

PHILLIP BOYLE
& Associates

How local governments can reshape bus services

2 October, 2019

DART study



DART study

Study method

On-board surveys
Observation surveys
Observation locations

Thompsons Road Park+Ride
Doncaster Park+Ride

Service starts
Survey 0700 - 1900
Service routes

- On-board surveys counted boarding and alighting passengers on Routes 906 & 907
- Kerb-side surveys counted passenger loads, boarding and alighting at 6 locations on Routes 905, 908 & 309
- License plate data was collected at several sites including the Park+Ride areas on Doncaster and Thompsons Roads
- Myki data was compared to the data collected in the surveys
- The surveys ran from 7am - 7pm. (Some of the AM and PM Peak load was not covered by the survey)
- The survey took place in winter June 2018.

DART strengths: More than a CBD Peak commuter service

- DART services support interpeak and counter-peak trips to the CBD
- Interpeak and counter-peak trips:
 - 303 inbound and 304 outboard
 - 133 inbound
- Interpeak
 - Route 907 strongest
 - Route 908 weakest
 - 523 inbound and 463 outboard trips
 - 21 inbound and 43 outboard trips
- Counter-peak
 - Route 907 strongest
 - 303 PM inbound and 137 AM outboard trips
 - Route 908 weakest
 - 42 PM inbound and 50 AM outboard trips
 - Routes 908 & 309 do not support counter-peak trips

Inter-peak	Route 907	Route 908	Route 909	Route 905	Total
Inbound	523	21	354	304	1,239
Outbound	463	43	286	282	1,091

Counter-peak	Route 907	Route 908	Route 905	Total
Into the CBD in the PM Peak	153	60	42	255
Out of the CBD in the AM Peak	137	35	50	222

Photo: RBA Counter-peak load Route 906 1720 Friday March 2017

Students use Route 906 inbound to reach destinations along Blackburn Road

Inbound: Route 906 (0700 - 1900) The Pines to Freeway

Destination	Number of students
The Pines	~35
Donvale Shops	~15
Blackburn Road	~30
Total boardings	~100

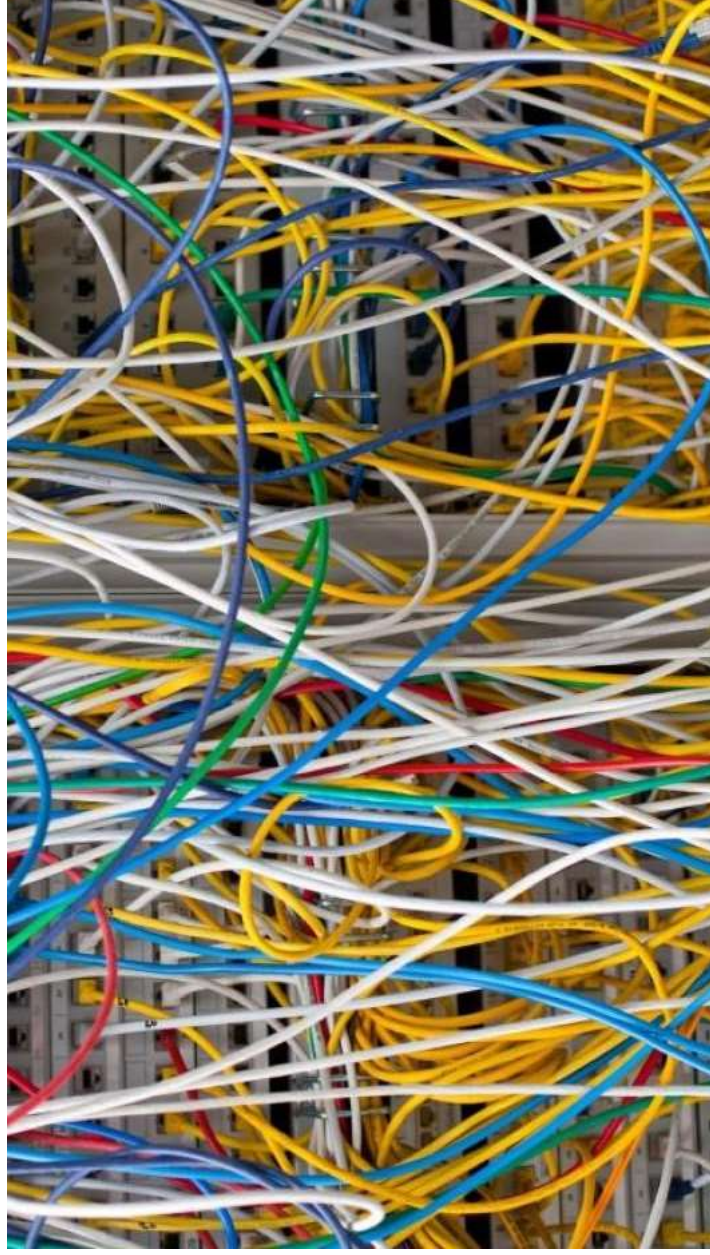
Most passengers who park at the Doncaster Park+Ride live along DART bus routes

P+R (both days)

Suburb	Number of vehicles
Doncaster	~100
Doncaster East	~50
Doncaster West	~20
Doncaster North	~10
Doncaster South	~10

Most of the vehicles parked at Doncaster Park+Ride are based in suburbs north and east of the facility. This chart shows the origin of 574 of the 773 vehicles that were observed over two days. Vehicles from postcodes represented by fewer than 8 vehicles were not included on this chart.

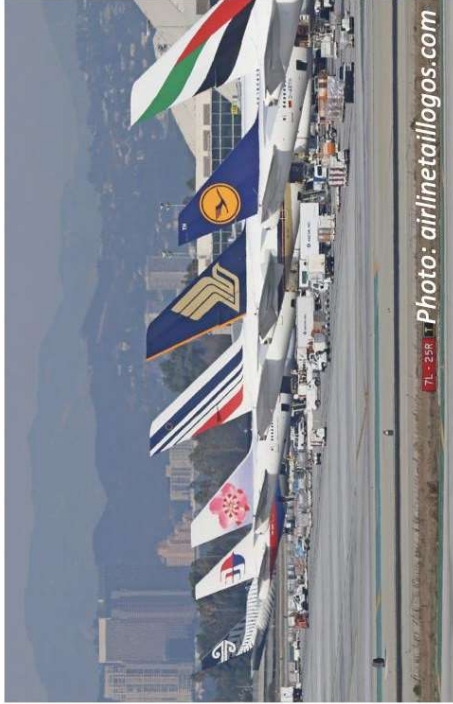
Kabelsalad



Investigating an improved solution

- **PTV proposal:**
 - Little change to contracts:
 - Additional buses
 - Dead running (unpaid kms)
 - Extra drivers
 - Driver habits/expectations
 - No additional inter-operator tension
 - (Shared bays)
- **MCC asked how could:**
 - Passenger convenience be improved?
 - Interchange footprint reduced so that the value of the land and placemaking around the station be maximised?

Could a 'Port' system be introduced

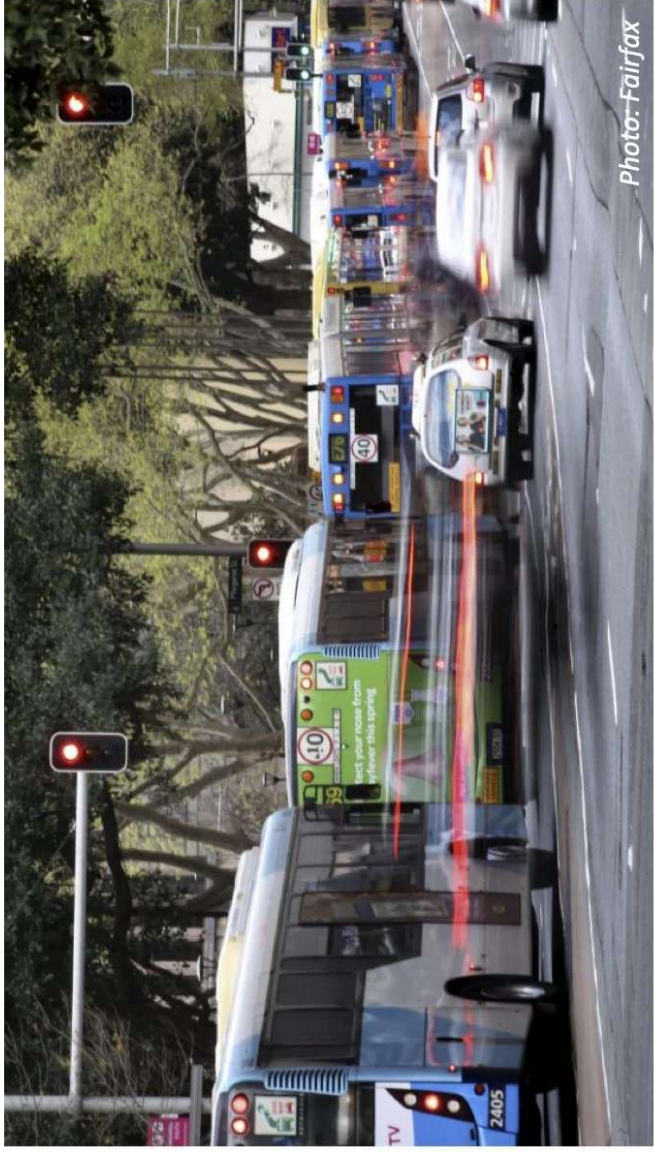
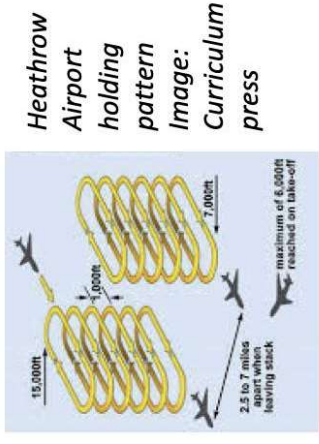


Port systems minimise the number of 'gates', wharfs and platforms.

Perth busport: 30 Routes with up to 12 Routes pre-assigned to a 'pod' of 4 bays/stands



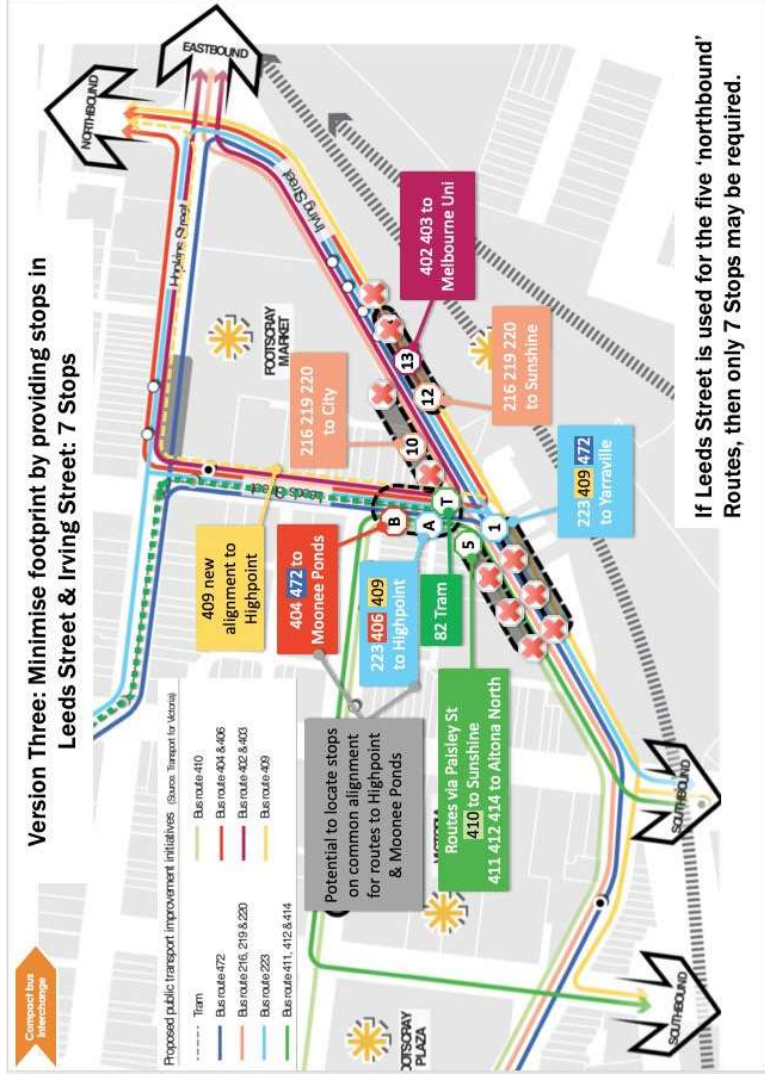
Port systems have to avoid/minimise holding patterns



No area for layovers away from stops



A 'port' system could consolidate the Routes and services at 7 platforms



This groups the Routes by direction around a platform with multiple bays

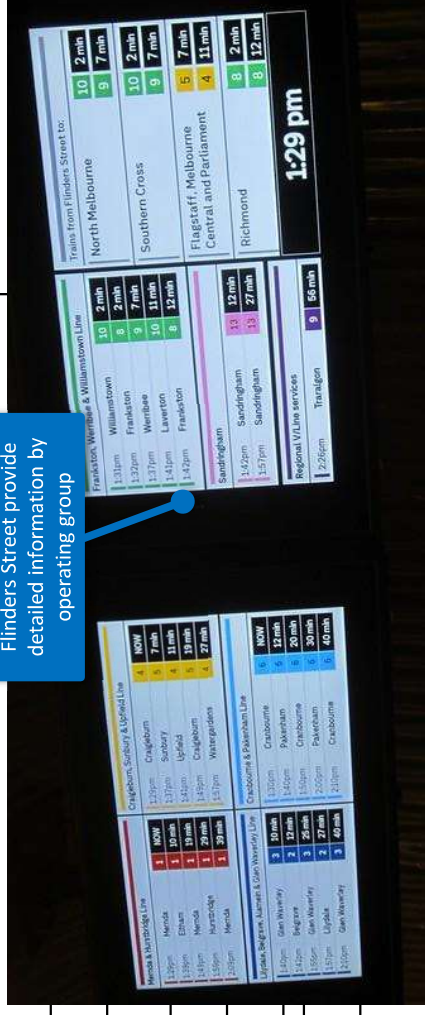
7 platforms appeared to give the best passenger & land use outcome

- **Good passenger outcome**
 - All platforms near the Station and within line-of-sight
 - Platform approach allows passenger information to reduce waiting time
 - Sunshine by bus or train
- **Smallest footprint**
 - Best outcome for the centre

Live departure time screens for service groups allow passengers to choose from a number of options to reach common destinations

Giao thông vận tải Footscray				Ngày 12 tháng 6 năm 2019		9:50 sáng			
Dịch vụ cho Điểm cao "Highpoint"									
Lên kế hoạch	Tên tuyến	Chỗ / Sân ga	Khởi hành Footscray	Đến Highpoint	Lên kế hoạch	Tên tuyến	Chỗ / Sân ga	Khởi hành Footscray	Đến Melb. Uni
9:52 sáng	406 Keilor East	A	2 phút	10:13 sáng	9:54 sáng	Xe lửa đến City Loop + 401 @ North Melbourne	1	4 phút	10:13 sáng
9:53 sáng	223 Highpoint	A	3 phút	10:08 sáng	9:56 sáng	402 Melbourne University	12	6 phút	10:23 sáng
9:53 sáng	82 Moonee Ponds	T	3 phút	10:11 sáng + chỗ ngồi	9:57 sáng	Xe lửa đến Flinders Street + 401 @ North Melbourne	1	7 phút	10:17 sáng
10:08 sáng	223 Highpoint	A	18 phút	10:23 sáng	10:00 sáng	Xe lửa đến Flinders Street + 401 @ North Melbourne	1	10 phút	10:20 sáng
Dịch vụ cho Đại học Victoria "Victoria University"									
Lên kế hoạch	Tên tuyến	Chỗ / Sân ga	Khởi hành Footscray	Đến Victoria Uni					
9:52 sáng	406 Keilor East	A	2 phút	9:58 sáng					
9:53 sáng	82 Moonee Ponds	T	3 phút	9:57 sáng + chỗ ngồi					
10:04 sáng	409 Highpoint	A	13 phút	10:07 sáng					
10:12 sáng	406 Keilor East	A	22 phút	10:18 sáng					
上午10:12	406 Keilor East	A	22分钟	上午10:18					

Updated passenger information displays at Flinders Street provide detailed information by operating group



What decisions are hidden behind the timetable and embedded in the contracts?



- Number of Routes at a platform/stop
- Through and terminating Routes
- Routes by Operator
- Dwell time
 - 5 minute allowance for on-time running
 - Layovers by terminating Routes/frequency/shift change

PTV hasn't always shown all their cards

Test by destination group & operator

Some synergies and potential conflicts emerge when attempting to group routes and stops by common destinations

Some operational challenges may be caused by combining through/terminating routes and multiple operators in shared bays

Goal: consolidate all Routes by destination for passenger convenience

Group/Bay	Route	Direction	Destination Group	Operator	Comments / conflicts
A	223	Highpoint	Highpoint	Transdev	A mix of terminating and through routes The 3 operators may require a double bay to avoid conflict
	409	Highpoint	Highpoint	CDC	
	406	Both directions / Terminating	Highpoint	Sita	
B	472	Moonee Ponds	Moonee Ponds	Sita	One operator but a mix of through and layover routes, potentially manageable by operator
	404	Both directions / Terminating	Moonee Ponds	Sita	
C	216/219	Sunshine / Sunshine South	Sunshine	Transdev	Meets all criteria of 'direction, destination & single operator'
	220	Sunshine	Sunshine	Transdev	
D	216/219	City	City	Transdev	Meets all criteria of 'direction, destination & single operator'
	220	City	City	Transdev	
E	402	Both directions / Terminating	Melbourne University	Sita	Multiple Routes requiring layover - possible conflict, but the single operator could manage this
	403	Both directions / Terminating	Melbourne University	Sita	
F	411/412	Both directions / Terminating	Laverton	CDC	Multiple Routes requiring layover - possible conflict, but the single operator could manage this
	414	Both directions / Terminating	Laverton	CDC	
G	223	Yarraville	Yarraville	Transdev	The 3 operators may require a double bay to avoid conflict
	409	Yarraville	Yarraville	CDC	
H	472	Yarraville / Williamstown	Yarraville	Sita	All through routes, requiring less time at interchange
	410	Both / Terminating	Footscray Hospital / Sunshine	CDC	

Find examples of existing rail replacement provision that add flexibility to layout

Providing separate bays for terminating routes and grouping by common operator reduces the chance of conflict/crowding

version Six - Further reduce the risk of delays by removing any bay sharing between different operators

Group	Bay	Route	Direction	Destination Group	Operator	Comments
A	1	262/219	City	City	Transdev	4 destination groups • People are a priority
	2	220	City	City	Transdev	
	3	262/219	Sunshine / Sunshine South	Sunshine	Transdev	
	4	220	Sunshine	Sunshine	Transdev	
B	221	Yarraville	Yarraville	Yarraville	Transdev	3 destination and destination groups • People are a priority (5 bay exclusivity for layover control). This may prevent some lower control
	223	Yarraville	Yarraville	Yarraville	Transdev	
C	409	Highpoint	Highpoint	Highpoint	CDC	3 destination and destination groups • People are a priority (5 bay exclusivity for layover control). This may prevent some lower control
	406	Highpoint	Highpoint	Highpoint	CDC	
D	404	Both directions / Terminating	Moonee Ponds	Moonee Ponds	Sita	3 destination and destination groups • People are a priority (5 bay exclusivity for layover control). This may prevent some lower control
	409	Both directions / Terminating	Highpoint	Highpoint	Sita	
E	414	Both directions / Terminating	Melb. North	Melb. North	CDC	3 destination and destination groups • People are a priority (5 bay exclusivity for layover control). This may prevent some lower control
	403	Both directions / Terminating	Melb. North	Melb. North	CDC	
F	402	Both directions / Terminating	Melbourne University	Melbourne University	Sita	3 destination and destination groups • People are a priority (5 bay exclusivity for layover control). This may prevent some lower control
	403	Both directions / Terminating	Melbourne University	Melbourne University	Sita	
G	411	Both directions / Terminating	Laverton Hospital / Sunshine	Laverton Hospital / Sunshine	CDC	3 destination and destination groups • People are a priority (5 bay exclusivity for layover control). This may prevent some lower control
	412	Both directions / Terminating	Laverton Hospital / Sunshine	Laverton Hospital / Sunshine	CDC	
H	409	Moonee Ponds	Moonee Ponds	Moonee Ponds	Sita	3 destination and destination groups • People are a priority (5 bay exclusivity for layover control). This may prevent some lower control
	410	Moonee Ponds	Moonee Ponds	Moonee Ponds	Sita	

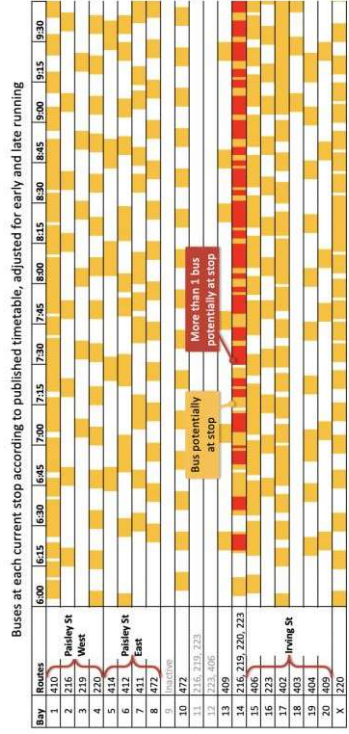
Hastus – the secret software sauce



- Bus & tram scheduling & operations planning
- Network design from concept to coordinated timetables
- Patronage estimates and customer impacts
- On-demand services
- Electric bus planning

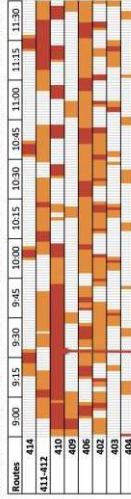
Test by dwell time

Timetable analysis with a 5 minute 'on-time' window reveals the potential for more delays in shared bays



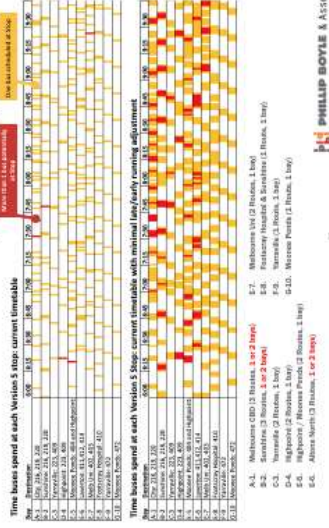
Some layovers in the CAA are long. This is usually due to low service frequencies and driver change-overs.

Buses at each Stop according to HASTUS modelling of published timetable and required layover between services (interpeak)

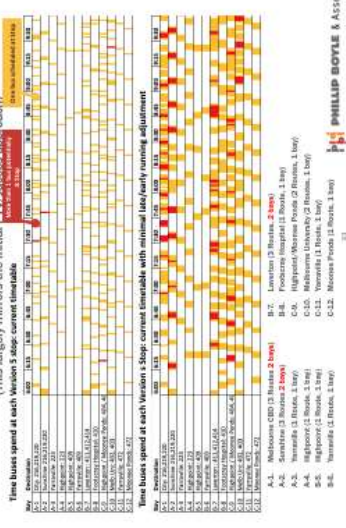


Bay potentially occupied for long periods.
Different operators have different practices. Bus may leave the area and come back, or driver may "lock & leave" to take an on-road break.

Testing Version Five against the timetable suggests an increase to 10 stops and 10-13 bays



If sharing is minimised, the interchange would need 12 Stops with 12-15 bus bays to support current services.



Identify the steps towards better passenger outcomes and a more efficient layout

- Realign Routes within the contract
 - Longer but quicker
- Redeploy contract kilometres
 - Such as Route 402 to Melbourne University
- Relocate terminations and layovers
 - Highpoint, Laverton
- Reduce time lost on road
 - Priority such as bus lanes
 - Shorter signal phases
- Gather information about actual movements and bay occupation
 - Bus tracking system
 - Parking sensors in bus bays

