Infrastructure approval

Section 115ZB of the *Environmental Planning & Assessment Act 1979*

I grant approval to the State significant infrastructure application referred to in schedule 1, subject to the conditions in schedules 2.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts including economic and social impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the SSI.

The Hon Pru Goward MP
Minister for Planning

Sydney January 13th 2015

SCHEDULE 1

Application no.:	SSI-6136
Proponent:	Roads and Maritime Services
Approval Authority:	Minister for Planning
Land:	**Land in the suburbs of Hornsby, North Wahroonga, Wahroonga, Normanhurst, Thornleigh, Pennant Hills, Beecroft, West Pennant Hills, Carlingford, North Rocks, Northmead and Baulkham Hills**
State Significant Infrastructure:	Development for the purposes of the NorthConnex project being a new multi-lane road link between the M1 Pacific Motorway (formerly the F3 Sydney–Newcastle Expressway) at North Wahroonga and the Hills M2 Motorway at Baulkham Hills, including: ▪ construction and operation of two road tunnels for traffic traveling north - south between the M1 Pacific Motorway and the Hills M2 Motorway; ▪ M2 integration works; ▪ construction of access points and improvements to intersections and interchanges in the vicinity of NorthConnex; ▪ construction of ventilation facilities; ▪ motorway control centre; and ▪ 11 temporary construction facilities to support the construction of the proposal.
Critical State Significant Infrastructure	The proposal is critical State significant infrastructure by virtue of schedule 5 clause 3 of the State and Regional Development SEPP.

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DEFINITIONS

Act, the	*Environmental Planning and Assessment Act 1979.*
AHD	Australian Height Datum
ancillary facility	Temporary facility for construction, including for example an office and amenities compound, construction compound, batch plant (concrete or bitumen), material crushing and screening, materials storage compound, maintenance workshop, testing laboratory or material stockpile area. *Note:* • *Where a stockpile management protocol has been approved by the Secretary for the SSI, material stockpile areas are not considered to be ancillary facilities.*
CEMP	Construction Environmental Management Plan.
CO	Carbon monoxide
conditions of approval	The Minister's conditions of approval for the SSI.
construction	Includes all work in respect of the SSI, other than: (a) survey works including general alignment survey and survey controls (including installation of global positioning system (GPS), repeater stations, survey of existing and future utilities or building/road dilapidation surveys. (b) further investigations including investigative drilling, excavation or salvage; treatment of contaminated sites or work undertaken in accordance with a strategy or salvage operation required by the conditions of this approval. (c) establishing (but not operating) ancillary facilities /construction work sites in locations meeting the criteria identified in condition D52, or where criteria are not fully satisfied, those ancillary facility sites which have been approved in accordance with conditions D51 and/or D53. This includes the establishment of ancillary facilities access roads and the provision of services to the facility and installation of erosion and sedimentation controls; (d) minor clearing or translocation of native vegetation, as identified in the documents listed in condition A2, or in accordance with approved reports or plans required by the conditions of this approval; (e) installation of environmental impact mitigation measures (including erosion and sedimentation control, temporary exclusion fencing for sensitive areas, and at-house acoustic treatment) and measures identified in approved strategies, plans, programs and other documents required by the conditions of this approval. (f) property acquisition adjustment works, including the installation of property fencing, demolition and removal of buildings; (g) relocation of utilities; (h) other activities determined by the Environmental Representative to have minimal environmental impact (e.g. minor access roads, minor adjustments to services/ utilities, temporary relocation of pedestrian and cycle paths and property access, etc). Construction includes all work where heritage, threatened species, populations or endangered ecological communities would be affected, unless otherwise approved by the Secretary in consultation with the Office of Environment and Heritage.
DPI	Department of Primary Industries (including NSW Office of Water).
EEC	Endangered Ecological Communities.
EIS	Environmental Impact Statement.
EPA	Environment Protection Authority.

EPL	Environment Protection Licence under the *Protection of the Environment Operations Act 1997*.
feasible and reasonable	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. **Feasible** relates to engineering considerations and what is practical to build. **Reasonable** relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community expectations and nature and extent of potential improvements. Where requested by the Secretary, the Proponent shall provide evidence as to how feasible and reasonable measures were considered and taken into account.
heritage	Encompasses both Aboriginal and non-Aboriginal heritage including sites that predate European settlement, and a shared history since European settlement such as a shared associations in pastoral landscapes as well as associations linked with the mission period.
heritage item	An item as defined under the *Heritage Act 1977*, and assessed as being of local, State and/or National heritage significance, and/or an Aboriginal Object or Aboriginal Place as defined under the *National Parks and Wildlife Act 1974*.
incident	A set of circumstances that: • causes or threatens to cause material harm to the environment; and/or • breaches or exceeds the limits or performance measures/ criteria in this approval.
Minister, the	Minister for Planning.
motorist	Includes drivers, passengers and motor bike riders.
Motorway Operations Complex	The grouping of buildings including the motorway control centre, southern ventilation facility, water treatment plant, workshop grouping and associated miscellaneous parking and surface structures.
NATA	National Association of Testing Authorities, Australia.
NO	Nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Oxides of nitrogen.
NSW Heritage Council	Heritage Council of NSW or its delegate.
OEH	Office of Environment and Heritage.
OEMP	Operation Environmental Management Plan.
operation	Means the operation of the SSI, but **does not** include commissioning trials of equipment or temporary use of parts of the SSI during construction, or maintenance.
PAH	Polycyclic aromatic hydrocarbons.
PIR	Preferred Infrastructure Report.
PM_{10}	Particulate matter (10 micrometres or less in diameter)
$PM_{2.5}$	Particulate matter (2.5 micrometres or less in diameter)
pre-construction	All work in respect of the SSI that is excluded from the definition of construction.
publicly available	Available for inspection by a member of the general public (for example available on an internet site).
relevant Council(s)	The Hills Shire Council, Ku-ring-gai Council, and Hornsby Shire Council, as applicable.
Secretary	Secretary of the Department of Planning and Environment.
Secretary's approval, agreement or satisfaction	A written approval from the Secretary (or delegate). *Note:* • *Where the Secretary's approval, agreement or satisfaction is*

	required under a condition of this approval, the Secretary will endeavour to provide a response within one month of receiving an approval, agreement or satisfaction request. The Secretary may ask for additional information if the approval, agreement or satisfaction request is considered incomplete. When further information is requested, the time taken for the Proponent to respond in writing will be added to the one month period.
sensitive receiver	Residence, educational institution (e.g. school, university, TAFE college), health care facility (e.g. nursing home, hospital), religious facility (e.g. church) and children's day care facility.
SSI	Means the State significant infrastructure approved under this approval and as generally described in Schedule 1 (SSI 6136)
SSI footprint	That area within the SSI boundary physically impacted by construction activities.
VOC	Volatile organic compounds

SCHEDULE 2

PART A

ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

A1 In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all feasible and reasonable measures to prevent and/or minimise any harm to the environment that may result from the construction or operation of the SSI.

TERMS OF APPROVAL

A2 The Proponent shall carry out the SSI generally in accordance with the:
- (a) State significant infrastructure application (SSI 6136);
- (b) *Roads and Maritime Services — NorthConnex: Environmental Impact Statement — Volumes 1A, 1B, 1C, 2, 3, 4, 5 and 6*, prepared by AECOM Australia Pty Ltd, dated July 2014;
- (c) *Roads and Maritime Services — NorthConnex: Submissions and Preferred Infrastructure Report — Volumes 1, 2, 3 and 4*, prepared by AECOM Australia Pty Ltd, dated November 2014; and
- (d) conditions of this approval.

A3 In the event of an inconsistency between:
- (a) the conditions of this approval and any document listed from condition A2(a) to A2(c) inclusive, the conditions of this approval shall prevail to the extent of the inconsistency; and
- (b) any document listed from condition A2(a) to A2(c) inclusive, and any other document listed from condition A2(a) to A2(c) inclusive, the most recent document shall prevail to the extent of the inconsistency.

A4 The Proponent shall comply with any reasonable requirement(s) of the Secretary arising from the Department's assessment of:
- (a) any reports, plans or correspondence that are submitted in accordance with this approval; and
- (b) the implementation of any actions or measures contained in these reports, plans or correspondence.

LIMITS OF APPROVAL

A5 This approval shall lapse 10 years after the date on which it is granted, unless the works of this SSI approval are physically commenced on or before that date.

STATUTORY REQUIREMENTS

A6 The Proponent shall ensure that all licences, permits and approvals are obtained as required by law and maintained as required throughout the life of the SSI. No condition of this approval removes the obligation for the Proponent to obtain, renew or comply with such licences, permits or approvals.

A7 This approval does not apply to the operation of spoil receiving locations and facilities. The receipt of spoil at these location and facilities shall be undertaken in accordance with separate approvals or licences applying to those locations or facilities.

Disposal or storage of materials at or adjacent to the waste disposal locations identified in the documents listed in condition A2 is not allowed under this approval.

STAGING

A8 The Proponent may elect to construct and/or operate the SSI in stages. Where staging is proposed, the Proponent shall submit a **Staging Report** to the Secretary prior to the commencement of each proposed stage. The Staging Report shall provide details of:

(a) how the SSI would be staged, including general details of work activities associated with each stage and the general timing of when each stage would commence; and

(b) details of the relevant conditions of approval, which would apply to each stage and how these shall be complied with across and between the stages of the SSI.

Where staging of the SSI is proposed, these conditions of approval are only required to be complied with at the relevant time and to the extent that they are relevant to the specific stage(s).

SUBMISSION OF ANY STRATEGY, PLAN OR PROGRAM

A9 The Proponent shall ensure that any strategy, plan, program, or other document, required by the conditions of this approval and relevant to each stage (as identified in the Staging Report) is submitted to the Secretary no later than one month prior to the commencement of the relevant stage(s), unless otherwise agreed by the Secretary.

Notes:

- *While any strategy, plan or program may be submitted on a progressive basis, the Proponent will need to ensure that the existing operations on site are covered by relevant and suitable strategies, plans or programs at all times; and*
- *If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program shall clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.*

COMPLIANCE MONITORING AND TRACKING

A10 The Proponent shall take all appropriate measures to ensure that employees, contractors and sub-contractors are aware of, and comply with, the requirements of the conditions of this approval relevant to their respective activities.

A11 The Proponent shall be responsible for environmental impacts resulting from the actions of all persons that it invites onto the site, including contractors, sub-contractors and visitors.

A12 In the event of a dispute between the Proponent and another public authority, in relation to an applicable requirement in this approval or relevant matters relating to the SSI, either party may refer the matter to the Secretary for resolution. The Secretary's determination of any such dispute shall be final and binding on the parties unless further statutory approval is required.

A13 The Proponent shall prepare and implement a **Compliance Tracking Program**, to track compliance with the requirements of this approval. The Program shall be submitted to the Secretary for approval prior to the commencement of construction and operate for a minimum of 24 months following commencement of operation, subject to the Secretary's review of the outcomes of the Independent Environmental Audit Report referred to in condition E31. The operation of the program may be extended if the Secretary determines that there has been unsatisfactory compliance.

The Program shall include, but not necessarily be limited to:

(a) provision for the notification of the Secretary prior to the commencement of construction and prior to the commencement of operation of the SSI (including prior to each stage, where works are being staged);

(b) provision for periodic review of the compliance status of the SSI against the requirements of this approval;
(c) provision for periodic reporting of compliance status to the Secretary, including but not limited to:
    (i) a Pre-Construction Compliance Report prior to the commencement of construction,
    (ii) half-yearly Construction Compliance Reports, for the duration of construction, and
    (iii) a Pre-Operation Compliance Report prior to the commencement of operation;
(d) a program for independent environmental auditing in accordance with *AS/NZS ISO 19011:2014 - Guidelines for Auditing Management Systems*;
(e) mechanisms for recording environmental incidents during construction and actions taken in response to those incidents;
(f) provision for reporting environmental incidents to the Secretary during construction, in accordance with conditions A14 and A15;
(g) procedures for rectifying any non-compliance identified during environmental auditing, review of compliance or incident management; and
(h) provision for ensuring all employees, contractors and sub-contractors are aware of, and comply with, the conditions of this approval relevant to their respective activities.

INCIDENT REPORTING

A14 The Proponent shall notify the Secretary and relevant public authorities of any incident with actual or potential significant on-site or off-site impacts on people or the biophysical environment within 24 hours of becoming aware of the incident. The Proponent shall provide full written details of the incident to the Secretary within seven days of the date on which the incident occurred.

Note:

- *Where an incident also requires reporting to the EPA and/or OEH, the incident report prepared for the purposes of notifying the EPA and/or OEH would meet this requirement.*

A15 The Proponent shall meet the requirements of the Secretary or relevant public authority (as determined by the Secretary) to address the cause or impact of any incident, as it relates to this approval, reported in accordance with condition A14, within such period as the Secretary may require.

PART B

ENVIRONMENTAL PERFORMANCE

AIR QUALITY

Physical Requirements

B1 The ventilation outlets shall be constructed at the locations specified in Appendices A and B.

B2 The ventilation outlets shall be constructed to achieve an outlet exit plane at a height of 20 metres above ground level. The ventilation outlets shall be constructed at an approximate height of:
(a) the northern ventilation outlet: 194 metres (AHD); and
(b) the southern ventilation outlet: 147 metres (AHD).

B3 The ventilation outlet exit plane must have a minimum exit velocity of:
(a) 13 metres per second; or
(b) a velocity, or variable velocity, to be determined in the Tunnel Ventilation, Incident Response and Traffic Management Systems Integration Protocol required under condition B7, but only if an equivalent or better environmental outcome than presented in the Proponent's most up to date air assessment can be demonstrated to the satisfaction of the Secretary, in consultation with the EPA.

B4 The tunnel ventilation system shall be designed, constructed and operated to release emissions from the ventilation outlets and to avoid emissions from the portals or the tunnel support facilities at Wilson Road and Trelawney Street, except for emergency smoke management purposes in the event of a fire in the tunnel and periodic testing of the system.

B5 The tunnel shall be designed and constructed so as to allow for potential future modification of the ventilation system if required. The Proponent shall demonstrate by the production of a report, to the satisfaction of the Secretary, how this will be allowed for prior to finalising detailed design.

B6 The Proponent shall install ventilation outlet emission sampling points and associated safe access thereto, during construction of the ventilation outlet. The sampling points shall be designed and located in accordance with the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (EPA 2007, or as updated), or an equivalent methodology approved by the Secretary in consultation with the EPA.

B7 Prior to operation, the Proponent shall prepare and implement a **Tunnel Ventilation, Traffic Incident Response and Traffic Management Systems Integration Protocol** in consultation with the Transport Management Centre, for the approval of the Secretary. The Protocol must be reviewed by a suitably qualified and experienced independent ventilation specialist to confirm that, before the tunnel is open to traffic, the ventilation/traffic management systems would operate together to ensure conditions E2, E3, E4, E8 and E11 are met. The Protocol should include a commissioning procedure to be completed before the tunnel is opened to traffic.

Note:
- *Tunnel ventilation design and operation, incident response triggers and procedures, and traffic management, should be fully integrated in accordance with the primary objective of ensuring the safety of motorists in the tunnel.*

Air Quality Community Consultative Committee

B8 Prior to finalising the detailed design of the SSI and the establishment of the ambient air quality monitoring stations required under condition E7, the Proponent shall establish an Air Quality Community Consultative Committee (AQCCC) to provide input prior to and during the operation of the SSI. The AQCCC shall:

(a) be comprised of:
    (i) two representatives from the Proponent and tunnel operator,
    (ii) one representative from each of the relevant Councils, and
    (iii) three representatives from the local community, whose appointment has been approved by an expression of interest process conducted by the Proponent in consultation with the Secretary;
(b) be chaired by an independent party put forward by the Proponent and approved by the Secretary;
(c) meet at least four times a year, or as otherwise agreed by the chair and the Secretary;
(d) review and provide advice on the location of the community based monitoring stations, operation environmental management plans and other operation stage documents, compliance tracking reporting, audit reports, or complaints; and
(e) provide advice on the dissemination of monitoring results and other information on air quality issues.

The AQCCC shall be operated for a period of two years from the commencement of operation, or as otherwise approved by the Secretary, in consultation with the chair.

SOIL, WATER QUALITY AND HYDROLOGY

B9 Except as may be provided by an EPL, the SSI shall be constructed and operated to comply with section 120 of the *Protection of the Environment Operations Act 1997*, which prohibits the pollution of waters.

B10 All activities taking place in, on or under waterfront land, as defined in the *Water Management Act 2000* should be conducted generally in accordance with the NSW Office of Water's Guidelines for Controlled Activities.

B11 Watercourse crossings, including temporary work platforms, waterway crossings and/or coffer dams, shall be designed and constructed in consultation with the DPI (Fisheries) and NSW Office of Water, and where feasible and reasonable, be consistent with the *NSW Guidelines for Controlled Activities Watercourse Crossings* (NSW Office of Water 2012), *Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge 2003), *Policy and Guidelines for Fish Friendly Waterway Crossings* (NSW Fisheries February 2004), and *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI Fisheries 2013). Where multiple cell culverts are proposed for crossings of fish habitat streams, at least one cell shall be provided for fish passage, with an invert or bed level that mimics watercourse flows.

B12 The proponent shall take all feasible and reasonable measures to limit operational groundwater inflows into each tunnel to no greater than one litre per second across any given kilometre.

Flood Mitigation Strategy

B13 A **Flood Mitigation Strategy** shall be prepared in respect of the flood prone land and overland flowpaths for the waterways and catchments in the vicinity of the Hills M2 Motorway and Cockle Creek adjacent to the M1 Pacific Motorway. The Strategy shall be designed to ensure that the SSI, where feasible and reasonable, does not worsen existing flooding characteristics in the vicinity of the SSI. The Strategy shall include but not be limited to:
(a) the identification of flood risks to the SSI and adjoining areas, including further modelling and the consideration of local drainage catchment assessments, and climate change implications on rainfall and drainage characteristics. This must consider blockages of waterway structures from floating debris in its flood level modelling;
(b) the identification of design and mitigation measures that would be implemented to protect proposed operations and not worsen existing flooding characteristics within and in the vicinity of the project boundary during construction and operation, including soil erosion and scouring;
(c) consideration of limiting flooding characteristics to the following levels:

(i) a maximum increase in inundation time of one hour in a 1 in 100 year ARI rainfall event;
(ii) a maximum increase of 10mm in inundation at properties where floor levels are currently exceeded in a 1 in 100 year ARI rainfall event; and
(iii) a maximum increase of 50mm in inundation at properties where floor levels would not be exceeded in a 1 in 100 year ARI rainfall event.

or else provide alternative flood mitigation solutions consistent with the intent of these limits;

(d) the identification of measures to be implemented to minimise scour and dissipate energy at locations where flood velocities are predicted to increase as a result of the SSI and cause localised soil erosion;
(e) identification of drainage system upgrades; and
(f) identification of the timing and maintenance responsibility of any necessary works.

The strategy shall be prepared by a suitably qualified and experienced person in consultation with directly affected landowners, the NSW Office of Water, OEH, and relevant Councils.

The Strategy shall be peer reviewed and confirmed as meeting the requirements of this condition by a suitably qualified and experienced independent hydrological engineer. The Strategy shall be submitted to the Secretary and the relevant Council prior to the commencement of construction in the vicinity of the flood prone land and overland flowpaths for the waterways and catchments in the vicinity of the Hills M2 Motorway and Cockle Creek adjacent to the M1 Pacific Motorway, or as otherwise agreed by the Secretary.

B14 All relevant information shall be provided to the relevant Council and/ or NSW State Emergency Service, to assist in the preparation of any new or necessary update(s) to the relevant plans and documents in relation to flooding, to reflect changes in flooding levels, flows and characteristics as a result of the SSI.

Water Quality Plan and Monitoring Program

B15 A **Water Quality Plan and Monitoring Program** shall be prepared and implemented to ensure that the project monitor and avoids or mitigates impacts on surface and groundwater quality and resources, during construction and operation. The Plan and Program shall be developed in consultation with the EPA, DPI (Fisheries), NSW Office of Water, and relevant Councils, for the approval of the Secretary, and shall include but not necessarily be limited to:

(a) identification of works and activities during construction and operation of the SSI, including tunnel discharge, runoff, emergencies and spill events, that have the potential to impact on surface water quality of potentially affected watercourses and riparian land;
(b) a **risk management framework** for evaluation of the risks to groundwater and surface water resources and dependent ecosystems as a result of groundwater inflows to the tunnels, including definition of impacts that trigger contingency and ameliorative measures;
(c) the identification of environmental management measures relating to surface and groundwater during construction and operation, including water treatment, erosion and sediment control plans and stormwater management measures consistent with Water Sensitive Urban Design measures, where relevant, and consistent with the measures detailed in the documents listed in condition A2, including the specifications and design details of the Water Treatment Plants;
(d) commitment to designing discharge points into watercourses affected by the proposal to emulate a natural stream system, where feasible and reasonable;
(e) the presentation of water quality objectives, standards and parameters, having regard to the *Australian and New Zealand guidelines for fresh and marine water quality* (Agriculture and Resource Management Council of Australia and New Zealand and the Australian and New Zealand Environment and Conservation Council 2000), developed in accordance with condition B16 and endorsed by EPA;
(f) representative background monitoring data (including but not necessarily limited to representative data collected by the relevant Council, and considering seasonality) for

surface and groundwater quality parameters, to establish baseline water conditions prior to the commencement of construction;

(g) identification of construction and operational phase surface and groundwater quality monitoring locations (including watercourses, waterbodies and wetlands) which are representative of the potential extent of impacts from the SSI, including the relevant analytes and frequency of monitoring;

(h) commitment to a minimum monitoring period of three years following the completion of construction or until the affected waterways and/ or groundwater resources are certified by a suitably qualified and experienced independent expert as being rehabilitated to an acceptable condition. The monitoring shall also confirm the establishment of operational water control measures (such as sedimentation basins and vegetation swales);

(i) contingency and ameliorative measures in the event that adverse impacts to water quality are identified, with reference to the impact triggers defined in accordance with (b);

(j) identification of and commitment to 'make good' provisions for groundwater users to be implemented in the event of a decline in water supply levels from existing bores associated with groundwater changes from either construction and ongoing operational dewatering caused by the SSI; and

(k) reporting of the monitoring results to the Secretary, EPA, OEH, NSW Office of Water, DPI (Fisheries) and the relevant Council;

The construction elements of the Plan and Program shall be submitted to the Secretary for approval prior to the commencement of construction of the SSI, as part of the Construction Soil and Water Management Plan required by condition D57(f). The operational elements of the Plan and Program shall be detailed in principle as part of the Construction Soil and Water Management Plan. The final operational elements of the Plan and Program shall be submitted to the Secretary for approval one year prior to the commencement of operation of the SSI, unless otherwise agreed by the Secretary. A copy of the Plan and Program shall be submitted to the EPA, DPI (Fisheries), NSW Office of Water and relevant Councils prior to its implementation.

B16 As part of the Water Quality Plan and Monitoring Program, the Proponent shall provide details of how the potential impact of discharges on receiving waters would be avoided or minimised, which shall include but not necessarily be limited to:

(a) characterisation of current water quality in any receiving waters that could be affected by the proposal;

(b) a statement of the ambient water quality objectives and the environmental values for the receiving waters relevant to the proposal;

(c) a statement of the indicators and associated trigger values or criteria for the identified environmental values;

(d) details of the significance of any identified impacts on surface waters including consideration of the relevant ambient water quality outcomes;

(e) demonstration of how the proposal will be designed and operated to:

  (i) protect the water quality objectives for receiving waters, where they are currently being achieved, and

  (ii) contribute towards achievement of the water quality objectives over time, where they are not currently being achieved; and

(f) demonstration that any groundwater discharge water quality is consistent with supporting a slightly to moderately disturbed level of aquatic ecosystem protection for receiving waters as defined by the *Australian and New Zealand guidelines for fresh and marine water quality* (Agriculture and Resource Management Council of Australia and New Zealand and the Australian and New Zealand Environment and Conservation Council 2000).

Land Contamination

B17 Prior to the commencement of site preparation and excavation activities, or as otherwise agreed by the Secretary, in areas identified as having a moderate to high risk of contamination, a **Soil Contamination Report** shall be prepared by a suitably qualified person(s) in accordance with the requirements of the *Contaminated Land Management Act 1997* and associated

guidelines, detailing the outcomes of Phase 2 contamination investigations within these areas. The Report shall detail, where relevant, whether the soil is suitable (for the intended land use) or can be made suitable through remediation and/or outline the potential contamination risks from the project to human health and receiving waterways.

For land to be disturbed by the SSI, where the investigations identify that the site is suitable for the intended operations and that there is no need for a specific remediation strategy, measures to identify, handle and manage potential contaminated soils, materials and groundwater shall be identified in the Report and incorporated into the Construction Environmental Management Plan and Soil and Water Management Plan. Should a remediation strategy be required, the Report shall include a remediation plan for addressing the disturbed area, and how the environmental and human health risks will be managed during the disturbance, remediation and/or removal of contaminated soil or groundwater.

If required, the Report shall be accompanied by a **Site Audit Statement**(s), prepared by an accredited Site Auditor under the *Contaminated Land Management Act 1997*, verifying that the disturbed area has been or can be remediated to a standard consistent with the intended land use. A final Site Audit Statement(s), if required, shall be prepared by an accredited Site Auditor, certifying that the contaminated disturbed areas have been remediated to a standard consistent with the intended land use and shall be submitted to the Secretary and Relevant councils prior to operation of the site.

HERITAGE

B18 The Proponent shall not harm, modify or otherwise impact any heritage items outside the SSI footprint.

B19 The Proponent shall detail avoidance, mitigation and management measures for all heritage items in the study area adopted in Volume 6, *Technical Working Paper: Non-Aboriginal Heritage Assessment* and *Technical Working Paper: Aboriginal Cultural Heritage*, of the document listed in condition A2(b), and any heritage item in the vicinity of the study area that may be affected by the SSI, noting the provisions of condition B18. The avoidance, mitigation and management measures are to be detailed in the Construction Heritage Management Plan required by condition D57(c) and the Construction Noise and Vibration Management Plan required by condition D57(b).

B20 Identified impacts to heritage items shall be minimised where feasible and reasonable through both detailed design and construction, particularly with regard to the Thornleigh Maltworks. Where impacts are unavoidable, works shall be undertaken in accordance with the actions to manage heritage construction impacts specified in the Construction Heritage Management Plan required by condition D57(c) and under the guidance of a suitably qualified and experienced heritage specialist.

B21 The Proponent shall, where feasible and reasonable, design and construct the SSI to avoid trees that are heritage items or are associated with the heritage significance of heritage items or heritage conservation areas. In particular, the Proponent is to consider the avoidance of impacts to the Canary Island Palms associated with the Garden at 1 Pacific Highway, Wahroonga (I762) and street trees on Woonona Avenue, Wahroonga (I769).

Where impacts to the Canary Island Palms cannot be avoided, the Proponent shall further investigate options for relocation of those trees in consultation with the relevant Council, prior to the commencement of works impacting the relevant trees.

Where impacts to the street trees cannot be avoided, the Proponent shall further investigate options for replacement of those trees in consultation with the relevant Council, prior to the commencement of works impacting the relevant trees.

B22 Prior to conducting acoustic treatment at any heritage item in accordance with this approval, the Proponent shall obtain and implement the advice of a suitably qualified and experienced built heritage expert to ensure any such work is carried out in a manner sympathetic to the heritage values of the item.

TRANSPORT AND ACCESS

B23 The SSI shall be designed so as not to preclude the future delivery of:
(a) a direct west bound access route from the Hills M2 Motorway for northbound traffic along the SSI; and
(b) a direct south bound access route from the SSI for eastbound traffic along the Hills M2 Motorway.

B24 The SSI is to be designed with the objective of minimising adverse changes to existing traffic performance and existing access arrangements and services for other transport modes. This includes consideration of the speed and reliability of public transport bus services.

B25 In relation to new or modified local road, parking, pedestrian and cycle infrastructure, the SSI (including ancillary facilities) shall be designed:
(a) in consultation with the relevant roads authority;
(b) taking into consideration existing and future demand, pedestrian and road safety and traffic network impacts; and
(c) to meet relevant design, engineering and safety guidelines, including *Austroads Guide to Traffic Engineering Practice*.

The design of any such infrastructure shall be certified by a suitably qualified and experienced expert that has considered the above matters.

WASTE MANAGEMENT

B26 Waste generated outside the site shall not be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence or waste exemption under the *Protection of the Environment Operations Act 1997*, if such a licence is required in relation to that waste.

B27 The reuse and/or recycling of waste materials generated on site shall be maximised as far as practicable, to minimise the need for treatment or disposal of those materials off site.

B28 All liquid and/or non-liquid waste generated on the site shall be assessed and classified in accordance with *Waste Classification Guidelines* (Department of Environment, Climate Change and Water 2009).

B29 All waste materials removed from the SSI site shall only be directed to a waste management facility or premises lawfully permitted to accept the materials.

B30 The handling of spoil generated during construction of the SSI is to be conducted in accordance with the Spoil Management Strategy required under condition D40.

UTILITIES AND SERVICES

B31 Utilities, services and other infrastructure potentially affected by construction and operation shall be identified prior to construction to determine requirements for access to, diversion, protection, and/or support. Consultation with the relevant owner and/or provider of services that are likely to be affected by the SSI shall be undertaken to make suitable arrangements for access to, diversion, protection, and/or support of the affected infrastructure as required.

B32 The Proponent shall prepare dilapidation surveys and reports (including movement prediction studies) on the condition of local roads, footpaths, services and utilities affected by

construction. The Proponent shall carry out rectification work at the Proponent's expense and to the reasonable requirements of the owners.

URBAN DESIGN AND VISUAL AMENITY

B33 Prior to completion of detailed design, or as otherwise agreed by the Secretary, an **Urban Design and Landscape Plan** shall be prepared and implemented for the SSI. The Plan shall be prepared by suitably qualified and experienced person(s), in consultation with the relevant Council and community, for the approval of the Secretary. The Plan shall present an integrated urban and landscape design for the SSI, and shall include, but not necessarily be limited to:

(a) identification of design objectives, principles and standards based on:
  i) local environmental and heritage values,
  ii) urban design context,
  iii) sustainable design and maintenance,
  iv) community safety, amenity and privacy, including 'safer by design' principles where relevant,
  v) relevant design standards and guidelines; and
  vi) the urban design objectives outlined in Section 7.5.4 of the EIS;

(b) landscaping and building design opportunities to mitigate the visual impacts of the operational fixed facilities, including the ventilation facilities, emergency smoke extraction outlets and the Motorway Operations Complex, in accordance with the following design considerations:
  i) design and proportions of building facades, fences and landscaping should have regard to the surrounding urban context and built form and streetscape character,
  ii) opportunities for deep soil zone should be retained to sustain vegetation, including large trees,
  iii) design should have regard to breaking up building massing and articulating buildings and fences,
  iv) variations in materials and finishes should be used, and
  v) retention of a minimum of three (3) hours of direct sunlight in habitable rooms and in at least 50% of the principal private open space area at residential properties impacted by overshadowing from the SSI between 9.00am and 3.00pm on 21 June, or avoidance of unreasonably reduced access to sunlight where existing residential properties currently receive less than this requirement;

(c) the location of existing vegetation and proposed landscaping (including use of endemic and advanced tree species where practicable). Details of species to be replanted/ revegetated shall be provided, including their appropriateness to the area and habitat for threatened species. Where feasible and reasonable, cleared vegetation shall be reused;

(d) a description of disturbed areas (including compounds) and details of the strategies to progressively rehabilitate, regenerate and/ or revegetate these areas;

(e) design features, built elements, lighting and building materials;

(f) an assessment of the visual screening effects of existing vegetation and the proposed landscaping and built elements. Where receivers have been identified as likely to experience high visual impact as a result of the SSI, the Proponent shall in consultation with affected receivers, identify opportunities for providing at-receiver landscaping to further screen views of the SSI. Where agreed to with the landowner, these measures shall be implemented during the construction of the SSI;

(g) graphics such as sections, perspective views and sketches for key elements of the SSI, including, but not limited to, built elements of the SSI;

(h) monitoring and maintenance procedures for the built elements, rehabilitated vegetation and landscaping (including weed control) including performance indicators, responsibilities, timing and duration and contingencies where rehabilitation of vegetation and landscaping measures fail; and

(i) evidence of consultation with the relevant Council and community on the proposed urban design and landscape measures prior to its finalisation.

Note:

- *The Plan may be submitted in stages to suit a staged construction program of the SSI.*

PROPERTY AND LAND USE

B34 The Proponent shall design and construct the project to minimise impacts to, and interference with, third party property and infrastructure, where feasible and reasonable, and to ensure that such infrastructure and property is protected during construction and operation. Any damage caused to property as a result of the SSI shall be rectified or the landowner compensated, within a timeframe defined in the Construction Environmental Management Plan, with the costs borne by the Proponent.
Note:
- *Property inspections are required under condition D6 for properties at risk of impact/ damage from works associated with the SSI.*

B35 The Proponent shall construct and operate the SSI with the objective of minimising light spillage to residential properties and be generally consistent with the requirements of *Australian Standard 4282-1997 Control of the obtrusive effects of outdoor lighting*. Notwithstanding, the proponent shall provide at receiver treatment to mitigate residual night lighting impacts for properties adjoining or adjacent to the Motorway Operations Complex, in consultation with affected landowners.

SUSTAINABILITY

B36 The SSI shall be designed and constructed to achieve an excellent 'Design' and 'As built' rating under the Infrastructure Sustainability Council of Australia (ISCA) infrastructure rating tool.

B37 Opportunities to reduce operational greenhouse gas emissions shall be investigated during detailed design. The sustainability initiatives identified must be regularly reviewed, updated and implemented throughout the design development and construction phase, and annually during the operational phases.

PART C

COMMUNITY INFORMATION AND REPORTING

COMMUNITY INFORMATION, CONSULTATION AND INVOLVEMENT

C1 Prior to the commencement of construction, or as otherwise agreed by the Secretary, the Proponent shall prepare and implement a **Community Communication Strategy** to the satisfaction of the Secretary. The Strategy shall provide mechanisms to facilitate communication between the Proponent (and its contractor(s)), the Environmental Representative (see condition D1), the relevant Council and community stakeholders (particularly adjoining landowners) on the design and construction environmental management of the SSI. The Strategy shall include, but not be limited to:

(a) identification of stakeholders to be consulted as part of the Strategy, including affected and adjoining landowners, key community and business groups, and community and social service organisations;
(b) procedures and mechanisms for the regular distribution of accessible information to community stakeholders on construction progress and matters associated with environmental management, including provision of information in appropriate community languages;
(c) the formation of community-based forums that focus on key environmental management issues for the SSI. The Strategy shall provide detail on the structure, scope, objectives and frequency of the community-based forums;
(d) procedures and mechanisms through which the community stakeholders can discuss or provide feedback to the Proponent and/or Environmental Representative in relation to the environmental management and delivery of the SSI;
(e) procedures and mechanisms through which the Proponent can respond to enquiries or feedback from the community stakeholders in relation to the environmental management and delivery of the SSI; and
(f) procedures and mechanisms that would be implemented to resolve issues/ disputes that may arise between parties on the matters relating to environmental management and the delivery of the SSI, including but not limited to disputes regarding rectification or compensation for impacts to third party property and infrastructure. These procedures and mechanisms may include the use of a suitably qualified and experienced independent mediator.

Issues that shall be addressed through the Community Communication Strategy include (but are not necessarily limited to):

(i) traffic management (including property access, pedestrian access);
(ii) air quality;
(iii) heritage matters;
(iv) landscaping and urban design matters;
(v) construction staging, hours and activities;
(vi) noise and vibration mitigation and management;
(vii) water quality, hydrology and flooding matters; and
(viii) biodiversity matters.

The Proponent shall maintain and implement the Strategy throughout construction of the SSI.

Complaints and Enquiries Procedure

C2 Prior to the commencement of pre-construction and construction, or as otherwise agreed by the Secretary, the Proponent shall ensure that the following are available for community enquiries and complaints for the duration of construction:

(a) a 24 hour telephone number(s) on which complaints and enquiries about the SSI may be registered;
(b) a postal address to which written complaints and enquires may be sent;
(c) an email address to which electronic complaints and enquiries may be transmitted; and
(d) a mediation system for complaints unable to be resolved.

The telephone number, the postal address and the email address shall be published in newspaper(s) circulating in the local area prior to the commencement of construction and prior to the commencement of operation. This information shall also be provided on the website (or dedicated pages) required by this approval.

C3 Prior to the commencement of pre-construction and construction, or as otherwise agreed by the Secretary, the Proponent shall prepare and implement a **Construction Complaints Management System** consistent with *AS 4269: Complaints Handling* and maintain the System for the duration of construction and up to 12 months following completion of construction of the SSI.

Information on all complaints received, including the means by which they were addressed and whether resolution was reached, with or without mediation, shall be maintained in a complaints register and included in the construction compliance reports required by this approval. The information contained within the System shall be made available to the Secretary on request.

Provision of Electronic Information

C4 Prior to the commencement of pre-construction and construction, or as otherwise agreed by the Secretary, the Proponent shall establish and maintain a new website, or dedicated pages within an existing website, for the provision of electronic information associated with the SSI, for the duration of construction and for 12 months following completion of the SSI. The Proponent shall, subject to confidentiality, publish and maintain up-to-date information on the website or dedicated pages including, but not necessarily limited to:

(a) information on the current implementation status of the SSI;
(b) a copy of the documents listed in condition A2, and any documentation supporting modifications to this approval that may be granted from time to time;
(c) a copy of this approval and any future modification to this approval;
(d) a copy of each relevant environmental approval, licence or permit required and obtained in relation to the SSI;
(e) a copy of each current report, plan, or other document required under this approval;
(f) the outcomes of compliance tracking in accordance with condition A13 of this approval; and
(g) details of contact point(s) to which community complaints and enquiries may be directed, including a telephone number, a postal address and an email address.

PART D

CONSTRUCTION ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL REPRESENTATIVE

D1 Prior to the commencement of construction of the SSI, or as otherwise agreed by the Secretary, the Proponent shall appoint a suitably qualified and experienced Environmental Representative(s) that is independent of the design and construction personnel, and that has been approved by the Secretary. The Proponent shall employ the Environmental Representative(s) for the duration of construction, or as otherwise agreed by the Secretary. The Environment Representative(s) shall:

(a) be the principal point of advice in relation to the environmental performance of the SSI;
(b) monitor the implementation of environmental management plans and monitoring programs required under this approval and advise the Proponent upon the achievement of these plans/programs;
(c) have responsibility for considering, and advising the Proponent on, matters specified in the conditions of this approval, and other licences and approvals related to the environmental performance and impacts of the SSI;
(d) ensure that environmental auditing is undertaken in accordance with the Proponent's Environmental Management System(s);
(e) be given the authority to approve/reject minor amendments to the Construction Environment Management Plan. What constitutes a "minor" amendment shall be clearly explained in the Construction Environment Management Plan;
(f) be given the authority and independence to require reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts; and
(g) be consulted in responding to the community concerning the environmental performance of the SSI where the resolution of points of conflict between the Proponent and the community is required .

D2 The Environmental Representative shall prepare and submit to the Secretary a monthly report on the Environmental Representative's actions and decision on matters specified in condition D1 for the preceding month. The reports shall be submitted within seven (7) days for the end of each month for the duration of construction of the SSI, or as otherwise agreed by the Secretary. Notwithstanding, the Environmental Representative shall be given the independence to report to the Secretary at any time and/or at the request of the Secretary.

SOIL, WATER QUALITY AND HYDROLOGY

Construction Soil and Water Management

D3 Soil and water management measures consistent with *Managing Urban Stormwater - Soils and Construction Vols 1 and 2, 4th Edition* (Landcom, 2004) shall be employed during the construction of the SSI to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.

D4 Where available and practicable, and of appropriate chemical and biological quality, stormwater, recycled water or other water sources shall be used in preference to potable water for construction activities, including dust control.

Settlement

D5 A geotechnical model of representative geological and groundwater conditions shall be prepared prior to excavation and tunnelling in subject area(s) to identify geological structures and groundwater features. This model shall include details of proposed excavations and tunnels, construction staging, and identify surface and sub-surface structures and infrastructure which may be impacted by the SSI, including the specific attributes of those structures. The Proponent shall use this model to assess the predicted settlement, ground movement, stress redistribution and horizontal strain profiles caused by excavation and tunnelling on adjacent property and infrastructure.

D6 The Proponent shall undertake a review of property and infrastructure at risk from damage to determine appropriate settlement criteria to prevent damage.

D7 Should the geotechnical model in condition D5 identify exceedances of the criteria established in condition D8 or in **Table 1** (whichever is the lower), the Proponent shall identify and implement mitigation measures such as appropriate support and stabilisation structures in consultation with the relevant land and/or infrastructure owners prior to the commencement of construction to ensure where possible that underground services, infrastructure and adjacent buildings will not experience settlements exceeding the criteria.

Table 1 — Settlement Criteria

Beneath Structure/Facility	Maximum Settlement	Maximum Angular Distortion
Buildings - Low or non sensitive properties (i.e. ≤ 2 levels and carparks)	30 mm	1 in 350
Buildings - High or sensitive properties (i.e. ≥ 3 levels and heritage items)	20 mm	1 in 500
Roads and Parking areas	40 mm	1 in 250
Parks	50 mm	1 in 250

The above criteria does not remove any responsibility from the Proponent for the protection of existing structures or for rectifying any damage resulting from the SSI.

D8 Settlement criteria for individual utility structures and infrastructure shall be determined in consultation with the relevant authorities prior to the commencement of any construction potentially affecting the individual utility structure or infrastructure.

NOISE AND VIBRATION

Land Use Survey

D9 Prior to the commencement of construction, a detailed land use survey shall be completed to confirm sensitive receivers with respect to construction vibration, construction ground-borne noise and operational noise impacts (for example, educational facilities, laboratories with sensitive equipment). Noise Catchment Areas (NCAs) identified in the EIS should be refined to ensure that each catchment represents a similar acoustic environment. Additional noise monitoring should be carried out to confirm rating background levels and existing traffic noise levels for the refined NCAs. Additional long-term noise monitoring shall also be carried out at locations NL19, NL20, NL21 and NL22 (as identified in the EIS). The results of the detailed land use survey and additional noise monitoring shall be detailed in the Construction Noise and Vibration Management Plan required by condition D57(b).

The detailed land use survey may be undertaken on a progressive basis in discrete areas, provided that the land use survey and additional noise monitoring is completed and detailed in the Construction Noise and Vibration Management Plan, approved by the Secretary, prior to the commencement of the works that would impact on sensitive receivers..

Construction Hours

D10 Construction activities associated with the SSI shall be undertaken during the following standard construction hours:

(a) 7:00am to 6:00pm Mondays to Fridays, inclusive; and
(b) 8:00am to 1:00pm Saturdays;
(c) at no time on Sundays or public holidays.

D11 Notwithstanding condition D10, tunnelling may be undertaken 24 hours, seven days per week.

Note:

- *Other activities associated with the SSI (such as spoil handling and haulage and works associated with the Darling Mills Creek viaduct, and the Yale Close and Barclay Road bridges) may be undertaken outside the hours specified in condition D10 where allowed in accordance with condition D13.*

D12 Except as permitted by an EPL, activities resulting in impulsive or tonal noise emissions shall only be undertaken:
(a) between the hours of 8:00 am to 6:00 pm Monday to Friday;
(b) between the hours of 8:00 am to 1:00 pm Saturday; and
(c) in continuous blocks not exceeding three hours each with a minimum respite from those activities and works of not less than one hour between each block.

For the purposes of this condition, 'continuous' includes any period during which there is less than a one hour respite between ceasing and recommencing any of the work the subject of this condition.

D13 Notwithstanding conditions D10 and D12, construction works (including spoil handling and haulage and works associated with the Darling Mills Creek viaduct, and the Yale Close and Barclay Road bridges) associated with the SSI may be undertaken outside the hours specified under those conditions in the following circumstances:
(a) construction works that cause $L_{Aeq\ (15\ minute)}$ noise levels that are:
  (i) No more than 5 dB above rating background level at any residence in accordance with the *Interim Construction Noise Guideline (DECC, 2009); and*
  (ii) No more than the noise management levels specified in Table 3 of the *Interim Construction Noise Guideline* (DECC, 2009) at other sensitive landuses; or
(b) for the delivery of materials required by the police or other authorities for safety reasons; or
(c) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm; or
(d) construction works approved through an **Out-Of-Hours Work Protocol** prepared as part of the Construction Noise and Vibration Management Plan required by condition D57(b), provided the relevant Council, local residents and other affected stakeholders and sensitive receivers are informed of the timing and duration at least 48 hours prior to the commencement of the works; or
(e) construction works approved through an Environment Protection Licence (including any Out-Of-Hours Work Protocol).

Construction Noise and Vibration

D14 The Proponent shall implement all reasonable and feasible noise mitigation measures with the aim of achieving the following construction noise management levels and vibration criteria:
(a) construction noise management levels established using the *Interim Construction Noise Guideline* (DECC 2009);
(b) vibration criteria established using the *Assessing Vibration: a Technical Guide* (DECC 2006) (for human exposure); and
(c) the vibration limits set out in the *German Standard DIN 4150-3: Structural Vibration-effects of vibration on structures* (for structural damage).

Any construction activities identified as exceeding the construction noise management levels and/or vibration criteria shall be managed in accordance with the Construction Noise and Vibration Management Plan required by condition D57(b).

Note:
- *The* Interim Construction Noise Guideline *identifies 'particularly annoying' activities that require the addition of 5dB(A) to the predicted level before comparing to the construction NML.*

D15 Reasonable and feasible noise mitigation measures should be applied to construction activities when the following residential ground-borne noise levels are exceeded:

(a) Evening (6:00pm to 10 pm) — Internal $L_{Aeq(15\ minute)}$: 40dB(A); and
(b) Night (10pm to 7am) — Internal $L_{Aeq(15\ minute)}$: 35 dB(A).

The mitigation measures should be outlined in the Construction Noise and Vibration Management Plan (including the Out-Of-Hours Work Protocol) required by condition D57(b).

D16 Wherever practical, piling activities that affect sensitive receivers shall be undertaken using quieter alternative methods than impact or percussion piling, such as bored piles or vibrated piles.

D17 The Proponent shall implement operational noise mitigation measures at receivers, or equivalent temporary measures, at the start of construction, and in areas where the documents listed in condition A2 have identified high noise impacts (including at or adjacent to construction work sites or ancillary facilities), and where existing noise barriers are to be altered.

Construction Traffic Noise

D18 Construction traffic movements on public roads shall aim to limit any increase in existing road traffic noise levels to no more than 2 dB(A). All feasible and reasonable noise mitigation and management measures shall be implemented and any activities that could exceed the construction noise management levels shall be identified and managed in accordance with the Construction Noise and Vibration Management Plan (condition D57(b)).

D19 The Proponent is to ensure that construction vehicle contractors operate so as to minimise any sleep disturbance impacts. Measures that could be used include toolbox talks, contracts that include provisions to deal with unsatisfactory noise performance for the vehicle and/or the operator, and specifying non-tonal movement alarms in place of reversing beepers or alternatives such as reversing cameras and proximity alarms, or a combination of these, where tonal alarms are not mandated by legislation.

D20 No use of compression brakes shall be permitted for construction vehicles associated with the SSI during construction.

Blasting

D21 Should blasting be required, the Proponent shall prepare a Blast Management Strategy in consultation with the EPA and incorporate this Strategy into the Construction Noise and Vibration Management Plan required under condition D57(b). The Strategy shall be prepared with an aim to demonstrate that all blasting and associated activities will be undertaken in a manner that will not generate unacceptable noise and vibration impacts or pose a significant risk impact to residences and sensitive receptors. The Strategy shall also address the principles outlined in *Hazardous Industry Planning Advisory Paper No 6: Hazard Analysis* (Department of Planning January 2011) and *Assessment Guideline: Multi-Level Risk Assessment* (Department of Planning and Infrastructure May 2011) for the handling and storage of hazardous materials. Issues to be considered in the Strategy shall include, but not necessarily be limited to:

(a) details of blasting to be performed, including location, method and justification of the need to blast;
(b) identification of any potentially affected noise and vibration sensitive sites including heritage buildings and utilities;
(c) establishment of appropriate criteria for blast overpressure and ground vibration levels at each category of noise sensitive site;
(d) details of the storage and handling arrangements for explosive materials and the proposed transport of those materials to the construction site;
(e) identification of hazardous situations that may arise from the storage and handling of explosives, the blasting process and recovery of the blast site after detonation of the explosives;
(f) determination of potential noise and vibration and risk impacts from blasting and appropriate best management practices; and
(g) community consultation procedures.

D22 The vibration levels for blasting activities, including both above ground and underground work, shall meet the requirements of D27 and D28.

D23 Blasts shall be limited to an average of one single detonation in any one day, and a maximum of six per week, unless otherwise agreed by the EPA through consultation on the Construction Noise and Vibration Management Plan.

D24 For any section of tunnel construction where blasting is proposed, a series of initial trials at reduced scale shall be conducted prior to production blasting to determine site-specific blast response characteristics and to define allowable blast sizes to meet the airblast overpressure and ground vibration limits in conditions D27 and D28.

D25 Blasting associated with the project shall only be undertaken during the following hours:
(h) 9:00 am to 5:00 pm, Monday to Friday, inclusive;
(i) 9:00 am to 1:00 pm Saturday; and
(j) at no time on Sunday or on a public holiday.

This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons to avoid loss of life, property loss and/or to prevent environmental harm.

D26 Where vibration levels exceed the acceptable vibration dose values, feasible and reasonable mitigation measures shall be considered and implemented.

D27 Airblast overpressure generated by blasting associated with the SSI shall not exceed the criteria specified in **Table 2** when measured at the most affected residence or other sensitive receiver.

Table 2 — Airblast Overpressure Criteria

Airblast overpressure (dB(Lin Peak))	Allowable exceedance
115	5% of total number of blasts over a 12 month period
120	0%

D28 Ground vibration generated by blasting associated with the SSI shall be limited for human comfort to the criteria specified in **Table 3** when measured at the most affected residence or other sensitive receiver.

Table 3 — Ground Vibration Limits for Human Comfort (AS 2187.2)

Receiver	Type of blasting operations	Peak component particle velocity (mm/s)
Sensitive site*	Operations lasting longer than 12 months or more than 20 blasts	5 mm/s for 95% blasts per year 10 mm/s maximum unless agreement is reached with the occupier that a higher limit may apply
Sensitive site*	Operations lasting for less than 12 months or less than 20 blasts	10 mm/s maximum unless agreement is reached with occupier that a higher limit may apply
Occupied non-sensitive sites, such as factories and commercial premises	All blasting	25 mm/s maximum unless agreement is reached with occupier that a higher limit may apply. For sites containing equipment sensitive to vibration, the vibration should be kept below manufacturer's specifications or levels that can be shown to adversely affect the equipment operation

Notes:

- *A sensitive site includes houses and low rise residential buildings, theatres, schools, and other similar buildings occupied by people.*

- *The recommendations in Table J4.5(A) of AS 2187.2 are intended to be informative and do not override statutory requirements with respect to human comfort limits set by various authorities. They should be read in conjunction with any such statutory requirements and with regard to their respective jurisdictions.*

D29 The blasting criteria identified in conditions D27 and D28 do not apply where the Proponent has a written agreement with the relevant landowner to exceed the criteria and the Secretary has approved the terms of the written agreement. In obtaining the Secretary's approval for any such agreement, the Proponent shall submit to the Secretary:

(a) details of the proposed blasting program and justification for the proposed increase to blasting criteria including alternatives considered (where relevant);
(b) an assessment of the environmental impacts of the increased blast limits on the surrounding environment and most affected residences or other sensitive receivers including, but not limited to noise, vibration and air quality and any risk to surrounding utilities, services or other structures;
(c) details of the blast management, mitigation and monitoring procedures to be implemented; and
(d) details of consultation undertaken and agreement reached with the relevant landowners (including a copy of the agreement in relation to increased blasting limits).

The following exclusions apply to the application of this condition:

(i) any agreements reached may be terminated by the landowner at any time should concerns about the increased blasting limits be unresolved;
(ii) the blasting limit agreed to under any agreement can at no time exceed a maximum Peak Particle Velocity vibration level of 25 mm/s or maximum Airblast Overpressure level of 125 dBL; and
(iii) the provisions under this condition (to increase applicable blast criteria in agreement with the relevant landowners) do not apply where the property is a heritage property.

HERITAGE

D30 Prior to the commencement of construction affecting the Thornleigh Maltworks, and subject to condition B20, the Proponent shall carry out an archival recording of the heritage item to record the connection of the original structures to the modern upgraded structures of the Thornleigh Maltworks. Where archaeological test excavations are carried out, in accordance with the documents listed in condition A2, those investigations shall be undertaken in consultation with the relevant Council and OEH (Heritage Division), and shall:

(a) be conducted in accordance with the *Archaeological Assessments Guideline* (Heritage Council, 1996) using a methodology prepared in consultation with the OEH (Heritage Division). The archaeological investigation shall be undertaken by an archaeological heritage consultant, a suitably qualified and experienced heritage expert with demonstrated ability to comply with the *Criteria for the Assessment of Excavation Directors* (Heritage Council July 2011);
(b) provide for the detailed analysis of any heritage items discovered during the investigations;
(c) include management options for these heritage items (including options for relocation and display); and
(d) if the findings of the investigations are significant, provide for the preparation and implementation of a heritage interpretation plan.

Within 12 months of completing the above work, or as otherwise agreed by the Secretary, the Proponent shall prepare a **report containing the findings of the excavations**, including artefact analysis, and the identification of a final repository for finds, prepared in consultation with the OEH (Heritage Division) and to the satisfaction of the Secretary. The final approved report shall be submitted to the Secretary, the Heritage Council of NSW, and the local library and the local Historical Society in the relevant local government area(s).

D31 The Proponent shall not harm, modify or otherwise impact the heritage items listed as receiving 'No Impact' from the SSI under the column heading 'Degree of Impact' in Table 7 of Volume 6, *Technical Working Paper: Non-Aboriginal Heritage Assessment*, of the document listed in condition A2(b).

D32 The Proponent shall take all reasonable steps so as not to harm, modify or otherwise impact any Aboriginal heritage item associated with Archaeological Sensitive Area 1 management zone or Archaeological Sensitive Area 2 management zone.

D33 This approval does not allow the Proponent to harm, modify or otherwise impact human remains as part of the SSI.

D34 Where previously un-identified heritage items are discovered during construction of the SSI, the Proponent shall implement appropriate procedures for managing those impacts as specified in the Construction Heritage Management Plan required by condition D57(c).

TRANSPORT AND ACCESS

D35 The SSI shall be constructed, where feasible and reasonable, to avoid the use of local roads (through residential streets) by heavy vehicles to gain access to ancillary facilities.

D36 Construction vehicles (including staff vehicles) associated with the SSI shall be managed to:
- (a) minimise parking or queuing on public roads;
- (b) minimise idling and queuing in local residential streets where practicable;
- (c) adhere to the nominated haulage routes identified in the Construction Traffic and Access Management Plan required under condition D57(a); and
- (d) ensure access and egress from construction compounds is undertaken in a safe and lawful manner, with particular regard given to:
  - (i) implementation of traffic management or signalisation, in consultation with Hornsby Shire Council, of the Lymoore Avenue and Sefton Road intersection as access for the Pioneer Avenue ancillary facility (C8); and
  - (ii) changes of shifts occur outside of school zone hours.

D37 Safe pedestrian and cyclist access through or around worksites shall be maintained during construction. In circumstances where pedestrian and cyclist access is restricted due to construction activities, a satisfactory alternate route shall be provided and signposted, including provision of permanent footpaths where pedestrian access is reliant on grassed verges.

D38 Access to all properties shall be maintained during construction, where feasible and reasonable, unless otherwise agreed by the relevant property owner or occupier. Any access physically affected by the SSI shall be reinstated to at least an equivalent standard, unless agreed with by the property owner.

D39 Upon determining the haulage route(s) for construction vehicles associated with the SSI, and prior to construction, a suitably qualified and experienced independent expert shall prepare a **Local Road Dilapidation Report** for local roads within control of the relevant Councils. The Report shall assess the current condition of the road and describe mechanisms to restore any damage that may result due to its use by traffic and transport related to the construction of the SSI. The Report shall be submitted to the Secretary for information and the relevant Council for review prior to the commencement of haulage.

Following completion of construction, a subsequent Report shall be prepared to assess any damage to the road that may have resulted from the construction of the SSI.

Measures undertaken to restore or reinstate roads affected by the SSI shall be undertaken in a timely manner, in accordance with the reasonable requirements of the relevant Council, and at the full expense of the Proponent.

Note:

- *Nothing in these conditions restricts the Proponent commencing adjustments and minor upgrades to the existing road network to cater for construction traffic and installation of temporary project signage prior to the commencement of construction.*

Spoil Management

D40 Prior to commencement of any tunnelling works, the Proponent shall prepare and implement a **Spoil Management Strategy** for the SSI. The Strategy is to be developed, in consultation with EPA and the relevant Council, for the approval of the Secretary. The Strategy shall incorporate detailed information on the handling of spoil generated during construction of the SSI, and provide information regarding each of the broad parameters specified in Table 8-29 of Volume 1C of the document listed in condition A2(b).

The Strategy is to be prepared separate to, but consistent with, the Construction Traffic and Access Management Plan required under condition D57(a).

Ancillary Facility Access Arrangements

D41 Prior to implementation of access arrangements C5-2, C5-4, C5-5 and C9-2, the Proponent shall conduct a road safety audit(s), to be prepared by a suitably qualified and experienced road safety auditor in consultation with the Transport Management Centre. The details of the road safety audit(s) shall be included in the Ancillary Facilities Management Plan required under condition D41.

D42 Heavy vehicle construction traffic is not permitted on local roads outside the standard construction hours specified in condition D10, unless approved by the Secretary having regard to amenity, traffic and safety impacts.

BIODIVERSITY

D43 The Proponent shall demonstrate that the management of native vegetation during construction has been conducted in accordance with the following objectives:

(a) vegetation clearing shall be minimised in order to reduce impacts to any threatened species or Endangered Ecological Communities, and

(b) impacted vegetation shall be rehabilitated with endemic species (in the first instance) and locally native species.

Pre Clearing Surveys

D44 Prior to construction, pre clearing surveys and inspections for endangered and threatened species shall be undertaken to confirm the on-site location of those species. The surveys and inspections, and any subsequent relocation of species and associated management/offset measures, shall be undertaken under the guidance of a suitably qualified and experienced ecologist. Methodologies shall be incorporated into the Construction Flora and Fauna Management Plan required under condition D57(d) and/or the Biodiversity Offset Package required under condition D47.

D45 Prior to the clearing of any hollow-bearing trees, or as otherwise agreed by the Secretary, the proponent shall prepare and implement a **Nest Box Plan** to provide replacement hollows (natural and/or artificial) for displaced fauna. The Plan shall be prepared in consultation with OEH, and detail the number and type of nest boxes to be installed, which shall be justified based on the number and type of hollows to be removed (based on pre clearing surveys), the density of hollows in the area to be cleared and in adjacent areas, and the availability of adjacent food resources. The Plan shall also provide details of maintenance protocols for the nest boxes installed including responsibilities, timing and duration. The Plan shall be approved by the Secretary and implemented as part of the Construction Flora and Fauna Management Plan required under condition D57(d).

D46 Prior to the commencement of construction that would result in the disturbance of *Epacris purpurescens*, the Proponent shall prepare a **Flora Translocation Strategy** to determine the

feasibility and potential efficacy of translocation measures. The Strategy shall be prepared in consultation with OEH, for the approval of the Secretary prior to the commencement of construction resulting in the disturbance of *Epacris purpurescens*.

The Strategy shall include:

(a) a feasibility assessment of timeframe and staging requirements, availability of expertise, risk effectiveness analysis, and availability/suitability of translocation sites;
(b) detail of species specific information on the proposed methods of, and discussion of results of past recorded responses to, translocations; and
(c) a framework for the translocation process applicable to this species.

Biodiversity Offsets

D47 Within 12 months of the commencement of construction, the Proponent shall develop and implement a Biodiversity Offset Package for the approval of the Secretary. The Package shall detail how the ecological values lost as a result of the SSI will be offset. The Package shall be consistent with the *NSW offset principles for major projects (state significant development and state significant infrastructure) (OEH, 2013)* and align, as far as is feasible and reasonable, with the *Biodiversity Offset Strategy requirements of the NSW Biodiversity Offsets Policy for Major Projects* (OEH 2014), unless otherwise agreed by the Secretary.

The Package shall include, but not necessarily be limited to:

(a) the identification of the extent and types of habitat that would be lost or degraded as a result of the final design of the SSI;
(b) the objectives and biodiversity outcomes to be achieved;
(c) the final suite of the biodiversity offset measures selected and secured in consultation with OEH;
(d) the management and monitoring requirements for compensatory habitat works and other biodiversity offset measures proposed to ensure the outcomes of the package are achieved, including:
(e) the monitoring of the condition of species and ecological communities at offset (including translocation) locations;
(f) the methodology for the monitoring program(s), including the number and location of offset monitoring sites, and the sampling frequency at these sites;
(g) provisions for the annual reporting of the monitoring results for a set period of time as determined in consultation with the OEH; and
(h) timing and responsibilities for the implementation of the provisions of the Package.

Where land offsets cannot solely achieve compensation for the loss of habitat, additional measures shall be provided to collectively deliver an improved or maintained biodiversity outcome for the region.

Where monitoring referred to in (e) above indicates that biodiversity outcomes are not being achieved, remedial actions shall be undertaken to ensure that the objectives of the Biodiversity Offset Package are achieved to the satisfaction of the Secretary. Such remedial actions shall be documented under an addendum to the Biodiversity Offset Package and the addendum be submitted for the approval of the Secretary, prior to the implementation of that addendum.

HAZARDS AND RISK

D48 Dangerous goods, as defined by the Australian Dangerous Goods Code, shall be stored and handled strictly in accordance with:

(a) all relevant Australian Standards;
(b) for liquids, a minimum bund volume requirement of 110% of the volume of the largest single stored volume, within the bund; and
(c) the *Environment Protection Manual for Authorised Officers: Bunding and Spill Management,* technical bulletin (Environment Protection Authority, 1997).

In the event of an inconsistency between the requirements listed from (a) to (c) above, the most stringent requirement shall prevail to the extent of the inconsistency.

PROPERTY AND LANDUSE

D49 The Proponent shall provide boundary screening within all construction sites that adjoin or are adjacent to residential and/or commercial properties, consistent with the surrounding context, in consultation with affected property owners.

ANCILLARY FACILITIES

D50 The ancillary facilities shall be operated in accordance with the Construction Environment Management Plan required under condition D56.

D51 Prior to the establishment of the ancillary facilities described in the documents listed in condition A2, the Proponent shall prepare and implement an **Ancillary Facilities Management Plan** to outline the environmental management practices and procedures that are to be followed during establishment and operation of the ancillary facilities. The Plan shall be prepared in consultation with the Environmental Representative, EPA and the relevant Council, and to the satisfaction of the Secretary. The Plan shall detail the management of these ancillary facilities, and include, but not necessarily be limited to:

(a) a description of the ancillary facility (including a site layout plan), its components and details of the existing environment on and in the vicinity of the site;
(b) details of the activities to be carried out at the facility, including the hours of operation, staging of operation and predicted date of commissioning;
(c) a description of the plant, equipment and materials to be used and/or stored on the site, including dangerous and hazardous goods;
(d) a summary of the potential environmental impacts associated with the construction and operation of the facility;
(e) details of the mitigation, monitoring and management procedures specific to the facility that would be implemented to minimise environmental and amenity impacts or, where this is not possible, feasible and reasonable measures to offset these impacts;
(f) a description of how the management and mitigation measures set out in the documents listed in condition A2 will be implemented on the site, and if not, justification for any departures from those management and mitigation measures;
(g) identification of the timing for the completion of site establishment activities at the facility and how the site will be decommissioned (including any necessary rehabilitation); and
(h) mechanisms for the monitoring, review and amendment of this plan.

In considering the approval of the plan, the Secretary shall take into account the Proponent's response to public authority and council comments on the plan.

The Proponent shall also update the Plan to incorporate the site establishment and operation practices required for any additional ancillary facilities approved by the Secretary under condition D53.

No construction works shall be undertaken on the ancillary facility sites prior to approval of the Construction Environmental Management Plan required under condition D56.

D52 Other than ancillary facilities described in the documents listed in condition A2, or those ancillary facilities approved by the Secretary under condition D53, or allowed under condition D54, the location of ancillary facilities shall comply with the following locational criteria:

(a) be located more than 50 metres from a waterway;
(b) be located within or adjacent to land where the SSI is being carried out;
(c) have ready access to the road network;
(d) be located to minimise the need for heavy vehicles to travel on local streets and/or through residential areas;
(e) be sited on relatively level land;

(f) be separated from nearest residences by at least 200 metres (or at least 300 metres for a temporary batching plant);
(g) not require vegetation clearing beyond that already required by the SSI;
(h) not impact on heritage items (including areas of archaeological sensitivity) beyond those already impacted by the SSI;
(i) not unreasonably affect the land use of adjacent properties;
(j) be above the 20 ARI flood level unless a contingency plan to manage flooding is prepared and implemented; and
(k) provide sufficient area for the storage of raw materials to minimise, to the greatest extent practical, the number of deliveries required outside standard construction hours.

D53 Prior to establishment of any ancillary facility not described in the documents listed in condition A2 and which does not meet the criteria in condition D52, the Proponent shall prepare and implement a **Site-Specific Ancillary Facilities Management Plan**. The plan shall be prepared for the approval of the Secretary, subject to condition D54, and include:
(a) a detailed description of the ancillary facility, including proposed use and access arrangements;
(b) a review of the environmental and social impacts of the ancillary facility, including an analysis of compliance with the locational criteria specified in condition D52;
(c) measures to avoid, mitigate and manage environmental and social impacts associated with the ancillary facility; and
(d) demonstration that, with the measures proposed in accordance with (c), the impacts of the ancillary site are consistent with:
(i) the overall project impacts described in documents listed in condition A2; and
(ii) all relevant conditions of this approval.

D54 The Secretary's approval is not required for minor ancillary facilities (e.g. lunch sheds, office sheds, and portable toilet facilities, etc.) that do not comply with the criteria set out in condition D52 of this approval and which:
(a) are located within an active construction zone within the approved SSI footprint; and
(b) have been assessed by the Environmental Representative to have:
(i) minimal amenity impacts to surrounding residences, with consideration to matters such as noise and vibration impacts, traffic and access impacts, dust and odour impacts, and visual (including light spill) impacts, and
(ii) minimal environmental impact in respect to waste management, and no impacts on flora and fauna, soil and water, and heritage beyond those approved for the SSI; and
(c) have environmental and amenity impacts that can be managed through the implementation of environmental measures detailed in the Construction Environment Management Plan required under condition D56.

D55 All ancillary facilities shall be rehabilitated to at least their pre-construction condition or better, to the satisfaction of the Secretary, unless otherwise agreed by the landowner where relevant.

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

D56 Prior to the commencement of construction, or as otherwise agreed by the Secretary, the Proponent shall prepare and implement a Construction Environmental Management Plan (CEMP) for the SSI. The CEMP is to be prepared in consultation with the EPA, OEH, NSW Office of Water, DPI and the relevant Council, for the approval of the Secretary. The CEMP shall outline the environmental management practices and procedures that are to be followed during construction. The CEMP is to be prepared in accordance with the *Guideline for the Preparation of Environmental Management Plans* (Department of Infrastructure, Planning and Natural Resources, 2004). The CEMP shall include, but not necessarily be limited to:
(a) a description of activities to be undertaken during construction of the SSI (including staging and scheduling);

(b) statutory and other obligations that the Proponent is required to fulfil during construction, including approvals, consultations and agreements required from authorities and other stakeholders under key legislation and policies;
(c) a description of the roles and responsibilities for relevant employees involved in the construction of the SSI, including relevant training and induction provisions for ensuring that employees, including contractors and sub-contractors, are aware of their environmental and compliance obligations under these conditions of approval;
(d) an environmental risk analysis to identify the key environmental performance issues associated with the construction phase; and
(e) details of how environmental performance would be managed and monitored to meet acceptable outcomes, including what actions will be taken to address identified potential adverse environmental impacts (including any impacts arising from the staging of the construction of the SSI). In particular, the following environmental performance issues shall be addressed in the CEMP:
    (i) measures to monitor and manage dust emissions including dust from stockpiles, blasting, traffic on unsealed public roads and materials tracking from construction sites onto public roads;
    (ii) measures for the handling, treatment and management of hazardous and contaminated materials (including asbestos);
    (iii) measures to monitor and manage waste generated during construction including but not necessarily limited to: general procedures for waste classification, handling, reuse, and disposal; use of secondary waste material in construction wherever feasible and reasonable; procedures or dealing with green waste including timber and mulch from clearing activities; and measures for reducing demand on water resources (including potential for reuse of treated water from sediment control basins);
    (iv) measures to monitor and manage hazard and risks;
    (v) measures to monitor and rectify any impacts to third party property and infrastructure, including details of the process for rectification or compensation of affected landowners, and timeframes for rectification works or compensation processes; and
    (vi) the issues identified in condition D57.

The CEMP shall include procedures for its periodic review and update (including the sub-plans required under condition D57), as necessary (including where minor changes can be approved by the Environmental Representative).

The CEMP shall be submitted for the approval of the Secretary no later than one month prior to the commencement of construction, or as otherwise agreed by the Secretary. The CEMP may be prepared in stages; however, construction works shall not commence until written approval of the relevant stage has been received from the Secretary.

The approval of a CEMP does not relieve the Proponent of any requirement associated with this SSI approval. If there is an inconsistency with an approved Construction Environmental Management Plan and the conditions of this SSI approval, the requirements of this SSI approval shall prevail.

Construction Environmental Management Plan — Sub Plans

D57 As part of the CEMP for the SSI, the Proponent shall prepare and implement:

(a) a **Construction Traffic and Access Management Plan** to ensure traffic and access controls are implemented to avoid or minimise impacts on traffic, pedestrian and cyclist access, and the amenity of the surrounding environment. The Plan shall be developed in consultation with the relevant Council, emergency services, road user groups, and pedestrian and bicycle user groups, and include, but not necessarily be limited to:
    (i) identification of construction traffic routes and construction traffic volumes (including heavy vehicle/spoil haulage) on these routes;

(ii) details of vehicle movements for construction sites and ancillary facilities including parking, dedicated vehicle turning areas, and ingress and egress points;
(iii) discussion of construction impacts that could result in disruption of traffic, public transport, pedestrian and cycle access, access to public land (including, but not limited to, access to the Murri-Yanna track in the Bidjigal Reserve), property access, including details of oversize load movements, and the nature and duration of those impacts;
(iv) details of management measures to minimise traffic impacts, including temporary road work traffic control measures, onsite vehicle queuing and parking areas and management measures to minimise peak time congestion and measures to ensure safe pedestrian and cycle access;
(v) details of measures to maintain or provide alternative safe and accessible routes for pedestrians throughout the duration of construction;
(vi) details of measures to maintain connectivity for cyclists, with particular emphasis on providing adequate access between key existing cycle routes for commuter cyclists;
(vii) details of measures to manage traffic movements, parking, loading and unloading at ancillary facilities during out-of-hours work;
(viii) details of methods to be used to communicate proposed future traffic changes to affected road users, pedestrians and cyclists, consistent with the Community Communication Strategy required under condition C1;
(ix) an adaptive response plan which sets out a process for response to any traffic, construction or other incident; and
(x) mechanisms for the monitoring, review and amendment of this plan.

(b) a **Construction Noise and Vibration Management Plan** to detail how construction noise and vibration impacts will be minimised and managed. The Plan shall be consistent with the guidelines contained in the *Interim Construction Noise Guidelines* (Department of Environment and Climate Change 2009). The plan shall be developed in consultation with the EPA and shall include, but not be limited to:
(i) identification of the work areas, site compounds and access points;
(ii) identification of sensitive receivers and relevant construction noise and vibration goals applicable to the SSI and stipulated in the conditions above;
(iii) details of construction activities and an indicative schedule for construction works, including the identification of key noise and/or vibration generating construction activities (based on representative construction scenarios, including at ancillary facilities) that have the potential to generate noise and/or vibration impacts on surrounding sensitive receivers, particularly residential areas;
(iv) an **Out-of-Hours Work Protocol** for the assessment, management and approval of works outside of standard construction hours as defined in condition D10 of this approval, for the Secretary's approval. The Out-of-Hours Work Protocol must detail:
(A) assessment of out-of-hours works against the relevant noise and vibration criteria,
(B) detailed mitigation measures for any residual impacts (that is, additional to general mitigation measures), including extent of at-receiver treatments,
(C) where the out-of-hours works include spoil haulage, commitment to at-receiver treatment at properties that would experience residual impacts, and, unless approved by the Secretary in accordance with condition D42, avoidance of out-of-hours access to local roads, and
(D) proposed notification arrangements;
(v) identification of feasible and reasonable measures proposed to be implemented to minimise and manage construction noise impacts (including construction traffic noise impacts), including, but not limited to, acoustic enclosures, erection of noise walls (hoardings), respite periods and the limiting of truck movements during night periods;
(vi) identification of feasible and reasonable procedures and mitigation measures to ensure relevant vibration and blasting criteria are achieved, including suitable blast

program, applicable buffer distances for vibration intensive works, use of low-vibration generating equipment/ vibration dampeners or alternative construction methodology, and pre- and post- construction dilapidation surveys of sensitive structures where blasting and/ or vibration is likely to result in damage to buildings and structures (including surveys being undertaken immediately following a monitored exceedance of the criteria);

(vii) details of tunnelling described in condition D11, including associated impacts, management and mitigation measures;

(viii) if blasting is required, an assessment of the potential noise and vibration impacts, and a strategy to minimise and manage those impacts, including preparation of an appropriate community information program;

(ix) a description of how the effectiveness of mitigation and management measures would be monitored during the proposed works, clearly indicating how often this monitoring would be conducted, the locations where monitoring would take place, how the results of this monitoring would be recorded and reported, and, if any exceedance is detected, how any noncompliance would be rectified; and

(x) mechanisms for the monitoring, review and amendment of this plan.

(c) a **Construction Heritage Management Plan** to ensure construction impacts on Aboriginal and non-Aboriginal heritage will be appropriately avoided, minimised and managed. The Plan shall be developed in consultation with OEH, the relevant Council, the NSW Heritage Council (for non-Aboriginal State heritage items) and the relevant Local Aboriginal Land Councils (for Aboriginal heritage), and include, but not necessarily be limited to:

(i) in relation to Aboriginal Heritage:

(A) details of management measures to be carried out in relation to Aboriginal heritage, including a detailed methodology and strategies for protection, monitoring, and conservation of sites and items;

(B) procedures for dealing with previously unidentified Aboriginal objects (excluding human remains), including cessation of works in the vicinity, assessment of the significance of the item(s) and determination of appropriate mitigation measures, including when works can re-commence, by a suitably qualified and experienced archaeologist in consultation with the Secretary and Aboriginal stakeholders, assessment of the consistency of any Aboriginal heritage impacts against the approved impacts of the SSI, and, where relevant, registration in the OEH's Aboriginal Heritage Information Management System (AHIMS) register;

(C) procedures for dealing with human remains, including cessation of works in the vicinity, notification of Secretary, NSW Police Force, OEH and Aboriginal stakeholders, and commitment to cease recommencing any works in the area unless authorised by the OEH and/or the NSW Police Force;

(D) details of monitoring and management measures to ensure impacts on rock shelter and overhang sites are avoided;

(E) heritage training and induction processes for construction personnel (including procedures for keeping records of inductions) and obligations under the conditions of this approval including site identification, protection and conservation of Aboriginal cultural heritage; and

(F) procedures for ongoing Aboriginal consultation and involvement for the duration of the SSI; and

(ii) in relation to non-Aboriginal Heritage:

(A) identification of heritage Items directly and indirectly affected by the SSI;

(B) consideration of methods to prevent damage to retained heritage items, including:

I. procedures for identifying minimum working distances to retained heritage items (including, at minimum, vibration testing and monitoring),

II. detailed options for alteration of construction methodology should preferred values for vibration be exceeded, and
III. commitment to implementing those options if preferred values for vibration are likely to be exceeded;

(C) details of management measures to be implemented to prevent and minimise impacts on heritage items (including further heritage investigations, archival recordings and/or measures to protect unaffected sites during construction works in the vicinity);
(D) details of monitoring and reporting requirements for impacts on heritage items;
(E) procedures for dealing with previously unidentified heritage objects, (including cessation of works in the vicinity, assessment of the significance of the item(s) and determination of appropriate mitigation measures including when works can re-commence by a suitably qualified and experienced archaeologist in consultation with the OEH, NSW Heritage Council and the Secretary, assessment of the consistency of any heritage impacts against the approved impacts of the SSI, and, where relevant, notification of the Heritage Council of NSW in accordance with section 146 of the *Heritage Act 1977*; and
(F) heritage training and induction processes for construction personnel (including procedures for keeping records of inductions and obligations under this approval including site identification, protection and conservation of non-Aboriginal cultural heritage; and

(iii) mechanisms for the monitoring, review and amendment of this plan.

(d) **a Construction Flora and Fauna Management Plan** to detail how construction impacts on ecology will be minimised and managed. The Plan shall be developed by a suitably qualified and experienced ecologist and in consultation with the OEH and DPI, and shall include, but not necessarily be limited to:

(i) plans for impacted and adjoining areas showing vegetation communities; important flora and fauna habitat areas; locations where threatened species, populations or ecological communities have been recorded; including pre-clearing surveys to confirm the location of threatened flora and fauna species and associated habitat features;
(ii) the identification of areas to be cleared and details of management measures to avoid residual habitat damage or loss and to minimise or eliminate time lags between the removal and subsequent replacement of habitat such as:
(A) clearing minimisation procedures (including fencing),
(B) clearing procedures (including nest box plan),
(C) removal and relocation of fauna during clearing (including microbat management plan),
(D) habitat tree management, and
(E) construction worker education;
(iii) rehabilitation details, including identification of flora species and sources, and measures for the management and maintenance of rehabilitated areas (including for *Epacris purpurascens*);
(iv) a **Weed Management Strategy**, incorporating weed management measures focusing on early identification of invasive weeds and effective management controls (including for those related to aquatic and riparian zones);
(v) a description of how the effectiveness of these management measures would be monitored;
(vi) a procedure for dealing with unexpected EEC/ threatened species identified during construction, including cessation of work and notification of the OEH, determination of appropriate mitigation measures in consultation with the OEH (including relevant re-location measures) and updating of ecological monitoring and/ or biodiversity offset requirements; and
(vii) mechanisms for the monitoring, review and amendment of this plan.

(e) a **Construction Air Quality Management Plan** to detail how construction impacts on local air quality will be minimise and managed. The Plan shall be developed in consultation with the EPA, and shall include, but not necessarily be limited to:
   (i) identification of sources (including stockpiles and open work areas) and quantification of airborne pollutants;
   (ii) key performance indicators for local air quality during construction;
   (iii) details of monitoring methods, including location, frequency and duration of monitoring;
   (iv) mitigation measures to minimise impacts on local air quality;
   (v) procedures for record keeping and reporting against key performance indicators;
   (vi) provisions for implementation of additional mitigation measures in response to issues identified during monitoring and reporting; and
   (vii) mechanisms for the monitoring, review and amendment of this plan.

(f) a **Construction Soil and Water Management Plan** to manage surface and groundwater impacts during construction of the SSI. The plan shall be developed in consultation with, EPA, NSW Office of Water, and relevant Councils, and include, but not necessarily be limited to:
   (i) details of construction activities and their locations, which have the potential to impact on water courses, storage facilities, stormwater flows, and groundwater, including identification of all pollutants that may be introduced into the water cycle;
   (ii) the construction related requirements of condition B15;
   (iii) potential impacts on watercourse bank stability and the development of appropriate mitigation measures as required;
   (iv) an **Acid Sulfate Soils Management Plan**, if required, including measures for the management, handling, treatment and disposal of acid sulfate soils, including monitoring of water quality at acid sulfate soils treatment areas, should the project impact on acid sulfate soils;
   (v) a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be undertaken, the locations where monitoring would take place, how the results of the monitoring would be recorded and reported, and, if any exceedance of the criteria is detected how any non-compliance can be rectified; and
   (vi) mechanisms for the monitoring, review and amendment of this plan.

PART E

OPERATIONAL ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

AIR QUALITY

In-Tunnel Air Quality

E1 The Proponent must monitor (by sampling and obtaining results by analysis) the pollutants, within the tunnel, specified in **Table 4**. The Proponent must use the sampling method, units of measurement and sample at the frequency specified opposite in the other columns.

The number and siting of the monitoring stations inside the tunnel must be determined to permit an accurate calculation, per the requirements of condition E2, E3 and E5, and be independently verified in accordance with a methodology approved by the Secretary in consultation with the EPA. As a minimum there should be monitoring stations at the entry portals, the base of the ventilation outlets, ramp junctions and at the intermediate exhaust outlets (Wilson Street and Trelawney Street emergency smoke extraction facilities).

Sampling points and visibility monitoring points established under this condition shall be audited prior to its commencement of monitoring for compliance with the requirements set out in **Table 4**. Verification and compliance auditing is to be undertaken by an independent person(s) or organisation(s) approved by the Secretary, and paid for by the Proponent. Monitoring shall take place in accordance with this condition throughout operation of the SSI.

Table 4 – In-Tunnel monitoring methodology

Pollutant/parameter	Units of measure	Frequency	Method[1]
CO	ppm	Continuous	Special Method 1[1]
NO_2	ppm	Continuous	Special Method 1[1]
Visibility	m^{-1}	Continuous	Special Method 1[1]

Note:

1. *Special Method 1 means a method approved by the Secretary in consultation with the EPA.*

In-Tunnel Air Quality — Limits

E2 The tunnel ventilation system must be designed and operated so that the average concentration of CO and NO_2, calculated along the length of the tunnel, does not exceed the concentration limit specified for that pollutant in **Table 5**.

Table 5 – In-tunnel average limits along length of tunnel

Pollutant	Concentration Limit	Units of measurement	Averaging period
CO	87	ppm	Rolling 15-minute
CO	50	ppm	Rolling 30–minute
NO_2	0.5	ppm	Rolling 15-minute

E3 The tunnel ventilation system must be designed and operated so that the concentration of CO as measured at any single point in the tunnel must not exceed the concentration limit specified for that pollutant in **Table 6** under all conditions (including congested conditions).

Table 6 – In-tunnel single point exposure limits

Pollutant	Concentration Limit	Units of measurement	Averaging period
CO	200	ppm	Rolling 3–minute

E4 The tunnel ventilation system must be designed and operated so that the visibility in the tunnel does not exceed the level specified in **Table 7**.

Table 7 — In-tunnel visibility limits along length of tunnel

Parameter	Average extinction co-efficient Limit	Units of measurement	Averaging period
Visibility	0.005	m^{-1}	Rolling 15–minute

In-Tunnel Air Quality — Notification and Reporting

E5 In addition to the general reporting requirements specified in condition E17, the Proponent shall, within 24 hours, notify the Secretary, EPA and Ministry of Health of any recordings above the limits specified in conditions E2, E3 and E4. The notification shall detail the nature of the event, the concentration or visibility levels that occurred, the duration of the event, and the measures employed to minimise the concentration levels and/or improve the visibility levels.

Upon receipt of this notification, the Secretary shall consider the circumstances of the event, including:

(a) the nature of the event, including any details relating to the cause;
(b) the duration of the event;
(c) the extent and severity of the event;
(d) the frequency of the event, including whether an event with the same or similar circumstances has occurred previously.

Based on consideration of the circumstances of the event, the Secretary may request the Proponent to prepare a Tunnel Air Quality Management Systems Effectiveness Report.

E6 Within 20 working days of any request by the Secretary under condition E5, the Proponent shall prepare and submit a Tunnel Air Quality Management Systems Effectiveness Report on the overall system performance and cause and major contributor of any exceedances, detailing the following:

(a) the overall performance and concentration levels in the tunnel for the preceding six month period (or since commencement of operation, where the SSI has operated for under six months), including average and maximum levels and time periods;
(b) details of any instances throughout the operation of the SSI where pollutant concentration levels in the tunnel have exceeded the limits specified in E2, E3 and E4; and
(c) consideration of improvements to the tunnel air quality management system, including but not limited to installation of the additional ventilation management facilities allowed for under condition B5, and discussion of whether those improvements are feasible and reasonable.

The Tunnel Air Quality Management Systems Effectiveness Report is to be prepared by the Proponent and reviewed by a suitably qualified and experienced independent specialist(s). The Secretary shall approve the independent person/organisation.

The Proponent shall comply with any requirements arising from the Secretary's review of this report.

Ambient Air Quality — Monitoring

E7 The Proponent shall monitor (by sampling and obtaining results by analysis) the pollutants and parameters specified in Column 1 of **Table 8** at the following locations as a minimum:

(a) two ground level receptors near the northern ventilation outlet, at locations suitable for detecting any impact on air quality from the outlet;
(b) two ground level receptors near the southern ventilation outlet, at locations suitable for detecting any impact on air quality from the outlet;

(c) one location along Pennant Hills Road, at a location suitable for detecting any impact on air quality along Pennant Hills Road; and
(d) one location away from any of the locations at (a), (b) and (c) suitable for providing background ambient air quality reference data for the project area.

All monitoring stations shall be established subject to the land owner's and occupier's agreement. The Proponent must use the sampling method, units of measure, and sampling frequency specified in **Table 8**.

The Proponent shall commence monitoring for at least twelve continuous months prior to operation. The locations are to be agreed to by the AQCCC. The Proponent shall meet all operating costs associated with the stations.

The Proponent, following consultation with the AQCCC, shall review the need for the continuation of the ambient monitoring stations after a period of two years from commencement of operation. Any recommendation to close the stations shall require the approval of the Secretary in consultation with the EPA.

The establishment and operation of the stations is to be undertaken in accordance with recognised Australian standards and undertaken by an organisation accredited by NATA for this purpose and approved by the Secretary in consultation with the EPA and the AQCCC. The quality of the monitoring results shall be assured through a NATA accredited process prior to the data being considered as a basis for compliance/auditing purposes.

Monitoring results shall be made publicly available and shall be subject to an independent audit at six-monthly intervals (or at a longer interval, if approved by the Secretary). The auditor shall be approved by the Secretary in consultation with the EPA and the AQCCC, and the auditor's report shall be directly provided to the Proponent and the AQCCC.

Table 8 —Ambient Air Quality Monitoring Methodologies

Pollutant	**Units of measurement**	**Averaging Period**	**Frequency**	**Method[1]**
NO	pphm	1-hour	Continuous	AM-12
NO_2	pphm	1-hour	Continuous	AM-12
NO_x	pphm	1-hour	Continuous	AM-12
PM10	µg/m^3	24-hour	Continuous	AS3580.9.8-2008[2]
PM2.5[5]	µg/m^3	24-hour	Continuous	AS3580.9.13-2013[3] or as otherwise agreed by the Secretary in consultation with the EPA
CO	ppm	1-hour,8-hour	Continuous	AM-2 & AM-6
Parameter[4]	**Units of measurement**	**Averaging Period**	**Frequency**	**Method[1]**
Wind Speed @ 10m	m/s	1-hour	Continuous	AM-2 & AM-4
Wind Direction @ 10 m	°	1-hour	Continuous	AM-2 & AM-4
Sigma Theta @10m	°	1-hour	Continuous	AM-2 & AM-4
Temperature @ 2m	K	1-hour	Continuous	AM-4
Temperature @ 10m	K	1-hour	Continuous	AM-4
Other	**Units of measurement**	**Averaging Period**	**Frequency**	**Method[1]**
Siting	NA	NA	NA	AM-1 & AM-4

Notes:

1. *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (EPA 2007).*
2. *AS3580.9.8-2008, Methods for the Sampling and Analysis of Ambient Air – Determination of Suspended Particulate Matter – PM_{10} Continuous Direct Mass Method using Tapered Element Oscillating Microbalance Analyser* (Standards Australia 2008).
3. *AS3580.9.13-2013, Methods for the Sampling and Analysis of Ambient Air – Determination of Suspended Particulate Matter – $PM_{2.5}$ Continuous Direct Mass Method using a Tapered Element Oscillating Microbalance Analyser* (Standards Australia 2013).
4. *TBD - location for meteorological monitoring station(s) to be representative of weather conditions likely to occur in the vicinity of the northern and southern ventilation outlets.*
5. *Appropriately modified to include size selective inlet for $PM_{2.5}$ or as otherwise approved by the Secretary.*

Ambient Air Quality — Goals

E8 Should ambient monitoring of air pollutants exceed the following goals, the provisions of Condition E9 shall apply:

(a) CO – 8 hour rolling average of 9.0 ppm (NEPM);
(b) NO_2 – One hour average of 0.12 ppm (245 µg/m3) (NEPM);
(c) PM_{10} – 24 hour average of 50 µg/m^3 (NEPM); and
(d) $PM_{2.5}$ – 24 hour average of 25 µg/m^3 (proposed NEPM).

Only monitoring station(s) that meet the requirements of Australian Standard AS2922 – 1987 shall be used for the purposes of assessing compliance with the ambient goals specified in this condition, unless otherwise agreed by the Secretary. A Protocol for the evaluation of a potential measurement that exceeds the criteria shall be developed by the Proponent and approved by the Secretary in consultation with the EPA, Ministry of Health and the AQCCC.

Ambient Air Quality — Notification and Reporting

E9 Should the results of monitoring required under condition E7 show that any of the goals specified in Condition E8 have been exceeded for any given event (excluding extraordinary events such as bushfires, dust storms, etc (as to be defined in the Protocol required under condition E10)), the Proponent shall immediately notify the Secretary, EPA and Ministry of Health. The notification shall be followed up with a detailed report within 20 working days, which shall be prepared by the Proponent, reviewed by a suitably qualified and experienced independent specialist(s), and submitted to the Secretary, on the cause and major contributor of the exceedance and the options available to prevent recurrence. The Secretary shall approve the independent person/organisation prior to the commencement of operation, or at some other time prior to preparation of the report.

Where the operation of the tunnel is identified to be a significant contributor to the recorded exceedance, this report shall include consideration of improvements to the tunnel air quality management system so as to achieve compliance with the ambient air quality goals, including but not limited to installation of the additional ventilation management facilities allowed for under condition B5, and discussion of whether those improvements are feasible and reasonable.

The Proponent shall comply with any requirements arising from the Secretary's review of the Report.

Ventilation Outlets — Monitoring

E10 The Proponent shall install monitoring equipment to monitor pollutants inside the ventilation outlets. Pollutant monitoring inside the ventilation outlets (by sampling and obtaining results by analysis) shall be for the pollutants and parameters specified in Column 1 of **Table 9**.

The Proponent must use the sampling method, units of measures and sample at the frequency specified in the other columns. Monitoring equipment installed under this condition is to be independently audited prior to its commencement of monitoring for compliance with the requirements set out in **Table 9**.

Auditing is to be undertaken by an independent person(s) or organisation(s) approved by the Secretary and paid by the Proponent. Monitoring shall take place in accordance with this condition throughout operation of the SSI.

Table 9 — Ventilation Outlet Emission Monitoring Methodologies

Pollutant	**Units of measure**	**Frequency**	**Method**[1]
Solid particles	mg/m^3	Continuous	Special Method 1[4]
Solid particles	mg/m^3	Quarterly	TM-15
PM_{10}	mg/m^3	Quarterly	OM-5
$PM_{2.5}$	mg/m^3	Quarterly	OM-5
NO_2 or NO or both, as NO_2 equivalent	mg/m^3	Continuous	CEM-2
NO_2	mg/m^3	Continuous	CEM-2
CO	mg/m^3	Continuous	CEM-4
VOC[2]	mg/m^3	Continuous	CEM-8
Speciated VOC	mg/m^3	Annual	TM-34
PAH	$\mu g/m^3$	Annual	OM-6
Parameter	**Units of measure**	**Frequency**	**Method**[1]
Velocity	m/s	Continuous	CEM-6
Volumetric flow rate	m^3/s	Continuous	CEM-6
Moisture	%	Continuous	TM-22
Temperature	°C	Continuous	TM-2
Other	**Units of measure**	**Frequency**	**Method**[1]
Selection of sampling locations	N/A	N/A	TM-1

Notes

1. *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (EPA 2007) *or an alternative method approved by the Secretary in consultation with the EPA.*
2. *Must include, but not be limited to: Benzene, Toluene, Xylenes, 1,3-Butadiene, Formaldehyde and Acetaldehyde.*
3. *Must include, but not limited to; 16 USEPA priority PAHs, namely; Naphthalene, Phenanthrene, Benz(a)anthracene, Benzo(a)pyrene, Acenapthylene, Anthracene, Chrysene, Indeno(1,2,3-cd)pyrene, Acenaphthene, Fluoranthene, Benzo(b)fluoranthene, Dibenz(a,h)anthracene, Fluorene, Pyrene, Benzo(k)fluoranhtene, Benzo(g,h,i)perylene.*
4. *Special Method 1 means a method approved by the Secretary in consultation with the EPA.*

Ventilation Outlets — Limits

E11 The concentration of a pollutant discharged from the ventilation outlets referred to must not exceed the respective limits specified for that pollutant in **Table 10**.

Table 10 —— Ventilation Outlet Mass Pollutant Concentrations

Pollutant	100 percentile limit	Units of measurement	Averaging period	Reference conditions
Solid particles	1.1	mg/m^3	1 hour, or the minimum sampling period specified in the relevant test method, whichever is the greater	Dry, 273K, 101.3kPa
NO_2 or NO or both, as NO_2 equivalent	20	mg/m^3	1 hour block	Dry, 273K, 101.3kPa
NO_2	2.0	mg/m^3	1 hour block	Dry, 273K, 101.3kPa
CO	40	mg/m^3	1 hour rolling	Dry, 273K, 101.3kPa
VOC (as propane)	1.0	mg/m^3	1 hour rolling	Dry, 273K, 101.3kPa

E12 An independent person or organisation, approved by the Secretary shall:

(a) verify that compliance with ventilation outlet limits detailed in **Table 10** will not result in air quality impacts greater than predicted in the documents listed in condition A2;

(b) undertake an appropriate assessment to indicate how ventilation outlet discharge velocities have been optimised in consideration of energy requirements and air quality impacts at all sensitive receivers; and,

(c) validate recorded monitoring data and certify compliance with the ventilation outlet limits.

The information required in paragraphs (a)-(c) will be made available to the Secretary on request.

The ventilation outlet limits detailed in **Table 10** shall be reviewed on a five-yearly basis and may be lowered (i.e. made more stringent), subject to a sustainability assessment and there being improvements in vehicle fleet emissions, if the Proponent is directed to do so by the Secretary following consultation with the EPA.

Ventilation Outlets — Notification and Reporting

E13 Should the results of monitoring show that any of the ventilation outlet limits specified in Condition E11 have been exceeded, the Proponent shall immediately notify the Secretary, EPA and Ministry of Health. The notification shall followed up with a detailed report within 20 working days, which shall be prepared by the Proponent, reviewed by a suitably qualified and experienced independent specialist(s), and submitted to the Secretary, on the cause and major contributor of the exceedance and the options available to prevent recurrence. The Secretary shall approve the independent person/organisation prior to the commencement of operation, or at some other time prior to preparation of the report.

Where the operation of the tunnel is identified to be a significant contributor to the recorded exceedance, this report shall include consideration of improvements to the tunnel air quality management system so as to achieve compliance with the ambient air quality goals, including but not limited to installation of the additional ventilation management facilities allowed for under condition B5, and discussion of whether those improvements are feasible and reasonable.

The Proponent shall comply with any requirements arising from the Secretary's review of the Report.

Emergency Discharge

E14 Conditions E2, E3, E4, E8 and E11 do not apply in an emergency to prevent damage to life or limb.

The Proponent shall, as soon as reasonably practicable, notify the Secretary and the EPA of any such discharge.

Local and Sub-Regional Air Quality

E15 The Proponent shall assist the relevant Council(s) in developing an air quality assessment process for inclusion in a Development Control Plan or other appropriate planning instrument, in considering planning and building approvals for new development in the area adjacent to the northern and southern ventilation outlets which would be within a potential three-dimensional zone of affectation (buffer volume). This process shall include procedures for identifying the width and height of buildings that are likely to be either affected by the plume from the ventilation outlet or affect the dispersion of the plume from the ventilation outlet through building wake effects. The Proponent shall meet all reasonable costs for the development of this process and any necessary amendments to the planning instrument(s) required to implement the process.

E16 Prior to operation, the Proponent shall investigate, in consultation with the EPA the measures for smoky vehicle enforcement in areas surrounding the SSI, taking into consideration cost effectiveness. Any measures implemented as a result of investigation recommendations shall be in accordance with current RMS smoky vehicle enforcement programs. The effectiveness of the smoky vehicle enforcement measures shall be documented in the Independent Environmental Audit required under condition E31.

Air Quality — General Reporting

E17 The Proponent must develop and implement a reporting system for in-tunnel, ambient and ventilation outlet limits to the satisfaction of the Secretary in consultation with the EPA. The reporting system must be approved, fully implemented and operational prior to operation. Minimum analytical reporting requirements for air pollution monitoring stations shall be as specified in the *Approved Methods of Modelling and Assessment of Air Pollutants in NSW* (EPA 2007, or as updated).

Air Quality — Public Access to Monitoring Results

E18 Results of hourly updated real-time ambient monitoring of PM_{10}, $PM_{2.5}$, visibility, NO_2, and CO at the approved monitoring stations, in-tunnel CO/NO_2 and ventilation outlet measurements, and relevant meteorological data, shall be provided on a website and made publicly available each month in hard copy format in an easy to interpret format. These data shall be preliminary until a quality assurance check has been undertaken by a person or organisation accredited by NATA for this purpose. The availability of these data shall be conveyed to the local community by way of newsletter (including translation into common community languages in the area) and newspaper advertisement at least one month prior to the commencement of operation.

Air Quality — Auditing and Quality Assurance

E19 The provision, operation and maintenance (including all auditing and validation of data) of all air quality monitoring and reporting shall be funded by the Proponent.

E20 All continuous emissions monitoring systems installed and operated as a requirement of condition E10 shall undergo relative accuracy test audits at an interval not exceeding 12 months, or as otherwise agreed to by the Secretary in consultation with the EPA.

E21 The Proponent shall appoint an external auditor to conduct an audit of the air quality monitoring (in tunnel and external) at six-monthly intervals or at any longer interval if approved by the Secretary. Air quality audits shall commence six months from commencement of operation. The

auditor shall ensure that the operating procedures and equipment to acquire air monitoring, meteorological data and emission monitoring data and monitoring reporting comply with NATA (or equivalent) requirements and sound laboratory practice. The Proponent must document the results of the audit and make available all audit data for inspection by the Secretary upon request. A copy of the audit report shall also be issued to the Proponent and AQCCC.

E22 The Proponent shall undertake appropriate quality assurance (QA) and quality control (QC) measures for air quality and ventilation outlet emission monitoring data. This shall include, but not necessarily be limited to: accreditation/quality systems, staff qualifications and training, auditing, monitoring procedures, service and maintenance, equipment or system malfunction and records/reporting. The QA/QC measures shall be approved by an independent expert approved by the Secretary prior to monitoring of air quality and ventilation outlet emissions as appropriate.

NOISE AND VIBRATION

Operational Noise and Vibration

E23 The Proponent shall design and operate all fixed facilities, including the northern and southern tunnel portals; northern and southern ventilation facilities; the Motorway Operations Complex; the Trelawney Street and Wilson Road emergency smoke extraction outlets and the Coral Tree Drive switching station, with the objective of not exceeding the requirements of the *NSW Industrial Noise Policy* (EPA 2000) and the *Sleep Disturbance Application Note to the Industrial Noise Policy* (DEC 2007). The Proponent shall apply mitigation at existing receivers where the noise requirements cannot be achieved.

E24 A detailed **Operational Noise Management Plan** shall be prepared as part of the OEMP, to the satisfaction of the Secretary. The Plan shall provide details of noise and vibration control measures to be undertaken during the operation stages, sufficient to address the technical requirements of the EPA, and generally in accordance with the *Road Noise Policy* (DECCW 2011) and the *Industrial Noise Policy* (EPA 2000).

The Plan shall include, but not be limited to:

(a) tests for ascertaining acoustic parameters;
(b) predicted noise levels;
(c) noise criteria for operation of the project;
(d) location, type and timing of erection of permanent noise barriers and/or other noise mitigation measures demonstrating best practice including silencers and building treatments for associated plant rooms and enclosures for exposed plant;
(e) specific physical and managerial measures for controlling noise; and,
(f) noise monitoring, reporting and response procedures including the monitoring on surrounding roads which experience significantly increased traffic volumes as a result of the project, including but not limited to North Rocks Road.

E25 For the purpose of assessment of noise criteria specified in the Operational Noise Management Plan required under condition E24, noise from the development shall be:

(a) measured at the most affected point on or within the site boundary at the most sensitive locations to determine compliance with $L_{Aeq,T}$ noise limits;
(b) measured in the free field at least three to five metres from any vertical reflecting surface in line with the worst-affected dwelling facade to determine compliance with L_{Amax} noise limits; and
(c) subject to the modification factors provided in Section 4 of the *NSW Industrial Noise Policy* (EPA 2000), where applicable.

Notwithstanding, should direct measurement of noise from the fixed facilities be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the EPA [refer to Section 11 of the NSW *Industrial Noise Policy* (EPA 2000)]. Details of such an alternative noise assessment method accepted by the EPA shall be submitted to the Secretary prior to the implementation of the assessment method.

E26 Monitoring of operational noise shall be undertaken in accordance with the Operational Noise Management Plan. The Proponent shall, in consultation with the EPA, assess the adequacy of the traffic noise and ventilation noise mitigation measures within one year of operation, with regard to the criteria specified in the Operational Noise Management Plan. Should assessment indicate a clear trend in traffic noise levels on surrounding roads which exceed Operational Noise Management Plan defined noise criteria as approved by the EPA, the Proponent shall implement further reasonable and feasible mitigation measures in consultation with affected landowners and/or occupiers.

TRANSPORT AND ACCESS

E27 Prior to operation, the Proponent shall prepare and implement an **Operational Traffic Management Plan**. The Plan shall outline the proposed measures to ensure the satisfactory performance of the SSI during operation. The Plan shall be prepared in consultation with the Transport Management Centre. The Plan shall include, but not necessarily be limited to:

(a) detail of public transport improvements in and around Pennant Hills Road resulting from opportunities provided by the project, prepared in consultation with Transport for NSW;
(b) a description of the tolling strategy for the SSI, with reference to the existing and proposed arrangements for the Sydney motorway network more generally;
(c) details of legally enforceable mechanisms for restricting dangerous goods vehicles from the tunnel; and
(d) details of legally enforceable mechanisms for restricting heavy vehicles from Pennant Hills Road, except where those vehicles are entering or exiting destinations accessible only via Pennant Hills Road or are subject to (c) above.

The Plan shall be submitted for the information of the Secretary at least one month prior to commencement of operation of the SSI.

E28 At 12 months, and 5 years, after the commencement of operation of the SSI, or as otherwise agreed to by the Secretary, the Proponent shall prepare a **Road Network Performance Review Plan** in consultation with relevant Councils that includes:

(a) an updated analysis, including modelling of traffic impacts to the adjoining road network, as a consequence of the SSI. This shall include a review of new information available about potential land use changes;
(b) an updated description and explanation of the extent of SSI improvements and the area of affected road network considered in the updated analysis and its consistency or otherwise with the affected network;
(c) identification of potential mitigation measures to manage any predicted traffic performance deficiencies, including bus priority measures and management measures to minimise toll avoidance, particularly for heavy vehicles;
(d) the predicted traffic performance improvements from these measures, including any cumulative improvements;
(e) justification of why the predicted 'without project' performance of any intersection on the adjoining road network cannot be improved; and
(f) details of any complaints received relating to traffic, transport and access impacts, and how they have been addressed in the Plan.

The Plan shall be submitted to the Secretary, Transport for NSW (in relation to impacts on bus services) and to relevant Council within 60 days of its completion and made publicly available.

The purpose of the Plan is to optimise road network performance, and manage the performance impacts of the SSI on the adjoining road network by identifying or confirming

mitigation improvements that could be required in areas where traffic performance may be unsatisfactory at time of completion of construction.

URBAN DESIGN AND VISUAL AMENITY

E29 The ongoing maintenance and operation costs of urban design and landscaping items and works implemented as part of this infrastructure approval shall remain the Proponent's responsibility until satisfactory arrangements have been put in place for the transfer of the asset to the relevant authority. Prior to the transfer of assets, the Proponent will maintain items and works to the design standards established in the Urban Design and Landscape Plan required under condition B33.

OPERATION ENVIRONMENTAL MANAGEMENT PLAN

E30 Prior to the commencement of operation, or as otherwise agreed by the Secretary, the Proponent shall prepare and implement an **Operation Environmental Management Plan** (OEMP) for the SSI. The OEMP shall outline the environmental management practices and procedures that are to be followed during operation, and shall be prepared in consultation with relevant agencies and in accordance with the Guideline for the Preparation of Environmental Management Plans (Department of Infrastructure, Planning and Natural Resources, 2004). The OEMP shall include, but not necessarily be limited to:

(a) a description of activities to be undertaken during operation of the SSI (including staging and scheduling);
(b) statutory and other obligations that the Proponent is required to fulfil during operation, including approvals, consultations and agreements required from authorities and other stakeholders under key legislation and policies;
(c) overall environmental policies, guidelines and principles to be applied to the operation of the SSI;
(d) a description of the roles and responsibilities for relevant employees involved in the operation of the SSI, including relevant training and induction provisions for ensuring that employees are aware of their environmental and compliance obligations under these conditions of approval;
(e) an environmental risk analysis to identify the key environmental performance issues associated with the operation phase; and
(f) details of how environmental performance would be managed and monitored to meet acceptable outcomes, including what actions will be taken to address identified potential adverse environmental impacts, including those safeguards and mitigation measures detailed in section 10 of the PIR (and any impacts arising from the staging of the construction of the SSI). In particular, the following environmental performance issues shall be addressed in the OEMP:
    (i) air quality;
    (ii) noise and vibration, through preparation of the Operational Noise Management Plan required under condition E24;
    (iii) traffic and transport, through preparation of the Operational Traffic Management Plan required under condition E27;
    (iv) climate change and energy use;
    (v) visual amenity and landscaping;
    (vi) groundwater inflows, treatment and discharge, soil, and subsidence; and
    (vii) surface water quality and hydrology.

The OEMP shall be submitted for the approval of the Secretary no later than one month prior to the commencement of operation, or as otherwise agreed by the Secretary. Operation shall not commence until written approval has been received from the Secretary.

Note:

- *The approval of an OEMP does not relieve the Proponent of any requirement associated with this SSI approval. If there is an inconsistency with an approved OEMP and the conditions of this SSI approval, the requirements of this SSI approval prevail.*

INDEPENDENT ENVIRONMENTAL AUDIT

E31 Within 12 months of the commencement of operation, and at any other stage required by the Secretary, the Proponent shall commission and pay the full cost of an **Independent Environmental Audit** of the SSI. This audit shall:

(a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
(b) include consultation with the relevant agencies and local Councils;
(c) assess the environmental performance of the SSI and assess whether it is complying with the requirements in this approval, and any other relevant approvals (including any assessment, plan or program required under these approvals);
(d) review the accuracy of predicted environmental outcomes discussed in the documents listed in condition A2;
(e) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals; and
(f) recommend measures or actions to improve the environmental performance of the SSI, and/or any strategy, plan or program required under these approvals.

Within 60 days of commissioning this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary and relevant public authorities, together with its response to any recommendations contained in the audit report.

Notes:

- *This audit team shall be led by a suitably qualified and experienced auditor, and include experts in air quality, biodiversity, noise and vibration, hydrology and any other fields specified by the Secretary.*
- *The audit may be staged to suit the staged operation of the SSI.*

APPENDIX A

SOUTHERN VENTILATION FACILITY — LOCATION PLAN (CONDITION B1)

APPENDIX B

NORTHERN VENTILATION FACILITY — LOCATION PLAN (CONDITION B1)


KEY PLAN
Currently viewing
TO HORNSBY
TO NEWCASTLE
TO SYDNEY
TO BLACKTOWN
Motorway operations complex
1 Southern ventilation facility
2 Water treatment plant
3 Substation
4 Service yard
5 Workshop
6 Storage
7 Motorway control centre
Pennant Hills Road
Aiken Road
Copeland Road
Ashley Avenue
Karloon Road
Eaton Road
Hillside Place
Gum Grove Place
Lisle Circuit
Coral Tree Drive
Lamorna Avenue
HILLS M2 MOTORWAY
Northbound alignment
Southbound alignment
Pennant Hills Road northbound on-ramp
Pennant Hills Road southbound off-ramp
Motorway operations complex
Southern ventilation outlet: approximately E319240, N6263000 (MGA 56)
N
0
100
200m
LEGEND
Tunnel
Tunnel and on and off-ramps
Toll gantry location
Tunnel portal location


Northern ventilation facility features
1 Maintenance bay
2 Pump room
3 Substation
4 Ventilation outlet
5 Water tanks
6 Noise wall
7 Cycle path
8 Tunnel portal
TO NEWCASTLE
From northbound tunnel
Fern Avenue
Bareena Avenue
Woonona Avenue
Northern ventilation outlet: approximately E325350, N6268210 (MGA 56)
Northern ventilation facility
M1 PACIFIC MOTORWAY NORTHBOUND
M1 PACIFIC MOTORWAY SOUTHBOUND
Cut and cover structure over
Burns Road
To southbound tunnel
N
0
20
40m
LEGEND
Waterway