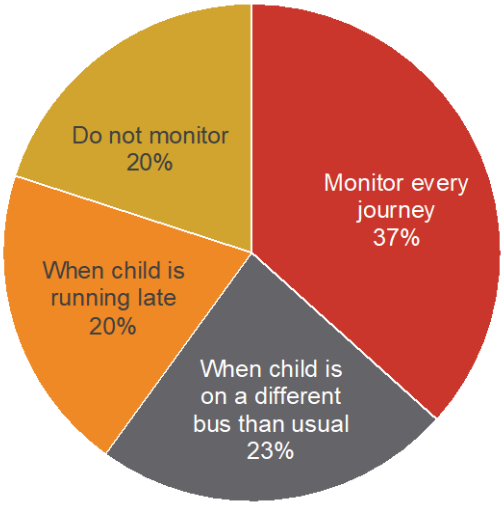
Monitoring the journey

More notable than the response to a consolidated source for information, was the support and anticipated benefits for having public bus information available on the PTV website and mobile app for monitoring the journey, and this is the reason most respondents would use the information in these tools themselves. Having this information provides reassurance for parents particularly when a bus is not running to schedule. Comments received included:

- *"Helps to know when they will arrive home and get to school."* Has children in primary and high school, currently takes private and public bus
- *"I would feel safer knowing I could monitor when they are. I have had no concerns yet, but this gives me more reassurance I can check up or keep an eye on them."* Has children in primary and high school, currently takes public bus
- *"It gives you both reassurance where they are headed and helps kids feel more secure knowing where they are going."* Has children in primary and high school, currently takes public bus
- *"If there [are] specific details available regarding school bus & live updates where they are, it will take the worry & stress out of the situation & put my mind at ease."* Has children in primary school, currently takes public bus
- *"Helps [me] to know when they will arrive home and get to school."* Has children in primary and high school, currently takes private and public bus
- *"It gives you options, so if you know the bus is running really late or not turning up, you can plan another route to school."* Student, catches public bus

The investigations found that the majority of parents who participated were already monitoring their child/children's journey in some way or another – including through tracking regular route services or checking in directly with their child.

Figure 3: Parents current monitoring of their children's journeys to/from school (n=30)



Distinguishing between school routes and regular routes

Of those who currently use public school routes, a majority of respondents were under the impression that the public bus that their child catches is already included on the PTV website, although some were unsure. This suggests that there is some minor confusion or lack of transparency of what is and isn't currently included on the PTV website and mobile app.

3 Understanding data requirements

DoT has established, comprehensive systems and processes for the production and management of public transport data, particularly where this feeds into publicly available systems.

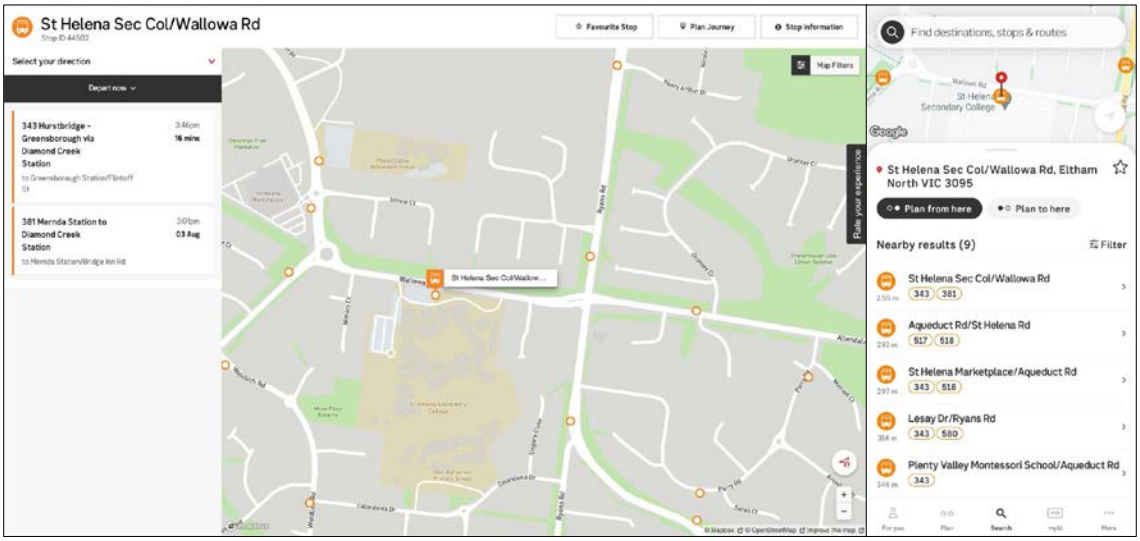
3.1 Data to support systems

Currently the PTV website and app provides information only for regular public route services as both static and real-time:

- Static route maps, timetables, routes available from a specific stop/nearby locations
- Real time departure information

When a user searches for possible journeys to and from school they will receive results for these public routes that may stop at or nearby their school, giving the impression that their travel options may be quite limited, or in some cases non-existent.

Figure 4: PTV Journey Planner example search results for after school services



3.1.1 Static information

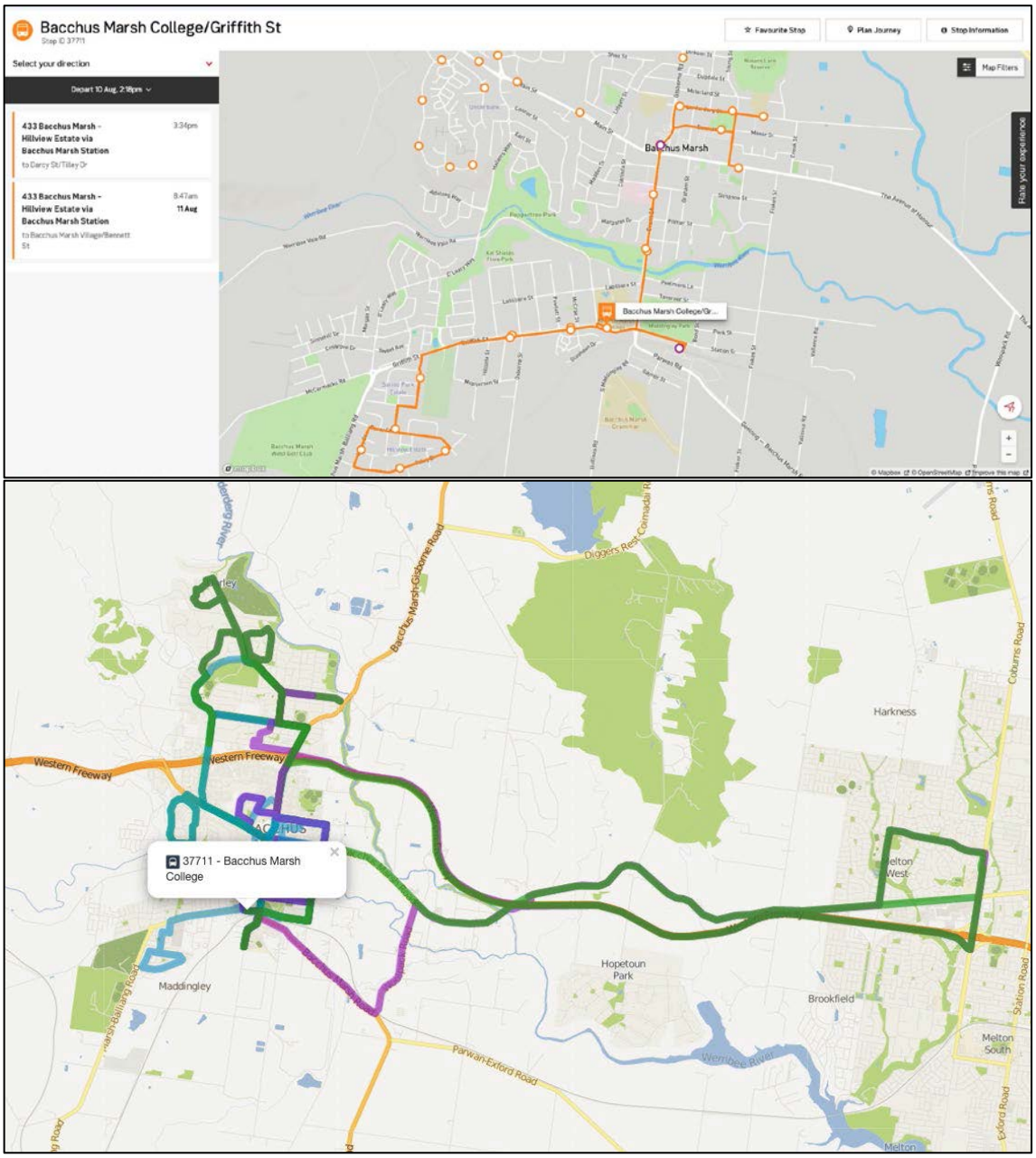
Route map information for regular routes is established in GIS systems to determine exact routes paths and distances to feed the wider provision of route information to passengers and determination of contract payments to bus operators for the kilometres they travel each year. Regular routes are subject to consultation between DoT, bus operators and at times the general public to establish the best locations for stops and appropriateness or roads to allow sage manoeuvring of buses. This level of oversight gives confidence that the paths are correct and up to date.

For school routes, the path of travel may vary over time, as there is sometimes seen to be a level of discretion with these services. They may be using unofficial stop locations (not marked by a PTV flag) in order to provide the maximum coverage to students and minimise travel distances between their home and bus stop.

For operators that deliver services under the myki ticketing system, there is a baseline of data required to support this system to correctly calculate fares depending on where passengers board and alight the bus. This route and stop information exists in DoT's systems and is

considered largely up to date. Figure 5 shows the bus services that a potential passenger would find using the PTV website to access Bacchus Marsh College versus the range of routes that are already mapped into the Smartrak and myki systems

Figure 5: Example of visible routes on PTV site versus available mapped routes



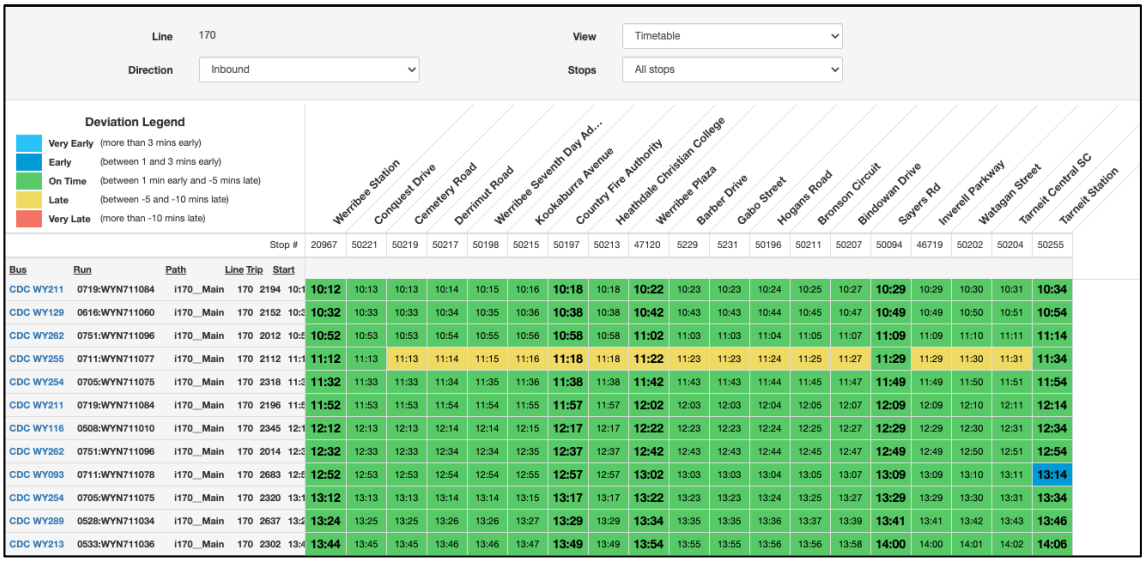
These school routes extend well beyond the current regular town service network, using roadside stops that may not be mapped in any system but are rather 'informal' stops that are known to the people who use these services. This is similar to a handful of 'hail and ride' services that operate within Melbourne and some regional centres.

3.1.2 Real-time information

Passengers' expectations have grown in line with access to information, and real-time arrivals now form part of a baseline of information provided by many transit agencies in Australia and internationally. The extension of this information to school bus services will require an additional level of data from GPS tracking in each vehicle.

Bus operators in Melbourne and regional centres using myki are linked into the Smartrak system, that provides real-time updates of bus positions, current route being delivered, and timetable adherence.

Figure 6: Smartrak real-time tracking interface



Bus tracking capability is not currently required for many school routes but will be available where the vehicles utilised are required to have this equipment installed for when they are delivering regular route services.

If the Department wishes to provide consistency of information across all routes in each city or centre, then buses currently solely used to deliver school peak services will be required to have this capability installed. Similar to when this technology was introduced to regular route services, the roll-out period attempted to minimise the inconsistencies, by installing devices en masse by depot then 'flicking the switch' on live information by depot or groups of routes.

The level of information at a stop level for school routes will affect the ability to provide passengers with an estimate of arrival time at their stop. School routes are currently not subject to the same measurement of on-time running as regular route services; hence many may only have their first and last stops confirmed in DoT's systems for the purpose of determining route lengths, in-service time and the full delivery of a route from start to finish.

Figure 7: Example of route with Smartrak data only for the only first and last stop

In order for passengers to receive real-time information about their specific stop, there is a requirement for:

- The stop to be mapped in DoT's systems
- A time allocated to the stop
- The bus delivering the service to be active in Smartrak.

Confirming stop locations with bus operators, DoT's data team and DoT's Infrastructure and Network Service Change teams is anticipated to be one of the more time-consuming tasks that would be required to enable a consistent journey planning experience for school route passengers.

Table 4: Summary of data for static and real-time information systems

Data Required	Static	Real-Time
Route name and number	✓	✓
Route alignment in GIS format (.kml)	✓	✓
All stop locations in GIS format (.kml)	✓	✓
Unique Path IDs for all route variants	✓	✓
Unique Stop IDs and name data	✓	✓
Stop set-down / pick-up restrictions (if applicable)	✓	✓
Timetable with unique trip IDs	✓	✓
Timing points to display 'major stops'	✓	✓
Vehicle block and run data		✓

4 Baseline data assessment

The project team performed an audit of available school bus route and timetable data to understand the degree to which the desired journey planning information has already been prepared in order to feed other data systems.

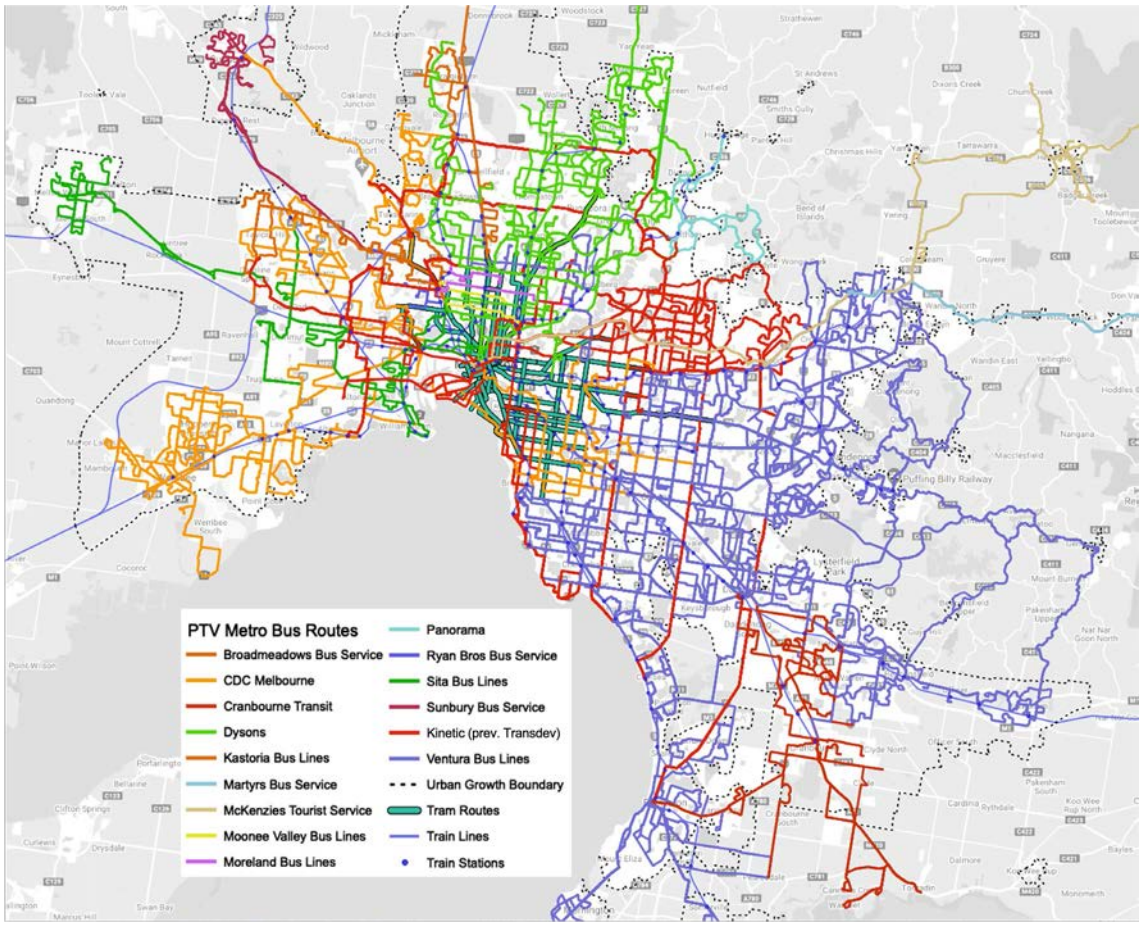
4.1 Scope of inclusion

Across Victoria there are around 2,000 school routes under consideration by this project. The definition of a route may vary, with morning and afternoon school trips often being allocated different route numbers and names to distinguish them. Particularly for afternoon bus travel, there may be an imbalance in the number of school services, where there is not the level of frequency on the regular route network as there is during the AM commuter peak. While every effort has been made to eliminate double counting of services in this report, all numbers presented here should be considered the best estimate of the number of route paths that will require processing for passenger information.

4.1.1 Melbourne

Across Metropolitan Melbourne there are currently 13 different bus operators that provide public services across 29 contracts. Most of these contracts also include a number of school routes that are integrated into weekday operations where possible. Additionally, these operators may also deliver privately chartered school services with buses outside their DoT core contracts.

Figure 8: Melbourne route bus network displayed by operator



These 13 operators are users of the myki ticketing system, which requires them to provide a certain level of data to DoT to track bus movements as discussed in the previous section. This places them well for roll-out of school route information.

In addition, two main school bus contractors, Driver Bus Lines and Mees provide a significant volume of school bus services. These operators also provide services on the fringes of Melbourne that may fall into the free School Bus Program network, hence a distinction between these routes, and the vehicle requirements to serve each one may present some additional work.

Many bus operators in Melbourne may also provide privately chartered school bus services, contracted directly with the schools themselves and available only to students who have applied for access, and/or paid for a pass or fares each time they travel. These services are not within the scope of this project.

4.1.2 Regional

Country and Regional Urban Bus Services (CRUBS) cover the larger regional cities of Victoria such as Geelong, Ballarat, and Bendigo, to connected centres such as the Latrobe Valley, down to smaller towns with a less than a handful of public routes, and some with a bare minimum of service. Across the state this involves 69 operators under 100 contracts. Within this there are over 600 STS country school routes, complemented by approximately 1,450 free SBP routes.

The next tier of smaller centres may or may not have a supporting regular route bus network, which will provide a challenge for providing real-time service information if equipment is not readily installed on buses, and that the size of operations may not require this level of investment in GPS technology.

Again, in each regional centre there is a mix of STS school routes and SBP routes, which at times may combine into a single service. This blurs the lines of what routes are considered publicly accessible and which require permission to access.

Table 5: CRUBS centres with subsidised STS routes

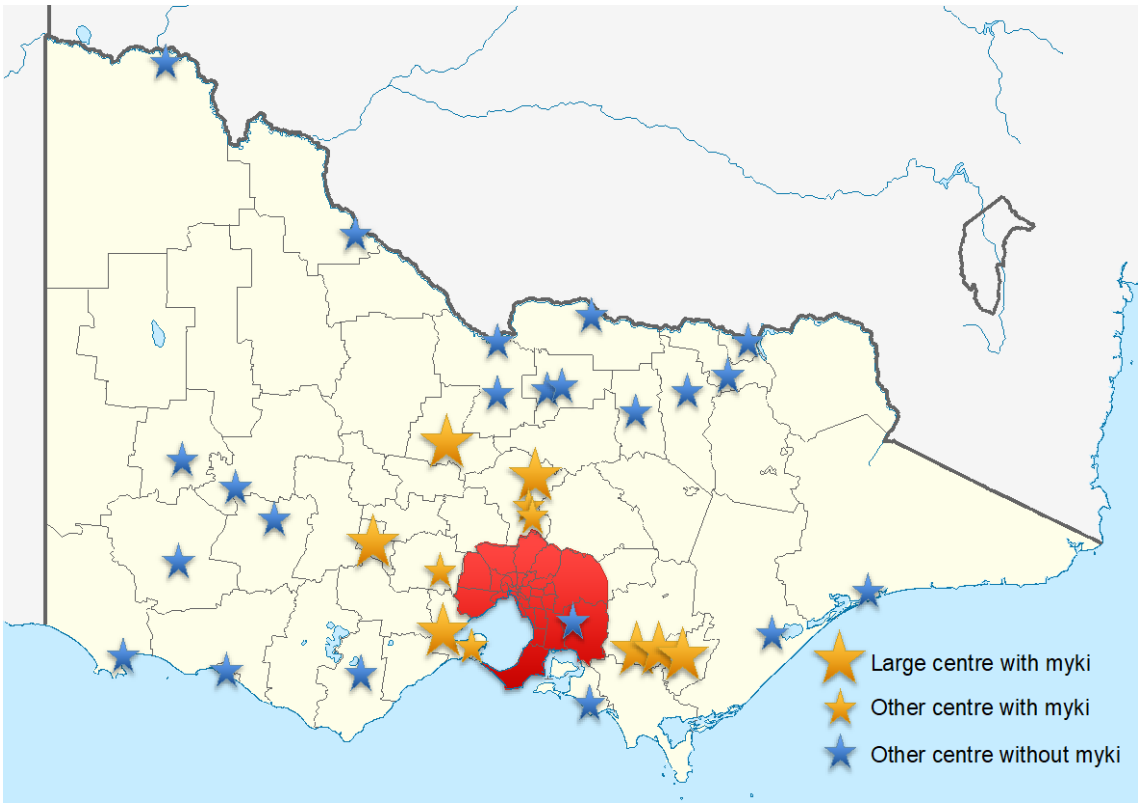
Ararat	Hamilton	Seymour
Bacchus Marsh	Horsham	Shepparton
Ballarat	Lakes Entrance	Stawell
Beechworth-Yackandandah	Latrobe Valley	Swan Hill
Benalla	Mildura	Wallan / Kilmore
Bendigo	Mooroopna	Wangaratta
Cobram	Officer*	Warragul
Colac	Portland	Warrnambool
Echuca	Rochester	Wodonga
Geelong & Bellarine	Sale	Wonthaggi

Note that the Officer CRUBS centre is within the Melbourne metropolitan boundary, yet only operates STS school services and has historically been outside the myki ticketing system.

Targeting the larger centres for the update and provision of school route information would go a long way to handling the bulk of work to introduce school services into the journey planner.

Routes in remaining smaller centres may require additional effort to source, prepare and validate data, resources at the operator's end may be more limited.

Figure 9: CRUBS centres with subsidised STS routes



In addition to the centres in Table 5 there are handful of centres that operate non-subsidised school routes, collecting fares directly from passengers for the provision of these routes. As these services are not subject to the same level of data provision as those under the standard PTV fares structure, they have not been considered as part of the potential roll-out of service information.

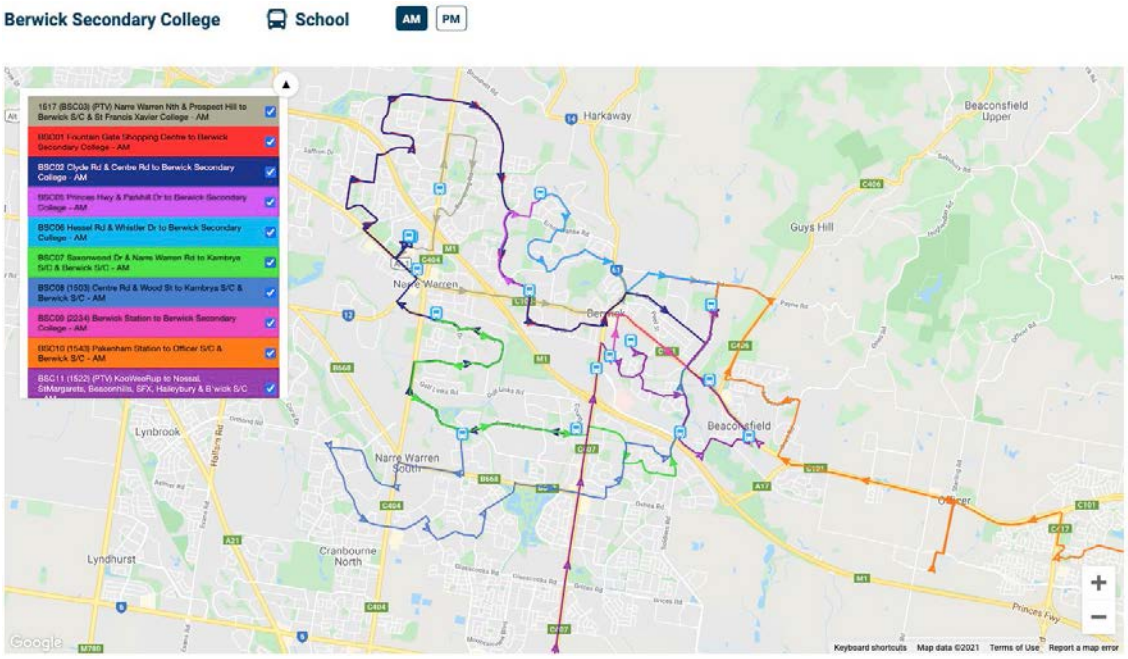
4.2 Data collection and review

4.2.1 Melbourne and regional centres with myki

Within Metropolitan Melbourne, the majority of school routes are provided by operators that also deliver regular public bus routes that require a substantial amount of route and timetable information to feed the Smartrak and myki systems. This data is held by both operators and DoT and will go a long way in enabling the provision of real-time service information across all bus route types.

One operator, Ventura, has already taken it upon themselves to present this data on their own website, with the goal of allowing parents and students to track the real-time location of their bus service.

Figure 10: Real-time school bus information from Ventura website



The issues arising from school route data in Melbourne and major centres will come not from a lack of existence of route information, but from its currency and detail to a stop level for journey planning purposes. Table 6 shows that the majority of school bus routes in this category have not been updated in the last four years, with a surge in reviews in 2017 largely in Melbourne, Bacchus Marsh, and the Latrobe Valley. Of the routes in Melbourne, a large proportion of these are operated by Ventura in Melbourne's east and southeast, having undergone review as part of contract renewal at this time.

Table 6: School Routes path currency

Year updated	Route paths
2010	100
2012	235
2013	145
2014	32
2015	107
2016	269
2017	559
2018	86
2019	28
2020	30
2021	26

While many school routes may not have changed since they were last reviewed, there will still need to be a process of reviewing each route to confirm that this is the case, or to identify and rectify any issues of missing or incorrect data.

In the larger regional centres and those within the myki commuter zone, routes are mapped as part of the bus tracking and fare collections systems, meaning that a substantial volume of services will already have much of the information required to commence their integration into PTV journey planning tools.

Table 7: Regional myki centre routes already mapped

Centre	Routes in Transnet
Bacchus Marsh	27
Ballarat	76
Bendigo	58
Geelong	313
Kilmore	1
Latrobe Valley	92
Wallan	17
Warragul	26

Note: 'Routes' refers to route paths

4.2.2 Other regional centres

The centres presented in Table 7 account for the majority of STS routes and around half the total school routes (including SBP routes) outside of Melbourne. Of the remaining CRUBS centres, there are a high volume of SBP routes that carry students in addition to the STS routes.

Table 8 shows the total number of additional SBP routes that operate in centres with more than 10 identified school runs. Those shown in italics consists solely of SBP routes, or non-subsidised STS routes, highlighting that a number of larger towns such as Bairnsdale and Leongatha will fall outside the scope of this exercise to provide school route information.

Table 8: Regional centres with significant SBP school route networks

Centre	Runs/Paths	Centre	Runs/Paths	Centre	Runs/Paths
Bairnsdale	*62*	Wodonga	22	*Euroa*	*13*
Sale	50	Benalla	22	Ararat	12
Shepparton	43	Warrnambool	18	*Yarrawonga*	*12*
Wonthaggi	34	Hamilton	18	*Alexandra*	*12*
Wangaratta	29	*Maffra*	*17*	*Donald*	*11*
Swan Hill	26	*Camperdown*	*16*	*Newborough*	*10*
Timboon	*26*	Kyneton	16	*Numurkah*	*10*
Echuca	26	*Maryborough*	*16*	*Mortlake*	*10*
Portland	26	Rochester	14	*Boort*	*10*
Leongatha	*24*	*Yarram*	*14*	*Myrtleford*	*10*
Colac	23	Stawell	14	*Mansfield*	*10*
Horsham	22	*Daylesford*	*14*		

Note: AM and PM school runs may count as 2 separate routes.
Italics indicates only SBP routes operate

5 Closing the gap

5.1 Validating existing data

Validation of school route data with the various parties involved in planning and delivering these services will be paramount to ensuring that information that reaches the public is reliable and current.

5.1.1 Validating services in Smartrak

Where route data already exists within Smartrak, this will provide the starting point to prepare information for public-facing systems. Although it may appear that much of the work has already been done once routes are installed into this system, there is always room for errors and improvements.

Highlighted in previous sections, there may be many cases where not all stops have been mapped into the system, as these are not required under current monitoring regimes. Stop locations will need to be confirmed with operators along with any publicised and anticipated passing times.

The route names, path names and path codes in Smartrak do not always provide consistency and can create confusion when trying to confirm a route's details. These various attributes will need to be matched or cross-referenced in order to confirm that all routes have been correctly mapped.

Table 9: Process of validating information in Smartrak

Actions / checklist	Source/stakeholder
Confirm routes to be delivered according to each contract	Contract manager
Confirm Service Specification forms part of the contract, or create from template	Contract manager
Export routes currently mapped in Smartrak	Smartrak
Cross-reference route codes, paths to identify any discrepancies	
Confirm continued operation of the service – *or has this been removed since contract commencement?*	Smartrak
Confirm correct start and end locations and times	Smartrak & service specification
Confirm intermediate stop locations with operator	Operator & Smartrak
Note any new stops required in DIVA	
Note any informal stops or Hail and Ride sections of the route	
Validation process only, not yet for upload	

This exercise will provide DoT with valuable insight as to whether all routes that have been entered into the system are currently in operation, or continue to run as they were originally designed at contract commencement. Particularly as urban areas expand within Melbourne and other regional centres and the demand for school travel grows, there is potential that services have been extended in practice to meet immediate demand, and the retroactive updating of route information at times has not kept pace.

5.1.2 DIVA validation

DoT's DIVA system provides the ongoing repository of bus information that will support journey planning activities and act as the 'source of truth' for service information.

Taking a route's information from the initial route and timetable specification through to importing into Smartrak is a lengthy process, as summarised in Table 10.

Table 10: DIVA import checklist (simplified)

Actions / checklist
Set up Routes stop sequences as per Planning Specification
Check Timing Points and Print flag settings are correct
Route options - Update any missing links
Import DoT-approved Hastus timetables
Create new stops as provided by Network Operations Infrastructure (NOI) team
Add new and existing intermediate stops/times between timing points
If unable to import using .xlsx format - edit DIVA schedules by moving individual trips to match DoT-approved timetable
Check Geo-referencing
Export timetable outputs
Export Stop Sequence spreadsheet to relevant stakeholders
Add unique Trip# to each trip
Ensure Timing Points are correctly selected
Update DIVA matching table and import routes to match FINAL XML
Import FINAL Run Block XML
Check Route Options - Run in, Run out, Connecting
Export and upload to Smartrak

5.2 Creating new data

5.2.1 Agreement of route names and numbers

The project identified a number of inconsistencies in the numbering and naming of school route services across the State. The previous section highlighted that the first step in preparing data for publication is to ensure that the route aligns with its Service Specification – a document that will need to first be prepared and agreed upon.

While potentially trivial on the surface, route numbering will need to provide clear and consistent messaging that these are school day only routes with typically one or two trips per day and allow passengers to distinguish between each route.

There is currently repetition of route numbers across multiple regional centres for public facing routes, e.g., Route 1 may refer to anywhere from Wallan to Warrnambool, hence it may be possible to continue to refer to school routes by their existing route codes used by operators and DoT, while recognising their 'common' number in the route name. For example, school routes 1 to 30 in Ballarat need not be renumbered to avoid confusion with similar routes in Geelong.

A decision for DoT will be how to clearly indicate School Routes from regular routes to signal to passengers that this service will not be available every weekday and for one or two trips per day. Route numbers starting with S and or with 4 digits instead of the typical 3 used in Melbourne are commonly employed and would minimise the volume of transition to new route codes.

5.2.2 Confirming route paths, stops and times

Similar to the process used to validate data already existing within DoT's systems, a clear Service Specification will provide the basis for preparing the required data.

Table 11: Data creation checklist

Actions / checklist	Source/stakeholder
Confirm routes to be delivered according to each contract	Contract manager
Confirm Service Specification forms part of the contract, or create from template	Contract manager
Confirm continued operation of the service – *or has this route been removed since contract commencement?*	Contract manager, operator
Confirm correct start and end locations and times	Service specification
Confirm intermediate stop locations with operator, including any timing points or key stops used to regulate the timetable	Operator & Smartrak
Prepare initial route alignment data	Hastus/DIVA
Prepare initial stop location data	Hastus/DIVA
Prepare initial timetable data from timing points / key stops	Hastus/DIVA
Note any new stops required in DIVA	Name/number conventions
Note any informal stops or Hail and Ride sections of the route	
Validation process only, not yet for upload – need to follow DIVA import process at Table 10	

The stop name and number conventions used by DoT provide a consistent message for passengers about their location, and at the back end, can assist in distinguishing between school-only stops. Stop landmarks such as “XYZ Secondary College” take precedence over the Cross Street/Travel Street convention. Stops within school grounds are often numbered starting with 44###, however this may not always be the case. Consistency going forward within this program will be key.

5.3 Data compatibility

For both the validation of existing data and preparation of new data, a key objective and risk raised by DoT has been the compatibility of data across the range of systems that will draw upon this information. New works to include school route information will need to be consistent with the established processes for data interoperability across each of these systems.

As noted earlier, the collection, revision, and preparation of school bus data to support Journey Planning may also be beneficial to other projects in establishing a new baseline of information that can be adopted for a range of works including route planning and network reviews.

5.4 Stakeholder involvement

5.4.1 DoT and Operators

From the development of Service Specifications through to the provision of service information and actual delivery of the routes, there is a range of teams and stakeholders involved. Table 12 provides an overview of those parties flagged in previous sections, grouped against the areas of focus throughout the end-to-end process.

Table 12: DoT teams and stakeholders involved in data preparation process

Area of focus/task	Inputs	Parties/Team	Outputs
Route specifications	Specification Template	Network Planning, Contracts	Consistent route information
Route alignments	.kml maps	Network Service Change (BSC), Operators, Data	Agreed alignments mapped in all systems
Route Names & Numbering	Conventions/rules Existing numbering and names	Contracts, Planning, Operator, Wayfinding, DDA	Agreed routes names and numbering Unique Metlink IDs for each travel direction
Stop Locations	Existing stops Operator information	Network Operations Infrastructure, Network Planning, Operator, Wayfinding, DDA	New approval process for existing stops not currently recorded – special designation for school only stops?
Stop Names & Numbering	Conventions/ rules, e.g., 44xxx schools	Network Planning, Operator, Wayfinding,	Agreed stops names and codes
Timing Points	Confirmed stops	NSC, Contracts, Operators	Agreed Timing Points for public Agreed Contract Monitoring Points
Timetable data	Detailed timetable xml/xls from operator	NSC, Timetable assurance, Operators	Agree stop-specific times
Ticketing information	Zones, fare rules	NSC, NTT	Stops & routes assigned to fare zones/rules Myki BDC shifts
Bus Tracking	Operator blocking	Data, CIO Team, OPA	Real-time information for relevant systems

5.4.2 Schools

Currently schools are more likely to liaise directly with bus operators to provide and prepare school route information. The reference group noted that some schools may contract DoT directly, within the planning space, to advocate for service changes. Direct engagement with schools by DoT is typically not required from a data perspective, however in the roll-out of this program there would need to be ongoing communication with schools to ensure the correct message is being conveyed to families regarding the project's scope of providing information only, and not changing any rules regarding access services.

6 Recommendations

6.1 Next steps

The initial validation of the project's vision, understanding of the current data available to support PTV's journey planning tools, and sizing of the task to validate existing data and prepare new data to fill gaps provides a solid foundation to progress this investigation to the next level of detail.

To solidify support for the introduction of school route information into PTV's journey planner, the immediate next steps are summarised in Table 13 and expanded upon in the following subsections.

Table 13: Recommended next steps

#	Recommendation	Section
1	Expand user engagement and validation to include a greater sample size and representation of potential travellers and parents, including those from regional areas	6.1.1
2	Conduct further customer research regarding the clear delineation of school route services and how these may be presented	
3	Collate and prepare Service Specifications from CRUBS and metropolitan contracts to develop a clear baseline of what should be reflected in the data	6.1.2
4	Engage with other areas of DoT who will be required to support the next phase of effort	6.1.3
5	Conduct a pilot study to firm up data processing requirements and timelines	6.1.4
6	Incorporate lessons learnt from pilot study to wider roll-out of school bus data preparation and publication	6.1.5

6.1.1 Further user validation and research

Initial customer research conducted in this phase of work is indeed promising in that the majority of participants were supportive of the ideas presented. In discussion of these results among members of the project reference group there was a desire expressed to expand the size and demographic representation of the survey group, and the detail of questions posed.

Noting the importance of school routes in regional centres where there may be more limited regular route service alternatives for students to use, there was a desire to have a greater number of parents and students from regional Victoria to participate in subsequent rounds of feedback and validation.

In regional areas there is also likely to be a greater possibility of students at each school utilising the free School Bus Program network. There may be a more marked difference in attitudes to publishing information in areas where many school routes are genuinely only accessible by students, versus an urban environment where students may have viable travel options on the regular public route network.

Further research may provide an opportunity to improve understanding of the mix of school services offered. By understanding passengers' origin and destination, whether they pay fares

or obtain a pass from their school, or have applied for travel permission, DoT will be able to group responses by a more granular split of route types, but also gain more insight into how passengers and parents see (or don't see) the difference in service offered.

6.1.2 Develop service specifications

Establishing a clearly defined baseline of school routes that could be incorporated into PTV's journey planner will be a first step in reducing the confusion between school route types and preparations for customer-ready information.

The timetable and routing information for school services can be inconsistent and at times minimal, both within operators' contracts and in existing data systems. By creating a standard service specification for each route, matching those used for regular public route services, there will be a consistent source of truth for route information and a base from which to measure any future service changes.

This template will also ensure that the basis for each piece of information required to build journey planning data – route alignment, destinations, route name, number, and timetable – is clearly captured before proceeding to detailed data production.

6.1.3 Ongoing engagement within DoT

If the project is to move through the various layers of approvals, there will need to be engagement with a range of teams within DoT, NTT, BusVic, and the Minister's Office to build and gain support.

The continuation of a project Reference Group to guide the project will be fundamental to continue the success of this initial stage in drawing out key questions and developing workable solutions.

6.1.4 Pilot study

To better understand the level of data processing required across a range of service types, this study recommends a pilot run of routes are brought up from their current level of information to 'public ready' status.

PBA Transit Planning has identified suitable networks for a pilot that provide a range of service types and geographic spread to test the impacts of:

- Size of operations
- Existing bus tracking data
- The interface of free school bus and public school bus services.

Bacchus Marsh

Comprising three regular route services, STS services that operate under public route numbers, stand-alone STS runs, and extensions beyond the township into SBP services, this will provide the breadth of service types and efforts to prepare data. Bacchus Marsh currently operates myki and Smartrak, meaning much route data is currently available in the required format and this would undergo validation as described in Section 4.1.

Cranbourne

Within Melbourne but on the expanding urban fringe, the school routes here are more likely to have been subject to change in recent years and have a requirement to utilise newly built roads.

Mildura

Mildura contains a high number of STS services and is also served by SBP routes from smaller satellite towns – while these are separate networks, the coverage of the town route network affects the design of SBP routes and eligibility. The existing regular route network is complemented by V/Line coach services and provides solid base of online journey planning information in static form.

6.1.5 Wider roll-out

Incorporating the lessons learnt from the trial study, refinements may be made to the data collection, preparation and publication efforts for other networks and operators across the state. This will also inform refinement of the envisaged implementation presented in Figure 11.

Wider roll-out may also consider developments in other areas of DoT with respect to school bus routes and synergies in preparing new and revised data, e.g., baselining school information ahead of network reviews.

6.2 Risks

While current access arrangements for school routes is not proposed to change as part of this project, there is a longstanding belief that the services within scope are solely for the use of students, with some confusion between these routes and those provided under free School Bus Program.

DoT will need to develop clear messaging around this prior to and following publication of school bus information to manage the expectations of all stakeholders – schools, students, parents, bus operators and the wider public.

User testing and acceptance will also play a part in ensuring the correct functionality has been developed and meets the goals around clear distinctions of school routes versus regular routes.

Maintaining the currency of information will be important for school services that have a higher propensity to change with reduced notice, as schools and operators move quickly to provide the best access for students. Ongoing engagement and clear data requirements for operators will ensure that passenger information keeps pace with service improvements.

6.3 Timing

The rollout of this functionality across all bus networks will take time to complete each of the data preparation, validation, and implementation phases. Similar to the rollouts of myki ticketing equipment and live bus tracking functionality, a staged approach by regional centre and by operator has been seen as the most likely approach to minimise implementation risks.

6.3.1 Data preparation

The project reference group discussed the importance of developing achievable and flexible timetables that recognise the often-varied level of effort that is required to process data for seemingly similar routes and networks. The timelines discussed here are therefore simply a guide to the potential time to undertake the tasks to prepare school route data to the appropriate standard.

Previous efforts in this space to map in Hastus the bare minimum of routes paths from start to end, correctly identifying each turn and road segment have taken anywhere from 15 to 90 minutes per route. Challenges arise in metro fringe areas and regional centres where road network growth requires the mapping of roads themselves in the first instance to support the route data.

To drill down to a stop level requires another level of effort beyond mapping the lines of route. In Melbourne and larger regional centres, this is likely to be less of a significant leap due to the prevalence of existing stop data for regular route services. In smaller centres where routes travel beyond the reaches of the regular town network routes, this task may require more effort to provide accurate information.

Table 14: Estimates of time for data preparation

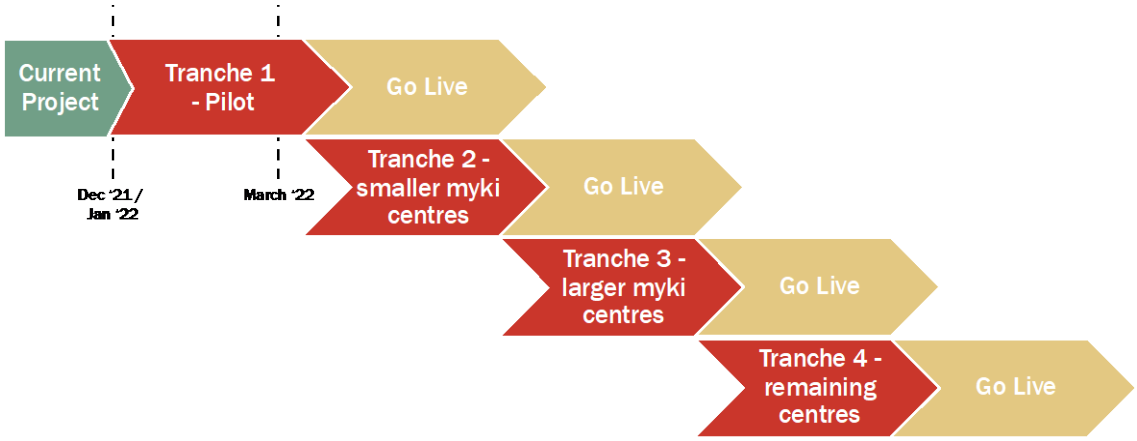
Category of Routes	Volume of Routes	Processing hours per Route/Centre	Total Hours
Melbourne School Routes	~1,100	1-2	1,100 – 2,200
Regional Centres with myki already in Transnet	~600	1-2	600 – 1,200
Regional Centres without myki	22 centres	8-40	400 – 800

6.3.2 Implementation

There was a strong view that implementation dates for each tranche of release should only be agreed upon once the data for that tranche has been prepared to the required accuracy and detail, rather than creating a workload profile to fit an implementation date goal.

One such approach could consider the introduction of school route journey planning data to the public website and app on a quarterly basis ahead of each school term, using the data that has been prepared and validated in the previous quarter. This will create a rolling program of preparation and implementation to complement business as usual activities for DoT, PTV and bus operators.

Figure 11: Staged preparation and implementation by route groups



In addition to rolling out information by geographic location or local network, the reference group also recognises the ability to roll out information by varying type, depending on the time required to prepare it for public use. For example, timetable data can be more readily published from stop and timetable information, whereas developing static maps can be a more manual labour-intensive process. A suggested order of potential roll-out is:

1. Static timetable information (web and .pdf)
2. Web-based maps (using .kml data)
3. Incorporate static data into Journey Planner options
4. Real-time information (where tracking equipment exists)
5. Static route maps
6. Real-time information (where tracking would require installation)

Appendices

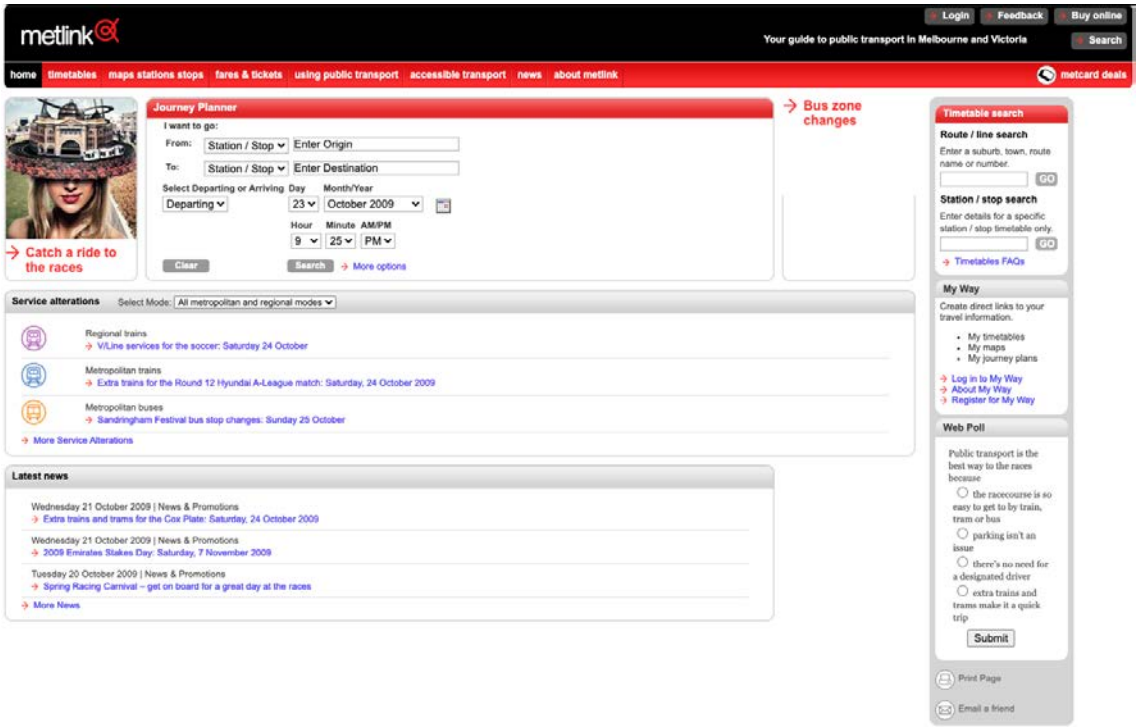
PTV Journey Panning tools

There has been an evolution of these tools over recent years to incorporate wider information, not least of which the linking of real-time information from vehicles. Additionally, the information provided publicly by these tools is available through third-party journey planning tools such as Google Maps, where passengers may find static (not real-time) information about timetables and potential multi-leg journeys.

Initially, passengers were provided the option of separate Metlink (see Figure 12) and Viclink websites to access information for metropolitan and regional travel information. The core functionality of the website has been established early, including:

- Journey Planner, prominently positioned
- Announcements of planned changes and disruptions
- Ability to create a set of favourite routes and stops
- Searching for information by route/stop
- Links to ticketing information

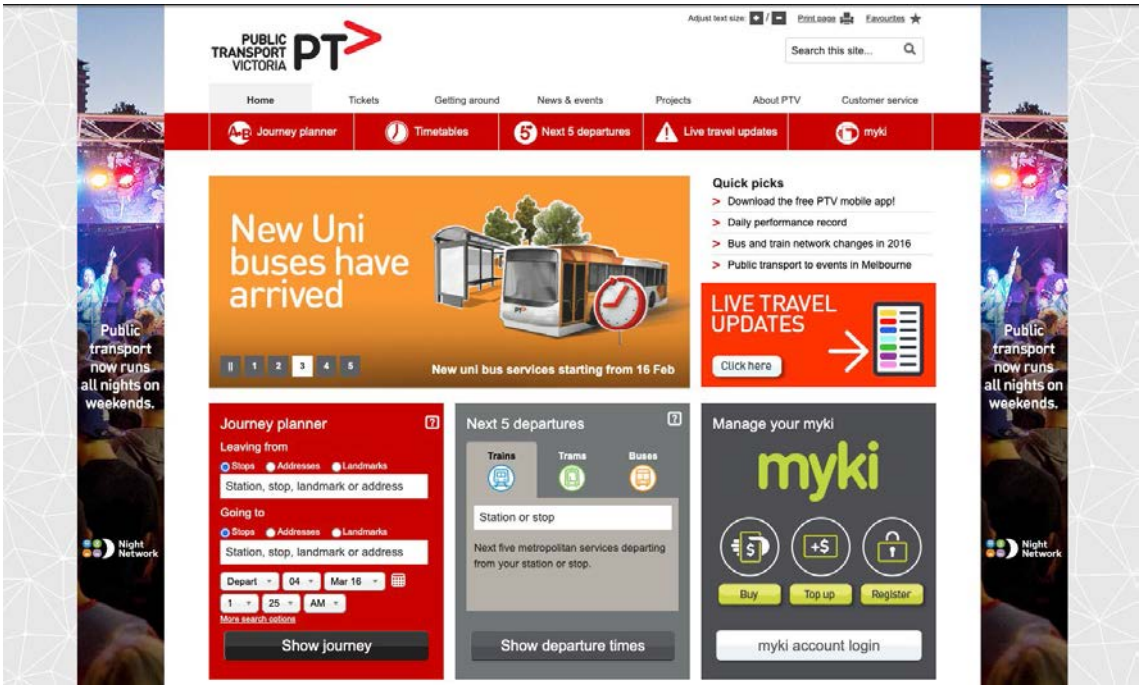
Figure 12: Metlink website with Journey Planner embedded on front page (2009)



The consolidation into Metlink and subsequent transformation to PTV has seen more integrated service information, including:

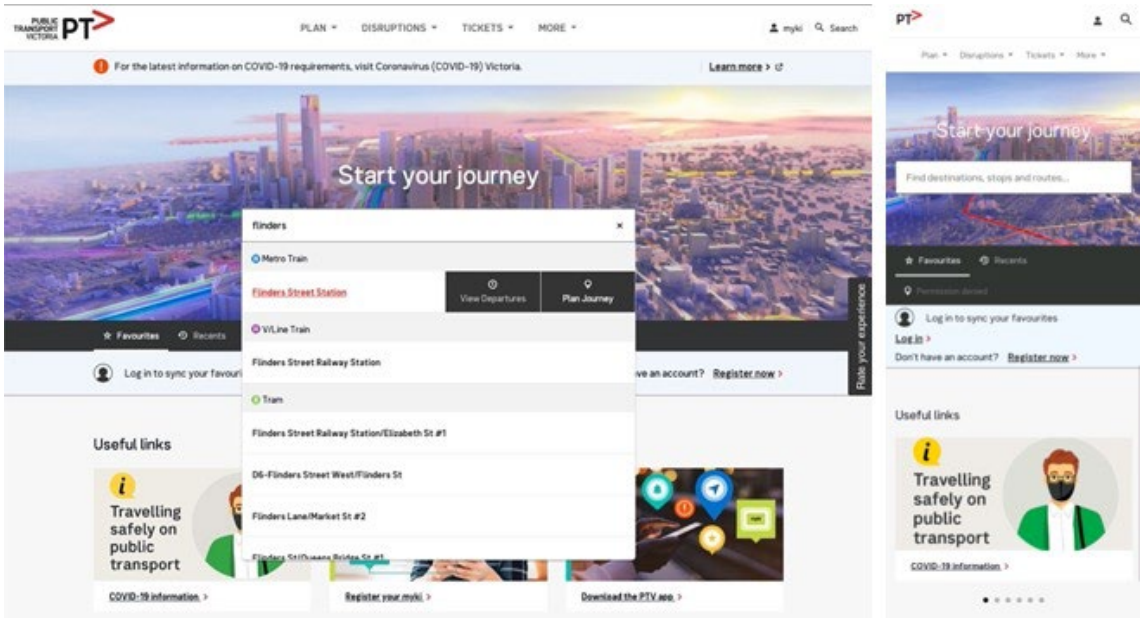
- myki top-up functionality,
- live train line information for disruptions
- transparent network performance statistics
- 'Next 5' departures
- planned disruption notices across modes and routes.

Figure 13: PTV website with Journey Planner (2016)



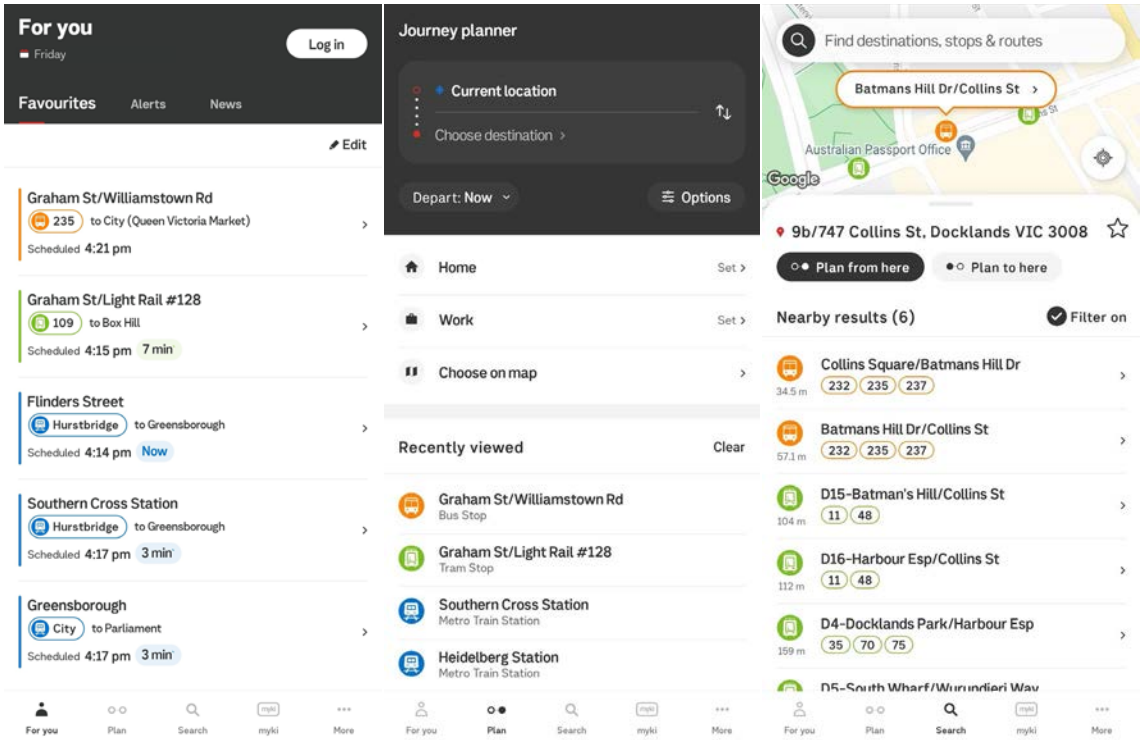
The acceleration of smartphone technology and increased likelihood of people browsing websites or accessing information from their phone has created more sleek websites and functionality that meets user demand for fast access to a wide array of information.

Figure 14: Current PTV website with integrated departures and journey planning (desktop vs. mobile)



The PTV app provides passengers with a quick point of access to their most used stops and routes, and the functionality to locate nearby services using their phone's GPS signal.

Figure 15: PTV mobile app screengrabs



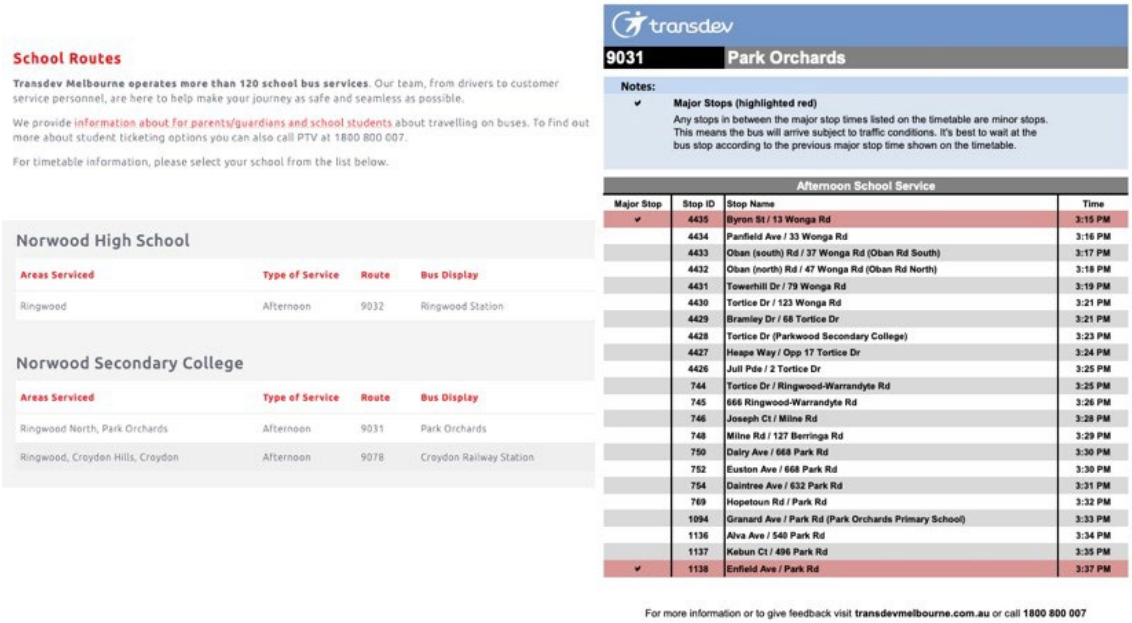
Current school journey planning experience

Students and parents in Victoria may be provided with quite different pathways to planning their school journeys depending on where they live and which bus operator provides their best route.

School route information is typically consolidated by the schools themselves, or bus operators across their network of routes. This is largely static route information, with PDFs of route maps and limited timetable information. This may be supplemented with links to the PTV website for publicly available bus, tram and train information depending on the location of the school.

Bus operators hold a wealth of information for school bus services that is not always captured by DoT's requirements. Passing times at individual bus stops is not always required for bus contract management of timing points and confirming services have been delivered, however this level of information is important to the passengers using those stops. Figure 16 shows detailed stop time information provided by Transdev, however route maps are not available.

Figure 16: Detailed timetables grouped by school



School Routes

Transdev Melbourne operates more than 120 school bus services. Our team, from drivers to customer service personnel, are here to help make your journey as safe and seamless as possible.

We provide information about for parents/guardians and school students about travelling on buses. To find out more about student ticketing options you can also call PTV at 1800 800 007.

For timetable information, please select your school from the list below.

Norwood High School

Areas Serviced	Type of Service	Route	Bus Display
Ringwood	Afternoon	9032	Ringwood Station

Norwood Secondary College

Areas Serviced	Type of Service	Route	Bus Display
Ringwood North, Park Orchards	Afternoon	9031	Park Orchards
Ringwood, Croydon Hills, Croydon	Afternoon	9078	Croydon Railway Station

transdev

9031 Park Orchards

Notes:

✔ **Major Stops (highlighted red)**
Any stops in between the major stop times listed on the timetable are minor stops. This means the bus will arrive subject to traffic conditions. It's best to wait at the bus stop according to the previous major stop time shown on the timetable.

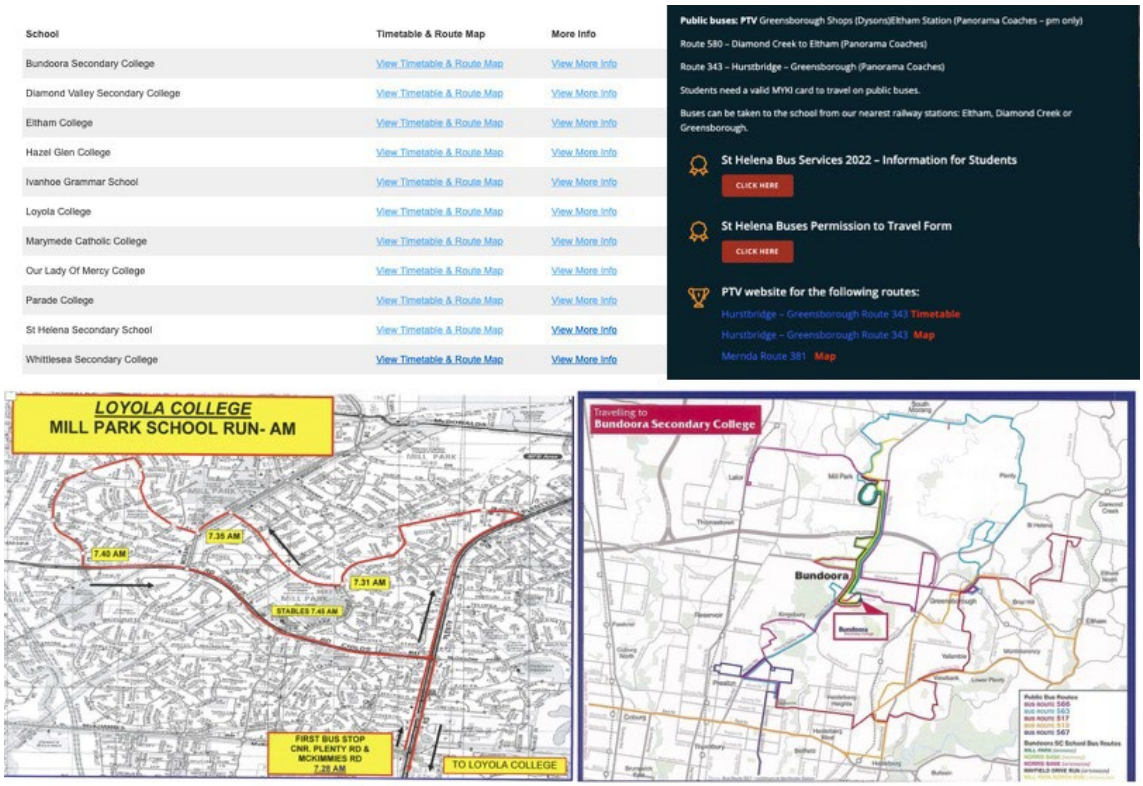
Afternoon School Service

Major Stop	Stop ID	Stop Name	Time
✔	4435	Byron St / 13 Wonga Rd	3:15 PM
	4434	Panfield Ave / 33 Wonga Rd	3:16 PM
	4433	Oban (south) Rd / 37 Wonga Rd (Oban Rd South)	3:17 PM
	4432	Oban (north) Rd / 47 Wonga Rd (Oban Rd North)	3:18 PM
	4431	Towerhill Dr / 79 Wonga Rd	3:19 PM
	4430	Tortice Dr / 123 Wonga Rd	3:21 PM
	4429	Bramley Dr / 68 Tortice Dr	3:21 PM
	4428	Tortice Dr (Parkwood Secondary College)	3:23 PM
	4427	Heape Way / Opp 17 Tortice Dr	3:24 PM
	4426	Jull Pde / 2 Tortice Dr	3:25 PM
	744	Tortice Dr / Ringwood-Warrandyte Rd	3:25 PM
	745	666 Ringwood-Warrandyte Rd	3:26 PM
	746	Joseph Ct / Milne Rd	3:28 PM
	748	Milne Rd / 127 Berringa Rd	3:29 PM
	750	Dairy Ave / 668 Park Rd	3:30 PM
	752	Euston Ave / 668 Park Rd	3:30 PM
	754	Daintree Ave / 632 Park Rd	3:31 PM
	769	Hopetoun Rd / Park Rd	3:32 PM
	1094	Granard Ave / Park Rd (Park Orchards Primary School)	3:33 PM
	1136	Alva Ave / 540 Park Rd	3:34 PM
	1137	Kebun Ct / 496 Park Rd	3:35 PM
✔	1138	Enfield Ave / Park Rd	3:37 PM

For more information or to give feedback visit **transdevmelbourne.com.au** or call **1800 800 007**

Figure 17 presents one approach by bus operators to consolidate common information by schools that they serve. Schools then provide information in a variety of ways, from links through to the PRV website for regular route services, individual route maps, or a consolidated network map. Schools have the benefit of providing information for all their services across multiple operators, particularly if they are served by a combination of School Routes, SBP routes and private chartered services.

Figure 17: Static route maps and information by operator, grouped by school

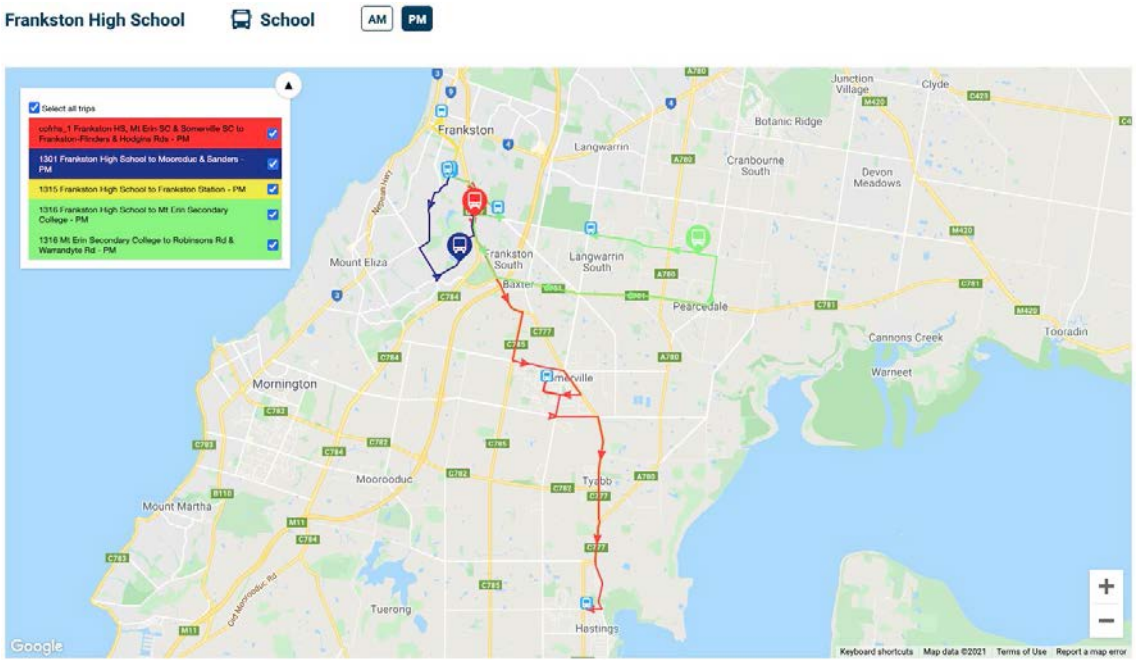


Some operators may elect to produce their own timetable and route materials, using a combination of driver shift cards that provide stop and route descriptions, and key maps produced via Google or other mapping tools.

Figure 18: Route maps and timetables prepared by operator, grouped by school

Ventura has invested in its own real-time information site for school buses, drawing off the currently available GPS data that is installed on its fleet that delivers regular route services. Students and parents can filter routes by school and time of day to see all available routes for that school and track them in relative real time each school day.

Figure 19: Real-time school bus tracking prepared by bus operator



School journey planning in other jurisdictions

The project conducted a high-level review of other Australian public transport authority websites and tools to understand if and how they provide school bus information and if or how these services are distinguished from other bus routes.

New South Wales

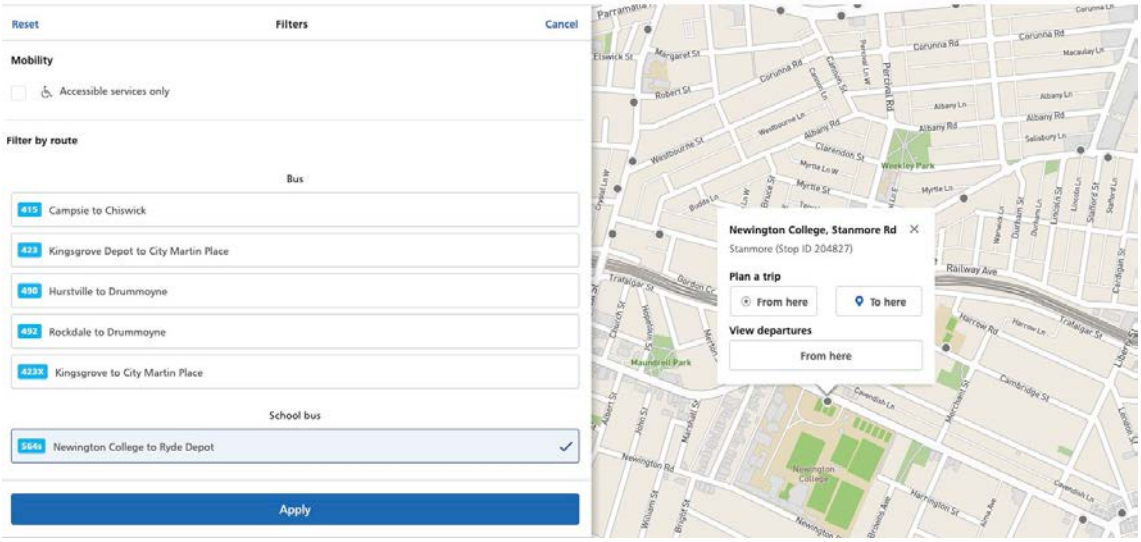
Transport for NSW provides journey planning information via its transportnsw.info website, integrated across rail, light rail, bus, and ferry services. Information for school services is presented alongside regular bus routes, with a distinction of these services by labelling them as School Routes.

Table 15: TfNSW Journey Planner treatment of school routes

Information / Functionality	Availability	Commentary
Timetables	Yes	PDFs contain key stops only
Route maps	Yes	Dynamic maps in Journey planner No map on PDF timetables
Journey planner integration	Yes	
Distinction of school routes	Yes	"School bus" is listed as a separate category to "Bus"
Filter by School Routes only	Yes	

Figure 20 shows TfNSW's journey planner interface, allowing users to select that stop at or closest to their school and display all regular and school bus services available to them.

Figure 20: TfNSW Journey Planner with School Bus functionality



Queensland

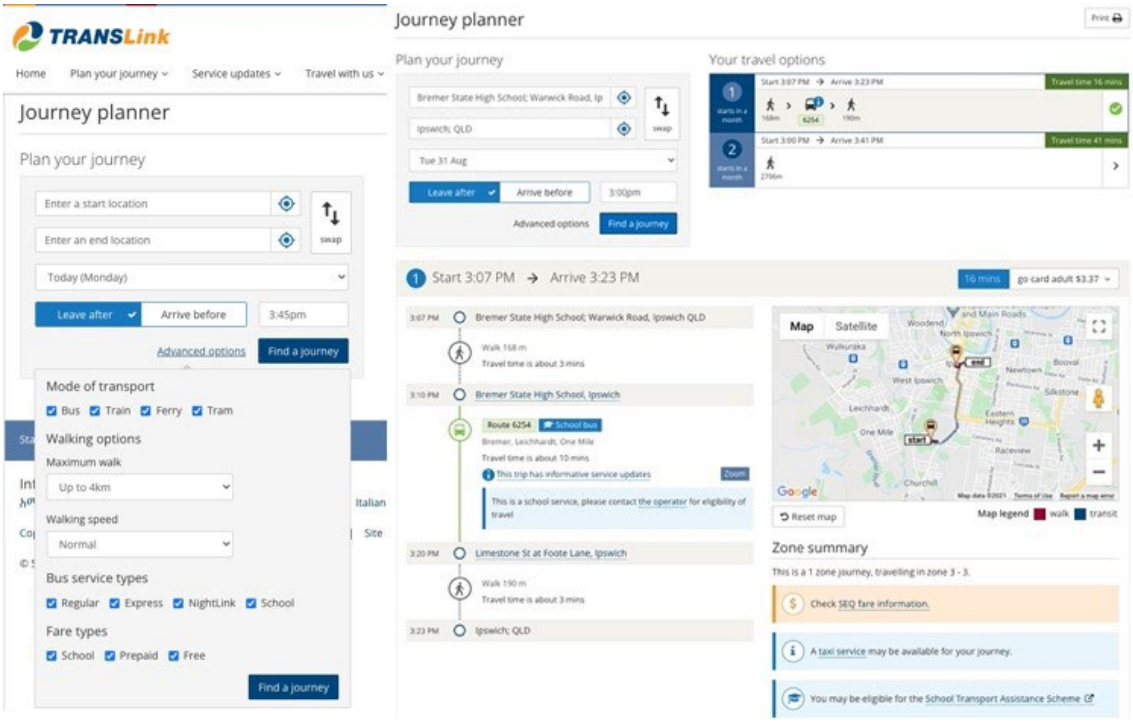
Translink's journey planning tools allow users to separate out school bus services, along with express and night bus routes. School bus routes have distinct 4-digit route numbers compared to regular 3-digit codes and are tagged as School Bus when presented. Where eligibility restrictions apply, this is also noted.

Table 16: Translink Journey Planner treatment of school routes

Information / Functionality	Availability	Commentary
Timetables	Yes	
Route maps	Yes	
Journey planner integration	Yes	
Distinction of school routes	Yes	School routes typically have 4-digit codes to distinguish from 3-digit regular routes
Filter by School Routes only	Yes	

Figure 21 shows Translink Queensland's interface allows users to select or exclude school bus routes from their search results, and to filter out any services that require a special fare to travel.

Figure 21: Translink Queensland journey planner



Western Australia

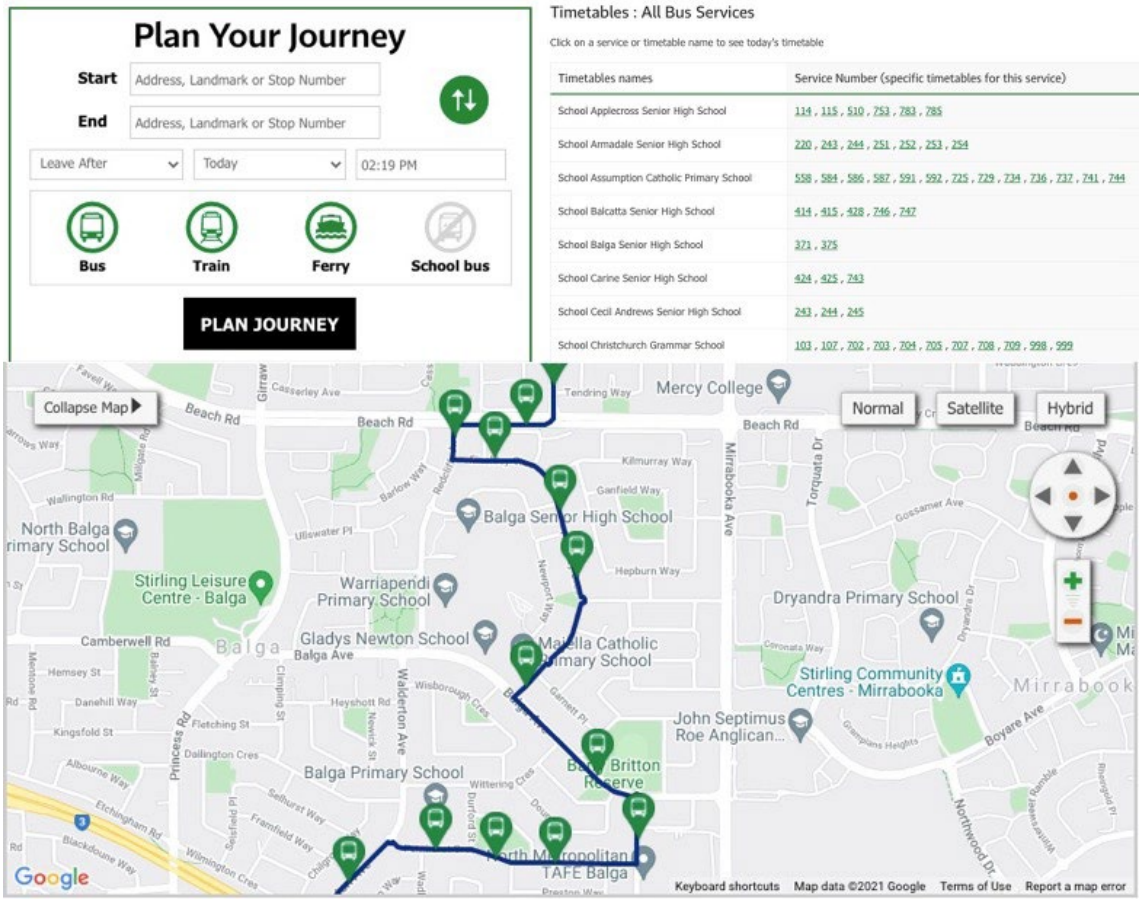
Transperth provides the option to select school bus services as a journey planning option, however this is turned off by default when users access the site.

Table 17: Transperth Journey Planner treatment of school routes

Information / Functionality	Availability	Commentary
Timetables	Yes	Search all routes/timetables for a particular school
Route maps	Yes	
Journey planner integration	Yes	
Distinction of school routes	Yes	Separate category
Filter by School Routes only	Yes	School bus is turned off by default, requiring users to specify they want these options to appear in search results

Figure 22 shows Tranperth's journey planner interface, with the option to include school routes switched off by default requiring users to make a specific effort to include these in their search results. It also depicts the results found by searching for school timetables by grouping routes according to the schools that they serve, a routes presented on a native Google maps overlay sowing schools and other points of interest.

Figure 22: Transperth Journey Planner



Investigation into the Feasibility of Introducing School Routes into PTV Journey Planner

PBA Transit Planning for Bus Association Victoria

February 2022