

Appendix E Framework Traffic Management Plan



CBD Metro TA 2108 Transport and Access Advisor

Framework Traffic Management Plan

Sydney Metro

24 August 2009

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Framework Traffic Management Plan

Prepared for

Sydney Metro

Prepared by

AECOM Australia Pty Ltd

Level 11, 44 Market Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8295 3600 F +61 2 9262 5060 www.aecom.com

ABN 20 093 846 925

In association with

Sinclair Knight Merz and MVA Asia

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Reviewed by	Tom Brimson	
Authorised by	Richard Merrett	Signature:
In Principal support from RTA:		Signature:
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Glossary

Term	Acronym / Abbreviation	Description
Acoustic		Pertaining to the sense of organs of hearing, or to the science of sound.
Ambient		Surrounding or existing.
Bored tunnel		An underground tunnel constructed by a tunnel boring machine.
CityRail Station		Existing rail station on the CityRail network
Community Liaison Group	CLG	Group of community representatives
Construction site (or worksite)		Land required for construction activities associated with the project (including storage, amenities, site offices, etc), and may be required for the construction and commissioning phases. A construction site may be temporary (e.g. for Enabling Works such as adjustment to a water main) or long term (e.g. a station construction worksite).
Construction Environmental Management Plan	CEMP	A document setting out the management, control and monitoring measures to be implemented during construction of a development, to avoid or minimise the potential environmental impacts identified during an environmental impact assessment process
Construction Traffic Management Plan	CTMP	Construction Traffic Management Plan is a document prepared for each stage of construction work, and describes the impact and mitigation measures to address changes to traffic conditions resulting from discreet elements and stages of construction activity.
Crossover		Track form to allow trains to move to an adjacent track.
Cut and cover construction		Method of construction for underground structures where a hole is excavated from the surface down, the structure is built and then covered.
Director-General's requirements		Requirements for an environmental assessment issued by the Director-General of the Department of Planning in accordance with the Environmental Planning & Assessment Act 1979.
Diamond Crossover		Two crossovers located adjacent to each other in a diamond formation.
Earth Pressure Balance Machine		Is a mechanised tunnelling method in which spoil is admitted into the tunnel boring machine (TBM) via an arrangement which allows the pressure at the face of the TBM to remain balanced without the use of slurry.
Framework Traffic Management Plan	FTMP	Framework Traffic Management Plan is a document which outlines the processes and systems to be established to control traffic issues which are common to all Metro Worksite locations.
Integrated Metro Operations	IMO	Integrated Metro Operations is responsible for running the Metro Operation, within the permanent route infrastructure and refers to all running systems and operations required to operate the Metro.

Term	Acronym / Abbreviation	Description
IMO contractor		Integrated Metro Operations contractor responsible for rollingstock, rail systems, tunnel services, and station building works, fitout and services including mechanical and electrical.
IMO construction contract		The agreement between the project company and the construction contractor to undertake the IMO works
IMO site access plan		The plans of that name that form part of the project management plans and must be updated by the project company in accordance with the plan and reports schedule
IMO construction traffic management plan		Plan for site access for contractors and public during construction and operation phases
Geotechnical conditions		Relating to the form, arrangement and structure of geology, soils etc.
Kiss-and-ride		Where a car passenger is dropped off at a public transport station/bus interchange by a private car. This is generally by a family member, hence the 'kiss' goodbye.
Maintenance depot		Land including buildings and facilities for the maintenance of the Metro system, including rolling stock and the infrastructure.
Metro railway		A guided system designed to transport passengers on a railway track, together with its infrastructure and associated sidings, that: (a) provides high-frequency commuter and other passenger services, and (b) is operated using automated systems, that are integrated with trains, from one or more central control points, and (c) is operated using dedicated rail infrastructure facilities that are not operationally connected with other types of rail infrastructure facilities.
Metro railway system		(a) a metro railway and its rail infrastructure facilities, and (b) stations, platforms, maintenance facilities, depots and other transport interchanges, works, structures and facilities associated with or incidental to the metro railway or rail infrastructure facilities (including commercial and retail facilities).
Ministry of Transport	MOT	Now Department of Transport and Infrastructure (NSWTI)
Paid concourse		Area of the station that can only be accessed by ticket holders.
NCLG		The Network Coordination Liaison Group is a group of stakeholders who are to be formed to ensure that construction related impacts of the CBD Metro are managed with respect to changing road demands and competing interests in the CBD over the life of the construction of the project.
Proponent		The person proposing to carry out development comprising all or any part of the project, including any person certified by the Minister for Planning to be the proponent (such certification to be obtained prior to commencement of the relevant part of the project). Sydney Metro is the proponent for the CBD Metro project.
Permanent Route Infrastructure	PRI	Comprises the civil, tunnelling works and station excavations to be designed and constructed by the PRI Contractor on behalf of Sydney Metro, for handover to the IMO contractor for construction of the IMO Works.

Term	Acronym / Abbreviation	Description
PRI Contractor		(PRI) contractor, responsible for surface works for construction of the Stabling and Maintenance Depot, tunnelling works, and excavation and retaining structures associated with the station boxes
Product		The new metro railway in total including assets, brand, systems, intellectual property, interfaces and metro services
Road header		Machine used to excavate tunnels with a boom-mounted cutting head.
Road User		A road user is any person who uses a road, driveway or footpath, and includes motorists, buses, pedestrians, cyclists, taxis etc.
Rolling stock		Standard single deck metro trains used on the metro railway.
Road Occupancy License	ROL	A Road Occupancy License is a process whereby an Authority (primarily RTA) gives its approval for an activity which involves removing one or more lane of the road from traffic or parking use to another use – usually temporary construction.
Spoil		Excess material resulting from the cut and fill balance. Generally comprises soil and rock material. All volumes refer to solid volume.
Stabling facility		Location where rolling stock (trains) are stored when not in service.
Station		Refers to proposed Metro station infrastructure, including platforms, concourse, entrance, pedestrian connections, staff facilities and associated requirements/facilities to service the station.
Station Plan		Plans that may be prepared for land on which metro railway stations are to be situated, and land in the vicinity of such metro railway stations, with respect to development, traffic and parking management arrangements, pedestrian links and access facilities, retail and commercial development associated with metro railway stations, public domain amenities and improvements, and other matters ancillary to the operation of metro railway stations and any associated transport or other facilities.
Sydney Metro		Sydney Metro is the NSW Government agency constituted under the Transport Administration Act 1988 to develop a metro railway system, including procuring the CBD Metro and possible future extensions of it.
Speed Zone Authorisation	SZA	A speed Zone Authorisation is a process whereby the RTA gives permission for a change to the speed limit.
Traffic Management Plan	TMP	A traffic management plan is a document which describes the traffic impact and management measures for a specific work area.
Traffic and Transport Liaison Group	TTLG	The Traffic and Transport Liaison Group is a group of stakeholders which will be formed to ensure those stakeholders have the opportunity to review and comment on the traffic management measures and road changes proposed to be put into place to manage traffic on and adjacent to the project.
Tunnel boring machine	TBM	Machine used to excavate tunnels with a circular cross section through a variety of soil and rock strata.
Turnback		Configuration of tracks allowing a train to terminate a service and return to its starting point.

Term	Acronym / Abbreviation	Description
Unpaid concourse		Areas of the station that can be accessed by any member of the public.
Virgin excavated natural material	VENM	Natural material (such as clay, gravel, sand, soil and rock) that: (a) is not mixed with any other type of waste; and (b) has been excavated from areas of land that are not contaminated.
Variable Message Sign	VMS	Variable message signs used to provide advance notice of upcoming works and traffic arrangements and alternate routes and traffic arrangements during the works. Subject to prior approval and availability this may include existing RTA VMS and project VMS.

Executive Summary

This Framework Traffic Management Plan (FTMP) covers traffic management responses and strategic processes to issues which are common to all work sites proposed to enable construction of the CBD Metro. Detailed traffic management of individual worksites is covered in individual Traffic Management Plans (TMPs) for each site. The FTMP establishes the traffic management processes and acceptable criteria to be considered and followed to facilitate construction of the CBD Metro.

The Project requires construction work to be undertaken adjacent and connecting to the proposed stations at locations within and external to the Sydney CBD. It is important to provide a coherent and organised approach to managing the direct and cumulative impacts of construction on the road and pedestrian networks.

This Framework Traffic Management Plan (FTMP) is one of a series of Management Plans that will be developed for the construction of the CBD Metro. There will be four levels of documentation to enable construction and delivery:

- Framework Traffic Management Plan (Sydney Metro)
- Site Specific Traffic Management Plans (Sydney Metro)
- Construction Traffic Management Plans (Contractor)
- Traffic Control Plans (Contractor)

The FTMP will provide a framework for procedures and techniques to ensure the minimum of traffic disruption to occur during the four construction stages of:

- Enabling works, associated with utilities and site preparation;
- Demolition;
- Permanent Route Infrastructure (PRI) covering station tunnel and pedestrian subway construction; and
- Integrated Metro Operation (IMO) including station fitout, rolling stock and operation / maintenance.

This Plan and the site specific TMPs have been developed to satisfy the following aspects of the traffic arrangements during the full construction period:

- Measures to protect pedestrians and maintain surface public transport services adjacent to all Sydney Metro worksites;
- Measures to manage traffic flows through and surrounding the construction and spoil haulage routes, including traffic control measures such as regulatory and direction signposting, line marking and variable message signs; and
- Identify any mitigation measures to improve the efficiency of traffic conditions.

The CBD Metro is committed to achieving outstanding performance in relation to, the health and safety of its workers, and to minimising the impact of the works on road users and the community. The construction objectives that specifically relate to the FTMP are shown in **Table 1**:

A Traffic and Transport Liaison Group (TTLG) would be formed to ensure the authorities most affected are aware of the proposed construction activities, upcoming works and related transport implications and have an opportunity to comment on the mitigation measures proposed. The participants will vary depending on the worksite, the nature of the particular issue and the project delivery phase.

1.0 Procedural Requirements / Document Control

1.1 Preparation

This Framework Traffic Management Plan (FTMP) has been prepared to provide strategic advice on the proposed traffic management measures that will be established and practiced throughout the construction period of the CBD Metro.

This document is a living document and will evolve throughout the pre-tender phase of the project as well as throughout the construction period.

The FTMP has been prepared through a consultative process with relevant stakeholders including the city of Sydney, Leichhardt Council, Roads and Traffic Authority (RTA) and Ministry of Transport (MoT).

1.2 Purpose and Scope

This FTMP covers traffic management responses and strategic processes to issues which are common to all work sites proposed to enable construction of the CBD Metro. Detailed traffic management of individual worksites is covered in individual Traffic Management Plans (TMP's) for each Metro Station site

The FTMP establishes the traffic management processes and acceptable criteria to be considered and followed to facilitate construction of the CBD Metro.

1.3 Review

CBD Metro will review this document and ensure it remains updated and current.

A review, normally every 3 months during the delivery phase, will be undertaken to ensure the document remains up to date and reflects the status of progress and any changes made to Traffic Management processes and adopted by Sydney Metro.

1.4 Client Approval and Approval of Plan

Client acceptance of this document is indicated by signature in the Quality Information inside the cover of this document. The Plan is approved for use once signed by the General Manager, Metro Delivery.

In principle support from RTA, COS and LCC officers indicates that these organisations acknowledge the traffic management arrangements and processes indicated through this document. At such time as tenders for the project have been let this document will require updating to reflect any changes to the construction processes at the station worksites. Formal agency approval for the site specific TMPs (supported by the construction TMPs and TCPs) will be serviced in later phases.

1.5 Plan Control

The latest version of this Plan will be available on the project document management system for all Project personnel. Distribution of the Plan will be to those detailed on the distribution listing inside the cover page of this document. This distribution will be by "hard copy".

The General Manager, Metro Delivery, will maintain, review and update this plan.

1.6 Changes

Each new revision to the FTMP will be distributed to all registered copyholders with an instruction that the superseded copy be destroyed. Changes to the recent revision will be highlighted.

The revision number is included at the end of the document number, which is noted on each page. When amendments occur, the entire document will be reissued with the revision number updated accordingly.

1.7 Definitions and Terminology

The glossary summarises some of the frequently used terms.

2.0 Introduction

2.1 Project Background

Sydney Metro is the NSW Government agency constituted under the Transport Administration Act 1988 following proclamation of the Transport Administration Amendment (Metro Rail) Bill 2008 to develop a metro railway system, including procuring the CBD Metro and possible future extensions.

The CBD Metro is a 7 km metro railway from Central to Rozelle and will be first metro in a Sydney wide metro network. It will include new metro stations at:

- Central;
- Town Hall Square;
- Martin Place;
- Barangaroo- Wynyard;
- Pyrmont; and
- Rozelle.

There is also a protected future station safe guarded at the White Bay development.

The CBD Metro has been identified as delivering the following:

- A network enabler allowing an extension to the West (Parramatta) via the Inner West, and future extensions to the North West and potentially to the South East;
- An opportunity for a low cost reconfiguration of the CityRail network, to increase heavy rail service capacity to the CBD;
- Significant additional public transport capacity within the Sydney CBD using opportunities of the safe-guarded rail alignment, providing needed relief to the existing bus and CityRail corridors and stations; and
- New transport hubs at:
 - Barangaroo-Wynyard, serving the development site on Darling Harbour; and
 - White Bay (safe-guarded) serving the development at Bays Precinct.

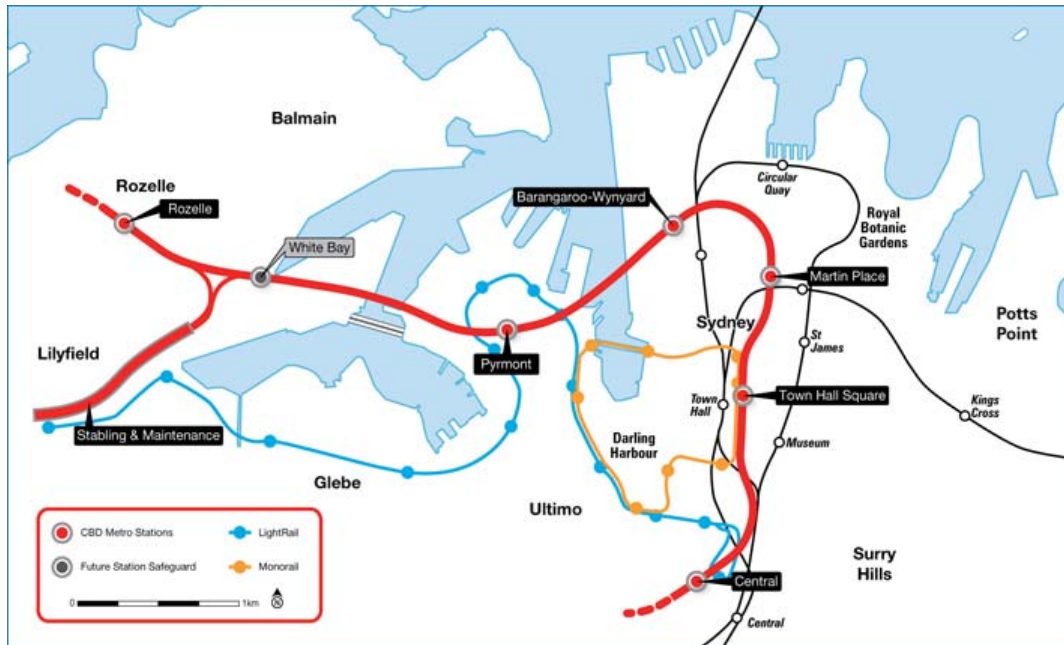
Construction sites will be required at all stations. In addition the White Bay precinct provides an opportunity to establish a major construction site to support tunnel construction, tunnel spoil removal and rail systems installation.

2.2 The Alignment

The CBD Metro alignment has been optimised based on a number of considerations and constraints, particularly in the CBD. In developing the alignment, the design considered the operational requirements for the user and aimed to minimise impacts on the existing and planned CBD developments by following road alignments as far as possible.

From Central station the alignment heads north following Castlereagh Street and Pitt Street to Hunter Street. The alignment from Martin Place Station at Castlereagh Street to Barangaroo – Wynyard Station at Margaret Street is constrained by a number of significant buildings that have deep basements. The alignment west of Barangaroo – Wynyard runs in a southwest direction underneath Darling Harbour before curving into Union Square at Pyrmont. The Metro then runs parallel to the Anzac Bridge as it crosses beneath Johnston's Bay and onto White Bay. The alignment then follows the Victoria Road corridor, as shown in **Figure 2.1**.

Figure 2.1: CBD Metro Alignment



Source: - CBD Metro Preliminary Environmental Assessment, 16/02/09

2.3 Stations

Details of station locations and construction worksites are provided in each of the site specific Traffic Management Plans for:

- Central Station
- Town Hall Station
- Martin Place Station
- Barangaroo-Wynyard Station
- Pymont Station
- White Bay & Depot Worksites
- Rozelle Station

2.4 Construction Stages and Timing

Construction works will commence in 2010 with trains operating between Rozelle and Central by the end of 2015. The delivery packages are Permanent Rail Infrastructure (PRI) and Integrated Metro Operations (IMO) which will be delivered by separate contractors:

- PRI contractor is to deliver the civil infrastructure handing over a lined tunnel and station complete with permanent retaining structure; and
- IMO contractor is to construct the Depot at Lilyfield and fit-out the civil infrastructure with rail track and all systems and to construct the internal facilities at the stations completed with all finishes and customer interface elements. The IMO contractor will also operate the Metro system.

A summary of the key construction dates is provided in **Table 2.1**.

Table 2.1: Key Construction Dates

Construction Staging Program

Construction Staging Activities	Indicative Station Construction Timeframe																							
	2010				2011				2012				2013				2014				2015			
Enabling & Site Establishment Works	■	■	■	■																				
Shaft & Cavern Excavation			■	■	■	■	■	■	■	■	■													
Ground Support and Cavern Lining									■	■	■													
Structural Concrete Works												■	■	■	■									
Specialised Installation Works																■	■	■	■	■				
Mechanical and Electrical Services																■	■	■	■	■				
Underground Pedestrian Link Works						■	■	■	■	■	■	■												
Systems Testing and Commissioning																					■	■	■	■

Source: CBD Metro July 2009

2.5 Traffic Management Planning

The Project requires construction work to be undertaken adjacent and connecting to the proposed Station locations at busy locations with the CBD. It is important to provide a coherent and organised approach to managing the impacts of construction on the road and pedestrian networks.

This Framework Traffic Management Plan (FTMP) is one of a series of Management Plans that will be developed for the construction of the CBD Metro. There will be four levels of documentation to enable construction and delivery:

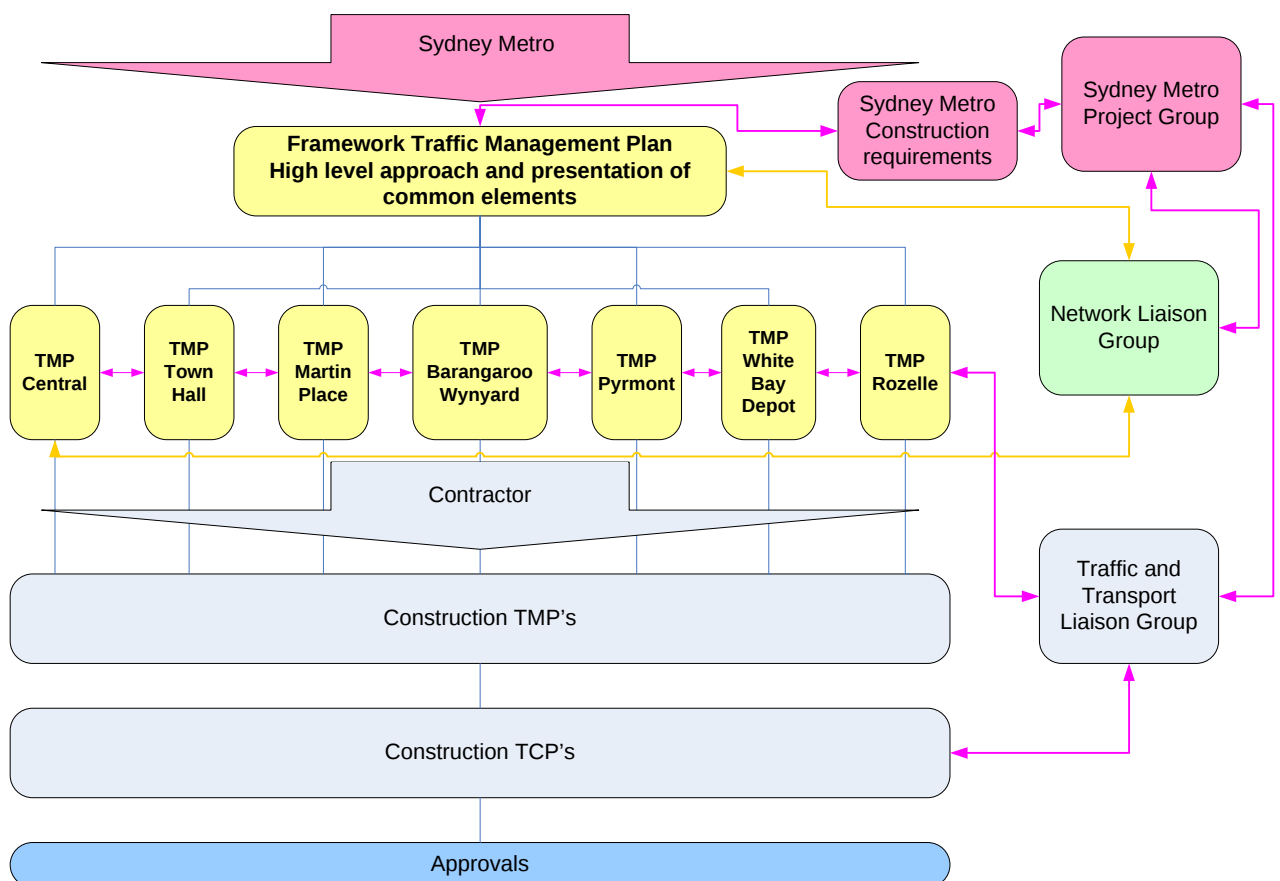
- Framework Traffic Management Plan (Sydney Metro)
- Site Specific Traffic Management Plans (Sydney Metro)
- Construction Traffic Management Plans (Contractor)
- Construction Traffic Control Plans (Contractor)

The purpose of each document is highlighted in **Table 2.2** and the hierarchy illustrated in **Figure 2.2**.

Table 2.2: Purpose of Traffic Management Plans Hierarchy and Documentation:

Document	Purpose	Produced by
Framework Traffic Management Plan (FTMP)	Provides a framework for procedures and techniques to ensure effective traffic management to enable project delivery. Summarises the proposed traffic management and traffic safety requirements for the construction phases of the project. With general principles and key assumptions.	Sydney Metro
Traffic Management Plans (TMP)	Produced for each station site and White Bay/Lilyfield Depot worksites. Outlines an approach to managing construction based upon current assumptions.	Sydney Metro
Construction Traffic Management Plans (CTMP)	Produced for each construction stage at each worksite	Contractor
Traffic Control Plans (TCP)	Produced for each traffic change and road occupancy for all work sites	Contractor

Figure 2.2: Hierarchy of Traffic Management plans



This FTMP prescribes the traffic management strategies, the traffic safety measures and the best practice standards to be implemented during construction that satisfy the requirements of the Ministers Conditions of Approval and the project objectives. The actual details of execution will be provided in the site specific Construction TMP's and associated Traffic Control Plans (TCP's).

More specifically, this FTMP identifies and outlines the major sections of the Project that require critical traffic, pedestrian and cyclist planning and management. Specific traffic management plans for these sections of the road works are critical to the successful programming and construction of the work.

This FTMP provides a framework for procedures and techniques to be applied across the three construction stages of:

- Enabling works including utilities, site preparation and demolition;
- Principal Station construction (PRI) covering station box and pedestrian subways; and
- Station Fitout (IMO) and Metro operation.

Managing the construction and delivery of the Project whilst keeping the existing road network functioning safe, 'and efficient' will be challenging. The concept traffic staging and phasing descriptions and drawings attached to this FTMP documentation detail the sequence and extent of temporary traffic diversions currently planned for the construction of the works.

This Plan and the subsequent suite of sub-plans to be developed, has been created to satisfy the following aspects of the traffic arrangements during the full construction period:

- Measures to protect pedestrians and maintain surface public transport services throughout the CBD;
- Measures to manage traffic flows through and surrounding the construction and spoil haulage routes, including regulatory and direction signposting, line marking and variable message signs;
- Identify any mitigation measures to improve the efficiency of traffic conditions; and
- Takes into account both local and regional traffic impacts.

This plan has been prepared in consultation with the RTA, Sydney City Council and Leichhardt Council, NSWTI and STA.

2.5.1 Traffic Management Concept Plans for Construction

These are the traffic management plans describing the planning & sequencing of the construction activities and are grouped into individual work packages. These concept drawings set the foundation for the development of detailed Construction Traffic Management Plans and their associated TCPs and Road Occupancy Licence (ROL) applications.

2.5.2 Preparation and Implementation of Traffic Control Plans

All Traffic Control Plans to be used during the construction activity will be developed in accordance with Australian Standard 1742.3 and the RTA's "Guide to Traffic Control at Worksites" by a suitably qualified person.

A TCP can only be prepared by a person who has undertaken and passed the RTA's "Traffic Control at Worksites Manual" training course and holds a current certification.

Relevant reference documents are:

- Australian Standard AS1742.3-2002 (Manual of uniform traffic control devices Part 3 Traffic control devices for works on roads;
- Roads and Traffic Authority NSW, Guide to Traffic Control at Work Sites (TCAWS). Version 3, 2004;
- Roads and Traffic Authority NSW, QA Specification G10 Control f Traffic; and
- AUSTROADS, "Guide to Traffic Management", 02-08 Traffic Theory 2008.

All worksites and traffic control plans will be implemented as per the authorised TCP for the appropriate State of the works by suitably qualified personnel.

2.5.3 Construction Traffic Management Plans

Prior to the commencement of substantial construction, a detailed Construction Traffic Management Plan (CTMPs) will be developed by the contractor for each stage of work involving changes to the transport network, and for each of the Metro Stations and related work areas. These will be derived from the Framework Traffic Management Plan and the Traffic Management Plans and take into account the detailed methodology determined by the contractor.

The CTMPs will also include any associated Road Occupancy Licence Applications and Speed Zone Authorisations supporting the CTMPs that require submission to the RTA or Council for consideration and approval. The CTMPs will also contain detailed Traffic Control Plans (TCPs) for each stage of construction and site.

The structure of the CTMP is based on the four main areas to be addressed:

- Conditions of Approval (DoP);
- The CBD Metro Framework Traffic Management Plan and Site Specific Traffic Management Plans;
- Supporting TCP drawings; and
- Consents and Approvals e.g. Road Occupancy Licences (ROLs) or Speed Zone Authorisations (SZA) applications, etc

2.5.4 Authorisation

All personnel employed on the CBD metro construction will perform their duties in accordance with the requirements of this Plan and in compliance with the manuals and procedures and any specific Project instructions.

2.6 Environmental Assessment

The FTMP has been developed having regard to the requirements of the Director General for the project. See **Table 2.3**.

The Site Specific TMPs will consider the management of traffic at individual worksites as well as the effects on pedestrians and traffic movements resulting from construction or changed conditions at worksites.

The TMPs also take into account details required by statutory authorities including the City of Sydney, Leichhardt Council and the Roads and Traffic Authority (NSW).

Table 2.3: Director General's Environmental Assessment Requirements.

Requirement	Condition Requirements	Reference
Key issues	General Construction Impacts – Consider the potential impacts associated with the construction of the project, and present a management framework for construction works to ensure that impacts are mitigated, monitored and managed. The EA must include consideration of, and a management framework for: • construction noise and vibration, including a considered approach to scheduling construction activities including transport, blasting and tonal or impulse noise generating works). • construction traffic including a considered approach to route identification and scheduling of transport movements, having regard to - Alternatives to road transport; - The number, frequency and size of construction related vehicles (both passenger, commercial and heavy vehicles); - The nature of existing traffic on construction access routes (with consideration of peak traffic times and sensitive road users, including emergency vehicles and buses) - The need to close, divert or otherwise reconfigure elements of the road network associated with construction of the project; and - How construction traffic impacts will be managed to minimise the potential for cumulative traffic impacts with other major construction activities in the region (whether this is to be managed as part of the subject project, or through a separate overarching mechanism beyond the direct scope of the project) The EA must also present a strategy for monitoring and mitigating traffic impacts, with a particular focus placed on those activities identified as having the greatest potential for adverse traffic flow, capacity or safety implications, and a broader, more generic approach developed for day-to-day traffic management. • Spoil management • Water Impacts	Individual Station Traffic Management Plans. Noise Assessment (Heggies) Individual Station TMPs and Environmental Assessment Site Specific TMPs and Environmental Assessment Construction Staging and Management Plan (by others) Spoil management Plan
Requirement	Condition Requirements	Reference
Consultation	The EA must reflect an appropriate and justified level of consultation with relevant parties during the preparation of the EA, including: • local, State or Commonwealth government authorities and service providers such as the Roads and Traffic Authority, RailCorp, State Transit Authority, the Ministry of Transport, the Department of Environment and Climate Change, the Department of Water and Energy, NSW Maritime, Sydney Ports, Barangaroo Delivery Authority, Sydney Harbour Foreshore Authority, Leichhardt Council, and City of Sydney Council; • The public, including specialist interest groups and affected landowners. • The EA must describe the consultation process, document all community consultation undertaken to date and identify the issues raised (including where these have been addressed in the EA).	This Framework Traffic Management Plan. Site specific TMPs. The EA Report

Source: Extract from the Director General's requirements, Department of Planning, Section 75F of the Environmental Planning and Assessment Act 1979.

2.6.1 Approach for Assessment of Potential Impacts

The level of impact of the construction works and associated traffic on the road and pedestrian networks will vary. To assist in identifying the level of impact and associated mitigation, a framework is suggested that establishes trigger levels relating to the scale of impact and mitigation. Such an approach has been adopted for the Crossrail project in the UK where a large number of stations are to be constructed in areas with large differences in land and transport use. A similar approach may be adopted by the contractor during construction.

See **Appendix A** for sample from Crossrail.

3.0 Project Policies and Practices

3.1 General Traffic Management Approach

Sydney Metro is committed to achieving outstanding performance in relation to, the health and safety of its workers, and to minimising the impact of the works on road users and the community. The construction objectives that relate to the FTMP are shown in **Table 3.1**.

Table 3.1: Relevant Construction Objective

Key Result Area	Construction Objective
Traffic Flow	• Minimum disruption to pedestrians, cyclists and motorists;
	• Keeping Sydney moving
	• Buses run on time with a minimum of disruption to routes and stops;
	• Minimum of changes to traffic operation and kerbside access; and
	• Minimise disruption to access for adjoining property.
Safety	• No- worker injury accidents during construction; and
	• No injury accidents to members of the public because of construction.

All construction activity undertaken or proposed for the construction of CBD Metro will comply with the following principles:

- Safe provision for vehicular and pedestrian traffic must be made at all work sites;
- Delays to traffic at each work site should be minimised;
- Works should be coordinated, to ensure that road users do not encounter delays in quick succession;
- A well informed driver is likely to be more successful in avoiding delay and more tolerant of unavoidable delay. Road users should therefore be kept informed about:
 - the locations of works,
 - the delays they are likely to encounter, and
 - any alternative routes which might be suitable,
 - to allow them to make informed decisions about whether to travel, when to travel, and which route to use;
- The project should present a professional and helpful face to road users throughout any construction or maintenance process;
- Road Users including pedestrians impacted by construction should have the opportunity to make informed decisions about their activities.

The Project requires construction work to be undertaken adjacent to and connecting with the proposed Station locations within the CBD. Hence the emphasis on public transport, private traffic, pedestrian and cyclist management methods and traffic impact minimisation is important. Design and operation of temporary traffic management layouts will require careful planning and coordination.

Motorists and pedestrians expect a high level of safety and service in using the existing road infrastructure. This requires efficient, effective and reliable traffic management strategies to be put in place which:

- achieve uniform traffic throughput;
- minimise changes to pedestrian routes and movement;
- ensure reliable and consistent travel times; and
- provide clear information to allow motorists to make appropriate decisions in relation to their journey.

These traffic management goals will be achieved by:

- understanding the impacts and identifying mitigations;
- strategic advance planning;
- implementation of traffic management plans that minimise traffic disruption for the shortest possible duration;
- providing a high level of comfort to users;
- ensuring a smooth traffic flow;
- minimising the number of conflicts and unclear information that may lead to incidents; and
- continuously monitoring the traffic and pedestrian systems to anticipate incidents before they are likely to occur (e.g. traffic congestion).

3.2 Traffic Management Strategy

Construction activities have the potential to disrupt existing traffic patterns in the surrounding areas. Minimisation, and where possible, elimination of disruption through effective traffic management techniques in accordance with the CBD Metro objectives is fundamental to the overall success of the Project.

Priority will be given to providing adequate guidance to drivers, pedestrians and cyclists and the community prior to commencement of the work. Priority will also be given to responding appropriately to issues and events as they arise during the construction works. Key traffic management initiatives include:

- Directional signage and line marking to direct and guide drivers and pedestrians past work sites and on the surrounding network. This will be supplemented by permanent and portable Variable Message Signs (VMS), where possible, to advise drivers of potential delays, traffic diversion, speed restrictions, alternate routes, etc;
- Public notification of proposed traffic changes by newspaper, radio, internet site, and community liaison;
- Co-ordination with the RTA's Traffic Operations Manager (TOM) in the event of incidents or undue congestion;
- Management of pedestrian and vehicular access to and past worksites to ensure safe entry and exit procedures. Depending on the location, this may require manual supervision, physical barriers, temporary traffic signals, modification to existing signals, or on occasions police presence; and
- Maintenance of access to existing properties and buildings, which may require temporary crossovers.

3.2.1 Information

3.2.1.1 Traffic and Transport Communication

The main objectives of traffic and transport communication are to:

- Provide timely, accurate and comprehensive traffic and transport information;
- Influence road users to adopt different travel modes in the area;
- Allow and accommodate community feedback regarding traffic issues;
- Manage traffic impacts to protect affected residential and business amenity; and
- Ensure media are well informed and aid in traffic impact minimisation.

During construction the project team will undertake ongoing consultation with the community to ensure that information is provided that assists in minimising disruption or inconvenience. This will be a key message of traffic and transport communications.

The Communications Plan co-ordinated by Sydney Metro will take account of traffic related issues.

3.2.1.2 Roadworks Information

The Project Teams Stakeholder and Community Manager will be responsible for ensuring a system is in place to inform the RTA, public, Councils, bus operators, Police and other emergency services each time changes are made to traffic arrangements. Advice will include information about upcoming traffic switches, anticipated delays to traffic, extended times of work or any likely major disruptions.

3.2.1.3 Advance Warning, Detour and Directional Signage

As part of the staging strategies to be implemented on high volume roads and also the less significant areas of local traffic impact, the importance of adequate and proper signage advising and directing traffic remains high.

Appropriate signposting will be installed to permit easy and safe passage of vehicles, pedestrians and cyclists, including users of all public transport facilities to access their facilities of choice with minimal disruption.

Variable message signs (VMS) would be used to provide timely advice of any incidents or traffic changes. The existing RTA VMS on major CBD approach roads may be utilised where warranted; and in accordance RTA policy and other priorities applying at the particular time of the incident or traffic changes. These would be supplemented by project VMS on approach roads to major worksite locations.

Static signposting covers information, regulatory, warning and guide signs as defined in national and RTA standards. All these classes of sign contribute to road safety. Regulatory signs can prohibit dangerous traffic movements, warning signs can give advance notice of road hazards ahead and guide signs can make the driving task easier and safer.

Safety principles for signs are:

- before approval is given for a new sign a demonstrated need should be established;
- all signs should convey a clear message to all users under all conditions; and
- the sign support structure should not create a safety hazard in itself.
- All signs will be manufactured and erected in accordance with Australian Standards AS1742, AS1742.1 to 1742.13, AS1743 and AS1744.

3.3 Hierarchy of Access

In identifying the most appropriate form of traffic management for each site consideration should be given to the priorities of different users. The site specific TMPs have been developed on the basis of the following hierarchy of access:

- 1) Incidents
- 2) Events
- 3) Pedestrians
- 4) Service Vehicles
- 5) Cycles
- 6) Public Transport – Buses
- 7) Coaches
- 8) Taxis
- 9) Kiss n' Ride
- 10) Private Cars
 - a) Shoppers / Short stay
 - b) Commuters

The strategic importance of routes and existing road hierarchy.

- Major Arterial
- Sub arterial
- Local road
- Special use

Outside the city road network, the RTA function road hierarchy would be adopted, i.e.:

- Toll way/Highway
- Arterial;
- Sub-arterial;
- Collector: and
- Local

This information is provided for each site in the site specific TMPs.

3.4 Inter-Agency and Community Liaison

3.4.1 General Approach

Implementing a project of this scale involves effective and ongoing interaction between various organisations and the general public.

Based on previous experience it is suggested that of the following groups be established:

- Traffic and Transport Liaison Group (fortnightly meetings in the project initiation phase, with monthly meetings once worksites are established)
- Network Co-ordination Liaison Group (quarterly meetings)

3.4.2 Network Co-ordination Liaison Group

The Network Co-ordination Liaison Group (NCLG) will provide a strategic and tactical forum for ensuring the CBD Metro works are coordinated with other development and public works; and will aim to mitigate impacts on local business, residents and CBD visitors by ensuring that construction impacts arising from the CBD Metro are integrated and balanced against the construction impacts of wider redevelopment and other changes occurring within the CBD. These activities may comprise of:

- COS Upgrade works;
- Redevelopment of existing buildings/sites; and
- Major services relocations.

The participants of this group may include organisations such as:

- Department of Environment and Climate Change
- Department of Planning
- COS and Leichhardt Municipal Council
- Sydney Metro/CBD Metro
- RTA
- Barangaroo Delivery Authority
- Sydney Harbour Foreshore Authority
- RailCorp
- Major Special Event proponents
- Major CBD redevelopment proponents – i.e. Energy Australia, land owners etc
- PRI & IMO Contractor

The scope of this group will be more strategic in its approach and will be concerned with longer term plans such as the end state arrangements.

The NCLG will co-ordinate with other existing groups, to ensure an integrated planning approach before, during and after the Metro is constructed.

3.4.3 Traffic and Transport Liaison Group

A Traffic and Transport Liaison Group (TTLG) would be formed to ensure the stakeholders most affected are aware of the proposed construction activities, upcoming works and related transport implications. The participants may vary depending on the worksite and potential issues and areas affected, however the core group may consist of:

- Sydney Metro

- RTA
- RTA – TMC
- NSWTI
- Police
- City of Sydney Council
- Leichhardt Council
- State Transit Authority
- Contractor

Other participants may attend depending on the particular project element being discussed:

- Taxi Council
- Bus and Coach Association
- Sydney Ports Corporation
- SHFA
- All Emergency Services

There is scope for two TTLGs, one for the CBD area stations and one covering Rozelle and White Bay.

In addition, consultation with other authorities would be undertaken on an as needs basis.

These other activities may comprise:

- City Of Sydney Upgrade works
- Redevelopment of existing sites;
- Major services relocations; and
- Large scale bus priority works etc.

The scope of this Group may be more strategic in approach and is likely to be more concerned with the longer term planning such as the end state arrangements.

The NCLG would co-ordinate with other existing groups and initiatives such as the Wynyard Transport Precinct Working Group, to ensure an integrated planning approach before, during and after station construction.

3.5 Communications with the Community

The Community Involvement Plan (CIP) for the CBD Metro will be developed as part of the TTLG process to address issues of importance to the community and other stakeholders that need to be consulted during design and construction process.

3.5.1 Existing businesses and residents

Existing owners of potentially affected properties will be consulted during the course of the Project. The project will endeavour to maintain access to properties for both pedestrians and vehicles to allow residents and businesses to access their properties. Any works affecting access and footway works will be carried out in stages, which will limit the extent of disruption at any one time.

Residents and businesses in the surrounding area will be notified prior to the start of works, together with advance notice on VMS and static advisory signage.

A copy of the traffic management documentation will be available in a convenient location such as local government offices or alternate display centre before implementation and the proposed works advertised in the public notices section of papers.

3.5.2 Notification of Traffic Switches or disruptive works

A range of communication strategies are proposed to allow both timely advice regarding the proposed works and to permit feedback to identify and address or mitigate potential issues. It is envisaged that a range of communication methods will be used including:

- Website (currently available and providing an on-line forum)
- Designated contacts from Sydney Metro and the contractor (and substitutes) for the duration of the works;
- Public notices in major regional and local newspapers; and
- Letter box drops of premises surrounding the worksite.

3.6 Approvals

3.6.1 Policy Context and Legislative Backing

Sydney Metro has powers granted under Part 6A of the Transport Administration Act 1988 to facilitate development of a Metro Railway system. Section 55D of the Act states:

- *Sydney Metro may, for the purpose of developing a metro railway system, prepare station plans for land on which metro railway stations are to be situated, and land in the vicinity of such metro railway stations, with respect to the following matters:*
 - *Development on the land, including development for integrated transport facilities such as bus or other transport interchanges*
 - *Traffic and parking management arrangements,*
 - *Pedestrian links and access facilities,*
 - *Retail and commercial development associated with metro railway stations,*
 - *Public domain amenities and improvements,*
 - *Station design and amenity,*
 - *Other matters ancillary to the operation of metro railway stations and any associated transport or other facilities.*
- *Sydney Metro is to consult with other relevant public authorities when preparing a station plan or an amendment to a plan.*
- *Sydney Metro may provide a station plan to the Minister for Planning and other relevant public authorities in connection with the exercise by the Minister or authorities of statutory and other functions relating to the land concerned.*

In addition to the powers granted under the Transport Administration Act, Clause 5 of Section 2 of the Roads Act, Section 138 states:

- *Section 138 does not require a public authority, or a network operator within the meaning of the Gas Supply Act 1996, to obtain a roads authorities consent to the exercise of the public authority's or gas distributors functions in, on or over an unclassified road other than a Crown road.*

Section 55D enables Sydney Metro to undertake necessary adjustments to traffic arrangements adjacent to work sites in accordance with the Station Plans. Where these arrangements occur on the RTA road network, or occur in the vicinity of Traffic Signals, Sydney Metro is required to obtain the consent of the RTA. Where the arrangements occur on road networks of other public authorities, such as Council, SHFA or the Port Authority, Sydney Metro is required to consult with those stakeholders. Any traffic or construction works required to support CBD Metro which are not identified in the Station Plans will need to be approved by the relevant roads authority e.g. adjustments to intersection arrangements on a Council road to facilitate a haulage route remote from the Station location.

3.6.2 Approvals Checklist

Table 3.2 identifies likely agencies that have an interest in the traffic management measures proposed at each CBD Metro Station location.

Table 3.2: Principal Agencies

	City of Sydney	Leichardt	Ministry of Transport	RTA	SHFA	Barangaroo Delivery Authority	Sydney Ports Corporation	RailCorp
Central	X		X	X				X
Town Hall	X		X	X				X
Martin Place	X			X				X
Barangaroo-Wynyard	X		X	X		X	X	X
Pyrmont	X			X				
White Bay/Depot				X	X		X	
Rozelle		X		X				

3.6.3 Traffic Management Plan Approvals Process

The site specific TMPs provide greater detail of individual TCP and ROL requirements.

Given the range of approvals and consents that may be required to facilitate the construction of the CBD Metro suggested that the Station TMPs and CTMP provide the main basis for any required approvals. These documents would be considered for approval by the Traffic and Transport Liaison Groups. Membership of the TTLG will include representatives of the main approval bodies. The TTLG, given its composition, could give in principle approval by signing off the TMPs and TCMPs. This would streamline the delivery process, and ensure sufficient authority is given to the TTLG.

The TTLG would be chaired by CBD Metro and will have a range of functions. Possible terms of reference include:

- To improve and maintain communication between the CBD Metro project and all other stakeholders; and
- To plan and review the traffic management arrangements for the CBD Metro works and approvals;
- To mitigate the overall impacts of the CBD Metro works on the area;
- To allow co-ordination of works / schemes in the area;
- To obtain approval in principle for the traffic management arrangements;
- To develop measures that offers the best value for traffic and the project; and
- To ensure that plans are agreed in a timely manner in accordance with the overall project programme.

3.6.4 Road Occupancy Licence Approval Process

The CBD Metro Construction Team will comply with the RTA, City of Sydney and Leichhardt Municipal Council procedures in applying for Road Occupancy Licences as summarised in this document. ROLs and supporting TCPs will also include applications to the RTA for any required 'Speed Zone Authorisations' (SZA).

For the project initiation works, lead times for submission of TMP and associated ROLs should assume an extended approval period of 20 working days. Once the worksites are established the normal 10 working days lead time for ROL applications may be applicable, depending on the extent of proposed road network changes.

After the granting of the ROL, it will be the responsibility of the Construction Team to ensure that the works are carried out safely and in accordance with applicable legislation, regulations, Australian Standards and RTA specifications and procedures.

Implementation of the TCP submitted with the ROL will be the responsibility of the Construction Manager or delegate. Prior to the commencement of any changes to the existing traffic arrangements, a toolbox or daily pre start meeting of all involved is to be held, with the nature of the changed arrangements and procedures for their implementation being discussed.

3.6.4.1 Coordination of ROL Activities & Cumulative Considerations

To ensure that road users do not experience excessive delays due to the cumulative impacts of multiple construction activities, the TTLG will oversee ROL applications within influence of the CBD and the Metro corridor to ensure cumulative impacts are managed.

The cumulative impact on travel time resulting from multiple ROLs submitted both to Council and to the RTA and operating concurrently will be assessed by the TTLG. Proposed road occupancies would be able to be vetoed by the TTLG should the potential impact on traffic flows and/or safety be compromised by having repeated ROLs in operation within influence of each other within the CBD.

Where necessary concurrent works are expected to have unreasonable impacts on travel time or create unreasonable levels of disruption, communication strategies will be required to advise motorists of periods when journey times are expected to be extended must be put into place in accordance with the project Community Consultation protocols.

3.6.4.2 Duration of ROLs

In the case of the CBD Metro where construction stages will require a number of years to complete, ROLs will generally be issued for the stages identified in the overall traffic management plan, with the condition that a forecast weekly schedule of proposed road occupancies is provided to the TTLG. The maximum period of time that a ROL could be valid for would be 3 years, at which time a new ROL must be applied for, taking into account changes that have occurred since the original ROL was approved.

3.6.5 Speed Zone Authorisation

An application to the RTA must be made for any proposed adjustment to speed limits whether they are temporary, such as those required for short term road occupancies, longer term such as for the duration of a construction stage or permanent. A Speed Zone Authorisation application usually accompanies a ROL application where a change in speed limit is proposed as part of the road occupancy.

The RTA process involves submission of a form available online from the RTA website, which is to be submitted via fax to the RTA Transport Management Centre's Planned Incident Unit. Depending on the extent of works and project familiarity the application will be supported by project TMP and traffic control plans. As discussed previously, ten working days, is the minimum advance notice required to enable processing of the application, after which the applicant may be issued with the authorisation. Speed Zone approvals comprise part of process for approval of the traffic Control Plan

No adjustments to speed limits are to be undertaken without an approved Speed Zone Authorisation.

3.6.6 Special Event Co-ordination

The CBD is impacted by several significant scheduled events, which affect visitor numbers on city streets, bus and rail services, and general traffic lanes but are generally of limited duration, e.g. Australia Day, Anzac Day services, Mardi Gras, major sporting events, festivals and other marches/parades for which prior approval has been granted.

Pedestrian activity in the CBD increases significantly in the lead-up to Christmas and through to the post Christmas sales. This period coincides with an increase in tourist activity, e.g. with summer cruise ship arrivals and generally increased visitor numbers. City of Sydney has a policy of not permitting disruptive works within the retail core during the period from the first week to the end of December. Where feasible, works affecting pedestrian paths and station access should be minimised, and/or increased site supervision by traffic controllers provided.

For traffic and transport management purposes, the RTA special event management guidelines process identifies four distinct classes of special event:

- **Class 1:** is an event that impacts major traffic & transport systems and there is significant disruption to the non-event community. For example: an event that affects a principal transport route in Sydney, or one that reduces the capacity of the main highway through a country town.
- **Class 2:** is an event that impacts local traffic and transport systems and there is low scale disruption to the non-event community. For example: an event that blocks off a main street town or shopping centre but does not impact a principal transport route or a highway.
- **Class 3:** is an event with minimal impact on local roads and negligible impact on the non-event community. For example: an on-street neighbourhood Christmas party.
- **Class 4:** is an event that is conducted entirely under Police control (but is not a protest or demonstration). For example: a small march conducted with a Police escort vehicle.

During construction, special consideration and traffic planning will be undertaken to address the road user needs during special events, including Sydney City Festivals, public holidays and events, marches, protests etc.

The traffic management requirements of Special Events may require adjustment to times of operation and routes used by haulage or delivery operations as well as varying approved road occupancy licence (ROL) conditions for CBD Metro construction. The CoS or RTA ROL approval will identify time and day restrictions, where potential conflicts are known at the time of submission.

The CBD Metro (PRI or IMO) Contractor will be responsible for incorporating known special events into the construction program and detailed responses and contingencies in the CTMP. It is envisaged that this aspect of co-ordination will occur through the Transport Services Coordination Authority's (formerly Transport NSW) Major Events Coordination Unit, approved event registers of local government and the regular Traffic and Transport Liaison Group.

During development of the CTMP the designs should take account of requirements of major regular events such as ANZAC day to ensure proposals do not impede those events.

3.6.7 Traffic Control Plan

All Traffic Control Plans to be used during the construction activity will be developed in accordance with Australian Standard 1742.3 and the RTA's "Guide to Traffic Control at Worksites" by a suitably qualified person.

A TCP can only be prepared by a person who has undertaken and passed the RTA's "Traffic Control at Worksites Manual" training course and holds a current certification. Relevant reference documents are:

- Australian Standard AS1742.3 -2002 (Manual of uniform traffic control devices Part 3 Traffic control devices for works on roads);
- Roads and Traffic Authority NSW, Guide to Traffic Control at Work Sites (TCAWS). Version 3, 2004;
- Roads and Traffic Authority NSW, QA Specification G10 Control of Traffic; and
- AUSTROADS. Guide to Traffic Engineering Practice.

All worksites and traffic control plans will be implemented as per the approved road occupancy licence and standards.

3.6.8 Adjustments to Traffic Signals

Any temporary or permanent works requiring reconstruction or adjustment to traffic signals requires the prior RTA approval of traffic signal design plans. Lead times for approvals can be more extensive than for other temporary works approvals, i.e. a 6 week lead time from submission to approval. Additional time may be required to facilitate the modification of traffic signals electronic hardware, in addition to undertaking any physical changes onsite to intersection layouts.

The PRI/IMO Contractor will be responsible for the preparation of traffic signal designs and obtaining prior approvals in a timely manner. Design shall comply with the RTA, DCM Specification for the Installation and Reconstruction of Traffic Light Signals (SI/TCS/8). Any works shall be carried out by an RTA accredited traffic signal contractor.

3.6.9 Over-Dimension or Over-Mass Vehicle Permits

Prior RTA approval to proposed oversize vehicles will need to be obtained and an authorisation permit granted prior to the movement of permit.

3.6.10 Adjustments to Bus Routes and Stops

Prior approval of NSWTI and STA to any proposed relocation of bus stops or routes is required prior to submitting any ROL application to the RTA.

3.7 Management of Construction Traffic

3.7.1 Truck Routes

Designated access routes for construction and spoil vehicles will be along the arterial road network where practicable. Details of all routes used for access and haulage during construction will be developed in consultation with the relevant local government authority and detailed in the appropriate section of the site specific TMPs.

The proposed truck routes are shown in **Figure 3.1**:

Figure 3.1: Proposed CBD Truck Routes

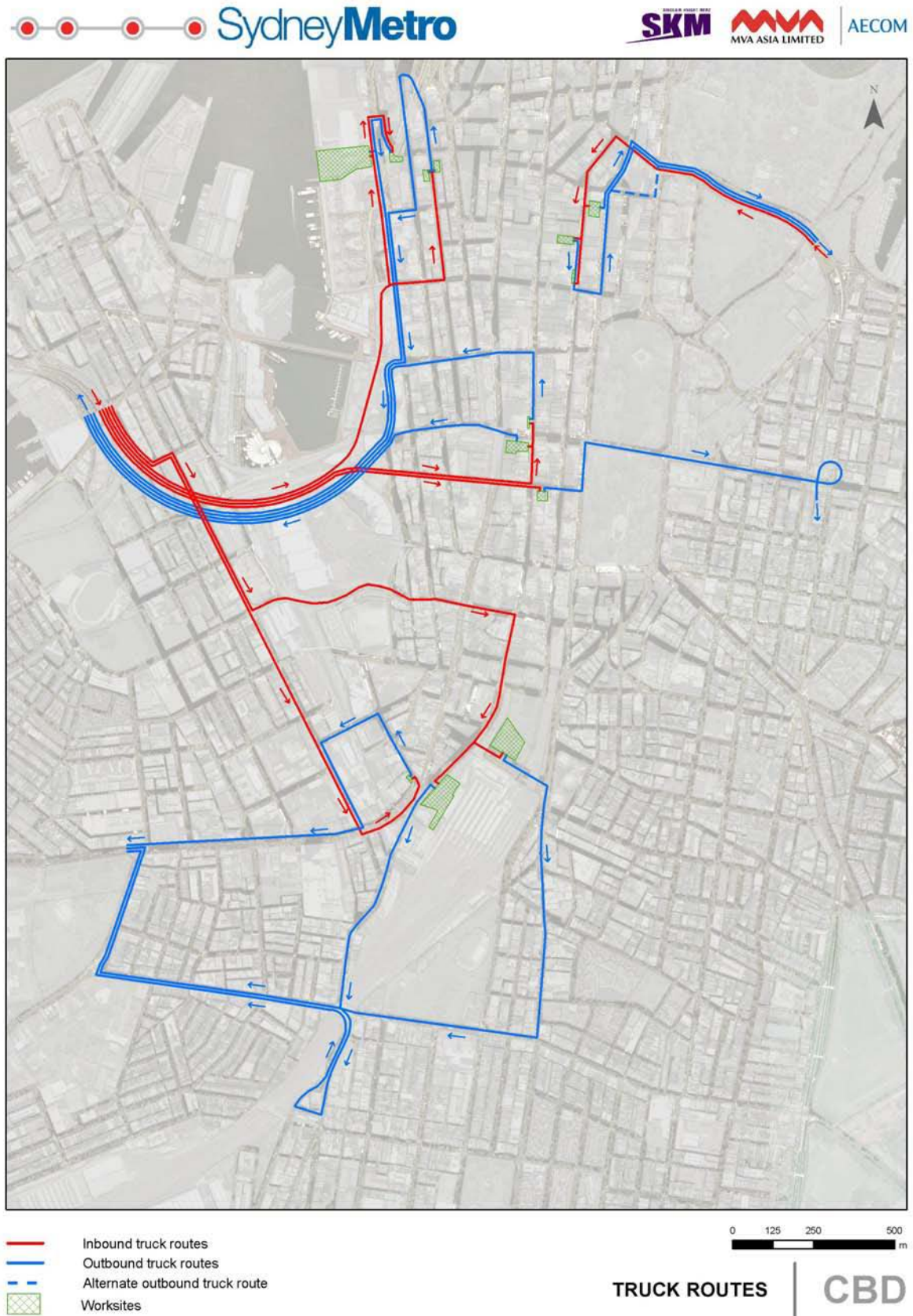
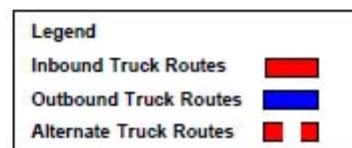


Figure 3.2: Proposed Pyrmont Truck Routes Alternative 1



10/11/2008/11/2008/11/2008

Figure 3.3: Proposed Pyrmont Truck Routes Alternative 2

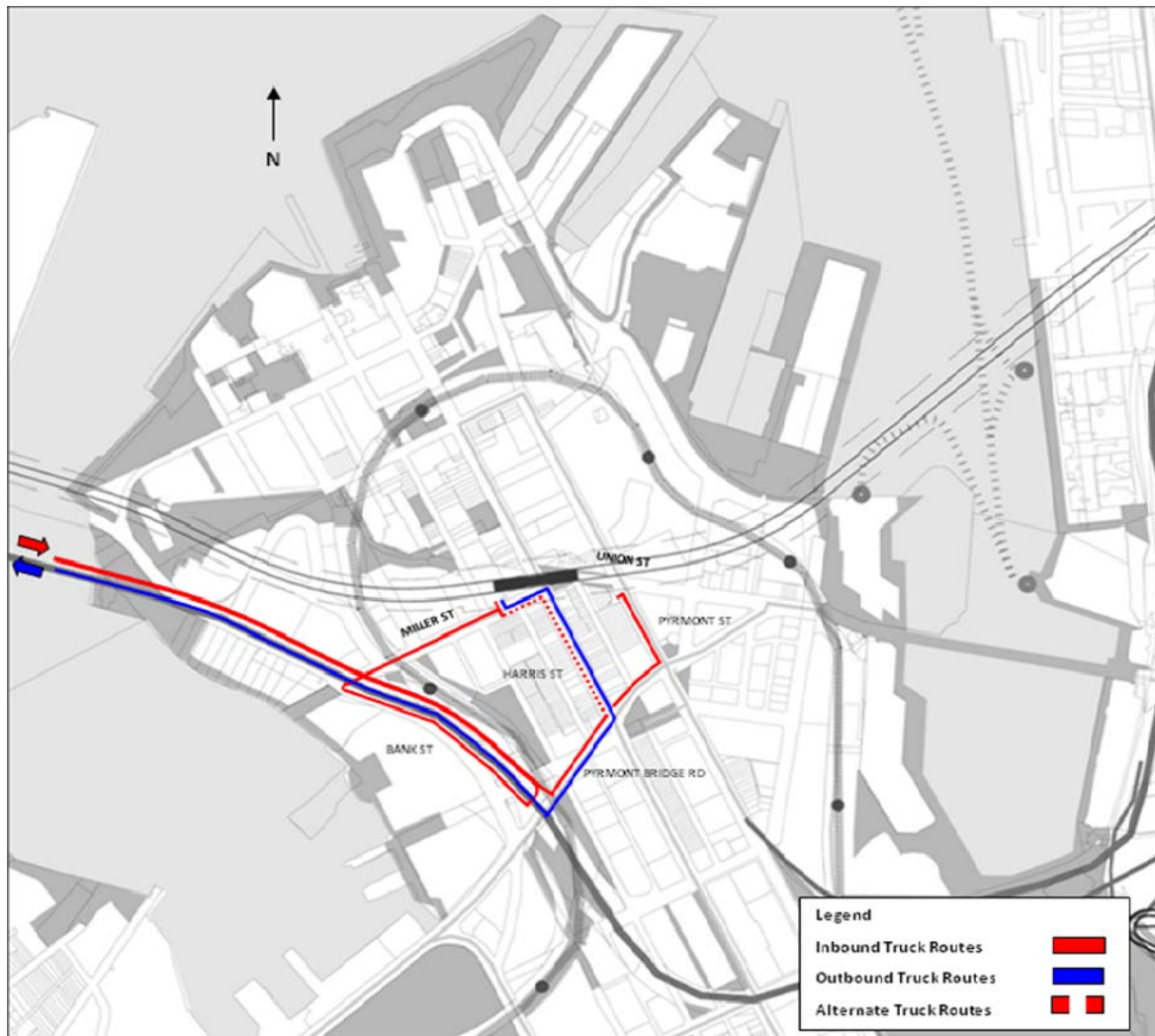


Figure 3.4: Proposed Rozelle Truck Routes

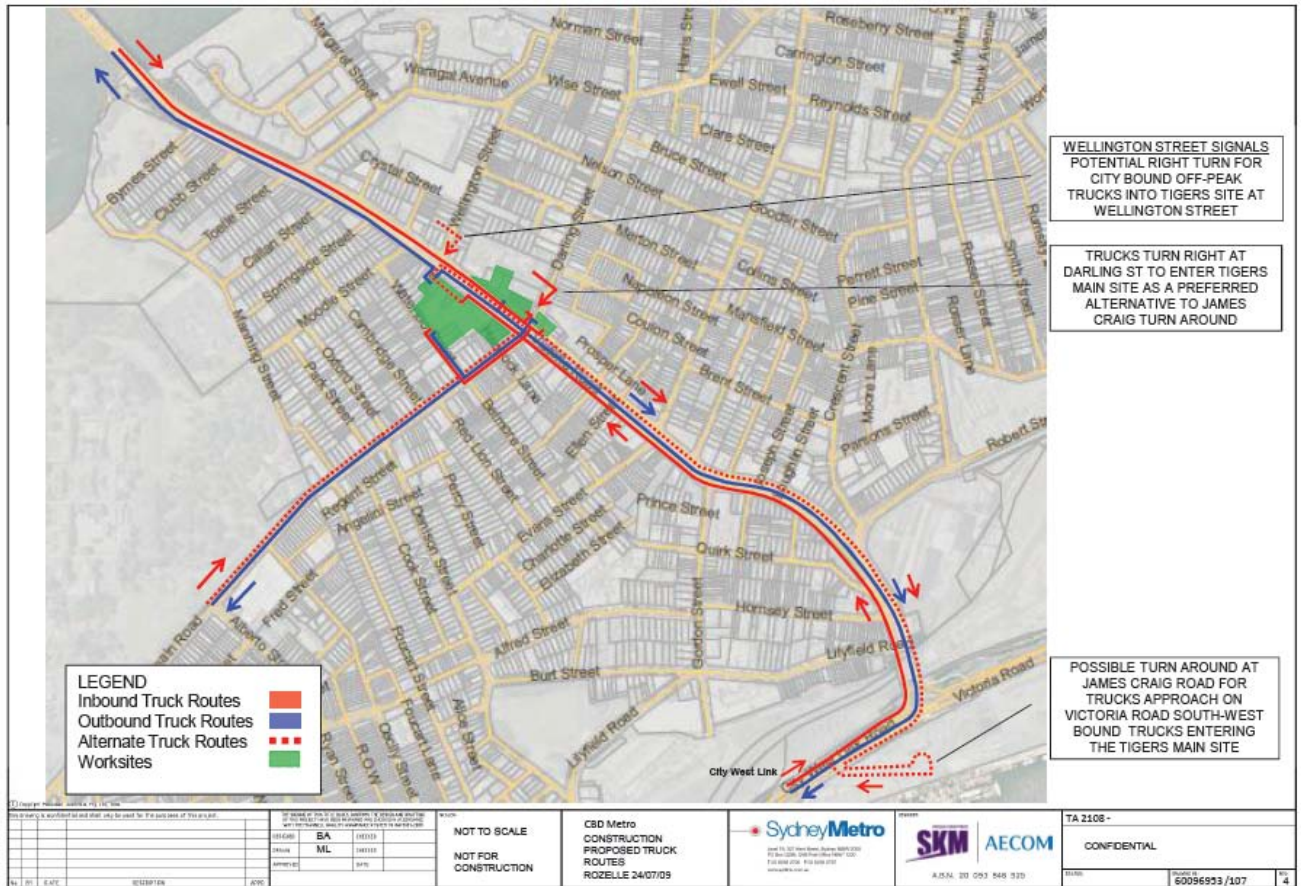
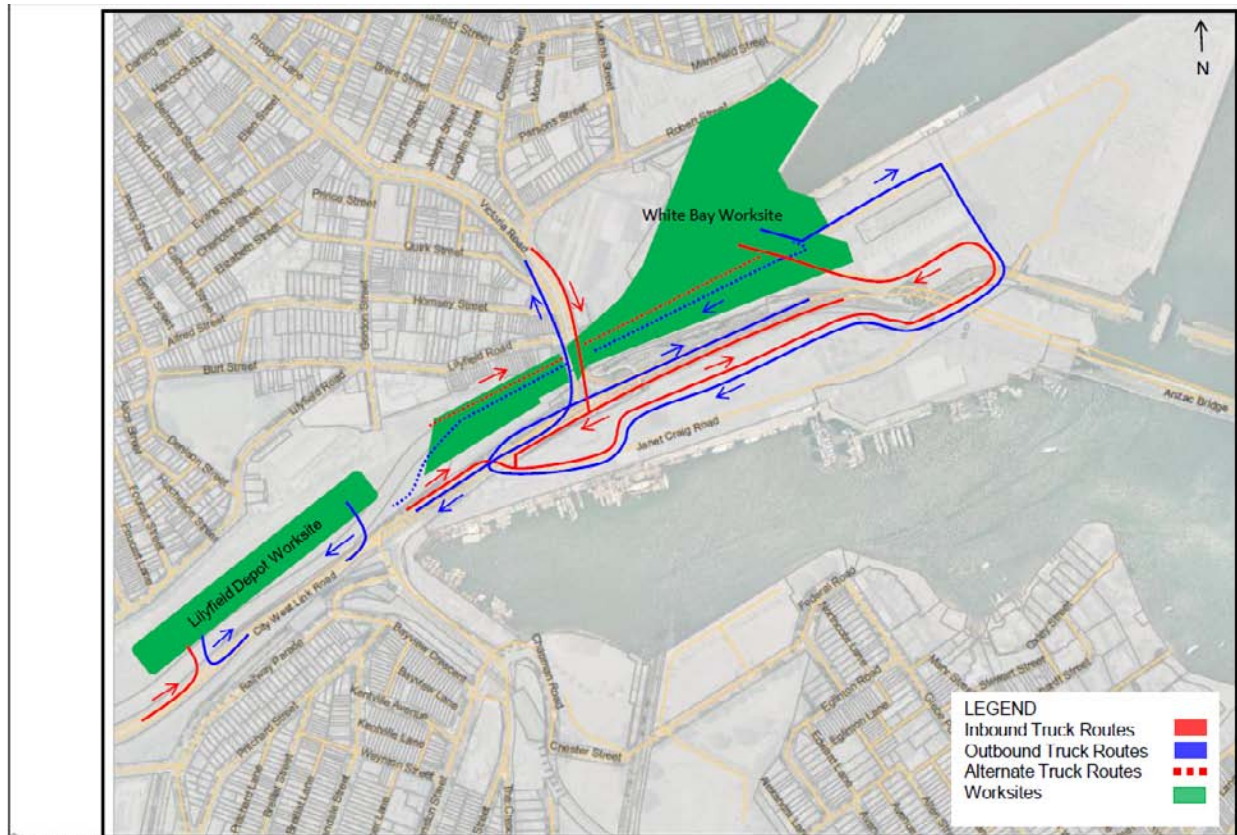


Figure 3.5: Proposed White Bay and Depot Truck Routes



Spoil haulage routes will be developed in a format such that a suite of individual instructions and maps are provided to contract operators for all points of origin to respective destinations and return. In addition, layover areas will be nominated should vehicles need to 'store' prior to arriving at the spoil removal sites. Approximate travel times during various periods of the day will be developed for each route as a guide to operators and also assist in more consistent and uniform arrival rates at each site.

3.7.2 Dilapidation Surveys

Dilapidation surveys of regional and local roads used by construction traffic will be undertaken prior to their use for construction as well as after construction is complete. Monitoring will be carried out to the satisfaction of, and a dilapidation report submitted to, relevant local government authorities. The proponent will be responsible for any necessary repair of deterioration attributable to the impacts of construction traffic.

3.7.3 Management of Truck Movements

Vehicle and pedestrian access to and from each Work site, including the locations of entries, exits, turning restrictions, slip lanes, traffic lights, signage and the like will be established in line with the requirements of the Environmental Assessment and in consultation with the RTA and Councils.

3.7.4 Construction Zones and Call Forward Areas

Due to restricted space within the worksite there may be requirements for some on road parking/waiting/unloading by construction traffic. Where this does not interfere with traffic lanes, such as where there is current parking, provision may be made for a dedicated construction zone, however the contractor will minimise the number and extent of these zones.

During times of continuous construction traffic activity, such as during excavation, it is likely call forward areas will be required to assist construction traffic management and minimise disruption to other road users. These areas would be located close to the worksite area.

It is likely that call forward areas and storing for construction traffic and material may occur within the Barangaroo and White Bay worksites due to the location and availability of space.

3.7.5 Design Construction Vehicle

To minimise the number of truck movements- the largest vehicle possible will be used however consistent with the constraints of the CBD access routes, safety and site constraints. It is suggested that the standard vehicle would be a single unit tipper truck able to carry 5m³ or 20-22 tonnes. Based on advice from the RTA the intention would be to avoid the use of truck and dog vehicles within CBD, although City of Sydney officers acknowledge that truck and long vehicles could be appropriate at some CBD locations such as the Central and Barangaroo-Wynyard worksites where access to the arterial roads is reasonably direct.

The standard vehicle at White Bay will be either Truck and Dog or a semi trailer which would have about 12m³ capacity, or 42 total tonnage.

3.7.6 Worker Access and Parking

The limited site areas available for the CBD station locations will normally preclude the provision of on-site parking for workers. However there is potential for parking to be provided on the White Bay or Rozelle Depot sites with transfers via scheduled bus services or shuttle bus. There may be some limited parking available at Rozelle and possibly Barangaroo within the worksites.

A similar arrangement is anticipated during the IMO phase, with materials and equipment required by trades persons stored remotely and transferred to site.

The assumption for all site specific TMPs is that there is no provision either on the road or within the worksite for worker parking unless explicitly stated.

3.7.7 Construction Consolidation Centre/Depot

To mitigate the impact of construction traffic Sydney Metro should consider the provision of a Construction Consolidation Centre/Depot to receive deliveries, and arrange for the co-ordinated central distribution to the worksite. Previous experience of these facilities elsewhere internationally has shown up to a 70% reduction in construction traffic movements where external marshalling of supplies and equipment is undertaken.

3.7.8 Driver Training

Truck drivers should be fully aware of the worksite and traffic management site access requirements including any truck noise management measures required. Taking account of current best practice drivers should receive Cycle Awareness Training.

The contractor will ensure that drivers receive a daily briefing on their routes, and worksite destinations in the form of toolbox talks.

3.8 Worksites

All worksites will be clearly defined with the use of hoardings or other clearly identifiable site boundaries. The TMPs will identify the boundaries and suggest with the footpath and road controls. Activities within the worksite are excluded from the TMPs except in relation to ensuring the movement of construction traffic in and out of the worksite is physically possible.

Worksites include any gantries, or other structures associated with the site layouts. The site specific TMPs will consider these interactions and the impacts of gantries, etc on the road and footpaths.

In providing any hoarding and gantry structure consideration will be given to ensuring sight lines for side roads, vehicle accesses, signposting, and traffic signals are maintained. The City of Sydney has published policies on hoardings accessible on their web site.

3.8.1 Hoardings

The design of hoardings will have an important impact on the success of pedestrian and vehicle management measures. The following considerations will be taken into account in designing hoardings:

- Surfaces are bright
- Smooth surfaces are used which allow pedestrians to brush past without snagging (this reduces shying from the edge)
- Surfaces are regularly cleaned and inspected
- Removal of graffiti and advertisements
- Adequate lighting provided
- Where adjacent to road edge a minimum hording offset of 500mm from the road edge with design feature to prevent pedestrians walking alongside the kerb.
- A city of Sydney preference for concertina style driveway gates rather than fixed rigid gates.

3.9 Site Security, Site Access and Signage

The issues to be considered in determining the location of site accesses are:

- Safety of travelling public;
- Safety of construction workers and equipment;
- Impact on local communities in terms of safety, noise and road damage;
- Ease of access for emergency vehicles; and
- Site security.

The worksites and depots will have appropriate arrangements to discourage entry without approval and minimise vandalism. All access points to fenced compounds and depots will have lockable gates (see **Section 3.8.1** above).

Appropriate information signs will be provided at work sites to identify the Project and contact persons.

3.10 Hours of work

Standard NSW construction hours are 7.00am to 6.00pm on weekdays and 8.00am to 1.00pm on Saturdays. While some of the construction work would be undertaken within these standard construction hours, the majority of the works would need to be undertaken on a 24 hour, seven day week basis. Some adjustment to these standard project work hours may be considered by CBD Metro for the Pyrmont worksites.

The proposed construction hours for the below-ground and above-ground activities are outlined below in **Table 3..** In exceptional cases of urgency it may be necessary to depart from these assumed hours. This would not take place without prior discussion with and/or notification of local residents and the Department of Environment and Climate Change.

Table 3.6: Expected hours of work

Activity	Construction Hours	Comment/expectations
Below-ground construction activities		
Tunnelling	24 hours per day, six days per week	- Some activities that support tunnelling and fitout works may need to occur 24 hours per day, seven days per week - Rock hammering in the tunnel between 10.00pm and 7.00am is likely to be precluded where it may impact on residential receivers
Construction of station caverns	As above	
Above-ground construction activities		
Construction Sites	Standard DECC construction hours	The following activities would be undertaken 24 hours per day, six days per week where noise impact management measures have been established: - Surface works supporting underground construction (e.g. concrete pumping, truck loading) - Excavation in hard ground Non-disruptive preparatory work, repairs or maintenance may be carried out on Saturday afternoons or Sundays between 8am and 5pm. Activities requiring temporary possession of roads may need to be undertaken outside the assumed hours to minimise safety impacts and inconvenience to commuters. Similarly, works involving utilities would need to be undertaken during periods of low demand likely to be outside of standard hours.
Construction Traffic	24hours per day, 7 days per week	- Spoil trucking operations are likely to occur between 7am to 10pm, seven days per week. Spoil trucking from the White Bay worksite will take place 24hours per day, 7 days per week. - At locations where sensitive noise receptors are close to construction sites, significant construction vehicle movements are likely to be restricted during evening and night-time periods. - Extended periods of localised lane and road closures would likely be required for safety purposes for the demolition of multi-storey buildings.

Source: CBD Metro July 2009

3.11 Safety Audit

3.11.1 Purpose and Benefits

A Road Safety Audit Process is a formal procedure for checking the design, implementation and operation of road works from a safety perspective. The establishment of quality systems provides the philosophy underpinning the Road Safety Audit Process. The overriding objective of the process is to ensure that all existing road schemes and future routes operate at an acceptable level of safety, with safety being an integral part of the road network development process.

The benefits of road safety audits are that:

- The likelihood of accidents on the road and the adjacent network can be reduced;
- The severity of accidents can be reduced;
- Road safety is given greater prominence in the minds of road designers,

- The need for costly remedial work is reduced; and
- The total cost of a project to the community, including accidents, disruption and trauma, is reduced.

3.11.2 Stages when Road Safety Audits are Undertaken

Road safety audits will be undertaken at the following stages:

Detailed Design Stage	At this stage, the geometric design, traffic signing scheme, linemarking plans, lighting plans and landscaping plans are available and will be looked at in relation to the operation of the road.
Pre-Opening Stage	Prior to opening a site, an inspection will be made for all relevant conditions at night and during the day for all likely road users to ensure that the construction has addressed earlier audit concerns and to check for any hazardous conditions that were not apparent at the feasibility or design stages.
Road Safety Audits of Temporary Work	The Metro will undertake regular safety audits of work zones to ensure all worksite safety arrangements are in place. These audits will be additional to the daily inspections by site staff. Particular attention will be given to OH&S guidelines, work areas adjacent to the road, movement of construction traffic, vehicle speeds, and all warning devices/systems.
Road Safety Audit Procedure	All road safety audits will be undertaken in accordance with the RTA Publication "RTA Accident Reduction Guide Part 2-Road Safety Audits 2005 ".but also with reference to Austroads Guide to Road Safety Part 6 January 2009

3.12 Pedestrian Security/Safety/Lighting

All worksites will take consideration of issues of pedestrian safety and security. Any hoardings, or other fixed site boundaries will have the lighting as required by current standards. In situations where street lighting is obscured by worksite arrangements additional lighting will be provided to meet, or exceed current standards.

Consideration will also be given in design to the layout of any hoarding/fence lines to maximise sight lines for pedestrians, and design out hiding places and blind spots to improve pedestrian personal security. Any gantry arrangements or tunnels will have internal lighting.

Consideration will be given to relocating or supplementing existing CCTV cameras if the worksite creates blind spots.

3.12.1 Provision for Vulnerable Users (School Children, Elderly and Mobility Impaired)

Where worksites have an impact on footpaths, consideration will be given to the requirements of all pedestrians and especially vulnerable users. DDA requirements will be adopted with drop kerbs, etc provided at crossings. Footpath widths are required to allow two way pedestrian traffic allowing for pushchairs and wheelchairs.

Where high numbers of vulnerable users use a footpath, special provision and design consideration may be required to mitigate impacts.

4.0 Proposed Work Method

The underground stations along the proposed CBD Metro route will be cavern stations with the exception of White Bay station, which will be constructed using cut and cover techniques

Cavern stations are planned at locations where there is depth or land use restrictions for construction of cut and cover stations. Caverns are required to be in competent ground conditions to ensure the large spans required for the stations can be supported.

Cavern stations will primarily be mined with surface structure elements such as entrance, emergency egress and ventilation shafts constructed using cut and cover techniques similar to typical building basement methods.

A primary worksite will be established at the surface to support all stages of cavern station construction and secondary worksites will be required to support shaft construction activities. The site constraints at the surface are considerable with impacts on pedestrian and vehicular traffic for four or more years at each station primary worksite and to a lesser extent at secondary worksites.

Station shafts will excavated using conventional excavation methods and the caverns will be excavated using roadheaders and rock breakers. It is envisaged that cavern excavation would be completed prior to the arrival of the Tunnel Boring Machines (TBMs) constructing the running tunnels. TBMs will be pulled through the station and prepared for the tunnel drive to the next station. A range of activities will be required at the primary worksite to support this process.

The main truck generating activity will be associated with spoil removal from the excavation of cavern stations, entrance, emergency egress and ventilation shafts, as discussed in Section 4. Other activities that will be supported by truck movements include:

- Enabling works will include building demolition works for property at primary worksites; temporary construction power supply installation; utilities/services relocation or diversion clear of the works and site establishment of station worksites;
- Ground support and lining works for station caverns with plant and material delivered to the underground cavern from the surface;
- Structural concrete works for station entrances, emergency egress and ventilation shafts, followed by internal building works and station architectural fit-out/finishes;
- Specialised installation works associated station platforms, concourses, accommodation and circulation areas, services and other amenities, station entry/exit gates, platform screen doors and barrier installation.
- Mechanical and electrical fitout of station services and communication systems (including local power supply, lighting, public address, plant room cooling/humidity control; building management systems, smoke exhaust, gas purging, water and waste water, mechanical ventilation, etc.);
- Underground pedestrian concourse areas are to be constructed by combination of mining methods (to minimise disturbance of the road surfaces); and
- Testing and commissioning station systems.

The indicative station construction staging and indicative construction timeframe for the construction activities are summarised in **Table 2.1**.

4.1 Other Temporary Worksites

In addition to the main construction sites identified, other temporary worksites would be required from time to time, as part of the enabling works, PRI works, IMO works and/or other minor works packages.

The temporary worksites would be short in duration in comparison with the main CBD Metro construction sites. Duration for these worksites would range from less than 24 hours (for overnight delivery of oversized loads to site), to longer durations of up to 12 months (for worksites required for utility diversions, initial stages of building demolition works, and other staged areas to facilitate infrastructure construction).

The size, location and extent of temporary worksites have not been determined at this stage of the project, however the activities would likely be for work items such as:

- Delivery and lifting of large construction equipment, materials, and components of the works (e.g., escalators, lifts, steel or concrete beams/columns, etc) from within the road reserve, that can not be undertaken from within the main construction sites due to space limitations;
- Removal and lifting of large construction equipment and material (e.g. TBM components at Belmore Park (Central Station), materials from demolition of existing building, etc) that can not be undertaken from within the main construction sites due to space limitations;
- Pit and duct systems for 11kV construction power supply for all station sites, and 33kV supply at Pyrmont and Rozelle/Lilyfield;
- Other utility/services connections for construction purposes (e.g. water supply points, connections for telecommunications, etc);
- Construction and permanent depot access connections onto City West Link Road at Lilyfield;
- Pit and duct systems for bulk power supply routes at Central/Surry Hills and Rozelle/Lilyfield;
- Relocation or diversion of existing services/utilities clear of the main CBD Metro construction sites;
- Initial stages of building demolition works where there is no suitable vehicular access within the property boundary;
- Utility/services connections for the CBD Metro infrastructure in the vicinity of stations, and the stabling and maintenance depot (e.g., water supply, sewer, stormwater, power supply, telecommunications, data, etc);
- Other staged temporary areas to facilitate infrastructure construction works;
- Station precinct and stabling and maintenance depot urban domain and finalisation works external to the main worksite locations including minor adjustment/interface with roads; provision of bicycle ways, pedestrian areas and footpaths; hard and soft landscaping; relocation or adjustment to bus stops and taxi ranks; provision of bicycle storage facilities; way finding and signage; line marking; exterior lighting; and other urban domain treatment works.

Measures and management processes that would be implemented to minimise impact associated with temporary worksites would include items such as the following:

- Coordination of works to ensure concurrent worksites at any one location do not coincide (for example a water main diversion on one side of the road would not be undertaken at the same time as installing a telecommunications cable pathway on the opposite side of the road);
- Staging of the works to ensure extent of impact is minimised. For example 'rolling' worksites would be used for linear worksites required for utilities. Trenches for utilities within roads would be excavated, pipework/ducts installed, and backfilled in short (easier to manage) sections along the length of the utility works wherever practicable;

- Alternative 'trenchless' construction methods including pipe jacking, auger boring, microtunnelling, pipe ramming, pilot tube, and horizontal directional drilling could be used where space and methods permitted reduces disturbance on the surface;
- Where works in roadways are required to cross through or are in proximity of intersections, or other constrained areas, night works and the use of road plates would be employed to ensure day-time traffic is not impacted;
- The construction contractors would be required to prepare Traffic Control Plans (TCPs) and road occupancy permits for each worksite for approval by the relevant authorities (e.g. RTA and/or Council) prior to the works commencing on site;
- Provision of suitable traffic control and warning devices as detailed in the TCPs such as traffic control personnel, signage, etc;
- Provision of suitable worksite fencing/barricades to ensure safety of the public and the workers. Where works are proposed in or adjacent to the road reserve, vehicular barricades would be used, otherwise chain wire/mesh type fencing would be used around worksites within footpath areas;
- Access and security of temporary worksites would be carefully managed at all times including when no activity is being undertaken within the sites;
- Minimising storage of materials and equipment within temporary worksites;
- Selection of noisy construction equipment and methods (such as jack picks, jack hammers, rockbreakers, concrete cutting, cranes, etc) would include consideration of proposed working hours, duration of works, and proximity of residential and other sensitive receivers;
- Use and management of suitable environmental controls such as cleaning of truck wheels, sweeping or pavements, control of excavated material to prevent mud tracking and dust, silt socks around stormwater inlets, etc;
- Maintaining and coordinating access to adjacent properties, and access for emergency services at all times;
- Undertaking appropriate community notification and liaison prior to and during the works.

4.2 Trenchless Construction Methods

Trenchless construction methods are an alternative to open trenching. There are different methods depending on the sites specific requirements. Trenchless methods use either steerable or non-steerable equipment. The steerable equipment can provide pipelines at accurate lines and grades, which is essential for certain applications such as gravity flow sewers. Each different method has its advantages and limitations and the selection of the appropriate method is crucial. The various trenchless methods available are pipe jacking, auger boring, microtunnelling, pipe ramming, pilot tube, and horizontal directional drilling. The particular trenchless techniques also vary depending on whether pressure conduits, gravity flow conduits, where and under what facility they are being installed, length of the installation, and the diameter.

4.3 Traffic Management Constraints

4.3.1 General Constraints

In order to make the design and approval of the traffic management easier a number of general design principles and constraints will be established to cover the worksites for all stations. This would be supplemented by particular constraints, or clearly identified exceptions for each station/worksite. The absolute minimum requirements are listed in AS 1742.3

Table 4.1: General minimum traffic constraints

Constraint		Comment
Minimum Single lane widths (straight)	3.0m plus 0.5 m clearance on each side - total 4m	Assumed < 60 km/hr 85%ile actual travel speeds
Minimum paired lane width (one way)	6m plus 0.5m clearance on each side - total 7m	
Minimum single two way lane width	7.5m	
Minimum clear footway width (midblock)	3m Note AS 1742 states that the same width as existing should be retained	Absolute min 2.1m Note AS 1742 states that the same width as existing should be retained
Minimum footway width at crossing/intersections	4m	Note AS 1742 states that the same width as existing should be retained
All construction traffic access	to enter / exit worksite in a forward direction	
No road closures – road or pavement		May require special consideration at Margaret and Shelly Street
General Maximum truck size	12.5m	Rigid dual rear and single front axle trucks for most sites. Central, Barangaroo, Rozelle and White Bay / Depot may have the potential for larger trucks and hence reduce the number of movements
On site parking	Limited	No on-site parking for workers except possibly Barangaroo, White Bay, Depot and Rozelle.

4.3.2 Site Specific Issues

The individual TMPs for each station provide details on the various construction and traffic related issues. **Table 4.2** below summarises the key issues for each station identified at this time.

Table 4.2: Key Station Traffic Issues

Station / worksite	Key issues
Central	- Relocation of bus stops for university/student services - Impact on Eddy Avenue including truck movements - Pedestrian access through the worksite from Lee Street into the Central Station
Town Hall Square	- Interaction with the monorail - Access for bus stops - Pedestrian activity on George Street, Pitt Street, Bathurst and Park Streets - Flag control on Bathurst Street
Martin Place	- Pedestrian activity on Martin Place - Access for emergency vehicles to properties fronting Martin Place - Construction of the vent shaft on Castlereagh Street may require full or partial road closure
Barangaroo - Wynyard	- Impact on buses - Cut and cover on Sussex Street and Kent Street and probable associated road and or lane closures
Pymont	- Sensitive community needs - Need to maintain village amenity - Conflict with bicycles - Potential re routing of trucks
Rozelle	- Victoria Road key road and high traffic volumes - New bus lanes, bus movement and relocated bus stops - Capacity at Darling Street - Geometry and elevation
White Bay	- Use of private roads for access - Interaction with other leaseholders
Depot	Access to City West link

5.0 Operational Requirements

5.1 Traffic Control at Worksites

5.1.1 Policy and Responsibilities

It is the policy of Sydney Metro that work zones provide for the safe operation of road workers and the safe passage of vehicular and pedestrian traffic. Traffic control devices are provided to warn, instruct and guide road users safely through, around or past work sites on roads including footpaths. A key feature is the need to carefully plan the staging of the work so that workers and traffic are separated as far as possible. Traffic control at work sites will be in accordance with latest edition of the RTA Publications "Guide to Traffic Control at Work Sites", which is based on the Australian Standard, AS 1742.3.

It is the responsibility of all project personnel to ensure that roadworks are carried out in a safe and efficient manner. The project team will prepare specific Traffic Control Plans (TCPs) for all work which involves any obstruction whatsoever to traffic.

TCPs will be prepared by qualified personnel who hold a current RTA "Select/Modify Traffic Control Plans" or "Design and Inspect Traffic Control Plans" certificate.

Where work requirements necessitate temporary speed limits, the contractor will review and submit for RTA approval all Speed Zone Approvals before the temporary speed limit is intended to be implemented.

The contractor will then arrange for the supply and erection of appropriate temporary speed zoning signs. Following erection of the signs, arrangements will be made to cover the signs when the speed zones are not in use. Further details are provided in RTA Specification Part G10 section G10.1.4.

5.1.2 Traffic Control Techniques

The traffic control techniques to be employed will include:

- Temporary road deviations or detours;
- Raised pavement markers and clear line marking;
- Channelisation using traffic cones, safety barriers or lane delineators;
- Directional, information and regulatory sign posting; and
- Time of day routines to optimise traffic and construction activities.

A programme for the regular inspection of traffic infrastructure work will be implemented by the Construction Manager. This will ensure the controls in place continue to provide safe traffic management for both the travelling public and contractor employees or subcontractors. All controls will comply with current RTA Guidelines.

5.1.3 Approved Clothing for Work Personnel

Clothing will be in accordance with the requirements of Australian Standard AS 1742.3.

5.1.4 Plant and Equipment

Arrangements will be made to ensure all plant and equipment working near traffic or pedestrians is properly highlighted and protected to ensure public safety.

5.1.5 Other Traffic Control Devices

Details of other traffic control devices are given in RTA's Guide to Traffic Control at Worksites. These devices include barrier boards, plastic mesh fencing, temporary post mounted delineators, cones, flaps, traffic warning lamps, temporary pavement markings, boom gates and portable traffic signals. These items will be provided as required. However it is intended that the duration of the project will justify "permanent" solutions for the duration of the contract.

5.2 Frequency of Inspections

Road inspections will be carried out regularly to ensure the safe movement of traffic and the protection of persons and property through and/or around a work site. Inspections of all temporary traffic control devices are detailed in **Section 5.2.1**.

Inspections will ensure all signs and devices are properly located, oriented and maintained in an effective condition and the layout is satisfactory and not confusing to motorists or pedestrians. Records will be maintained of all traffic guidance schemes and any adjustments made to such schemes, together with dates and times the schemes were erected varied and removed. Inspection reports recording dates and times of inspections of traffic schemes will be recorded on a suitable proforma. Likewise, reports are to be prepared of all worksite inspections by OH&S Committee members.

In all cases of accidents or near miss incidents, a report will be submitted to the Site Safety Representative on an Employee Incident/Accident Report, who will carry out an investigation and report for the Project Director. The Site Safety Representative is responsible also for carrying out hazard analyses and developing appropriate safe work methods as detailed in the Occupational Health Safety and Rehabilitation Plan

5.2.1 Inspection of Roadwork Traffic Schemes

The requirement to inspect traffic control is stipulated in Section 6 of the RTA's "Traffic Control at Worksites Manual" and Appendix A of Australian Standard 1742.3. There are three main types of inspection:

- Pre-start and pre-close down inspections of short term traffic control
- Weekly inspections of long term traffic control, and
- Night inspections of long-term traffic control.

The checklist in the RTA's "Traffic Control at Worksites Manual" is generic and can be used for all three types of inspection whether short term, long term or night.

The responsibility and frequency of inspections is clearly stipulated in Section 6.1 of the RTA's "Traffic Control at Worksites Manual" and is summarised in **Table 5.1**:

Table 5.1: TCP Inspections

Inspection	Responsibility	Frequency
Pre-start & pre-finish	Traffic Supervisor (Contractor)	Daily
Weekly Audit	Traffic Engineer (Contractor)	Twice a week
Night Audit	Traffic Engineer (Contractor)	Once a week
Pre-opening Inspections	Traffic Manager, Traffic Engineer (Contractor)	Prior to opening any new temporary roadwork site or major adjustment

5.3 Emergency Incident Planning

An emergency is defined as:

An unforeseen event which requires urgent action to protect life or property, or an occasion when emergency services (Police, Fire Brigade, Ambulance or State Emergency Services) take control of a portion of the road network.

Examples of emergencies could include:

- Traffic accidents;
- Hazardous spillage's;
- Power Failures;
- Terrorist attacks;
- Flood;
- Fire; and
- Structural damage to a rail line, building, road tunnel or bridge.

In the event of an emergency occurring, the RTA's Incident Response Plan Manual should be consulted to determine the appropriate procedure and responses required.

All details of emergencies that occur within ROL areas are to be recorded and forwarded to the TOM within 7 days of the incident occurring, with details of where the incident occurred, any contributing factors related to the ROL and any actions that have been taken with respect to the ROL conditions.

Incident Management Plans for CBD Metro worksites will be developed in the CTMPs.

5.3.1 Accidents/Incidents and Complaints

The ROL database will maintain records of traffic accidents and incidents reported at work sites. Any complaints received regarding delays at work sites should be referred to the TTLG for investigation, the drafting of replies, and record purposes. The person in charge of the work site will continue to be responsible for dealing with complaints regarding safety issues. Where action is considered necessary to address the matters of the complaint, an appropriate recommendation will be forwarded to the project Traffic Manager.

5.3.2 Chemical Spills and Leaks

Information on procedures to be followed and properties of hazardous chemicals are detailed in:

- Department of Environment and Climate Change - Chemical Procedures Manual;
- WorkCover - "Chemical Emergency Guide"; and
- MR Form 1260 - Hazardous substances.

The Fire Brigade is primarily responsible for rendering safe and cleaning up after incidents involving flammable or hazardous substances, vapours, gases or liquid spillage, as well as an actual fire or explosion.

5.3.3 Availability of Dangerous Goods Safety Data

The Fire Brigade holds detailed information on dangerous goods and hazardous chemicals. The Alliance personnel are instructed not to approach such spills until the Fire Brigade have declared the site safe. In such cases the PRI or IMO contractors will close the roadway at a safe distance until the Fire Brigade arrives and issue appropriate instruction.

5.3.4 Accident Reporting and Investigation

Emergency procedures for major and minor accidents are set out in the Occupational Health and Safety Plan (to be developed). Any accident associated with construction traffic activity that results in injury to a member of the public will be recorded and details provided to the TTLG.

5.3.5 Notification of Accidents to RTA and WorkCover

The Safety Manager or Construction Manager will be responsible for reporting all accidents to the RTA and, if appropriate, to WorkCover or Council.

5.4 Traffic controllers and temporary traffic signals

These will be utilised/installed if necessary in accordance with RTA Traffic Control at Worksites.

5.5 Use of Variable Message Signs including Permanent VMS

These will be used to inform drivers where necessary to avoid particular roads or areas where activities associated with CBD Metro would cause disruption. Where they are used this would be in accordance with documented RTA procedure and guidance.

The placement of temporary VMS will consider pedestrian safety and disabled access needs when placed on footpaths. A road occupancy license may be required when a portable VMS is proposed to be installed in a parking or loading bay.

Appendix A: Crossrail (United Kingdom) EA Triggers

Appendix A: Crossrail EA Triggers

Traffic Levels and Delays to Vehicle Occupants

For the purpose of this Study significant effects were deemed to exist if any of the situations described below were identified at a specific location:

OT1a

- non-congested highway in the peak hour (i.e. <85% capacity)
- a 10% increase in AM peak hour traffic levels of the two-way traffic on the adjoining highway

OT1b

- traffic congestion exists or will exist or the site is in a sensitive area (e.g. school, hospital, etc)
- a 5% increase in AM peak hour traffic levels of the two-way traffic on the adjoining highway

OT1c

- A 30% increase in traffic levels on the adjoining highway in the off-peak period.

OT1d

- junction approach running above 85% capacity on an individual lane basis in the peak hour
- permanent decrease in AM peak hour link speed of more than 5%

OT1e

- junction approach running at less than 85% capacity on an individual lane basis in the peak hour
- permanent decrease in AM peak hour link speed of more than 10%

OT1f

- permanent decrease in link speed of more than 30% in the off-peak hour

OT1g

- permanent increase in journey length of more than 1,250 metres

Public Transport

For the purpose of this Study significant effects were deemed to exist if any of the situations described below were identified:

N.B. Rail journey times are assessed separately.

OT2a

- Is there a change (increase or decrease) in bus journey time of more than 20%?

OT2b

- a permanent change in bus journey distance of greater than 400m

OT2c

- A change (an increase or decrease) in representative journey times of greater than 10 %.
- Assessed Separately - See journey times tables in TAR.

Pedestrian Delay & Loss of Amenity

For the purpose of this Study significant effects were deemed to exist if any of the six situations described below were identified at a specific location:

OT3a

- permanent increase in 12-hour total traffic of more than 10%
- increase in 12-hour traffic flow is greater than 40 movements per day
- there are > 100 pedestrians 2-way per 12-hour weekday
- the vulnerability of the pedestrian is "high"

OT3b

- permanent increase in total traffic of more than 30%
- increase is greater than 40 movements per day
- there are between 50 and 100 pedestrians 2-way per 12-hour weekday
- the vulnerability of the pedestrian is "high"

OT3c

- permanent increase in total traffic of more than 30%
- increase is greater than 40 movements per day
- there are > 100 pedestrians 2-way per 12-hour weekday
-

OT3d

- permanent increase in pedestrian journey length of more than 250 metres
- there are > 100 pedestrians 2-way per 12-hour weekday

OT3e

- permanent increase in journey length of more than 500 metres
- there are between 50 and 100 pedestrians 2-way per 12-hour weekday

OT3f

- permanent increase in journey length of more than 1,000 metres
- there are less than 50 pedestrians 2-way per 12 hour average weekday

Cyclist Delay & Loss of Amenity

For the purpose of this Study significant effects were deemed to exist if any of the six situations described below were identified at a specific location:

OT4a

- permanent increase in total traffic of more than 10%
- increase is greater than 40 vehicular movements per day
- there are > 100 cyclists 2-way per 12-hour weekday
- the vulnerability of the cyclist is "high"

OT4b

- permanent increase in total traffic of more than 30%
- increase is greater than 40 vehicular movements per day
- there are between 50 and 100 cyclists 2-way per 12-hour average weekday
- the vulnerability of the cyclist is "high"

OT4c

- permanent increase in total traffic of more than 30%
- increase is greater than 40 vehicular movements per day
- there are > 100 cyclists 2-way per 12-hour weekday
- the vulnerability of the cyclist is "moderate"

OT4d

- permanent increase in journey length of more than 750 metres
- there are > 100 cyclists 2-way per 12-hour weekday

OT4e

- permanent increase in journey length of more than 1,250 metres
- there are < 100 cyclists 2-way per 12-hour weekday

Station and Interchange Impacts

A significant impact is defined as:

OT5

- additional AM peak hour 2-way patronage expected

Parking and Loading

A significant impact will be defined as:

OT6a

- Any loss of special use spaces on- or off-street?

OT6b

- Predicted increase in on-street parking demand in AM peak period?

OT6c

- Any loss of private car parking spaces?

OT6d

- Any loss of off-street station car parking spaces?

Accidents & Safety

For the purpose of this Study significant effects were deemed to exist if any of the situations described below were identified:

OT9

- more than 10 accidents at a junction or 100m link in the last three years
- permanent increase in 12-hour 2-way traffic of more than 10%

Delays and Disruption to Users of Community Facilities

The community effects consultant will be notified of all links where the following is true:

- - permanent increase in total traffic of more than 100%

