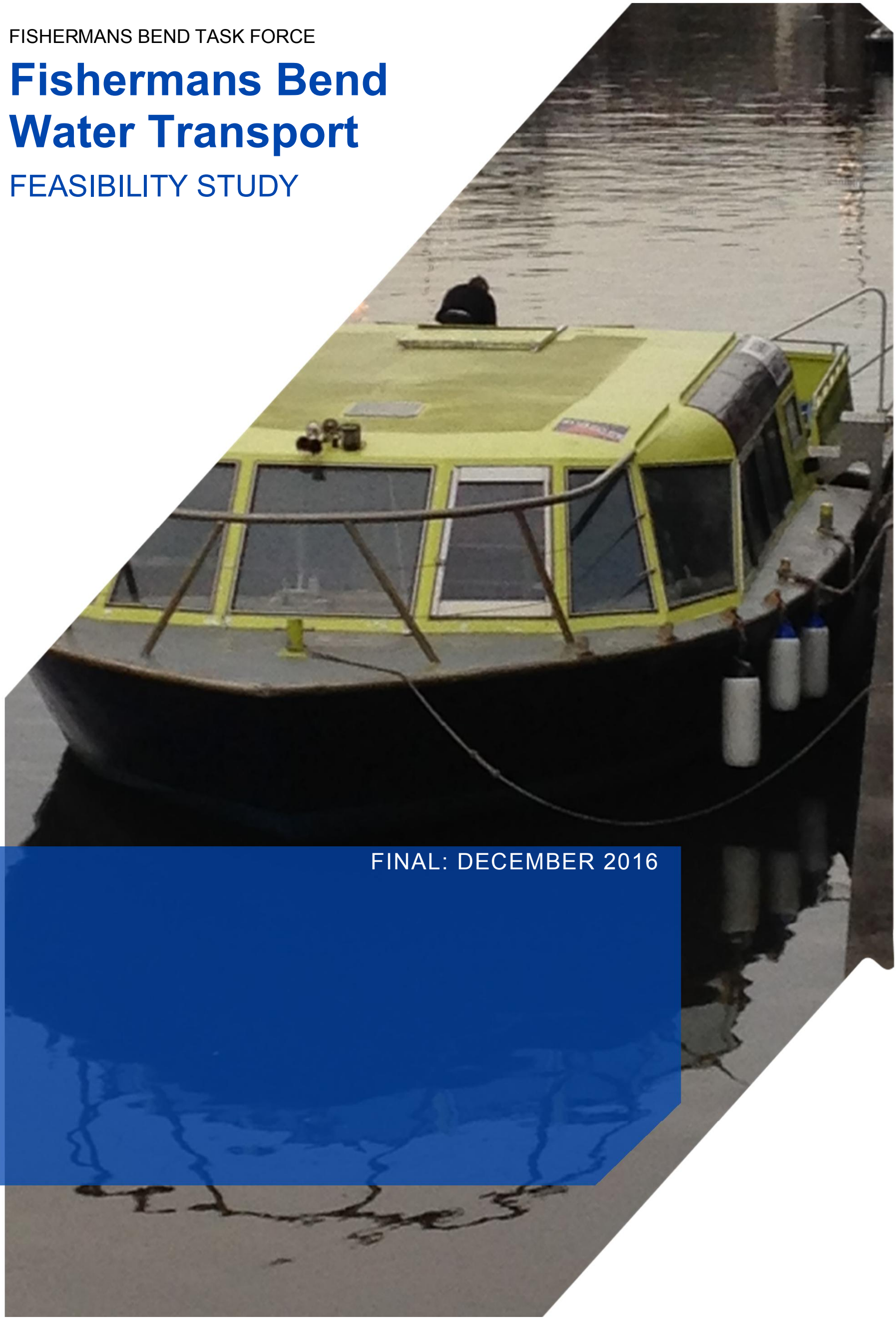
FISHERMANS BEND TASK FORCE

Fishermans Bend Water Transport

FEASIBILITY STUDY



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WSP | PARSONS BRINCKERHOFF

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FEASIBILITY STUDY

Fishermans Bend Task Force

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EXECUTIVE SUMMARY

Introduction

The vision for the Fishermans Bend redevelopment recognises that the 485-hectare area near Melbourne's CBD is an opportunity to set new benchmarks for inner city urban renewal, and drive best practice sustainability outcomes across transport, building resilience to climate change, housing supply, diversity and choice and sustainability and energy efficiency measures. Fishermans Bend is planned to accommodate 80,000 people and 60,000 jobs by 2050, which will create a significant people movement challenges, especially during peak periods. In order to support this community, and the design goals, a target has been set for 80% of transport movements to be undertaken by public transit using an integrated transport network.

To aid the fulfilment of this vision, this report investigates the role that could be played by a water transport network focused on serving Fishermans Bend.

It has been identified that such a network has a number of commercial an operational challenges. The following is a list of the key findings based on the implementation of the proposed water transport network once Fishermans Bend has been fully developed:

- The ferry operation is forecast to contribute a maximum of 4% of the total people movement task, even once full redevelopment of the site has been completed in the year 2050.
- The network is expected to have a BCR of 0.8 and a negative net present value of -$26M
- Implementation of the network at an earlier stage of the Fishermans Bend development will generate less favourable outcomes.

Network characteristics

In order to maximise the attractiveness of such a service and maximise the number of people carried, it is important that the services be scheduled at frequent intervals, provide an attractive journey duration, and provide quality access to/from the most intense development areas within Fishermans Bend.

For the purpose of analysis, a service frequency of 10 minutes during peak periods and 20 minutes during off peak periods and an operating span of 7am to 9 pm has been adopted. Operational reliability issues have been identified in relation to clearance restrictions under the Spencer Street Bridge at high tide and periods of high river flow, as well as operating restrictions imposed by the Port of Melbourne during certain commercial ship movements.

Investigations into a possible route structure for a ferry network have identified that the low operating speed restriction on the river network of 5 knots (under 10 km/h), and the winding nature of the river courses, result in a slow average journey time meaning that it is not a viable proposition to consider operating ferries over the full navigable length of the Yarra and Maribyrnong Rivers. The provision of frequent stops will also impact on total journey time to Fishermans Bend due to the time penalties associated with docking. Therefore a number of wharves with very low patronage are difficult to justify because of the delay to other passengers by up to three minutes for docking.

Analysis has identified that there is a rapid diminishment of operating return (patronage per additional operating distance beyond Flinders Street Station on the Yarra River and Shepherd Bridge (Footscray Road) on the of Maribyrnong, provided a suitable site can be identified for a park and ride facility. Commuter style operations to Williamstown could not be supported due to the small passenger catchment of that location and the difficulties in providing park and ride facilities.

Patronage modelling identified a considerable amount of short trips from local wharf to local wharf. Most of these movements appear to be interchanges with trams or trains. They have be discounted on the basis that they do not represent trips to Fishermans Bend, which is the focus of this study, and because

in reality it is doubtful that these people would chose to make the interchange in circumstances other than as a ‘free’ trip under Myki fare conditions.

The Westgate Punt, which currently conveys bicycles and pedestrians between Spotswood and Fishermans Bend, should continue to be assessed independently to any decision related to the provision of wider network ferry operations consistent with the above route structure.

Ferry infrastructure

The options for placement of ferry terminals to serve the Fishermans Bend area are not ideal. The river frontage between Bolte Bridge and Todd Road is designated for port operations and is included in the new port infrastructure lease. Terminals placed at either end of this stretch of river frontage are not well located compared to points of proposed highest demand within Fishermans Bend. This fact is further frustrated by the Yarra’s Edge development and the fact that the land uses of Fishermans Bend will be set back from the river’s edge, thus requiring travellers to walk a significant distance to/from their destination and negotiate the Lorimer Street major arterial road which is a designated truck route.

There are a range of challenges in identifying the location of ferry stops along the river in locations that will be capable of maximising the capture of travel demand whilst satisfying environmental and planning constraints. In addition, options for the location of ferry storage and maintenance facilities are severely limited but essential to the support of operations.

Ferry design challenges

The design of the ferries needs to be bespoke in nature due to the highly restricted air space under the Spencer Street Bridge. This requires a difficult design trade-off between head height within the ferry and the need for the floor in the hull to be as low as possible. Passengers travelling at deck height is not advisable due to the potential interaction with the low bridges. The bespoke nature of the design will mean that the capital cost of the ferries will be high because there is a limited market for similar designed ferries in other application or locations.

Issues of accessibility will need further consideration. The dynamic nature of the interface between the ferries and the wharves, combined with the need to descend down into the hull of the boat for the journey, present challenges for managing access for disabled or infirm people and meeting the requirements of the Disability Discrimination Act.

Financial Performance

Two options have been considered for the operation of the preferred network. One based on a fare structure consistent with Myki, the other based on a flat fare of $5.00 per trip.

Based on a fare of $5.00 per trip, the ferry network operations would be unattractive for a private operator to initiate, with a BCR of just 0.5. Should the network be considered as a part of the wider public transport network of Melbourne allowing the use of Myki, then the economic BCR improves to 0.7, which is comparable performance to many existing public transport services provided in Melbourne.

However, if Myki ticketing is to be considered then this increases the potential patronage of the service increases by 73% (from 1.46 m to 2.53 m trips per year) because many people will reuse a previously validated Myki ticket meaning that revenue is reduced and there is minimal impact on the BCR of the scheme (remains at 0.7). This is largely due to the large share of ferry trips which form a part of a longer public transport journey (transfers) and therefore will not generate any additional revenue to the service, with these trips not generating any additional road decongestion benefits.

Considering the demand, cost and likely revenue for the ferry operations, the expected economic performance of the ferry network, after full build out of Fishermans Bend, are as follows:

Table ES.1 Economic Performance

OPTION	BCR	NPV ($M)	TOTAL TRIPS (PA)	PV OF REVENUE OVER 25 YEARS ($M)
Scenario 1				
100 Person Vessel	0.4	-$201	4.47m	$82
50 Person Vessel	0.6	-$153		
Scenario 2				
100 Person Vessel	0.7	-$63	2.53m	$54
50 Person Vessel	0.8	-$26		
Scenario 3				
100 Person Vessel	0.7	-$52	1.46m	$85
50 Person Vessel	0.8	-$28		

The above results are premised on the implementation of the network at the time of full build out of the Fishermans Bend development. Options for staged implementation have been considered as follows:

- Introduce the full network at an early stage of Fishermans Bend development. The financial and economic results are likely to be reduced in relation to the percentage of development completed, making this a difficult option to support.
- Staged implementation of the full network based on deferring ferry purchases and operating a reduced frequency service. The reduced frequency of service will potentially impact travel time choices and introduce interchange time penalties making the use of the ferries less attractive. This would be especially critical for the Yarra services which are proposed to originate from Flinders Street Station as a connection for train arrivals. The other routes could perform better based on people planning their journey to match the ferry timetable.
- Implement on a route by route basis with a full service offering. The most attractive first route would be the Maribyrnong River based on the assumption of the provision of a park and ride facility. Ferry capital costs may be lower because there are no low bridges over this section of river. Yarra River is the second preference but requires the resolution of ferry design issues. Docklands has the lowest patronage but has the advantage of being able to share ferry design with the Maribyrnong route and therefore may be considered for earlier implementation.

Considering the demand for the ferry operations, the total number of passengers delivered to Fishermans Bend during the morning 2 hour peak period, after full build out of Fishermans Bend, are as follows:

Table ES.2 Predicted maximum patronage

FERRY ROUTE	EXPECTED PEAK 2HR PATRONAGE
Yarra River	650 to750
Maribyrnong	150 to 250
Docklands	400 to 500
TOTAL	***1200 to 1500***

This represents just 3-4% of the total peak hour movement requirements into Fishermans Bend estimated by the modelling used as a basis for the ferry patronage analysis. Patronage magnitude risk

also needs to be considered given that the modelling assigns trips on the basis of time and cost. There could be downward pressure of ferry patronage as a result of passenger perceptions, weather conditions and perceived attractiveness of other nodes. It is noted that Fishermans Bend is planned to be serviced by a direct light rail service from the CBD and by an underground metro style heavy railway which each have stops planned close to the highest trip demand locations within Fishermans Bend e.g. the centre of each precinct.

The conclusion is that it is expected that a water transport network could have a role to play in providing access to Fishermans Bend. However, the perception of its viability will be reliant on it being provided as a minor part of the public transport network, an acceptance of the relatively high upfront costs to set up the network (compared to other public transport services such as a bus route) and an advanced level of development being completed in Fishermans Bend.

1 INTRODUCTION

1.1 Context

Whilst there have been a number of water transport studies, and operations trials, related to the provision of water transport on the waterways of Melbourne, none have specifically addressed the role of ferry operations as a means of providing public transport access to Fishermans Bend.

Fishermans Bend has a 4 km long Yarra River water frontage along its northern boundary, albeit that much of this length is currently dedicated to activities associated with the Port of Melbourne and Docklands community at Yarra's Edge. Historically the river has presented a restriction to access from the north with such trips being directed via the Westgate Bridge to the west, or Charles Grimes Bridge to the east, with both routes adding a considerable distance to journeys and exposing travellers to significant traffic congestion issues during peak periods.

Land based transport planning to support the Fishermans Bend development continues to reinforce these and other travel corridors through the addition of new bus, tram and heavy rail access.

WSP | Parsons Brinckerhoff (WSP | PB) was commissioned by the Fishermans Bend Taskforce (FBT) to respond to a recommendation from the Fishermans Bend Advisory Committee (MAC) which states:

> "Water transport – should be considered as part of any overall transport strategy, while taking into account ownership of waterfront land, and ongoing operations of the Port"

In the "Fishermans Bend Vision – The next chapter in Melbourne's growth story" September 2016 reference is made to the potential role of water transport in providing access to Fishermans Bend, especially to the Lorimer Precinct.

The purpose of this document is to assist FBT to provide answers to the following tasks:

- Identify the opportunity for water transport to move people around and between Fishermans Bend and other key destinations including but not limited to, the CBD and Docklands
- In identifying of locations, consideration needs to be made for suitable passenger transfer locations, types of vessels that may be able to access the site and underside bridge clearances at high tide and flood events
- Investigate the costs and benefits of water transport options including capital and operating costs of services
- Investigate the relative benefits of water transport compared to alternative options
- Investigate the role that the existing Westgate Punt could play in improving access to Melbourne's west, including its current role, operation, catchment, cost and future changes which could enhance the role of this service for Fishermans Bend.

The conclusions from the investigations will be an important input to decision on potential role water transport could play in a draft transport strategy for the development of Fishermans Bend.

1.2 Scope

Melbourne's waterways are often considered an underutilised resource that could potentially provide the opportunity to connect communities and key land uses. The Yarra and Maribyrnong Rivers present the opportunity to connect Fishermans Bend with the CBD as well as selected eastern and northern suburbs. The use of ferries to transport people along the waterways can complement Melbourne's public transport network and provide a more sustainable solution to the use of motor vehicles.

Figure 1.1 provides an overview of the areas that could potentially be accessible by water transport from the Fishermans Bend development area.

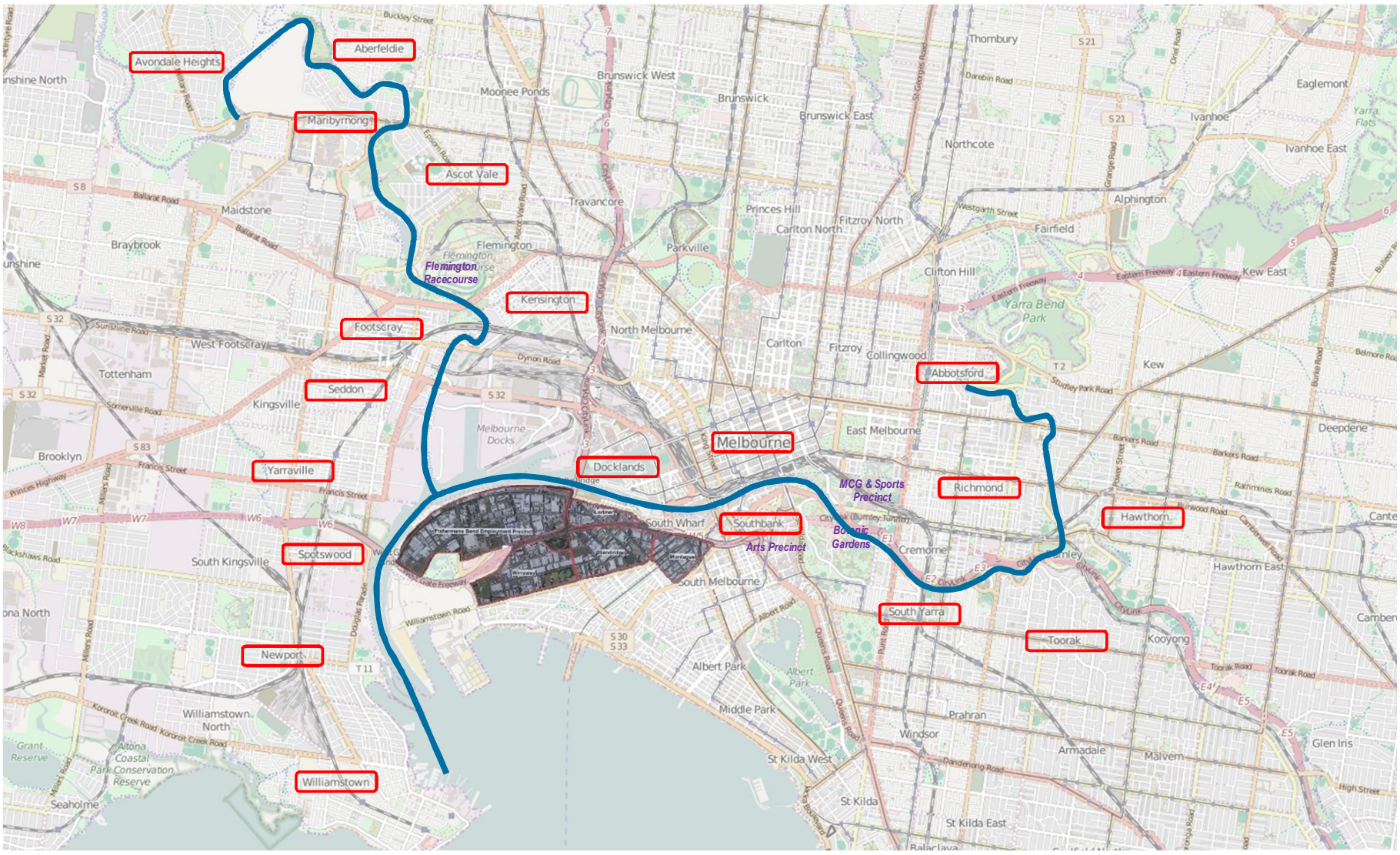

Figure 1.1 Suburbs potentially accessible via the Yarra and Maribyrnong Rivers

The scope of this study is to examine the feasibility of utilising a water transport system to complement the transport of people to/from the Fishermans Bend via other modes.

This report examines the following:

- → Demand assessment using the VITM strategic model
- → Stakeholder consultation with Parks Victoria, existing ferry operators, Port of Melbourne Corporation, and City of Melbourne
- → Background material contained in previous reports
- → Case Studies from other Australian experiences
- → The effect of river constraints on vessel design
- → Terminal/wharf location options
- → Ferry storage and maintenance
- → Route options & service planning
- → Evaluation of ferry operations scenarios
- → Benefits and costs of services
- → The role of the Westgate Punt.

1.3 Background research

There have been a number of ferry focused studies undertaken for Melbourne but very few of them have focussed on operations on the Yarra River. The relevance of this is that the operating environment on the river with its need for flat bottom, low profile transit ferry requirements, is very different to Port Phillip operations where the vessels need to be of a substantial size and hull design to cope with the heavy seas experienced in that environment.

The main common theme running through all studies undertake to date is that the operation of commuter style ferry services in Melbourne is not financially attractive. Anecdotally, we are aware that some of the existing tourism operators are not making sufficient returns to justify investment in the renewal of ferries, and the recent Port Phillip Ferries trial operations between Wyndham and Port Arlington to Docklands are not generating a sustainable passenger loading.

A seasonal (spring/summer) water shuttle has operated in Docklands but the service was suspended in 2008 because the level of subsidy required from Parks Victoria, VicUrban, the City of Melbourne and developers was disproportionate to returns.

We are aware of only the following studies that have examined specifically Yarra River scheduled ferry services:

Yarra River Shuttle Service Review: AECOM, 2009

In 2003, Parks Victoria recognised a gap in the tourist river shuttle market and sought to fill it with a free trial service over the summer of 2003. This was a success in terms of patronage numbers and Williamstown Bay and River Cruises won a tender to deliver it for a period of three years.

From the inception of the service in 2004, it delivered an operating loss each season totalling over $1.9 between 2004 and 2008, largely due to high overheads and limited patronage. The service was withdrawn in 2008 after four seasons of subsidised operation.

The report draws out the following lessons learnt:

- The fare of $3 dollars was deemed to be too high by the travelling public.
- The cost of running the service was higher than expected with a fare closer to $14 being required to offset operating costs
- The service lacked distinct features to differentiate it from other modes of transport and duplicated a wide range of public transport options (e.g. the City Circle Tram or walking along the river)
- The private operators already provide tourist ferry services on the Yarra and if a scheduled services was considered viable then it would be reasonable to expect that the private sector would have adopted this operations model
- The service was marketed as a hop-on and hop-off service; however passengers were found to be using it as a cruising ferry option thus decreasing capacity for other short patrons and therefore hindering the ability to generate revenue;
- In order to avoid competition with other ferries the eservice it was targeted at a specific area of operation meaning there was insufficient demand to sustain the ferry
- Demand for the services were weather dependant and seasonal resulting in periods of low patronage and others where the service could not handle the demand
- Services were interrupted by events programs on the river such (e.g. Moomba) and other vessel movements
- The service did not have a clear identity and sent out mixed messages to users on the one hand being a tourism activity, on the other a means of moving around the city.
- The avoidance of anti-competition laws restricted what Government could provide without affecting the existing operators.

Visitor Infrastructure Waterways Study: SGS Economics and Planning, 2012

One of the goals of the City of Melbourne's Tourism branch is to increase visitor numbers to Docklands and to promote travel to the attractions and precincts along the city's waterfront. They held a belief that water transport services within the city would be popular with visitors and, therefore, wanted to understand its role in supporting travel by visitors of water transport.

The key drivers of the research were:

- Contributing to ease of movement around the city i.e. stops that link with walking, cycling and public transport networks
- Strengthening connections between attractions and precincts along the city's waterways, and improving visitors' ease of access to them.

The report identifies a number of important features required to support any proposal to introduce water transport services on the Yarra River:

- Regular passenger water transport is typically tourist oriented.
- Passenger water transport services typically involve small vessels (50 – 75 passengers) running high frequency services (e.g. periods between services are generally less than 15 minutes).
- Passenger water transport services can involve on-board and/or remote ticketing (pre purchase).
- Seating provision typically matches passenger flow, with an average provision of one seat per passenger waiting to embark.
- The provision of covered waiting areas by ferry operators and public authorities varies, depending on the availability existing sheltered spaces.
- A linear Yarra River service could not operate with one secure ticketing point because it is a multi-stop circuit. Instead, passengers could pre purchase a ticket or use the Myki, swipe on/off credit service as they would a train, tram or bus. Gated berthing could allow more controlled boarding and reduce fare evasion.
- Ferry stops in Melbourne's Docklands and the Yarra River will require consistently formatted signage and information.
- The level of demand is unlikely to be attractive to small (counter) retailers.

A draft ferry/shuttle route between Morell Bridge and Docklands was suggested with stopping points identified to strike a balance between the following criteria:

- Address spatial gaps where a ferry/shuttle service is shown to provide a faster transport link between two points than land based public transport
- Maximise accessibility for passengers to and from visitor attractions in Docklands and along the riverfront
- Maximise accessibility for passengers to bridges crossing the Yarra River, and
- Utilise existing berthing platforms (where visible in aerial photography of the riverbank).

River Shuttle…scheduled water transport service on Melbourne's river system. City of Melbourne, 2015

This report has not as yet been made publically available, however information released via the press suggests that the initial proposal is to operate a regular shuttle service between Flinders Street Station and New Quay in Docklands, with it being integrated into the public transport include the use of Myki ticketing. It is recognised that the service would require subsidisation from some source in order to be sustainable.

The proposal relies heavily on the development of a unique vessel that will address issues such as:

- It being an iconic, state of art design
- Having light displacement, low profile to fit under the bridges, low wash/wake to avoid impacts on other river users and the river banks
- Operated using green power, such as solar
- Able to operate in all weather conditions
- Capable of carrying bicycles
- DDA compliant if possible
- 60-100 passenger capacity
- Ability to embark/disembark from either side rapidly
- 5 to10kn operating speed.

City of Melbourne advises that the vessel has been scoped to concept design, but the concept has not been progressed beyond this point at this stage.

2 IDENTIFYING THE OPERATION

2.1 Key considerations

2.1.1 Navigable waters

The limit of upstream navigation on the Yarra River is Dights Falls where a weir was built in the early 1840s to supply water to a flour mill. The limit of upstream navigation on the Maribyrnong River is at the Canning Street Bridge in Avondale heights. The question as to whether all these waters will be accessible to ferries will be determined by the draft of the vessels and their ability to turn around in the width of the river. Existing ferry operators do not have experience in operating beyond The Collingwood Children's Farm on the Yarra River (due to unknown river conditions beyond this point) or Maribyrnong Road Bridge on the Maribyrnong River (due to the bridge piers being close together and set at an angle to the river making navigation difficult). Downstream, the Yarra River provides access to Port Phillip, however the sea state beyond Williamstown will need to be carefully considered with reference to the long, low freeboard, flat bottomed designs most likely required for river access. The presence of numerous low bridges also has the potential to restrict ferry navigation at times of high river levels.

Refer to Section 2.1.3 for further restrictions related to Port of Melbourne operations.

2.1.2 Bridge clearances

Both the Yarra and Maribyrnong Rivers are crossed by a large number of road, rail and pedestrian bridges. Clearances under these bridges are influenced by tides (more pronounced near the entrance to the Bay) and river flows caused by rainfall events, including flooding. The potential disruption of services at times of high water would have a significant impact on service reliability and hence patronage demand, an issues that has not been factored into the demand modelling.

On the Yarra River, the Spencer Street Road Bridge presents the controlling vertical clearance (2.05 m at high tide), whilst on the Maribyrnong River the Lynchs Road Bridge has a clearance of 3.15 m at high tide. There are no air draft clearance issues on the Docklands or Williamstown routes.

Discussion with ferry operators indicates that these limits have a significant impact on operation of ferries. Route and operation planning is done on a day to day basis, and can be updated during the day, based on expected and observed conditions. Boats with an air draft of 1.8 m are regularly constrained by river height, particularly in relation to operations down stream of Southgate wharf towards Fishermans Bend. This has the potential to be a considerable constraint for the operation of regular scheduled ferry services.

Historical data related to river heights at Spencer Street Bridge has not been available and therefore it is not possible to quantify the magnitude of this problem, but anecdotal evidence suggests that this is a regular barrier to ferry operations. It is recommended that a time series survey of conditions be undertaken before finalising plans for a proposed ferry operation.

2.1.3 Port operations

The river from Williamstown to Bolte Bridge and Shepherds Bridge, falls under the jurisdiction of the Commercial Vessel Traffic System (VTS).

Operation of vessels on the river must comply with the International Rules for the Avoidance of Collisions at Sea, but must also work under the Port of Melbourne Corporation 'Harbour Master's Directions' and the 'Port Information Guide', which include the following requirements:

- Harbour Master's Directions informs about, amongst other things, the regulations and practices that govern vessel operations
- Port Information Guide informs about, amongst other things, port safety and security.

The Yarra effectively operates as a one way channel which means that ships over a specified length are not permitted to pass each other. However shallow draft vessels such as ferries, may pass a commercial ship where there is sufficient navigable water, which for the ferries poses no constraint, except for locations where ships are turned. When a ship is being turned in the Swanston Dock, Appleton Dock or Yarraville swing basins other craft are instructed to keep clear. This is done via radio communication with the Port Control Tower, or in summer months when there are higher numbers of pleasure craft, may also involve the Port despatching a 'steer clear boat' to advise these craft to keep clear. The process of turning a ship could take between 10 and 30 minutes depending on the size of the vessel, the number of tugs involved in the move and prevailing conditions. The potential disruption of services due to commercial shipping activities would have a significant impact on service reliability and hence patronage demand, an issues that has not been factored into the demand modelling.

Movements to and from the Port follow an irregular pattern throughout the day, but as shown in Figure 2.1 that there is generally an increase in the number of movements during the times that correspond to the morning and afternoon commuter peaks on the transport network. On a given weekday, there could be one to six inward (and possibly turning) movements during the morning peak, and one to six inward movements during the afternoon peak.

Figure 2.1 Port of Melbourne movements per week in a sample of weeks in 2011

Source: Port of Melbourne Corporation, Ernst & Young analysis

Movements per week in 2011	Week of 25 Nov	Week of 2 Dec	Week of 9 Dec	Week of 16 Dec
Total in	20	22	17	23
Total out	18	22	26	26
Total movements	38	44	43	49
Weekly AM peak movements 0700-0930	1 in 3 out	6 in 4 out	2 in 3 out	2 in 1 out
Weekly PM peak movements 1600-1830	1 in 3 out	6 in 0 out	2 in 4 out	3 in 1 out
Total weekly peak movements	8	16	11	7

There is currently a discrepancy in river speed limits as follows:

- Commercial shipping – 8knots Williamstown to Westgate Bridge and then 6knots to Bolte Bridge (Port of Melbourne regulations)
- Recreational craft – 10knots Williamstown to Westgate Bridge then 5 knots to all locations upstream (Parks Victoria regulations).

It is understood that discussions are occurring to harmonise these speed limits and it is possible that they may be standardised around the PoMC limits. Any application to increase speed limits will require a full risk assessment to be undertaken. However, given this issue has not yet been resolved, this study has assumed the continuation of Parks Victoria limits. It should be noted that the results of the financial/economic assessment will be sensitive to what is effectively a 20% increase in operating speed, therefore this will be tested with a sensitivity analysis.

It is also worth noting that PoMC would need to approve any proposed structures such as ferry wharfs proposed within the port limits.

2.1.4 River operation restrictions

There are times when events on the Yarra River in particular, may cause limitations for the delivery of a scheduled service. During Moomba the Masters Water Skiing Championship, New Year's Eve fireworks, and rowing regattas can each cause river closures.

2.1.5 Ferry design

Ferry design will be critical to the success or otherwise of regular scheduled water transport services. The areas of consideration are set out below:

A ferry tries to power its way out from under the Spencer Street bridge in the Melbourne CBD after becoming stuck on June 16. 2012

- *Air draft* – The objective is to design a ferry that minimises air draft, but at the same time provides the ability for passengers to stand upright within the craft. A nominal air draft of 1.8m is assumed as being the maximum to allow the craft to operate under the low bridges at high tide, most of the time (refer to Section 2.1.2 for concerns about high river levels). In order to accommodate a ceiling height of 2.1m (7ft) plus a nominal roof structure thickness, the floor of the vessel would need to be about 0.4m below the water line. This creates a trade off in vessel design with buoyancy and draft of the vessel.
- *Manoeuvrability* – The narrow nature of the river, particularly towards the upstream sections, requires a vessel that can turn in close to its own length. Manoeuvrability will also be important for docking where valuable time lost positioning the craft will directly impact on the journey times for passengers. This is also the time when the craft is most susceptible to damage from impact with the structure. Wind and water flow affects compound the skill required, especially when the vessel is approaching with the wind and tide from behind the vessel, or there is a strong wind pushing the craft towards the structure.
- *Propulsion* – Existing ferry operators have found that propeller drives are susceptible to damage from objects in the river and most have chosen to use water jet propulsion. The use of twin drives is also desirable to assist low speed manoeuvrability.
- *Stability* – The rapid boarding and disembarking of passengers from one side of the vessel, and the effect of passengers freely moving around the craft has a major influence on hull design. The solutions normally adopted to counter this are flat bottom hulls or catamaran/trimaran designs. V-hull design is less stable and requires greater water depth.
- *Compatibility with wharf structures* – The interaction between the vessel and the pier is dynamic and can be impacted by tides and water action. The best solution is the use of floatable pontoons optimised to match the ferry design. Whist this could be achieved for new installations there are many existing ferry wharfs (e.g. Southbank) that are fixed bluestone structures. Ferry operators experience significant damage when alongside these structures.
- *Operating speed* – The operating speed of the craft, and the design of the hull has a direct effect on wake generation. Vessel wake has the potential to disturb other river users (especially rowers) and can cause bank erosion. Wash restrictions of 300mm wave height apply on the rivers.
- *Boarding and disembarking* – The gap between the wharf and vessel is dynamic due to wind, wave and tide effects. There is a significant history of personal injury caused by gaps between trains/trams and platforms despite the fact that these types of gaps are static and predictable. There will also be a height difference between the floor of the vessel and the wharf surface, and there could be a gunnel to also step over. These issues create a significant barrier to boarding by disabled and infirm passengers, such that existing operators advise against such people using their services. Where the ferry is to be a form of public transport, it is expected that it will need to comply with the Disability Discrimination Act. The solution may involve the use of gangways and/or lifting devices, both of which necessitates staff assistance and will delay ferries at the wharf. Furthermore, the requirement for the floor of the ferry to be below water level means that there will be steps down into the ferry cabin to negotiate.
- *Bicycle accommodation* – It is desirable for any form of public transport to consider the potential to accommodate the carriage of bicycles. Provision could be made for a limited number of bicycles (e.g. on the stern deck) subject to the vessel design. Of particular consideration would be the potential for any

ferry operating to Williamstown to accommodate the volumes of bicycles currently conveyed by the Westgate Punt and avoid the continued need for this specialised operation.

- *Comfort and style* – Given the low speed of ferries due to the river speed limits, then journey times will be relatively lengthy and there would be a passenger expectation that seats will be available, especially for the infirm.
- *Staffing* – The number of staff required to operate commercial ferry operations is determined by the design of vessel and the nature of its operations. A requirement for up to 5 crew is required in some applications. Existing Yarra ferries have received dispensation to operate with only two crew members, a skipper and a deckhand, the latter of which is responsible for mooring work and assisting passengers. Therefore, this crewing level has been assumed for this study.
- *Ticket sales* – If the ferry is to be part of Melbourne's public transport network then the provision of Myki validation machines on board the vessel would be preferable. However if a fare for use system is to apply then ticket sale facilities will need to be considered for boarding passengers. The options are:
  - Ticket kiosk at each wharf: The need for staff would make these costly to operate, and there would be a need to also provide staff amenities. Furthermore, existing operators have been refused permission to install ticket berths along the river edge due to environmental and visual impacts.
  - Ticket machine at each wharf: Allows people to pre-purchase tickets while waiting for the ferry for immediate boarding. Maintenance of remote machines will need to be considered.
  - On-board ticket issue machine: Will require fewer machines but could significantly delay ferries when boarding passengers queue to purchase tickets before moving inside.
- *Safety* – The design will need to accommodate sufficient positive buoyancy to prevent it sinking should it be holed. The placement and capacity for sufficient foam will influence design. Also, sufficient storage space will be required for life jackets, and the design of the vessel should allow passengers to still exit the cabin when the vessel is semi-submerged.
- *Compliance with standards and regulations* – The maritime environment is heavily regulated and the vessel design will need to comply with a variety of standards and regulations such as:
  - Marine Safety (Domestic Commercial Vessel) National Law 2012
  - National Standard for Commercial Vessels
  - Lloyds Rules and Regulation for the Classification of Special Service Craft
  - Sections of the USL Code.
- *Image* – there is the opportunity for any new ferry fleet to look modern and stylish and to become a marketing icon for the city and could be linked to the Fishermans Bend branding.

The ability to satisfy all ferry design considerations will be challenging. Discussions with existing ferry operators suggest that at best the design of any new craft will be a series of compromises. It is generally acknowledged that the design of existing ferries operating in Melbourne are not well suited to the proposed role as a commuter ferry. Figure 2.2 provides examples of the various vessel designs that have been adopted to address the low clearance requirements of the river, in all cases the designs trade off height, width and carrying capacity.

It is not possible to buy a suitable ferry 'off the shelf', therefore there is a cost penalty associated with the design and manufacture. One operator believes that he may have a solution for a new ferry design but is not prepared to share this because of commercial issues and intellectual property rights.

Figure 2.2 Collage of different Yarra River water craft

However, the City of Melbourne has undertaken some research into a bold new ferry design as part of a suggested solution for access to Docklands. Under council's latest plan, a water service would run every day on a regular timetabled service.

The downstream route would be from Flinders Landing to New Quay in Docklands, including stops at South Wharf and Crown Casino. The upstream service would stop at the World Trade Centre and Collins Landing. There would be potential for the service to be extended to more riverside suburbs such as Richmond, Hawthorn, Williamstown and Maribyrnong once demand is established.

The vessel is a trimaran design incorporating seating over the side pontoons and with a central isle. Bicycles would be accommodated on top of the side pontoons.

With such a wide variety of designs, and no recent history of vessels being constructed, it is difficult to place a capital cost on construction of new craft to suit commuter style operations. The requirement to design and construct a vessel unique to the Melbourne situation also means that construction costs related to ferries elsewhere has a low relevance. Anecdotal evidence suggests that with the premium for the bespoke design, the cost of construction may be between $1.2M and $1.8M, therefore a capital cost of $1.6M has been assumed for a 100 passenger ferry for the purpose of this study.

2.1.6 Wharf design

Modern wharf design suggests the use of floating pontoons. These are particularly suited to the river situation given the significant rise and fall due to tides and rain events. This style of wharf also presents a constant height above waterline for vessels making boarding more predictable.

Providing a pontoon parallel to the river bank will minimise intrusion into the waterway. This is also an economical solution when it is expected that only one boat would be temporarily docked at any time.

Where demand requires two berths, then it becomes more desirable to use a finger arrangement where the pontoon is perpendicular to the river bank and allows boats to dock on both sides. This latter approach is more likely to be applicable to the wharfs proposed for Fishermans Bend where multiple routes operate and vessels may need to lay-over awaiting next turn of services. However, this could create some issues with the interface with shipping associated with Port of Melbourne.

It is expected that it would be desirable for the wharf to accommodate shelter for waiting passengers and potentially ticketing facilities, otherwise these would need to be provided on the river bank.

2.1.7 Ferry fleet storage and maintenance

When not operating services the ferries will need to be stored in an appropriate location. As evidenced by the rafting up of ferries upstream of Queens Street Bridge, the availability of suitable space is currently at a premium.

There will be a need for good landside access to the ferries and room for a depot so that running repairs can be supported, as shown in Table 2.1. There are few such locations along the rivers, and it is beyond the scope of this study to resolve this requirement. However, sites such as the substation dock in Burnley, or wharfs along the Maribyrnong River in Footscray could provide opportunities, which may need to be further investigated.

Major maintenance will require access to a dry dock or ship lift facility and the capability of existing facilities will require assessment. At present, the Duke and Orr Slipway in Appleton Dock services some of the existing river vessels, but its future is uncertain because of its location within the Port of Melbourne. When this facility has not been available, ferries have been taken to Queenscliff at the southern end of the Bay, the trip being very dependent on weather conditions. If a commuter style ferry service is to be implemented then consideration should be given to securing the Duke and Orr facility, or alternatively consider opportunities that may be available in Williamstown where there are some private and disused slipways, and the currently disused Tenix dockyard facility.

Table 2.1 Maintenance functions to be accommodated

Scheduled dockings	Planned servicing	Breakdowns	Operational services
Inspections and surveys	Diesel engine and auxiliary generator services	Leaks	Fuelling
Upgrades, repairs and modifications	Cleaning	Electrical failures	Bilge pump out and disposal
Cleaning (hull, interior and exterior)	Coolant change	Mechanical failures	Lubrication
Painting	Electrical/mechanical inspection		Berthing and security
Engine overhaul			Stores
Outstanding work requests			

2.2 Route and service planning

2.2.1 Introduction

In considering the design of a ferry network to support travel to Fishermans Bend it is important to consider the following:

- Service design:
  - directness
  - legibility
  - travel time
- Service spread of hours
- Service frequencies
- Demand thresholds for wharves:
  - assessing services to existing wharves
  - assessing the preferred location of new wharves.

2.2.2 Route planning

In order to assess the relative merits of services operating on each of the river courses, a decision was made to break the proposed network into four key routes as follows:

- Fishermans Bend to Dights Falls via the Yarra River
- Fishermans Bend to the Maribyrnong ADI site via the Maribyrnong River
- Fishermans Bend to Williamstown via the Yarra River and incorporating the existing bicycle punt operations
- Fishermans Bend to Docklands via Victoria Harbour.

Based on identified constraints, patronage, and costs these routes will be modified and developed in the most likely preferred operations plan for river transport operations.

2.2.3 Wharf locations

The placement of ferry wharves will require particular consideration. These will need to be as close as possible to demand locations in order to minimise walking distances for passengers, and where possible, accommodate park and ride facilities to boost patronage. This decision will need to be traded off against locations suitable for the provision of terminals in a balance with other water's edge land uses/activities, environmental issues, and other sharing with tourist ferry operators.

River wharfs were placed on the basis of the following criteria:

- Close to residential areas
- Close to commercial/retail areas such as CBD, Docklands, Southbank
- Close to major event venues such as Tennis Centre, Flemington Racecourse
- Proximity of connecting public transport such as at Flinders Street Station, tram routes and rail stations
- Availability of existing wharfs
- Accessibility to the river's edge
- Land availability for car parking.
- Spacing that considered the timing impacts of frequent docking on total journey time.

The placement of Wharves in Fishermans Bend is critical to the success of the operation, with the main consideration being proximity to the proposed areas of intensive land uses.

There are some practical/constraining issues associated with placing wharves along the southern bank of the Yarra River adjacent to Fishermans Bend such as:

- established private uses to the west of Todd Road such as Pier 35 Marina
- the land east of Todd Road to the Bolte Bridge is still designated for port activities and has not been incorporated into the Fishermans Bend master plan because it is part of the Port of Melbourne lease agreement
- the Mirvac residential developments east of the Bolte Bridge including boat harbours which prevent landside access.

Other issues associated with river bank ownership, access, environment and heritage will need further consideration before the prosed wharf sites can be accurately determined.

2.2.4 Service planning

The level of demand, and navigation restrictions will influence the frequency and span of operating hours for the ferry routes. Lower frequencies have the potential to impact on demand and attractiveness of the route. For the purpose of evaluation, the base case operation assumes a 20 minute service frequency, and a span of operating hours from 7 am to 9 pm, in order to strike a balance between costs and service attractiveness

There is also the potential to utilise ferry vessels for tourism activities outside peak periods when some of the fleet may be underutilised. This potential has not be assessed in this report.

In assessing operation of the four nominated routes it has been decided to overlap the routes so that each route will service the two main stops within the Fishermans Bend area.

Figure 2.3 provides a map of the proposed route structure used as the basis for the patronage analysis and provides a reference number for each stop location to assist with the evaluation process. Further detail about the stop locations is provided in Table 2.2.

Table 2.2 Proposed wharf location details

STOP NUMBER	LOCATION	LOCATION DETAILS
Fishermans Bend Termini		
FB1	Fishermans Bend: Lorimer	A new terminal located between the Westgate Bridge and the Yarra's Edge development
FB2	Fishermans Bend: West	A new terminal located between the western end of the port lease and Pier 35, near the end of Todd Road. This location may require negotiation with the new Port lessee.
Yarra River Route (dark green)		
Y1	North Wharf	Utilises the existing pontoon facility at the rear of the ANZ building in Docklands
Y2	South Wharf	Utilises the existing pontoon facility adjacent to South Wharf Promenade, providing access to the Convention Centre, DFO retail and restaurants
Y3	Casino	Utilises the existing pontoon facility outside Crown Casino
Y4	Southbank	Utilises the existing pontoon facility along Southbank Boulevard downstream of Ponyfish Island

STOP NUMBER	LOCATION	LOCATION DETAILS
Y5	Flinders Street Station	A new pontoon to be provided as close as possible to the Elizabeth Street Subway entrance to Flinders Street Station to allow efficient interchange with trains and access to the CBD
Y6	Yarra Park	Utilises the existing pontoon facility near Rod Laver Arena, most likely only in use for special events
Y7	Punt Road	A modified pontoon to be provided up stream of Punt Road on the southern bank to service a walk-in catchment from the western end of South Yarra
Y8	South Yarra	Utilises the existing pontoon facility down stream of Herring Island on the southern bank to service the South Yarra area
Y9	Toorak	A new pontoon facility down stream of Grange Road on the southern bank to provide a walk-in catchment from Toorak
Y10	Hawthorn	A new pontoon facility on the south bank between M1 and Swan Street with the potential to establish an adjacent commuter carpark (subject to approvals)
Y11	Bridge Road	A new pontoon facility on the east bank up stream of Bridge Road serving the northern areas of Hawthorn as wells Richmond
Y12	Abbotsford	A new pontoon facility on the south bank adjacent to the northern end of Church Street
Y13	Collingwood Children's Farm	A new pontoon facility on the south bank adjacent to the Farm car park, which could potentially be developed for commuter parking mid-week
Maribyrnong River Route (light green)		
M1	Footscray	Utilises the existing pontoon facility down stream of Footscray Road and adjacent to an existing car park on the west bank which could be adapted to provide a park and ride facility
M2	Kensington	A new pontoon facility on the east bank at the end of Hobsons Road with the potential for a car park to capture park and ride from the Kensington area
M3	Flemington Racecourse	Utilises the existing pontoon facility near the racecourse, most likely only in use for special events
M4	Edgewater	A new pontoon facility on the west bank down stream of Fisher Parade with the potential to provide a park and ride facility by sharing the existing car park
M5	Ascot Vale	A new pontoon facility on the north bank near the end of Charles Street with the potential to provide a park and ride facility (subject to approvals)
M6	Highpoint	A new pontoon facility on the west bank near the end of Hillside Crescent within walking distance of Highpoint Shopping Centre. Also the potential to provide park and ride facilities (subject to approvals)
M7	Moonee Ponds	A new pontoon facility on the east bank in the vicinity of Raleigh Street
M8	Aberfeldie	A new pontoon facility on the north bank at the end of Afton Street with the opportunity to share the existing car park for park and ride
M9	Maribyrnong	A new pontoon facility on the south bank in the vicinity of the proposed redevelopment of the ADI Defence site

STOP NUMBER	LOCATION	LOCATION DETAILS
Docklands Route (orange)		
D1	Harbour Town	Utilising one of the existing wharfs along the northern edge of Victoria Harbour to provide walk-in catchment from the residential towers and Harbour Town
D2	Harbour Esplanade	A new pontoon facility adjacent to the 'Cow up a Tree' sculpture positioned to capture foot traffic from Southern Cross Station and provide special event services to Docklands Stadium
Williamstown Route (blue)		
W1	Westgate Park	Collocated with the eastern wharf servicing the Westgate Punt, providing access to the eastern extremes of Fishermans Bend
W2	Spotswood	Collocated with the western wharf servicing the Westgate Punt, providing access to the Spotswood area
W3	Williamstown	Utilising the existing pontoon wharfs at Gem Pier providing a walk-in catchment only given the absence of a suitable area for car parking. Additional pontoons may be required in order to share this location with tourist ferries

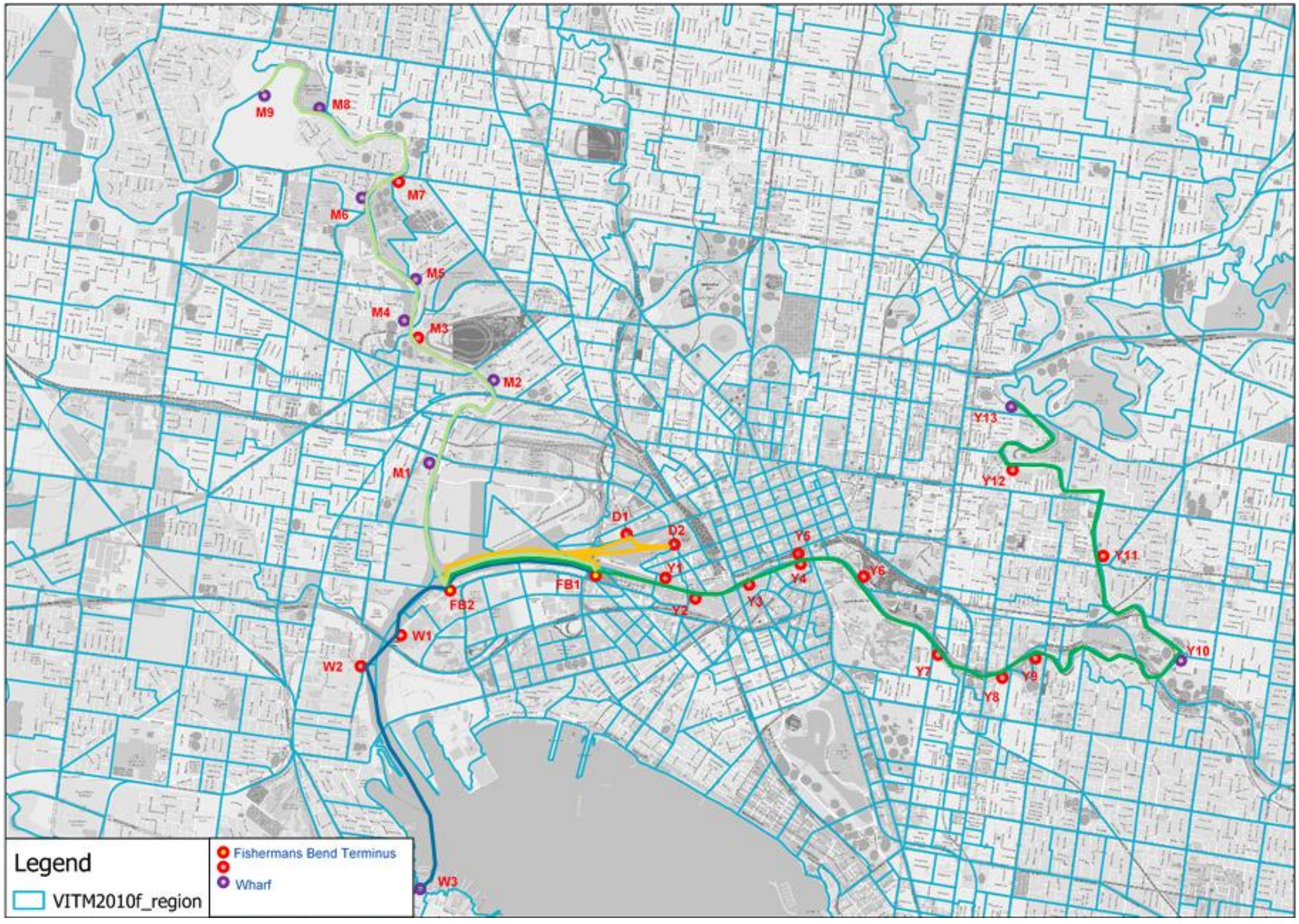

Figure 2.3 Ferry routes and stop locations for investigation

3 WESTGATE PUNT OPERATIONS

3.1 Current operations

3.1.1 Route

The Westgate Punt currently provides access for active travel between Spotswood and Fishermans Bend during peak periods. The Westgate Punt service provides a linkage between the Hobsons Bay/ Maribyrnong River cycle trails and the Bay Trail, the latter of which provides linkages into the Fishermans Bend precinct and the expanded central city area of Melbourne.

The Punt operates between Spotswood Jetty on Douglas Parade (near the corner of Craig Street) in Spotswood, and Westgate Landing on Lorimer Street (near the corner of Sardine Street) in Port Melbourne (map below).

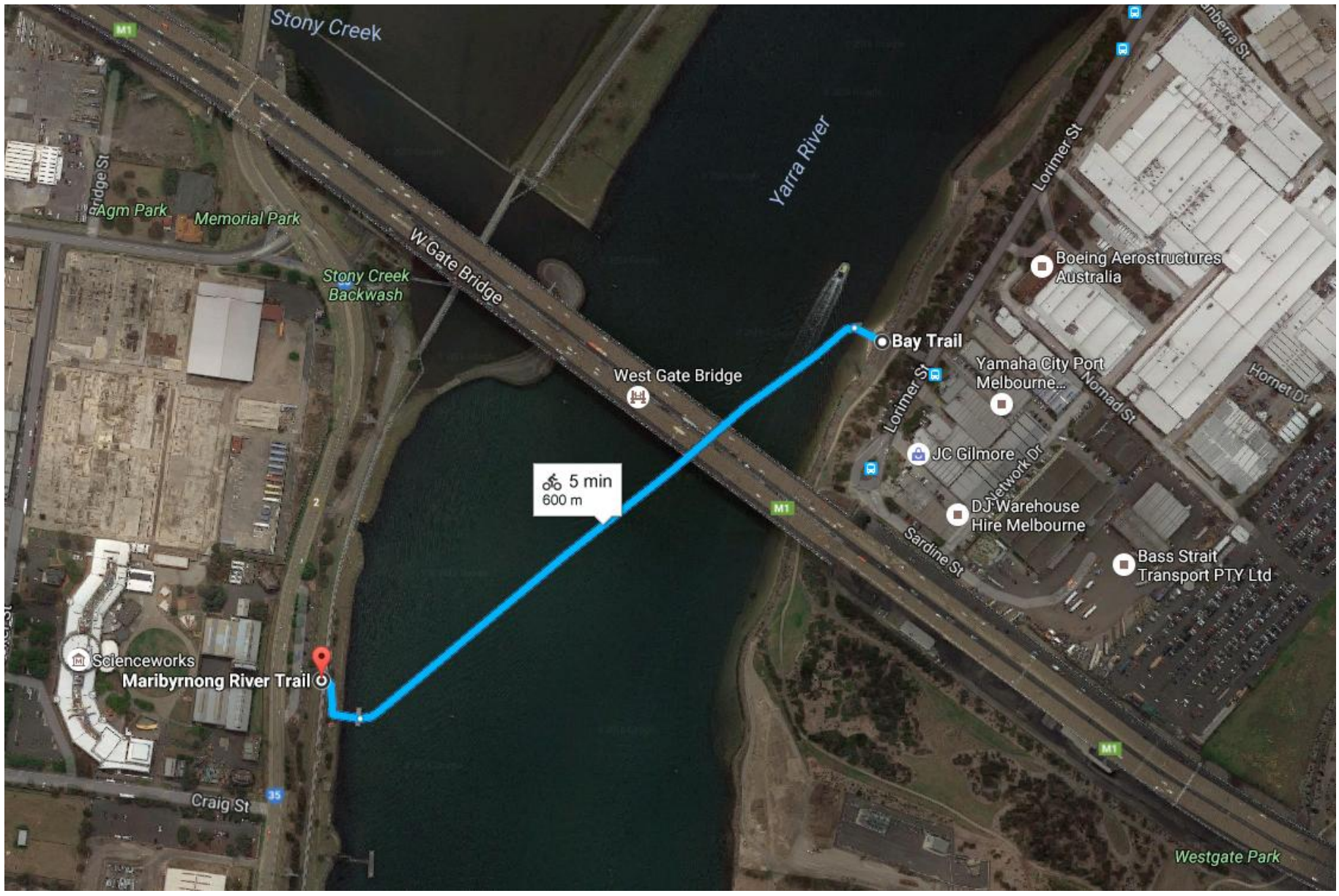

Figure 3.1 Westgate Punt Ferry route

Whilst Fishermans Bend and the adjacent inner south western suburbs are well connected by the (albeit congested) road network, there is a lack of crossing opportunities for active transport modes.

The Westgate Bridge, unlike some other major freeway bridges in Australia does not accommodate pedestrian or bicycle movements. At the time of design and construction the bridge pedestrian/cycling provision was not standard for freeways, there was a lack of connections off the bridge (the cycle trails along the rivers and into the city were yet to be provided) and there was largely industrial catchments on both side of the Yarra River. It is unlikely that the bridge will be retrofitted with cycle lanes, and it would be unattractive for cyclists to take such a route given the height of the bridge and steep gradients.

Without the link over the Westgate Bridge, cycle commuters from the inner south-west must take a lengthy 13 kilometre trip via Footscray Road and the Port of Melbourne precinct in order to access Fishermans Bend. This longer option takes about thirty to forty minutes longer (depending on the speed of the cyclist). Through the provision of the punt service, cyclists and pedestrians now have an attractive alternative to driving over the Westgate Bridge or the lengthy cycling trip through the port precinct and Docklands.

3.1.2 Operations

Privately operated punt services between Spotswood and Port Melbourne have been in operation since 1997. During the period of private operation weekend and public holiday services for recreational users were provided, but weekday commuter services were ad-hoc and unreliable throughout the year. As a commercial operation, the service provider responded to low demand periods (such as poor weather or winter months, where cycle traffic is lower) by choosing not to operate. Additionally, the $5.00 fee per trip set by the operator at the time was generally deemed too high for commuters. Consequently patronage rates were very low.

As a result, in 2011 the State Government agreed to provide funding to supplement costs associated with a reliable (all year round) weekday peak hour punt service, with the existing private operator contracted to provide the service during the morning and evening peaks. The Punt provides a Yarra River crossing every 20 minutes on weekdays between 6.30 am and 9.20 am, and then between 4.00 pm and 6.50 pm, with the trip taking five to seven minutes per trip (one way) on average.

The Government subsidy enabled the charging of a $2 per trip (rather than the $5 per trip) fare during the weekday peaks which assisted with attracting regular users. The Punt also operates a service on weekends and public holidays, with the punt operating on demand, with a $5 per trip fare being charged, importantly, the service does not operate outside peaks on weekdays.

Figure 3.2 Westgate Punt at Westgate wharf

The punt is currently crewed by three staff throughout the year (on a casual basis) with the boat being berthed at facilities nearby at Pier 35 marina in Port Melbourne. Under the current arrangements, the Westgate Punt relies on the good will of both Parks Victoria and the Port of Melbourne Corporation who allow Westgate Punt P/L to utilise their landside docking facilities free of charge (wharves and dry docking). The recent lease of the Port of Melbourne could potentially change this arrangement.

The Westgate Punt operator has raised concerns with the Government around the safety, amenity and compliance of the existing punt facilities as part of the recent review of the punt. The operation presently lacks ready access to bathroom facilities for staff and passengers and there is also a lack of non-slip materials on the ramps and wharves, signage and shelter for passengers.

The contract between Government and the punt operator provides for an annual fee of $219,000 (2014-2015 Year) indexed to CPI, paid in monthly instalments. This amount was determined by Government in consultation with the punt operator and is based on an hourly fee of approximately $100 per hour to operate the punt. In addition to the subsidy from Government, the operator also retains any fare revenue, which covered approximately 22% of income to the operator in the 2014-15 operating year, implying a total cost to operate of around $255,000 per annum (including operator margin).

3.1.3 Catchment and Punt usage

The Westgate Punt has a wide catchment of origins and destinations which extend beyond the local suburbs of Spotswood and Fishermans Bend via the wider bicycle network. The distribution of punt trips is shown in Figure 3.3.

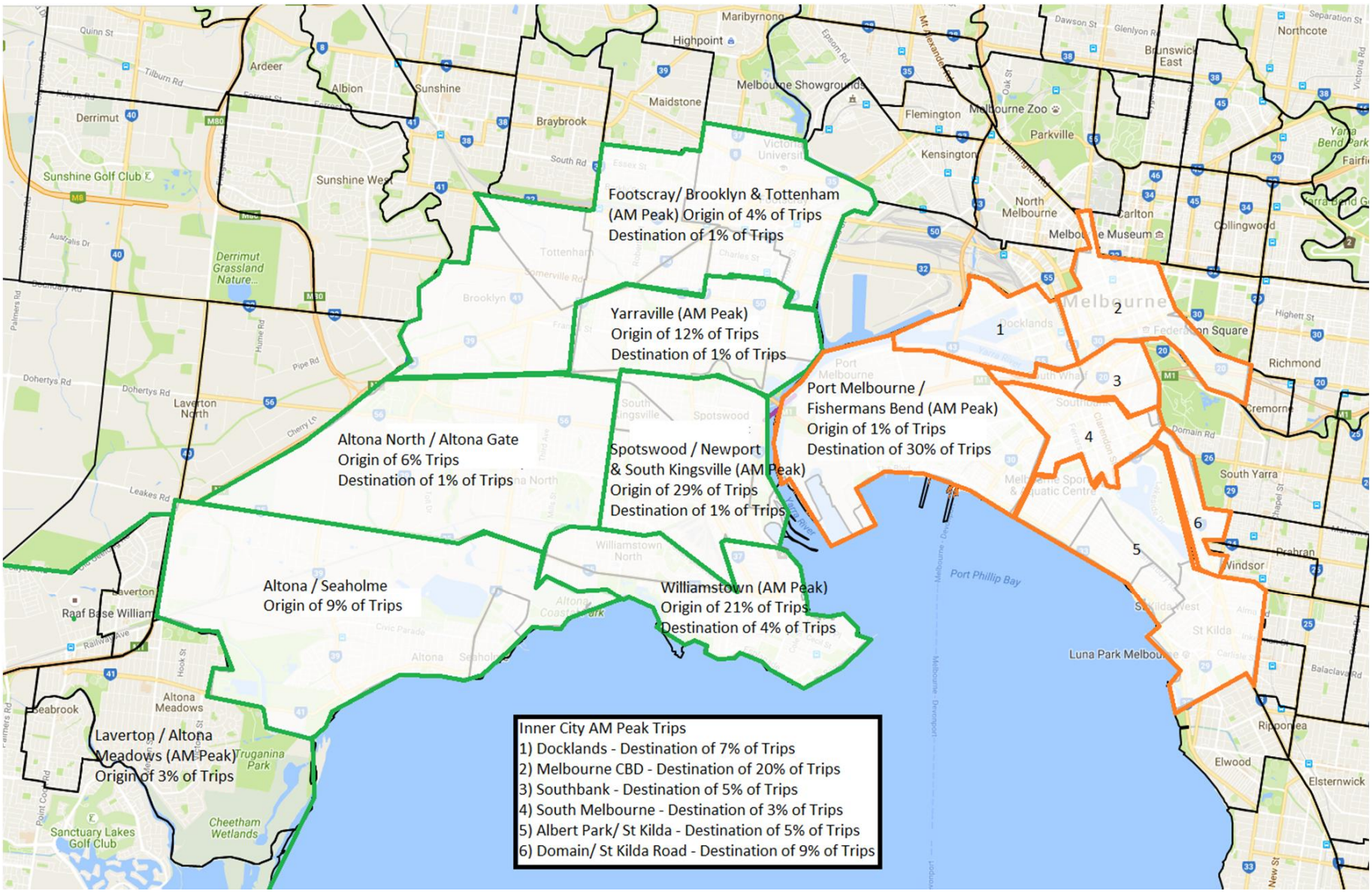

Figure 3.3 Origin and destination of Westgate Punt trips (2014-15)

Whilst the Spotswood, Newport and South Kingsville areas adjacent to the western stop are the greatest generator of punt trips (at 29% of all first trips of the day) the trips from neighbouring suburbs in the inner south west Williamstown (21% of all trip origins), Altona/ Altona North (15%), Yarraville (12%) collectively provide 55% of all trip origins.

Destinations of punt trips are equally dispersed as origins, with Fishermans Bend/ Port Melbourne receiving the largest share of trips (30% of all destinations). However destinations such as the Melbourne CBD (20% of destinations), Docklands/ Southbank (12%) and Domain/ St Kilda Road (9%), rank highly.

The distribution of the origins and end destinations of punt trips away from the terminals suggests that the punt provides a more attractive travel option than closer and more frequent public transport services to the Melbourne CBD and the expanded central city. This most likely indicates a strong personal preference for cycling for these extended trips, in spite of the potentially shorter travel time by other modes of public

transport (i.e. for trips around the Williamstown and Altona rail corridors to the Melbourne CBD). The personal preference for cycling over other modes is also indicated by the high rate of repeat use on weekends, with 38% of weekday punt users also using the ferry on weekends when the fare is higher and road congestion is reduced.

Journey data suggests that not all trips are return trips with about 10% higher morning peak journeys taken compared with the evening service. The peak periods of usage correspond with the general peak of other public transport services, with the busiest hour of use between 7:30 am and 8:30 am in the morning and between 5:30 pm and 6:30 pm in the evenings.

Overall annual patronage on the punt has been steadily increasing since the full time operation of peak services, with total passenger trips per day increasing from 45 trips a day in 2011 to 129 a day in 2014-15. Current usage translates to total patronage of 32,334 trips per annum (peak service). Currently the Westgate Punt has a capacity of 12 passengers (and bicycles) per trip, with a daily capacity of approximately 480 passengers (based on 20 return trips, 240 per direction). The current usage suggests that on a daily level it is only operating at 25% capacity. However is possible that at peak times some services could be full (and require users to wait 20 minutes for the next service), but this cannot be determined as patronage has only been provided at a daily level by the punt operator.

3.2 Future demand for Westgate Punt to Fishermans Bend

The Fishermans Bend and Port Melbourne employment precincts are key destinations for existing Westgate Punt users. With the changes to the employment mix (blue collar to white collar employment) alongside the ongoing development of the Fishermans Bend precinct, it is anticipated that the current patronage growth trend on the Westgate Punt will continue.

In addition, cycling as a mode of transport is increasing in popularity across metropolitan Melbourne, with the rate of journey to work trips bicycle growing by over 7.1% on average in the five years between the 2006 and 2011 census. Cycling trips to work from Hobsons Bay and Maribyrnong LGAs increased annually by 5.8% and 12.9% respectively during that period. This rate of growth compares favourably to the general rate of growth in commuter cycling across Melbourne from 2006 to 2011 (refer to Table 3.1).

Table 3.1 Journeys to work in the Inner West (2011 Census Data)

Area	Mode	2006	2011	5 year change	Average annual change
Melbourne metro - all	Bicycle	18,879	25,600	35.6%	7.1%
Melbourne metro - all	Walking	51,369	56,286	9.6%	1.9%
Melbourne metro - all	All Active	72,254	83,897	16.1%	3.2%
Hobsons Bay LGA Origin	Bicycle	395	510	29.1%	5.8%
Hobsons Bay LGA Origin	Walking	616	665	8.0%	1.6%
Hobsons Bay LGA Origin	All Active	1,011	1,175	16.2%	3.2%
Maribyrnong LGA Origin	Bicycle	586	963	64.3%	12.9%
Maribyrnong LGA Origin	Walking	834	904	8.4%	1.7%
Maribyrnong LGA Origin	All Active	1,420	1,867	31.5%	6.3%

The current punt, whilst well utilised during peak periods, only makes up a small proportion of the total number of trips to Fishermans Bend today (129 per day). As the precinct transitions towards the ultimate build out, this proportion of trips is expected to grow. There are no available forecasts, and the VITM model is unable to predict walking and cycling trips of this nature. Nevertheless, despite the total numbers using the punt, it will more than likely increase into the future. However it is worth noting that the patronage will provide an insignificant contribution to the total transport access task for the Fishermans Bend development.

The recent review of the current Westgate Punt operations suggest that based on the current frequency of service, the financial breakeven point (the point at which the private ferry operator could run the service at a $2 fare without a subsidy, ignoring economic benefits) is at a daily patronage level approximately four times the load carried today at 127,500 trips per year (approximately 500 trips per day). This is likely to challenge the capacity of current punt design, and need for a larger vessel or a second vessel will require a higher fare for breakeven.

Given the lengthy alternative route between the inner west of Melbourne and Fishermans Bend, and the preference of cyclists to choose this mode over alternative public transport, it is likely that the Westgate Punt will fulfil an increasing role.

3.3 Alternatives to the Punt service

The Westgate Punt provides an alternative route to Fishermans Bend for active transport users, travelling from the inner south western suburbs. As discussed in Section 3.1.3, the majority of the catchment for punt trips (starting origins) are located in the suburbs of Spotswood/ Newport, Williamstown, Yarraville and Altona (77% of all origins). Whilst a large share of these trips are heading to Fishermans Bend / Port Melbourne (30%), a relatively large share of punt users are heading to destinations in the Melbourne CBD, Domain, Docklands and Southbank.

For trips originating from and going to these areas of Melbourne, existing public transport services provide more frequent service with a shorter and more reliable travel time than active transport modes. Outside connectivity offered by the rail and tram network to the CBD, the Altona and Spotswood areas are currently serviced by the Route 232 bus service. The Route 232 service operates from the Altona North Park and Ride (on Millers Road Altona) via Altona Gate shopping centre and the Westgate Freeway through the Lorimer Precinct and Docklands to the CBD, operating every 10 minutes during peak.

Whilst enhancements to this existing bus service to better service Fishermans Bend (routing off the Freeway into the employment precinct) or the provision of a new high frequency bus link from Newport station may induce some shift of patronage away from the Westgate Punt, it is unlikely that the provision of these services would be able to replace the punt service. The catchment of the Westgate Punt presently has more frequent and faster travel times to destinations in the Melbourne CBD and Fishermans Bend (both rail and bus, alongside road connectivity) than the Westgate Punt service. The strong personal preference towards active transport that existing users demonstrate indicates that these punt users are unlikely to shift to an altered or new bus service, indicating that the punt service would be patronised by cyclists post bus network changes.

New public transport networks are proposed to support the development of Fishermans Bend including a light rail connection to the CBD and an underground rail route from Newport to CBD via Fishermans Bend. The latter of these proposed projects would make rail journeys to Fishermans Bend more attractive and may provide an alternative to the potential market for punt trips.

3.4 Potential enhancements to the Punt service

As part of the recently released Westgate Park Master Plan, Parks Victoria proposes to shift the eastern wharf of the punt service from the northern to the southern side of the Westgate Bridge. As part of this move Parks Victoria would provide a new wharf to align with views of the park, to aid legibility and way finding, and lighting improvements. The shift to the Westgate Park location will shorten the punt operating length by approximately a third (i.e. 200 metres).

However the relocation of the wharf will increase the distance between the punt service and the proposed Lorimer Employment Precinct. The shift away from Lorimer Street will make the existing punt service less apparent to non-park users and potentially raise passive surveillance/security issues for punt users, especially during the darker periods of operation (winter months).

The reconstruction of the Westgate Park wharf does provide an opportunity to upgrade facilities and address issues raised by the Westgate Punt operator. Parks Victoria should be required to improve signage, shelter and user facilities (such as toilets and waiting areas) at the Westgate Park wharf, to improve the amenity and

attractiveness of the service. At the same time, it may be appropriate to consider safety and shelter enhancements to the existing Spotswood wharf (non-slip surfaces and shelters).

As Fishermans Bend increasingly becomes a diversified destination (e.g. education facilities), this raises the potential for the punt service to operate outside of peak periods during weekdays. Parks Victoria, PTV, DEDJTR and the Westgate Punt operator would need to assess the viability of providing non peak services as the precinct develops.

4 ASSESSING DEMAND

4.1 Introduction

The primary objective of the patronage modelling has been to endeavour to maximise the potential for ridership so that, in the first instance, the concept of ferry operation is provided the best possible chance of a successful outcome. If under the most optimistic scenario the outcome is negative then the study will be able to draw a conclusive view on water transport feasibility, otherwise sensitivity analysis will be applied to test the robustness of the proposition.

4.2 Modelling assumptions

The Victorian Integrated Transport Model (VITM) has been chosen to provide an assessment of the likely demand for water transport services in the context of land use and transport networks. For this purpose, the 2046 Reference Case land use forecast and transport network supplied by DEDJTR has been used. In order to assess demand for services when the Fishermans Bend precinct, the 2051 land use forecasts supplied by DELWP have been applied to forecast demand for water transport when the precinct is fully developed. This approach is consistent with the transport modelling occurring for the whole of Fishermans Bend

As part of the 2046 Reference case transport network, the Fishermans Bend precinct is serviced by numerous on-road public transport routes including bus routes to inner Melbourne and the neighbouring southern suburbs, alongside light rail connections to Docklands and the CBD. A direct underground rail connection between Fishermans Bend, Newport (connecting to Melbourne's south western suburbs), and Southern Cross (connecting to the northern suburbs of Melbourne) has also been included in the network assumptions. This network has been chosen to assess any potential demand for water transport in the context of a fully developed Fishermans Bend precinct (both land use and transport network wise). Public transport vehicles have not been constrained by capacity in the model (unconstrained), with public transport users freely able to board any public transport mode in the model (and not be crowded out).

In order to test the role for water transport it has been necessary to adapt the base model data to incorporate the ferry routes identified in the preceding chapter. The capabilities of the model do not include the ability to specify ferry operations therefore it has been necessary to code the ferry routes as an alternative transport mode. The public transport options for buses and trains were considered, with a decision made to code the ferry routes as 'trains'. The reason for this choice is that coding the routes as buses would only allow for walk-in catchments at the stops whereas the train function allows the selected application of park and ride characteristics which provides a wider catchment potential and therefore a higher patronage outcome. The location of park and ride facilities is provided in Table 2.2, no park and ride was considered for the two Fishermans Bend wharfs.

In order to reflect the speed restrictions on Melbourne's waterways, an average line speed of 10 kilometres per hour has been assumed for each route (approximately 5 knots). The use of this average travel speed is optimistic because it does not make allowance for time spent approaching and departing wharves en-route which will add up to 3 minutes each and further lower the average speed. The fare level for the ferry routes have been assumed to be equal to the network wide fare, with free transfer between public transport services enabled in the model, at the same transfer penalties as other rail based transfers, in order to create the most optimistic modelling outcomes.

4.3 Modelling outcomes

The four ferry routes have been modelled at a fixed headway of 20 minutes (3 services per hour, per direction) throughout the day. The forecast patronage by route can be found in Table 4.1.

Table 4.1 Four route Ferry Network

ROUTE	AM PEAK (7-9 AM) BOARDINGS	TOTAL DAILY BOARDINGS
Maribyrnong Route	**1,173**	**5,245**
Yarra Route	**1,532**	**8,464**
Docklands Route	**400**	**2,536**
Williamstown Route	**198**	**835**
Network Total	**3,303**	**17,080**

Whilst demand is significant on some routes, in particular the Yarra and Maribyrnong Rivers, further analysis of the VITM forecasts shows that there are relatively few trips to Fishermans Bend.

The overall route demand is boosted by a considerable amount of short trips from local wharf to local wharf, particularly on the longer Yarra and Maribyrnong routes. Most of these movements appear to be interchanges with trams or trains along the route and not focused on inner Melbourne. A potential reason for this appears to be the very slow ferry journey times and ‘competition’ from other transport modes. This is especially apparent on the Williamstown Route, which competes with a direct rail link to Fishermans Bend.

In order to better understand the role of water transport in the context of servicing Fishermans Bend, a breakdown of AM Peak trips to Fishermans Bend compared to total boardings by wharf is provided in the Figure 4.1 for each route.

Figure 4.1 Trips to Fishermans Bend (both wharves) by origin wharf – AM Peak

Of the total trips to Fishermans Bend, at the Fishermans Bend end of the journey the majority of passengers use the Bolte Bridge Wharf (FB1) to complete their journey (refer to Figure 4.2). The Bolte Bridge Wharf in the modelled transport network has several linkages to areas of high density development as well as the wider public transport network servicing Fishermans Bend and inner Melbourne (inducing bus and tram links) when compared to the Todd Road Wharf (FB2). It is also noted that most people arriving at Fishermans Bend have travelled from ferry stops on the Yarra River and the Bolte Bridge Wharf is the first stopping point in Fishermans Bend for these routes. The tendency for the model to predict that passengers will alight at the first available stopping point in Fishermans Bend is highlighted in Figure 4.3.

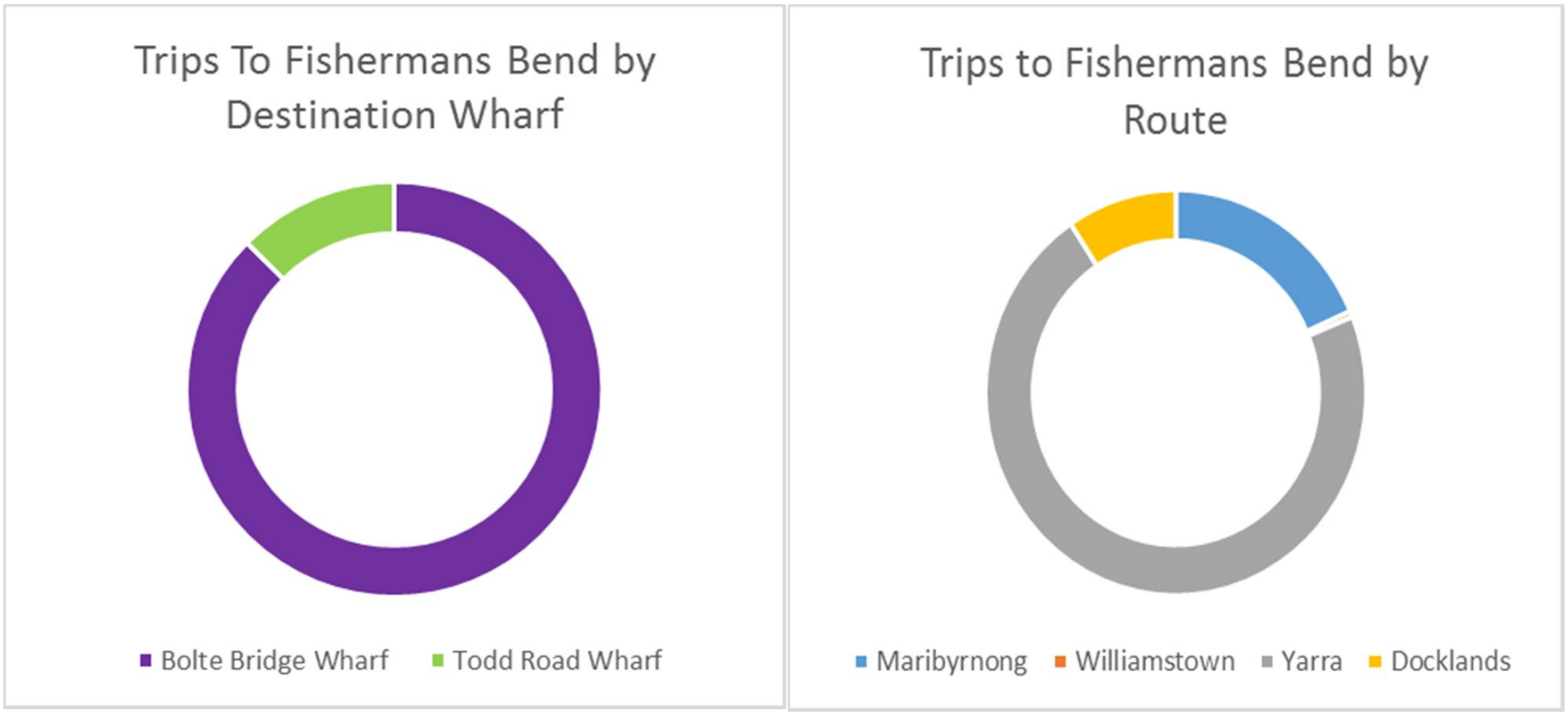

Figure 4.2 Destination and origin of trips to Fishermans Bend – AM Peak

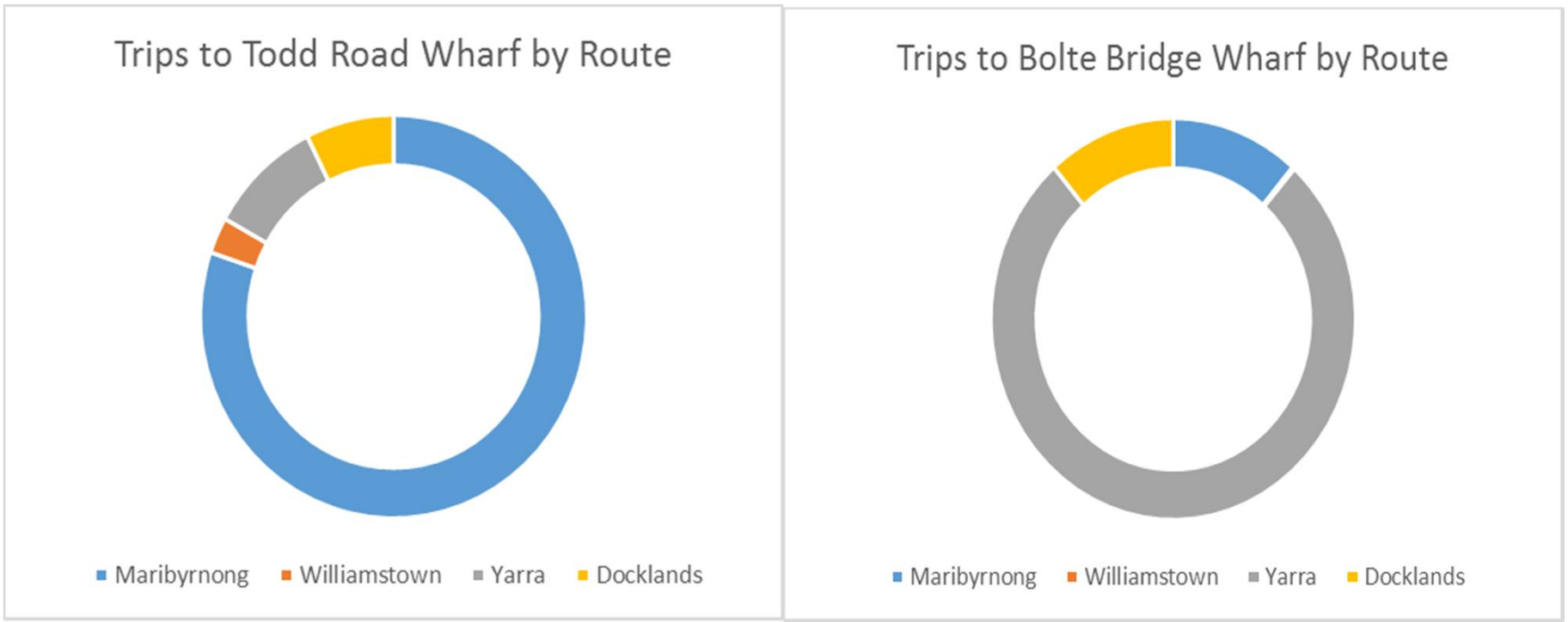

Figure 4.3 Destination of trips Fishermans Bend by Wharf – AM Peak

5 REFINING ROUTE OPTIONS

5.1 Context

From the demand assessment in the previous Chapter it is obvious that the concept of operating ferries the full length of the river cannot be supported given the diminishing patronage as distance from Fishermans Bend increase. This outcome is largely attributable to the low ferry speed and long journey times.

For the purposes of this report, where the primary objective is to consider a ferry network that will support trips to Fishermans Bend and assist with accessibility to that site, there are a range of issues that would suggest a rationalisation of the wider network to something that is more focussed. There are a number of observed travel behaviours that do not materially support this outcome.

- A number of wharves have very low patronage and the action of stopping at them, delaying other passengers by up to three minutes cannot be supported.
- There is a considerable amount of short trips from local wharf to local wharf movement showing from the VTIM model outputs. Most of these movements appear to be interchanges with trams or trains. The assumption of the application of Myki fares to the ferry would mean that these trips earn no additional revenue. They will be discounted on the basis that the option to take these journeys in reality will not be particularly visible and therefore it is doubtful that people would chose to make the interchange, and if a fare were to be applied to the ferry then these trips would be substantially reduced.

5.2 Demand analysis by route

In order to focus on trips to Fishermans Bend, VITM was interrogated to provide the origin of all morning peak period trips and the source of those trips. The outcome is provided in Table 5.1 and shows that demand drops significantly the further the wharf is from Fishermans Bend. The primary reason for this appears to be the very slow ferry journey times and ‘competition’ from other transport modes.

Table 5.1 Trips to Fishermans Bend by route and distance

ROUTE AND WHARF	DISTANCE FROM FISHERMANS BEND (KM)	AM PEAK (2HR) BOARDINGS
Maribyrnong Route		
M1 - Shepherd Bridge	4.0	109
M2 - Newmarket	5.8	14
M3 - Flemington Racecourse	7.0	16
M4 - Edgewater	7.2	16
M5 - Ascot Vale	7.9	23
M6 - Maribyrnong Park	9.1	31
M7 - Maribyrnong Road	9.8	0.
M8 - Aberfeldie	11.8	2
M9 - Maribyrnong Defence Site	13.8	1

ROUTE AND WHARF	DISTANCE FROM FISHERMANS BEND (KM)	AM PEAK (2HR) BOARDINGS
Yarra Route		
Y1 - Collins Landing	3.2	6
Y2 - South Wharf	3.8	0
Y3 - Southbank / Casino	5.4	32
Y5 - Flinders Street Station	6.4	16
Y6 - Melbourne Park	7.4	0
Y7 - Punt Road	8.8	4
Y8 - Prahran (Herring Island)	10.0	8
Y9 - North Toorak	10.6	5
Y10 - Hawthorn	13.0	1
Y11 - Bridge Road	15.2	0
Y12 - Victoria Street (CUB Site)	17.8	0
Y13 - Johnston Street	19.6	0
Docklands Route		
D1 - Waterfront City	2.8	35
D2 - Harbour Esplanade	3.4	7
Williamstown Route		
W1 - Spotswood	3.5	1
W3 - Gem Pier	7.8	12

Another way of looking at this is to examine the rule of diminishing returns. An indices has been developed that compares the number of boardings at a particular wharf to the distance of travel to Fishermans Bend. Distance of travel is related to the cost of providing the service so the graphs shown in Figure 5.1 indicate the relative feasibility of providing service between wharfs on a route, and compared to the other routes.

A review of the data suggests:

- The Williamstown ferry is a poor performer – this is most likely because there are good road and rail connections via the Westgate Bridge and the future Metro 2 rail alignment from Newport to Fishermans Bend. The Westgate Punt also draws upon a similar market.
- The performance of the Yarra route is poor and drops off rapidly after the Flinders Street Station wharf.
- The Maribyrnong River route has the strongest performance, with the most significant outcome being over a short distance from Shepherd Bridge.

→ The Docklands route is relatively short and as a result returns good results – although demand is low and travellers could catered for on other transport options

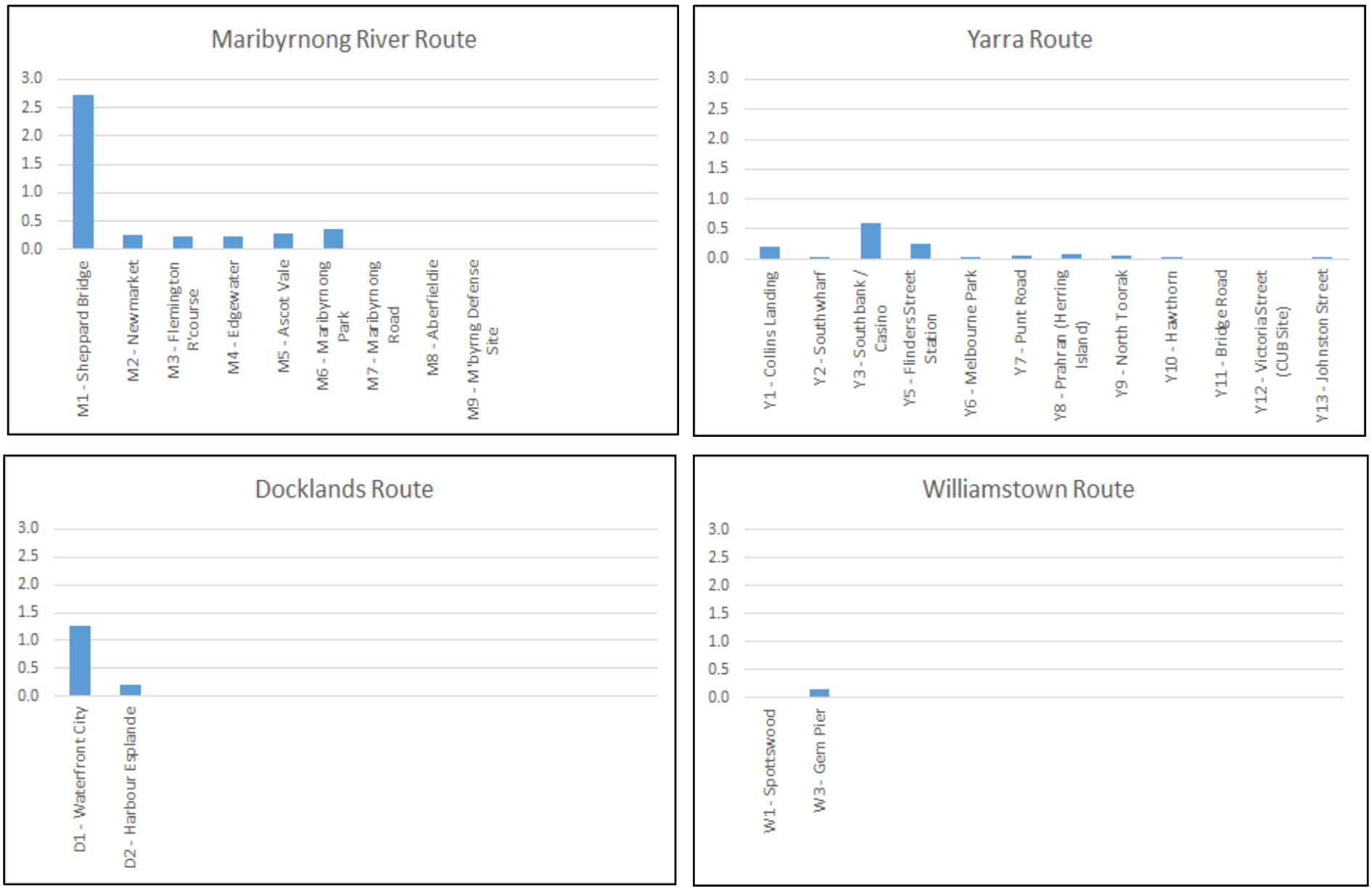

Figure 5.1 Indices of wharf efficiency (patronage\distance) – AM Peak

Figure 5.2 examines the number of boardings by the distance from Fishermans Bend (note distance is shown to the furthest wharf at Fishermans Bend). The data shows that:

→ The Maribyrnong route has the strongest demand reflecting the fact that the river provides the most direct route to Fishermans Bend, and although travel speeds are low, they are still better than the average travel speed achievable by the indirect road routes.

→ Demand for Maribyrnong route services drops off proportionally to distance as a result of the unattractiveness of the ferries due to their slow speed.

→ The Yarra route displays similar characteristics to the Maribyrnong route however the magnitude of demand is significantly lower. This is mainly due to the lower density of development along this route and the proliferation of park lands and sports grounds along the route. Also, the eastern suburbs have a much better accessibility to, and range of choices for, transport options.

→ Docklands demand is relatively strong due to the short trip distance across the river compared to the longer road distance required to access Fishermans Bend.

→ The Williamstown route struggles to generate demand due to its small catchment area and excellent alternative transport options.

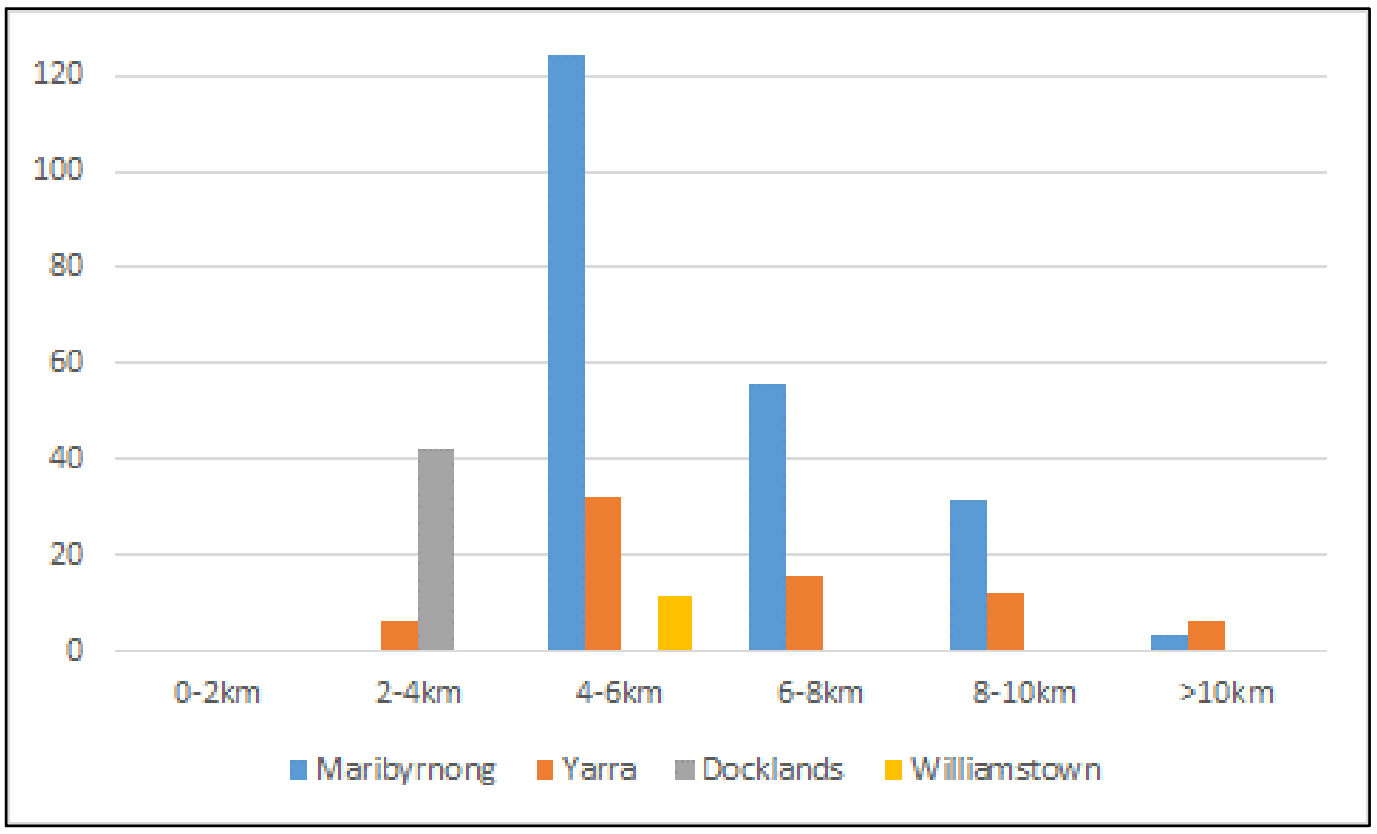

Figure 5.2 Boardings by distance – AM Peak (distance from furthest Fishermans Bend wharf)

5.3 Identifying a preferred route

Based on the preceding analysis, the following outcomes are suggested for each route:

- ***Maribyrnong route*** – Whilst the demand on this route is generally stronger than the other routes, there is a rapid drop in the benefit for operations beyond Shepherd Bridge (Footscray Road). It is therefore recommended that the focus be on identifying a suitable site for a park and ride facility in this vicinity and truncate this route at that point.
- ***Yarra route*** – The most significant demand points on this route are Southbank and Flinders Street Station wharf. Beyond these locations there is a significant distance past the sports and entertainment precinct before there is further commuter demand. Therefore, it is recommended that this route not operate beyond Flinders Street Station wharf.
- ***Docklands*** – There is sufficient demand for trips out of Victoria Harbour to make this a location of interest, and the relatively short route distance suggests that this route should be included in the further assessment.
- ***Williamstown route*** – There is very low demand on this route and the distance of travel is relatively long. The recommendation is to not include this route, but to support the continued operation of the Westgate Punt as a standalone operation.

Figure 5.3 shows the recommended route structure that has been identified as the basis for the feasibility assessment.

The benefits of this shorter route will not only reflect in an improved operating cost to revenue ratio, but will also significantly reduce the number of ferries required and hence the initial capital outlay.

It is proposed that the route would be operated at 10 minute intervals during peak periods and 20 minutes during off peak periods. Apart from matching the stronger demand levels during peak periods, this scheduling means that vessels will be available for maintenance, special events traffic or potential tourism activities during the off peak periods.

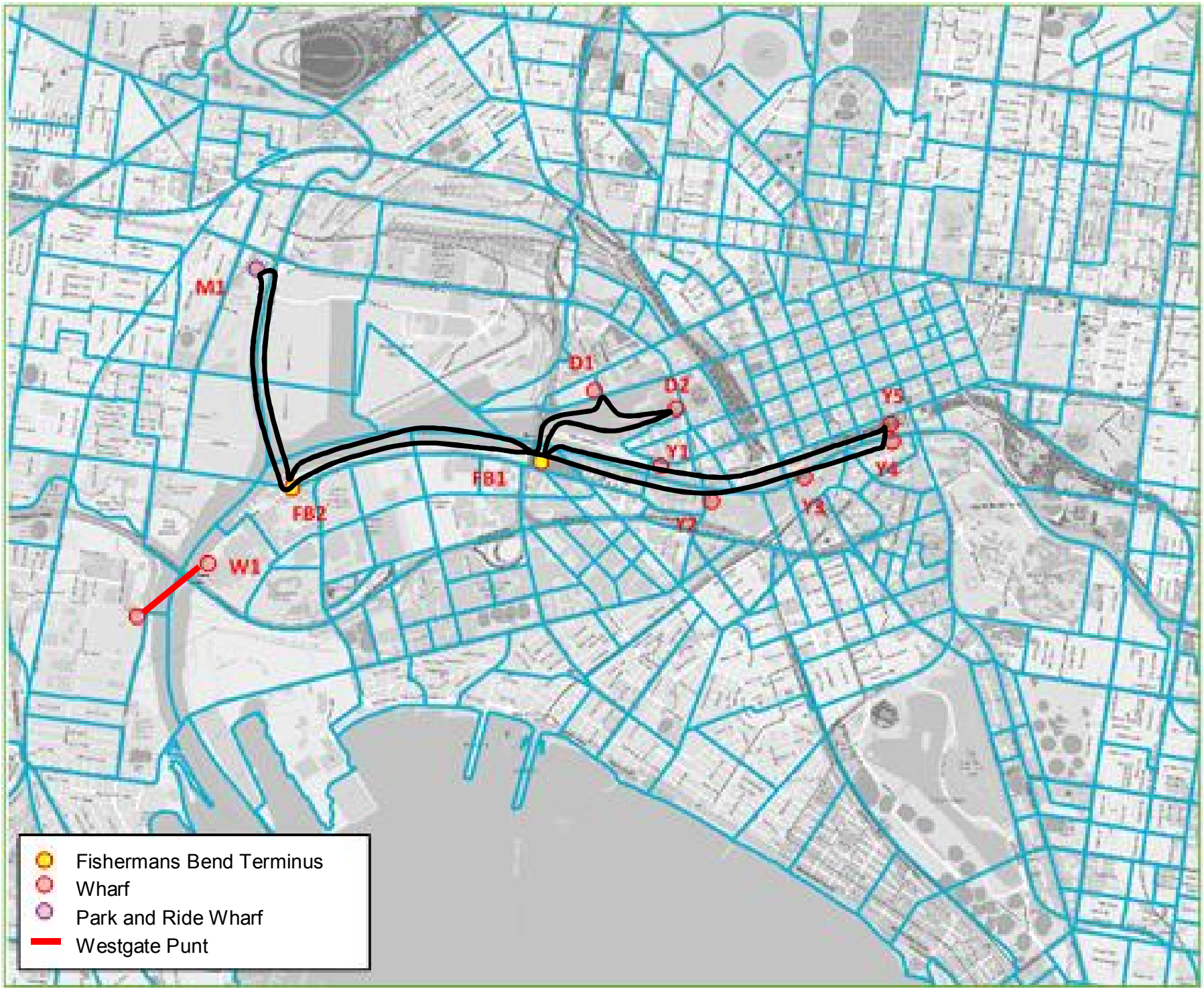

Figure 5.3 Proposed water transport route structure

This network scenario has been modelled in VITM to determine the demand for the revised shorter route focused on Fishermans Bend. Overall ferry network demand has declined from approximately 17,000 to around 10,000 per day, with boardings during the AM Peak period declining from 3,300 to 2,250 boardings per peak, reflecting the reduced number of destinations serviced.

Total demand for the revised route, by stop, can be found in Table 5.2.

Table 5.2 Revised Fishermans Bend focused route

ROUTE AND WHARF	AM PEAK (2HR) BOARDINGS	TOTAL DAILY BOARDINGS
Fishermans Bend Focused Route		
M1 – Shepherd Bridge	300	1,007
FB2 – Todd Road Wharf	117	747
D1 – Waterfront City	66	390
D2 – Harbour Esplanade	464	1,322
FB2 – Bolte Bridge Wharf	170	2,504
Y1 – Collins Landing	353	1,166
Y2 – South Wharf	95	561
Y3 – Southbank / Casino	188	853
Y5 – Flinders Street Station	498	1,544
Total	**2,250**	**10,094**

The financial and economic viability of both (refined and original) ferry network options has been assessed in the next chapter.

6 DETERMINING THE VIABILITY

6.1 Introduction

In order to determine the viability of any water transport network servicing Fishermans Bend, an economic and financial analysis of three network scenarios servicing Fishermans Bend has been undertaken. Capital and operating costs have been estimated and compared against the estimated patronage (refer to Section 4) and any benefits that may accrue to the transport network.

The analysis appraises the following network scenarios:

Scenario 1: The 'Base Case' Fishermans Bend ferry network option (refer to Figure 2.3) assessed at the Myki Fare level.

Scenario 2: The Fishermans Bend focused ferry network option (refer to Figure 5.3) assessed at the Myki Fare level.

Scenario 3: The Fishermans Bend focused ferry network option assessed at a total fare of $5 per trip.

As a sensitivity test for costs (capex and opex), each network scenario will be appraised with a vessel capacity of 50 and 100 per ferry.

6.2 Estimating the costs of the Ferry network

In order to estimate the likely costs of setting up and operating a water transport network servicing Fishermans Bend, a review of current passenger ferry operations elsewhere in Australia was undertaken. New South Wales, Queensland and Western Australia currently operate passenger ferries as part of their respective public transport networks.

New South Wales, with the largest and most complex ferry network in Australia, operates ferries under a private franchise model, with periodic reviews of costs and scale of operations undertaken by IPART Independent Pricing and Regulatory Tribunal of New South Wales (IPART). In 2015, IPART reviewed the maximum fares for seven private ferry operators that provide regular passenger ferry services under contract to Transport for NSW (TfNSW) in the Sydney, Central Coast and North Coast areas of NSW. As part of this review, IPART identified the 'reasonably efficient' operating and capital costs associated with providing ferry services for the purposes of setting customer fares and subsidies to operators.

For the purposes of this study, the capital and operational costs determined reasonably efficient by IPART have been applied to the Fishermans Bend water transport options, except where local information suggests the use of an alternative approach.

6.2.1 Operating costs

Using the reasonably efficient costs determined by IPART, the indicative operating costs for each water transport option have been estimated. The operational costs associated with running a ferry service can be broadly broken down into three components, on-boat costs, boat overheads and onshore overhead costs.

On-boat operational costs

These costs relate to the costs per boat of operating a ferry service, with the overall rate dependant on the hours of operation and the total number of boats operating the network. The categories estimated include:

- *Berthing fees* – relates to the maintenance costs paid for wharves which are used by the ferry services. This could be under an ownership model, where the cost represents maintenance and renewal, or as a fee for use from a third party. A rate of $1.60 per service hour has been assumed for wharf maintenance (IPART) assuming high frequency services, but noting that Parks Victoria reportedly currently collects

$2.60 per passenger from tourism operators. It is assumed that the higher use of the wharfs will lead to a review of the Parks Victoria charges.

- *Repairs and Maintenance* – this includes parts and consumable costs relating to the repair and maintenance of ferries. This includes; ferry maintenance, administration buildings, ticket booths, plumbing, electrical etc. A rate of $9.32 per service hour has been assumed for this study (IPART).
- *Crew / Labour* – this is dependent on the size of the vessel, for the purposes of this study vessels have been assumed to have two operators (captain and deck hand) at a rate of $70 per service hour (IPART).
- *Fuel* - The cost of fuel in relation to the provision of regulated ferry passenger services, net of any fuel tax credits (excise rebates). The rate per service hour for fuel is directly dependant on the size of the vessel, with a rate of $16 per service hour assumed for a vessel with a capacity of 50 passengers, with a rate of $32 per service hour assumed for a 100 passenger vessel (IPART).
- *Operating Insurance* – including all insurance premium expenses other than ferry insurance. This includes public liability, terminal and equipment, and director's and officer's liability insurance. A typical rate based on wide Australian experience suggests a number of $6.79 per service hour has been assumed in the analysis (IPART).
- *Operator Margin* – this includes the reasonable return on investment to any operator, to allow for the cost of capital and operator drawings throughout the year of operation. This has been assumed to be a margin of 5.8% on top of all costs (IPART Weighted Average Cost of Capital Report 2015).
- *All other costs* – includes all other operational costs that aren't accounted for in the above categories. For example; cash collections costs, office rent, communication costs, and advertising. A rate of $11.80 per service hour has been assumed in the analysis (IPART).

Overheads

Boat overhead costs relate to the costs per boat of operating a ferry service, regardless of the number of hours operated, with the overall rate dependant on the total number of boats operating the network. The categories estimated include:

- *Moring/storage fees* – relates to the annual rent and maintenance costs paid for moorings/berths for vessels. A rate of $6,000 per annum per boat assumed for berthing fees (IPART & Westgate Punt).
- *Boat Insurance* – including all insurance premium expenses relating to the vessel. A typical rate based on wider Australian experience suggests a rate of $14,100 per annum for a small ferry has been adopted for vessel insurance (IPART).

Onshore staff overheads

This relates to the staff costs for the major ferry terminals on the network. For this study, five staff per route have been assumed, with two staff each allowed for the Fishermans Bend terminals (one for customer service and one to assist with vessel berthing) with one additional staff member allowed for the next busiest stop on route. A rate of $26.50 per service hour has been assumed for each staff member (50% of IPART on board crew cost).

The makeup of the operating costs for the Fishermans Bend focused network (Scenarios 2 & 3) is provided for different sized vessels in Table 6.1. The main difference is that the larger vessel has a higher rate for fuel and insurances, which then flows from operator margin.

Table 6.1 Indicative operating costs for Fishermans Bend focused network (per service hour)

OPERATIONAL COSTS	50 PASSENGER VESSEL		100 PASSENGER VESSEL	
On Boat operational costs	***$122.22***	***90.7%***	***$139.17***	***91.8%***
Berth Fees	$1.60	1%	$1.60	1%
All other costs	$11.80	10%	$11.80	8%
Repair and Maintenance Costs	$9.32	8%	$9.32	7%
Crew	$70.00	57%	$70.00	50%
Fuel	$16.01	13%	$32.03	23%
Operating Insurance	$6.79	6%	$6.79	5%
Operator Margin	$6.70	5%	$7.63	5%
Overheads	***$6.35***	***4.7%***	***$6.35***	***4.2%***
Boat Mooring/storage	$1.90	29.9%	$1.90	29.9%
Boat Insurance	$4.46	70.1%	$4.46	70.1%
Onshore Staff Overhead	***$6.13***	***4.6%***	***$6.13***	***4.0%***
TOTAL per service hour	$134.71	100%	$151.65	100%

6.2.2 Capital costs

For the operation of ferry services, the capital costs associated with running a ferry service can be broadly broken down into two components, vessel (ferries), and the cost of landside infrastructure.

Capital expenditure that can be incurred by ferry operators relating to vessels tend to include:

- Ferry acquisition costs and related depreciation
- Spare parts (ferries)
- Engine rebuilds and mid-life overhaul expense
- Safety equipment and structural repairs and refurbishment of the vessels hull and coach house, and on-board services (electrical systems, etc.).

For the purposes of the evaluation, all of the above elements have been estimated and included in the appraisal, details of which can be found under Section 6.2.1.

Other capital expenditure incurred by ferry operations on the landside of the operation (that that does not relate to vessels) tend to include:

- Wharf infrastructure (including car parking, typically owned and maintained by Parks Victoria)
- Onshore Depot Facilities (Dry-docking and maintenance)
- Office accommodation (building, equipment and furniture)
- Vehicles (such as fuel tankers, mobile repair and service vehicles)
- Park and ride facilities.

For the purposes of the evaluation, the costs of wharf infrastructure (excluding land acquisition costs) have been estimated, due to a lack of specific information being available. For onshore depot facilities, including berthing of vessels, it has been assumed that existing Duke and Orr Slipway (at Appleton Dock) will be made

available for the use of any ferry operator at no upfront capital cost. For the purposes of the appraisal, office accommodation and vehicle costs have been operationalised and included in the operating costs.

The assumed useful economic life is 25 years for slow ferries (those travelling at or below 15 knots or below 30 km/h) and 15 years fast ferries (IPART). In practice, vessels are subject to periodic surveys by Maritime Safety Victoria to ensure that they are safe to continue operating. For the purposes of this study, slow ferries with an economic life of 25 years have been assumed, with a half-life overhaul being required at 12-13 year point of operation (based on the IPART defined expected engine life of 12.5 years) to determine a whole of life cost. As a result the project life or evaluation period has been assumed to be 25 years from the first day of operation (opening year).

Ferries

Capital costs for ferries are typically directly related to the size of the vessel and the conditions which the vessel needs to operate in. One key consideration which was brought out in consultation with existing Yarra River ferry operators and the City of Melbourne Water Unit is the impact of the Yarra River's low bridge clearances on the design and cost of vessels. Typically ferry public transport elsewhere in Australia and New Zealand operates in waterways where bridge clearances are not as constrained as the Yarra River, where bridges can be as low as two metres and at times impassable due to tides/ rainfall.

As part of determining the reasonable cost of a vessel in Victoria would be, consultation with the largest Yarra River private ferry operator (Melbourne River Cruises P/L) and the City of Melbourne Waterways Unit, which examined in 2014 the acquisition of ferries for operation on the Yarra River was undertaken. Based on the river conditions, both the stakeholders indicated that bespoke vessels would be required to operate any services on the Yarra River. Based on a bespoke design, it would be reasonable to assume that any vessel operating in the Yarra River would be at least 50% more costly than a comparable vessel in New South Wales.

As such, the analysis has assumed that any new vessels required to operate a ferry service on the Yarra River would have a capital cost 50% higher than the amount deemed reasonable by IPART in New South Wales. The engine replacement costs were taken as equivalent to IPART costs, with this cost combined with the expected overhaul expenses (8.5% of total cost of the vessel) to determine the half-life refurbishment cost. Each network scenario has been be appraised with a vessel capacity of 50 and 100 per boat as a sensitivity test, using the costs highlighted in the table below of vessel capital costs (based on size of vessels).

Table 6.2 Indicative capital costs by vessel size

PASSENGER CARRYING CAPACITY	VESSEL COST (NSW IPART)	EXPECTED VESSEL COST (VICTORIA)	EXPECTED ENGINE REPLACEMENT COST (A)	SPARES AND OVERHAUL EXPENSE (8.5% OF ENGINE COST) (B)	TOTAL HALF-LIFE REFIT COST (A+B)	WHOLE OF LIFE COST PER VESSEL
40	$830,000	$1,245,000	$235,000	$20,000	$255,000	$1,500,000
50	$875,000	$1,312,500	$248,000	$21,000	$269,000	**$1,581,500**
60	$920,000	$1,380,000	$260,482	$22,000	$283,000	$1,663,000
70	$960,000	$1,440,000	$271,807	$23,000	$295,000	$1,735,000
80	$1,000,000	$1,500,000	$283,000	$24,000	$307,000	$1,807,000
90	$1,040,000	$1,560,000	$295,000	$25,000	$319,487	$1,879,487
100	$1,080,000	$1,620,000	$306,000	$26,000	$332,000	**$1,952,000**
110	$1,125,000	$1,687,500	$319,000	$27,000	$346,000	$2,033,500
120	$1,170,000	$1,755,000	$331,000	$28,000	$359,000	$2,114,000
130	$1,210,000	$1,815,000	$343,000	$29,000	$372,000	$2,187,000
140	$1,250,000	$1,875,000	$354,000	$30,000	$384,000	$2,259,000
150	$1,290,000	$1,935,000	$365,000	$31,000	$396,000	$2,331,000
160	$1,330,000	$1,995,000	$377,000	$32,000	$409,000	$2,404,000
170	$1,375,000	$2,062,500	$389,000	$33,000	$422,000	$2,484,500
180	$1,410,000	$2,115,000	$399,000	$34,000	$433,000	$2,548,000

Based on IPART INDEC REPORT - Modern Equivalent Asset (MEA) Replacement Costs for Ferries (2015)

Wharves and landside infrastructure

Presently Parks Victoria owns and maintains numerous commercial grade wharves on the Yarra and Maribyrnong Rivers for the use of existing private ferry and charter operators in the waterways. In order to reduce the upfront costs, the potential ferry routes utilise these existing facilities where possible. Whilst the existing wharves may be suitable for ad-hoc use, the appraisal has included costs for bringing these wharves up to a similar standard to other local wharves in Sydney and Brisbane (similar facilities to some bus stops). For this purpose where there is an existing wharf, the cost of providing Adshel style bus shelters, signage and DDA tactile has been assumed, with an allowance of $15,000 per wharve.

Where an existing wharve has not already been provided by Parks Victoria, a cost of $25,000 per wharf has been allowed for, in addition to the $15,000 per wharf amenity costs above to provide for a full cost per new wharf of $40,000. This $25,000 per wharf cost has assumed a wharf of 10 square metre in size at a rate of $2,500 per square metre and is based on guidance provided by the City of Melbourne Waterways Unit.

Where park and ride facilities have been provided, a cost of $500,000 has been included in the cost of the stop, to allow for a 50 space car park (at a rate of $10,000 per space). Other landside costs such as berthing overheads, the overhead required to maintain all of the ferry wharves has been included in the operating costs, based on fees charged for the Westgate Punt and IPART estimates.

At the two main wharves servicing Fishermans Bend, it has been assumed that a larger than standard wharf would be required to manage higher patronage throughput and service multiple routes. As such a ferry terminal similar in size and layout to the Bulimba Ferry Terminal on the Brisbane River, was used as a guide.

The Bulimba Ferry Terminal is presently the busiest suburban ferry terminal in Brisbane, and was reconstructed at a cost of $800,000 after the 2010-11 Queensland Floods.

In the context of Fishermans Bend, the two terminals (FB1 and FB2) are assumed to have a higher level of facilities than other wharves on the network, featuring covered waiting areas, staffed pavilion and dual-berths to enable multiple vessels to berth at the same time at either wharf. For this purpose, a combined cost of $1,600,000 has been assumed for the cost of the Fishermans Bend ferry terminals, with the capital and operating costs (staffing and maintenance costs) included in all ferry routes appraised. A concept layout of the terminal can be found below in Figure 6.1.

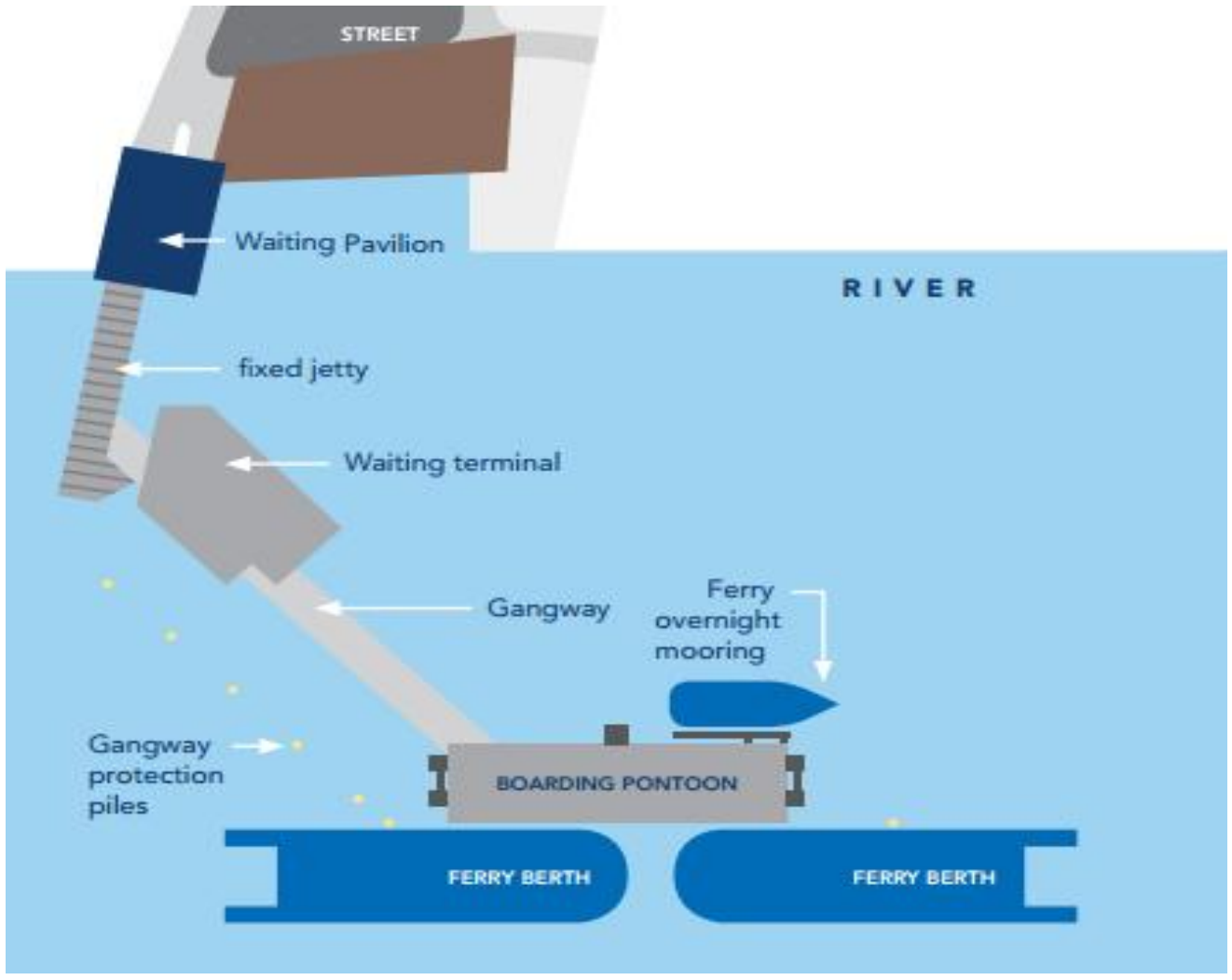

Figure 6.1 Potential concept layout for FB1 and FB2 wharves (based on Bulimba Wharf QLD)

6.2.3 Summary of costs used in the assessment

Using the modelled run times, an expected service coverage of 14 hours (7 am to 9 pm on weekdays) and the nominated service frequency of each route, the total vessel requirement, capital costs, estimated service hours and operating costs have been estimated for each scenario:

- *Scenario 1* (four routes in operation, with a flat 20 minute headway) a total of 52 vessels across the four routes would be required at an upfront cost of **$97.5 m**. This cost includes the upfront capital cost of **$94.0 m** for boats (100 person capacity, at assuming each route is run independently of each other) and **$3.5 m** for wharves and supporting infrastructure. A total of 632 service hours would be operated per day, leading to an annual operating cost of **$25.2 m** for the network.
- *Scenarios 2 and 3* (one route in operation, with a 10 minute peak and 20 minute off peak headway) a total of 24 vessels would be required at an upfront cost of **$43.2 m**. This cost includes the upfront capital cost of **$41.1 m** for boats (100 person capacity) and **$2.1 m** for wharves and supporting infrastructure. A total of 320 service hours would be operated per day, leading to an annual operating cost of **$12.2 m** for the route.

A breakdown of capital costs by element per scenario can be found below in Table 6.4.

Table 6.3 Estimated capital costs per network scenario

TOTAL CAPITAL COSTS	SCENARIO ONE (WHOLE NETWORK)	SCENARIO 2 & 3 (REFINED NETWORK)
Vessels	52 at $94.0m (100pax) or $76.2m (50pax)	24 at $41.1m (100pax) or $33.3m (50pax)
New Wharves	14 at $0.6m	1 at $0.1m
New Park and Ride Facilities	11 at $5.8m	1 at $0.5m
Upgrades to Existing Wharves	15 at $0.4m	6 at $0.1m
Fishermans Bend Terminals	$1.9m	$1.9m
TOTAL UP FRONT COST	**$102.7m (100pax) or $84.9m (50pax)**	**$43.6m (100pax) or $35.8m (50pax)**
Half Life Vessel Refit Costs	$18.3m (100pax) or $14.8m (50pax)	$8.4m (100pax) or $6.8m (50pax)
TOTAL COST (REAL)	**$121.0 (100pax) or $84.2m (50pax)**	**$52.0m (100pax) or $42.6m (50pax)**

6.3 Revenue

For each of the three water transport scenarios, the expected fare box revenue has been estimated based on the modelled patronage for the network.

For the Myki fare scenarios (Scenarios 1 and 2) it has been assumed that the ferry operator would collect no new/ additional fare from users who transfer from another mode of public transport due to the free transfer aspect of Myki (as these customers have already paid a fare to the State for their initial trip). As such, in these two scenarios, it has been assumed that the only revenue which is payable to the operator would come from customers making their first public transport trip on the ferry network.

For the $5 per trip fare (Scenario 3), all customers would pay a flat fare to the ferry operator, irrespective if they have previously purchased a Myki or not. This fare has been applied to the demand calculated in VITM, for the Fishermans Bend focused ferry network, with the demand forecast being annualised (using an expansion factor of 251 to convert daily to annual patronage). In order to estimate the likely fare revenue payable to the ferry operator over the project life (25 years) demand inputs from VITM have been kept constant, reflecting the 2046 VITM forecast (total buildout).

The estimated revenue for each scenario can be found in Table 6.5.

Table 6.4 Estimated revenue per network scenario

OPTION	PV OF REVENUE OVER 25 YEARS ($M)	REVENUE ($M PA)	TOTAL TRIPS (PA)
Scenario 1	$82	$7.3	4.47m
Scenario 2	$54	$4.6	2.53m
Scenario 3	$85	$7.3	1.46m

As the water transport network has been modelled in VITM using a Myki fare rate, a fare elasticity has been applied to patronage in Scenario 3 to reflect the increase in fares payable by customers. Using guidance from IPART in their review of efficient fares, the recommended fare elasticity for ferries has been used to reshape the likely demand for the ferry service when a fare of $5 per trip is applied (-0.38 during peak times, -0.48 per off peak periods).

As shown in the table above, the application of a $5 fare has a significant impact on the total number of trips on the ferry network, reducing the trips per annum from 2.53 m to 1.46 m. However as expected, the charging of $5 fare to all customers, not just those accessing the ferry as their first trip does significantly increase the amount of revenue collected by the service operator (59% increase in annual revenue). The

charging of this fare lifts the total fare revenue of the service to a similar level to the Scenario 1 network, which has three times the patronage of Scenario 3.

6.4 Financial assessment

Using the revenue calculated above, a financial appraisal of each of the three scenarios has been undertaken, to assess the cost recovery and financial viability of the network for an operator to operate without subsidy. Using the costs determined in Section 6.2, the total capital and operating costs for each scenario and vessel size option has been estimated (in present value terms) and set out in Table 6.5.

For this assessment, the Internal Rate of Return (IRR) of the costs have been compared against the NPV of the fare revenue per scenario, using a 7% discount rate over the 25 year life of the network. Capital costs have been spread over a two year initial start-up period and discounted at 7 per cent (real).

- The Financial BCR is a measure of value for money for expenditure. BCRs of 1.0 or greater indicate that the project is financially viable over the 25 year investment period.
- The NPV gives an indication of the magnitude of the net benefits to the operator. Positive NPVs indicate that the investment is desirable.
- A cost recovery below 100% indicates that the network would not be financially sustainable for an operator to operate on a commercial basis, as the revenue collected does not cover capital or operating costs of doing business.

Estimates of the likely cost recovery for each network scenario are provided in Table 6.5.

Table 6.5 Financial viability of each network scenario

OPTION	FINANCIAL BCR	NPV (PV $M)	COST RECOVERY (%)	TOTAL CAPEX (PV $M)	TOTAL OPEX (PV $M)	TOTAL TRIPS (PA)
Scenario 1						
100 Person Vessel	0.2	-$295	22%	$102	$287	4.47m
50 Person Vessel	0.2	-$248	25%	$87	$256	
Scenario 2						
100 Person Vessel	0.3	-$133	29%	$46	$142	2.53m
50 Person Vessel	0.3	-$109	33%	$37	$126	
Scenario 3						
100 Person Vessel	0.5	-$43	45%	$46	$142	1.46m
50 Person Vessel	0.5	-$35	52%	$37	$126	

In order improve viability of the service, a sensitivity test was undertaken on each option where the vessel capacity was reduced from 100 to 50 passengers (which have the impact of lowering the annual operating costs and the overall capital outlay). This option was chosen over lowering the frequency of service (which would also lower capital and operating costs of the networks) due to the impact on customer demand.

Demand for public transport services are highly elastic to changes in frequency, with the impact of reducing frequency by half having an impact greater than half on customer demand, especially when services are less frequent than turn up and go (10 minute or better frequency). As such customers which are prepared to use a 20 minute service will not be prepared to use a 40 minute service lowering the overall viability of the service, even when the lower capital and operating costs are considered.

Due to the high capital and operating costs of operating the evaluated ferry networks, it is unlikely that any of the proposed scenarios would be financially viable to operate without any form of subsidy, even with a reduced vessel capacity. It is therefore unlikely that a private operator would find the provision of a regular

commuter style service an attractive proposition. This is not an uncommon outcome when the provision of other modes of public transport is concerned.

Therefore, if government is to become involved in subsidising the service then an economic assessment will help identify benefits to the State from the introduction of a water transport network. Based on those benefits a decision can be made on whether the provision of that subsidy is in the interest of the people of Melbourne.

6.5 Economic assessment

In order to determine whether the water transport scenarios for Fishermans Bend have significant economic benefits to the State, an economic appraisal assessing the incremental economic costs and benefits of each scenario compared to a do nothing situation has been undertaken.

- Economic costs include incremental changes relative to the no network case required to deliver the benefits and includes both the whole of life capital expenditure and operating expenditure but excludes price escalation and levies.
- Conventional economic benefits include primarily transport-related benefits quantified in accordance with the National Guidelines for Transport System Management (NGTSM) and the Department of Treasury and Finance (DTF) guidelines where appropriate.

The conventional economic benefits that were quantified are:

- *Public transport user benefits* – benefits include vehicle operating cost savings from people switching from car to public transport. Certain benefits are unperceived/misperceived by users but result in a change in consumption of resources, so resource cost correction were applied, this includes fare revenue and parking resource cost corrections.
- *Road user benefits (decongestion)* – benefits related to reduction of road congestion as a result of people switching from cars to public transport.
- *Non-user benefits (externality impacts)* - benefits accruing to Victorians as a result of reduction in car kilometres on the road, such as reduction in crashes and greenhouse gas emissions resulting from people switching from cars to public transport.

Benefits and operating costs are calculated over a 25 year evaluation period from network opening and discounted at a rate of 7 per cent (real). Capital costs have been spread over a two year initial start-up period and discounted at 7 per cent (real).

- The NPV gives an indication of the magnitude of the net benefits to society. Positive NPVs indicate that the investment is desirable to society as a whole.
- The BCR is a measure of value for money for public expenditure. BCRs of 1.0 or greater indicate that the project is economically viable.

Table 6.7 summarises the economic assessment results for each network scenario.

Table 6.6 Economic benefit of each network scenario

OPTION	BCR	NPV ($M)	TOTAL TRIPS (PA)	PV OF REVENUE OVER 25 YEARS ($M)
Scenario 1				
100 Person Vessel	0.4	-$201	4.47m	$82
50 Person Vessel	0.6	-$153		
Scenario 2				
100 Person Vessel	0.7	-$63	2.53m	$54
50 Person Vessel	0.8	-$26		
Scenario 3				
100 Person Vessel	0.7	-$52	1.46m	$85
50 Person Vessel	0.8	-$28		

The economic assessment indicates that none of the water transport scenarios for Fishermans Bend are economically viable. Whilst a Fishermans Bend focused network (Scenarios 2 and 3) has a higher economic return to the State than a general river service as per Scenario 1, there are still insufficient societal benefits to the State to justify investment.

6.6 Findings

Overall, based on the expected patronage, high capital investment up front, and the ongoing operating costs of ferries, it is unlikely that the provision of water transport services to Fishermans Bend would be financially viable for a private operator, and unattractive as a target for public funding given the BCR of less than 1.

If government were to consider funding the set up and operation of a water transport service then Scenario 3 (50 person capacity ferry and a $5 fare to the operator) is the best performing network evaluated. After considering the potential economic benefits, the service still does not deliver and economic return on investment.

However, with a BCR of 0.8, the service performs better than some of Melbourne's neighbourhood (local and indirect) bus routes. However, the level of upfront investment required to acquire vessels and construct wharves represents a significantly greater investment than for a bus service and with a greater commercial risk from both the success in attracting patronage and the absence of the ability to redirect the resources if required.

It should also be noted that the financial and economic analysis assumes a commencement year aligned with the full build-out of the Fishermans Bend development. Introducing the service at an earlier time would result in a progressively worse financial performance resulting from the reduced revenue earning potential. Staging the implementation of the service operations would also produce a worse result because patronage attraction is sensitive to service frequency and vessel size. Reducing frequency of service will not only limit travel choices but result in increased door to door travel times due to longer wait/interchange times for users. The purchase of smaller boats in the initial years to reduce capital cost will result in either overcrowding (leading to the need to buy more small vessels to support demand in later years), or result in a mixed capacity ferry fleet as larger designs are considered in future years.

7 CONCLUSIONS

7.1 Preferred route structure

This study has examined the feasibility of utilising a water transport network to assist in the movement of people to/from the proposed redevelopment area at Fishermans Bend. This assessment has been based on a range of modelling assumptions designed to test a best case scenario for water transport. In practice it is possible that the patronage numbers may not be realised if these ideal conditions cannot be replicated. Examples of such assumptions include the practicalities of providing park and ride facilities in Footscray, the preference to switch to water transport where there is a choice between modes, and the degree of accessibility to the final trip destination within Fishermans Bend.

The analysis has identified that the route structure shown in Figure 7.1, with the ferries operating a 10 minute peak, and 20 minute off-peak schedule, and with a fare of $5 per trip, is the best of the scenarios considered in this report. However, this still does not provide a positive BCR.

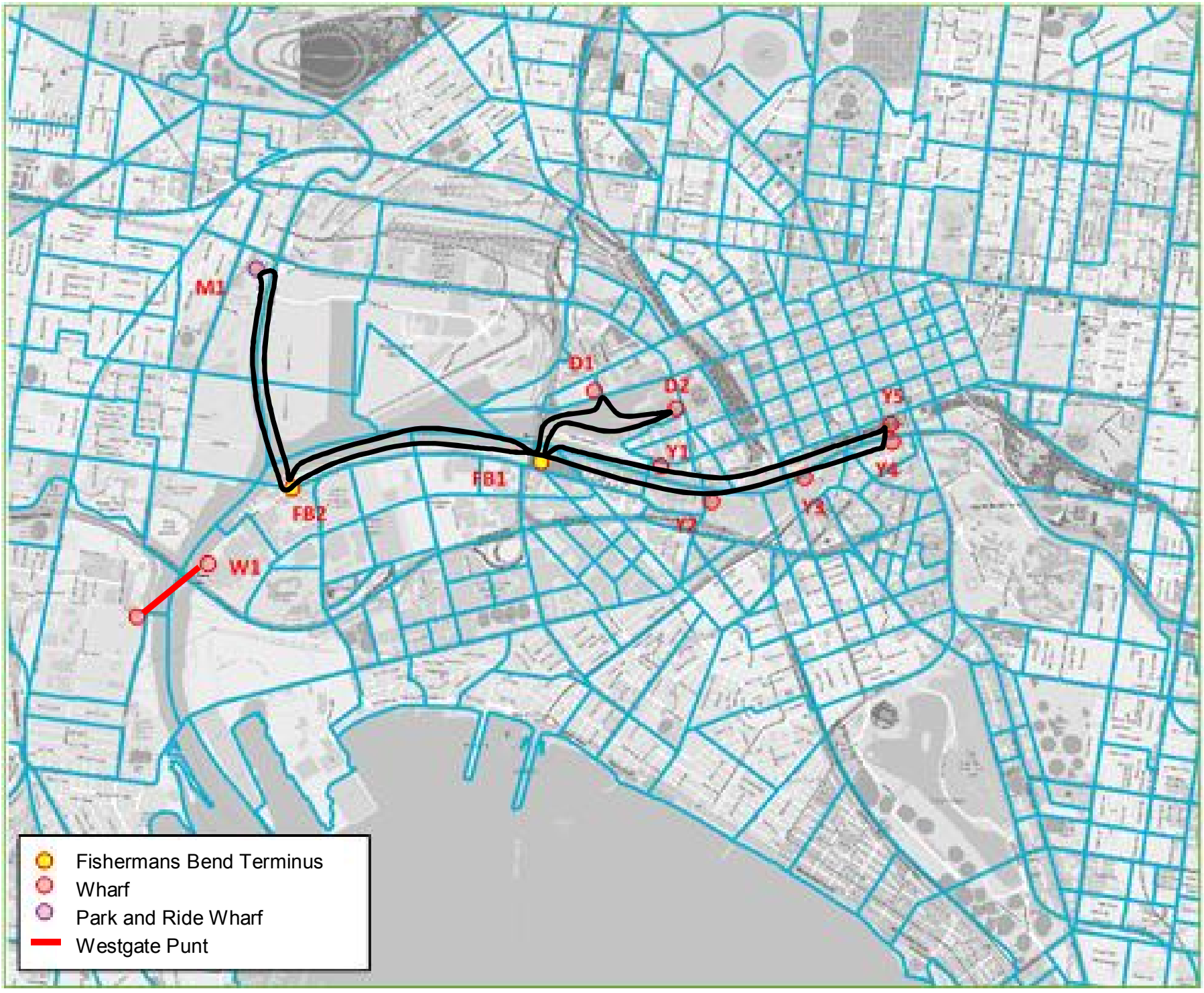

Figure 7.1 Proposed route structure

7.2 Network and operations issues

The generalised investigation findings related to factors affecting patronage demand, and hence revenue outcomes, for the ferry services are:

1. The low speed limits on the Yarra and Maribyrnong River waterways severely limits the ability of ferry services to provide a time competitive public transport option for trips to/from Fishermans Bend.
2. The absence of high density residential areas, and a proliferation of parklands and sporting facilities along the rivers restricts the potential catchment for ferry operations.
3. The continued operations of the Port of Melbourne along South Wharf between the Bolte Bridge and Todd Road restricts access to a large portion of the Fishermans Bend Area because placing ferry wharves in this area will be inconsistent with ongoing port operations.
4. The segregation between the intensified land uses of Fishermans Bend and the river's edge, combined with the heavily utilised Lorimer Street transport corridor, requires a substantial walking link from the river to the potential focal point of trips. This adds time to journeys and means that users will be subject to environment issues such as rain and sun which makes the use of the ferries less attractive compared to proposed light rail and heavy rail solutions that deposit people closer to these activity areas.
5. When ferry operations were considered over the full length of the Maribyrnong and Yarra Rivers, it was found that they generated a significant number of localised trips, often in conjunction with interchange with tram routes, however these do not contribute to the main task of providing access to Fishermans Bend, and provide limited revenue benefits.
6. The generation of trips to Fishermans Bend is observed to reduce rapidly as the length of trip increases. Viability of the operation beyond Flinders Street Station on the Yarra, and Footscray Road on the Maribyrnong is highly questionable.
7. Regular ferry services to Williamstown cannot be supported, largely due to the small catchment area, a lack of the potential for park and ride facilities, and the excellent alternative route options for road and rail (assuming the provision of the proposed metro rail tunnel connecting Newport to Fishermans Bend and the CBD).
8. The operation of the Westgate Punt for bicycles appears to have a continuing role and should form part of a future ferry network subject to its future viability.
9. Although the feasibility has not considered the potential of tourism, it is possible that the regular route operations could be attractive to tourists. Spare off peak ferries could also be deployed on charter work adding to the viability of the operations. Further market sounding would be required in order to assess the potential for such demand.
10. The potential to use the ferries to satisfy travel demand for special events such as those in the Sports & Entertainment Precinct or Flemington is also possible but has not been considered.
11. Attempts to provide commuter services on the Yarra River and Port Phillip have generally received poor support and suffered from lower than expected patronage numbers.

The establishment of the identified water transport network will require a significant capital investment (estimated to be in excess of $35 M), but there are significant risks associated with this investment such as:

- In order to support the service frequency required to attract the patronage it would be necessary to commission the building of 24 ferries
- The ferries will be of bespoke design and therefore will have little value for resale
- Purpose built wharf structures will be required to support easy boarding conditions at all river levels. Modifying existing wharfs to make them suitable for commuter operations may prove challenging given that Parks Victoria has not approved a range of upgrade concepts in the past
- The ability to satisfy the requirements of the Disability Discrimination Act due to ferry design requirements and the dynamic interface between the vessels and wharf structures.

The following are some further considerations that may determine the practical implementation of a successful ferry operation and include:

- *The ability to provide a reliable service* – There are two key issues that have a high potential to cause regular disruptions to the scheduled ferry operations, something that will impact the ability to market the ferry operations as a viable commuter option:
  - Bridge clearances – Accommodating the low bridge clearances on the Yarra River at high water levels can be accommodated with careful ferry design, however the flow of the Yarra is highly unpredictable with existing operators indicating that access under the bridges frequently restricts operations. Further river height monitoring at Spencer Street Bridge would be required to assess the extent of the impact on potential operations.
  - Port operations – Port operations, particularly the turning of ships in the swing basins, results in the river being closed for periods of up to 30 minutes at a time. Given the frequency of arrival and departures from the port, this will regularly impact on ferry access and therefore reliability.
  - Special events –Moomba, New Year's Eve and rowing events can affect the ability to operate regular ferry services.
- *Travel choice decisions* – There is an underlying assumption in the patronage modelling that people will choose to use the ferry services based on a cost/time decision. In reality, people do not make travel mode choices based purely on these issues. Therefore the performance of the services will rely upon the successful marketing of the services and people's preparedness to include the water transport option in their travel choice. Issues such as comfort, service reliability, interchange times and access issues compared to other available options (e.g. the comfort of one's own car) will shape the nature of patronage. The ferry services will be much more susceptible to weather conditions, not so much in terms of vessel operations, but rather due to the remoteness of the wharves from the main travel demand locations people may wish to access.
- *Contribution to total travel demand* – The proposed ferry network is expected to deliver up to 1200 to 1500 people to Fishermans Bend during the morning peak period, even when using a set of positive patronage assumptions. This represents only 3-4% percent of total trips forecast to the wider precinct in the model and is very low scale in the scheme of Melbourne's public transport network. The decision that needs to be made is whether the capital cost of setting up the ferry service, and the operational costs and risk, are offset by the role the ferries will pay in satisfying the movement demand to Fishermans Bend.

7.3 Financial outcomes

Finally, but importantly, is the issue of financial and economic viability. It has not been possible to identify a viable network outcome within the scope of this study. The best identified route had a financial BCR of 0.4 and an economic BCR of 0.8. This suggests that the development of the network would not be attractive to private operators, but in terms of water transport as a part of the wider public transport network, the economic results are no worse than many other public transport services operated under subsidy arrangements.

The financial/economic assessment is premised on the full build out of Fishermans Bend. Beginning the water transport service prior to this point in time would result in reduced patronage. Staging of the network introduction without affecting coverage is unlikely to be achievable because patronage demand is related to service frequency. Scaling back the number of vessels purchased would mean a lower level of service frequency. The other options for phasing the implementation would be to operate only one of the three routes embedded in the proposed network. In this case, the Maribyrnong route would be the preferred first route. It would require a capital outlay of $30 M and return a BCR of 0.8 assuming the full build out of Fishermans Bend, boat size of 50 persons and the identification of a suitable site for a park and ride facility.

An individual breakdown of the financial an economic performance of each ferry route evaluated can be found below in Table 7.1

Table 7.1 Estimated economic and financial performance of Scenario 1 routes

ROUTE	BCR	NPV ($M)	COST RECOVERY (%)	UPFRONT CAPITAL COST ($M)	ANNUAL OPERATIONAL COST ($M)	TOTAL TRIPS (PA)
WILLIAMSTOWN						
100 Person Vessel	0.3	-$32	13%	$12.2	$3.3	0.21m
50 Person Vessel	0.3	-$26	15%	$10.2	$3.0	
MARIBYRNONG RIVER						
100 Person Vessel	0.7	-$27	34%	$29.9	$7.8	1.32m
50 Person Vessel	0.8	-$14	38%	$24.7	$6.9	
DOCKLANDS						
100 Person Vessel	0.3	-$39	12%	$12.1	$3.5	0.81m
50 Person Vessel	0.3	-$33	13%	$10.1	$3.2	
YARRA RIVER						
100 Person Vessel	0.4	-$93	23%	$43.3	$10.6	2.12m
50 Person Vessel	0.5	-$71	24%	$35.5	$9.4	

7.4 Recommendations

1. Water transport has a potential role to play as a part of the wider public transport network serving Fishermans Bend, however its viability is dependent on a high degree of build out of the proposed development and significant public subsidy.
2. The financial results for the network is highly dependent on the level of patronage that the service attracts. VITM has been used to inform this study, but it is untested in its ability to identify the true demand for water transport services because it does not take into consideration human factors that influence why people chose to make particular travel choices. Experience from previous attempts to implement Yarra River and Port Phillip commuter style ferry services suggests a low uptake of those services. Therefore, there is a need for a full market sounding exercise, or trial operation, to be undertaken before making any investment decision.
3. Issues of service reliability needs further investigation. Active monitoring of river height under the Spencer Street Bridge is required in order to better understand the constraints on ferry design, with the aim of identifying the maximum vessel air draft that would allow a high degree of service delivery. This would then inform the decision on vessel design feasibility. Also, more investigation is required into the issue of port operations and their effect on scheduled ferry operations in order to conclude whether the frequency and duration of service disruption from shipping activities is consistent with the delivery of a reliable commuter service.
4. Water transport should not be considered as an element of the transport network for Fishermans Bend until the 2040's at the very least, when demand may then be sufficient to justify a reassessment.

7.5 Commercial disclaimer

In preparing this report, we have relied upon the information and data provided by, and assumptions made by, several different entities. While we have reviewed the sources of information, data and assumptions, we disclaim and will not assume responsibility for the accuracy of such data, information and assumptions received from any such entity.

Any demand forecast is subject to uncertainties. Inevitably, some assumptions used to develop the forecasts and revenue projections will not be realised, and unanticipated events and circumstances may occur. Therefore we cannot provide any form of assurance that the forecasts or revenue documented in this report will be achieved. The actual outcome will vary from that forecast and the variations may be material.

The report has been prepared for Fishermans Bend Taskforce (FBT) in relation to the development of Fishermans Bend. The report may be relied upon by FBT and their related bodies corporate and affiliates (i.e. authorised reliants). We do not undertake any responsibility arising in any way whatsoever to any person or organisation other than the authorised reliants in respect of information set out in the report, including any errors or omissions therein arising through negligence or otherwise however caused.