



Sydney Metro Network Stage 1 (CBD Metro)

Environmental Assessment

Volume One

Manidīs Roberts

SINCLAIR KNIGHT MERZ
SKM

Central

Town Hall Square

Martin Place

Barangaroo–Wynyard

Pymont

Rozelle



Sydney Metro Network Stage 1 (CBD Metro)

Environmental Assessment

Prepared by
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September 2009

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Certification

Submission of Environmental Assessment			
Prepared under Part 3A of the <i>Environmental Planning and Assessment Act 1979</i>			
Environmental Assessment prepared by:			
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Address:	Sinclair Knight Merz 100 Christie Street St Leonards 2065	Manidis Roberts 17 York Street Sydney 2000	
In respect of:	CBD Metro – Environmental Assessment		
Applicant name: Applicant address:	Sydney Metro Level 19 321 Kent Street Sydney 2000		
Proposed development:	Construction and operation of the CBD Metro, comprising a seven-kilometre metro rail system with new stations at Central, Town Hall Square, Martin Place, Barangaroo-Wynyard, Pyrmont, Rozelle, a safe-guarded future station at White Bay and a stabling and maintenance depot at Rozelle.		
Land to be developed:	Land proposed to be developed is within the City of Sydney and Leichhardt local government areas as described within the Environmental Assessment.		
Environmental Assessment:	An Environmental Assessment is attached that addresses all matters in accordance with Part 3A of the <i>Environmental Planning and Assessment Act 1979</i> .		
Declaration:	I certify that I have prepared the contents of this Environmental Assessment and to the best of my knowledge the information contained in the document is neither false nor misleading.		
Signature:			
Name:	Chris Gorman	Ken Robinson	Mark Hather
Date:	1 September 2009	1 September 2009	1 September 2009





Summary

Introduction

Sydney is one of the world's top 50 cities in terms of gross domestic product and yet it is one of only three of these cities without a metro system, the other two being Seattle and Tampa.

To maintain and improve Sydney's global position and contribution to national productivity, Sydney requires efficient transport networks for the free-flow of people between their homes and jobs, and to allow the planned agglomeration of high value employment in the CBD and wider centres.

The NSW Government believes that transformational transport products are now required to fully realise the vision for Sydney as outlined in the *Metropolitan Strategy*. In addition to increasing the capacity of our existing transport network the NSW Government considers that it is now time for Sydney to develop a new product that will take urban transport demands through at least this century and beyond.

The NSW Government has committed to delivering Australia's first metro rail system, as part of a major investment in Sydney's sustainable growth and prosperity, with the CBD Metro being the first step of a broader Sydney network. The project is a critical part of the government's investment plan to make Sydney's transport network more efficient which will, in turn, contribute not only to its liveability, but also to its economy.

The CBD Metro would deliver a fast, frequent and reliable underground rail service between RailCorp's Central Station and Rozelle, in Sydney's inner west. New stations would be built at Central, Town Hall Square, Martin Place, Barangaroo-Wynyard, Pyrmont and Rozelle, with infrastructure at White Bay for a future station.

The system presented in this Environmental Assessment would significantly contribute to meeting the community's transport needs. It would also help to contribute to the community's quality of life and bring a range of economic and social benefits.

Why does Sydney need a metro?

Sydney is a global city. Its population is expected to reach six million in the next 25 years (Department of Planning 2008), which will put added pressure on transport infrastructure.

Sydney's transport network carries close to 16 million trips on an average week day, and the growth in demand for travel is outstripping population growth. The number of average weekday trips across Sydney has increased by 30 per cent in the past two decades (Department of Planning 2005). There is therefore considerable pressure on the capacity of the transport network to accommodate future population growth.

This issue is evident across Sydney's complex network of road, rail and bus routes, which is already at capacity in key areas – areas that are also experiencing the highest rates of population and employment growth.

The NSW Government is working towards a comprehensive transport blueprint to meet Sydney's needs. The proposed metro network would be an essential addition to Sydney's transport system. The first

stage of this network, the CBD Metro, would be capable of carrying from 29,000–40,000 passengers per hour in each direction, which would significantly alleviate transport pressures.

In the longer term, the CBD Metro would be extended beyond Rozelle to the north-west and beyond Central to Westmead as part of Metro Line 1. A second line is planned from Malabar via the city to the Northern Beaches. The metro network would serve major transport corridors that are not currently serviced by mass transit, or do not have the capacity to meet future needs. This is expected to include many of Sydney's most heavily used and congested bus corridors, such as Parramatta Road, Victoria Road, Anzac Parade and Military Road.

Objectives of the CBD Metro project

The key objectives of the CBD Metro project are to:

- Provide a metro network enabler that can:
 - Accommodate the planned extension to the west and north-west (Metro Line 1).
 - Facilitate the planned expansion of the broader metro network to the south-east and north-east (Metro Line 2).
- Deliver additional mass transit capacity where it is needed most – in and around the Sydney CBD – by:
 - Attracting passengers away from existing crowded rail networks, including at key station locations such as Central, Wynyard and Town Hall.
 - Providing alternative means for those using heavily congested bus services operating into and through the CBD.
- Help make best use of the CityRail network and create a wider range of timetable and investment choices for the existing commuter rail network.
- Soundly link land use planning with transport planning to deliver on the state's strategic objectives for improved urban environments with reliable transport.
- Contribute to the environmental and social sustainability and strong economic global position of the city.

The CBD Metro project

The CBD Metro would comprise a seven-kilometre underground railway within twin tunnels, each about six metres in diameter. It would traverse the City of Sydney and Leichhardt local government areas. It has been designed to enable a future extension to Westmead from Central Station and extensions to the north-west from Rozelle.

New stations would be built at Central, Town Hall Square, Martin Place, Barangaroo-Wynyard, Pyrmont and Rozelle, with infrastructure at White Bay for a future station. Two alternatives for the eastern entrance at Pyrmont Station have been designed. While both alternative station configurations are viable, Alternative 2 is Sydney Metro's preferred alternative.

The CBD Metro would provide efficient interchange with other transport modes such as bus (at Rozelle and Central stations), rail (at all CBD metro stations), ferry (at Barangaroo-Wynyard Station) and light rail (at Pyrmont and Central stations).

Services would operate every two to three minutes in peak, with a daytime maximum waiting time of five minutes in off-peak times. Hours of operation would be Monday to Thursday from 5.30am to midnight, Friday and Saturday from 5.30am to 1.00am and Sunday from 6.00am to midnight.

The metro trains would be single deck made up of five carriages, with a sixth carriage added if required at a later date. Each train would accommodate 965 passengers. Each carriage would be air conditioned and would have at least three bi-parting doors on each side to allow easy entry and exit.

An initial fleet of 13 trains would be stabled and maintained at a new, purpose-built depot at the former Rozelle Marshalling Yard, adjacent to the City West Link Road. A pedestrian and cyclist bridge would be provided over the depot from Lilyfield Road to White Bay to provide pedestrian and cyclist access to the Rozelle foreshore and also to the Annandale light rail station.

Subject to planning approval, construction is expected to start in 2010, and continue over the next four-year period. This would be followed by a period of testing, commissioning and preparation for operation. It is expected that the first CBD Metro services would be operational from the end of 2015.

While the majority of surface construction would be undertaken within standard daytime construction hours, some surface works and the majority of underground works would need to be undertaken on a 24-hour, seven-days-per-week basis to meet the planned start of service in 2015.

Environmental Assessment

The Environmental Assessment has been prepared to assess the potential environmental impacts of the project. The Environmental Assessment is in accordance with the requirements of Part 3A of the *Environmental Planning and Assessment Act 1979*, the *Environmental Planning and Assessment Regulation 2000*, and specific requirements issued by the Director-General of the Department of Planning.

The purpose of the Environmental Assessment is to seek project approval from the NSW Minister for Planning. The Part 3A environmental assessment process seeks to ensure that the community is consulted and that all relevant environmental matters including issues raised by the community are considered during the development and assessment of the project.

The Environmental Assessment quantifies and assesses potentially adverse impacts and identifies the benefits of the project during construction and operation. It details required management strategies to avoid and minimise potential impacts and to enhance the benefits of the project.

Key environmental issues

As presented below, the key issues would relate to:

- Construction impacts pertaining to spoil management, traffic, noise and vibration, and non-indigenous heritage.
- Operational impacts pertaining to opportunities to improve local and regional transport, noise and vibration, social and land use impacts and changes to the public domain.

Construction spoil management

The project would generate about 1.27 million cubic metres of spoil. Most would be sandstone and shale excavated from below the sub-surface, and this material (over 80 per cent of the total project material) is likely to be clean, uncontaminated virgin material suitable for reuse.

The largest work site for the project would be at White Bay, where about 500,000 cubic metres of spoil would be generated from the excavation of the White Bay Station cavern, the tunnels to Central Station, the tunnels to Rozelle Station and the tunnel from the Rozelle stabling and maintenance depot. The site may also be used as a storage and transit location for spoil from all other project sites.

Some spoil generated from surface activities has the potential to be contaminated, especially excavation in former industrial areas such as White Bay and the former Rozelle Marshalling Yard. The potential volume of contaminated spoil is expected to be less than one per cent of the total excavated volume for the project. The contaminated material would be treated according to the Department of Environment, Climate Change and Water guidelines.

Construction traffic

The CBD Metro project requires construction work to be undertaken adjacent to busy sites within the CBD and inner west. The main emphasis in managing construction traffic is on minimising the impacts on nearby receivers, as well as public transport, commercial and commuter traffic, pedestrians and cyclists.

The opportunity exists for spoil from White Bay and the Rozelle stabling and maintenance depot to be removed via rail or barge instead of trucks. Road transport is the only practicable means of spoil removal from sites other than the White Bay site.

The removal of spoil is expected to generate the highest volumes of heavy vehicle traffic (up to 24 truck movements per hour at some sites). The strategy for minimising the impact of truck movements in the CBD and built-up areas includes selecting appropriate truck sizes, choosing suitable routes, reducing the amount of time spent on the local road network, ensuring truck movements occur where they minimise the impact on bus operations, managing pedestrian conflicts at driveway crossings, and restricting hours of truck operation where they would result in impacts on the road network.

Some adjustments to the road network would be required during construction, including the relocation of bus stops, taxi and loading zones; temporary occupation of on-street parking; and adjustments to footpaths.

A project-specific Framework Traffic Management Plan and site-specific Traffic Management Plans have been prepared to provide a framework for procedures and techniques to ensure effective traffic management and materials delivery during the construction of the project.

Construction noise and vibration

Noise and vibration would be generated by construction traffic and tunnelling operations. Despite some construction works being undertaken over the 24-hour period, the residential and commercial noise goals are not expected to be exceeded at any of the nearby receivers surrounding the main construction site at White Bay. For the remaining construction sites, given the nature and duration of the works and the proximity of sensitive receivers to the sites, the noise goals are expected to be exceeded at some of these receivers. Higher exceedances are predicted during evening and night-time periods as a result of the more stringent noise goals.

Construction traffic noise is likely to comply with the daytime traffic noise goals at all sites and with the night-time goals at most sites. Some substantial exceedances of the night-time noise goals are predicted to occur from night-time vehicle movements on Bligh Street, and along the access routes to and from the Pyrmont Station construction site. In particular, exceedances (up to about 19 dBA) of the sleep disturbance criterion are predicted to occur at receivers at Pyrmont and on Victoria Road, Rozelle, due to night-time construction activities and/or vehicle movements. These predictions are based on the implementation of a full noise enclosure for the construction sites.

The operation of the roadheaders and tunnel boring machines is likely to result in some residences experiencing ground-borne noise above the goals. At some locations, these impacts may last up to three weeks for minor exceedances (up to about 6 dBA) and up to about two weeks for more substantial exceedances (up to about 13dBA for Lilyfield Road residents near the tunnel portal). Given the proximity of some construction sites to nearby structures, vibration impacts from plant and equipment such as rockbreakers and vibratory pile drivers, would need to be appropriately managed to avoid structural damage.

Where construction works are undertaken closer than the safe working distance of nearby structures, site-specific vibration monitoring would be undertaken, and if necessary, building condition surveys would be prepared and reviewed during and following construction.

Consistent and clear mitigation measures are required to manage the expected exceedances in noise goals, including an active community consultation program. The proposed Construction Noise and Vibration Strategy would provide a comprehensive framework for the implementation of the mitigation measures. Importantly, significant physical noise mitigation, in the form of acoustic sheds, would be employed where feasible.

Measures to minimise and manage construction noise and vibration impacts would be considered during design development and construction planning in close consultation with surrounding communities.

Non-indigenous heritage

The CBD Metro project would potentially affect a number of archaeological sites and non-archaeological (built) heritage items. Some of these items are listed on local or state heritage registers, while others contribute to heritage conservation zones and/or are unlisted. Central Station is the only site containing state significant non-archaeological and archaeological heritage items to be directly affected by the works, including Macquarie-period remains likely to be within areas of excavation.

During construction, two locally listed areas would be temporarily affected (Belmore Park and Martin Place Special Area) and up to 10 built heritage items would be impacted.

Two schemes have been put forward for station entrances at the eastern end of Pyrmont Station. Under the Alternative 1 option, four buildings in the Pyrmont Heritage Conservation Area would be demolished and replaced with new station entrance structures. These buildings consist of the Victorian commercial buildings at 3-9 Union Street. Although the buildings are located in the Heritage Conservation Area, they are not individually heritage-listed items and there would be no loss of heritage-listed buildings at Pyrmont.

In response to community concern, the Alternative 2 option has been developed to significantly reduce the impact on the four buildings in the Pyrmont Heritage Conservation Area. Under the revised option, a rear section of the aforementioned buildings would be removed to make way for the services building and the station entrance has been relocated to the vacant corner at Pyrmont and Union streets. The Alternative 2 option would therefore conserve the majority of these heritage buildings and retain the Union Street building facades.

Three sets of Victorian and Edwardian commercial buildings that contribute to the Rozelle Conservation Area would also be demolished and replaced with new station entrance structures. At Town Hall Square, four unlisted buildings that also have heritage values would be demolished.

Given the significance of the non-indigenous heritage items throughout the study area, avoiding and minimising impacts on these heritage items has been a key consideration during development of the reference design and would continue to be a key focus during the ongoing design development and construction planning for the project. The construction would be managed carefully to minimise any

adverse impacts on heritage items and to maximise opportunities for enhancing significant heritage items.

Operational transport

At a local station site level, there are opportunities to introduce improvements at metro stations to further improve passenger access and interchange with other modes of transport. There could also be opportunities for other measures to be introduced to improve wider passenger links to the CBD Metro across the whole transport network.

An integrated transport strategy has been developed for the CBD Metro with the following key features:

- Integrating the existing and proposed pedestrian network with the CBD Metro (e.g. delivery of the Barangaroo Pedestrian Link between Wynyard and the Barangaroo precinct).
- Integrating metro stations with existing and planned cycling routes. Weather-protected bicycle parking facilities would be provided at station entries to allow cyclists to secure bicycles and continue their journey by metro.
- Relieving pressure on the rail network by providing additional stations to distribute passengers throughout the CBD and onwards to Pyrmont and Rozelle. The new stations would be carefully designed to integrate with existing CityRail stations and pedestrian networks to provide easy access for commuters while reducing the strain on CityRail stations.
- Supporting strategies to increase capacity on the CityRail network with a fast and efficient transfer to the CBD Metro at Central Station.
- Allowing for potential reconfiguration of the CityRail network to take advantage of freed up capacity and improve the 'sectorisation', and therefore the reliability, of the network.
- Providing direct and convenient passenger interchange between CBD Metro stations and area bus stops.
- Linking existing surface and sub-surface pedestrian desire lines to both metro and bus passenger-waiting areas.
- Rationalising some Victoria Road bus services and allowing redistribution of bus assets to better provide cross-regional or metro catchment services.

These opportunities would be progressed in discussion with stakeholders following submission of the project for approval.

Operational noise and vibration

Potential noise and vibration impacts from the operation of the CBD Metro would not be significant, as outlined below.

- Ground-borne noise and vibration from train operations within the tunnels would comply with the noise design goals, provided that a higher performance track is installed at identified critical locations. A standard track would be used for less sensitive areas.
- Airborne noise from train operations along surface track (between the tunnel portal and the stabling area) is predicted to comply with the appropriate noise design goals at all locations surrounding the Rozelle stabling and maintenance depot.



- Airborne noise from stabling and maintenance operations at the Rozelle stabling and maintenance depot is expected to comply with the intrusive and amenity noise goals at all residential receiver locations. However, if noise levels are significantly higher than those predicted, there would be a requirement for noise mitigation in order to minimise potential sleep disturbance at the nearest residences during the night-time period.
- Train noise breakout through the tunnel ventilation shafts and noise emissions from tunnel ventilation equipment would meet the noise design goals at surrounding sensitive receivers due to the implementation of mitigation measures such as in-duct noise attenuation.

Measures to minimise noise impacts from the project would be confirmed during the detailed design phase of the project. An Operational Noise and Vibration Management Sub-Plan would be developed to ensure that these measures are incorporated into the operational phase of the project.

Economic and social implications

The CBD Metro would have a number of adverse and positive impacts on the community and local economy.

A permanent impact would be the need to acquire and demolish about 33 properties to build and operate the CBD Metro. This would result in the relocation of about 175 business tenants.

During construction, temporary amenity impacts may arise from noise; dust; vibration; disruptions to traffic, pedestrian movements and customer access; and changes to passing trade and business servicing facilities.

Some community facilities may also be adversely affected during construction, including the Rozelle Neighbourhood Centre, Balmain Leagues Club, and public spaces such as Union Square and Martin Place. The construction of the CBD Metro would also provide opportunities for site redevelopment.

During operation, a section of the Balmain Leagues Club would be permanently affected by the upgraded facilities for transfer onto buses along Victoria Road.

In addition, the CBD Metro would bring a number of economic and social benefits. There would be improvements in travel speed, reliability, accessibility and connectivity; enhanced opportunities for business agglomeration; generation of economic multipliers; the generation of about 2000 jobs directly during construction; and better access to employment and education opportunities, social and community services, and cultural activities.

Through the application of site-specific mitigation measures, the negative impacts of the project would be addressed to an acceptable level. Overall, any shorter term adverse impacts of the project would be outweighed by the variety of social and economic benefits that would result from the CBD Metro.

Land use implications

With the varied environment traversed by the CBD Metro, the project would create or enhance opportunities for urban development and renewal, including public domain benefits such as Town Hall Square and the Barangaroo Pedestrian Link.

In broad terms, the interface of the CBD Metro with both current and potential land uses is primarily being addressed through a parallel master planning process centred on each station location. The master planning strategy for each station has informed the development of the station plan, which is intended to illustrate the general arrangement of station elements over the next 15 to 25 years, whether they are to be implemented as part of the CBD Metro project or by other authorities at a later date.

No additional development is proposed within Rozelle and Pyrmont as part of the project. At all stations, local planning controls would continue to regulate new development.

Justification and conclusions

The CBD Metro would be the foundation for a major transformation in the way Sydney lives, works and moves around. The metro rail network would re-shape the urban environment of Sydney, driving land use change, leading to urban renewal and creating new urban places, improving access to jobs and reducing congestion, journey times and emissions across the transport network. The CBD Metro would provide relief to the greatest capacity constraint on the entire transport network – the CBD – while providing for future metros to the west and north-west. The metro would also facilitate a wider range of timetable and investment choices for the commuter rail network.

In particular, the CBD Metro would:

- Provide additional intra-CBD services and an additional north-south route through the CBD, with a capacity of 29,000 up to 40,000 passengers per hour. By providing an alternative means for moving people around the CBD, it would substantially reduce congestion on CityRail suburban services between Central and Town Hall/ Wynyard, particularly with people transferring at Central from Inter-City services onto already overcrowded services such as on platforms 16/17. It provides the opportunity to divert passenger loads to new stations, relieving peak hour congestion at CityRail's Town Hall and Wynyard stations.
- Help to relieve heavily congested bus services into and through the CBD, particularly in the Victoria Road corridor, by providing additional transport choice between Rozelle and the CBD. It would also relieve bus congestion within the CBD, reduce the number of buses using Anzac Bridge by 30 per cent, and reduce the number of buses using the northern part of George Street by 45 per cent.
- Service the planned Barangaroo development, which is a government-owned 22-hectare redevelopment site located on the western apron of the CBD. Some 10-15 per cent of passengers on the CBD Metro are expected to access the proposed Barangaroo-Wynyard Station. These passengers would also benefit from the proposed Barangaroo Pedestrian Link between Barangaroo and CityRail's Wynyard Station, which forms part of the CBD Metro project.

It is inevitable that a project of this scale would have adverse temporary impacts in the CBD environment, particularly during construction. However, these impacts need to be considered within the context of the overall objectives of the project and the long-term other benefits of the project both in transport terms and as a catalyst for redevelopment and urban regeneration.

In particular, the proposed metro system would target Sydney's major transport corridors to address the significant areas of growing transport congestion faced within the city. It would provide fast and frequent rail services linking key population and employment centres, and support major destinations such as Parramatta and Macquarie Park, making them more attractive as employment locations.

The introduction of a metro system to Sydney would also help encourage the transition of the heavy rail network from a CBD-focused, largely peak-hour market, to a more versatile mode of choice for all trip types, and thus help to ensure the development of a comprehensive and fully integrated transport network.

While the CBD Metro would provide significant benefits on its own it would also be of strategic importance as an enabler of the entire metro network. That is, the CBD Metro would form the central spine to which all other metros would link or interchange. Accordingly, it is considered by the NSW Government to be the first logical and critical step in the transformation of Sydney's transport system.

Next steps

Sydney Metro is seeking approval from the Minister for Planning for the construction and operation of the CBD Metro. The next steps in the process are:

- **Exhibition of the Environmental Assessment** for a minimum of 30 days and invitation to the community and stakeholders to make submissions.
- **Consideration of submissions.** Submissions received by the Director-General of the Department of Planning would be provided to Sydney Metro and any relevant public authorities. Sydney Metro may then be required to prepare and submit:
 - A submissions report, which contains responses to issues raised in the submissions, and/or further design development.
 - A preferred project report, outlining any proposed changes to the project to minimise its environmental impacts.
 - A revised Statement of Commitments.
- **Determination of the Environmental Assessment.** The Director-General of the Department of Planning provides an assessment report on the Environmental Assessment to the Minister for Planning, who then makes a decision on the project and, if approved, can set Conditions of Approval.

Consultation with the community and stakeholders would continue throughout the detailed design and construction phases. The station plans have been placed on public exhibition concurrently with the Environmental Assessment.

You can comment on the Environmental Assessment or the project by sending a written submission to:

Director, Major Infrastructure Assessments NSW Department of Planning
GPO Box 39
SYDNEY NSW 2001

Submissions must be received by 12 October 2009. Further details on the submissions process are available on the Department of Planning's website (<http://www.planning.nsw.gov.au/>).

All submissions and information obtained during the public exhibition period will be used in accordance with the *Privacy Act 1988*. All submissions received are regarded as public documents and any information contained in them can be published in subsequent assessment documents. Copies of the submissions received on the project may be issued to interested parties. If the author of a submission does not wish the information to be distributed, this needs to be clearly stated in the submission.





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