

7.0 Environmental assessment

7.11 Soils and contamination

This section provides an assessment of the potential soils and contamination impacts associated with the construction and operation of the proposed modification and proposes mitigation measures to address these impacts.

7.11.1 Introduction

Table 7-84 outlines the SEARs that relate to soils and contamination and identifies where they are addressed in this modification report. The full assessment of soils and contamination impacts is provided in **Appendix L** (Contamination assessment report).

Table 7-84 SEARs – Soils and contamination

Desired Performance Outcome	SEAR	Where addressed within the Modification Report
<p>The environmental values of land, including soils, subsoils and landforms, are protected.</p> <p>Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.</p>	1. Verify the risk of acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Risk Map) within, and in the area likely to be impacted by, the project.	Section 7.11.4 Section 4.2.4 in Appendix L (Contamination assessment report)
	2. The impact of the project on acid sulfate soils (including impacts of acidic runoff offsite) in accordance with the current guidelines.	Sections 7.11.4 and 7.11.5 Sections 5.2 and 6.2 in Appendix L (Contamination assessment report)
	3. The likelihood of land contamination and identify if remediation of the land is required, having regard to the ecological and human health risks posed by the contamination in the context of past, existing, and future land uses. Where assessment and/or remediation is required, the EIS must document how the assessment and/or remediation would be undertaken in accordance with current guidelines.	Sections 7.11.4 and 7.11.5 Sections 4.19 and 5.1 in Appendix L (Contamination assessment report)
	4. Identify whether soil salinity is likely to be an issue and if so, determine the presence, extent and severity of soil salinity within the project area, and assess the impacts of the project on soil salinity and how it may affect groundwater resources and hydrology.	Sections 7.11.4 and 7.11.5 Sections 4.2.3, 5.3 and 6.3 in Appendix L (Contamination assessment report)
	5. The impacts on soil and land resources (including erosion risk or hazard). Particular attention must be given to soil erosion and sediment transport consistent with the practices and principles in the current guidelines.	Section 7.11.5 Sections 5.5 and 6.4 in Appendix L (Contamination assessment report)

7.11.2 Method of assessment

Legislation and policy context

The soils and contamination assessment was prepared in accordance with the following legislation, regulations and policies, where relevant:

- *Contaminated Land Management Act 1997* (NSW) (CLM Act)
- *Protection of the Environment Operations Act 1997* (NSW) (POEO Act) and regulations under the POEO Act relevant to this report include:
 - *Protection of the Environment Operations Legislation Amendment (Waste) Regulation 2014*
 - *Protection of the Environment Operations Legislation Amendment (Waste) Regulation 2018 (Amendment Regulation)*
 - *Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019*
- *Environmentally Hazardous Chemicals Act 1985* (NSW) (EHC Act)
- State Environmental Planning Policy (Resilience and Hazards) 2021 (specifically the former State Environmental Planning Policy No 55 – Remediation of Land (SEPP 55)).

The following guidelines relevant to the assessment of potentially contaminated land in NSW that have been considered during the preparation of this report include:

- *Guidelines for the NSW Site Auditor Scheme* (third edition) (NSW EPA, 2017c)
- *Managing Land Contamination, Planning Guidelines SEPP 55-Remediation of Land (planning guidelines)* (or updates), NSW Department of Urban Affairs and Planning (DUAP) and NSW EPA, 1998
- *Guidelines for the Assessment and Management of Groundwater Contamination* (NSW Department of Environment and Conservation (DEC), 2007)
- *Site Investigations for Urban Salinity* (NSW Department of Land and Water conservation (DLWC), 2002b)
- *Soil and Landscape Issues in Environmental Impact Assessment* (NSW DLWC, 2000)
- *National Environment Protection (Assessment of Site Contamination) Measure 2013* (ASC) (NEPM, 2013) National Environment Protection Council (NEPC), 1999
- *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997* (NSW EPA, 2015)
- *Environmental Guidelines: Solid Waste Landfills*, Second Edition (NSW EPA, 2016)
- *Guidelines for Consultants Reporting on Contaminated Land: Contaminated Land Management Act 1997* (CLM Act), as amended in 2020 (NSW EPA, 2020)
- *Guidelines for the Assessment and Management of sites Impacted by Hazardous Ground Gases*, second edition, revised in 2020 (NSW EPA, 2012)
- *Waste Classification Guidelines Part 1: Classifying waste*, dated November 2014 (NSW EPA, 2014)
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand and Australian State and Territory Governments (ANZAST), 2018)
- *Acid Sulfate Soils Manual* (Acid Sulfate Soils Management Advisory Committee (ASSMAC) 1998), which includes the *Acid Sulfate Soils Assessment Guidelines* (DoP, 2008)
- Heads of EPAs Australia and New Zealand, 2020, *PFAS National Environmental Management Plan*, January (NEMP), as amended in January 2020.

- Journal of Australian Geomechanics Society, Vol. 42: No 1, 2007, *Practice Note Guidelines for Landslide Risk Management*
- *Managing Urban Stormwater: Soils and Construction Volume 1* (DPIE, 2004) and *Volume 2* (A. Installation of Services; B. Waste Landfills; C. Unsealed Roads; D. Main Roads; E. Mines and Quarries) (DECC, 2008).

The guidelines noted above or other appropriate/endorsed guidelines would be taken into account should further investigations, remediation work and validation be carried out.

Method of Assessment

An assessment of the existing soil conditions and presence of potential contamination within the study area was completed via desktop review of available information.

The following sources of information were reviewed:

- Proposed Western Sydney Orbital (existing Westlink M7) Environmental Impact Statement (PPK & SKM, 2000) and various reported investigations undertaken prior to the construction of the existing Westlink M7 Current and historical land use (using aerial imagery and zoning maps and 1943 aerial imagery) to identify commercial/industrial land use and other potentially contaminating land sources within the study area
- Asbestos register (illegal dumping) for the Westlink M7 provided by Transurban
- Reports produced by Lotsearch Pty Ltd over the entire study area, including a 500-metre buffer from the Westlink M7. The information reviewed included:
 - NSW EPA records for notified and regulated contaminated sites under Section 60 of the CLM Act, current and former licenced activities under the POEO Act, former gaswork sites, EPA Per and Poly-Fluoroalkyl Substances (PFAS) investigation program, sites under the Australian Department of Defence sites' three-year Regional Contamination Investigation Program, sites listed on the National Waste Management site database (DAWE, 2012), and other sites with known contamination issues
 - Historical business activities from the *Universal Business Directors Business to Business Directory* including dry cleaners, motor garages and service stations (for the years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961, and 1950)
 - Historical aerial photographs for the years (including 2020, 2015, 2014, 2009, 2000, 1991, 1982, 1970, 1965, 1961, 1955, and 1949)
 - Historical topographic and parish survey maps
 - Topographic features (including point of interest, tank areas, major easements)
 - Hydrogeology and registered groundwater wells
 - Geology, soils, acid sulfate soil risk and dryland salinity potential maps
 - Local Environmental Plan (LEP) zones
 - Heritage items
- Department of Defence website on the location of unexploded ordnance (UXO)
- NSW Rural Fire Service (RFS) and Fire and Rescue NSW websites for PFAS investigation sites within five kilometres of the Westlink M7
- Online business directories for current RFS and Fire and Rescue sites not currently listed as PFAS investigation sites within two kilometres of the Westlink M7
- Historical titles review for selected lots where land use was unclear from the above sources.

The database searches are included as **Appendix L** (Contamination assessment report).

7.11.3 Study area

The Soils and Contamination Assessment defined the study area as the construction footprint for the proposed modification, comprised of the Westlink M7 lease area and non-Westlink M7 land nominated for use as temporary construction ancillary facilities, plus a 100-metre buffer around these locations. The study area within the Westlink M7 lease area was broken down into five distinct precincts referred to as Precincts 1, 2, 3, 4 and 5. The precincts cover the study area south to north in sections of between five and 10 kilometres in length. The study area precincts are presented in Table 7-85 and are illustrated in Table 7-84 to Figure 7-101.

Table 7-85 Study area precincts

Precinct	Description
1	Prestons to Elizabeth Hills (southern extent starts north of the M5 Motorway interchange, 140 metres south of Kurrajong Road)
2	Elizabeth Hills to Horsley Park (this includes the approved M12 Motorway interchange, which is currently the intersection between Westlink M7 and Elizabeth Drive)
3	Horsley Park to Eastern Creek
4	Eastern Creek to Rooty Hill
5	Rooty Hill to Dean Park (to the intersection with Richmond Road)

7.11.4 Existing environment

A detailed description of the existing environment is provided in **Appendix L** (Contamination assessment report). A summary from this report is provided as follows.

Soils and geology

Topography and drainage

The topography varies across the study area with higher elevations and rolling hills terrain typically adjacent to the Western Sydney Parklands (WSP) in Precincts 2 and 3. The elevation at WSP reaches 146 metres Australian Height Datum (AHD) just north of Elizabeth Drive. In Precincts 1, 4, and 5 the topography resembles flat and gently undulating, creek channels, and floodplain terrains. The elevation at its lowest level reaches 26 metres AHD near Prestons in Precinct 1.

There are various creeks and water bodies across the study area as shown and referred to in **Section 7.5** (Surface water and groundwater). Contaminants of potential concern are expected nearby creeks and water bodies which have been subject to former contaminating activities.

Geology

The study area is underlain by the following geologies described in Table 7-86.

Table 7-86 Summary of geologies within and surrounding the study area

Name	Location	Description
Bringelly shale (Rwb)	Occurs in majority of the study area.	<ul style="list-style-type: none"> From the Wianamatta group, dating from the middle Triassic age Described as shale, carbonaceous claystone, claystone, laminate, fine to medium grained lithic sandstone, rare coal, and tuff
Quaternary alluvium (Qpn)	Occurs in majority of the southern part of the study area (majority of Precinct 1 and parts of Precinct 2).	<ul style="list-style-type: none"> Medium grained sand, clay, and silt from the quaternary age
Recent sediments/fill (Qal)	Occurs in portions of the northern part of the study area (parts of Precincts 4 and 5).	<ul style="list-style-type: none"> Fine grained sand, silt, and clay from the quaternary age

In addition, the study area intercepts two geological features:

- A lineament about 500 metres south of the approved M12 Motorway interchange
- A fold for about 3.5 kilometres starting north of the Westlink M7 intersection with the Great Western Highway up to the Westlink M7 intersection with Woodstock Avenue to the north.

Soil landscape

The potential for erosion within the study area is generally moderate to high. Areas along creeks and drainage lines have a higher potential for erosion. The study area is underlain by six soil landscapes as summarised in Table 7-87 and shown in Figure 7-97 to Figure 7-101.

Table 7-87 Summary of soil landscapes within and surrounding the study area

Soil Landscape	Characteristics
Berkshire Park Alluvial (ALbp)	The Berkshire Park soils are found on dissected, gently undulating low rises on the Tertiary terraces of the Hawkesbury/Nepean River stem. These soils have a very high wind erosion hazard if cleared. These soils are subject to localised seasonal waterlogging, localised flood hazard, impermeable subsoils, and low fertility.
Blacktown Residual (REbt)	The Blacktown soils occur on the low undulating hills on Wianamatta Group shales in the areas around Bankstown and Chatswood. These soils are moderately reactive, highly plastic, and generally poorly drained.
Disturbed Terrain (DTxx)	Disturbed terrain occurs on level plain to hummocky terrain, extensively disturbed by human activity. This terrain is prone to mass movement hazards, unconsolidated low wet strength materials, impermeable soil, poor drainage, localised very low fertility and toxic materials (including asbestos).
Luddenham Erosional (ERlu)	The Luddenham soils occur on the low undulating hills on Wianamatta Group shales. These soils have a high erosion potential, localised impermeable highly plastic subsoil, moderately reactive and have the potential for surficial acid sulfate soils movement hazards.
Picton Colluvial (COpn)	The Picton soils are found on steep to very steep sided slopes characterised by macid sulfate soils movement. These soils are prone to extreme erosion hazards, acid sulfate soils movement (slump) hazards, steep slopes, and are occasionally impermeable and reactive plastic subsoils.
South Creek Alluvial (ALsc)	The South Creek soils occur across the flood plains, valley flats, and along drainage depressions of channels on the Cumberland Plain and are usually flat laying with channels. These soils are prone to erosion hazards and frequent flooding is common in areas where they are identified.

Soil salinity

Medium to high salinity potential in soils has been identified across the study area. High hazard or risk from dryland salinity has been identified throughout the study area between Prestons (at the southern extent of the study area) and Elizabeth Hills and between Eastern Creek and Dean Park (at the northern extent of the study area). These areas are mapped and shown in Figure 7-102 to Figure 7-106.

Acid sulfate soils

The probability of occurrence of acid sulfate soils is extremely low (one to five per cent) across the study area. A small, localised area of high probability of occurrence of acid sulfate soils (greater than 70 per cent) has been identified within an inland lake in Elizabeth Hills, about 100 metres east of the study area. Inland acid sulfate soils also have the potential to occur in creeks and drains within the study area.

Hydrogeology

Porous, extensive aquifers of low to moderate productivity are mapped within the study area and surrounds. Groundwater is expected to exist as aquifers due to alluvial aquifers associated with quaternary alluvium, within the Bringelly Shale, and within the Hawkesbury Sandstone which underlays the Bringelly Shale.

A total of 38 registered groundwater bores were located within one kilometre of the study area. Out of these 38, all were registered for the purpose of monitoring, except three: of which, one was registered for groundwater dewatering in 1996, one for disposal of aquaculture waste in 1961, and one for domestic general use in 1966. The locations of these groundwater bores are shown in Figure 7-107 to Figure 7-111. The standing water level ranged from 2.6 and 34 metres below ground level. It is expected that there is a high and moderate potential of groundwater dependant ecosystems in numerous areas adjacent and within the study area.

Groundwater dependent ecosystems

Groundwater dependent ecosystems (GDEs) are ecological communities that are dependent, either entirely or in part, on the presence of groundwater for their health or survival.

A search of the Bureau of Meteorology's GDE Atlas indicated that there are several locations within the study area that have a moderate to high potential to depend on groundwater within the study area (refer to **Appendix H** (Biodiversity development assessment report)). South Creek is considered to have a high potential to support aquatic GDE, while moderate to high potential GDEs were also mapped within the study area, generally near the four creek crossings (Cosgroves, Badgerys, and South and Kemps Creeks).

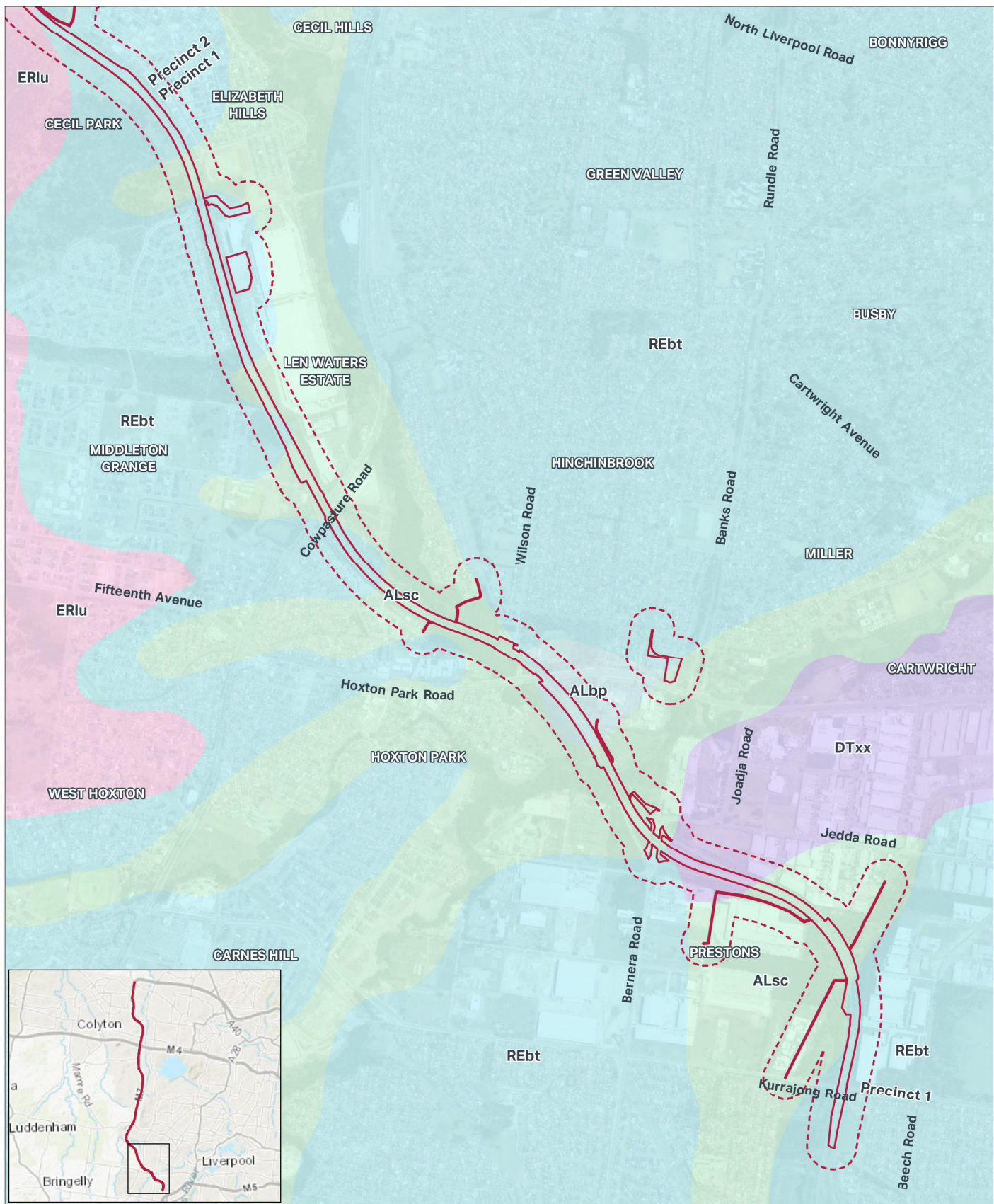


FIGURE 7-97: SOIL LANDSCAPES WITHIN THE STUDY AREA
(SHEET 1 OF 5)



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Legend

 Construction footprint	Soil Landscapes
 Study area	ALbp
	ALsc
	DTxx
	ERlu
	REbt

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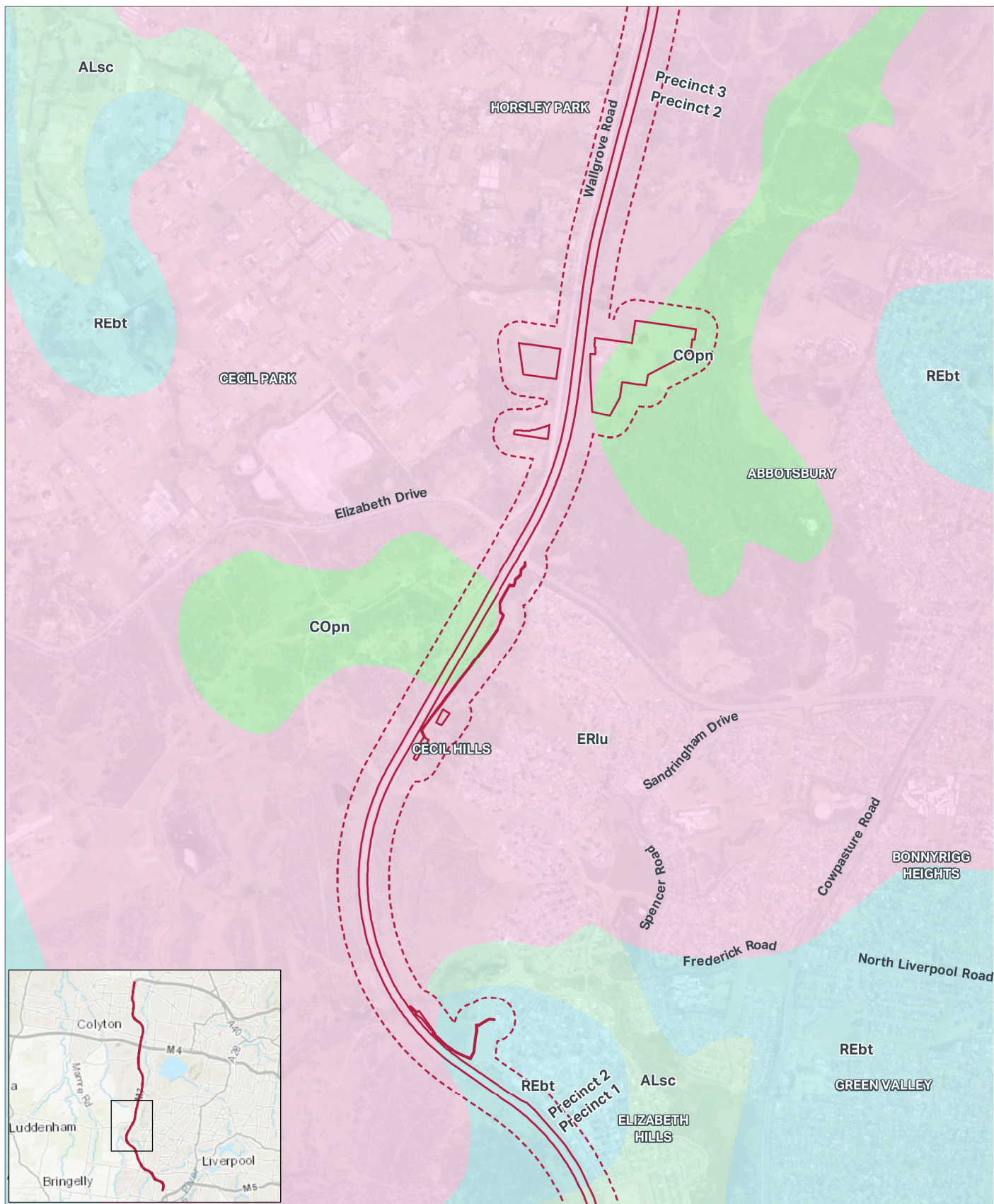


FIGURE 7-98: SOIL LANDSCAPES WITHIN THE STUDY AREA
(SHEET 2 OF 5)



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Legend

	Construction footprint	Soil Landscapes
	Study area	ALsc
		COpn
		ERlu
		REbt

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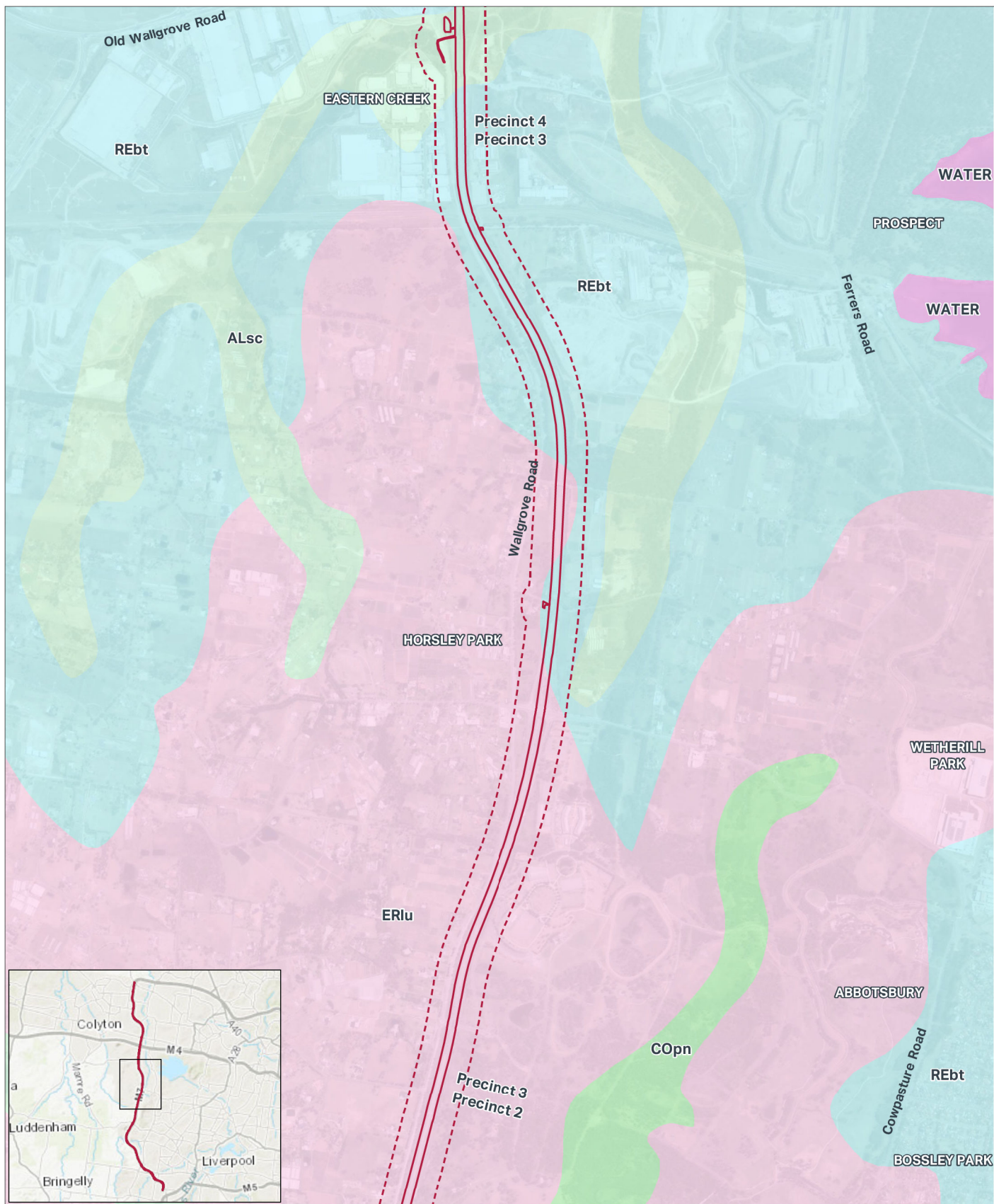


FIGURE 7-99: SOIL LANDSCAPES WITHIN THE STUDY AREA
(SHEET 3 OF 5)



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Legend

 Construction footprint	Soil Landscapes
 Study area	ALsc
	COpn
	ERIu
	REbt
	WATER

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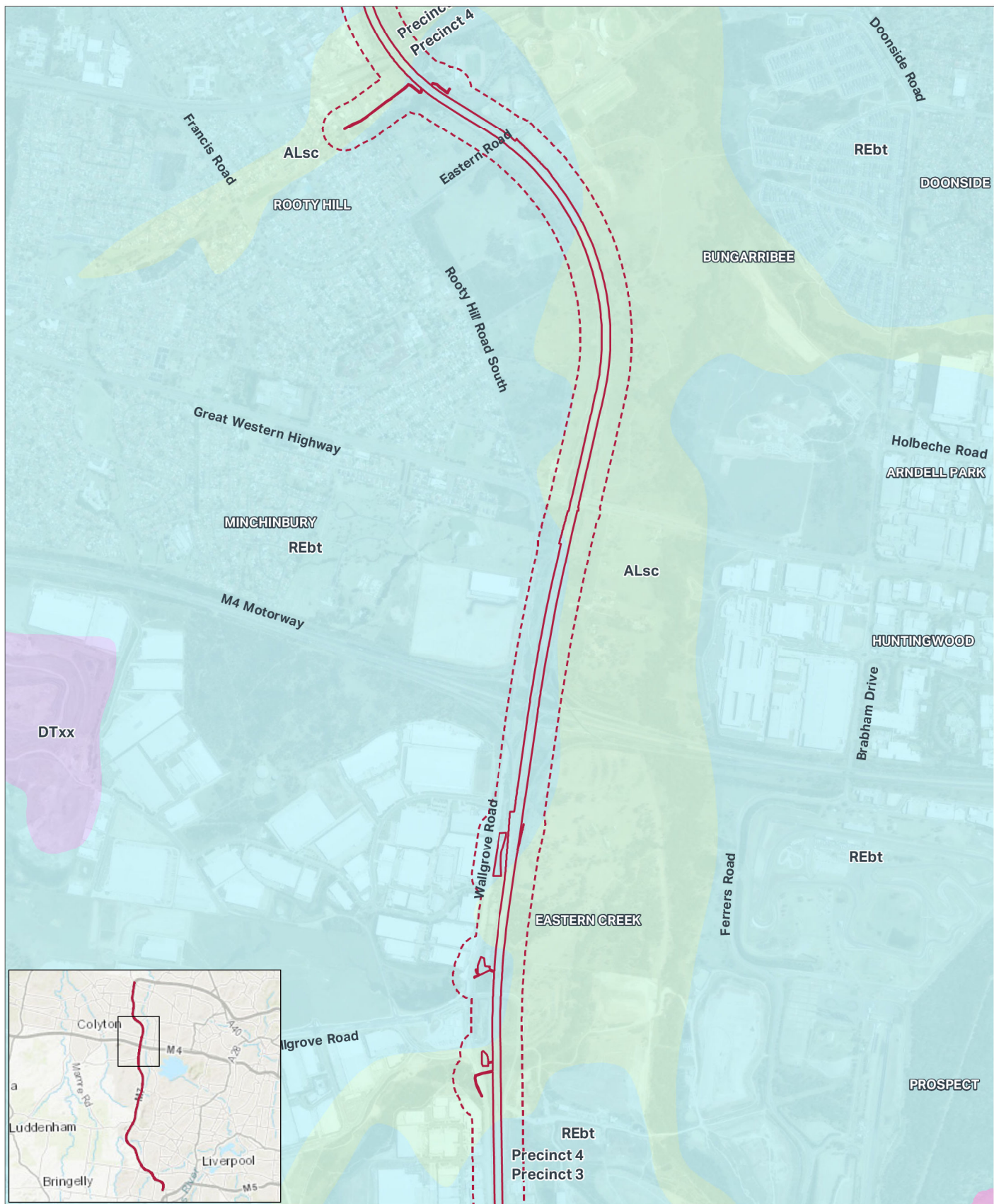


FIGURE 4-100: SOIL LANDSCAPES WITHIN THE STUDY AREA
(SHEET 4 OF 5)



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Legend

	Construction footprint	Soil Landscapes
	Study area	ALsc
		DTxx
		REbt
		WATER

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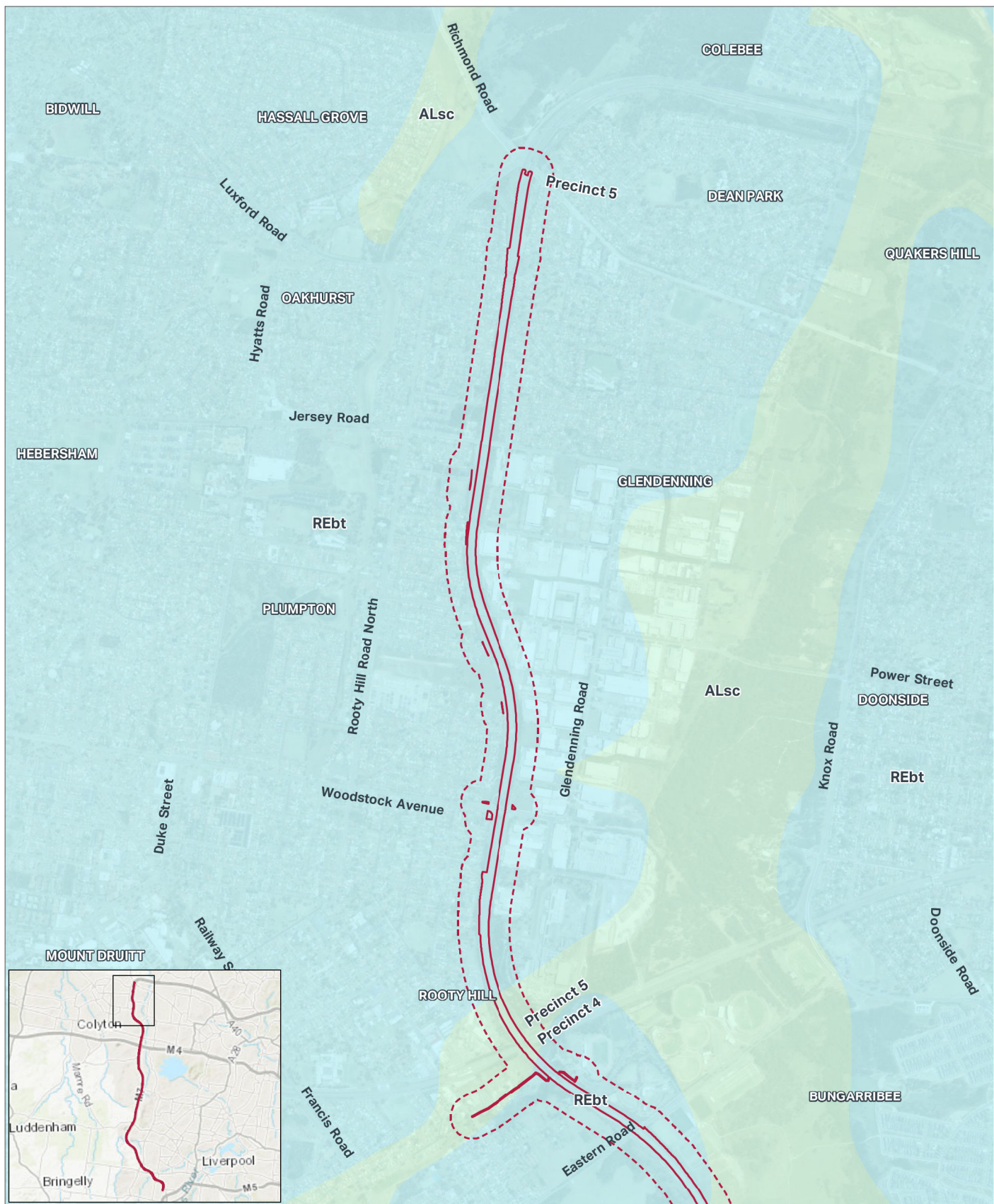


FIGURE 4-101: SOIL LANDSCAPES WITHIN THE STUDY AREA
(SHEET 5 OF 5)



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Legend

	Construction footprint	Soil Landscapes
	Study area	ALsc
		REbt

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FIGURE 7-102: SALINITY HAZARDS WITHIN THE STUDY AREA
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Legend

-  Construction footprint
  Study area
- Soil Salinity Hazard**
 Very High
 Moderate

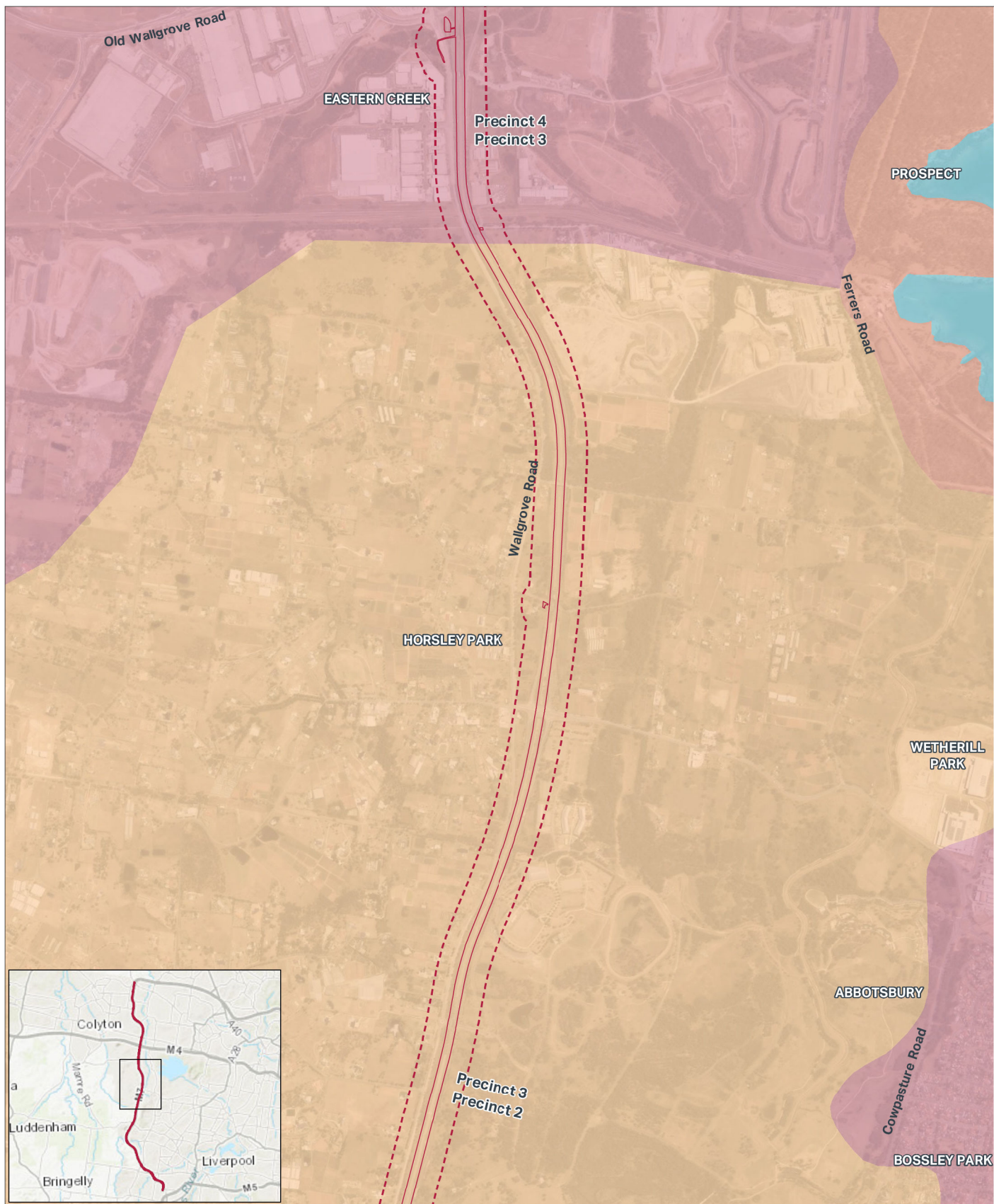


FIGURE 7-104: SALINITY HAZARDS WITHIN THE STUDY AREA
(SHEET 3 OF 5)



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Legend

	Construction footprint	Soil Salinity Hazard
	Study area	 Very High
		 High
		 Moderate
		 Water

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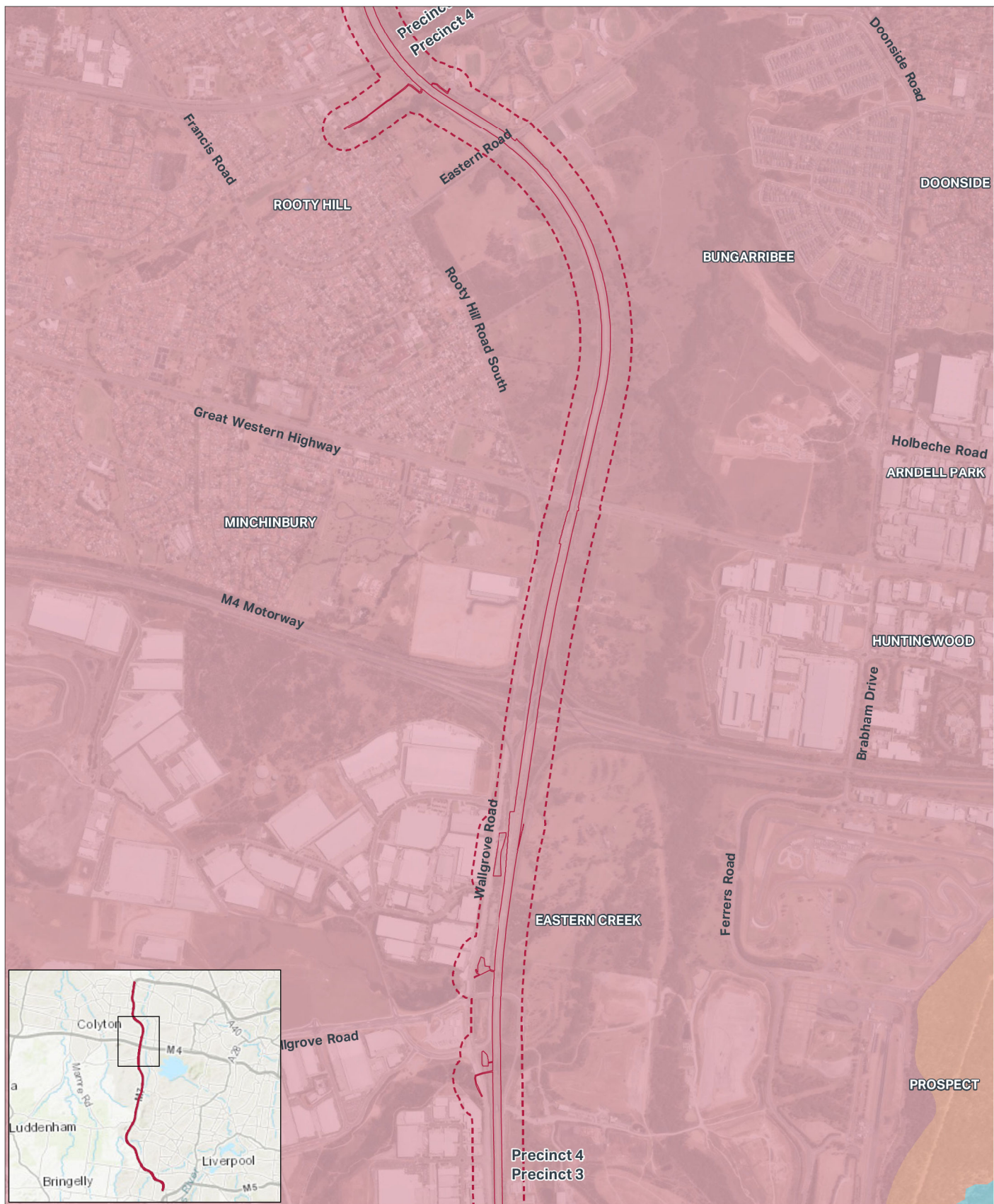







FIGURE 7-105: SALINITY HAZARDS WITHIN THE STUDY AREA
(SHEET 4 OF 5)



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	Construction footprint	Soil Salinity Hazard	
	Study area		Very High
			High
			Water

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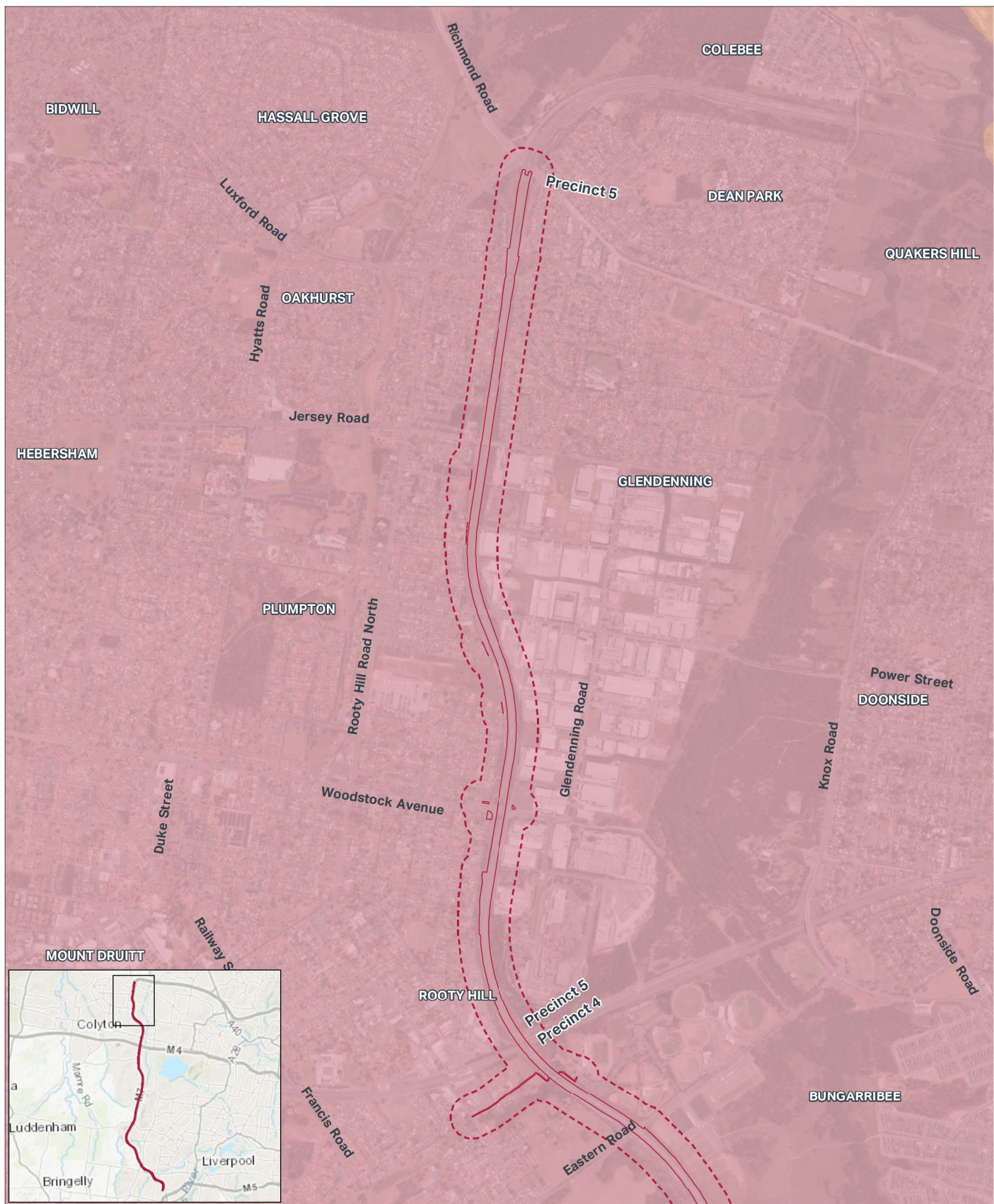


FIGURE 7-106: SALINITY HAZARDS WITHIN THE STUDY AREA
(SHEET 5 OF 5)



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- Construction footprint
- Study area

Soil Salinity Hazard

- Very High
- High

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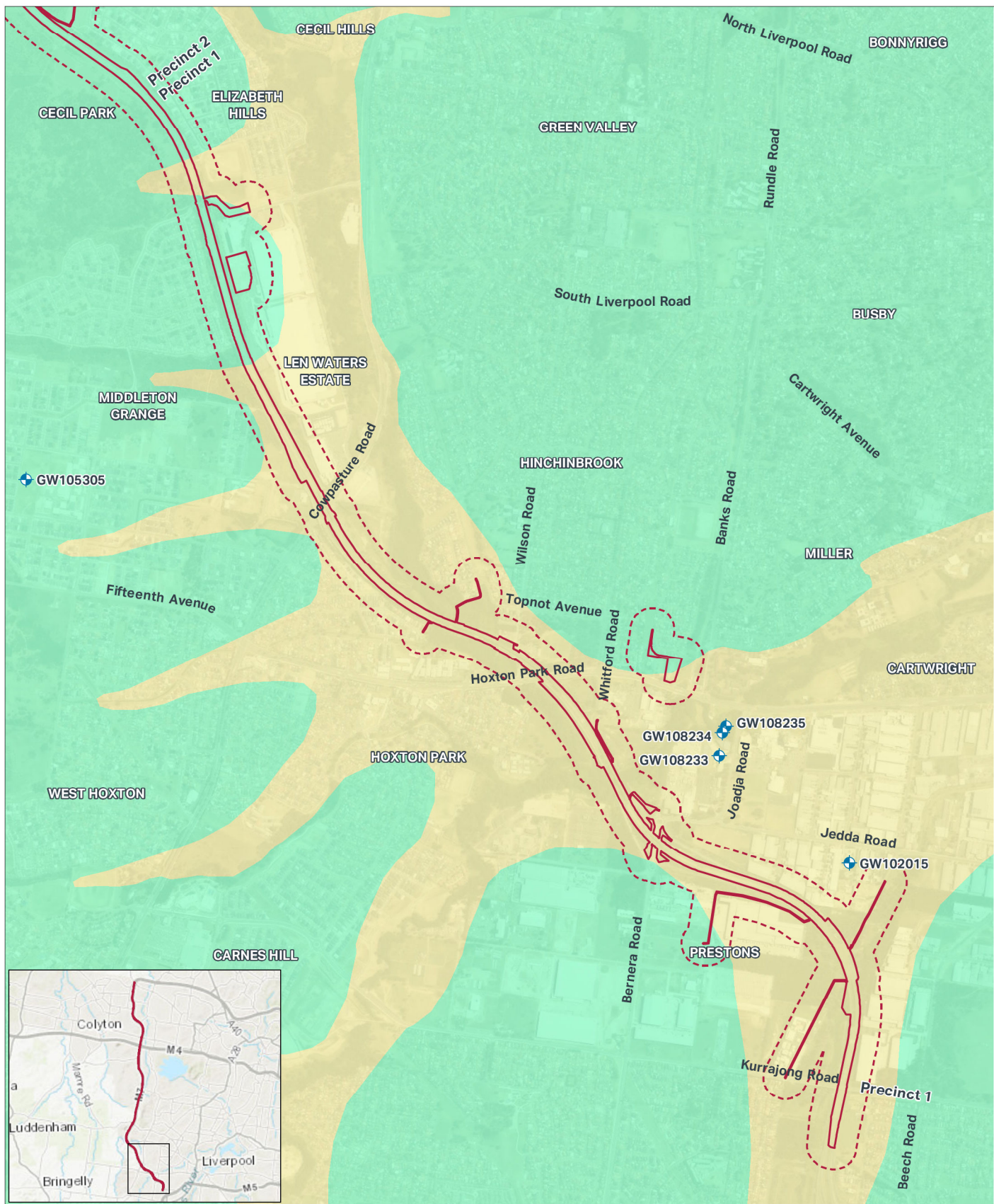


FIGURE 7-107: GEOLOGY AND REGISTERED GROUNDWATER BORES WITHIN STUDY AREA (SHEET 1 OF 5)



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Legend

Construction footprint

Study area

+ Registered groundwater bore

Seamless Geology

Q_av

Twib

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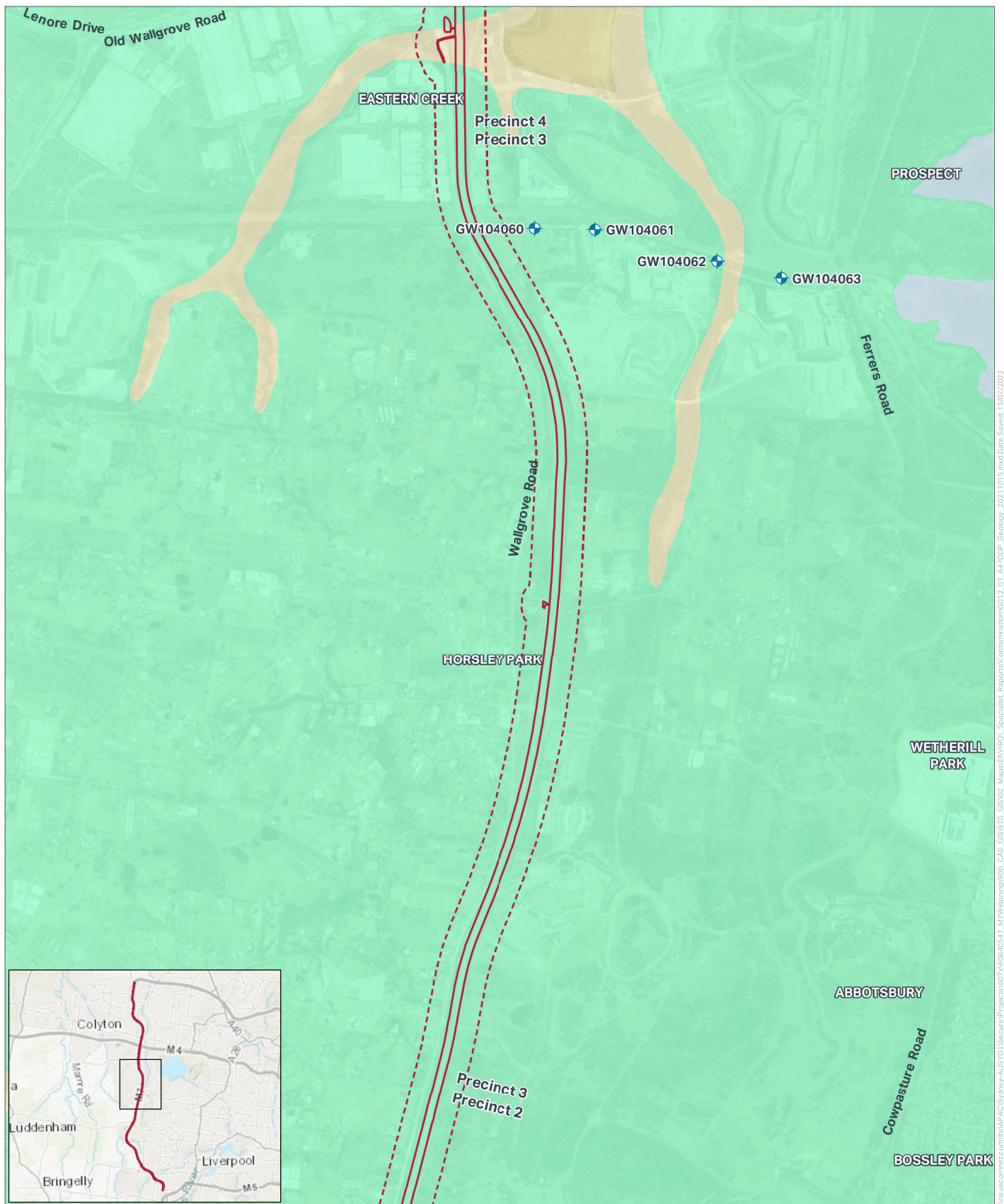


FIGURE 7-109: GEOLOGY AND REGISTERED GROUNDWATER BORES WITHIN STUDY AREA (SHEET 3 OF 5)



AECOM

Legend

- Construction footprint
- Study area
- + Registered groundwater bore

Seamless Geology

- QH_hf
- Q_af
- Q_hw
- Twib

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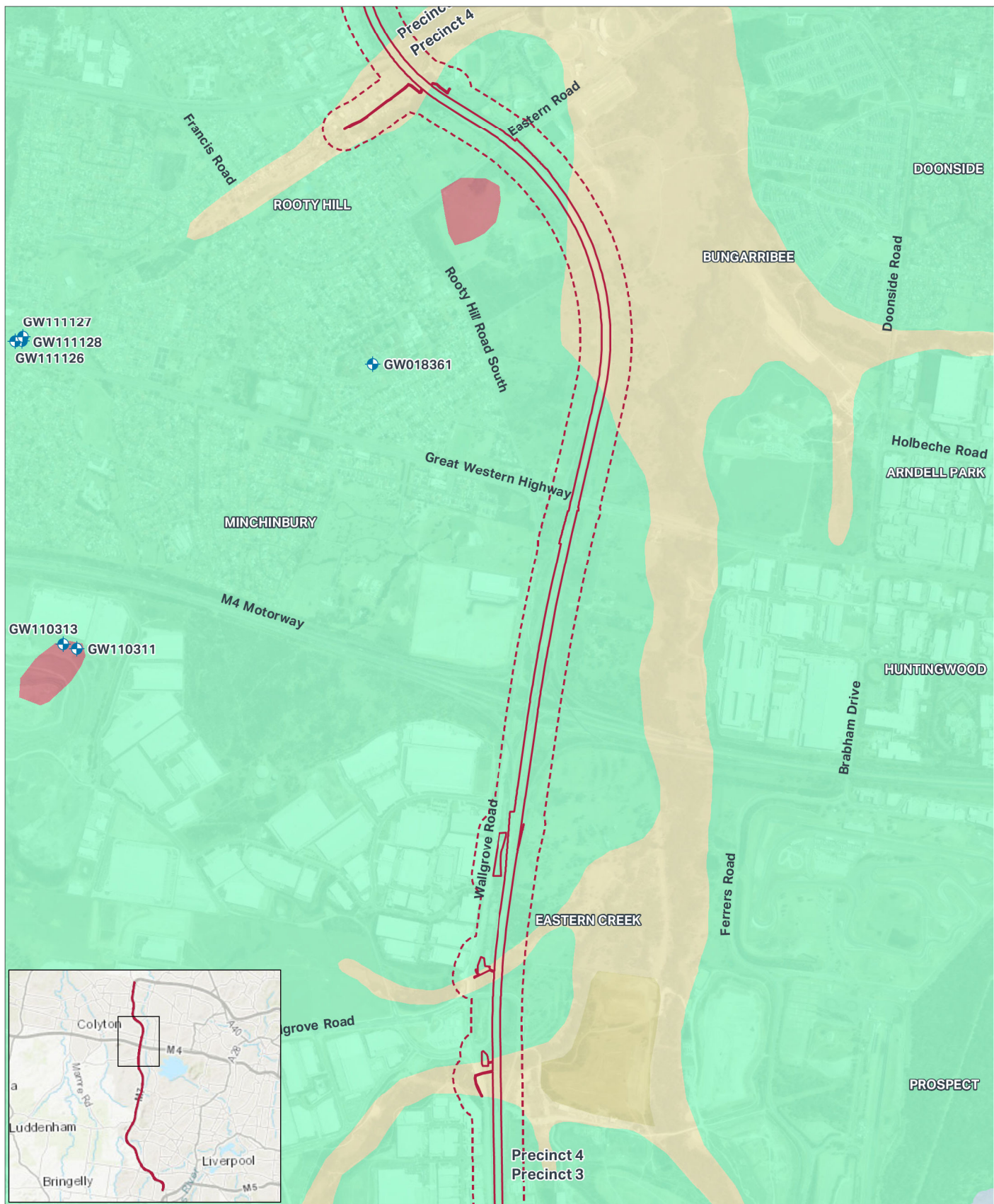


FIGURE 7-110: GEOLOGY AND REGISTERED GROUNDWATER BORES WITHIN STUDY AREA (SHEET 4 OF 5)



AECOM

Legend

Construction footprint

Study area

Registered groundwater bore

Seamless Geology

QH_hf

Q_af

Q_hw

MZui_v

Twib

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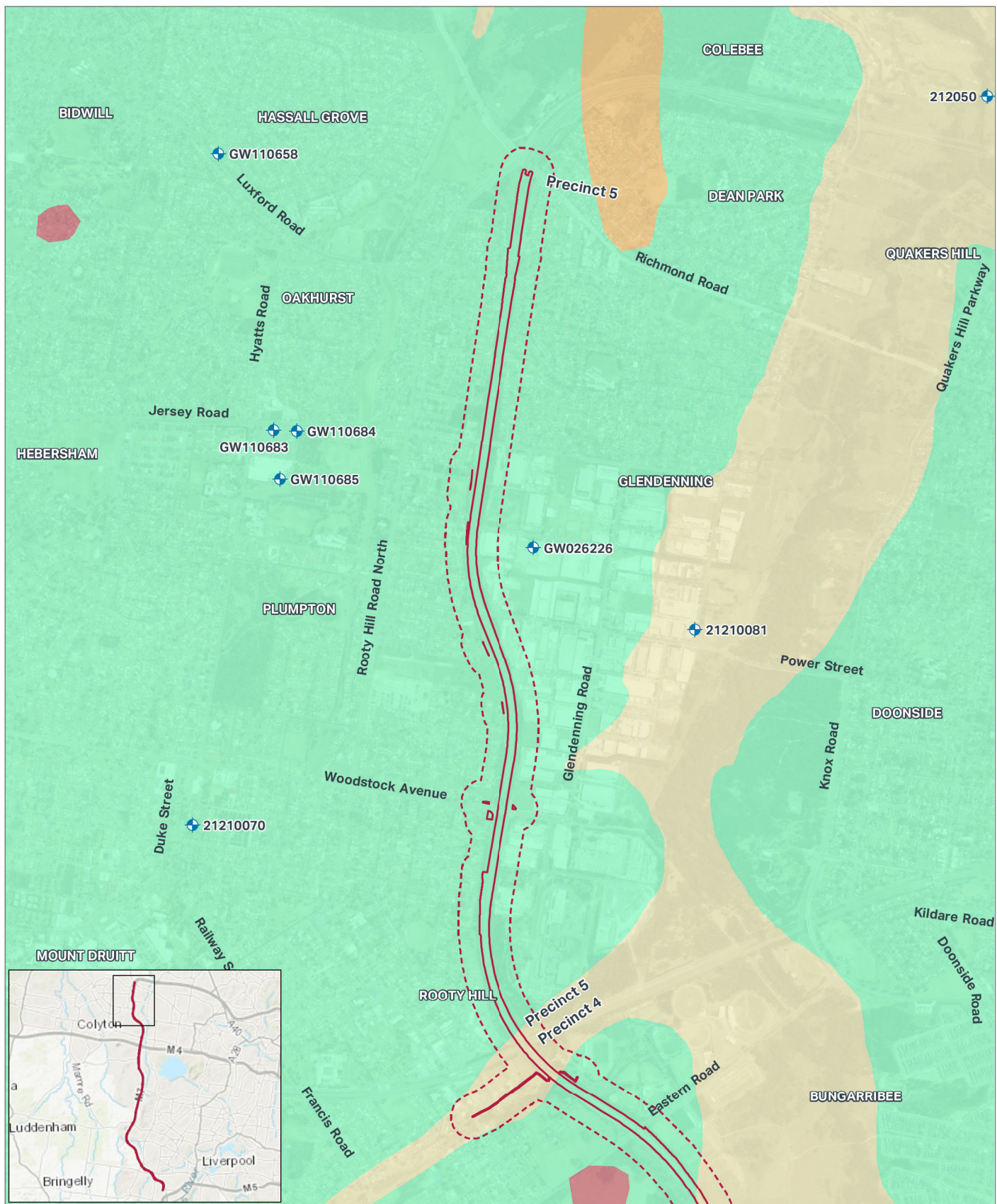


FIGURE 7-111: GEOLOGY AND REGISTERED GROUNDWATER BORES WITHIN STUDY AREA (SHEET 5 OF 5)



AECOM

Legend

Construction footprint

Study area

+ Registered groundwater bore

Seamless Geology

G_s

Q_af

MZui_v

Twib

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Contamination

Land use

- The current land use zoning of the Westlink M7 is classified as SP2 – Infrastructure (Road). Adjacent land use zones to the Westlink M7 include
- E2 – Environmental Conservation
- IN3 – Heavy Industrial
- IN1 – General Industrial (including State Environmental Planning Policy (Western Sydney Employment Area))
- IN2 – Light Industrial
- B2 – Local Centre
- B5 – Business Development
- SP2 – Infrastructure (Roads) (including Cowpasture Road, Wallgrove Road and Elizabeth Drive)
- SP2 – Infrastructure (Drainage and water supply)
- RE1 – Public Recreation
- RU1 – Primary Production
- RU4 – Primary Production Small Lots
- R1 – General Residential
- R2 – Low Density Residential
- R3 – Medium Density Residential
- R4 – High Density Residential.

Further information about the current land use can be found in **Section 7.9** (Land use and property) of this modification report.

Current potentially contaminating activities

Existing businesses or land uses which undertake potentially contaminating activities include service stations, dry cleaners, workshops, and industrial manufacturing sites as well as waste management facilities. Potentially contaminating activities within 100 metres of the study area are included in Table 7-88.

There are no potentially contaminating land uses within 100 metres of the study area present within Precinct 2.

Table 7-88 Current potentially contaminating land uses within 100 metres of the study area

Precinct	Site name address	Address	Land use/activity
1	Endeavour Energy Hoxton Park	490 Hoxton Park Road, Hoxton Park	Industrial, energy generation and storage facility
	Boral Cement Limited	10 Bernera Road, Prestons	Cement or lime manufacturing
	Mainfreight Distribution Pty Ltd	30-50 Yarrowa Street, Prestons	Chemical storage
	State Asphalt Pty Ltd	65-75 Yarrowa Street, Prestons	Waste storage and recovery
	BP Service Station	505 Cowpasture Road, Prestons	Operational petrol station
3	The Austral Brick Co Pty Ltd	738-780 Wallgrove Road, Horsley Park	Brick manufacturing
	Veolia Environmental Services Pty Ltd - this is part of Horsley Park Waste Management Facility	Wallgrove Road, Horsley Park	Waste storage, waste treatment and recovery, composting, waste disposal (landfill)
	Caltex Horsley Park	1768 Horsley Drive, Horsley Park	Operational petrol station
4	Veolia Environmental Services Pty Ltd and SUEZ Recycling and Recovery: both are part of waste assets management corporation (Eastern Creek Waste Management Centre)	Wallgrove Road, Eastern Creek	Waste storage and recycling (Landfill), composting
	Aluminium specialties group	3 Alspeg Place, Eastern Creek	Metal waste generation
	BP Truck Stop	1 Wallgrove Road, Eastern Creek	Petrol station
5	Infrabuild NSW Pty Ltd (formerly OneSteel NSW Pty Ltd)	22 Kellogg Road, Rooty Hill	Industrial, steel manufacturing and mining
	Infra	200 Power Street, Glendenning	Cement and lime manufacturing
	Sydney Trains	Near Rooty Hill train station	Railway systems activities
	NSW Rural Fire Service	2 Enterprise Drive, Glendenning	Fire station/depot

Historical potentially contaminating activities

Due to the nature of the past cut and fill construction of the Westlink M7, contamination along the study area from historical sources could have been moved to other parts of the corridor. There is also the potential for illegal dumping of soil and building wastes containing asbestos (ACM and friable) along the Westlink M7 within the study area.

Historical potentially contaminating activities have been determined through a review of historical aerial photographs, historical maps, historical businesses, and historical title searches. Potentially contaminating land uses identified during the historical aerial photography review of the study area include:

- Historical agricultural land uses and features including scattered buildings, agricultural lands and rural roads, creeks, and reserves
- Historical transport infrastructure including Hoxton Park Airport and the Cecil Hills Tunnel intersecting Elizabeth Drive
- Historical and existing industrial land uses including fuel merchants, brickworks, Endeavour Energy substation, electricity production facilities (existing), potential quarry, cement plant, crane manufacturer, poultry dealers, motor garage, service stations and a steel manufacturing plant
- Historical commercial land uses including market gardens near Wallgrove Road, Cecil Park and Woodstock Coursing (greyhound track and large agricultural property) in Plumpton.

In addition to the above, historical titles and observations revealed that the Westlink M7 at Cecil Park was potentially a metal works site; however, the appearance of the sheds indicates it may have also been livestock and/or horticultural activity.

Potential contamination activities related to former and existing land uses include:

- Degradation and demolition of structures containing hazardous building materials
- Historical and existing landfilling activities
- Isolated waste disposal and illegal dumping
- Buried waste materials
- Diffuse pesticide and herbicide use
- Chemical/fuel use and storage.

NSW EPA Records

There are 19 sites listed as either notified, licensed, or delicensed sites on the NSW EPA's database. There were no sites listed on the NSW EPA record of notices for sites regulated under the CLM Act within 100 metres of the study area.

Sites listed on NSW EPA records of notified and licenced sites within 100 metres of the study area are detailed in Tables 13 and 14 of **Appendix L** (Contamination assessment report).

National Waste Management site database

Waste management facilities located within 100 metres of the study area include:

- Eastern Creek Waste and Recycling Centre – operational facility owned by WSN Environmental Solutions, located at 29 Wallgrove Road, Eastern Creek
- Horsley Park Waste Management Facility - operational Landfill owned by Veolia Environmental Pty Ltd, located at 716-752 Wallgrove Road, Horsley Park.

Potential PFAS source sites

Foam containing PFAS was used by some NSW Rural Fire Brigades and Fire and Rescue NSW Brigades for firefighting activities, such as fuel type fires and training, since around 1975. Sites currently under investigation and sites not listed (identified by directory maps) were summarised in the **Appendix L** (Contamination assessment report). Sites located near the study area (within 500 metres) or within the same water catchment and up-gradient of the study area are summarised in Table 7-89.

Table 7-89 NSW RFS sites within 500 metres or within the water catchment and up-gradient of the study area

Precinct	Site	Site name and address	Description*	Proximity to the study area
1	1	Casula RFS at 1 Maple Road, Casula	Not listed as currently under investigation on RFS website.	1.3 kilometres southwest, within same water catchment
	2	Hoxton Park RFS at 8-10 First Avenue, Hoxton Park	An investigation has confirmed the presence of PFAS in some soil samples. A detailed site investigation is currently being undertaken by others to assess the extent of PFAS at the site and the improvement actions that will be required. There is currently no information on the extent of off-site impacts.	450 metres west and within same water catchment (Beard, Hinchinbrook and Cabramatta Creeks)
3	3	Horsley Park RFS at Arundle Road and The Horsley Drive, Horsley Park	Not listed as currently under investigation on RFS website.	860 metres west, within Reedy Creek water catchment, although three kilometres upstream of Westlink M7 crossing)
4	4	Eastern Creek RFS at 204 Rooty Hill Road South, Eastern Creek	Not listed as currently under investigation on RFS website.	200 metres west, within same water catchment (Eastern Creek)
5	5	Plumpton RFS at 7 Florence Street, Oakhurst	Not listed as currently under investigation on RFS website.	200 metres west, and downgradient of the study area
	16	NSW RFS at 2 Enterprise Drive, Glendenning	Not listed as currently under investigation on RFS website.	50 metres east and up topographic gradient

* The NSW Environment Protection Authority is leading the NSW PFAS investigation program and is monitoring the progress of NSW RFS PFAS investigations.

Asbestos

The asbestos register provided by the operators of Westlink M7 was reviewed for the study area. The register has records of known areas of illegal dumping and known asbestos. In Precinct 1, approximately 0.09 cubic metres of bonded asbestos (non-friable) and 0.04 cubic metres of friable asbestos were recorded. These were found in fibre cement on ground and in surface soils at the base of the toll point 1 gantry, and adjacent east of the toll gantry on the southbound exit ramp to Wallgrove Road respectively. Another 0.01 cubic metres of friable asbestos in soils was recorded in Precinct 4, located on the eastern kerb side (southbound direction) near the M4 Motorway interchange. A targeted contamination investigation was conducted in 2019 at the proposed Lighthorse Interchange Hub site which indicated that a fragment of bonded asbestos was observed within a soil stockpile at the former army camp (WWII) located within Precinct 4 (EES, 2019).

Historical spills and fires

The following information gathered between 2013 to May 2022 was obtained for the existing Westlink M7 by the Safety, Environment, and Stakeholder Manager for NorthWestern Roads:

- Vehicle fires have typically been confined to the road pavement
- Grass fires have occurred within the median strip or road shoulders and were largely associated with cigarette butt disposal
- Vehicle crashes have resulted in petrol/diesel fuel spills. Spills occur on the pavement, where the fuel can flow through the stormwater system to sediment basins. The majority of spills are contained to the road pavement area and cleaned according to procedures.

There is currently no available information regarding spills and fires along the existing Westlink M7 prior to 2013.

Potential areas and contaminants of concern

There is limited information regarding the construction of the existing Westlink M7; however, it is expected that the construction works adhered to contemporary design and quality standards, which included the involvement of an Independent Certifier. Standard construction practices at the time were likely to have been conducted in accordance with a Construction Environmental Management Plan (CEMP) and an unexpected finds procedure is expected to have been followed to manage unidentified chemical or asbestos contamination.

Based on the desktop review, source areas of potential contamination were identified within and surrounding the study area. A total of 48 sources were identified during the desktop review. For each source area, contaminants of potential concern (CoPCs) were identified, based on the source of potential contamination. Only sources or activities that are within, adjacent (within 100 metres) or topographically up-gradient have been considered as potential areas and sources of contamination. A summary of findings by precinct has been provided for the Westlink M7 median in Table 7-90, for the bridge widening areas in Table 7-91, for nearby construction compound and ancillary facilities in Table 7-92, and for other sites within the construction footprint in Table 7-93. These are illustrated in Figure 7-112 to Figure 7-127.

Table 7-90 Potential areas and contaminants of concern along the Westlink M7 median

Source area	Location	Contaminant of Potential Concern (CoPC)	Likelihood for risk of contamination
All Precincts			
Existing Westlink M7	Within the construction footprint	<ul style="list-style-type: none"> Heavy metals, TRH, PAH and BTEX 	Low – Standard emergency spill environmental safeguards were likely to have been implemented in the event of an accidental spill
Areas of former cut and fill associated with the construction of the Westlink M7	Within the construction footprint, especially at road intersections	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides 	Low – based on the assumptions above. The median likely comprises engineering fill on the edges of the median and general fill material/topsoil sourced locally from construction works or imported fill within the central portion of the median.
Areas of former filling near interceptions with surface water bodies	Within the construction footprint – near surface water bodies	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides 	Low – based on the assumptions above. The median likely comprises engineering fill on the edges of the median strip and general fill material/topsoil sourced locally from construction works or imported fill within the central portion of the median.
Former building structures	Within the construction footprint – various locations	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Lead and PCBs 	Moderate – the asbestos register indicates asbestos is present in Precinct 1 and 4 and experience suggests the potential for contamination of lead and PCBs from hazardous building materials (HAZMAT)
Precinct 1			
Areas of disturbed terrain and potential illegal dumping	Within the construction footprint and median strip – various locations	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides, herbicides 	Moderate – the asbestos register indicates asbestos is present in Precinct 1 and experience suggests the potential for contamination of heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides

Source area	Location	Contaminant of Potential Concern (CoPC)	Likelihood for risk of contamination
Recorded illegal dumping	Within the construction footprint adjacent to the median strip, north of Kurrajong Road	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM on ground and in surface soils) 	Moderate – the asbestos register indicates asbestos is present in Precinct 1
Substation and electricity production facilities (Endeavour Energy)	Adjoining the study area to the east and west, near Bernera Road interchange	<ul style="list-style-type: none"> PCBs, metals, TRH, PAH, BTEX Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) 	Low - Listed on NSW EPA list of contaminated sites. Potentially impacted groundwater is unlikely to be encountered and source area is located outside the construction footprint
Precinct 2			
Former large-scale agricultural sheds	Within the construction footprint and median strip	<ul style="list-style-type: none"> Heavy metal, TRH, PAH, BTEX, PCBs, herbicides and pesticides Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) 	Moderate – No information is available; however, experience suggests the potential for contamination
Potential illegal dumping	Within the construction footprint adjacent to median strip – various locations	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides, herbicides 	Moderate – Experience suggests the potential for contamination of heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides
Precinct 3			
Waste management facility	Within the construction footprint and median strip.	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Landfill leachate (Nutrients, Ammonia, Heavy metals, TRH, PAH, BTEX, PCBs, Phenols) Impacted soil associated with the landfill (Heavy metals, TRH, PAH, BTEX, PCBs and Phenols) Landfill gas Potential PFAS 	Moderate – No information is available, however there is potential for encountering landfill leachate and gases.

Source area	Location	Contaminant of Potential Concern (CoPC)	Likelihood for risk of contamination
Areas of disturbed terrain	Within the construction footprint and median strip – various locations	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides, herbicides 	Moderate – Experience suggests the potential for contamination of heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides
Precinct 4			
Waste management facility	Within the construction footprint and median strip.	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Landfill leachate (Nutrients, Ammonia, Heavy metals, TRH, PAH, BTEX, PCBs, Phenols) Impacted soil associated with the landfill (Heavy metals, TRH, PAH, BTEX, PCBs and Phenols) Landfill gas Potential PFAS 	High – No information is available, however experience suggests the potential for contamination as a result of migration of leachate from the landfill
Former building structures, disturbed ground, potential buried waste	Within the construction footprint and median strip, in the vicinity and south of the M4 Motorway (Light Horse) Interchange, as well as within the Old Wallgrove Road interchange	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides 	Moderate – the asbestos register indicates asbestos is present in Precinct 4 and experience suggests the potential for contamination of heavy metals, TRH, PAH, BTEX, PCBs, pesticides, and herbicides
Former army camp (WWII)	Within the construction footprint and median strip.	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, PCBs and OCPs UXO (nearby grenade range with slight potential for UXO) 	Moderate – Bonded asbestos and heavy metals have been identified within the former army camp. There is no information regarding PCBs and OCPs, however experience suggests the potential for contamination

Source area	Location	Contaminant of Potential Concern (CoPC)	Likelihood for risk of contamination
Precinct 5			
Railway and former disturbed ground	Within the construction footprint and median strip – in the vicinity of the railway	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides, phenolics (creosote) 	Moderate – No information is available; however, experience suggests the potential for contamination from the CoPC identified
Former building structures and historical businesses (chemical production, poultry farms), potential buried waste	Within the construction footprint and median strip, various locations	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides, chlorinated hydrocarbons, VOCs, SVOCs, phenols 	Moderate – No information is available; however, experience suggests the potential for contamination from the CoPC identified
Filled in dams	Within the construction footprint and median strip	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides 	Moderate – No information is available; however, experience suggests the potential for contamination from the CoPC identified
Steel plant (Infrabuild NSW)	Adjoining the study area to the east, north of the rail line	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Metals, TRH, PAH, BTEX, phenols 	Low - Listed on NSW EPA list of contaminated sites, however potentially impacted groundwater is unlikely to be encountered and source area is located outside the construction footprint

Notes: ACM – asbestos containing materials; TRH- total petroleum hydrocarbons; PAH – polycyclic aromatic hydrocarbons; BTEX – benzene, toluene, ethylbenzene, and xylenes; PCBs – polychlorinated biphenyls; OCP – organochlorine pesticides; VOC - volatile organic compounds; and SVOCs – semi volatile organic compounds.

Table 7-91 Potential areas and contaminants of concern at the bridge widening areas

Source area	Location	Contaminant of Potential Concern (CoPC)	Likelihood for risk of contamination
All Precincts			
Existing Westlink M7	Within the construction footprint	<ul style="list-style-type: none"> Heavy metals, TRH, PAH and BTEX 	Low – Standard emergency spill environmental safeguards were likely to have been implemented in the event of an accidental spill
Areas of former cut and fill associated with the construction of the Westlink M7	Within the construction footprint at various locations	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides 	Low – based on the assumptions above. Fill associated with existing Westlink M7 likely comprises of engineering fill, general fill material/topsoil sourced locally from construction works or imported fill. The volume of fill material in the bridge widening areas due to the original construction is likely to be low.
Areas of former filling near interceptions with surface water bodies	Within the construction footprint – near surface water bodies at B9817-NB, B9826-NB and B9827-SB	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides 	Low – based on the assumptions above. Fill associated with existing Westlink M7 likely comprises of engineering fill, general fill material/topsoil sourced locally from construction works or imported fill. The volume of fill material in the bridge widening areas due to the original construction is likely to be low.
Former building structures	Within the construction footprint at various locations	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Lead and PCBs 	Moderate – the asbestos register indicates asbestos is present in Precinct 1 and 4 and experience suggests the potential for contamination of lead and PCBs from hazardous building materials (HAZMAT)
Precinct 1			
Areas of disturbed terrain (former stockpiles)	Within the construction footprint adjacent to B9817-NB	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides, herbicides 	Moderate – the asbestos register indicates asbestos is present in Precinct 1 and experience suggests the potential for contamination of heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides

Source area	Location	Contaminant of Potential Concern (CoPC)	Likelihood for risk of contamination
Substation and electricity production facilities (Endeavour Energy). Potential source of contamination to Cabramatta Creek	Adjoining the study area to the east and west, near B9825-SB, B9826-NB and B9827-SB	<ul style="list-style-type: none"> PCBs, metals, TRH, PAH, BTEX Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) 	Low - Listed on NSW EPA list of contaminated sites, however the likelihood of encountering potentially impacted groundwater is minimal and source area is located outside the construction footprint
Potential illegal dumping	Within the construction footprint adjacent to B9826-NB and B9827-SB	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM on ground and in surface soils) 	Moderate – the asbestos register indicates asbestos is present in Precinct 1
Hoxton Park RFS potential source of PFAS contamination to Cabramatta Creek	450 metres west of the study area. Locations B9826-NB and B9827-SB are in proximity to Cabramatta Creek	<ul style="list-style-type: none"> PFAS TRH, BTEX and PAHs 	Low – PFAS has been identified during previous investigations. The NSW EPA is currently leading a PFAS investigation program of RFS sites. The likelihood of encountering potentially impacted groundwater is minimal and source area is located outside the construction footprint
Precinct 2			
Former large-scale agricultural sheds	Within the construction footprint and adjacent to B9841-NB and B9842-SB	<ul style="list-style-type: none"> Heavy metal, TRH, PAH, BTEX, PCBs, herbicides and pesticides Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) 	Moderate – No information is available, however experience suggests the potential for contamination

Source area	Location	Contaminant of Potential Concern (CoPC)	Likelihood for risk of contamination
Precinct 3			
Waste management facility	Adjoining the study area to the east. Locations in proximity to B9861-NB and B9862-SB	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Landfill leachate (Nutrients, Ammonia, Heavy metals, TRH, PAH, BTEX, PCBs, Phenols) Impacted soil associated with the landfill (Heavy metals, TRH, PAH, BTEX, PCBs and Phenols) Landfill gas Potential PFAS 	Low – The likelihood of encountering potentially impacted groundwater is minimal and source area is located outside the construction footprint
Precinct 4			
Waste management facility	Within the construction footprint and adjoining the study area to the east. Location in proximity to B9863-NB, B9864-SB, B9870-NB, B9871-SB, B9873-NB and B9874-SB	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Landfill leachate (Nutrients, Ammonia, Heavy metals, TRH, PAH, BTEX, PCBs, Phenols) Impacted soil associated with the landfill (Heavy metals, TRH, PAH, BTEX, PCBs and Phenols) Landfill gas Potential PFAS 	High – No information is available, however there is potential for encountering landfill leachate and gases.
Potential illegal dumping	Within the construction footprint and adjacent to B9893-NB and B9894-SB	<ul style="list-style-type: none"> Asbestos (friable asbestos in soils), likely ACM throughout 	Moderate – the asbestos register indicates asbestos is present in Precinct 4

Source area	Location	Contaminant of Potential Concern (CoPC)	Likelihood for risk of contamination
Eastern Creek RFS	200 metres west of the study area, potential source of PFAS to Eastern Creek tributary within the study area. Locations B9893-NB and B9894-SB are in proximity.	<ul style="list-style-type: none"> Potential PFAS TRH, BTEX and PAH 	Low – The likelihood of encountering potentially impacted groundwater is minimal and source area is located outside the construction footprint
Precinct 5			
Railway and former disturbed ground	Within the construction footprint – in the vicinity of the railway at B8245-NB and B9901-SB	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides, phenolics (creosote) 	Moderate – No information is available, however experience suggests the potential for contamination
Filled in dam pre-1991	Within the construction footprint adjacent to B9908-NB and B9909-SB	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides 	Moderate – No information is available, however experience suggests the potential for contamination
Former poultry farm	Within the construction footprint adjacent to B9910-NB and B9911-SB	<ul style="list-style-type: none"> Heavy metal, TRH, PAH, BTEX, PCBs, herbicides and pesticides Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) 	Moderate – No information is available, however experience suggests the potential for contamination

Notes: ACM – asbestos containing materials; TRH- total petroleum hydrocarbons; PAH – polycyclic aromatic hydrocarbons; BTEX – benzene, toluene, ethylbenzene, and xylenes; PCBs – polychlorinated biphenyls; OCP – organochlorine pesticides; VOC - volatile organic compounds; and SVOCs – semi volatile organic compounds.

Table 7-92 Potential areas and contaminants of concern at proposed construction ancillary facilities outside Westlink M7

Site	Site address	Source	Contaminant of Potential Concern (CoPC)	Likelihood for risk of contamination
Construction ancillary facility - Zone D-2	Hoxton Park Road, Hinchinbrook	Former market gardens and road works depot (fuel and chemical storage and stockpiling of soil/construction waste)	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Metals, TRH, PAH, BTEX, phenols, OCPs and PCBs 	Moderate – No information is available, however experience suggests the potential for contamination
Construction ancillary facility - Zone A-2	20 Blackbird Close, Len Waters Estate 30 Blackbird Close, Len Waters Estate	Adjoining former Hoxton Park Airport and filling for site levelling	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Metals, TRH, PAH, BTEX, phenols, OCPs and PCBs PFAS 	Moderate – No information is available, however experience suggests the potential for contamination
Construction ancillary facility – Zone A-3	Cowpasture Road, Elizabeth Hills Part Aviation Road	Adjoining former Hoxton Park Airport and filling for road construction	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Metals, TRH, PAH, BTEX, phenols, OCPs and PCBs PFAS 	Moderate – No information is available, however experience suggests the potential for contamination
Access roads	Various locations	Fill material of unknown origin and quality, and potential for uncontrolled dumping	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Metals, TRH, PAH, BTEX, phenols, OCPs and PCBs 	Moderate – No information is available, however experience suggests the potential for contamination

Notes: ACM – asbestos containing materials; TRH- total petroleum hydrocarbons; PAH – polycyclic aromatic hydrocarbons; BTEX – benzene, toluene, ethylbenzene and xylenes; PCBs – polychlorinated biphenyls; OCP – organochlorine pesticides; VOC - volatile organic compounds; and SVOCs – semi volatile organic compounds.

Table 7-93 Potential areas and contaminants of concern at other sites within the construction footprint

Site	Site address	Source	Contaminant of Potential Concern (CoCP)	Likelihood for risk of contamination
Noise walls	Within the construction footprint – various locations	Fill material of unknown origin and quality, and neighbouring commercial/industrial land uses	<ul style="list-style-type: none"> Asbestos (bonded asbestos in the form of ACM as well as friable asbestos and asbestos fines in soil) Heavy metals, TRH, PAH, BTEX, PCBs, pesticides and herbicides 	Moderate – No information is available, however experience suggests the potential for contamination from neighbouring current and historical commercial/industrial land uses
Water treatment basins	Within the construction footprint	Stormwater runoff from the existing Westlink M7	<ul style="list-style-type: none"> TRH, PAH, BTEX, Phenols 	Moderate – Known spills and leaks from vehicles

Notes: ACM – asbestos containing materials; TRH- total petroleum hydrocarbons; PAH – polycyclic aromatic hydrocarbons; BTEX – benzene, toluene, ethylbenzene, and xylenes; PCBs – polychlorinated biphenyls; OCP – organochlorine pesticides; VOC - volatile organic compounds; and SVOCs – semi volatile organic compounds.