



Planning &  
Environment

***MODIFICATION REQUEST:  
NorthConnex Modification 2***

***Modification to Condition B2 -  
Ventilation Outlet Heights  
SSI 6136 (MOD 2)***



Environmental Assessment Report  
Section 115ZI of the *Environmental  
Planning and Assessment Act 1979*

February 2018

Cover Graphic — Artist impression of northern ventilation outlet (Proponent's Mod M2 Modification Request, RMS 2017)

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## 1. BACKGROUND

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The Roads and Maritime Services (the Proponent) has submitted a request to modify condition B2 of the Minister's approval for the NorthConnex M1-M2 State significant infrastructure (SSI) project (SSI 6136).

The NorthConnex project was approved on 13 January 2015 by the then Minister for Planning under Section 115ZB of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The NorthConnex project comprises twin tunnels each at nine kilometres in length containing separate northbound and southbound carriageways. NorthConnex will link the M1 Pacific Motorway at Wahroonga and the Hills M2 Motorway at West Pennant Hills and would generally follow the alignment of Pennant Hills Road.

The twin tunnels are designed to be ventilated through a longitudinal ventilation system which moves air along the tunnels to a ventilation outlet at Gum Grove Place, West Pennant Hills, to the south (southern ventilation outlet) and Woonona Avenue, Wahroonga, to the north (northern ventilation outlet). The role of each ventilation outlet is to propel the collected vehicle emissions from the tunnels into the atmosphere for dispersal.

Formal construction of the NorthConnex project commenced following the approval of the project's construction environmental management plan in June 2015. Operation of the motorway is expected to commence in late 2019.

Condition B2 of SSI 6136 currently prescribes ventilation outlet tip heights of 194 metres (AHD) for the northern ventilation outlet and 147 metres (AHD) for the southern ventilation outlet. Condition B2 also requires the tip heights for the outlets to be 20 metres above ground level. The Proponent's modification request is seeking to clarify the reference point for the base of each ventilation outlet and to correct and clarify the tip heights of both outlets.

This assessment of the modification request addresses changes in impact, compared to the approved project, of increased tip heights of both the northern and southern ventilation outlets.

### 1.1. Approved Modification Requests

The former Director, Transport Assessments, approved a previous modification (under delegation) on 29 June 2016 (Modification 1). The approval of Modification 1 amended condition D47 of the Minister's approval for the project to extend the timeframe for the implementation of the Biodiversity Package.

## 2. CURRENT MODIFICATION

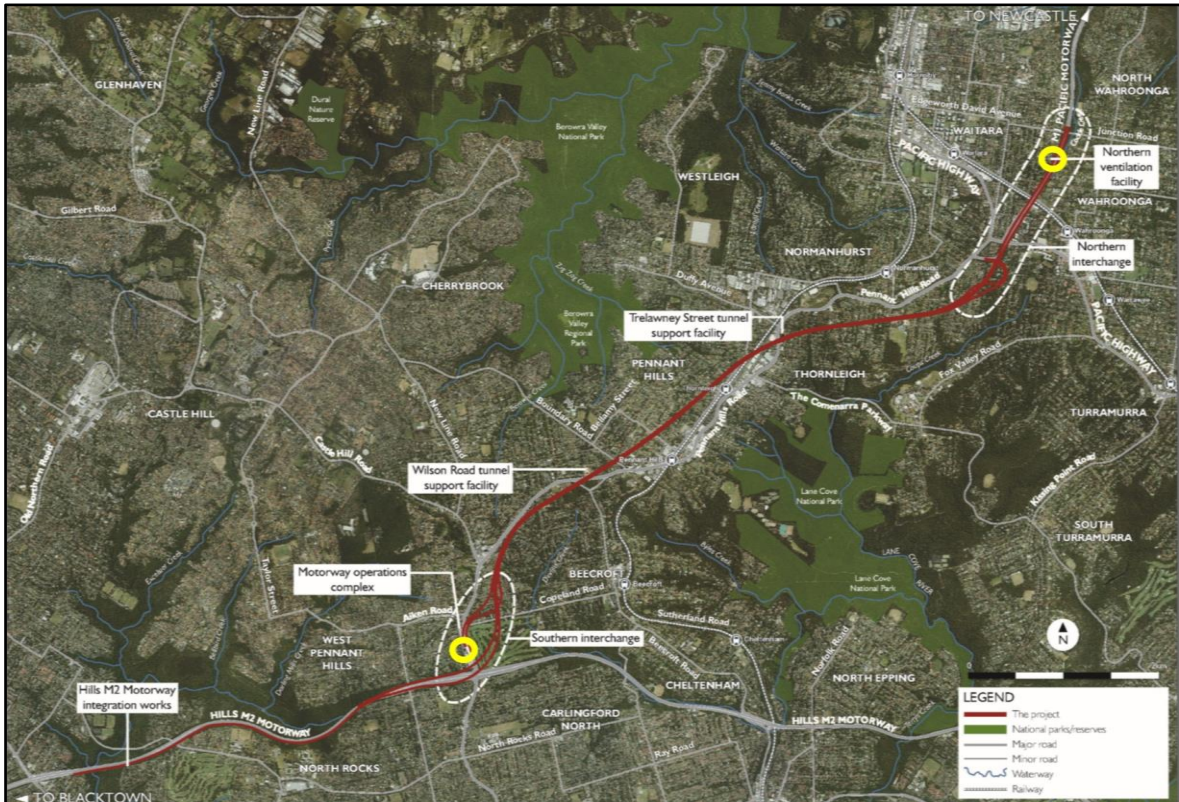
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### 2.1. Description of the Proposed Modification

The Proponent has submitted a Modification Request (Modification 2) to modify SSI 6163 to:

- clarify the reference point for measuring the height of each ventilation outlet; and
- correct and clarify the ventilation outlet tip heights as follows:
  - northern ventilation outlet: from 194 metres to 200.8 metres (AHD); and
  - southern ventilation outlet: from 147 metres to 148 metres (AHD).

The location of the approved ventilation outlets is shown in **Figure 1**.



**Figure 1.** Approved NorthConnex alignment with ventilation outlets located at yellow circles (Source: Proponent’s EIS)

**2.2. Justification**

The Proponent has identified inconsistencies between the designs proposed in the environmental impact statement (EIS), preferred infrastructure report (PIR) and the Minister’s conditions of approval, in relation to the intended ventilation tip heights.

As shown in **Table 1**, the originally proposed outlet heights in the EIS were increased by five metres in the PIR to improve air quality and health outcomes. However, the tip height limits approved in the Minister’s conditions of approval did not reflect this five metre increase.

**Table 1.** Ventilation outlet heights as originally proposed amended and approved

Ventilation Outlet		Outlet Tip Heights		
		Original Design	Amended Design	Approved Design
Northern	Tip	195.8 m (AHD)	200.8 m (AHD)	194 m (AHD)
	Base	172 m (AHD)	172 m (AHD)	174 m (AHD)
Southern	Tip	143 m (AHD)	148 m (AHD)	147 m (AHD)
	Base	118.5 m (AHD)	118.5 m (AHD)	127 m (AHD)

Note: blue highlighted cells indicate proposed ventilation outlet heights

These differing outlet tip heights led to inconsistencies between the assessment of the actual intended design, condition B2 of the Minister’s approval and the Proponent’s design described in the PIR. In addition, the reference points for the tip heights to be 20 metres above ground level require clarification as using this as a reference point is vague for the purposes of project delivery.

To ameliorate this, the Proponent has sought a modification to correct the outlet tip heights in the conditions for the project and to clarify the base height for the outlets.

The Proponent has updated its assessments for those areas of the original assessment that did not consider the desired tip heights, including visual impact assessment of the northern ventilation outlet and air quality impacts for both outlets.

### **3. STATUTORY CONTEXT**

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#### **3.1. Modification of the Minister's Application**

In accordance with Section 115ZL of the EP&A Act, a proponent may request the Minister to modify the approval for SSI. The Minister's approval for a modification is not required if the infrastructure as modified will be consistent with the existing approval. The proposed amendments to the approved ventilation outlet tip heights are not consistent with the existing approval. Consequently, modification of the Minister's approval under Section 115ZL of the EP&A Act is required.

#### **3.2. Delegated Authority**

Under the Instrument of Delegation dated 11 October 2017, the functions and powers of the Minister for Planning to determine a modification of the Minister's approval may be delegated to Directors reporting to the Deputy Secretary, Planning Services, whereby:

- the relevant local council has not made an objection;
- a political disclosure statement has not been made; and
- there are no public submissions in the nature of objections.

A political disclosure statement has not been made, the relevant local councils have not made an objection and no public submissions in the nature of objections have been received. Accordingly, the Director, Transport Assessments is delegated the authority to determine the modification request.

### **4. CONSULTATION AND SUBMISSIONS**

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#### **4.1. Public Exhibition**

Under Section 115ZL(1)(g) of the EP&A Act, the Secretary is required to make requests for modification of approvals given by the Minister publicly available. Accordingly, the Department publicly exhibited the modification request from Friday 8 December 2017 to Friday 22 December 2017, a period of 15 days, and made the modification request publicly available on its website.

The Department advertised the exhibition of the modification request in the *Sydney Morning Herald*, *Daily Telegraph*, *Hills News*, *Hills Shire Times*, *Hornsby and Upper North Shore Advocate*, *Northern District Times*, *North Shore Times* and *Parramatta Advertiser*.

The modification request was referred to Hornsby Shire Council, Ku-ring-gai Council, Hills Shire Council, Parramatta City Council and the Environment Protection Authority (EPA), the relevant authorities for the proposed modification. The Department accepted submissions until Friday 22 December 2017, during which time the Department received a submission from the EPA.

The EPA does not object to the proposed modification as the Proponent is not seeking to reduce the height of the ventilation outlets and the Proponent's air quality modelling indicates that impacts would not increase.

The Department did not receive any submissions from the public during the exhibition of the modification and local councils indicated they did not have any issues to raise with the modification request.

## 5. ASSESSMENT

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The Department has considered the content of the modification request and considers the key issues for its assessment include:

- changes to the ambient air quality surrounding both ventilation outlets; and
- increased catchment of visual impacts surrounding the northern ventilation outlet.

The Department has also considered potential impacts relating to elevated receptors and local planning controls as well as potential impacts from overshadowing.

### 5.1. Ambient Air Quality

#### Issue

The Proponent's air quality assessment in the EIS was not updated to account for the proposed five metre increases of each outlet in the PIR, so it is based on elevations that differ from those approved.

As such, the Proponent assessed the air quality and human health impacts of the proposed outlet tip heights based on reconfigured modelling using the parameters associated with Design Analysis A (maximum volume of vehicles in both tunnels as used in the EIS). This modelling used data from three consecutive years (2009, 2010, 2011) to establish meteorological conditions and ambient air quality to model the project's pollutant contributions with the proposed outlet tip heights.

This assessment indicates that for the majority of scenarios and pollutants, the ambient air quality improves with the proposed increased in ventilation outlet heights. There are some instances where modelling indicates the pollutant contributions for maximum carbon monoxide (CO<sub>(1 hour)</sub>) and maximum oxides of nitrogen (NO<sub>x(1 hour)</sub>) will be the same or worse than originally assessed for both the northern and southern ventilation outlets. However, both increases are attributed to anomalous peak events in the 2010 meteorological year over a 1 hour period. The same pollutants are shown to improve when averaged over longer periods in the same meteorological year.

Notwithstanding, the Proponent's assessment indicates that all project contributions, including those anomalous CO<sub>(1 hour)</sub> and NO<sub>x(1 hour)</sub> pollutants, would remain well below the relevant air quality and human health criteria in the project approval. In addition, the Proponent has indicated that human health risks are expected to improve as a result of the proposed increase in outlet tip heights, particularly as PM<sub>2.5</sub>, which is the primary pollutant contributing to human health risk, would generally improve.

#### Submissions

The EPA did not raise any objection to the increase in ventilation outlet heights as the modelling presented by the Proponent indicated that impacts on ambient air quality would not increase beyond that already assessed for the original project. Neither local councils nor the public raised any issues regarding ambient air quality associated with the proposed increase in ventilation outlet heights.

Notwithstanding, the issue of air quality was raised in the majority of submissions on the original project and the Department acknowledges the issue can cause substantial community concern.

#### Consideration

Typical emissions from ventilation outlets comprise pollutants such as particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), nitrous oxides (NO<sub>x</sub>) and carbon monoxide (CO). Once in the atmosphere, these pollutants can potentially impact on ambient air quality and subsequently human

health. The mechanical dispersion of these pollutants is affected by a range of factors including the exit plane, or tip height, of a ventilation outlet from which they are ejected.

The general principle of ventilation outlets is that the higher pollutants are ejected from an outlet, the greater the likely dispersion of pollutants in the receiving atmosphere, pending local weather conditions and topography. The Department's assessment of the original application noted that residents along the project corridor are likely to experience a net benefit to air quality, when heavy vehicles are diverted into the NorthConnex tunnels instead of Pennant Hills Road and road-level pollution is partly redistributed into the atmosphere through ventilation outlet dispersal.

The Department is satisfied the Proponent's assessment is consistent with the methodology used in the EIS and PIR. The Department also notes the EPA did not raise any issues in relation to the air quality assessment or impacts presented in the modification request.

The Department has carefully considered the Proponent's assessment of air quality impacts of the proposed increase in ventilation outlet heights. Whilst the Department acknowledges some anomalous events have indicated potential worsening of pollutant loads for CO<sub>(1 hour)</sub> and NO<sub>x(1 hour)</sub> scenarios, the Department is satisfied this is based on isolated and infrequent events. In addition, the Department considers the use of Design Analysis A parameters provides additional conservatism in the air quality modelling by ensuring the assessment is undertaken for the worst-case scenario. On balance, the Department acknowledges that the ambient air quality benefits of the project are likely to be further improved should these proposed heights be approved.

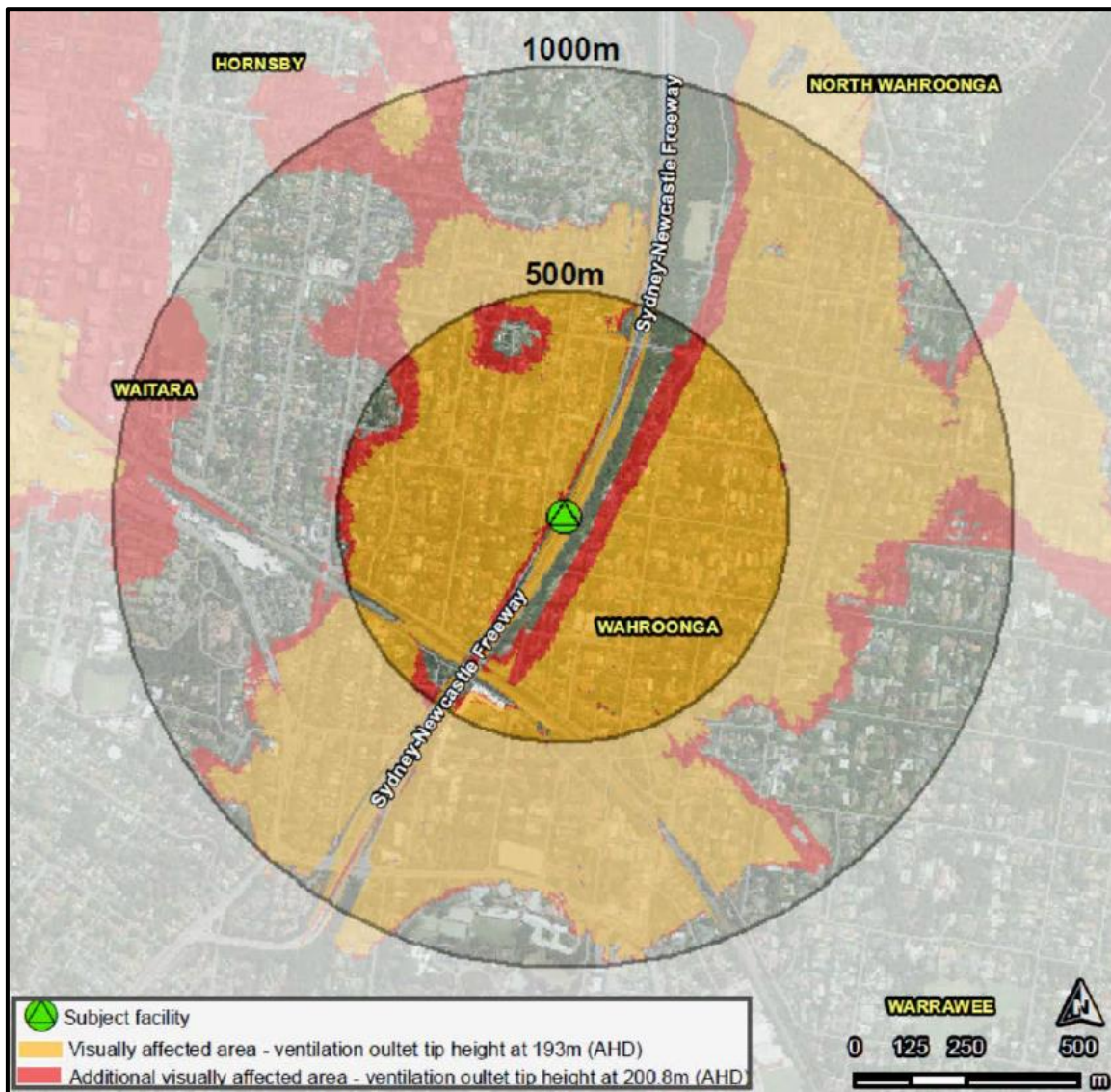
The Department is also satisfied that with the increase in the outlet heights, the project's air quality criteria set in the Minister's conditions of approval would continue to be met. It is noted that the Proponent is not seeking to modify the criteria, or the monitoring framework for these measures.

## 5.2. Visual Impacts

### Issue

The proposed increased height of the northern ventilation outlet means it could potentially be seen by a greater number of receivers in the visual catchment compared with that assessed in the EIS or PIR.

Consistent with the EIS, the Proponent has assessed the visual impacts of an increased outlet height for a visual catchment of up to one kilometre surrounding the northern ventilation outlet. **Figure 2** indicates the areas where additional receivers may be able to see the higher ventilation outlet.



**Figure 2.** Updated visual catchment mapping of the proposed tip height increased of the northern ventilation outlet (Source: Proponent's Modification Request)

In addition, the proposed clarification of the base heights for each outlet to remove the currently required '20 metre from ground level' reference point would result in total physical outlet heights of 28.8 and 29.5 metres for the northern and southern ventilation facilities respectively. However, these base heights are below the heights of adjacent roads.

Submissions

No submissions raised issues regarding visual impacts associated with the proposed increase in ventilation outlet heights. However, the Department acknowledges the community held concerns for this issue during the exhibition of the EIS.

Consideration

The Department acknowledges that increasing the height of the northern ventilation outlet by 6.8 metres above that approved for the original project would make it visible from more vantage points. However, it is also acknowledged that the catchment presented in **Figure 2** is based on topography alone and does not take into account potential obstructions such as vegetation or buildings. As such, the Department considers this approach to be conservative.



Whilst a greater number of receivers may be able to view a higher outlet, this impact is likely to diminish or be obscured with increased distance. Additionally, it is likely that any views beyond those receivers immediately adjacent to the site of the outlets will be partial. The Department considers that the urban design treatments to be applied to the ventilation facilities will assist in mitigating visual impacts.

The Department also acknowledges that the proposed base levels of each ventilation outlet would result in physical outlet heights more than 20 metres. However, the Department notes that the base of the outlets would be below the nearest road levels, effectively reducing the apparent height of the outlets, and would not significantly increase impacts to local visual amenity. These impacts can also be effectively managed through urban design and landscape measures.

### **Other issues**

#### Overshadowing

The Department sought clarification from the Proponent regarding potential impacts from overshadowing as a result of the proposed increase in outlet tip heights. The Proponent confirmed that the shadow study provided in the Stage 2 Urban Design and Landscape Management Plan (UDLMP) currently being reviewed by the Department is accurate and incorporates the proposed outlet tip heights.

The Department has reviewed this shadow study in its consideration of the modification request and acknowledges the ventilation facilities at both locations would comply with condition B33(b)(v). Specifically, a minimum of three hours of direct sunlight in habitable rooms and at least 50 per cent of the principal private open space between 9 am and 3 pm would continue to be achieved despite any increased outlet tip height at both locations.

#### Elevated Receptors

Condition E15 of SSI 6163 requires the Proponent to assist local councils in developing an air quality assessment process to guide planning controls and assessment of surrounding land uses, particularly in relation to elevated receptors.

The Department sought advice from the Proponent to determine whether any modification to the outlet tip heights would impact on the progress of activities relating to condition E15. The Proponent advised that whilst progress has been made on achieving the intent of this condition, any modification to the outlet tip heights would be incorporated into a review of the work done to date, prior to consulting with the councils.

The Department is satisfied with this response and considers the air quality benefits of increased outlet tip heights would not preclude elevated developments surrounding each outlet, compared with the approved outlet heights. The Department considers the intended outcomes prescribed in condition E15 will provide the necessary controls for local councils to continue to plan land uses and undertake development assessments in consideration of the impacts from the project.

## **6. RECOMMENDATION**

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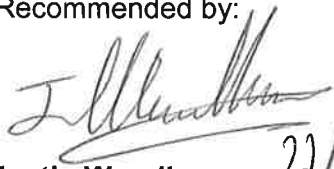
The Department is satisfied the proposed increase of both the southern and northern ventilation outlet heights would not substantially increase impacts beyond those already considered in the Department's original assessment of the project. The Department acknowledges more receivers may be able to see the northern ventilation outlet, however the Department considers the urban design treatments to this ventilation outlet would effectively mitigate visual impacts to these receivers.

The Department considers the relatively minor residual visual impact to any new receivers will be outweighed by further improvements to the local ambient air quality and human health risks compared to the current distribution of pollutants along the Pennant Hills Road corridor.

It is recommended that the Director, Transport Assessments, as delegate for the Minister for Planning:

- consider the findings and recommendations of this report;
- determine that the application falls within the scope of section 115ZI of the EP&A Act;
- approve the modification application NorthConnex Modification 2 – Ventilation Outlet Heights (SSI 6163), subject to conditions; and
- sign the attached notice of modification (Attachment D).

Recommended by:

  
**Justin Woodhouse** 22/2/18  
**Senior Planner**  
**Transport Assessments**

 22/2/2018  
**Kane Winwood**  
**Team Leader**  
**Transport Assessments**

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**DECISION**

Approved by:

  
26/2/18  
**Glenn Snow**  
**Director**  
**Transport Assessments**

## **APPENDIX A    MODIFICATION REQUEST**

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See the Department's website at:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=8824](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8824)

## **APPENDIX B SUBMISSIONS**

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See the Department's website at:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=8824](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8824)

## **APPENDIX C RECOMMENDED MODIFYING INSTRUMENT**

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See the Department's website at:

[http://majorprojects.planning.nsw.gov.au/index.pl?action=view\\_job&job\\_id=8824](http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8824)