



EcoTransit Sydney

White Bay Green Link

An overview



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Overview

The White Bay Green Link (WBGL) concept¹ is a combined light rail route and cycleway running from Lilyfield light rail stop to the Barangaroo precinct and the northern CBD via the existing, now unused, White Bay rail corridor and a tunnel beneath the Balmain Peninsula and under Darling Harbour.

This new route would create a direct express corridor (or 'arc') from the inner west to the northern and central CBD and would act as the spine on which a more comprehensive light rail and cycling network would, by steps, serve a widening commuter catchment.

The WBGL would transform the Barangaroo precinct from an enclave with poor public transport into a major public and active transport entry point for the CBD.

The broader planning context

The WBGL concept represents a bold solution to several important planning imperatives for the City of Sydney and the wider metropolis. It addresses the need to:

- Future-proof Sydney in the face of declining oil supplies.
- Reduce reliance on buses for access to, or circulation within, the CBD in favour of a modern and more efficient light rail system.
- Reduce the carbon footprint and the air pollutant load associated with the current, heavily congested transport mix of private vehicles and buses.
- Provide fast commuter access to Barangaroo from Sydney's west and inner west, without putting additional stress on the heavy rail network.
- Reduce the volume of car traffic entering CBD and diffuse predictable acute congestion points.
- Relieve pressure on CBD heavy rail stations, especially Wynyard and Town Hall.
- Increase cycling's share of commuter trips to and from the CBD.
- Simplify and speed up access to the central and northern CBD from the west and the north-west.

The WBGL as a Barangaroo transport solution

In its present form the Barangaroo scheme would be an isolated enclave insufficiently supported by public transport capacity for its expected 23,000 workers and residents. Its access relies too heavily on Wynyard station from which the site can be reached only by a long walk or on the CBD's planned light rail loop which is itself, in its present form, anchored on Central Station in the extreme south of the CBD, making it an inefficient compromise for commuters.

¹ EcoTransit Sydney acknowledges that the White Bay Green Link concept was originally conceived by Mr Nathan English.

Development of the precinct in the currently planned scheme will therefore place unsustainable amount of additional car traffic on overcrowded CBD streets – an unacceptable and counterproductive outcome.

At present, public transport from the inner west to the central and northern CBD relies almost completely on buses entering the CBD on an indirect route via the Anzac Bridge or Parramatta Road, Broadway and George Street. The WBGL would resolve this situation (which is bound to be worsened by the planned concentration of workers and residents in Barangaroo) by making Barangaroo the main access point for commuters from the inner west and, via future light rail extensions along Victoria Road, the inner north-west.

Combined with the Dulwich Hill light rail extension currently under construction, the WBGL will create an 'arc' through the inner west, allowing light rail to expand into an integrated network catering for inner Sydney (see map 2). With the WBGL solution in place, commuters from these regions of Sydney would save as much as 30 minutes on current peak period journey times.

This role could be enhanced by strategically located park-and-ride stations, large-capacity bicycle lockups and light rail–bus interchanges, on the existing and future light rail system.

As this network expands and more people rely on the WBGL to enter the city it will considerably reduce the number of private vehicles and buses on Inner Sydney roads.

Connection to the CBD light rail

The WBGL light rail would connect to the planned CBD light rail loop at Hickson Road. The immediate priority being for a comprehensive service to Barangaroo and the central CBD, the WBGL link would, in the first instance, proceed south towards the centre of the Barangaroo precinct where the line would join the CBD loop at Napoleon Street. A second stage extension would proceed north along Hickson Road, under the Harbour Bridge and around to George Street.

Impact on, and advantages for, Balmain

The WBGL route will take it along the White Bay waterfront – using the existing, now unused, freight rail corridor, and in the case of the cycleway component, sections of the foreshore – and then proceed in tunnel down the East Balmain peninsula to a 400m submerged tube tunnel beneath Darling Harbour (see Map 1).

The route will not impact on the historic fabric of Balmain or adversely affect residents or businesses while the advantages for this historic suburb are considerable. For residents, the route will create a quicker route to CBD jobs and retail. A proposed light rail stop beneath Gladstone Park will bring new customers to the Darling Street retail precinct and better connect Balmain Hospital to the rest of the Inner West and the CBD, securing its future as a medical centre for Balmain and the region.

The WBGL will therefore strengthen the commercial viability of the Balmain village whilst relieving its narrow streets of traffic congestion.

In the event that plans for a White Bay Cruise Passenger Terminal (CPT) proceed (and EcoTransit stresses it is not in favour of this location) the WBGL would provide a direct link to the CBD hotels and popular tourist precincts as well as providing a convenient and direct light rail link to the Main Western and Bankstown suburban rail lines. Importantly, this would obviate the necessity for large hardstand areas to assemble the fleets of buses that would otherwise be necessary to transport cruise passengers to their destinations. This would free up

an area of the White Bay waterfront large enough for the creation of an active recreation precinct sufficiently large to include, for example, two full-sized playing fields.

Tunnelled section

The light rail component of the WBGL would commence its underground route to Barangaroo and the CBD through a portal on the escarpment face (below Donnelly Street) south of Gladstone Park. This section takes advantage of good tunnel boring conditions through Sydney sandstone and would be excavated using standard road header machines.

Heading north and rising slightly, the tunnel would pass under Gladstone Park to a stop alongside, and at a lower level than, the disused subterranean Balmain Reservoir. This represents an opportunity for the creative reuse of this historic industrial structure which has the potential to provide a dramatic vestibule for the stop. An impression of the stop is shown in Illustration 1.

There is also potential for short pedestrian tunnels from the stop directly to the retail precinct and to streets to the north and south of Gladstone Park. These would obviate the necessity for light rail users to walk uphill to the stop entrance at Gladstone Park before descending to the stop.



Illustration 1: Gladstone Park light rail stop

From the Gladstone Park stop the bored tunnel would travel east under Darling Street to a stop in the vicinity of the Balmain Bowling Club near the lowest point in the saddle on the peninsula ridge. It would enter the immersed tube section underneath Illoura Park.

The immersed tube would be similar in design to the Sydney Harbour Road tunnel but would be half the width (approximately 13m wide internally). This would be sufficient to accommodate two light rail tracks, a cycleway and a pedestrian pathway, as shown in Illustration 2.



Illustration 2: A sustainable public and active transport connection

Gradient issues

Taking into consideration the depth of the harbour where the immersed tube would be located, and the need for the tube to be laid in a trench leaving sufficient headroom for a protective “rock blanket” above it, the base of the tube would be about 28m below water level.

Modern light rail vehicles can climb a maximum slope of 10%, (approximately 5.7 degrees) but this would be normal only for short distances. A more acceptable gradient would be 7% (4 degrees). On the Balmain side, the bored tunnel from the Gladstone Park stop to the immersed tube beginning at the East Balmain waterline would be on a gentle gradient of approximately 1.5 degrees. On the CBD side a 4 degree slope would allow light rail vehicles to climb back to the level of Hickson Road over about 500m.

These gradients would also comfortably accommodate cycling.

The cycleway

The cycleway component of the WBGL would connect with the proposed City West Cycle Link (CWCL) to provide a safe, off-road, express cycle route between the northern and central CBD and the inner west.

At White Bay the cycleway would run beside the light rail line but would diverge from it at the point where the light rail entered the Balmain tunnel portal. The cycleway would continue along the shoreline until it joined the light rail tunnel via a short tunnel on the eastern side of Ewerton Park. From here it would share the light rail’s bored tunnel (with the cycleway running on the south side of the light rail tracks) to the immersed tube. On the CBD side, in the northern section of the Barangaroo site, lifts would take cyclists to the level of Hickson Road with the possibility that a cycleway would also continue beside the light rail tracks as

they rose to street level on Hickson Road.

What will it cost?

We are fortunate in have the relatively recent example of the Sydney Harbour Tunnel (SHT) which is an immersed tube tunnel combined with bored approach tunnels, and other recent work through Sydney sandstone such as the Cross City Tunnel, to draw on in estimating the cost of the WBGL.

The SHT, which opened in 1992 cost \$554m. This equates to around \$890m in 2010 dollar terms. The SHT immersed tube section is 960m long and its two approach tunnels total 1300m in length.

However the Harbour Tunnel is approximately twice the width and over twice the length required for the proposed WBGL tunnel and, being for road traffic, requires a ventilation system – a feature that would not be required for a light rail and cycling tunnel.

By contrast the WBGL would consist of around 450m of immersed tube equivalent to two lanes of the SHT and 1800m of bored or cut-and-fill tunnel. Comparison with the SHT and the Cross-City Tunnel suggests that an upper limit for the cost of the WBGL would be \$450m, with the possibility that the cost may be as low as \$350m.

The WBGL therefore constitutes a relatively cheap way to facilitate a very large increase in public and active transport participation and a corresponding decline in road traffic on the most congested approaches to the CBD.

We suggest that a significant proportion of the cost of the project should be borne by the Barangaroo project which, in compensation, will have its financial value greatly increased by greater ease of access and commensurate increase in its commercial and retail value.



