



Australian Government

BUILDING OUR FUTURE



M12 Motorway

Amendment Report – Appendix K

Soils and contamination supplementary
technical memorandum

October 2020

Memorandum

Issued by Blair Cummings (Environmental Scientist, Jacobs)

Subject M12 Motorway amendment report - soils and contamination supplementary technical memorandum

Client Transport for New South Wales

Project M12 Motorway

Date October 2020

1. Introduction and background

1.1 Overview

Transport for New South Wales (TfNSW; formerly Roads and Maritime Services) proposes to build the M12 Motorway between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham (the project), over a distance of about 16 kilometres. The project would provide the main access from the Western Sydney International Airport at Badgerys Creek to Sydney's motorway network and is expected to be opened to traffic before the opening of the Western Sydney International Airport.

TfNSW is seeking approval under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to construct and operate the project. An environmental impact statement (EIS) was prepared to assess the potential impacts of the project and recommend management measures to appropriately address those impacts. The key features of the project as described in the EIS is provided in Section 1.1 of the amendment report. This EIS was placed on public exhibition from 16 October to 18 November 2019.

TfNSW proposes to amend the project following further design development since the exhibition of the EIS. The proposed changes include design changes and construction updates. These provide functional improvements to the design and improved integration with surrounding major transport infrastructure projects and potential future development. They also respond to issues raised in community and stakeholder submissions, and, in some instances, further reduce the potential impacts of the project as described in the EIS.

The proposed changes are described in **Section 1.2**.

1.2 Proposed design changes

The proposed changes to the project as described in the EIS are summarised below and are described in detail in Chapter 3 and Chapter 4 of the amendment report:

- Amendments to the motorway-to-motorway interchange at the M7 Motorway, including:
 - Changes to Elizabeth Drive and Cecil Road intersections, proposed exit ramps, the Wallgrove Road connection to Elizabeth Drive and proposed shared user path realignments
 - The widening of Elizabeth Drive under the M7 Motorway and approaches

- An option to provide a new connection between the M12 Motorway and Elizabeth Drive near the M7 Motorway interchange
- Two new signalised intersections into the Western Sydney International Airport, with provisions for future connection to potential developments north of the Western Sydney International Airport
- Additional ancillary facilities to support the delivery of the project.

Refinements have also been made as part of the ongoing development of the project since the EIS was exhibited. Refinements are changes that are consistent with the parameters of the project description as described in the EIS. For completeness, however, these refinements have been factored into the amended construction and operational footprint and included in the impact assessment described in this supplementary technical memorandum. The refinements are described in Section 3.3 and Section 4.2 of the amendment report and include:

- Lowering the height of the M12 Motorway in and around the Western Sydney International Airport interchange
- Reduction in the scope of work associated with the M12 Motorway and The Northern Road intersection
 - This intersection would still be constructed, but the main infrastructure work would be delivered as part of The Northern Road upgrade project
- Relocation of utilities
- Changes to property access and acquisition
- Changes to drainage
- Adjustments to construction access, hours, haulage, timing and material quantities.

The project with all proposed changes is referred to as the amended project.

1.3 Amended project

1.3.1 Overview

The amended project would continue to provide the main access from the Western Sydney International Airport at Badgerys Creek to Sydney's motorway network and be located between The Northern Road in the west and the M7 Motorway in the east. The amended project includes an option for a direct connection between the M12 Motorway and Elizabeth Drive at the eastern extent of the project. This option would include some realignment of Wallgrove Road and widening of Elizabeth Drive at the motorway-to-motorway interchange at the M7 Motorway to facilitate the connection. Therefore, two options are being proposed for the amended project at the interchange with the M7 Motorway.

The two options for the amended project would be consistent from The Northern Road in the west until Duff Road in the east. At the motorway-to-motorway interchange with the M7 Motorway, the project is proposed to be either:

- Option 1 – Without Elizabeth Drive connection
 - Interchange provides entry and exit ramps between the M12 Motorway and the M7 Motorway; in addition, it would maintain the existing connection of the M7 Motorway to Elizabeth Drive with new entry and exit ramps
- Option 2 – With Elizabeth Drive connection
 - Interchange as per option 1 and also provides entry and exit ramps between the M12 Motorway and Elizabeth Drive, Cecil Road and Wallgrove Road.

This section of the amended project is shown in **Figure 1-1**, with the Elizabeth Drive connection associated with option 2 shown in a different colour and detailed in inset A. The decision on which option would be built is dependent on funding being available to include the Elizabeth Drive connection. This will be determined during the detailed design and construction phase of the project. The key features of each option are described in the following sections.

The proposed changes (see **Section 1.2**) would result in an amended construction footprint (**Figure 1-2**) and an amended operational footprint (**Figure 1-3**). The footprints would be the same for both options, with each footprint assuming the worst case scenario (ie option 2).

The assessment of potential impacts described in **Sections 5** and **6** relates to the worst case scenario and covers both options, unless stated otherwise.

The key features of the amended project are listed in **Section 1.3.2** and include both options.

1.3.2 Key features of the amended project

The key features of the amended project are listed below. Where the description of the proposed amended project key features differs from the description listed in the EIS (see Section 1.1 of the amendment report), those changes are shown in bold text:

- A new dual-carriageway motorway between the M7 Motorway and The Northern Road with two lanes in each direction with a central median allowing future expansion to six lanes
- Motorway access via three interchanges/intersections:
 - A motorway-to-motorway interchange at the M7 Motorway and associated works (extending about four kilometres within the existing M7 Motorway corridor) **with the following options**
 - **Option 1 – without connection between the M12 Motorway and Elizabeth Drive**
 - **Option 2 – with connection between the M12 Motorway and Elizabeth Drive**
 - A grade-separated interchange referred to as the Western Sydney International Airport interchange, including a dual-carriageway four-lane airport access road (two lanes in each direction for about 1.5 kilometres) connecting with the Western Sydney International Airport Main Access Road
 - A signalised intersection at The Northern Road with provision for grade separation in the future
- Bridge structures across Ropes Creek, Kemps Creek, South Creek, Badgerys Creek and Cosgroves Creek
- A bridge structure across the M12 Motorway into the Western Sydney Parklands to maintain access to utilities, including the existing water tower and mobile telephone/other service towers on the ridgeline in the vicinity of Cecil Hills, to the west of the M7 Motorway
- Bridge structures at interchanges and at Clifton Avenue, Elizabeth Drive, Luddenham Road and other local roads to maintain local access and connectivity
- Inclusion of active transport (pedestrian and cyclist) facilities through provision of pedestrian bridges and an off-road shared user path, including connections to existing and future shared user path networks
- Modifications to the local road network, as required, to facilitate connections across and around the M12 Motorway including:
 - Realignment of Elizabeth Drive at the Western Sydney International Airport, with Elizabeth Drive overpassing the airport access road and rail infrastructure
 - **Two new signalised intersections from Elizabeth Drive into the Western Sydney International Airport, with provisions for future connection to potential developments to the north**
 - **Widening of Elizabeth Drive under the M7 Motorway and approaches**

- Realignment of Clifton Avenue over the M12 Motorway, with associated adjustments to nearby property access
 - Relocation of the Salisbury Avenue cul-de-sac, on the southern side of the M12 Motorway
 - **Realignment of Wallgrove Road to connect to Cecil Road, including a connection between Elizabeth Drive and Wallgrove Road via Cecil Road with a signalised intersection with Elizabeth Drive**
- Adjustment, protection or relocation of existing utilities
 - Ancillary facilities to support motorway operations, smart motorways operation in the future and the existing M7 Motorway operation, including gantries, electronic signage and ramp metering
 - Other roadside furniture, including safety barriers, signage and street lighting
 - Adjustments of waterways, where required, including Kemps Creek, South Creek and Badgerys Creek
 - Permanent water quality management measures including swales and basin
 - Establishment and use of temporary ancillary facilities, temporary construction sedimentation basins, access tracks and haul roads during construction
 - Permanent and temporary property adjustments and property access refinements as required.

An overview of the amended project is shown in **Figure 1-1**.

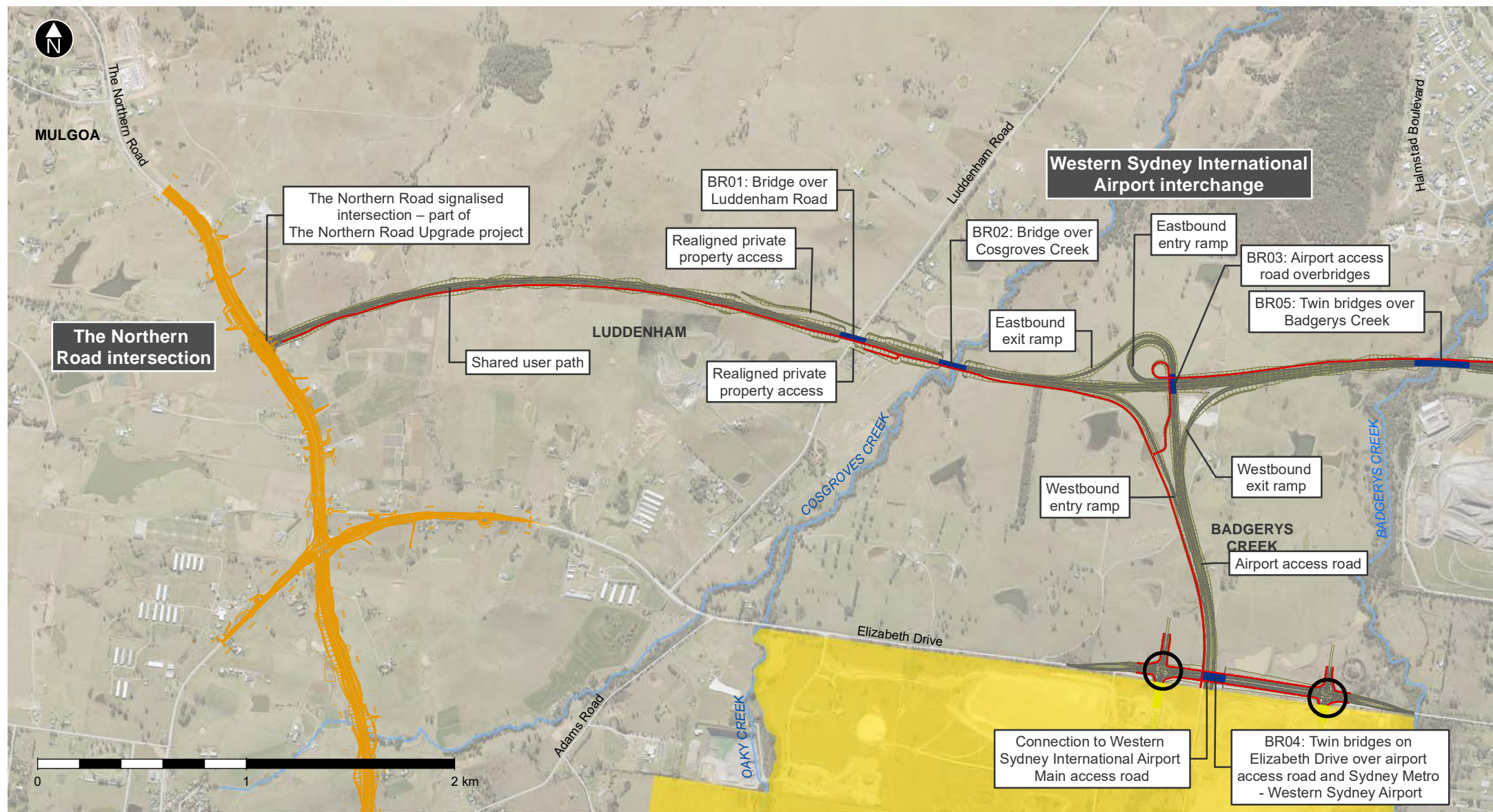
1.4 Purpose of document

This supplementary technical memo has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) issued 30 October 2018 to support the assessment of the project. The purpose of this memo is to identify and assess the potential to expose contamination and other latent soil conditions which could impact upon human health and the environmental receivers documented in the EIS as a result of the proposed amended project and, where required, recommend any changes or feasible and reasonable additions to the management measures.

This supplementary technical memorandum should be read in conjunction with the EIS (Section 8.1 and Appendix O of the EIS – Soils and contamination assessment report).

2. Assessment methodology

The methodology for the supplementary soils and contamination assessment was prepared in accordance with the policy and planning setting detailed in Section 8.1.1 of the EIS, and consistent with the methodology outlined in Section 8.1.2 of the EIS.



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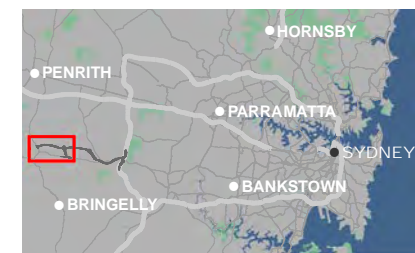
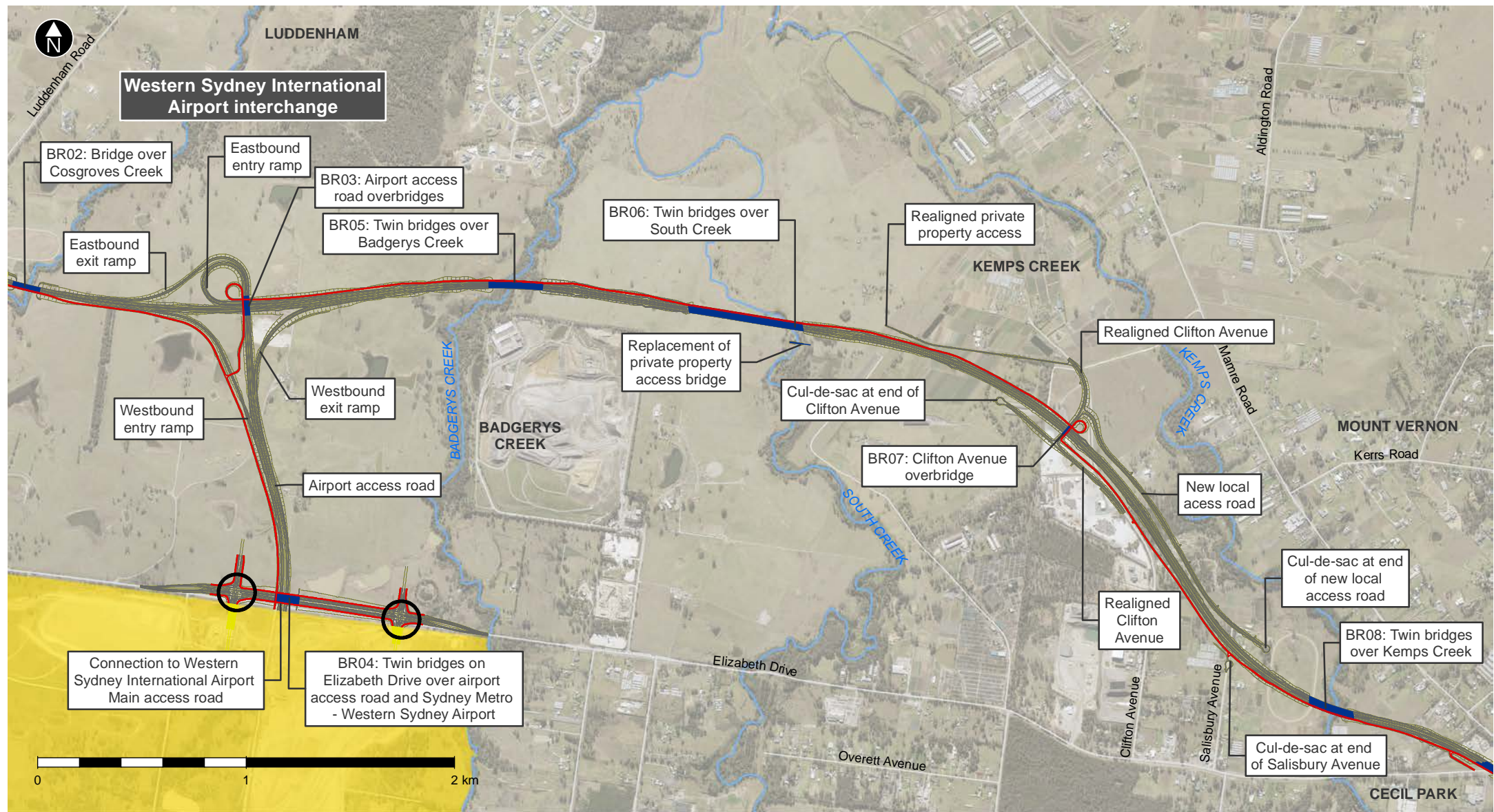


Figure 1-1 Key features of the amended project



- The amended project
- Existing roads
- Western Sydney International Airport
- Shared user path
- Waterways
- Signalised intersections into the Western Sydney International Airport
- Note: Indicative, subject to detailed design
- Bridges

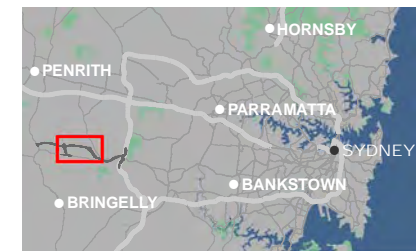
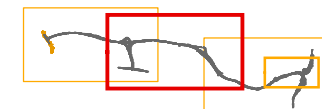


Figure 1-1 Key features of the amended project

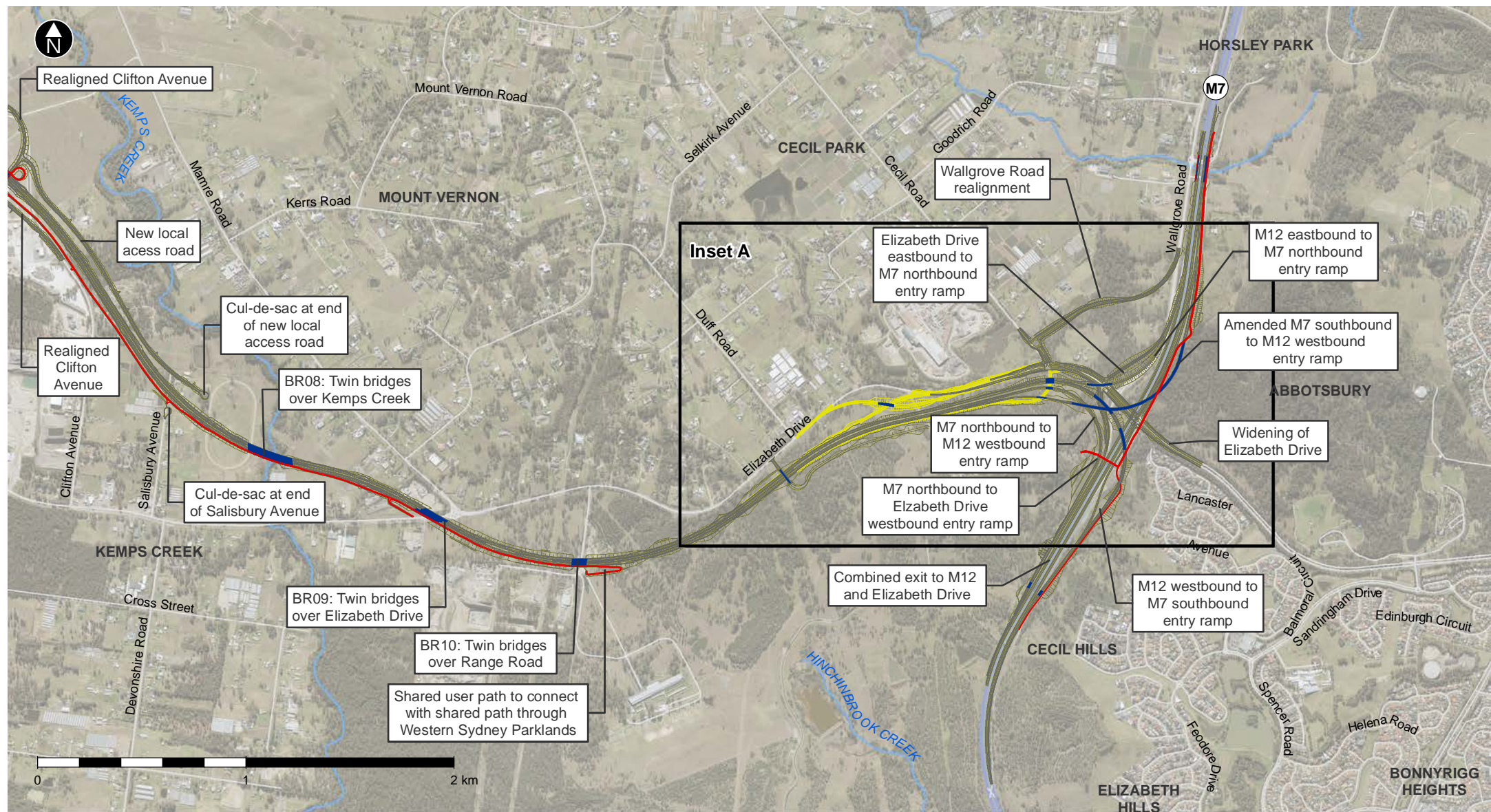
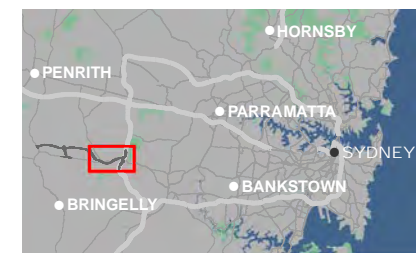
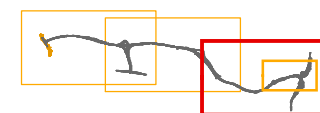
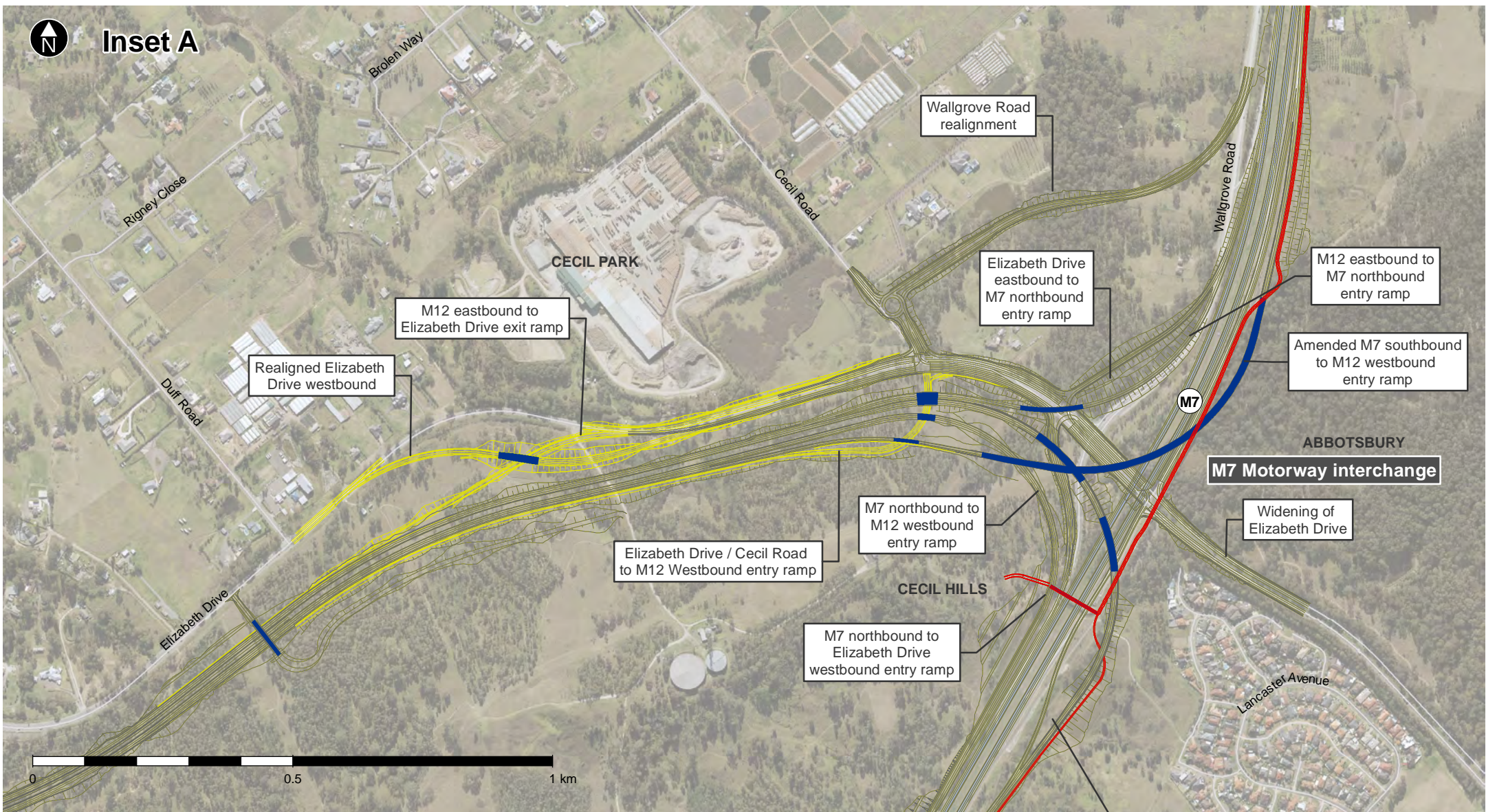
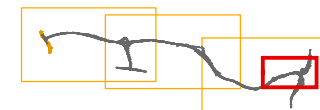


Figure 1-1 Key features of the amended project





- The amended project
- The amended project with Elizabeth Drive connection
- Shared user path
- Bridges
- Motorway
- Existing roads



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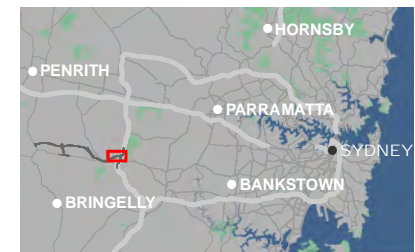
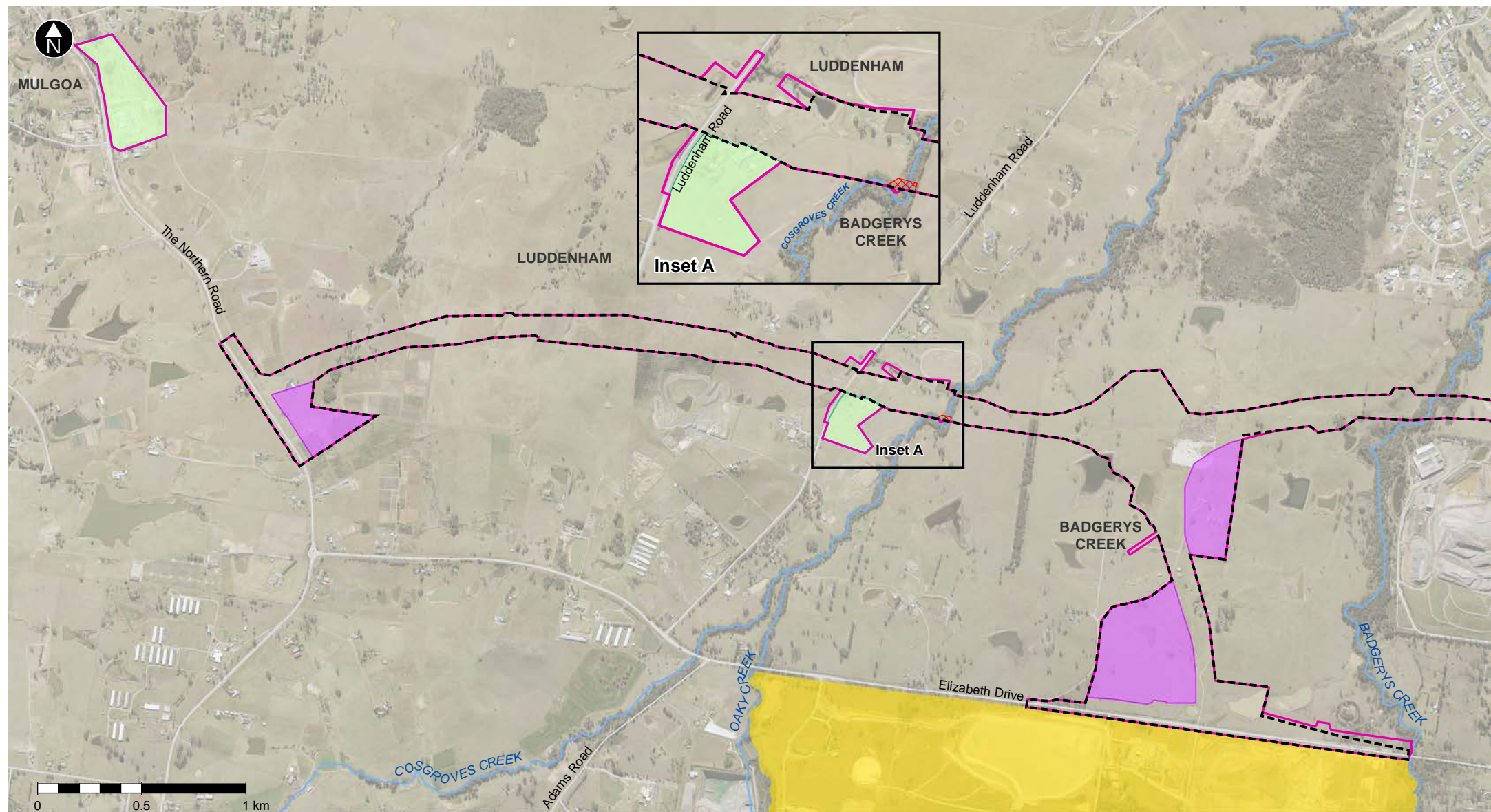
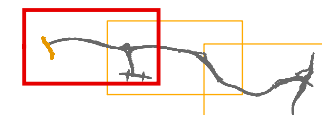


Figure 1-1 Key features of the amended project



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project exclusion zones

- Ancillary facilities as per the EIS
- Additional ancillary facilities
- Western Sydney International Airport
- Waterways
- Motorway
- Existing roads



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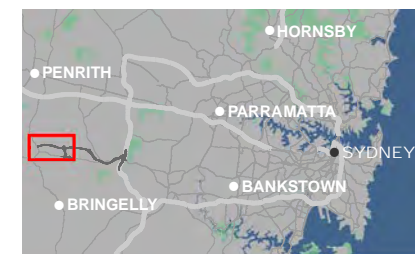
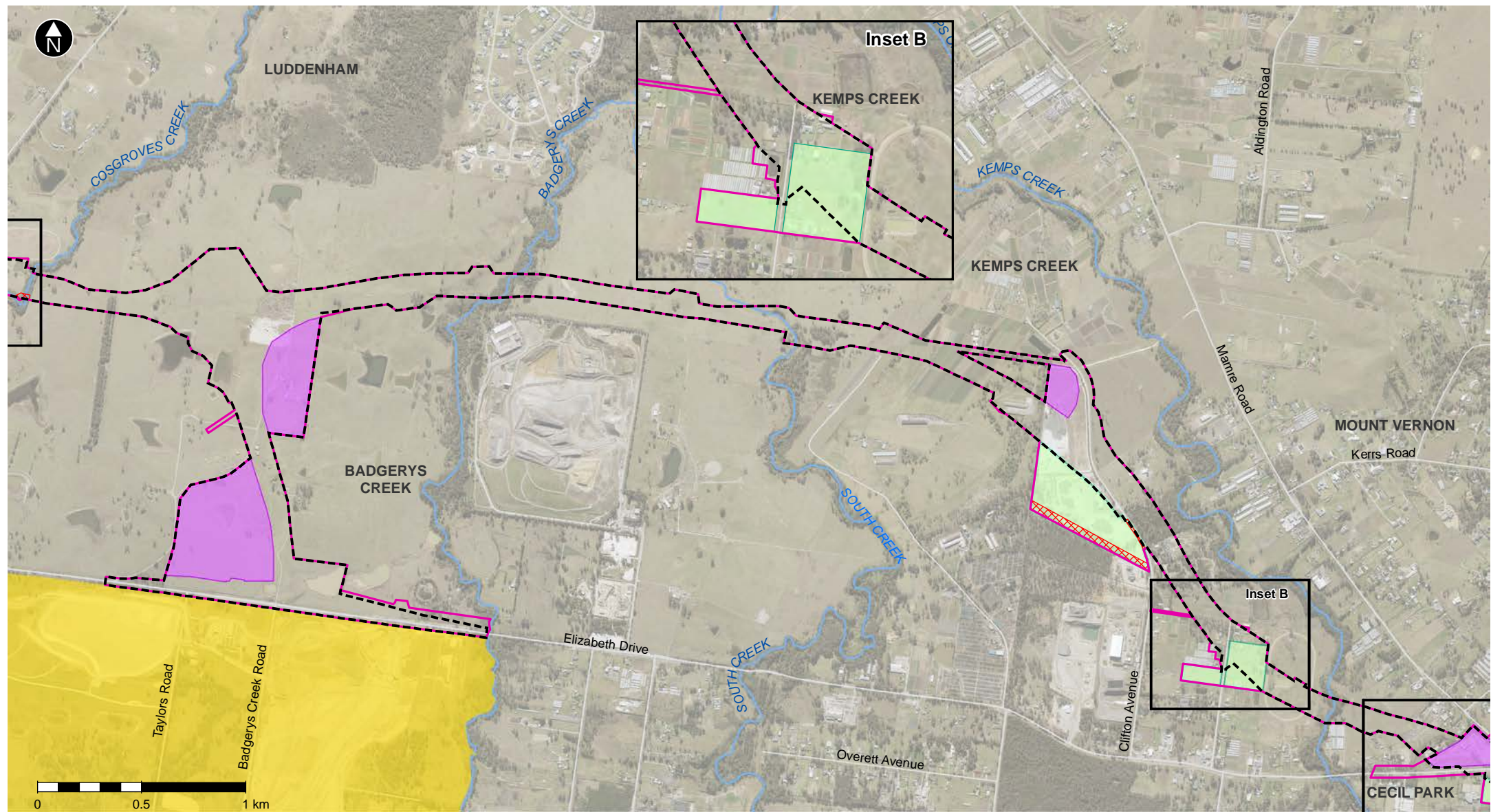
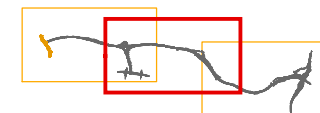


Figure 1-2 Construction footprints of the amended project and the project as described in the EIS



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project exclusion zones

- Ancillary facilities as per the EIS
- Additional ancillary facilities
- Western Sydney International Airport
- Waterways
- Motorway
- Existing roads



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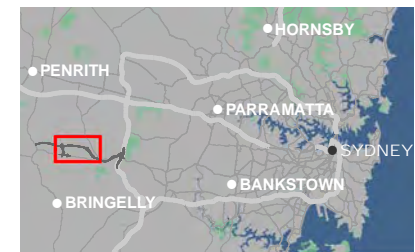
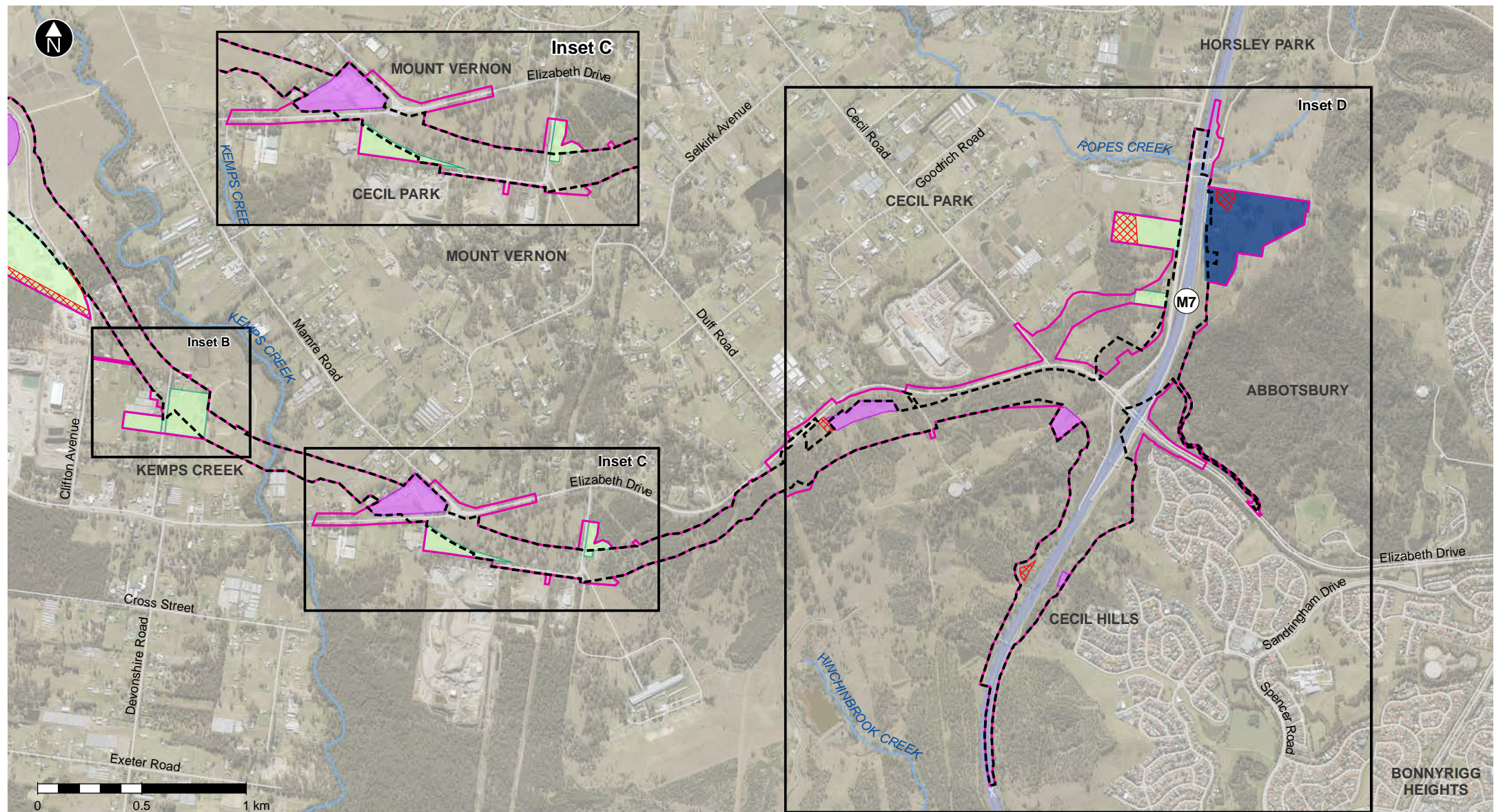
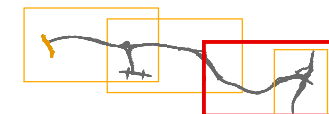


Figure 1-2 Construction footprints of the amended project and the project as described in the EIS



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project exclusion zones

- Ancillary facilities as per the EIS
- Additional ancillary facilities
- Amended ancillary facilities
- ~ Waterways
- Motorway
- Existing roads



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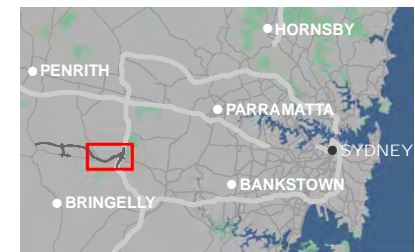
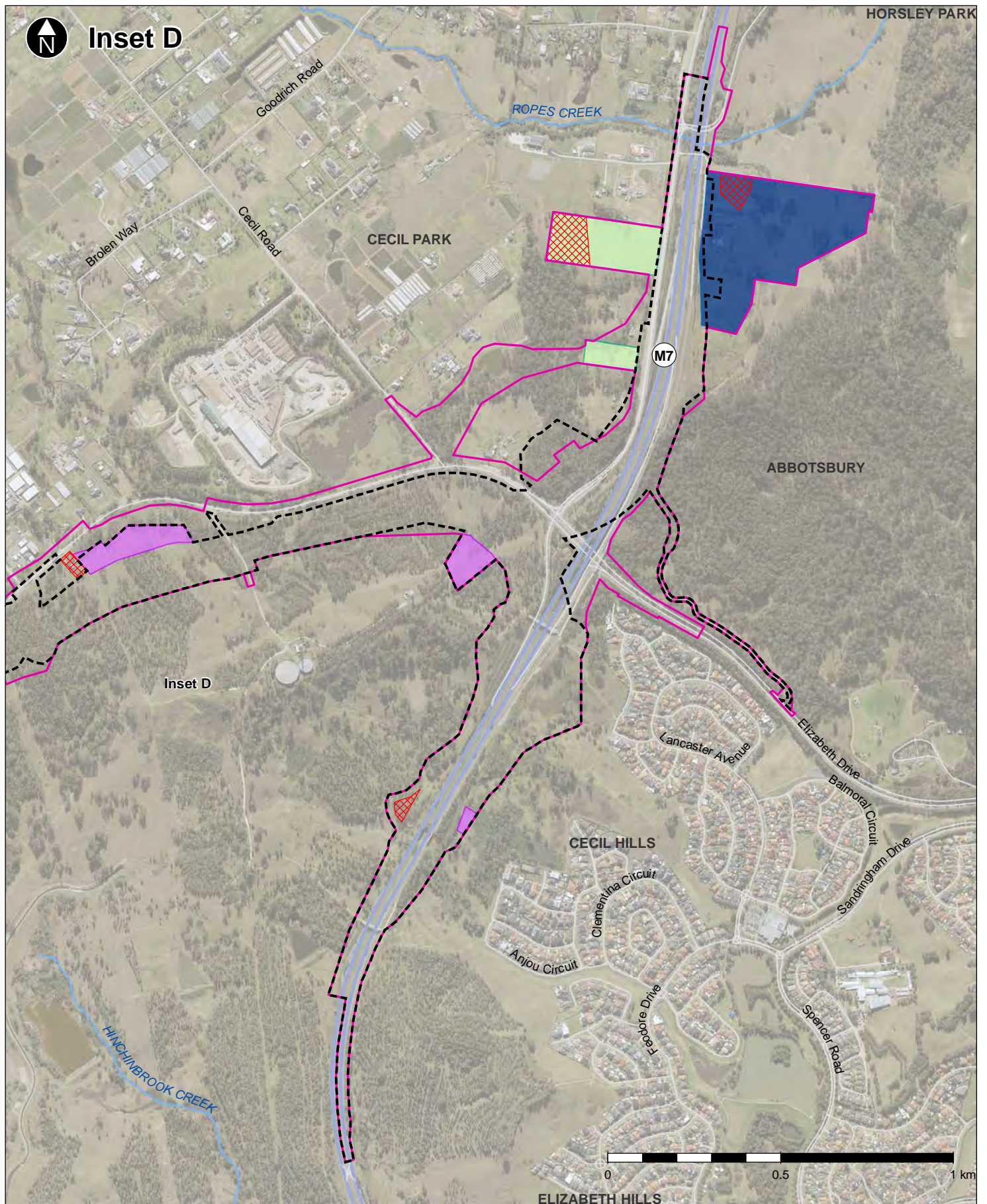
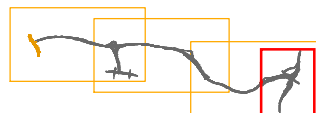


Figure 1-2 Construction footprints of the amended project and the project as described in the EIS



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project exclusion zones
- Ancillary facilities as per the EIS
- Additional ancillary facilities
- Amended ancillary facilities



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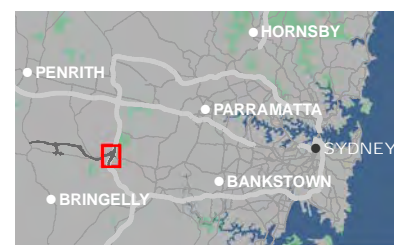
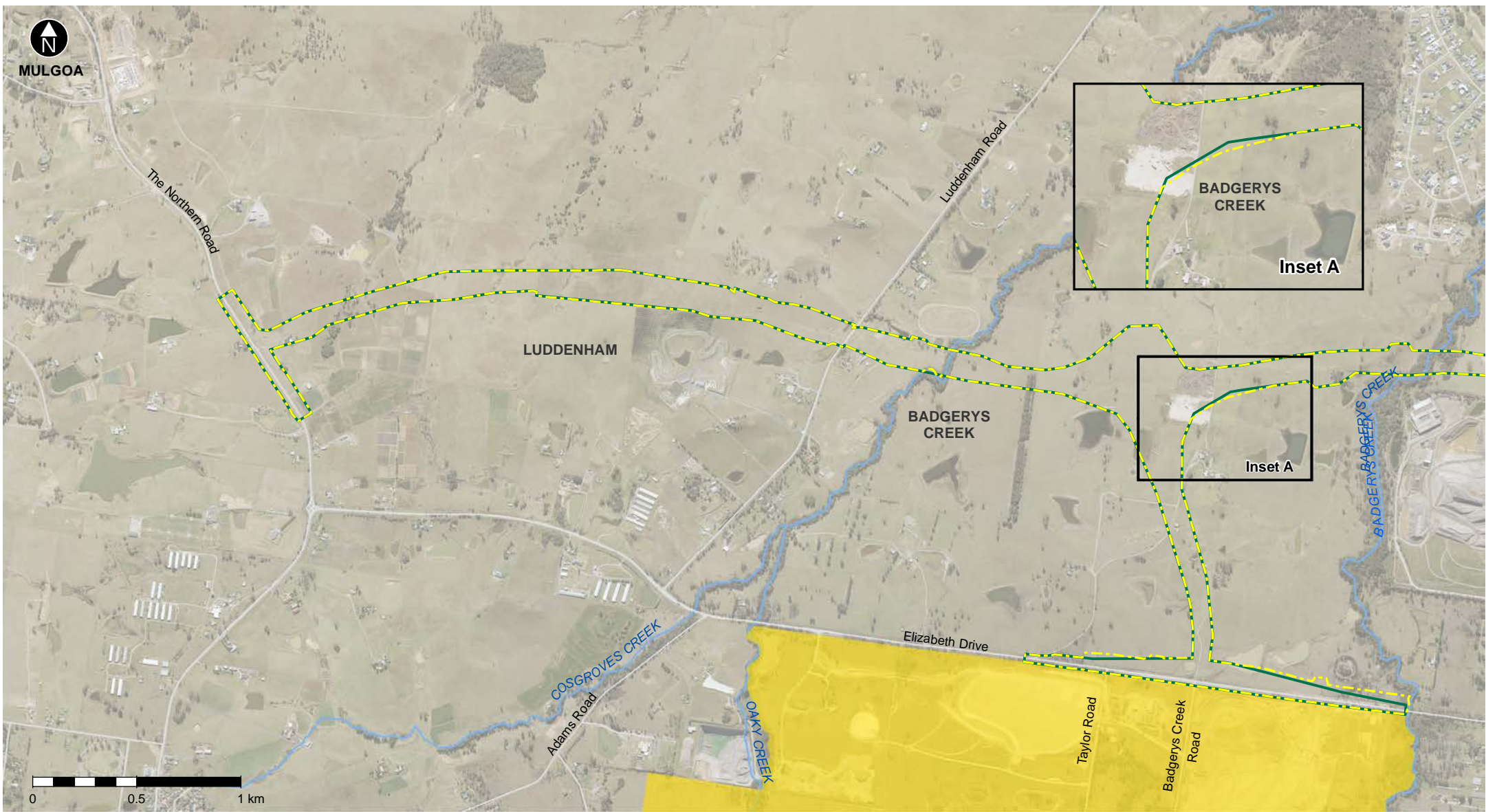
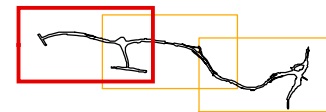


Figure 1-2 Construction footprints of the amended project and the project as described in the EIS



- The project operational footprint as per the EIS
- The amended project operational footprint
- ~~~~~ Waterways
- Western Sydney International Airport
- Existing roads



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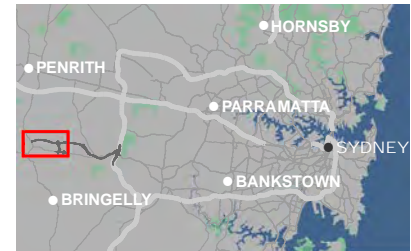
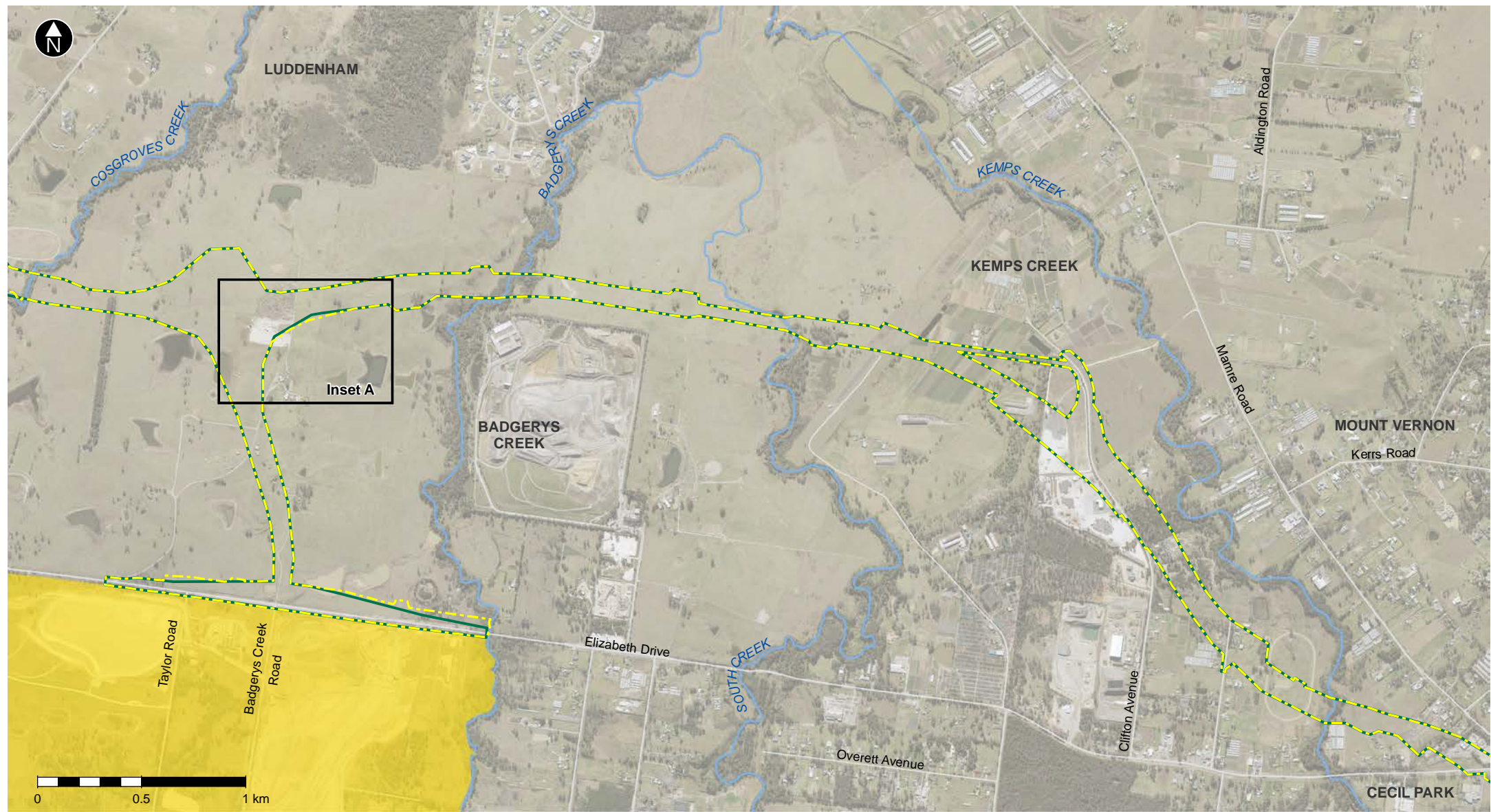
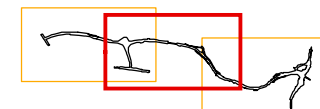


Figure 1-3 Operational footprints of the amended project and the project as described in the EIS



- The project operational footprint as per the EIS
- The amended project operational footprint
- ~~~~~ Waterways
- Western Sydney International Airport
- Existing roads



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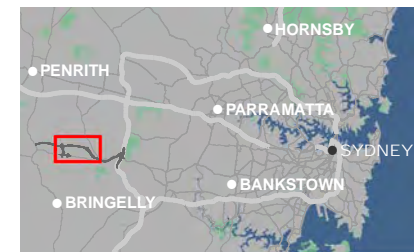
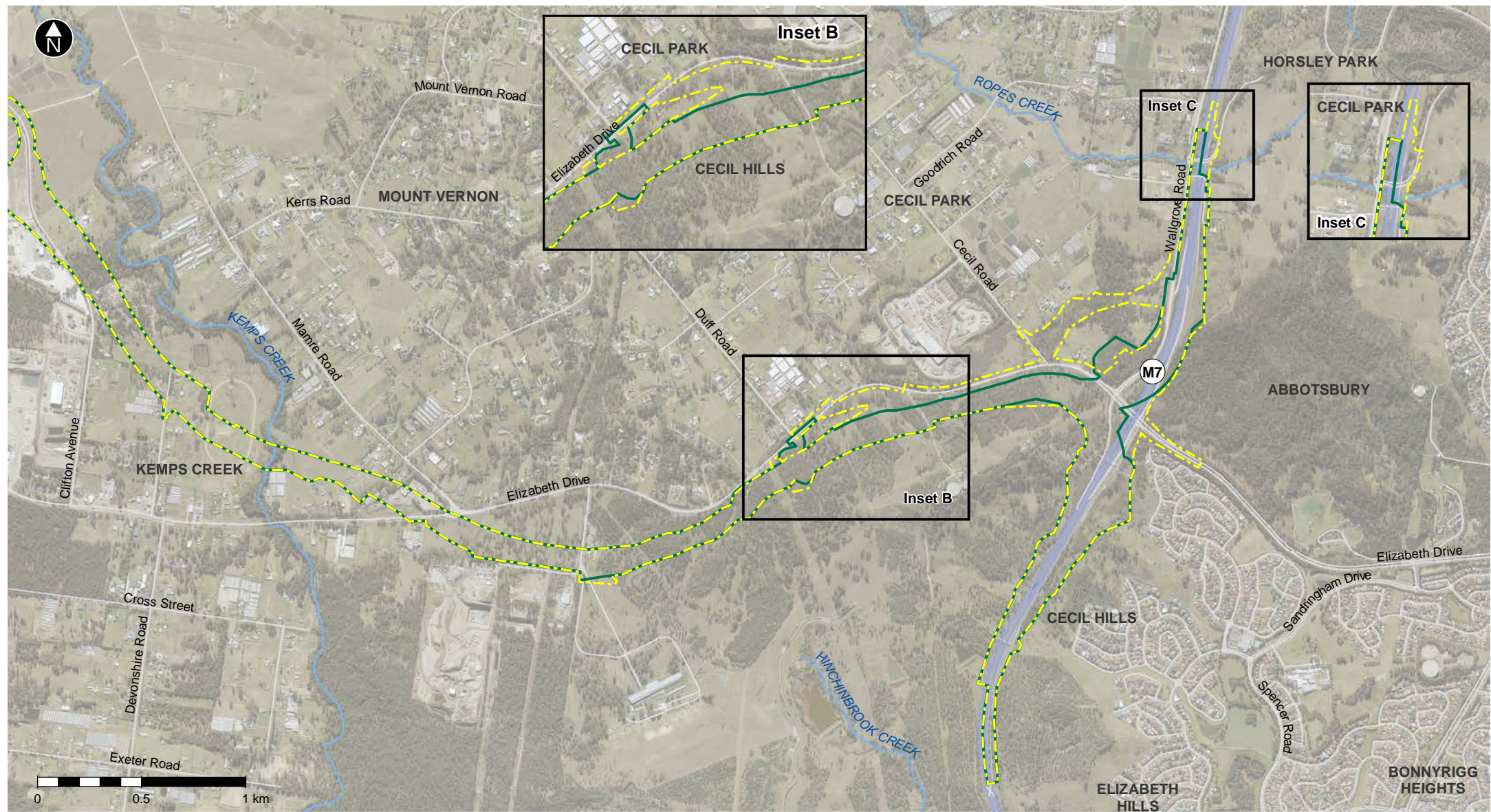
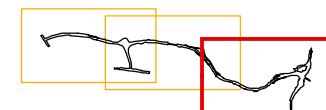


Figure 1-3 Operational footprints of the amended project and the project as described in the EIS



- The project operational footprint as per the EIS
- The amended project operational footprint
- ~~~~~ Waterways
- Motorway
- Existing roads



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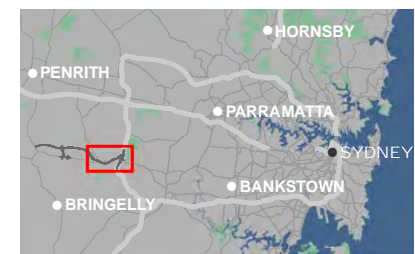


Figure 1-3 Operational footprints of the amended project and the project as described in the EIS

2.1 Amended study area

The project study areas are presented in Section 8.1.2 and Figure 8-1 of the EIS. These were used for the desktop and historical review components of the assessment, the site inspection and the identification of the geographical extent of potential areas of environmental interest (AEIs). The study areas and their purposes are defined below:

- Site investigation area¹ – For the purpose of site inspection, accessible areas within the construction footprint, and nearby land uses and potential AEIs were visited
- Groundwater bore search area – For the purpose of the groundwater bore search, the study area comprised the construction footprint and an approximately 500 metres radius from the footprint
- Broader study area – For the purpose of the soils and geology desktop assessment, the broader study area comprised the construction footprint and an approximately two kilometres radius from the footprint and was used to assess regional soil and geological conditions.

These study areas were updated for this supplementary assessment based on the amended construction footprint. The amended study areas are shown in **Figure 2-1**.

2.2 Review of existing information

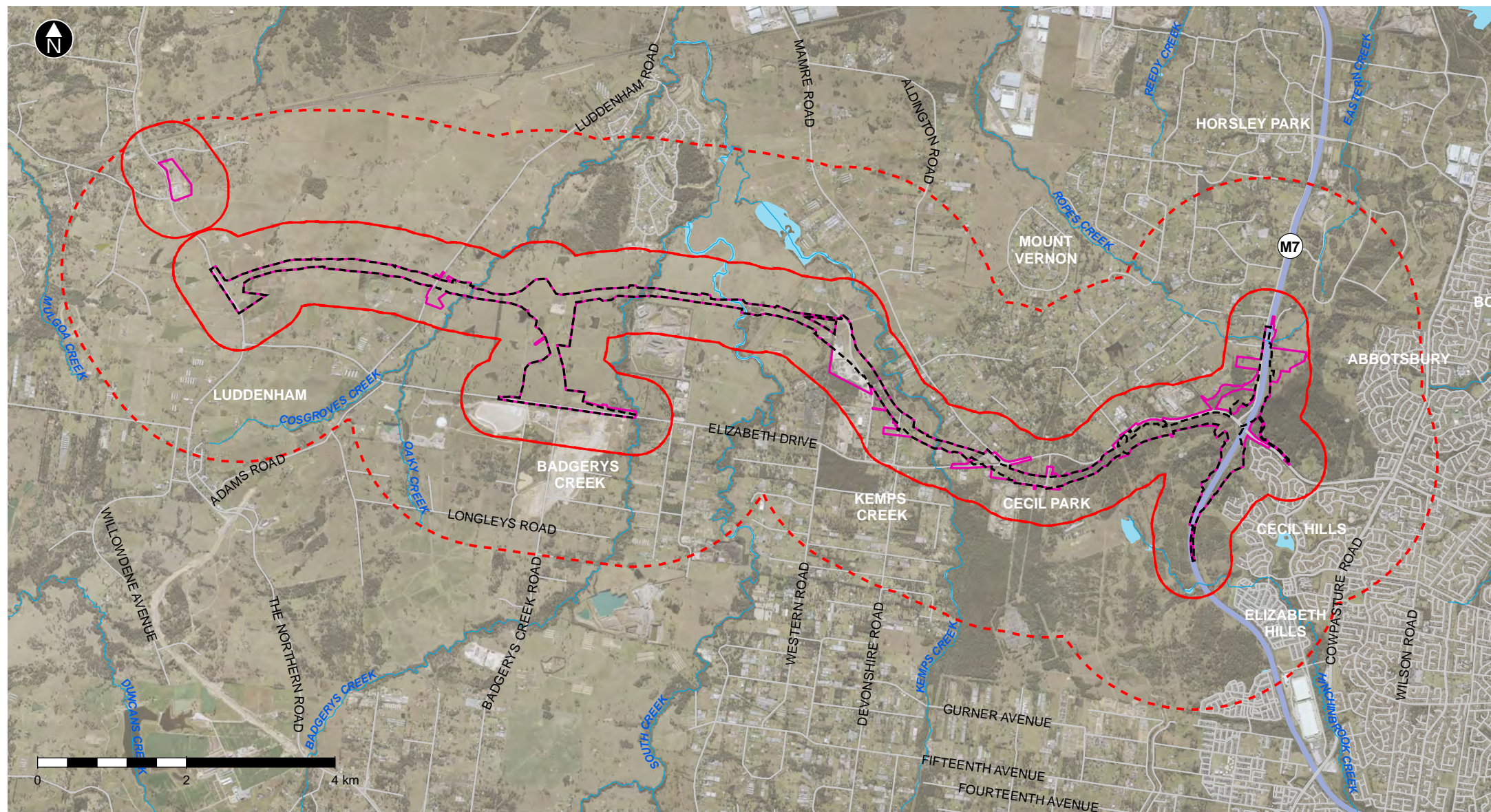
A review was carried out to determine if the proposed changes to the construction footprint would be located within existing AEIs identified in the EIS. Where proposed changes were located within or adjacent to an AEI, a review was carried out of previous field observations and laboratory results from the EIS.

Based on a review of project study areas presented in Section 8.1.2 and Figure 8-1 of the EIS against the amended project, all of the proposed changes are located within the EIS broader study area (ie two kilometre radius of construction footprint). Some of the desktop searches for the EIS were only conducted on a smaller study area, referred to as the groundwater bore search area (ie 500 metre radius of the construction footprint). All proposed changes were located within the groundwater bore search area from the EIS with the exception of the new proposed construction ancillary facility east of The Northern Road (AF 10). The groundwater bore search study area has been amended to capture the new ancillary facility and is shown in **Figure 2-1**.

For the additional area covered by the amended groundwater bore search area, a review was carried out on publicly available information, including:

- Land and Property Information Division: Historical aerial photographs (NSW Land and Property Management Authority, 1947 to 2002)
- Council websites
- Geographical and soil mapping
 - Review of Penrith 1:100,000 geological map (Geological Survey of NSW, 1991)
- Bureau of Meteorology (BOM) data, including
 - Climate and rainfall data
 - Groundwater dependant ecosystems
- NSW Environment Protection Authority (EPA) data, including
 - Record of notices (under section 58 of the *Contaminated Land Management Act 1997* (CLM Act))
 - List of contaminated site notified to the NSW EPA (under section 60 of the CLM Act)

¹ The site investigation area was not defined in Section 8.1.2 of the EIS or shown in Figure 8-1. It is described in this memo for clarity.



- The project construction footprint as per EIS
- The amended project construction footprint
- Amended study area for the purpose of the groundwater bore search (500 m)
- Amended study area for the purpose of the desktop and historical review components of the assessment, the site inspection, and geographical extent of potential AEIs (2 km)
- ~~~~~ Waterways
- Motorway
- Main roads

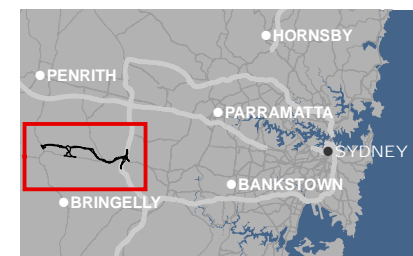


Figure 2-1 Amended study area

- Australian Soil Resource Information System (ASRIS) database
- The WaterNSW groundwater database
- Previous contaminated sites investigations.

2.3 Site investigation

A site investigation was carried out on 20 January 2020. The site inspection focussed on the areas of the amended construction footprint that lie outside the construction footprint as described in the EIS. The site inspection was only carried out in areas that are publicly accessible. The findings of the site inspection are discussed in **Section 4.2**.

2.4 Impact assessment

Changes to potential impacts to human health and environmental receivers from contamination and latent soil conditions exposed during construction and operation of the amended project were identified and assessed based on the reviews of existing information and site investigation. Environmental management measures identified in the EIS were then reviewed to confirm their suitability in managing and mitigating any new impacts.

3. Existing environment

Section 8.1.3 of the EIS provides a detailed description of the existing environment including project location and land use zones, topography, geology and soils, hydrogeology, acid sulfate soil risk, acid rock, salinity, contamination, rainfall and climate, groundwater, key water course geomorphology, existing water quality, sensitive receiving environments and site inspection observations.

4. Contamination information review

4.1 Previous contaminated sites investigation

The EIS identified 29 AEIs that could pose a potential contamination risk within the broader study area. Of these AEIs:

- 22 were numbered and are presented in Table 6.1 of Appendix O of the EIS
- Three generic AEIs were identified and considered to be generic/widespread across the construction footprint and are presented in Table 6.1 of Appendix O of the EIS
- Four AEIs were identified as site inspection reference locations and are presented in Figure 4-5 of Appendix O of the EIS.

The following AEIs were assessed in the EIS as having moderate to high risk exposure ranking:

- AEI 7 – Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)
- AEI 10 – SUEZ Kemps Creek Resource Recovery Park
- AEI 17 – Stockpiles within Hi-quality Quarry Group Head Office
- AEI 19 – Miscellaneous construction activities and stockpiles of building materials
- AEI 21 – Area of illegally dumped material
- Potential areas of existing fill
- Historical uncontrolled earthworks containing asbestos and buildings/ structures containing asbestos previously demolished/ degraded.

All of the above AEIs remain within the amended study area with the same risk exposure rankings as those presented in the EIS.

4.1.1 Renamed AEIs

Historical title information for DP2566, Devonshire Farms, Drivers Bush – Parish of Cabramatta, County of Cumberland Survey (completed 29 January 1890) was reviewed in relation to the location of the AEI 7 Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill) and is shown in **Attachment B**.

The EIS placed the Former Kari & Ghossayn Pty Ltd in land known as Lot 4 and 5 of DP 812284 in the Penrith Local Government Area (LGA). A review of the above documents indicates this may not be the correct location. The correct location is likely to be Lots 17-23 of Section A of DP 2556, where AEI 9 is located.

Based on the above information the following changes have been made to the AEI:

- AEI 7 is renamed:
 - Formerly: Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)
 - Now: Area of waste and imported fill
- AEI 9 is renamed
 - Formerly: Sydney Recycling Park / Wanless Recycling
 - Now: Sydney Recycling Park / Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill).

A review of the existing AEI risk exposure rating as presented in Table 8-9 of the EIS is provided in **Table 5-1**. The revised location of AEI 7 and AEI 9 are demonstrated in **Figure 4-1**.

4.1.2 Risk exposure rating review

A review of AEIs identified in the EIS was carried out to determine if the amended project would be located within these AEIs. Their risk exposure rankings were then reassessed.

The amended project is identified to be adjacent to the following AEIs:

- AEI 6 – PGH Bricks and Pavers adjacent to expanded construction footprint north along Cecil Road
- AEI 9 – Sydney Recycling Park/ Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill) adjacent to expanded construction footprint between Salisbury and Clifton Avenue.

A reassessment of the risk exposure ranking assigned to these AEIs is provided in **Table 5-1**.

4.1.3 AEIs associated with proposed changes

The proposed changes for the amended project are all within the EIS groundwater bore search study area (500 metre radius of the construction footprint) with the exception of one additional construction ancillary facility east of The Northern Road (AF 10). Desktop searches for the proposed location of AF 10 have been carried out as part of this assessment and have included review of:

- Council websites – Acid sulfate soils/acid rock
- NSW Environment Protection Authority (EPA) data, including
 - Record of notices (under section 58 of the *Contaminated Land Management Act 1997* (CLM Act))
 - List of contaminated site notified to the NSW EPA (under section 60 of the CLM Act)
- The WaterNSW groundwater database.

The results of the review of the above is detailed in the following subsections.

Acid sulfate soil

A review of Acid sulfate soils (ASS) in the vicinity of additional ancillary facility AF 10 has been carried out and is consistent with the methodology outlined for the ASS assessment in Appendix O of the EIS. The review indicated that there is no known or expected occurrence of ASS within the vicinity of the location of AF 10.

Acid rock

A review of Appendix O of the EIS indicated that the location of AF 10 was not included in the study area assessed for acid rock, however the EIS indicates that the underlying geology at the location of AF 10 consists of Bringelly Shales. Appendix O of the EIS concluded that 'To date, no occurrences of acid rock have been documented within Bringelly Shales', considering this the potential for encountering acid rocks at the location of AF 10 is considered to be extremely low.

Groundwater bore search

A search of the WaterNSW groundwater database identified no registered groundwater wells within a 500 metre radius of AF 10.

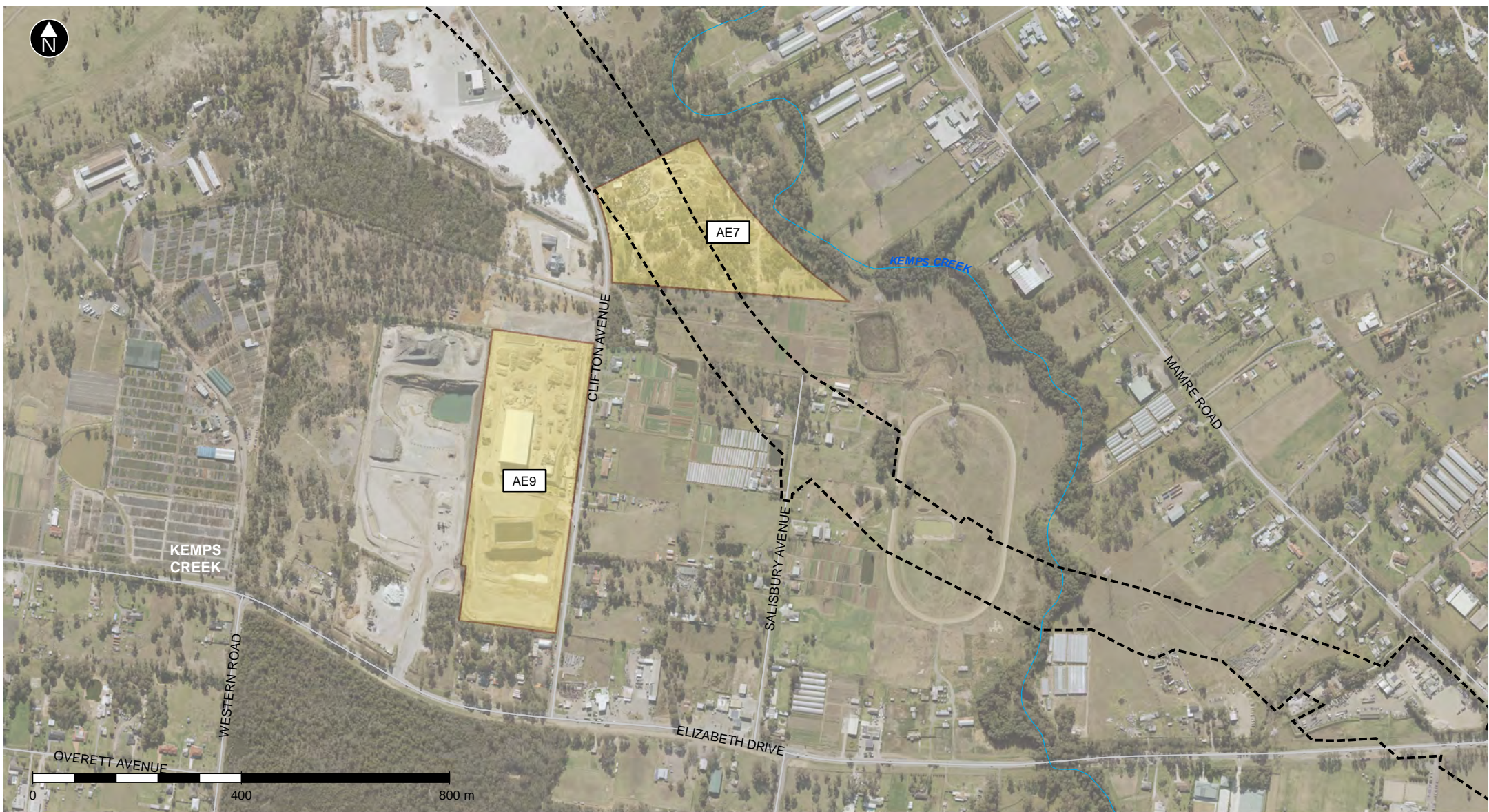
NSW EPA contaminated sites register findings

A search was conducted on 5 February 2020 of the NSW EPA Contaminated Sites Record of Notices (under section 58 of the *Contaminated Land Management Act 1997* (CLM Act) and the list of contaminated sites notified to the NSW EPA (under section 60 of the CLM Act). The search indicated that there were no sites registered with the NSW EPA within 500 metres of additional ancillary area AF 10 that were either regulated (current notices) or had been notified.

A search of NSW EPA Public Register under section 308 of the Protection of the Environment Operations Act 1997 (POEO Act) conducted on 5 February 2020 identified one premise within the area of additional ancillary area AF 10 or within approximately 500 metres of AF 10 which was historically or is currently licensed by the NSW EPA. Results of the search are listed in **Table 4-1**.

Table 4-1 POEO public record search within 500 metres of AF 10

Site	Suburb	Regulated/Notified	Site address	Site activity	Contamination status	Location relative to project
1	Orchard Hills	Issued Dec 2019 (POEO Act)	The Northern Road Upgrade – Stage 5 & 6 Between Eaton Road, Luddenham and Glenmore Parkway, Orchard Hills	CPB Contractors Pty Limited; Road construction Cement or lime handling	Issued POEO license	Next to project to the west



--- The project construction footprint as per the EIS

~ Waterways

— Main roads

Areas of environmental interest:

Site Id	Site name
7	Area of waste and imported fill
9	Sydney Recycling Park/ Wanless Recycling & Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)

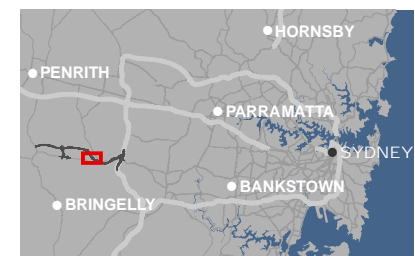


Figure 4-1 Revised location of AEI 7 and AEI 9

4.2 Site investigation findings

The following additional potential AEIs were observed during the site inspection:

- Large stockpiles of soil/fill were observed within a property owned by OzSource adjacent to Range Road and adjacent to and to the east of Brandown Quarry (**Photograph 1 and 2 in Attachment A**).
- A paddock containing a large area of stockpiles (**Photograph 4 in Attachment A**) was observed adjacent to Luddenham Road approximately 180 metres north of the intersection of Luddenham Road and Elizabeth Drive. The stockpile was observed to contain fill and general demolition rubble (i.e. bricks, concrete and metal).
- Large stockpiles of woodchips, logs and fire wood (**Photograph 5 and 6 in Attachment A**) were observed at a premises operated by TreeServe (tree management company) adjacent to and west of Clifton Avenue.

In addition to the additional potential AEIs observed in areas not previously surveyed, sections of potential asbestos containing material (ACM) pipe (**Photograph 3 in Attachment A**) were observed on the surface of AEI 21 – Areas of illegally dumped material, in a paddock west of and adjacent to Range Road already identified in the EIS.

It should be noted that no further assessment of the risk exposure ranking for AEI 21 has been carried out as contamination investigations for the EIS (JAJV, 2018) have already confirmed the presence of asbestos in this area and the AEI has already been given a risk exposure ranking of high.

4.3 Areas of additional cut

Areas of cut present a potential risk to the project in the event that contaminated groundwater and/or soil is encountered that requires disposal, management and/or treatment during excavation and construction activities.

The EIS identified one area of road cutting (the western cut) located about 1500 metres east of The Northern Road likely to intersect the water table based on a review of maximum monitored groundwater levels relative to the road design levels.

The amended project would result in two new areas of cut that may potentially extend below the water table. Both areas are in the vicinity of the airport interchange and are referred to as 'airport interchange northern cut' and 'airport interchange southern cut'. The amended project would, therefore, result in three areas of cut.

4.3.1 Airport interchange northern cut

The finished design level was assessed to be about 57 mAHD in this area. This is about four metres lower than the maximum monitored groundwater level at BH117 (60.79 mAHD), which is located about 400 metres west of the centre of the cut and about 100 metres west of the cut's western extent.

4.3.2 Airport interchange southern cut

The finished design level was assessed to be about 60 mAHD in this area. The nearest borehole BH119, located approximately 400 metres south of the cut's southern extent, recorded a maximum monitored groundwater level of 53.32 mAHD (0.68 metres below ground level). This location is monitoring a perched local groundwater system, as evidenced by BH120. BH120 was drilled in close proximity to BH119, which was drilled to 3.7 metres depth and was unsaturated. Rock was identified at 3.7 metres depth therefore rock coring was commenced at 3.7 metres depth. Consequently, water could no longer be observed.

A review of existing and additional AEIs and potential areas of existing fill indicated portions of the Western Sydney International Airport interchange cut are located within a potential area of existing fill.

Other additional areas of cut for the amended project are located at the eastern end of the alignment around the M7 Motorway interchange. Areas of cut present a potential risk to the amended project should contamination be present within the proposed cut areas. Should material from the cut areas be used in areas where filling is required then there is the potential to spread contamination throughout the proposed areas of filling.

5. Contamination assessment findings

The EIS detailed contamination assessment findings for the following:

- Groundwater
- Areas of environmental interest
- Areas of identified historical filling.

There would be no changes to the findings on areas of identified historical filling as a result of the amended project. The amended project would result in two new areas (airport interchange northern cut and airport interchange southern cut) of cut that may potentially extend below the water table. Additional groundwater investigations would be required within these two areas to further assess the potential impacts to the amended project. The changes to AEIs are described in the section below.

5.1 Amended areas of environmental interest

Section 6.2 of Appendix O of the EIS outlines the potential AEIs and their associated risks to environmental receptors, construction limitations, and site users in consideration of the potential for contamination and proposed construction activities.

Based on the contamination information review discussed in **Section 4**, the potential AEIs have been amended and are presented in **Table 5-1**. Bold text has been used to indicate which AEIs have changed materially from the EIS. The amended AEIs with moderate to high exposure risk rankings are presented as **Figure 5-1**.

Table 5-1 Amended potential areas of environmental interest

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
1	Caltex Service Station	No	The Northern Road, Luddenham (2 km south of project).	Cut (surface and depth)	Total Recoverable Hydrocarbons (TRH), Benzene, Toluene, Ethylbenzene, Xylenes (BTEX), Polycyclic Aromatic Hydrocarbons (PAH), heavy metals.	Soil, groundwater, soil vapour	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.
C	Luddenham Raceway	No	821 – 849 Luddenham Road, Luddenham (150 m south of project)	Filling (surface)	TRH, BTEX, heavy metals	Soil (surface)	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
2	Caltex Service Station	No	1163 Mamre Road, Kemps Creek (480 m north east of project ²)	Filling (surface)	TRH, BTEX, PAH, heavy metals	Soil, groundwater, soil vapour	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.
3	BP Service Station	Located closer to project – No change in Risk Ranking	Corner of Elizabeth Drive and Salisbury Avenue (240 m south of additional ancillary facility area)	Filling (surface)	TRH, BTEX, PAH, heavy metals	Soil, groundwater, soil vapour	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.

² This number was previously incorrectly noted as 300 m in Table 8-4 of the EIS

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
4	Brandown Quarry	No	Lot 90 Elizabeth Drive, Kemps Creek (next to project)	Filling (surface)	Heavy metals, TRH, BTEX, acids, sulphate, cyanide	Soil, groundwater	Soil results from soil samples taken within the construction footprint near this AEI returned concentrations of analytes below the adopted guidelines. Groundwater was not sampled in this area as part of the investigation.	<p>Due to the results, the risk ranking for this AEI has been lowered from moderate to low.</p> <p>No known contamination/ no excavation activities within AEI. Contamination distribution range (laterally) poses a low risk.</p>
5	Sydney International Shooting Centre	Located marginally closer to project – No change in Risk Ranking	Range Road, Kemps Creek (210 m south – amended construction footprint north of Sydney International Shooting Centre)	Cut and filling (surface and depth)	Lead, unexploded ordnance (UXO)	Soil	-	<p>Low</p> <p>Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.</p>

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
6	PGH Bricks and Pavers	Yes Risk ranking changed from low to moderate	Cecil Road, Cecil Park (Next to amended construction footprint north along Cecil Road)	Filling (surface)	Heavy metals, TRH, BTEX, acids, sulphate, cyanide	Soil	No intrusive investigation of this AEI carried out as part of the EIS as AEI was given a low risk ranking	Moderate Due to a change of alignment the AEI is located adjacent to the construction footprint the risk ranking has been raised from low to moderate. Possible contamination/ excavation activities next to project and within potential contamination distribution range (laterally and vertically).
7	Area of waste and imported fill	Yes	Lot 17 Clifton Avenue, Kemps Creek (Within construction footprint)	Filling (surface) Shallow cut	TRH, BTEX, PAH, heavy metals, OPP, OCP, PCB and asbestos	Soil, groundwater	Results from soil samples taken within the construction footprint near this AEI during the contamination investigation returned concentrations of analytes below the adopted guidelines, however no soil or groundwater were taken from directly within the AEI.	Moderate Due to the results, the AEI has retained its moderate risk ranking. Possible contamination/ construction activities within AEI and within potential contamination distribution range (laterally).

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
8	Hi-quality Quarry	Located closer to project – No change in Risk Ranking	1503 – 1509 Elizabeth Drive, Kemps Creek (260 m south – additional ancillary area)	Filling (surface)	Heavy metals, TRH, BTEX, acids, sulphate, cyanide	Soil, groundwater	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.
9	Sydney Recycling Park/ Wanless Recycling & Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)	Yes Risk ranking changed from low to moderate	16-23 Clifton Avenue, Kemps Creek (Next to amended construction footprint between Salisbury and Clifton Avenue)	Filling (surface) Shallow cut	TRH, BTEX, ammonia, PAH, heavy metals, OCP, OPP, PCB, nutrients, asbestos	Soil, groundwater, gas	No intrusive investigation of this AEI carried out as part of the EIS as AEI was given a low risk ranking.	Moderate Due to a change of alignment the AEI is located adjacent to the construction footprint the risk ranking has been raised from low to moderate. Possible contamination/ excavation activities next to project and within potential contamination distribution range (laterally and vertically).

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
10	SUEZ Kemps Creek Resource Recovery Park	No	1725 Elizabeth Drive, Kemps Creek (next to project)	Shallow cut and filling	TRH, BTEX, ammonia, PAH, heavy metals, OCP, OPP, PCB, nutrients, asbestos	Soil, groundwater, gas	Based on the results of the contamination investigation, there is groundwater and gas adjacent to this AEI containing contaminant levels exceeding the adopted guidelines.	Based on the results of the contamination investigation, considering that piling from bridge construction in the area is expected to encounter groundwater, and that landfill gas has the potential to impact construction within cuts, the moderate risk ranking is maintained. Risk: moderate Known contamination/ excavation activities next to project and within potential contamination distribution range (laterally and vertically).
11	Australian Native Landscapes (ANL)	No	210 Martin Road, Badgerys Creek (1.8 km south of project ³)	Bridge (surface and depth)	TRH, BTEX, OCP, OPP, heavy metals, carbamates	Soil	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.

³ This number was previously incorrectly noted as 300 m in Tables 5-5 and 6-1 of Appendix O of the EIS

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
12	Luddenham Broiler Farm (Baiada Poultry)	No	2907 The Northern Road, Luddenham (1km south of project)	Cut (surface and depth)	OCP, OPP, herbicides, carbamates, nitrates, heavy metals, nutrients	Soil	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.
13	Andreasens Green Wholesale Nursery	Located closer to project – No change in Risk Ranking	1543 Elizabeth Drive, Kemps Creek (180 m south – additional ancillary area)	Cut (surface and depth)	Heavy metals, OCP, OPP, carbamates, TRH, BTEX	Soil	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
14	Blue Sky Mining	No	2420 Elizabeth Drive, Luddenham (810 ⁴ m south west of project)	Bridge (surface and depth)	Heavy metals, TRH, BTEX, acids, sulphate, cyanide	Soil, groundwater	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.
15	United Service Station	Located closer to project – No change in Risk Ranking	Corner Elizabeth Drive and Clifton Avenue (340 m south west – additional ancillary facility)	Filling (surface)	TRH, BTEX, PAH, heavy metals	Soil, groundwater, soil vapour	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.

⁴ This number was previously incorrectly noted as 300 m in Table 8-4 of the EIS

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
16	Mobil Service Station	Located closer to project – No change in Risk Ranking	Lot A Elizabeth Drive, Kemps Creek (340 m south – additional ancillary facility)	Filling (surface)	TRH, BTEX, PAH, heavy metals	Soil, groundwater, soil vapour	-	Low Possible contamination/no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.
17	Stockpiles within Hi-quality Quarry Group Head Office	No	Corner Elizabeth Drive and Mamre Road, Kemps Creek (Within construction footprint)	Filling (surface)	Heavy metals, TRH, BTEX, acids, sulphate, cyanide	Soil	Based on the results of the contamination investigation, contaminated soil in this area exists at levels exceeding the adopted guidelines	Based on the results of contamination investigation, the moderate risk ranking of this AEI is maintained. Known contamination/ construction activities (filling) within project and within potential contamination distribution range (laterally).

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
18	Top Shape Live Christmas Trees	No	2450 The Northern Road, Luddenham (470 m south of project ⁵)	Cut (surface and depth)	Heavy metals, OCP, OPP, carbamates, TRH, BTEX	Soil	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.
19	Miscellaneous construction activities and stockpiles of building materials	No	Luddenham Road, Luddenham (within construction footprint)	Bridge (surface and depth)	Heavy metals, BTEX, asbestos, TRH, OCP, OPP, PAH	Soil	Based on the results of the contamination investigation, contaminated soil in this area exists at levels exceeding the adopted guidelines.	Based on the results of the contamination investigation, the high risk ranking of this AEI is maintained. Known contamination/ excavation activities within project and within potential contamination distribution range (laterally and vertically).

⁵ This AEI would be located about 900 m from the operational boundary of the amended project (as noted in Tables 5-5 and 6-1 of Appendix O of the EIS) and about 470 m from the construction boundary of the amended project

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
20	Miscellaneous stockpiles of building materials	Located closer to project – No change in Risk Ranking	1521 Elizabeth Drive, Kemps Creek 700 m south – additional ancillary facility	Filling (surface)	Heavy metals, BTEX, asbestos, TRH, OCP, OPP, PAH	Soil	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.
21	Area of illegally dumped material	Located closer to project – No change in Risk Ranking	Corner of Elizabeth Drive and Range Road, Kemps Creek (Within amended construction footprint - along Range Road adjacent to and west of additional ancillary facility)	Filling (surface)	Heavy metals, BTEX, asbestos, PAH, OCP, OPP, PCB, TRH	Soil	Possible asbestos fragments were submitted to the laboratory from within this AEI during the contamination investigation. Analytical results confirmed the presence of asbestos in this area.	Due to the confirmed presence of asbestos in this area and the nature of asbestos to migrate via air, soils and surface water, the risk ranking for this AEI has increased from moderate to high. Known contamination/ construction activities next to project and within potential contamination distribution range (laterally).

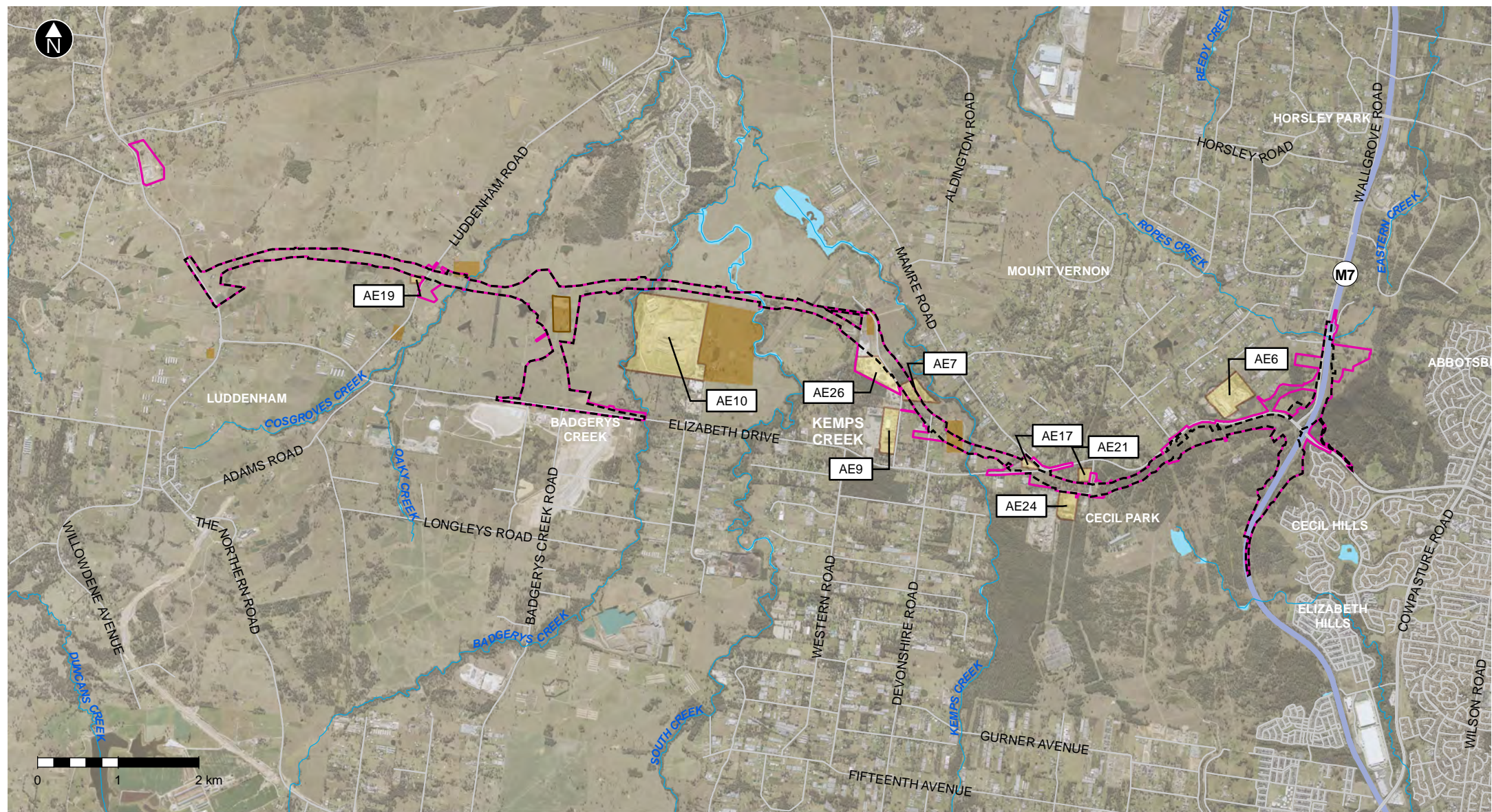
Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
22	Former airstrip	No	Western Road, Kemps Creek (next to construction footprint)	Next to fill embankment (surface)	Heavy metals, BTEX, PAH, TRH	Soil	-	<p>Low</p> <p>Possible contamination/no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.</p>
23	CPB Contractors Pty Limited- Road construction	Yes New AEI	The Northern Road Upgrade – Stage 5 & 6 Between Eaton Road, Luddenham and Glenmore Parkway, Orchard Hills and The Northern Road Upgrade – Stage 6 Between Littlefields Road and Eaton Road, Luddenham (Within construction footprint at The Northern Road) and (next to additional	Ancillary facility	Heavy metals, TRH, BTEX, PAH, OCP, OPP, asbestos	Soil	No intrusive investigation of this AEI carried out as part of the preparation of the supplementary technical memorandum.	<p>Low</p> <p>Considering the nature of the activity (road construction) and that these activities are expected to be carried out under a Construction Environmental Management Plan (CEMP) the AEI is considered a low risk.</p> <p>Possible contamination/ excavation activities within AEI. AEI located adjacent to ancillary facility and within the construction footprint at The Northern Road. Possible contamination distribution range (laterally and vertically)</p>

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
			ancillary area AF 10)					has potential to impact upon project.
24	Stockpiles within the OzSource property	Yes New AEI	Range Road, Cecil Park (Within amended construction footprint south of Range Road)	Filling (surface)	Heavy metals, BTEX, asbestos, PAH, OCP, OPP, PCB, TRH associated with stockpiled material	Soil	Contamination investigation undertaken for the EIS (JAJV,2018) indicated that soil samples taken within the construction footprint near this AEI returned concentrations of analytes below the adopted guidelines, however no soil samples were taken from directly within the AEI. Groundwater was not sampled in this area as part of the contamination investigation for the EIS (JAJV, 2018).	Moderate Possible contamination/ excavation activities within and adjacent to AEI and within potential contamination distribution range (laterally).

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
25	Large area of fill placed in stockpiles	Yes New AEI	2161-2177 Elizabeth Drive, Luddenham (800 m south of additional ancillary facility)	Filling (surface) Ancillary facility	Heavy metals, BTEX, asbestos, PAH, OCP, OPP, PCB, TRH associated with stockpiled fill material	Soil	-	Low Possible contamination/ no excavation activities within AEI. AEI located a considerable distance from the nearest construction element. Potential contamination distribution range (laterally and vertically) unlikely to impact upon project.
26	TreeServe (wood processing, stockpiles of woodchips, logs and fire wood)	Yes New AEI	90 Clifton Avenue, Kemps Creek (within project area and additional ancillary facility)	Cut and filling (surface and depth) Ancillary facility	Heavy metals, BTEX, PAH, TRH, VOC associated with the onsite, processing of wood products (i.e. woodchips, large logs and firewood) and machinery/plant used to handle and process the wood.	Soil	Contamination investigation undertaken for the EIS (JAJV, 2018) indicated that soil samples taken within the construction footprint near this AEI returned concentrations of analytes below the adopted guidelines, however no soil samples were taken from directly within the AEI. Groundwater was not sampled in this area as part of the	Moderate Possible contamination/ construction activities within AEI and within potential contamination distribution range (laterally and vertically).

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
							contamination investigation undertaken for the EIS (JAJV, 2018)	
Shown as 'Potential areas of existing fill'	Identified areas of potential fill	No	Generic AEIs along the project	Cut and filling (surface and depth)	Heavy metals, BTEX, asbestos, PAH, OCP, OPP, PCB, TRH	Soil, groundwater	Based on the results of the contamination investigation, groundwater below and next to several areas of the identified potential fill have returned concentrations exceeding the adopted guidelines. Soil samples analysed from within these AEIs returned concentrations below the adopted guidelines.	Based on the results of the contamination investigation, this AEI has maintained its high-risk ranking. Risk: high Known contamination/ excavation activities below construction footprint and within potential contamination distribution range (laterally and vertically).
	Historical and current agricultural land use	No	Generic AEIs along the project	Cut and filling (surface and depth)	Heavy metals, OCP, OPP, nutrients, BTEX, carbamates, herbicides	Soil (surface)	During the contamination investigation, pesticide and herbicide, and hydrocarbon and heavy metal analysis was used to assess the risk of historical and current agricultural land use on the project. Pesticide, herbicide,	Based on the results of the contamination investigation, the risk ranking of this AEI has been reassessed to low. Risk: Low No known contamination originating from historical agricultural land use/excavation activities within construction footprint and within potential contamination distribution

Figure Reference	Site	Change from EIS	Location	Construction element and anticipated depth	Potential contaminants of concern	Potential contamination distribution	Analytical results	Risk ranking
							hydrocarbon and heavy metal results targeting this AEI returned concentrations below the adopted guidelines. However, exceedances of nutrient guidelines in groundwater analyses may indicate groundwater contamination from agricultural land use.	range (laterally and vertically).
	Historical uncontrolled earthworks containing asbestos and buildings/ structures containing asbestos previously demolished/ degraded	No	Generic AEIs along the project	Cut and filling (surface and depth)	Asbestos	Soil (surface)	Based on analytical results from the contamination investigation, asbestos has been identified next to the construction footprint.	Given asbestos was identified next to the construction footprint, this AEI maintains its high-risk ranking.



- Waterways
- Motorway
- Main roads
- The project construction footprint as per EIS
- The amended project construction footprint
- Potential areas of existing fill
- Areas of environmental interest:

Site Id	Site name
6	PGH Bricks and Pavers
7	Area of waste and imported fill
9	Sydney Recycling Park/ Wanless Recycling & Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)
10	SUEZ Kemps Creek Resource Recovery Park
17	Stockpiles within Hi-quality Quarry
19	Miscellaneous construction activities and stockpiles of building materials
21	Area of significant flytipped waste
24	Stockpiles within the OzSource property
26	TreeServe (wood processing, stockpiles of woodchips, logs and fire wood)

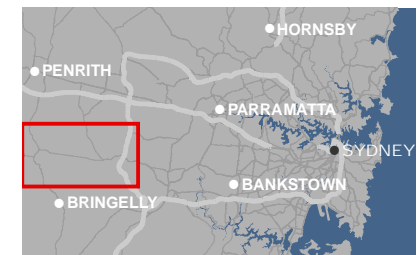


Figure 5-1 Amended AEIs with moderated to high ranking and potential fill areas

6. Assessment of potential impacts

This section provides an assessment of the amended project described in **Section 1.3** against the soil and contamination impacts documented in the EIS.

The EIS assessed the potential construction impacts of the project on the following:

- Soil erosion and sediment transportation hazard
- Acid sulfate soils
- Salinity
- Soil contamination
- Groundwater contamination
- Gas contamination.

Construction impacts associated with soil erosion and sediment transportation hazard, acid sulfate soils exposure, salinity and gas contamination risk as a result of the amended project would be comparable to the impacts documented in the EIS. Other construction impacts associated with the amended project are discussed below.

6.1.1 Soil contamination

Contamination (where disturbed as part of construction activities), if not managed appropriately, could potentially impact upon project elements (environmental, human health, time, budget).

Additional soil investigations for potential contaminants of concern for the area's current and historical agricultural land use and areas of potential fill would be required at the airport interchange northern cut and airport interchange southern cut to further assess the potential impacts to the amended project.

The EIS states that a Phase 2 Detailed Site Investigation (Phase 2 DSI) would be carried out for the AEIs identified as having a risk ranking of moderate or high, and for AEIs where PAH has been identified in soils at concentrations exceeding the respective human health investigation levels.

Based on the information reviewed as part of this supplementary assessment (see **Section 4.1.2**), the Phase 2 DSI would be also carried out for the following additional AEIs:

- Within AEI 24 – Stockpiles within the OzSource property
- Within AEI 26 – TreeServe where stockpiles of woodchips, logs and firewood were observed.

There would therefore be a total of seven AEIs in which a Phase 2 DSI would be required for the amended project.

Further soil investigations would also be required in areas of the construction footprint located adjacent to the following AEIs:

- AEI 6 – PGH Bricks and Pavers
- AEI 9 – Sydney Recycling Park / Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)
- AEI 10 – SUEZ Kemps Creek Resource Recovery Park.

6.1.2 Groundwater contamination

The airport interchange northern cut and airport interchange southern cut have the potential to extend below the water table.

The Groundwater supplementary technical memorandum (see Appendix J of the amendment report) carried out an assessment of the construction impacts on groundwater inflows. The assessment indicated that the 'entire range of estimated inflow rates are very low and for all

inflow rate scenarios would likely mostly or fully evaporate prior to being discharged'. Considering this, the memorandum concluded that the potential discharge of groundwater inflows from the airport interchange northern and southern cuts is not anticipated to result in adverse impacts to the receiving environments because the estimated inflow rates are very low.

Although groundwater inflows into the cuts are not anticipated to result in adverse impacts to the receiving environments, where excavations for these cuts encounter groundwater there is the potential for impacts to human health through the potential for construction workers to come into direct contact with the groundwater during excavation works.

The groundwater quality at these proposed cut locations could be impacted by general filling and historical/current agricultural use known to have occurred in the vicinity of these cuts. Based on the potential for impacts to human health from construction workers coming into contact with groundwater, groundwater would be required to be assessed for potential contaminants of concern including, heavy metals, TRH, BTEX, PAH, PCB, OCP, OPP and nutrients.

6.2 Operational impacts

The EIS assessed the potential construction impacts of the project on the following:

- Soil erosion and sediment transportation hazard
- Acid sulfate soils
- Salinity
- Soil contamination
- Groundwater contamination
- Gas contamination.

With the exception of groundwater contamination, the operational impacts are unchanged from the assessment carried out as part of the EIS.

The Groundwater supplementary technical memorandum (see Appendix J of the amendment report) carried out an assessment of the operational impacts of groundwater inflows and indicated that the operation inflows are likely to be the same or less than during construction due to reduced hydraulic gradients and concluded that discharge volumes, if any, would be less during operation. Considering this, the memorandum (JAJV, 2020) concluded that 'Adverse impacts to receiving environments due to potential operational groundwater discharge from the airport interchange northern cut and airport interchange southern cut are not anticipated to result in adverse impacts to the receiving environments.'

6.3 Cumulative impacts

Cumulative impacts are unchanged from the assessment carried out as part of the EIS and presented in Section 8.1.5 of the EIS.

7. Revised environmental management measures

Contamination and latent soil impacts associated with the proposed amended project are generally consistent with impacts described in the EIS and would therefore be managed through the implementation of the proposed management measures described in Section 8.1.6 of the EIS.

The amended project would not require any additional environmental management measures.

The following environment management measure (SC05) will need to be amended to include the additional sites requiring a Phase 2 DSI. The revised environmental management measures for impacts of soil and groundwater contamination is outlined in **Table 7-1**, with changes show in **bold** and strikethrough text (~~example~~).

Table 7-1 Amended environmental management measures (soils and contamination)

Impact	Reference	Environmental management measures	Responsibility	Timing
Impacts of soil and groundwater contamination	SC05	<p>Detailed site (contamination) investigations will be carried out in accordance with the NSW EPA (1995) Sampling Design Guidelines and other NSW EPA endorsed guidance including the NEPM (2013) guidelines within the following AEI locations to confirm the presence of contamination before the start of construction at these locations:</p> <ul style="list-style-type: none"> • AEI 17: Stockpiles within Hi-quality Quarry Group Head Office • Within AEI 19: the area of miscellaneous construction activities and stockpiles of building materials along Luddenham Road (Lot 1, DP228498) • Within AEI 7: Area of waste and imported fill Former Kari and Ghossayn solid waste landfill (Lot 17, Clifton Avenue) • Within AEI 21: Area of illegally dumped material along Range Road, Cecil Park • Within AEI 24: Stockpiles within the OzSource property • Within AEI 26: TreeServe (wood processing, stockpiles of woodchips, logs and fire wood) • Within the 'potential areas of existing fill' identified in the Soils and contamination assessment report (Appendix K Appendix Q) for the amended project. <p>Further soil investigations will be required in areas of the construction footprint located adjacent to the following two AEIs to confirm the presence of contamination before the start of construction at these locations:</p> <ul style="list-style-type: none"> • Within AEI 6: PGH Bricks and Pavers • Within AEI 9: Sydney Recycling Park/ Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill) • AEI 10: SUEZ Kemps Creek Resource Recovery Park <p>Additional soil and groundwater investigations will be required in the areas of additional cut around the airport interchange northern cut and airport interchange southern cut to further assess the potential impacts to the amended project.</p>	Contractor	Prior to construction

Impact	Reference	Environmental management measures	Responsibility	Timing
		Depending on results of the investigations, or if remediation is deemed required at any site within the amended construction footprint, a Remedial Action Plan will be prepared before the construction.		

8. Summary and conclusions

Based on the information reviewed as part of this supplementary assessment, further investigations would be carried out in addition to those stated in the EIS. The investigation would consist of Phase 2 DSI and would be carried out for the following additional AEIs prior to the construction of the amended project:

- Within AEI 24 – Stockpiles within the OzSource property
- Within AEI 26 – TreeServe were stockpiles of woodchips, logs and firewood were observed.

Further soil investigations would also be required in areas of the construction footprint located adjacent to the following three AEIs:

- AEI 6 – PGH Bricks and Pavers
- AEI 9 – Sydney Recycling Park / Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)
- Within AEI 10 – SUEZ Kemps Creek Resource Recovery Park

To further assess the potential impacts to the amended project, additional soil and groundwater investigations would be required in the areas of additional cut around the airport interchange northern cut and airport interchange southern cut to further assess the potential impacts to the amended project. The soil and groundwater investigations would be required to focus on potential contaminants of concern for the area's current and historical agricultural land use and areas of fill which sections of the interchange are located within.

In addition to the above recommended investigations, impacts associated with expected soil conditions and contamination can be managed with the mitigation measures detailed in **Section 7** of this memorandum and Table 9-1 of Appendix O of the EIS.

Although the need for more detailed investigation has been identified as part of the amended environmental management measures it is concluded that the amended project would not lead to unacceptable soil and contamination impacts. This conclusion is based on the determination of potential impacts to soil and contamination during both construction and operational stages, including potential cumulative impacts, of the amended project. With the application of the safeguards outlined in the EIS it is anticipated that soil and contamination impacts from the amended project would be effectively managed.

9. References

Department of Environment & Climate Change NSW (2008) Environmental Protection License, Licence 4581 (Kai & Ghossayn Pty Ltd), Archive date: 10 July 2008

Historical title information for DP2566, Devonshire Farms, Drivers Bush – Parish of Cabramatta, County of Cumberland Survey completed 29 January 1890

JAJV (2018) M12 Motorway Concept Design and EIS – Contamination Factual Report

JAJV (2018a) M12 Motorway Concept Design and Environmental Impact Statement – groundwater assessment report

JAJV (2019) M12 Motorway Environmental Impact Statement – Soils and contamination assessment report

JAJV (2020) M12 Motorway amendment report - groundwater supplementary technical memorandum

Land and Environment Court of New South Wales (2009) Record of proceedings – Environment Protection Authority v Ghossayn (2009) NSWLEC 181 (23 October 2009)

Prime Creative Media (2009) Inside Waste Magazine, Issue 33, November/December 2009

Specialist News (2009) Footprint news article, *Court orders director to pay \$91,000 over landfill breaches* dated Monday, 26 October 2009.

Water NSW (2020) NSW groundwater data, accessed February 2020 at <https://realtimedata.waternsw.com.au/water.stm>

Attachment A – Site Photographs



Photograph 1: Large stockpiles of soil/fill observed on the OzSource property south of Range Road.



Photograph 2: Smaller stockpile observed on the OzSource property south of Range Road.



Photograph 3: Sections of potential ACM pipe observed on the surface of existing AEI 21 west of and adjacent to Range Road.



Photograph 4: Paddock containing large area of fill placed in small stockpiles observed north of the intersection of Luddenham Road and Elizabeth Drive



Photograph 5: Large stockpile of wood chips observed at a premises operated by TreeServe on Clifton Avenue.



Photograph 6: Large stockpile of fire wood observed at a premises operated by TreeServe on Clifton Avenue

Attachment B – Historical Title Information for DP2566, Devonshire Farms, Drivers Bush

DP 2566

2566

STANDARD PREPARED

A

DEVONSHIRE FARMS
DRIVER'S BUSH
PARISHES OF CABRAMATTA
AND MELVILLE
COUNTY OF CUMBERLAND

Scale - 5 Chains to an Inch

Survey completed 29th Jan. 1830
No Minerals or Special conditions

COPY MADE
EXAMINED

This is the plan marked A referred to
in the annexed declaration by M^r Lie.
Sur. Arthur W. Stephen under the
Real Property Act.

Arthur W. Stephen
S^r Sur.

NOTE: Areas of N^{os} 1, 26, & 51 are
calculated to centre of KEMP'S
CREEK, which is the accepted
boundary.

Sec. B hereon comprises N^{os}
38 & 48 on D.P. 1073. Cert. of Title
Vol. 666 Fol. 16. & part of M.
Grants 50 ac.

5/12/90
Thomas J. Dickson
Solicitor
Sydney

FLEURS ESTATE

80 82

Richard Driver

J. Reynolds
40a G^t
30th June 1823

Monaghan
Loughlin Monaghan
50a G^t
30th June 1823

Walsh
50a G^t
30th June 1823

P. Randall
60a G^t

H. Marr
100a G^t

N^o 1094

N^o 1073

Deposited

Plan

Deposited

Plan

Connection not drawn to scale

3050
Plan

Dep

Deposited

Vol. SEC. 71

1100a G^t
30th June 1823
(Subdivided vide Dep. Plan 1073)

N^o 1073

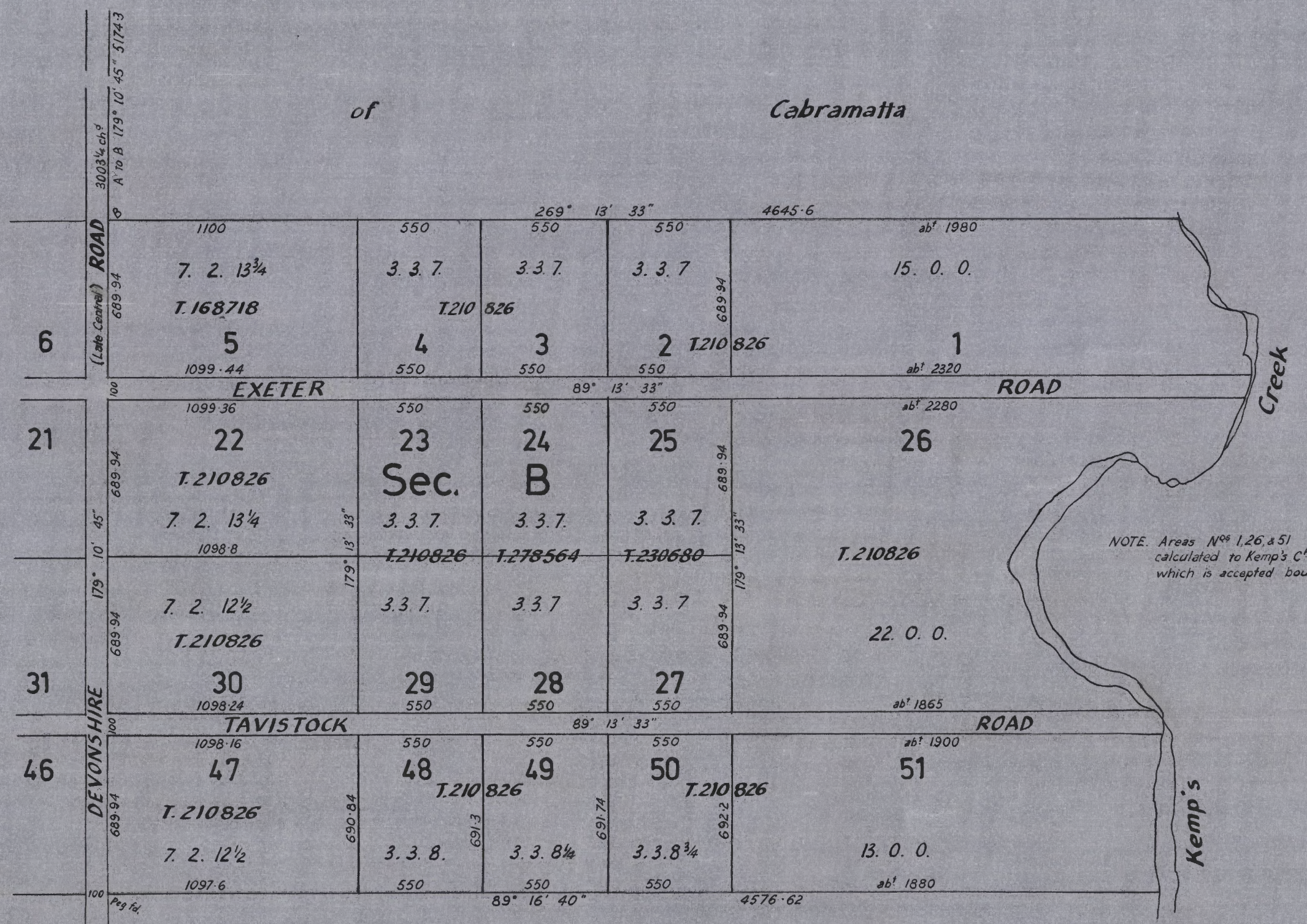
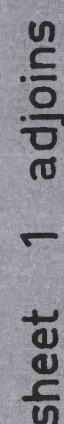
50a G^t
30th June 1823

Amended
14/12/90
J.H.M.



SH. 3/3

Cabramatta



NOTE. Areas Nos 1, 26 & 51
calculated to Kemp's C^k
which is accepted boundary

NOTES

NOTES		
No.	Lot	Sec.
		Particulars
(1)	3233	A
(2)	161 adj 16	A
(3)	3031	A
(4)	38	A
		Amend ^t of C.T. 1094/26 - A202001
		F.P. 160439 Sur.
		F.P. 415712 Sur.
		F.P. 416720

S^d A.W. Stephen L.S. 6-2-90



CONVERSION TABLE ADDED IN
REGISTRAR GENERAL'S DEPARTMENT

DP 2566 SH 1/3

LINKS	METRES
100	20.115
230.5	46.37
550	110.64
689.94	138.79
690.02	138.81
690.82	138.97
691.26	139.06
691.7	139.15
692.14	139.24
692.58	139.32
693.02	139.41
693.46	139.5
694.1	139.63
771.64	155.23
772.4	155.38
772.5	155.4
774.1	155.72
775	155.91
1100.2	221.32
1100.76	221.44
1100.84	221.45
1101.4	221.57
1101.96	221.68
1102.04	221.7
1102.6	221.81
2964	596.3
3003.25	604.2
5171.84	1040.4
5174.3	1040.9
5177.6	1041.6
6900.25	1388.1

AC	RD	P	HA
3	3	7	1.535
3	3	8	1.538
3	3	8 1/2	1.539
3	3	8 3/4	1.54
3	3	9 1/4	1.541
3	3	9 1/2	1.542
3	3	10	1.543
5	1	12	2.155
5	1	13	2.157
5	1	14	2.16
5	1	19 3/4	2.174
7	2	14 3/4	3.072
7	2	15 1/2	3.074
7	2	16	3.076
7	2	17 1/2	3.079



CONVERSION TABLE ADDED IN
REGISTRAR GENERAL'S DEPARTMENT

DP 2566 SH 2/3

LINKS	METRES
1.58	0.32
15.86	3.19
18.46	3.715
37.67	7.58
48.57	9.77
68.98	13.875
99.5	20.015
100	20.115
100.1	20.135
100.6	20.235
132.62	26.68
133.5	26.855
164.48	33.09
185.5	37.315
213.77	43.005
215.6	43.37
217.53	43.76
232.58	46.79
232.85	46.84
232.86	46.845
232.94	46.86
233.09	46.89
233.1	46.89
233.45	46.965
233.77	47.025
234.23	47.12
238.47	47.97
277.56	55.84
365.75	73.58
373.88	75.21
391.88	78.83
400	80.47
698.53	140.52
700	140.82
704.75	141.77
705.28	141.88
711	143.03
718.97	144.63
721.9	145.22
725.1	145.87
729.25	146.7
739.53	148.77
743.94	149.66
745.45	149.96
753.94	151.67
754.22	151.72
756.34	152.15
759.34	152.75
764.5	153.79
771.04	155.11
781.7	157.25
783.4	157.6
806.4	162.22
807.07	162.36
823.54	165.67
831.43	167.26
931.43	187.37
931.45	187.38
931.6	187.41
931.7	187.43
931.8	187.45
932	187.49
932.1	187.51
932.2	187.53
932.34	187.56
1722.5	346.51
1762	354.46
2000	402.34
2137.7	430.04
3003.25	604.2
3525.1	709.1
3549.15	714
5648.3	1136.3
51743	10409



CONVERSION TABLE ADDED IN
REGISTRAR GENERAL'S DEPARTMENT

DP 2566 SH 2/3 CONTD

AC	RD	P	SQ	M
1	2	20	1/4	6582
1	2	21	1/4	6608
1	2	23	1/2	6665
1	2	25	3/4	6722
1	2	26		6728
1	2	29	3/4	6823
1	2	33		6905
1	2	33	1/2	6918
1	2	39		7057
1	3	2	3/4	7152
1	3	6	1/2	7246
1	3	15	3/4	7480
1	3	16	1/4	7493
1	3	22		7638

AC	RD	P	HA
3	1	31	1.394
3	2	30	1.492
3	2	36	1.5
3	2	36 1/4	1.5
6	3	6	2.747
6	3	18 1/4	2.778



CONVERSION TABLE ADDED IN
REGISTRAR GENERAL'S DEPARTMENT

DP 2566 SH 3/3

LINKS	METRES
69.17	13.915
100	20.115
198	39.83
550	110.64
680.94	136.98
689.94	138.79
690.84	138.97
691.3	139.07
691.74	139.16
692.2	139.25
1097.6	220.8
1098.16	220.91
1098.24	220.93
1098.8	221.04
1099.36	221.16
1099.44	221.17
1100	221.28
1865	375.18
1880	378.2
1900	382.22
1980	398.31
2280	458.66
2320	466.71
3003.25	604.2
4576.62	920.7
4645.6	934.5
5174.3	1040.9

AC	RD	P	HA
3	3	7	1.535
3	3	8	1.538
3	3	8 1/4	1.538
3	3	8 3/4	1.54
7	2	12 1/2	3.067
7	2	13 1/4	3.069
7	2	13 3/4	3.07
13	-	-	5.261
15	-	-	6.07
22	-	-	8.9