Appendix B: Traffic and Transport Study

1.0 Background

This traffic study is structured into six main sections. **Section 2.0** describes the existing environment and current conditions on the sites included in the master plan development and the surrounding area. **Section 3.0** discusses future traffic generators in the area, opportunities and constraints, while **Section 4.0** addresses the impacts of master plan development and identifies relevant measures and opportunities that will minimise adverse impacts. **Sections 5.0** and **6.0** provide a conclusion and reference material.

2.0 Existing Conditions

The area subject to this master plan is located on the western side of Pyrmont. The surrounding area is reasonably well served by public transport and has good connections to the local and arterial road network. This section confirms the existing traffic and transport conditions of the site and surrounding area.

2.1 Public Transport

Pyrmont contains a variety of public transport modes with a high level of connectivity to the Sydney public transport network. Public transport modes include buses, light rail and ferry.

2.1.1 Sydney Buses

Sydney Buses service the surrounding area, including the following key routes (and shown on **Figure 2.1**):

- Route 443: Pyrmont/Star City – City; loop service between Circular Quay and Pyrmont, via the QVB;
- Route 449: Pyrmont/Star City, Broadway, Glebe, loop service; and
- Route 501: City – West Ryde; connections to Circular Quay, Town Hall and Railway Square.

The nearest Sydney Buses bus stops are at the following locations:

- Miller Street near Jones Street – route 501; and
- Corner of Pyrmont Bridge Road and Harris Street – routes 111, 443 and 449.

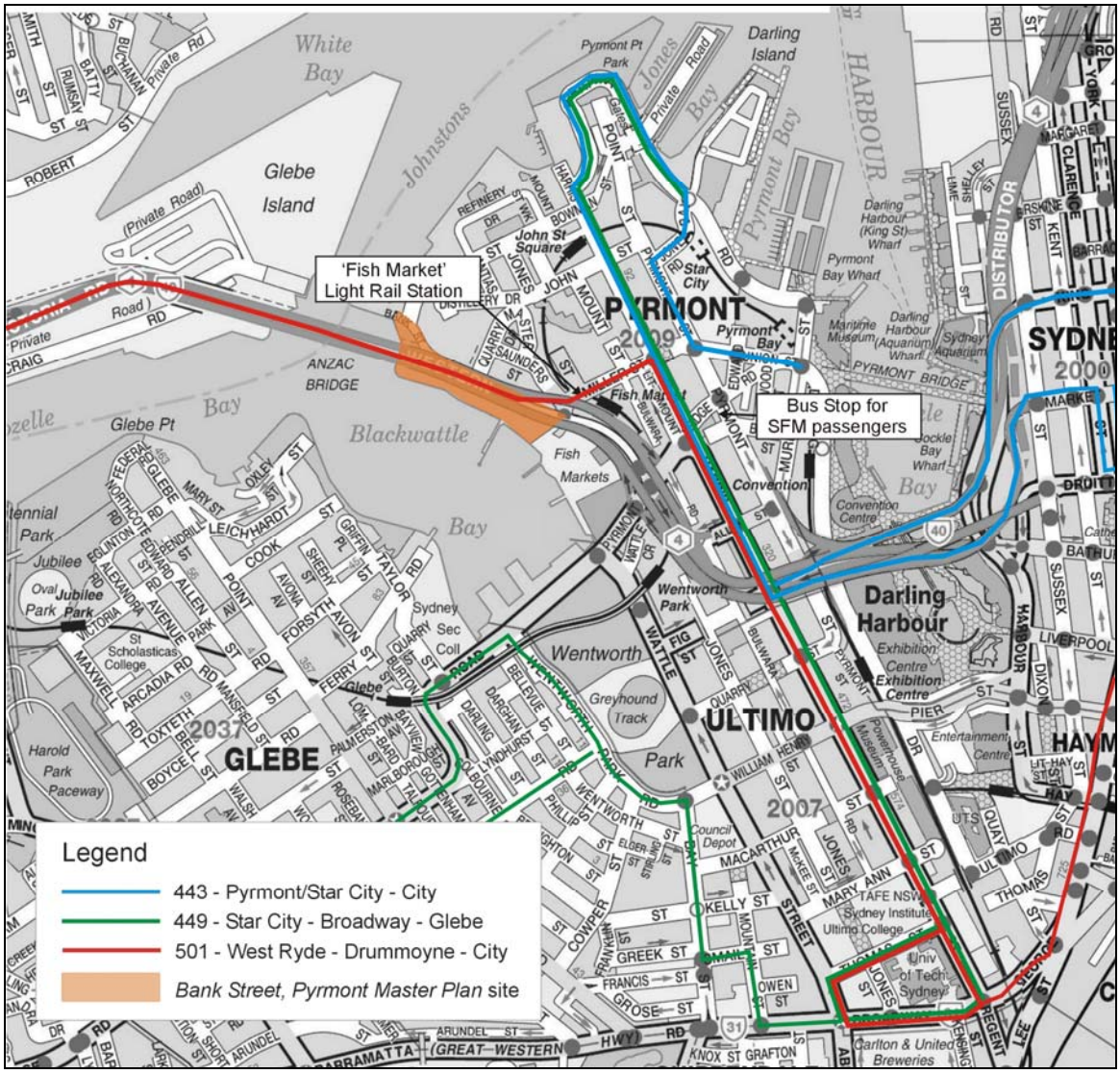
Service frequencies on routes 443 and 501 are typically 7-10 mins in the morning and afternoon peaks, 15-20 mins during the day and 20-25 mins at night. On Saturdays, services operate at 15-20 mins intervals. Services are less frequent (20-30 mins) on Sundays. Other route services operate less frequently.

2.1.2 Light Rail

Metro Light Rail operates a service between Central Station and Lilyfield (see **Figure 2.1**). The closest stations to the master plan area are ‘John Street Square’ located on the corner of John Street/Harris Street, and ‘Fish Market’, located close to the corner of Bank Street and Miller Street. Pedestrian access from the stations to Blackwattle Bay is considered to average 5 to 10 minutes.

Light rail services operate every 10 to 15 mins, seven days a week, starting at 06.00am from Central Station and Lilyfield, with the last service at 12.10am from Central Station and 12.33am from Lilyfield. A 24-hour service runs between Star City (approximately 15 minute walk from Blackwattle Bay) and Central Station.

Figure 2.1: Bus Routes, Light Rail Station and Local Streets in the Study Area



Source: Universal Publishers Pty 2005, Maunsell Australia Pty Ltd

Intermodal connections on the Metro Light Rail include:

- Central Station – Sydney Buses, CityRail and Country Link network;
- Convention Centre and Haymarket – Monorail;
- Lilyfield – Sydney Buses (Route 445); and
- Pyrmont Bay – Sydney Ferries.

2.1.3 Ferry

The nearest ferry connection currently in use is in Pyrmont Bay, off Pirrama Road. This ferry service accesses Circular Quay, Milsons Point, Balmain and Darling Harbour. The SFM master plan presents an option to incorporate a commuter ferry service to the central wharf on the site, however all water access components do not form part of the formal master plan.

2.2 Pedestrians

Generally, pedestrian footpath linkages in Pyrmont are of a high standard, resulting from the area's recent residential and tourist development, e.g. Jackson's Landing, Sydney Casino and Darling Harbour. The pedestrian/cycle ramp providing access between Miller Street and Anzac Bridge is shown in **Figure 2.2**.

Figure 2.2: Pedestrian/cycle ramp between Anzac Bridge and Miller Street

Source: Maunsell Australia Pty Ltd

However, pedestrian accessibility along the foreshore between Jackson's Landing and the fish market is poor. This is mainly a result of the mixed land use characteristics of the area, being a mix of undeveloped and developing residential areas and established industrial/commercial land. The pedestrian environment along Bank Street is dominated by a number of busy intersections and experiences high traffic noise, pollution and the visual dominance of the Western Distributor. Recent works by the RTA has resulted in bollards being incorporated into the design of the footpath around the Anzac Bridge pylons.

Overall, Pyrmont is a relatively contained area with good pedestrian links to the public transport network and to the City. Potential to improve any intermediate shortfalls in pedestrian activities can be facilitated by the current master plan development, and continuing development of the surrounding area.

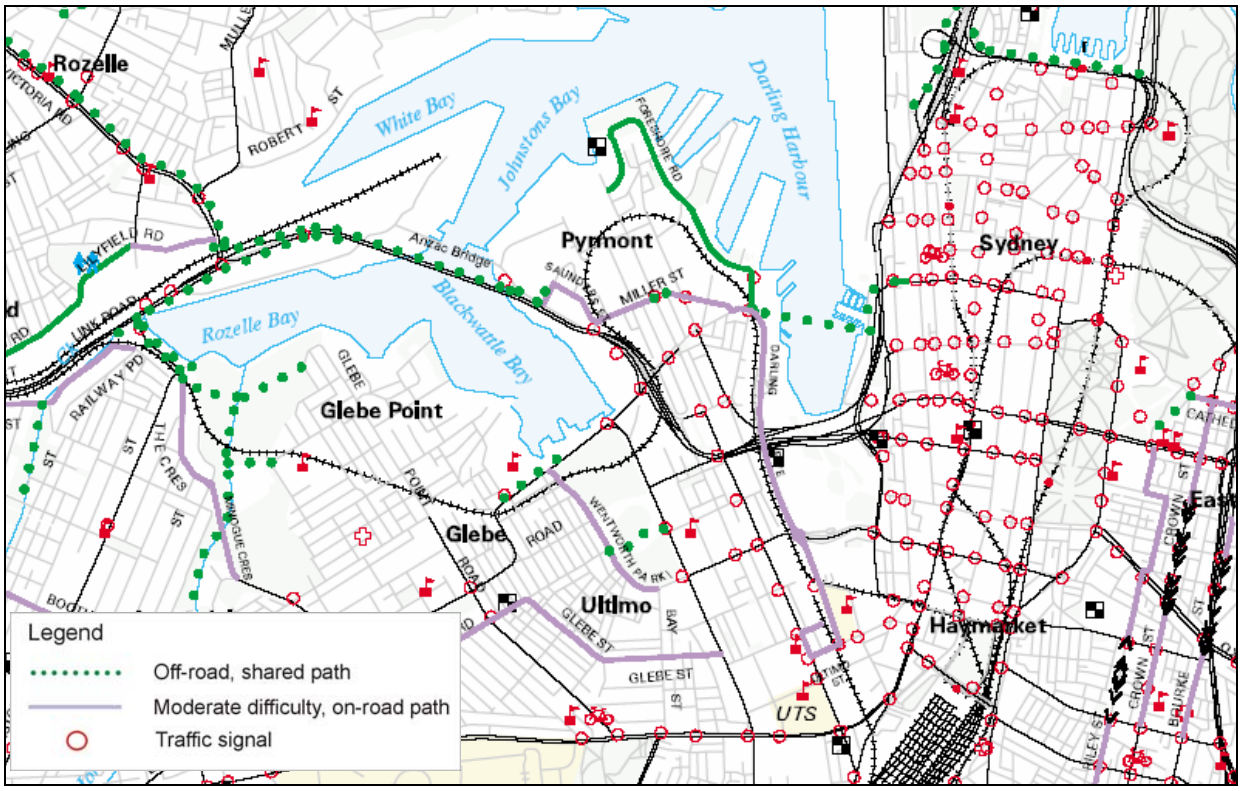
2.3 Cyclists

Pyrmont contains a network of on-road cyclist routes identified by directional signage. Cyclists are generally encouraged on low volume streets. Pyrmont Bridge Road and the Anzac Bridge have been recognised as common bicycle routes for cyclists to access the city and the Harbour Bridge from the inner western suburbs[1]. Pyrmont Bridge carries a relatively high number of cycle movements. Cyclists can travel between Miller Street and Anzac Bridge (which has existing off-road cyclist facilities), via the pedestrian/cycle ramp shown in **Figure 2.2.**

Although not defined as a cycle route, cyclists tend to use the low volume Bank Street, north of Miller Street. Cyclists can also access the fish market via Miller Street, and the CBD via the cycle path leading across Darling Harbour. Another cycle path leads from Miller Street to the south, providing a link with the University of Technology, Sydney. Existing bicycle routes are shown in **Figure 2.3.**

[1] Source: RTA (2000) Cross City Tunnel EIS, Technical Paper no. 9, Bicycles, 9-11

Figure 2.3: Existing bicycle routes



Source: Roads and Traffic Authority

2.4 Road Network

The road network around Blackwattle Bay is characterised by high levels of traffic. Major routes such as the Western Distributor and Pyrmont Bridge Road provide arterial functions for the Sydney network. Pyrmont Bridge Road provides local access to Bank Street and Harris Street, and to Miller Street, Bowman Street and Quarry Master Drive. Wattle Street has a significant impact on traffic in the area, providing access between Pyrmont Bridge Road / Western Distributor and Broadway, Parramatta Road and Cleveland Street.

Bank Street provides vehicular access to the fish market and other local land uses. North of Miller Street, volumes are low although likely to increase with the development of Jackson's Landing and the connection of Bank Street and Bowman Street. **Figure 2.4** indicates the surrounding street network.

Figure 2.4: Road Network

Source: Universal Publishers Pty Ltd

Bank Street connects with the arterial road network via two signalised intersections. Signals provide access to/from the Western Distributor westbound on-ramp/eastbound off-ramp, connecting to Anzac Bridge; while a second set of signals provide access to/from Pyrmont Bridge Road (east and west) and to/from the Western Distributor to the east. Vehicular access also occurs at the signalised intersection of Bank Street/Miller Street, and connections with Quarry Master Drive and Bowman Street.

RTA works completed in late 2005 on Bank Street include additional security structures on the Anzac Bridge pylons. These works should not affect the permanent vehicle operation of Bank Street.

2.4.1 Traffic Volumes

Traffic volumes at the southern end of Bank Street are 9,005 vehicles per day (vpd) according to data sourced from the RTA's Signal Co-ordinated Adaptive Traffic System (SCATS). To the north of the fish market/Miller Street intersection, traffic levels are significantly lower at 4,486 vpd[2].

This volume comprises traffic generated by the Bank Street master plan area (for example Hymix generates around 7000 vehicles per month[2]) and other uses such as Channel 10 on the corner of Quarry Masters Drive, the Child Care Centre and residential dwellings.

RTA annual average daily traffic (AADT) counts indicate that in 2002 the Western Distributor (on Anzac Bridge) carried around 129,000[3] vpd, up from 120,000 vpd in 1999. The historical traffic growth rate is 3.7% per annum, based on RTA published traffic data.

Pyrmont Bridge Road carries around 22,010 vpd (AADT 2002) west of Wattle Street (down from 24,616 vpd in 1999); and 31,655 vpd east of Wattle Street (down from 34,762 vpd in 1999). The section of Pyrmont Bridge Road between Wattle Street and the Western Distributor on-ramp has high traffic volumes as traffic accessing the Western Distributor from Wattle Street needs to travel via Pyrmont Bridge Road. To the northwest of the Western Distributor, traffic levels on Pyrmont Bridge Road are lower and the route performs more of a sub-arterial function servicing Harris Street and the Pyrmont/Darling Harbour area.

2.4.2 Intersection Performance

The intersections of Bank Street with Pyrmont Bridge Road and the Western Distributor offload ramps are complex. While the intersection operates as one multi-arm intersection, the Western Distributor ramps are physically separate. There is no right-turn from Pyrmont Bridge Road (western arm) to the eastbound Western Distributor, as access is provided from Wattle Street via Fig Street. The westbound on-ramp to the Western Distributor has extensive queues during peak periods, which typically extend along Pyrmont Bridge Road (east and westbound) and Wattle Street. Pedestrian crossing phases operate on all approaches at Pyrmont Bridge Road and Bank Street.

The intersection of Bank Street / Miller Street / fish market is a four-way cross intersection. All movements are permitted, however geometry is confusing with the offset angles of Miller Street and the fish market access road. There are also several Western Distributor supporting columns within proximity to the carriageways, which have potential safety impacts. Signal phasing is split with each approach operating individually with conditional left-turn phasing. Some conflict between heavy vehicles and pedestrians may occur at the entrance to the fish market. The SFM master plan proposes to realign this intersection to improve ingress and egress to the site for vehicles and pedestrians. This will also benefit Hymix south, who share this access with the fish market.

Network Performance Indicators

The capacity of an urban road network, where intersections are frequent, is controlled by the capacity of the intersections within that network. Average delay is commonly used to assess intersections performance, with Level of Service (LoS) used as indicator; LoS 'A' representing a good level of operation and LoS 'F' representing oversaturated conditions, where improvements are required. A summary of the LoS criteria is shown in **Table 1**.

[2] Maunsell (2003) Sydney Fish Market Master Plan Traffic and Transport Analysis

[3] RTA (2003) *Traffic Volume Data for Sydney Region 2002, Volume 1.*

Table 1: RTA Performance Criteria for Intersections

Level of Service	Average Delay / Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity; requires other control mode
F	> 70	Roundabouts require other control mode	At capacity; requires other control mode

Source: *Guide to Traffic Generating Developments*, Roads and Traffic Authority, 1993

For signalised intersections, LoS 'D' (an upper limit of a 56 second average delay) is considered a minimum level of performance, with intersections at this LoS approaching capacity.

Intersection performance is also measured by degree of saturation (D/S). This is a ratio between the volume travelling through the intersection and the theoretical capacity of the intersection. A ratio of 1.0 indicates severe congestion, which is typical of many inner city signalised junctions. A typical target for intersection operation is 0.9.

Intersection analysis has been undertaken for 2007 as reported in the SFM Transport Management and Accessibility Plan[4]. Results are summarised in **Table 2** for the current scenario without further development at fish market.

Table 2: Do Nothing Intersection Performance, Road System Peaks, 2007

Intersection	Morning Peak Hour			Evening Peak Hour		
	D/S	Average Delay (sec)	LOS	D/S	Average Delay (sec)	LOS
Bank Street, Miller Street and fish market Access*	1.04	122	F	0.88	48	D
Pyrmont Bridge Road/Bank Street/Western Distributor**	0.93	55	D	0.69	29	C
Pyrmont Bridge Road/Wattle Street	0.87	42	C	0.84	43	D

Source: Masson Wilson Twinney (2003) Sydney Fish Market Master Plan Transport and Accessibility Plan

Note:

* assumes existing geometry is maintained.

** D/S is from SCATES model of main part of intersection and delays are weighted average of SCATES's predicted delays and manual calculation of excluded movements (left turn movements from eastbound and westbound off-ramps and to westbound on-ramp).

[4] SFM TMAP, Masson Wilson Twinney 2003

The analysis indicates that without development, the Bank Street / Miller Street / fish market access will have extensive delays and poor operation during morning peak periods and some spare capacity during evening peaks. Opportunity to reduce delay is limited due to the proximity of other congested intersections.

2.5 Access and Traffic Generation

A high proportion of vehicle movements (particularly heavy vehicles) to and from Bank Street access the arterial network at Pyrmont Bridge Road / Western Distributor. Local area traffic calming along Miller Street is aimed at discouraging heavy vehicles from this route. Access and existing movements at each of the sites within the master plan is as follows:

NSW Maritime Minor

Current trips generated by the site are considered negligible.

NSW Maritime Site

Three vehicle access points are provided from Bank Street. The site is used by dragon boaters, who access the harbour via a dilapidated boat ramp (provided by the dragon boaters), which is positioned at the northern end of the site. The currently vacant site is used for storage of dragon boats and other passive watercraft. The trips associated with these uses are considered negligible.

No. 1 Bank Street

A vehicle access way leads to an internal courtyard that provides off-street parking. Pedestrian access to the property is via the same access way. Access to the harbour is achieved via the on-site timber wharf. Current trips generated by the single dwelling are considered negligible.

Poulos

Two vehicle access points are provided from Bank Street. The northern access does not appear to be used as vehicles were noted to park over the accessway (see **Figure 2.5**). There is no defined pedestrian access to the site and no water access.

Figure 2.5: Poulos Bros site access

Source: Maunsell Australia Pty Ltd

Poulos currently employ between 65 and 80 staff at any one time. Applying the JTW data results in approximately 30 car trips being generated during the morning and afternoon peak hours. Additional truck movements are considered to occur mainly outside of peak periods. The number of truck movements is taken into account in the total daily trips (i.e. 300 trips, refer **Table 1**).

Bidvest

Vehicular access is provided via a single entry point (see **Figure 2.6**) and exit point. Harbour access could be provided via a small wharf, however this is not currently used for business operations.

Figure 2.6: Bidvest Site Access

Source: Maunsell Australia Pty Ltd

Bidvest employ approximately 70 people and operates 24 hours a day. Based on a mode split of 39 percent commuting by car, it is estimated that the existing trip generation would be about 30 car trips during the morning and afternoon peak hours. Additional truck movements are considered to occur mainly outside of peak periods. The number of truck movements is taken into account in the total daily trips (i.e. 300 trips, refer **Table 1**).

Hymix

Vehicle access is provided via a single entry point leading to a loading area and onto a single exit point. The fish market access road also provides egress for some vehicles from the Hymix [5] site. Trucks can loop around the site and exit via the southernmost boundary of the site (see **Figure 2.7**). Hymix do not have water access from their operating site, however a wharf is located on the property currently leased to a charter boat company.

Figure 2.7: Hymix egress adjacent to fish market

Source: Maunsell Australia Pty Ltd

[5] Upgrades proposed by the SFM Master Plan Traffic and Transport Analysis Maunsell (2003) include the existing Hymix egress, which would become a vehicle actuated approach that would not run every cycle

The following descriptions of the existing use of Hymix are based on the report *Submission on Sydney Fish Market Master Plan* produced by Hymix, August 2003.

The concrete plant currently operates 24 hours a day, 52 weeks of the year. It employs a workforce of 35-45 full- time staff, which increases by up to another 5 staff at the time of peak production. Indirect employment generated by the plant includes 25-30 employees working at the quarry that supplies the plant which is located in Kulnura. On an average month, there are approximately 7000 vehicle movements in and out of the site. This consists of about 1500 truck movements in and out of raw materials, 5000 of ready mix concrete and 500 additional car movements for staff and support functions. At maximum capacity, vehicle movements would be about 15 per cent above this figure. Approximately 80 per cent of raw materials trucked in overnight (between the hours of 6pm and 6am). About 80 per cent of ready mix concrete is delivered between 6am and 6pm. The raw materials are delivered overnight 52 weeks of the year, while overnight deliveries of ready mix concrete occur infrequently (5-6 times) a year. It is estimated that about 65 percent of deliveries occur to the CBD, 20 percent to the west, with the remainder split between north and south based trips.

The information presented above results in the following vehicle movements:

- 16 employee/support vehicle trips per day (24 hours);
- 144 truck trips between 6am and 6pm; and
- 73 truck trips between 6pm and 6am.

This results in 233 daily vehicle trips or approximately 40 in a peak hour period.

Miller Street Lot

Vehicle access to the charter boat facility is provided via a single entry / exit point. Parking for a small number of vehicles is provided. Trip generation is negligible.

2.6 Parking

Car parking in Pyrmont is generally subject to restrictive development control policies. Government plans including SREP 26 and Planning NSW's[6] *Urban Development Plan* (UDP) *for Ultimo-Pyrmont Precinct* promulgate restrictive parking practices to encourage the use of public transport and to reflect the capacity of the road network. The UDP specifies a maximum parking provision for commercial premises north of Pyrmont Bridge Road.

Parking on Bank Street (north of the Hymix site) is long term and is observed to be well utilised. Between 8.00 am and 7.00 pm, 6-hour ticketed parking applies. Consultation indicates that long-term parking is in high demand with the commercial uses on Saunders Street. Parking demands for employees associated with Hymix, Poulos and Bidvest are all accommodated on-site.

The fish market site contains 429 marked car parking spaces, which operate at or near capacity during peak periods, particularly on Fridays, Saturdays and Sundays. Informal spaces for up to 40 vehicles can also be utilised during peak times. During the Christmas peak, the Hymix site is also used for parking, which provides an additional 200 spaces. The SFM master plan proposes an increase of the total number of car parking spaces available on the site to 993.

Parking demands for employees associated with Hymix, Poulos and Bidvest are all accommodated on-site.

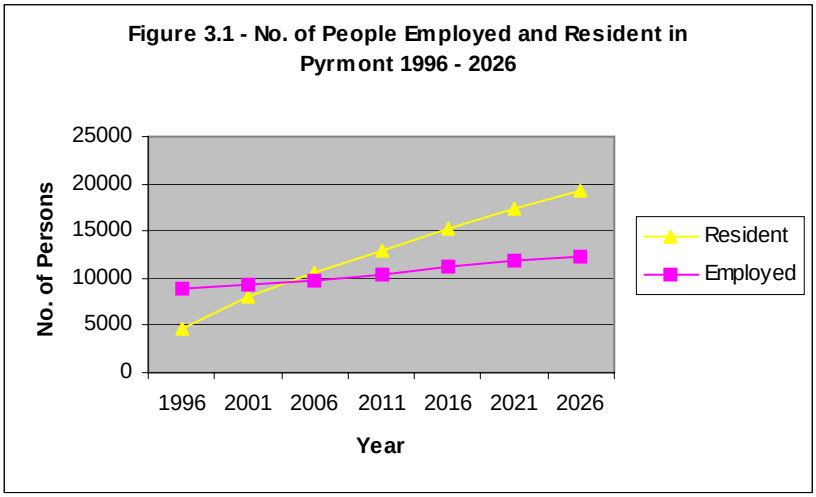
[6] Now Department of Planning (DoP)

3.0 Future Traffic Generators

3.1 Residential Population

The Pyrmont area has been significantly increasing in popularity as a residential area. Forecast land use patterns produced by the Transport Data Centre indicate that the trend towards residential redevelopment in Pyrmont is expected to continue. **Figure 3.1** shows the expected growth in residential population and jobs located in the Pyrmont area for the period up to 2026.

Figure 3.1 Pyrmont Resident and Employee Numbers



Jackson's Landing Residential Development

The Jackson's Landing residential development currently under construction, is set to create a 'community of 3,000 people'[7]. The development is due for completion in 2006. The development involves the proposed widening of Bowman Street (which intersects Bank Street by Glebe Island Bridge) from two lanes to three. Traffic generation projections for Bank Street AM peak are 240 vehicles travelling southbound, 100 northbound, per AM peak hour. This represents an approximate doubling of current traffic volumes.

3.2 Future Road Network Changes

New Western Distributor Upload Ramp

The RTA in the past has proposed a new upload ramp connecting Wattle Street to the westbound carriageway of the Western Distributor. If implemented, the ramp would reduce congestion on Wattle Street and Pyrmont Bridge Road, thereby reducing queue time on Pyrmont Bridge Road and improving the level of service offered by the Pyrmont Bridge Road/Bank Street intersection.

[7] Taken from the Jackson's Landing website: http://www.jacksonslanding.com.au/deve/deve/index.html

Pyrmont Bridge Road

Although this has not been officially announced, the potential closure of Pyrmont Bridge Road at Wentworth Park also involves an option to relocate Pyrmont Bridge Road away from the Blackwattle Bay foreshore and towards the Wentworth Park viaduct, possibly underneath Wentworth Park. This option would have a significant impact in reducing traffic congestion along Pyrmont Bridge Road.

The RTA is currently considering including both of the above options in its five-year forward program, however at present neither are included[8].

Cross City Tunnel

The recent completion of the Cross City Tunnel links the Western Distributor with the Kings Cross Tunnel and Eastern Distributor. The EIS forecast that traffic volumes on Anzac Bridge would increase to 139,180 vehicles per day after the opening of the tunnel. While no further information is available at this stage it is considered that forecast increases will not directly impact on traffic movements along Bank Street, but may increase noise impacts associated with Anzac Bridge.

Bowman Street

In response to the Jackson's Landing development, Bowman Street is expected to be widened. The details of the upgrade are not known at this stage though the widening is likely to incorporate additional room for a bus route.

3.3 Opportunities

Cycle Network and Facilities

Pyrmont Bridge Road has been nominated in the Cross City Tunnel EIS for inclusion in a proposed Sydney City bicycle network. Providing connectivity to the regional cycle route will be important to encourage access to the area by cyclists. Activating the disused NSW Maritime site will bring benefits of passive surveillance. A secure bicycle parking area could be provided, along with recommendations for cycle connections along Bank Street to Bowman Street. The development of commercial sites will also present the opportunity to establish cycle storage facilities in the sites themselves.

Pedestrians

The on-going re-development of Pyrmont will result in higher levels of pedestrian activity and generally improve levels of pedestrian amenity, safety and security. The development of a foreshore promenade (discussed as a Council objective in the UDP) will provide an important pedestrian link around Pyrmont and help to improve the area around Bank Street and Blackwattle Bay.

The development of Jackson's Landing, encouragement of foreshore access and opening up of the NSW Maritime site will all encourage pedestrian use of Bank Street and any future foreshore access to Jackson's Landing. Consideration should be given to reducing conflict between heavy vehicles, watercraft and pedestrians.

Bus

Increases in demand for bus services are most likely to be met by Sydney Buses, though is likely to include additional frequency rather than coverage. Route extension or alterations may be considered in the future should demand call for it, but is not being considered at present. The proposed widening of Bowman Street could facilitate bus access through Jackson's Landing and to Bank Street.

[8] Discussions with RTA, June 2004.

Light Rail

The proximity of the light rail station, particularly if the light rail is extended into the CBD, will improve the attractiveness of accessing the site by this mode. Pedestrian connectivity to the master plan area, including the recreational area at the NSW Maritime site will require careful consideration.

Ferry

The UDP indicates possible future ferry services to Jackson's Landing whilst the SFM Master Plan proposes a ferry service to the Fish Market. This may become more feasible upon the expected population increase in the area. The provision of a ferry service to Sydney Fish Market discontinued in 1999 due to commercial difficulties regarding public access to working wharves at the market. The development of a foreshore promenade along Bank Street may provide opportunities to develop a ferry service to this location rather than the Fish Market itself.

4.0 Traffic Impact Assessment

The major roads and intersections adjacent to the Bank Street, Pyrmont Master Plan site tend to be congested during peak periods and will continue to be congested as increased development occurs at Jackson's Landing and the fish market. To some extent, this limits the types of development that could occur within the precinct. However there are opportunities to include development land uses that generate traffic volumes outside the peak hours or land uses that attract trips by non-traffic modes (public transport, walking and cycling). The area is reasonably well serviced by public transport with bus and light rail connections.

4.1 Master Plan Development and Traffic Generation

This section considers transport impacts assuming development occurs to its full potential or to a floor space ratio of 2.5 to 1, in accordance with SREP 26 – City West. This represents a worst-case scenario. Cumulative traffic impacts, taking into consideration wider area developments, are also addressed. Existing traffic generation has been estimated following discussion with landowners, using Journey to Work (JTW 2001) data and traffic counts undertaken as part of the SFM Master Plan. The traffic generating potential of a development was calculated using RTA's Guide to Traffic Generating Development (RTA, 1993).

Journey To Work Data

According to the 2001 Journey to Work data, 39 percent of the population commute to work as car drivers in the Pyrmont area, while car passenger's account for 4.7 percent of the population. Given the area is highly accessible by public transport, 25.9 percent, or 1 out of 4 commuters travel to work by public transport in the form of bus and/or train.

RTA Guide to Traffic Generating Developments

Traffic generation rates in NSW are normally determined by the RTA's 'Guide to Traffic Generating Development' (RTA, 1993). It is noted that the data within this guide could be considered dated, however there is currently no other standard used to determine land use related traffic generation. For commercial land uses the guide indicates a daily generation rate of 10 trips per 100m² gross leasable floor area (GLFA) or a peak hour generation rate of 2 trips per 100m² GLFA. Gross leasable floor area is generally stated to be 80% of gross floor area (GFA).

4.1.1 Potential Traffic Generation

NSW Maritime Minor

Additional trips generated by the site are considered negligible.

NSW Maritime Site

For the purpose of assessing traffic generation it is assumed that the master plan site could include a maximum provision of about 40 parking spaces (**Section 4.2.4** discusses the provision in more detail – some of spaces could be provided on-street). It is noted that additional 'informal' space could be temporarily available during specific recreational events, however these events are likely to be infrequent and are not considered to contribute to typical traffic generation levels. Parking utilisation

and turnover will be dependent on the level of on-site facilities available for recreational users, cost, maximum permitted parking duration, and external parking availability.

Assuming an average stay of two hours and 50% of vehicles arriving/departing in the peak two hours (with three-hour maximum stay parking), traffic generation is likely to be up to 20 trips per peak hour. General comments on peak hour traffic generation resulting from the recreational use of the site include:

- Weekday AM traffic peaks are likely to be significantly lower than weekday PM peaks;
- Weekday PM peaks are not likely to coincide with truck movements associated with Hymix, Poulos and the fish market;
- Weekend peak traffic is likely to be higher than weekday peak hour traffic, and is not likely to coincide with adjacent land uses (Poulos and Hymix) however is likely to coincide with the fish market peak times;
- Peak times are also expected to be seasonally influenced with higher traffic generation levels occurring during summer months; and
- In isolation, this level of traffic generation is unlikely to impact on the operation of the adjacent road network.

No. 1 Bank Street

Future options include open space associated with the major NSW Maritime site to the south and Jackson's Landing to the north. Community uses involving re-adaptive use of the existing dwelling is another possibility although this would be constrained by the existing open space zoning of the land. The likely trip generation for community uses would be dependant on the type of use. However, trips are likely to be low assuming that the community use would primarily service to residents of Jackson's Landing, Bayview Apartments and other residential developments within walking distance of the site. Overall trips are considered negligible.

Poulos

The maximum developable site area is 5,143m² and maximum floor area is 12,857m² (from **Section 2.0**). Gross leasable floor area is therefore assumed to be 10,286m² (80% of gross floor area). The application of RTA traffic generation rates results in 1,029 daily vehicle trips and 100 peak hour vehicle trips. This results in a net increase over existing operations of about 70 vehicle trips in the peak hour.

Bidvest

The maximum developable site area is 2,988m² and maximum floor area is 7,470m² (from **Section 2.0**). Gross leasable floor area is therefore assumed to be 5,976m² (80% of gross floor area). The application of RTA traffic generation rates results in 600 daily vehicle trips and 60 peak hour vehicle trips. This results in a net increase over existing operations of 30 vehicle trips in the peak hour.

Hymix

The following two options for the development of the Hymix site have previously been identified:

- No redevelopment; and
- Intensification of current uses.

The consolidation of the site with part of the area devoted to open space is the preferred option. According to the Hymix submission on the SFM Master Plan Report (August 2003), a development application has been approved to undertake works on the site consisting of alterations to the existing facility in order to gain maximum efficiency in the current operations. This is estimated to result in an

increase in traffic generation of up to 30% above the current volumes. However, the intensification will also lead to the assessment of the potential for the existing wharf to be re-instated for boats delivering raw materials to the site. The reduction in heavy vehicles delivering material by road will be offset by future increases in productivity.

4.1.2 Summary – Future Development Options

The Preferred Master Plan includes the Option One development plus the intensification of the Hymix site. The Alternative Master Plan includes the development of the NSW Maritime site, Poulos and Bidvest, and the current operation of the Hymix site. An analysis of the impacts of potential traffic generation is provided in **Section 4.2**.

4.2 Cumulative Development Impacts

4.2.1 Road Network

Traffic generation levels for the sites will have a cumulative impact on Bank Street and the performance of the surrounding road network and intersections. **Table 3** indicates the levels of traffic generation expected based on the maximum development potential.

Table 3: Cumulative net increases in traffic generated by uses proposed within the master plan area

Site	Traffic Generation (vehicles per peak hour)				Net Increase (vehicles per peak hour)	
	Existing		Proposed			
	Daily[1]	Pk Hr	Daily[2]	Pk Hr	Daily[1]	Pk Hr
NSW Maritime minor	0	0	0	0	0	0
No. 1 Bank St	8	1	30[2]	2	22	0
NSW Maritime site	0	0	200	5[3]	200	5
Poulos Bros	300	30	1030	100	730	70
Bidvest	300	30	600	60	300	30
Hymix[9]	230	40	230	40	0	0
Total	**838**	**101**	**2090**	**207**	**1252**	**105**

Notes:

1. It is assumed that a peak hour trip to daily expansion factor of 10 is applicable in the above cases where data is not available. That is, peak volumes represent 10% of total daily traffic.
2. Assumes that a community use will generate a nominal 30 trips per day and that the majority of users will be local residents that walk or cycle to the venue.
3. Assumes nominal 5 trips during peak hour. Advice from NSW Rowing Association indicated that trips occur prior to AM peak, whilst dragon boaters generate trips during the shoulder of the PM peak.

4.2.2 Intersection Performance

The Bank Street traffic environment is generally controlled by the capacity of the Bank Street / Miller Street / fish market intersection. **Section 2** of this study indicated that this intersection is considered to be approaching capacity during peak hour. Furthermore, following the proposed redevelopment of the fish market in 2007 the intersection is expected to exceed capacity during peak hours, particularly during morning peak hours.

[9] Assumes Hymix is consolidated, and uses intensified.

The development of the NSW Maritime site is not expected to significantly impact the operation of the intersections as the peak hour flow of 20 vehicles is expected to occur largely outside of the typical weekday peak hour traffic, though it may coincide with the weekend peak fish market traffic. The overall impact of the peak hour flow generated by the NSW Maritime site is mitigated by the seasonal influence of recreational users, as the higher rates are likely to be generated during school and/or public holidays when AM/PM peaks are generally less defined. Furthermore, an average hourly traffic generation rate of 10 vehicles per hour is considered insignificant in terms of the surrounding network capacity.

The commercial redevelopment of the adjoining sites is likely to more significantly impact on the operation of the intersections. A net increase of about 105 vehicles during the peak hour is likely to have an impact on the level of service and average delay, particularly after 2007. Previous intersection analysis[10] suggests an existing majority (60%) left turn movement into Miller Street from Bank Street. During the AM peak, 47 southbound vehicles will be generated by the master plan development. Applying 60% to the left turn movement results in an additional 28 vehicles making this turn. This represents an increase of about 50% or one additional vehicle every two minutes. Through movements at the intersection will increase by one vehicle every four minutes. It is noted that increasing green time to maximise the majority left turn movement can be achieved without necessarily compromising vehicle delay on other movements.

Keeping in mind the zero net increase of vehicles generated by the Hymix site an additional 62 northbound vehicles will travel along Bank Street in the AM peak. This represents a 36% increase in the through movement or one vehicle per minute.

A number of future RTA initiatives, including the proposed Western Distributor Upload Ramp and potential Pyrmont Bridge Road closure / relocation will assist the operation of these intersections in the future, although these proposals are likely to occur post-2007. The timeframes for these initiatives will become clearer in the future.

The expansion of existing commercial uses is likely to result in a greater proportion of employees using public transport, particularly in response to the development of work place travel plans becoming a condition of development approval. The traffic impacts of commercial / office uses are therefore expected to be less than retail uses.

4.2.3 Access Arrangements

The development of the NSW Maritime site is unlikely to significantly increase traffic using Bank Street. Providing the site access arrangements and urban design guidelines (see **Section 2.6**) are followed, potential conflict between the site and Bank Street is expected to be minimal.

Assuming appropriate design standards are applied to the Poulos, Bidvest and Hymix sites at the access interface, potential traffic conflict at the Bank Street interface should be positive. Access may be an improvement over existing arrangements as commercial uses are likely to result in more narrow access widths.

4.2.4 Parking

No.1 Bank Street

All parking demands would be accommodated on-site (similar to Poulos and Bidvest, below).

[10] Maunsell (2003) Sydney Fish Market Master Plan Traffic and Transport Analysis

NSW Maritime Site

Without undertaking demand analysis it is likely that the NSW Maritime development will be well utilised as a passive and active recreational facility. Limiting the number of parking spaces permanently available will effectively restrict the facility to an appropriate number of recreational users at any one time. The danger however, is that an undersupply of parking opportunities could compromise frequent users if parking opportunities become difficult.

Consultation with dragon boat organisations has suggested that the provision of up to 40[11] parking spaces is likely to be sufficient for the passive use of the site. This represents a high end scenario (50% mode split) as it can be assumed that a proportion of short stay parking spaces will be in use by other recreational users.

Parking spaces can be provided as on-site and on-street parking. In minimising the amount of circulation space necessary for on-site parking it is considered advantageous to maximise the number of on-street parking spaces. It is suggested that about 25 on-street parking spaces could be provided if angle parking is utilised (based on 90 degree parking with landscaping). While parallel parking is preferable on public roads (in terms of sightline and safety issues) angle parking could be incorporated into the design of the site and therefore minimise adverse safety conditions as well as the balance of access and circulation space required on site. The maximum desirable number of on-site parking spaces is about 15.

Consultation with dragon boat organisations has suggested that an on-site area of about 800m² would be required to provide vehicle / trailer access for loading / unloading of vessels during training and competition times. This area would adjoin the storage building and should be restricted from public parking (by lockable bollards or similar) for safety reasons. This area could also include a proportion of on-site parking spaces. At all times when this area is not in use by dragon boat organisations it would be available to all passive recreation users.

The maximum permitted parking stay on or off-site will influence the types of users and parking opportunities in terms of providing for a reasonable turnover of spaces. A maximum parking stay of two to three hours is recommended.

The development of the site has potential spill over effects on parking supply in Bank Street and surrounding areas during peak seasonal times. In this regard short stay parking demand is likely to increase on Bank Street. As a public facility, any spill-over parking should be catered for through the supply of short-stay metered parking elsewhere on Bank Street.

One on-site space suitable for disabled users should also be provided. Bicycle parking and / or storage facilities should also be provided. Between 10 to 20 cycle parking spaces is considered reasonable.

Poulos and Bidvest

The redevelopment of the Poulos and Bidvest sites will result in increased demand for employee and visitor parking off-site. This can be divided into short-stay (visitors) and long-stay (employees) parking demand. While there is an existing supply of long-stay (6-hour) parking on-street, this is not guaranteed, therefore all foreseen parking demand on the commercial sites should be catered for on-site. Local government policy to restrict long-stay parking in areas such as Pyrmont is likely to minimise the number of long-stay or free parking spaces available in the area over time.

On-site parking according to UDP requirements (maximum of one space per 150m² gross floor area of commercial development north of Pyrmont Bridge Road) reflects a high degree of restraint supporting

[11] 40 spaces allows for 4 dragon boats, with 20 rowers to a boat, and assuming 50% drive and 50% use public transport or walk.

access by alternative modes. These rates result in the provision of 86 spaces for the Poulos site and 50 spaces for the Bidvest site. Spaces suitable for service vehicles should also be provided, depending on ultimate use. Dimensions should satisfy the design requirements set out in **Section 2.9**.

Secure bicycle parking / storage facilities are required at a rate of one employee space per 300m² gross floor area, plus one visitor space per 2500m² gross floor area. This equates to 43 employee spaces and 5 visitor spaces at Poulos and 25 employee spaces and 3 visitor spaces at Bidvest. Parking facilities should be provided in a secure and heavily trafficked location. Shower and change room facilities should also be provided.

Hymix

No change from the current situation is anticipated.

4.3 Pedestrians and Cyclists

Pedestrian and cyclist access will be provided along the foreshore and along Bank Street for each development site. It is envisaged that the Bank Street carriageway could be reduced to as low as six metres with parking provided on either side. It is noted that angle parking would require additional manoeuvring space adjoining the northbound carriageway and encroach the pedestrian pathway into the master plan site.

These design aspects are covered in more detail in **Section 2.6**, including the requirement for cycle storage facilities on commercial sites.

NSW Maritime Minor

No redevelopment is proposed at this location as gradients are considered non-conducive to pedestrian movement. Pedestrian movement will remain on Bank Street.

No.1 Bank Street

Given the relative level difference between this site and the adjacent NSW Maritime minor site, pedestrians are best provided for along Bank Street. Pedestrian access to the foreshore will ultimately occur across the site when developed as open space.

NSW Maritime Site

Prior to the redevelopment of No.1 Bank Street, pedestrians access the foreshore from Bank Street via a pedestrian path though the redeveloped passive boating facility (NSW Maritime main site). Foreshore access would be provided along the existing foreshore (**Figure 4.1**) from the boundary with No.1 Bank Street.

Figure 4.1: Existing paving at NSW Maritime site, April 2004

Source: Maunsell Australia Pty Ltd

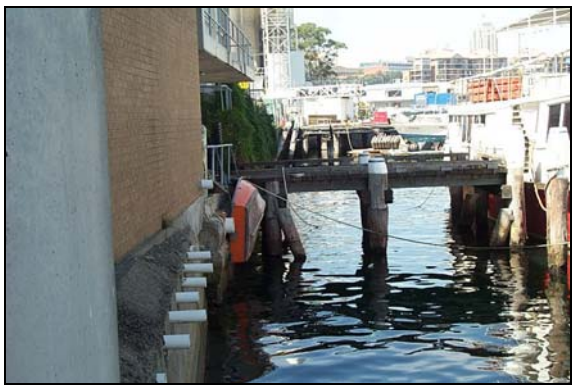
Poulos

If redevelopment does not occur at the Poulos site, a pathway adjacent to the NSW Maritime site will provide foreshore access. Fencing will be required to provide security for the Poulos site. Alternatively pedestrian access would be provided along Bank Street with landscaping and upgrading works to occur to improve the visual amenity of the area. Redevelopment of the site will incorporate a 10 metre setback to provide upgraded foreshore access.

Bidvest

The redevelopment of the Bidvest site will incorporate a 10 metre setback to provide foreshore access. Options for the removal or future use of the wharf should be investigated. It is proposed that public access between the foreshore and Bank Street should be provided between the Bidvest and Hymix sites.

Figure 4.2: Bidvest wharf, April 2004



Source: Maunsell Australia Pty Ltd

Hymix

Foreshore access should be provided along the Hymix site. Hymix intend to intensify by using the wharf to transport aggregate by boat. This would require the use of secure gates when loading / unloading in order to mitigate potential pedestrian safety impacts.

Any redevelopment of the site would incorporate a 10 metre setback to provide upgraded foreshore access.

Miller Street Lot

The Miller Street Lot is to be utilised as a public access way, with a 10 metre setback to provide upgraded foreshore access. To provide continuity, a boardwalk should be provided at the same time as the Hymix sites on either side.

4.3.1 Public Transport

The redevelopment of the various sites will only have a marginal impact on public transport patronage with the existing bus and light rail services able to easily accommodate the increased demand. However, combined with the Jackson's landing development to the north and fish market to the south, there may be some scope to increase public transport facilities in the area as follows:

- Buses – Increases in demand for bus services are most likely to be met by Sydney Buses, though this is likely to include increased frequency for existing bus routes rather than the introduction of new routes.
- Light Rail – this will become more attractive, particularly if routes are extended into the CBD and further west as currently planned.
- Ferry – the proposed ferry service to the fish market will benefit commuters to proposed commercial development with the master plan area

5.0 Conclusion

The development of the NSW Maritime site will facilitate pedestrian and cyclist access along Bank Street and the foreshore. Development options for the adjoining sites are expected to enhance public access along the foreshore promenade and also provide the development opportunity to provide links between Bank Street and the foreshore.

While the development of the NSW Maritime site is expected to marginally increase traffic levels in the area, impacts on the road network are likely to be minor. Traffic increases associated with the redevelopment of adjoining sites will have greater impacts on the capacity and operation of surrounding intersections during peak periods, however impacts can be mitigated with corrective traffic management and increased public transport mode share. Alternative transport methods (boat) may also be employed by one of the sites. Future mitigation measures also include proposed road network improvements.

6.0 Reference Material

Architectus Sydney Pty Ltd, 2003, Homebush Bay West – Wentworth Point Master Plan

Lend Lease, 2003, Jacksons Landing Master Plan with Amendments

Masson Wilson Twiney, 2003, TMAP Analysis Working Paper

Maunsell Australia Pty Ltd, 2003, Traffic and Transport Analysis Final Report

Maunsell Australia Pty Ltd, 2003, Sydney Fish Market – Draft Master Plan

NSW Government Architect's Office, Department of Commerce & JBA Urban Planning Consultants Pty Ltd