

6.12 Air quality

The air quality updated technical memorandum is provided in **Appendix L**, and a summary is provided below. This section should be read in conjunction with Section 8.2 of the EIS and the air quality assessment report provided in Appendix P of the EIS.

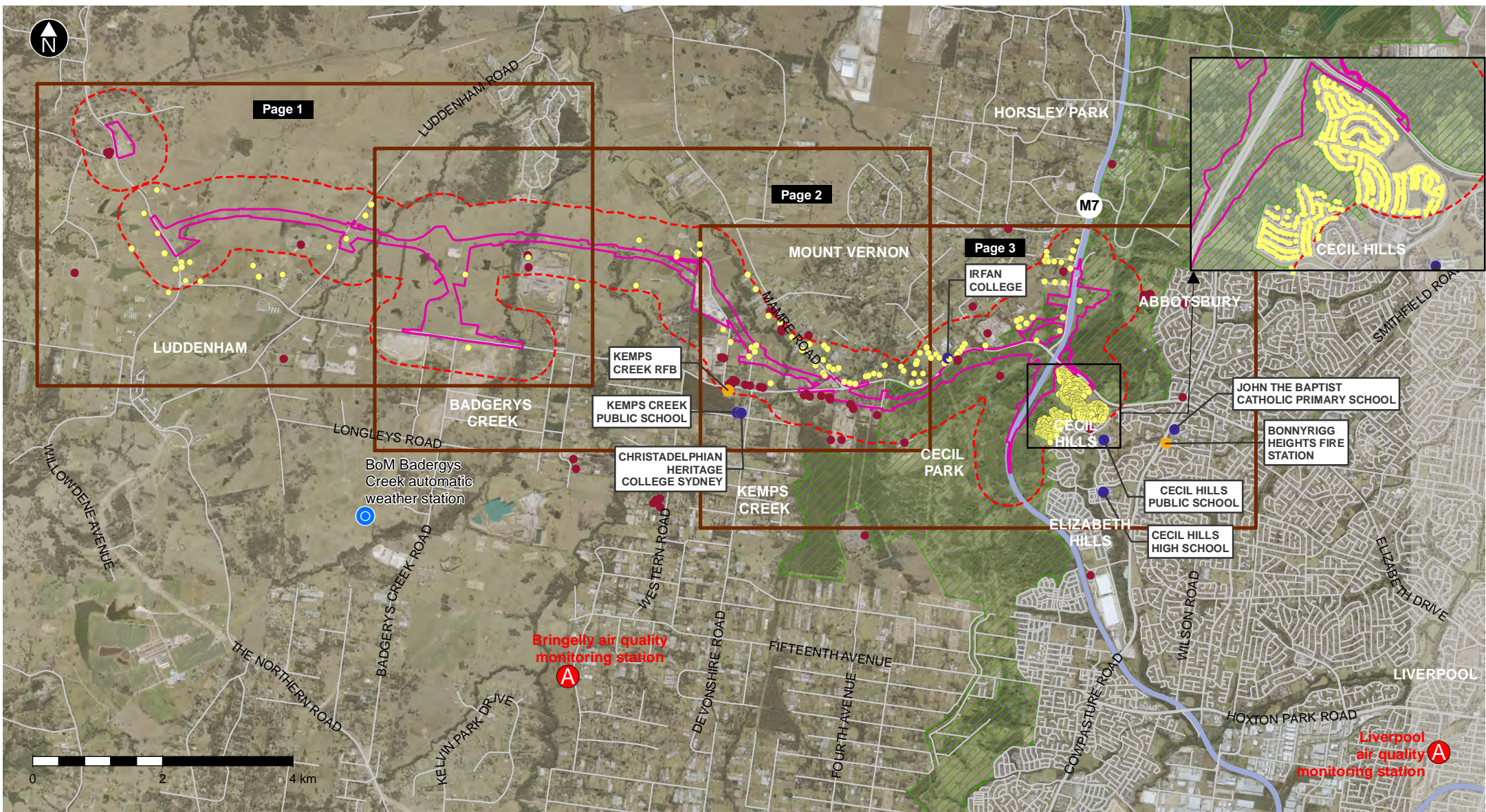
6.12.1 Assessment methodology

The assessment methodology comprised the following:

- Review of details of the amended project – to identify key air quality-related risks during construction and operation
- Review of statutes, policies and guidelines – to determine if any additional statutes, policies and guidelines would be applicable to the amended project
- Inclusion of updated data, where available – including updated traffic conditions, land-use data, planned road network and public transport updates, and updated transport modelling
- Use of the United Kingdom Institute of Air Quality Management (UK IAQM) semi-quantitative risk-based approach – to assess any changes in potential construction air quality impacts as a result of the amended project compared to those described in the EIS
- Application of the Tool for Roadside Air Quality (TRAQ) – to predict changes in potential operational air quality impacts as a result of the amended project for the same scenarios as described in the EIS
 - Results were then compared with the air quality impacts predicted for the project as described in the EIS to determine how air quality impacts would be changed from what was previously assessed
 - While the impact assessment criteria from the NSW EPA's 'Approved Methods for the Modelling and Assessment of Air Pollutants in NSW' (Approved Methods) (2016) do not specifically apply to road projects, they were also considered to provide an indication of the project's impact on air quality during operation
- Review of changes to potential cumulative air quality impacts as a result of the amended project
- Review of measures to mitigate or otherwise effectively manage any potential impacts detailed in the EIS.

The construction study area for the updated air quality assessment is shown in **Figure 6-59**. This represents a 350 metre buffer from the amended construction footprint. The operational study area for the updated air quality assessment is shown in **Figure 6-60**. This represents a 200 metre buffer from the amended construction footprint.

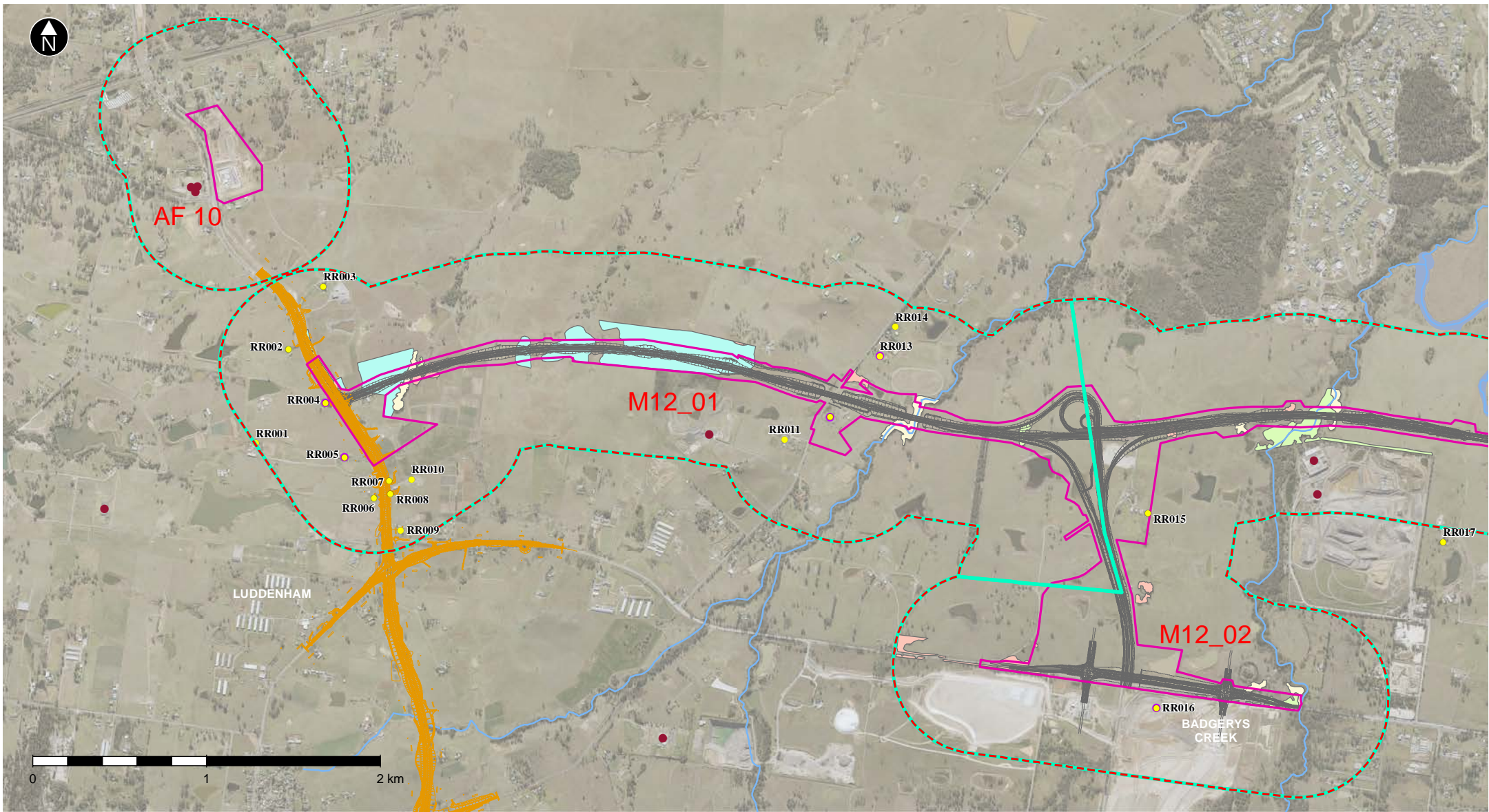
Emissions were assessed for the construction and operational road segments presented in **Figure 6-59** and **Figure 6-60** respectively. The operational road segments are consistent with those described in the EIS. The construction road segments are generally consistent with those described in the EIS, but with one additional road segment added (see **Figure 6-59**). This segment accounts for risks associated with AF 10 as a result of the amended project. This ancillary facility would be located outside the area covered by the construction assessment segments for the project as described in the EIS.



- The amended project construction footprint
- Amended study area (construction)
- Western Sydney Parklands
- Motorway
- Main roads
- Receivers**
- Residential
- Educational facility
- Emergency services
- Commercial
- ⊙ BoM automatic weather station
- Ⓐ OEH air quality monitoring stations



Figure 6-59 Amended construction air quality study area and nearby sensitive receivers



- The amended project
 - Part of The Northern Road upgrade project
 - The amended project construction footprint
 - - - Amended study area (construction)
 - Construction segments
- | | | |
|--|---|--|
| <p>Receivers</p> <ul style="list-style-type: none"> ● Residential ● Nearest receivers ● Commercial | <p>Threatened Ecological Communities (TEC)</p> <ul style="list-style-type: none"> ■ Cumberland Plain Woodland in the Sydney Basin Bioregion ■ Cumberland Plain Woodland in the Sydney Basin Bioregion (derived grassland form) | <ul style="list-style-type: none"> ■ River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions ■ Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions |
|--|---|--|

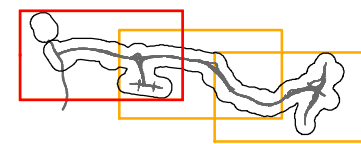
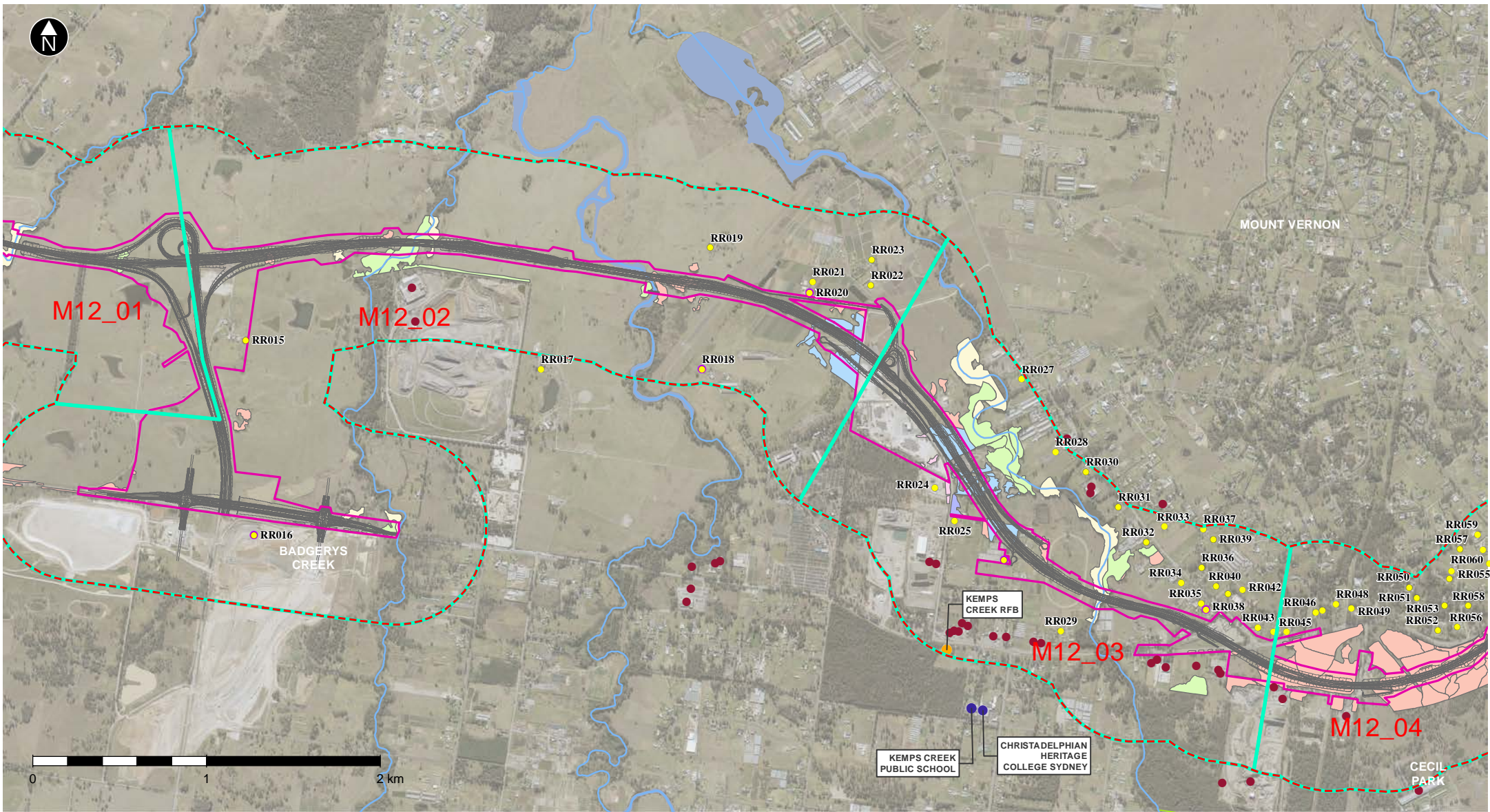


Figure 6-59 Amended construction air quality study area and nearby sensitive receivers



- The amended project
- ▭ The amended project construction footprint
- - - Amended study area (construction)
- ▭ Construction segments

- Receivers**
- Residential
 - Educational facility
 - Emergency services
 - Nearest receivers
 - Commercial

- Threatened Ecological Communities (TEC)**
- ▭ Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion
 - ▭ Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion
 - ▭ Cumberland Plain Woodland in the Sydney Basin Bioregion

- ▭ River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- ▭ Shale Gravel Transition Forest in the Sydney Basin Bioregion
- ▭ Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

▭ NPWS estate / reserves

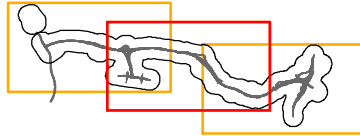
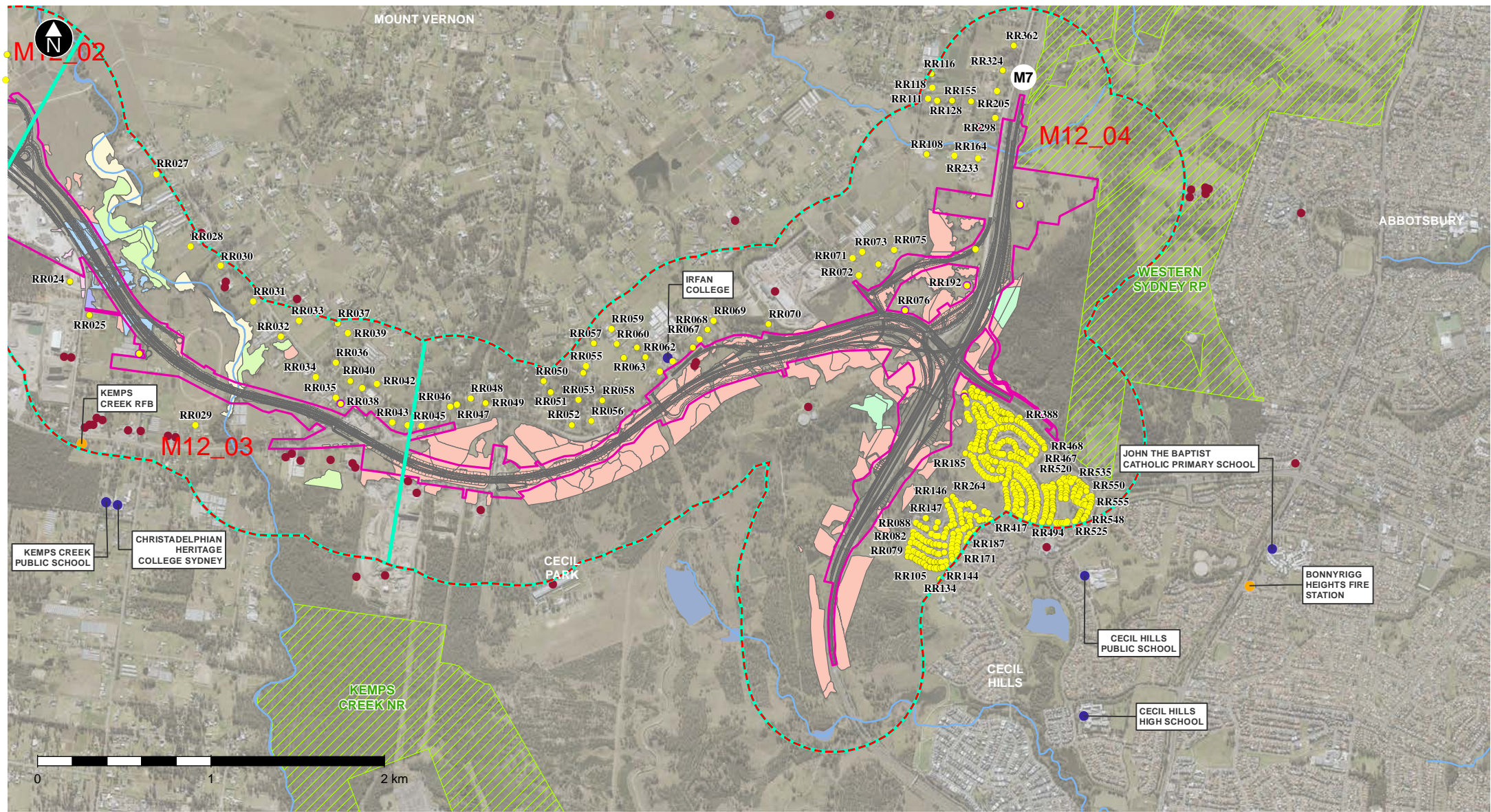


Figure 6-59 Amended construction air quality study area and nearby sensitive receivers



- The amended project
- ▭ The amended project construction footprint
- - - Amended study area (construction)
- ▭ Construction segments

- Receivers**
- Residential
 - Educational facility
 - Emergency services
 - Nearest receivers
 - Commercial

- Threshed Ecological Communities (TEC)**
- ▭ Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion
 - ▭ Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion
 - ▭ Cumberland Plain Woodland in the Sydney Basin Bioregion
 - ▭ Moist Shale Woodland in the Sydney Basin Bioregion

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions**
- ▭ Shale Gravel Transition Forest in the Sydney Basin Bioregion
 - ▭ Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

▨ NPWS estate / reserves

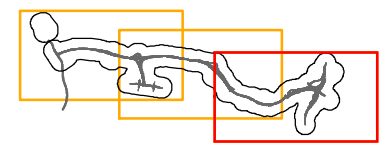
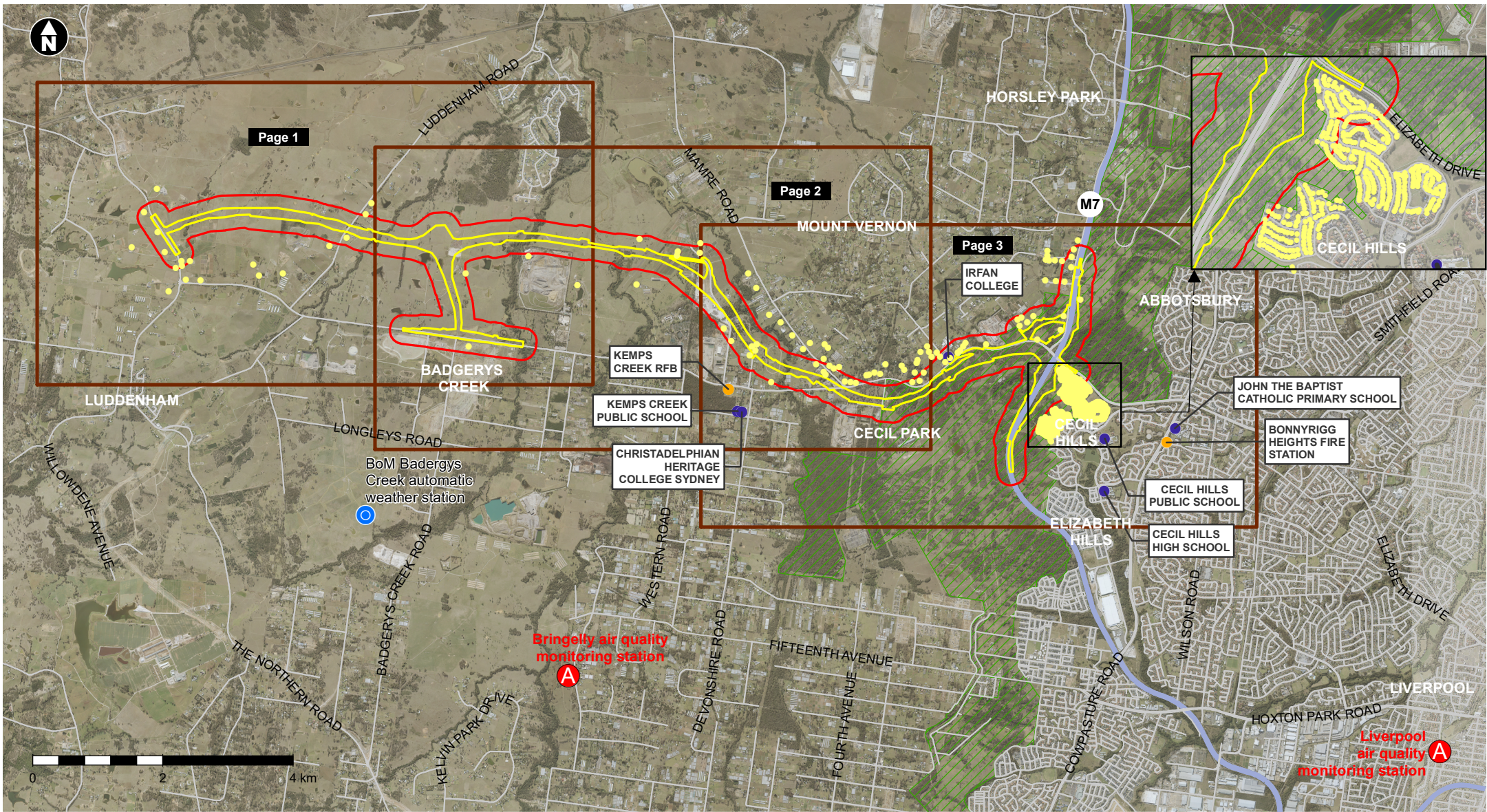


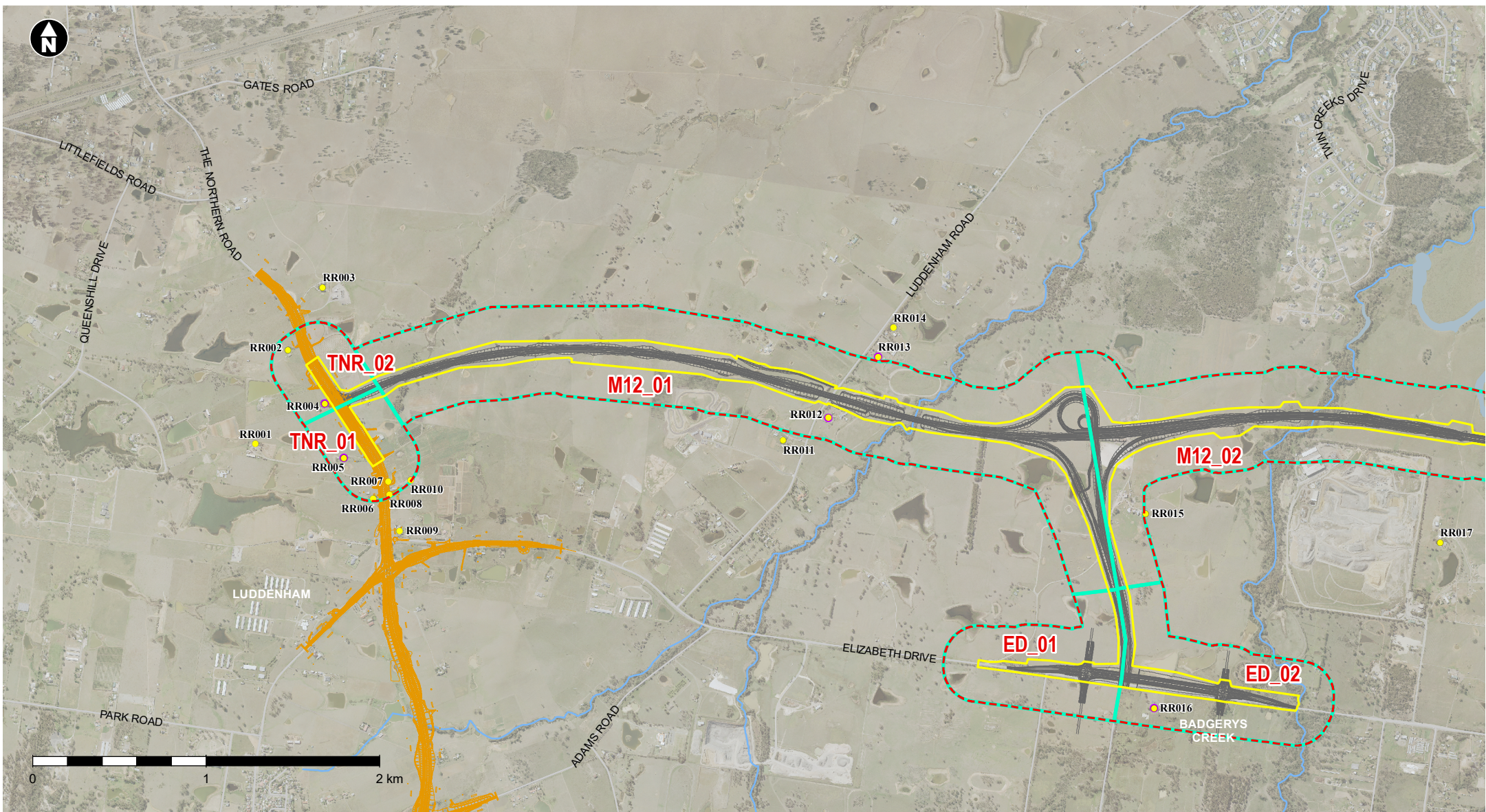
Figure 6-59 Amended construction air quality study area and nearby sensitive receivers



- | | | | |
|---|------------|----------------------|-------------------------------------|
| The amended project operational footprint | Motorway | Receivers | BoM automatic weather station |
| Amended study area (operation) | Main roads | Residential | OEH air quality monitoring stations |
| Western Sydney Parklands | | Educational facility | |
| | | Emergency services | |



Figure 6-60 Amended operational air quality study area and nearby sensitive receivers



- The amended project
 - The amended project operational footprint
 - ▭ Amended study area (operation)
 - ▭ Operational segments
- Receivers**
- Residential
 - Nearest receivers

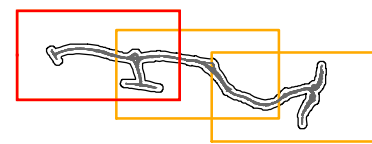
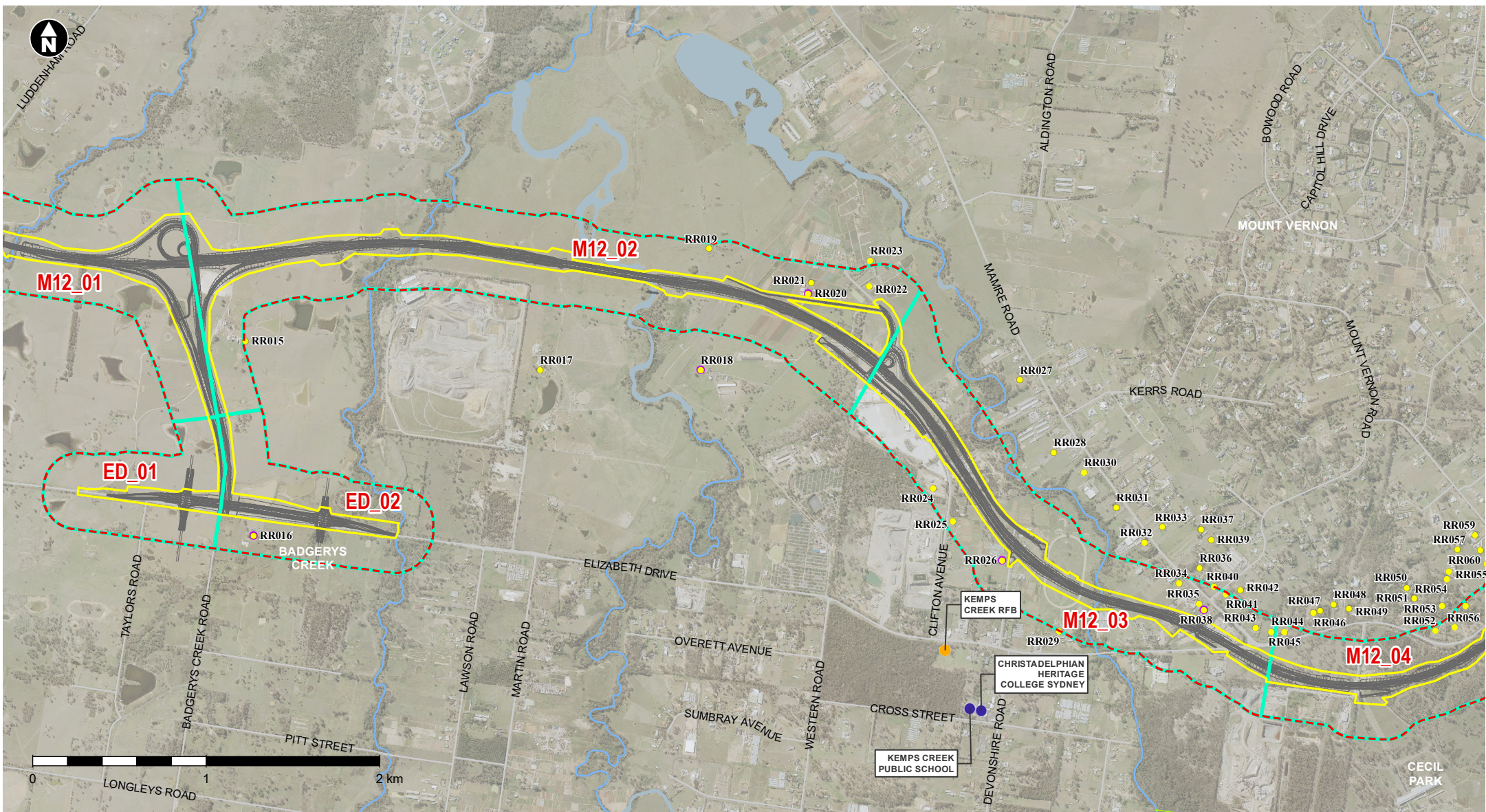


Figure 6-60 Amended operational air quality study area and nearby sensitive receivers



- The amended project
 - The amended project operational footprint
 - Amended study area (operation)
 - Operational segments
 - NPWS estate / reserves
- Receivers**
- Residential
 - Educational facility
 - Emergency services
 - Nearest receivers

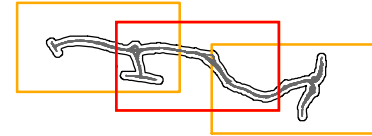
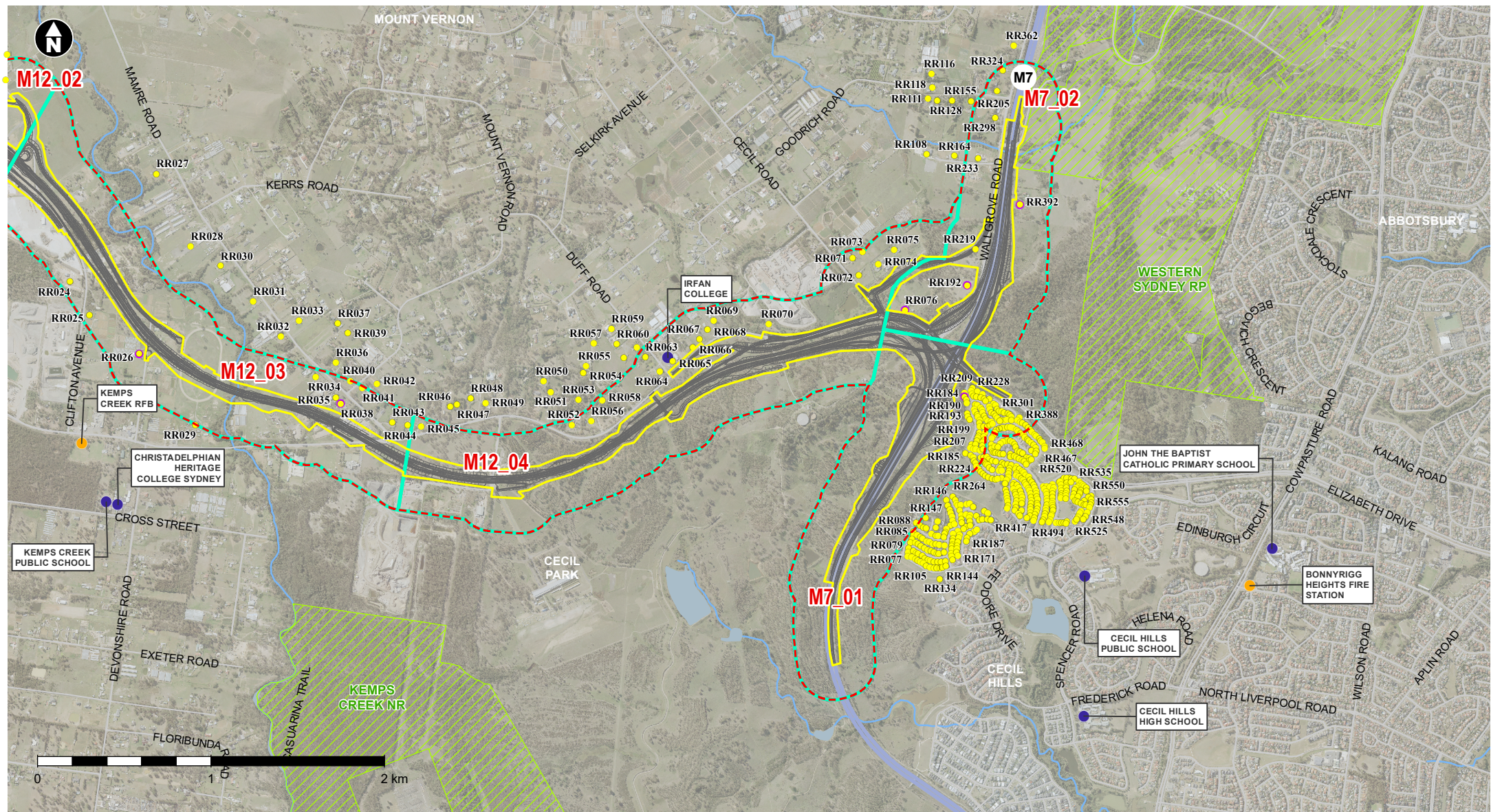


Figure 6-60 Amended operational air quality study area and nearby sensitive receivers



- The amended project
 - The amended project operational footprint
 - Amended study area (operation)
 - Operational segments
 - NPWS estate / reserves
- Receivers**
- Residential
 - Educational facility
 - Emergency services
 - Nearest receivers

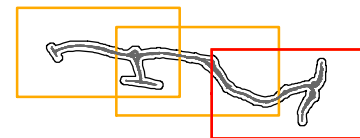


Figure 6-60 Amended operational air quality study area and nearby sensitive receivers

6.12.2 Existing environment

The existing environment described in Section 8.2.3 of the EIS is still applicable to the amended project. Changes to the alignment of the M12 Motorway and amended construction footprint would result some changes to the construction activities and operational traffic flows along some portions of the project. This is further described in **Section 6.12.3**.

6.12.3 Assessment of potential impacts

6.12.3.1 Construction impacts

The semi-quantitative method developed by the UK IAQM (2014) was used to assess the potential for dust impacts during the construction phase of the project as described in the EIS for the assessment segments M12_01 to M12_04 shown in **Figure 6-59**. The amended project was assessed under the same approach, consisting of:

- Step 1: screening review
- Step 2A: evaluating the potential magnitude of the works
- Step 2B: determining receiver sensitivities to dust soiling, human health and ecological dust impacts
- Step 2C: estimating the risk of dust soiling, human health and ecological dust impacts if no mitigation measures are applied
- Step 3: mitigation and management, involving the development of mitigation measures for each work location depending on the level of risk determined in Step 2
- Step 4: residual risks, involving evaluation of any residual dust related risks following the application of the mitigation measures in Step 3 to verify that a suitable level of mitigation has been applied to reduce the impact to the extent practicable.

For the assessment segments shown in Figure 8-13 of the EIS, the results of Step 1 and Step 2A of the IAQM methodology for the amended project were found to be consistent with the results identified for the EIS (See Section 8.2.4 of the EIS).

However, there were changes to Step B sensitivity ratings along assessment segments M12_01 and M12_04 as a result of the changes in setback distances to surrounding sensitive receivers associated with the amended project. Step 2B sensitivity ratings for dust soiling along M12_01 changed for earthworks, construction and track-out activities. These ratings increased from low (as described in the EIS) to medium for all three activities. Human health impact sensitivity ratings along segment M12_01 also changed for earthworks, construction and track-out activities. These ratings increased from medium (described in the EIS) to high for all three activities.

Along M12_04, human health impact sensitivity ratings changed for earthworks, construction and track-out activities. These ratings increased from medium (described in the EIS) to high for all three activities.

The unmitigated risk ratings under Step 2C were subsequently also increased for earthworks, construction and track-out along construction assessment segments M12_01 and M12_04 as a result of the changes in setback distances to surrounding receivers for the amended project. These ratings increased from low (described in the EIS) to medium for earthworks, construction and track-out (dust soiling, M12_01); from medium (described in the EIS) to high for earthworks, construction and track-out (human health, M12_01); and from medium (described in the EIS) to high for earthworks, construction and track-out (human health, M12_04).

Dust soiling, human health and ecological dust risk ratings along the other remaining segments assessed in the EIS (M12_02 and M12_03) remained consistent with those identified in the EIS.

Updated unmitigated construction dust risk values for the amended project are described in **Table 6-61**. Where the potential impact is changed from that described in Table 8-26 of the EIS, the impact is presented in **bold text**.

As AF 10 lies outside the assessment segments presented in the EIS, an additional segment has been added to address risks associated with AF 10 as a result of the amended project. The initial screening review (UK IAQM Step 1) undertaken for AF 10 identified the presence of human and ecological receivers within the construction study area (See **Figure 6-59**), and it was determined that the next IAQM steps of assessment would be required for the facility. Given that the land where AF 10 would be established is already being used as an ancillary facility for The Northern Road project, the potential magnitude of dust emissions (ie UK IAQM Step 2A) for demolition and construction activities was determined to be negligible. A dust magnitude rating of 'small' was estimated for earthworks to account for the limited bulk materials being stored and managed at the site. A dust magnitude rating of 'large' was determined for track-out (ie emissions associated with construction-related traffic) movements given the high number of traffic movements expected to be generated at the site per day.

As described **Table 6-61**, the highest unmitigated risk rating (Step 2C) around AF 10 was a 'medium' risk, associated with the potential for human health and ecological effects from dust generated from traffic movements associated with the facility. Unmitigated risk ratings of 'negligible' were predicted for the 'demolition' and 'construction' phases as the site is already cleared and is being used as a construction ancillary facility for The Northern Road project.

Under Step 2C, an unmitigated 'high' potential risk remains the highest unmitigated level for the amended project assessed (including AF 10). This remains consistent with the highest risk rating identified in the EIS.

The environmental management measures presented in Table 8-36 of the EIS were developed to mitigate and effectively manage this level of risk using guidance from the UK IAQM method. No changes to these measures would be required for the amended project, with these measures also to be applied at the proposed ancillary facility (AF 10). With the application of these measures, it is expected that there would be no significant residual dust-related impacts during construction, as was determined in Section 8.2.4 of the EIS.

In addition to construction dust, there were a range of other potential construction related air quality impacts that were considered for the amended project. These include:

- Exhaust emission from the combustion of fossil fuels
- Odours arising from uncovered contaminated and/or hazardous materials
- Airborne hazardous materials (eg asbestos and fungal spores).

Potential impacts from construction plant and equipment exhaust emissions, and potential odour impacts and impacts from airborne hazardous materials during demolition activities and excavation/handling of contaminated soils and areas of illegal dumping are not anticipated, due to the expected intensity of construction activities, setback distances from surrounding sensitive receivers, and the linear nature of the project. This is consistent with the impacts of the project as described in the EIS.

Table 6-61 Unmitigated construction dust risk values for the amended project (bold text shows change from EIS)

Construction area	Activity	Dust soiling		Human health impacts		Ecological effects	
		Project as per EIS	Amended project	Project as per EIS	Amended project	Project as per EIS	Amended project
M12_01 – M12 Motorway between The Northern Road and Western Sydney International Airport entrance/exit (including connections)	Demolition	Low risk	Low risk	Medium risk	Medium risk	Medium risk	Medium risk
	Earthworks	Low risk	Medium risk (increased)	Medium risk	High risk (increased)	High risk	High risk
	Construction	Low risk	Medium risk (increased)	Medium risk	High risk (increased)	High risk	High risk
	Track-out	Low risk	Medium risk (increased)	Medium risk	High risk (increased)	High risk	High risk
M12_02 – M12 Motorway between Western Sydney International Airport entrance/exit road and Clifton Avenue	Demolition	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk
	Earthworks	Medium risk	Medium risk	High risk	High risk	High risk	High risk
	Construction	Medium risk	Medium risk	High risk	High risk	High risk	High risk
	Track-out	Medium risk	Medium risk	High risk	High risk	High risk	High risk
M12_03 – M12 Motorway between Clifton Avenue and Elizabeth Drive near Mamre Road	Demolition	Low risk	Low risk	Medium risk	Medium risk	Medium risk	Medium risk
	Earthworks	Low risk	Low risk	Medium risk	Medium risk	High risk	High risk
	Construction	Low risk	Low risk	Medium risk	Medium risk	High risk	High risk
	Track-out	Low risk	Low risk	Medium risk	Medium risk	High risk	High risk

Construction area	Activity	Dust soiling		Human health impacts		Ecological effects	
		Project as per EIS	Amended project	Project as per EIS	Amended project	Project as per EIS	Amended project
M12_04 – M12 Motorway between Elizabeth Drive near Mamre Road and the M7 Motorway	Demolition	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk	Medium risk
	Earthworks	Medium risk	Medium risk	Medium risk	High risk (increased)	High risk	High risk
	Construction	Medium risk	Medium risk	Medium risk	High risk (increased)	High risk	High risk
	Track-out	Medium risk	Medium risk	Medium risk	High risk (increased)	High risk	High risk
Ancillary facility 10 (AF 10)	Demolition	N/A	Negligible	N/A	Negligible	N/A	Negligible
	Earthworks	N/A	Negligible	N/A	Low	N/A	Low
	Construction	N/A	Negligible	N/A	Negligible	N/A	Negligible
	Track-out	N/A	Low	N/A	Medium	N/A	Medium

6.12.3.2 *Operational impacts*

Changes in air quality were predicted for the amended project and compared to the changes in air quality predicted for the project as described in the EIS for the following pollutants:

- Particulate matter as PM₁₀
- Particulate matter as PM_{2.5}
- Carbon Monoxide (CO)
- Nitrogen dioxide (NO₂)
- Volatile organic compounds (VOCs).

Changes in concentrations of the above pollutants are graphed in Appendix L.

Results for each pollutant are presented below. In summary, it was found that the amended project would not result in any substantial changes to the local operational air quality outcomes compared to the project as described in the EIS. It is noted that existing local annually averaged PM_{2.5} concentrations were already measured at the EPA's eight µg/m³ impact assessment criterion.

Regional air quality was also assessed. In summary, it was found that the amended project would not result in any significant changes to regional operational air quality outcomes compared with the project as described in the EIS.

Particulate matter as PM₁₀

The M12 Motorway:

- Total 24-hour averaged PM₁₀ concentrations predicted to remain below the EPA's impact assessment criterion of 50 µg/m³ for the amended project, consistent with the project as per the EIS
 - Worst-case 24-hour averaged PM₁₀ concentrations were predicted to increase by up to 5.4 µg/m³ (in 2036) at the most-affected surrounding sensitive receiver compared with existing conditions. This increase is slightly higher than the predicted level in the EIS (up to 3.8 µg/m³)
- Total annually averaged PM₁₀ concentrations were predicted to remain below the EPA's 25 µg/m³ impact assessment criteria for the amended project, consistent with the project as per the EIS
 - Annually averaged PM₁₀ contributions from the amended project of up to approximately 2 µg/m³ were predicted at the most-affected surrounding sensitive receiver. This is comparable with the highest contribution determined in the EIS (1.5 µg/m³).

The Northern Road:

- Total 24-hour averaged PM₁₀ concentrations were predicted to remain below the EPA's 50 µg/m³ impact assessment criteria, consistent with the project as per the EIS
 - 24-hour averaged PM₁₀ concentrations were predicted to increase by up to 4.1 µg/m³ at the most-affected surrounding sensitive receiver (in 2036) as a result of the project compared with existing conditions. This is comparable with the EIS where the highest increase compared with existing conditions was 4.3 µg/m³
 - Worst-case changes between respective 2026 and 2036 project and no project options remained consistent with what was presented in the EIS, with changes of less than two µg/m³ also being predicted.

- Total annually averaged PM₁₀ concentrations at receivers within the operational study area around TNR were predicted to remain below the EPA's 25 µg/m³ impact assessment criteria, consistent with the project as per the EIS
 - Annually averaged PM₁₀ contributions from the amended project were comparable with the values presented in the EIS.

The M7 Motorway:

- Total 24-hour averaged PM₁₀ concentrations from the amended project remained below the EPA's impact assessment criterion (50 µg/m³), consistent with the project as per the EIS
 - The relative worst-case 24-hour averaged PM₁₀ concentrations for the amended project compared with the equivalent 2026 and 2036 no project scenarios were higher than the worst-case relative project and no project comparisons presented in the EIS by about 0.9 µg/m³. This was a result of changes to 'project' and 'no project' traffic forecasts that were applied for the amended project. Decreases between project and no project options were described for the project as described in the EIS.
- Total annually averaged PM₁₀ concentrations at receivers within the operational study area around the M7 Motorway were predicted to remain below the EPA's 25 µg/m³ impact assessment criteria, consistent with the project as per the EIS
 - Relative annually averaged PM₁₀ contributions from the amended project are predicted to increase compared with the values presented in the EIS. For the amended project, the highest relative project to no project contribution was around 0.6 µg/m³ higher, compared with marginal decreases (up to 0.5 µg/m³) for project options presented in the EIS. Again, this change is a result of the traffic forecasts applied in the amendment assessment.

Elizabeth Drive:

- No change in outcomes (ie instances of exceedances of the EPA's impact assessment criteria) for the 24-hour averaged PM₁₀ concentrations are predicted for the amended project compared with the project as described in the EIS, consistent with the project as per the EIS
 - Worst-case relative increases between project and no-project options up to 0.4 µg/m³ were predicted for the amended project. Decreases between project and no project options were described for the project as described in the EIS. This was a result of changes to project and no project traffic forecasts that were applied for the amended project. As a result, total 24-hour PM₁₀ concentrations were predicted to remain well below the EPA's 50 µg/m³ impact assessment criterion.
- Total annually averaged PM₁₀ concentrations at receivers within the operational study area around Elizabeth Drive were predicted to remain below the EPA's 25 µg/m³ impact assessment criteria, consistent with the project as per the EIS
 - Worst-case annually averaged PM₁₀ contribution increases from the amended project compared with the relevant no project options was 0.9 µg/m³. This was a result of changes to project and no project traffic forecasts that were applied for the amended project.

Particulate matter as PM_{2.5}

The M12 Motorway:

- Total 24-hour averaged PM_{2.5} concentrations were predicted to remain below the EPA's impact assessment criterion of 25 µg/m³, consistent with the project as per the EIS
 - 24-hour averaged PM_{2.5} concentrations were predicted to increase by up to 5.4 µg/m³ (in 2036) at the most-affected surrounding sensitive receiver compared with existing conditions. This increase is slightly higher than the predicted level in the EIS (up to 3.8 µg/m³).

- There were no receivers where increases greater than 2 $\mu\text{g}/\text{m}^3$ compared with existing concentrations were predicted, consistent with the project as per the EIS
 - Annually averaged $\text{PM}_{2.5}$ contributions from the amended project of up to approximately two $\mu\text{g}/\text{m}^3$ were predicted at the most-affected surrounding sensitive receiver. It is noted that local annually averaged $\text{PM}_{2.5}$ concentrations were already measured at the EPA's eight $\mu\text{g}/\text{m}^3$ impact assessment criterion.

The Northern Road:

- Total 24-hour averaged $\text{PM}_{2.5}$ concentrations were predicted to remain below the EPA's 25 $\mu\text{g}/\text{m}^3$ impact assessment criteria, consistent with the project as per the EIS
 - 24-hour averaged $\text{PM}_{2.5}$ concentrations were predicted to increase by up to 4.5 $\mu\text{g}/\text{m}^3$ at the most-affected surrounding sensitive receiver (in 2036) as a result of the project compared with existing conditions. This is comparable with the EIS where the highest increase compared with existing conditions was 4.3 $\mu\text{g}/\text{m}^3$
- There were no receivers where $\text{PM}_{2.5}$ contributions of more than two $\mu\text{g}/\text{m}^3$ were predicted, consistent with the project as per the EIS.
 - Worst-case annually averaged $\text{PM}_{2.5}$ contributions from the amended project remained comparable with the results presented in the EIS. For the amended project, the worst-case total (road contribution plus background) concentration was 10.7 $\mu\text{g}/\text{m}^3$. This increase is slightly higher than the predicted level in the EIS (10.4 $\mu\text{g}/\text{m}^3$), noting that local annually averaged $\text{PM}_{2.5}$ concentrations were already measured at the EPA's eight $\mu\text{g}/\text{m}^3$ impact assessment criterion.

The M7 Motorway:

- Total 24-hour averaged $\text{PM}_{2.5}$ concentrations from the amended project were predicted to remain below the EPA's impact assessment criterion (25 $\mu\text{g}/\text{m}^3$)
 - The relative worst-case 24-hour averaged $\text{PM}_{2.5}$ concentrations for the amended project compared with the equivalent 2026 and 2036 no project options were higher than the values presented in the EIS by approximately 0.9 $\mu\text{g}/\text{m}^3$. This was a result of changes to project and no project traffic forecasts that were applied for the amended project.
- Annually averaged $\text{PM}_{2.5}$ concentrations were predicted to result in one additional receiver experiencing contributions of more than 2 $\mu\text{g}/\text{m}^3$ when compared to the EIS.
 - For the amended project, the worst-case (road contribution plus background) concentration was 11.5 $\mu\text{g}/\text{m}^3$. This is consistent with the predicted level in the EIS (11.5 $\mu\text{g}/\text{m}^3$), noting that local annually averaged $\text{PM}_{2.5}$ concentrations were already measured at the EPA's eight $\mu\text{g}/\text{m}^3$ impact assessment criterion.
 - There was no change predicted in the number of receivers that would experience roadway contributions of more than two $\mu\text{g}/\text{m}^3$ between the 2026 amended project and no project options compared with the results described in the EIS.
 - For 2036, it was predicted that there would be one additional receiver for the amended project (compared to the EIS) where roadway contributions would increase from the one to two $\mu\text{g}/\text{m}^3$ category to the greater than two $\mu\text{g}/\text{m}^3$ category compared with the 2036 no project option.

The total number of receivers in the study area around the M7 Motorway predicted to experience contributions of more than two $\mu\text{g}/\text{m}^3$ as a result of the amended project would remain 61 which is consistent with the EIS (noting that this additional receiver near the M7 Motorway is offset by the one receiver reduction near The Northern Road).

Elizabeth Drive:

- Total 24-hour PM_{2.5} concentrations were predicted to remain below the EPA's 25 µg/m³ impact assessment criterion, as was determined in the EIS.
- For annually averaged PM_{2.5} contributions, there were no receivers where increases greater than two µg/m³ compared with existing concentrations were predicted, consistent with the project as per the EIS
 - For the amended project, annually averaged PM_{2.5} contributions at the most-affected receiver increased marginally (contributions up to 1.2 µg/m³ compared with 0.9 µg/m³ for the project as described in the EIS). This was a result of changes to project and no project traffic forecasts that were applied for the amended project.
 - Roadway contributions at the worst-affected receiver for both assessment scenarios (option 1 and option 2) were predicted to remain below two µg/m³. This is consistent with the project as described in the EIS.

Carbon monoxide (CO)

There would be no change in outcomes for the amended project compared with the project as described in the EIS. The highest 1-hour and 8-hour averaged CO contributions from the amended project both remained below one mg/m³ at the most-affected sensitive receivers. The resulting total concentrations remained well below the EPA's 1-hour and 8-hour impact assessment criteria of 10 mg/m³ and 30 mg/m³ respectively.

Nitrogen dioxide (NO₂)

There would be no change in outcomes for the amended project compared with the project as described in the EIS. The highest 1-hour and annually averaged NO₂ contributions from the amended project were 26 µg/m³ and 5 µg/m³ at the most-affected sensitive receivers. These values are four µg/m³ and one µg/m³ higher than the respective 1-hour and annually averaged worst-case contributions predicted in the EIS (of 22 µg/m³ and four µg/m³ respectively) This change occurs at the most affected receiver within the operational study area around the M7 Motorway as a result of the updated project and no project forecasts applied for the amended project review. Resulting total 1-hour and annually averaged NO₂ concentrations were predicted to remain well below the EPA's respective 246 µg/m³ and 62 µg/m³ impact assessment criteria.

Volatile Organic Compounds (VOCs)

There would be no change in outcomes for the amended project compared with the project as described in the EIS. The highest 1-hour averaged VOC contribution from the amended project predicted at a sensitive receiver would remain at less than one µg/m³ as per the project as described in the EIS. This is well below the EPA's 29 µg/m³ impact assessment criterion.

Regional air quality

Given that emissions from vehicle exhausts, wearing of tyres, vehicle braking, the road surface, and re-entrainment exhibit a pronounced spatial decline with distance from the roadway, and that contributions for the amended project were determined to be comparable with the EIS, it was determined that the emissions from the amended project would be consistent with those for the project as described in the EIS not lead to concentration contributions at levels that would adversely affect measured air quality conditions at the nearest Bringelly and Liverpool DPIE (Environment, Energy and Science) air quality monitoring stations.

As a result, it is unlikely that the amended project would have a measurable effect on background regional air quality, consistent with the regional air quality impacts of the project as described in the EIS.

6.12.4 Cumulative impacts

Considering the revised construction footprint for the amended project and the suitability of the existing controls determined in the EIS, it is similarly expected that emissions to air during construction of the amended project would present a limited risk of regional cumulative impacts.

Considering the limited geographical changes to the design from what was assessed in the EIS; how contributions for the amended project were determined to be comparable to the project described in the EIS and that contributions from other nearby road projects have already been incorporated into the impact assessment (see Section 8.2.5 of the EIS); cumulative operational air quality impacts associated with the amended project are also expected to remain consistent with those described in the EIS.

6.12.5 Environmental management measures

The air quality impacts associated with the amended project are generally consistent with the impacts described in the EIS. The environmental management measures identified in Section 8.2.6 of the EIS are therefore considered appropriate to manage the air quality impacts associated with the amended project. No additional or amended environmental management measures are required for the amended project.