



Figure 5-17 Motorway operations complex

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Figure 5-18 Northern ventilation facility operational layout

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5.2.7 Drainage

The proposed drainage system has been designed to prevent additional adverse effects on private properties for the 100 year ARI storm event. Further details are provided in **Section 7.9** (Surface water) and **Section 7.8** (Hydrogeology and soils).

Tunnel drainage

As the main alignment tunnels are proposed to be drained tunnels, there would be an ongoing inflow of groundwater into the tunnel. This would require the project to accommodate the capture, removal, treatment and discharge of groundwater during the operational phase. The tunnel drainage system and treatment plant would also manage deluge system water (as part of the fire and life safety system) in the unlikely event of an emergency in the tunnels.

The tunnel drainage system would flow to a sump with a capacity of 420 cubic metres, located at the southern interchange. Water would then be pumped from the sump to a treatment plant for treatment and discharge to the local stormwater system. The sump would contain capacity for accidental spillage up to 50,000 litres. The final arrangement would be determined as part of the detailed design.

Further information on treatment and discharge of operational and emergency water is provided in **Section 7.9** (Surface water) and **Section 8.2** (Hazard and risk).

Surface drainage

Surface works at the portals, the Hills M2 Motorway integration and the M1 Pacific Motorway tie-in are located in areas managed by existing drainage infrastructure. The project would increase the amount of impervious surface and the catchment area of this drainage infrastructure. This would necessitate the following alterations and / or augmentations to the existing drainage infrastructure:

- Demolition and reconstruction of pits and pipes.
- Alterations to four existing operational detention basins adjacent to the Hills M2 Motorway.
- Alterations to the Pennant Hills Road drainage system to provide capacity for a 20 year ARI storm event, including increasing the size of the existing Pennant Hills Road detention basin and collection of the first flush for the one year ARI storm event.
- Extension of five transverse drainage culverts on the Hills M2 Motorway.
- Provision for water quality treatment of a one year ARI storm event around the northern interchange using gross pollutant traps and oil / water separators.
- Provision of spillage containment tanks around the northern interchange, with a capacity of 50,000 litres.
- A new transverse drainage culvert under the M1 Pacific Motorway / Pennant Hills Road connector to act as a relief culvert for a probable maximum flood event.

Additionally, surface ancillary facilities would require connections to third party stormwater systems.

5.2.8 Bridges and viaducts

Modifications would be required to the following three existing bridges to accommodate the Hills M2 Motorway integration:

- Yale Close overbridge would be widened by around 3.5 metres. The existing bridge is a single span bridge around 32 metres wide.
- Barclay Road overbridge would be lengthened by around four metres. The existing bridge is a two span bridge around 48 metres long.
- Darling Mill Creek viaduct would be widened by around 3.5 metres. The existing bridge is a five span bridge around 32 metres wide.

The location of the above bridges is shown on **Figure 5-19** and **Figure 5-20**.

Three cycleway bridges would be constructed as part of the project. The new cycleway bridges would provide a grade separated connection across the on and off-ramps of the main alignment connection to the Hills M2 Motorway and the on-ramp of the main alignment connection to the M1 Pacific Motorway. The cycleway bridges would be around 2.5 metres wide and would vary in number of spans depending on the location and local topographical conditions. The cycleway bridges would be located at:

- The southern interchange from the Hills M2 Motorway across the westbound off-ramp of the project.
- The southern interchange from the Hills M2 Motorway across the eastbound on-ramp of the project.
- The northern interchange from the M1 Pacific Motorway across the southbound on-ramp of the project.

A grade separated connection across the off-ramp of the main alignment connection to the M1 Pacific Motorway would also be provided at the northern ventilation facility.

5.2.9 Connections to existing roads

The Hills M2 Motorway

As part of the project, modifications to the Hills M2 Motorway would be undertaken west of Pennant Hills Road to enable southbound traffic from the project to merge safely with existing westbound traffic on the motorway (refer to **Figure 5-19** and **Figure 5-20**). These works would extend for a distance of around 3.5 kilometres west of the Pennant Hills Road interchange to the existing Windsor Road off-ramp. This would include:

- An additional westbound lane on the Hills M2 Motorway.
- Widening of Yale Close bridge and Darling Mill Creek viaduct.
- Lengthening of Barclay Road overbridge.

Minor alterations would also be required to allow eastbound traffic from the Hills M2 Motorway to leave the motorway and join the northbound carriageway of the project.

The M1 Pacific Motorway

To provide connection to the project, modifications to the M1 Pacific Motorway beyond the northern interchange would be required (refer to **Figure 5-21**). The works would extend around 200 metres north of Edgeworth David Avenue in Wahroonga. Surface works along the M1 Pacific Motorway would generally involve widening of the road surface for the merge and diverge to and from the main alignment tunnels.

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Figure 5-19 Hills M2 Motorway integration works - Map 1

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Figure 5-20 Hills M2 Motorway integration works - Map 2

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Figure 5-21 M1 Pacific Motorway tie-in works

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5.2.10 Changes to the local road network

A number of changes would be required to local roads to facilitate the surface works associated with the project. Changes to the local road network would be required at both the southern and northern interchanges. Surface road works at the southern and northern interchange are outlined below and shown in **Figure 5-22** and **Figure 5-23**.

Southern interchange

Local road changes around the southern interchange would include:

- Widening of Pennant Hills Road to accommodate the southbound tunnel off-ramp and the northbound tunnel on-ramp.
- Temporary provision of an additional right-turn lane at Eaton Road for the purpose of construction heavy vehicle traffic access to Pennant Hills Road. This would also involve adjustments to traffic signals at this intersection.

Northern interchange

Local road changes around the northern interchange would include:

- Widening of Pennant Hills Road northbound (at Pearce's Corner) to create a permanent additional right-turn lane onto the Pacific Highway.
- Widening of the M1 Pacific Motorway / Pennant Hills Road connector to accommodate tunnel on and off-ramps.
- Repositioning of the Hewitt Avenue cul-de-sac to accommodate the widened M1 Pacific Motorway / Pennant Hills Road connector.

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