Appendix L - Part 1

Contamination Impact Assessment

Prepared for
Transport for NSW
ABN: 18 804 239 602

Contamination Impact Assessment

Technical Report

14-Jul-2022
Westlink M7 Widening

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Contamination Impact Assessment

Client: Transport for NSW

ABN: 18 804 239 602

Prepared by

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14-Jul-2022

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Glossary and abbreviations

Key terms	Description
Approved project	The Westlink M7 (previously referred to as Western Sydney Orbital) is an existing 39-kilometre-long toll road connecting the M5 Motorway at Prestons, the Hills M2 Motorway at Baulkham Hills and the M4 Motorway at Eastern Creek.
Conditions of Approval (CoA)	These are the current conditions that apply to the approved project. Found here: https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=SSI-663-MOD-5%2120190718T013836.398%20GMT
Construction footprint	The area required for construction of the proposed modification.
Operational footprint	The area required for operation of the proposed modification.
Proposed modification	The addition of a trafficable lane in both directions within the existing median of the Westlink M7, from about 140 metres south of the Kurrajong Road overhead bridge at Prestons (southern end) to the Westlink M7 Bridge at Richmond Road in Oakhurst/Glendenning (northern end), excluding at the M4 Motorway/Westlink M7 Light Horse Interchange.
Study area	Refer Section 3.2.1.
Transport for NSW	The proponent seeking approval for the modification.
Westlink M7	M7 Motorway or formerly known as Western Sydney Orbital.

Acronym	Definition
ACM	Asbestos containing material
AHD	Australian height datum
ANZAST	Australian and New Zealand and Australian State and Territory Governments
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure 2013
AASS	Actual acid sulfate soil
ASS	Acid sulfate soil
ASSMAC	Acid Sulfate Soils Management Advisory Committee
ASSMP	Acid sulfate soil management plan
bgl	Below ground level
CLM Act	*Contaminated Land Management Act 1997* (NSW)
CoPC	Contaminant of potential concern
CSM	Conceptual site model
DECC	Former NSW Department of Environment and Climate Change (now OEH)
DP	Deposited plan
DPE	NSW Department of Planning and Environment
DSI	Detailed Site Investigation
DUAP	NSW Department of Urban Affairs and Planning

Acronym	Definition
EHC Act	*Environmentally Hazardous Chemicals Act 1985* (NSW)
EIS	Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPA	NSW Environment Protection Authority
ENM	Excavated natural material
HEPA	Heads of EPAs Australia and New Zealand
km	kilometres
LEP	Local Environmental Plan
LGA	Local Government Area
m	metres
NEPC	National Environment Protection Council
NEMP	National Environmental Management Plan
NEPM	National Environment Protection Measure
NSW	New South Wales
OCPs	Organochlorine pesticides
OEMP	Operational environmental management plan
OPPs	Organophosphorus pesticides
PAHs	Polycyclic aromatic hydrocarbons
PASS	Potential ASS
PCBs	Polychlorinated biphenyls
PFAS	Per- and poly- fluoroalkyl substances
POEO Act	*Protection of the Environment Operations Act 1997* (NSW)
RAP	Remedial Action Plan
SAQP	Sampling, Analysis and Quality Plan
SEARs	Secretary's Environmental Assessment Requirements
SSI	State Significant Infrastructure
SVOC	Semi-volatile organic compounds
SWL	Standing water level
SWMP	Soil and Water Management Plan
Transport	Transport for NSW
TRH	Total recoverable hydrocarbon
UPSS	Underground Petroleum Storage Systems
UXO	Unexploded ordnance
VENM	Virgin excavated natural material
VOC	Volatile organic compounds
WSO Co	Western Sydney Orbital (WSO) Co Pty Limited

Executive Summary

The Westlink M7 is an existing 39-kilometre-long toll road connecting the M5 Motorway at Prestons, The Hills M2 Motorway at Baulkham Hills and the M4 Motorway at Eastern Creek ('the approved project'). Transport for NSW (Transport) is seeking a modification to the approved project to widen part of the Westlink M7 in response to current and forecast traffic growth, and to improve motorway efficiency, travel time performance and safety.

A contamination assessment was undertaken to identify the potential for contamination within areas to be impacted by the construction and operation of the proposed modification. The study area for the contamination assessment comprises a 100-metre buffer of the construction footprint for the proposed modification and the ancillary compounds located outside the Westlink M7 lease boundary.

The contamination assessment has been prepared to address the relevant Secretary's Environmental Assessment Requirements (SEARs) issued for the proposed modification. Specifically, this report has been prepared to assess the potential impacts of construction and operation of the proposed modification on human and ecological receptors; identify acid sulfate soil and soil salinity within the proposal area and identify potential impacts; assess the impacts on soil and land resources (particularly soil erosion and sediment transport); and to identify appropriate mitigation and management measures to address the impacts identified.

Potential existing areas of contamination were identified within the study area that could have an adverse impact on human or ecological health if disturbed during construction or remain during operation of the proposed . The sources of contamination include demolition of former buildings that comprised hazardous building materials (lead based paint and asbestos containing materials [ACM]), former market gardens, illegal waste dumping, past industrial land uses, service stations and landfills, and use of the existing Westlink M7.

Mitigation measures including targeted Detailed Site Investigations (DSIs), implementation of a Soil and Water Management Plan (SWMP) and procedures for the management of saline soils and potential inland acid sulfate soils would minimise the risk of adverse impacts to ecological and human receptors during construction. The adverse impacts from contamination during operation would be managed by the implementation of an Operational Environmental Management Plan (OEMP) and assessment of redundant construction areas for future land uses.

1.0 Introduction

The Westlink M7 is an existing 39-kilometre-long toll road connecting the M5 Motorway at Prestons, The Hills M2 Motorway at Baulkham Hills and the M4 Motorway at Eastern Creek ('the approved project') (SSI 663). Transport for NSW (Transport) is seeking a modification to the approved project to widen part of the Westlink M7 in response to current and forecast traffic growth, and to improve motorway efficiency, travel time performance and safety.

1.1 Overview of proposed modification

Transport for NSW (Transport) as the proponent for the proposed modification, is requesting that the Minister for Planning and Homes modify the project planning approval for the Western Sydney Orbital (now referred to as Westlink M7) under section 5.25 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The original approval (DPE reference number SSI-663) was for the construction and operation of the existing four-traffic lane motorway. The proposed modification would provide an additional trafficable lane in both directions within the existing median of the Westlink M7. The motorway would be widened from about 140 metres south of the Kurrajong Road bridge at Prestons (southern end) to the intersection with Richmond Road in Oakhurst/Glendenning (northern end), excluding at the M4 Motorway/Westlink M7 Motorway (Light Horse) interchange. The key features of the proposed modification are shown in Figure 1-1 to Figure 1-5.

FIGURE 1-1: KEY FEATURES (SHEET 1 OF 5)

N 0 400 800 m

AECOM

Legend

- Proposed widening
- Operational footprint
- Watercourse
- Existing noise wall
- New noise wall (NW####)
- Transport for NSW bridge number B9#### proposed to be widened

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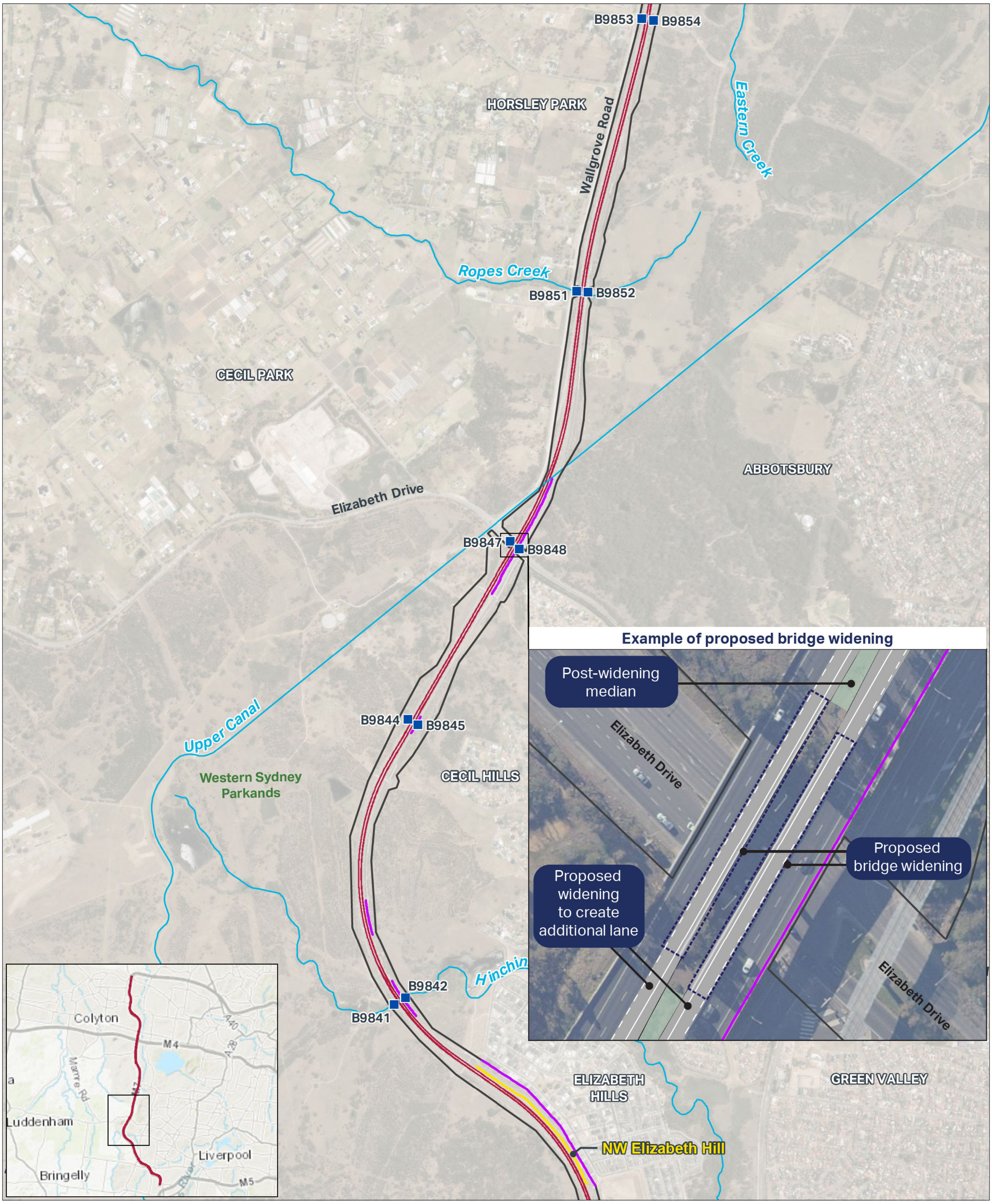
B9853
B9854
HORSLEY PARK
Wallgrove Road
Eastern Creek
Ropes Creek
B9851
B9852
CECIL PARK
ABBOTSBURY
Elizabeth Drive
B9847
B9848
Example of proposed bridge widening
Post-widening median
Elizabeth Drive
Proposed bridge widening
Proposed widening to create additional lane
Elizabeth Drive
Upper Canal
B9844
B9845
Western Sydney Parkands
CECIL HILLS
Hinchin
B9842
B9841
ELIZABETH HILLS
GREEN VALLEY
NW Elizabeth Hill
Colyton
M4
Luddenham
Liverpool
Bringelly
M5

FIGURE 1-2: KEY FEATURES (SHEET 2 OF 5)

N 0 400 800 m

AECOM

Legend

- Proposed widening
- Operational footprint
- Watercourse
- Existing noise wall
- New noise wall (NW####)
- Transport for NSW bridge number B9#### proposed to be widened

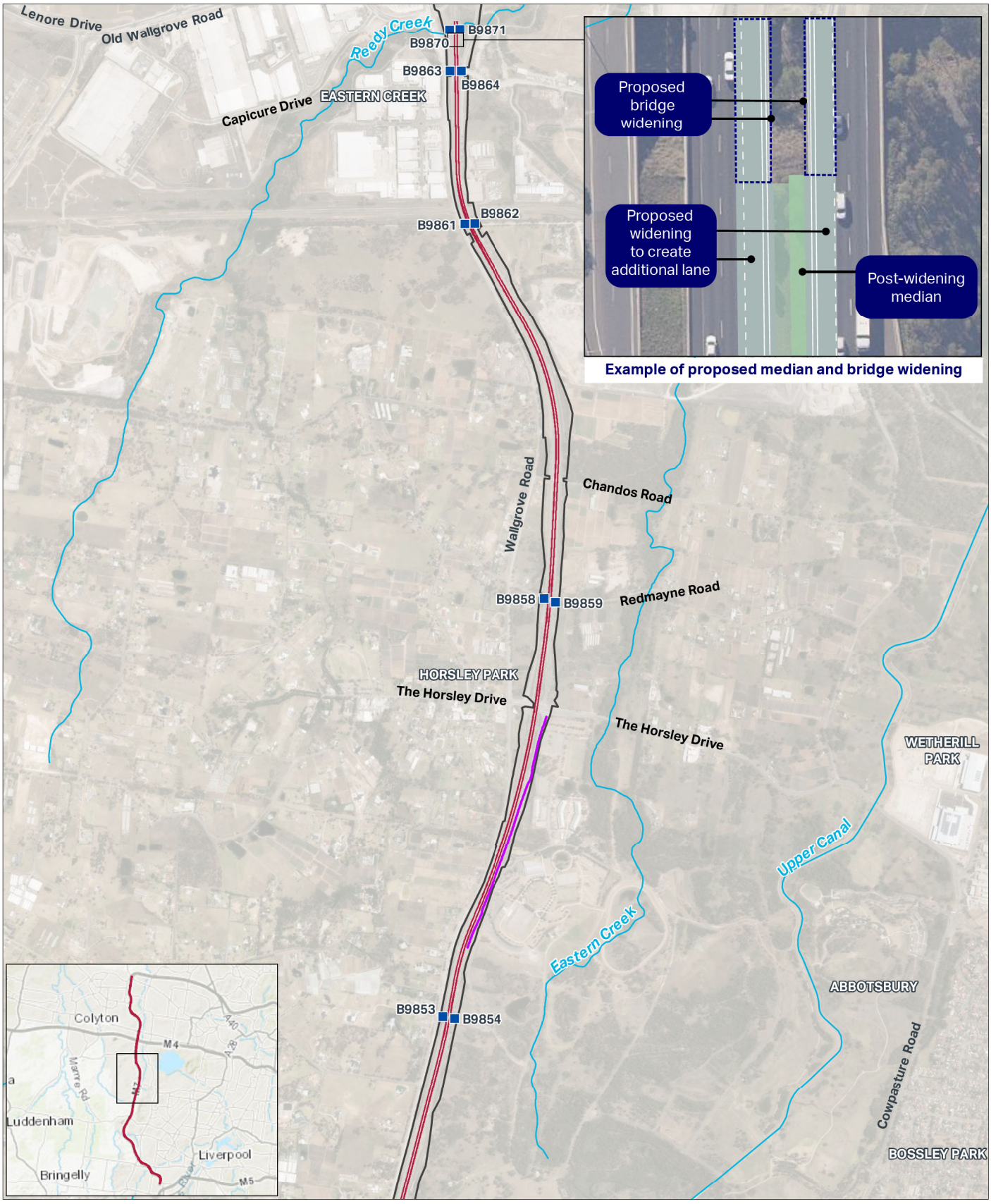

FIGURE 1-3: KEY FEATURES (SHEET 3 OF 5)

N

0 400 800 m

AECOM

Legend

- Proposed widening
- Operational footprint
- Watercourse
- Existing noise wall
- Trransport for NSW bridge number B9#### proposed to be widened

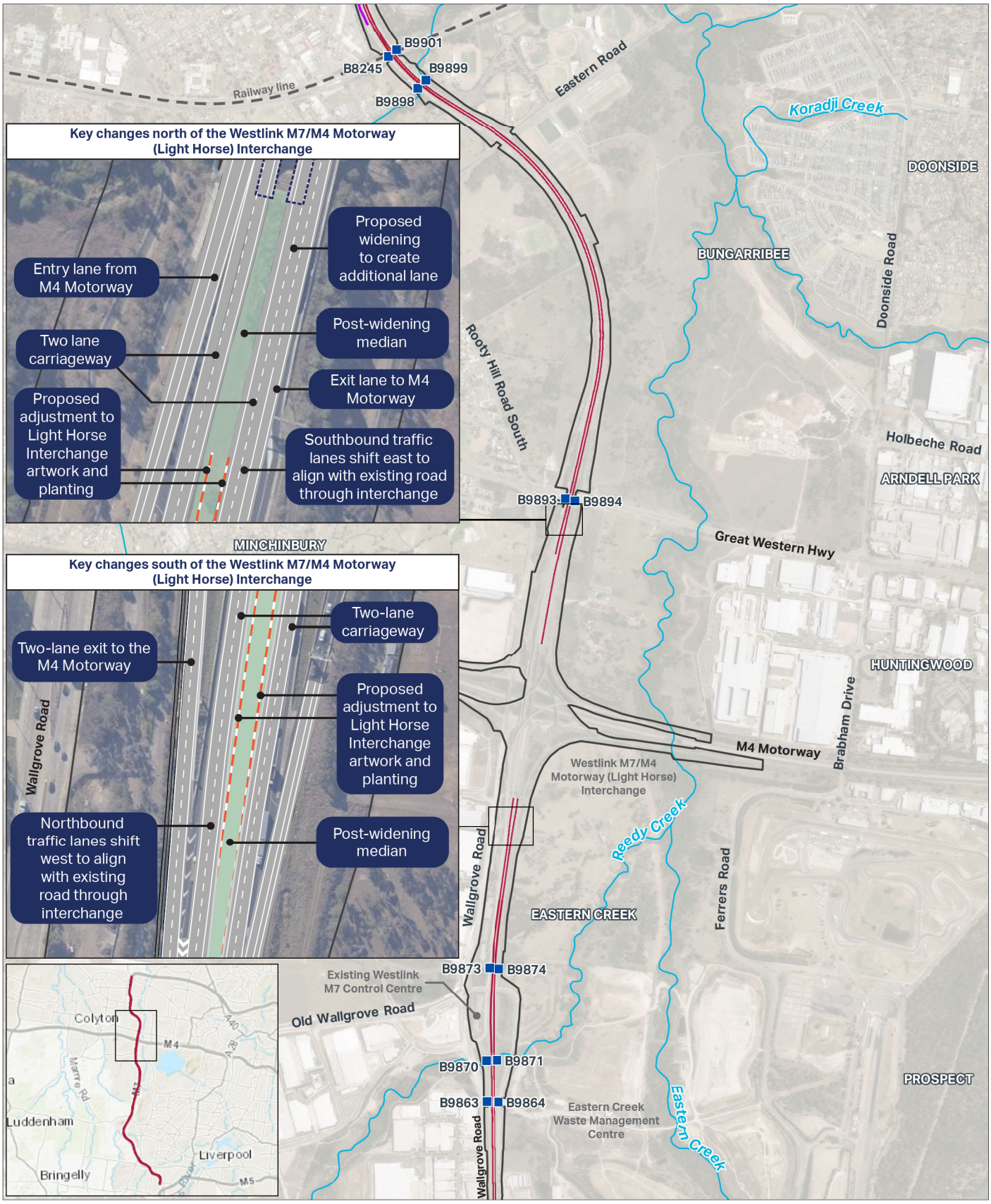

FIGURE 1-4: KEY FEATURES (SHEET 4 OF 5)

N

0 400 800 m

AECOM

Legend

- Proposed widening
- Operational footprint
- Watercourse
- Existing noise wall
- Artwork potentially impacted by proposed modification
- Transport for NSW bridge number B9#### proposed to be widened

Source: Imagery © Department of Customer Service 2020
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community.

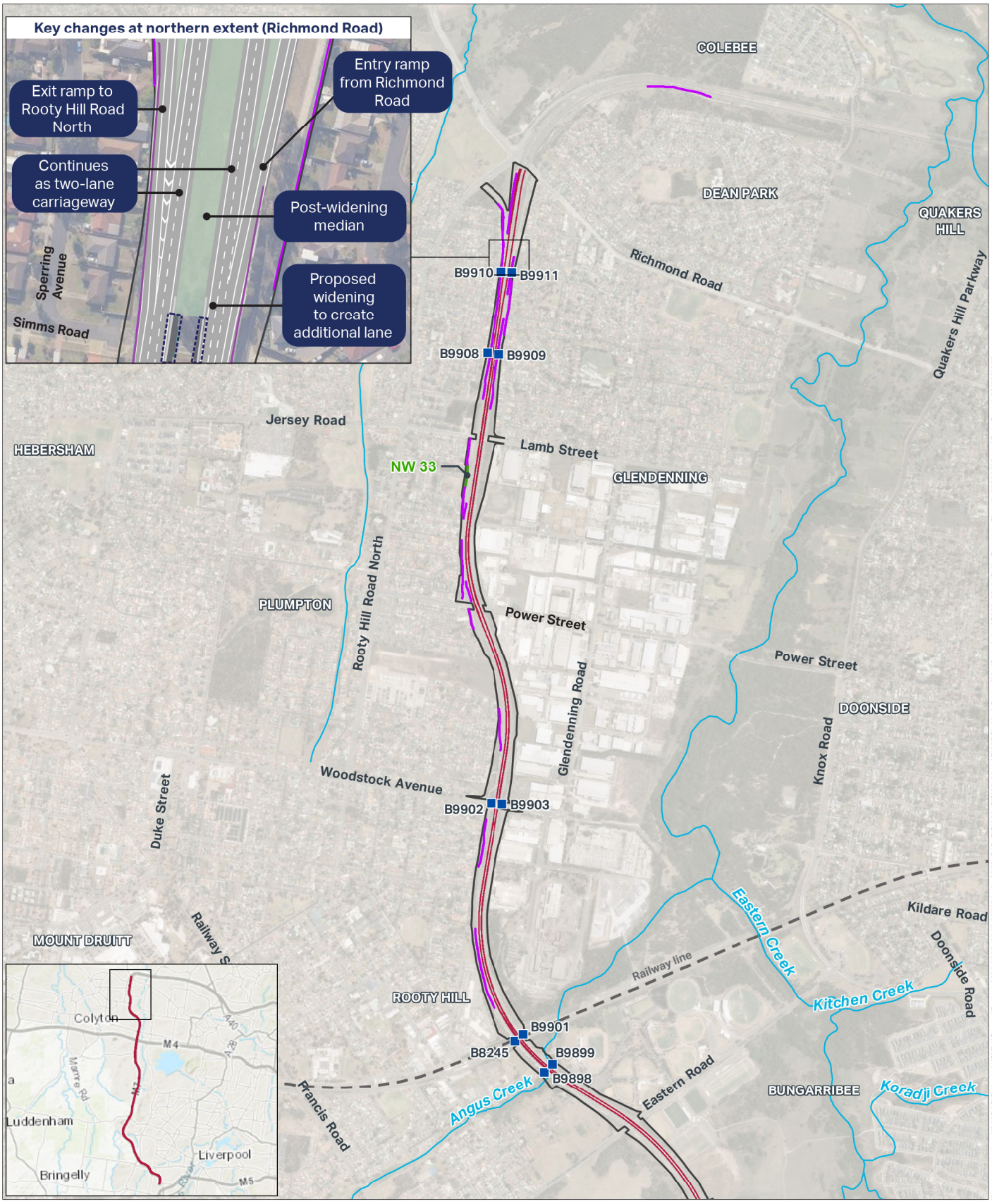

FIGURE 5-5: KEY FEATURES (SHEET 5 OF 5)

Legend

- Proposed widening
- Operational footprint
- Watercourse
- Existing noise wall
- Existing noise wall height increase (NW####)
- Transport for NSW bridge number B9#### proposed to be widened

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1.2 Purpose of this technical report

This technical report provides a contamination assessment of the proposed modification and supports the Modification Report. This report addresses the relevant Secretary's Environmental Assessment Requirements (SEARs) for the modification report provided by the NSW Department of Planning and Environment (DPE) (Application number SSI 663).

1.2.1 Secretary's Environmental Assessment Requirements

The relevant SEARs are presented in Table 1.

Table 1 SEARs – Soils and contamination

Desired Performance Outcome	SEAR	Where addressed within this report
The environmental values of land, including soils, subsoils and landforms, are protected. Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.	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 4.2.4**
	2. The impact of the project on acid sulfate soils (including impacts of acidic runoff offsite) in accordance with the current guidelines.	**Section 5.2** **Section 6.2**
	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.	**Section 4.19** **Section 5.1**
	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.	**Section 4.2.3** **Section 5.3** **Section 6.3**
	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 5.5** **Section 6.4**

1.3 Structure of this technical report

This technical report is structured as follows:

- **Section 1.0 – Introduction**: This section provides context for the report.
- **Section 2.0 – Proposed modification**: This section provides a description of the proposed modification including construction and operational activities.
- **Section 3.0 – Method of assessment**: This section outlines the methods used to assess the proposed modification as it relates to contamination.
- **Section 4.0 – Existing environment**: This section describes the existing environment as it relates to contamination.
- **Section 5.0 – Construction impact assessment**: This section assesses the impacts of the proposed modification during construction as it relates to contamination.
- **Section 6.0 – Operational impact assessment**: This section assesses the impacts of the proposed modification during operation as it relates to contamination.
- **Section 7.0 – Mitigation and management measures**: This section documents environmental management measures that are proposed to mitigate the identified impacts of the proposed modification (taking into account the existing Conditions of Approval for the approved project).
- **Section 8.0 – Conclusion**: This section summarises the construction and operational impacts of the proposed modification as it relates to contamination and briefly describes the recommended mitigation and management measures.

2.0 Proposed modification

The proposed modification would permit the addition of a trafficable lane in both directions within the existing median of the Westlink M7. A full description of the construction activities and operational features are provided in detail in **Chapter 4** (Proposed modification) of the Modification Report.

The proposed modification to the approval for the Westlink M7 would include the following key operational components (refer also Figure 1-1 to Figure 1-5):

- Widening of the motorway into the existing median for a length of about 26 kilometres along the Westlink M7, from about 140 metres south of the Kurrajong Road overhead bridge at Prestons (southern end) to Richmond Road interchange in Oakhurst/Glendenning (northern end), excluding at the M4 Motorway/Westlink M7(Light Horse) Interchange
- Widening the exit from the Westlink M7 northbound onto the M4 Motorway westbound from one lane to two lanes
- Widening of 43 existing northbound and southbound bridges on the Westlink M7 at 23 locations within the centre median, and widening on outside of the bridges on the approach to the M4 Motorway from Old Wallgrove Road
- Upgrades, additions and modifications to noise walls
- Utility works and upgrades to drainage
- Intelligent Transport System (ITS) installations, adjustments and relocations to cover the new lane configurations.

Existing operational features impacted by the proposed modification would include:

- Main road alignment, including median and bridge areas
- Interchanges, tie-ins and entry/exit ramps
- Fill embankments and cuttings
- Culverts and drainage structures
- Water quality control measures, including basins
- Landscaping
- Existing public art and landscaping at the M4 (Light Horse) Interchange
- Maintenance access
- Security fencing
- Noise barriers
- Shared path
- Other associated elements required during operation (for example, intelligent transport systems (ITS), utilities and variable message signs (VMS)).

The following activities would be required to facilitate construction of the proposed modification:

- Establishment of several construction ancillary facilities within and adjacent to the Westlink M7 and the M12 Motorway construction area. These would be used for stockpiling, construction support at bridge and median widening locations, project offices and compounds. The precise number and location of construction ancillary facilities would be determined by the construction contractor in accordance with the environmental approval
- Vegetation clearing within the median/widening areas and construction ancillary facilities (including for construction accesses)
- Demolition of existing structures and infrastructure within the widening areas

- Provision of temporary water management infrastructure including the maintenance of stormwater drainage and establishment of waterway crossings and diversions
- Utility works within Westlink M7 and adjoining roads, particularly around existing motorway bridge substructures
- Earthworks for bridge and road widening within the existing median, and placement and compaction of fill material (refer below for further information on earthworks proposed)
- Bridge widening works including establishment of substructures such as piles, abutments, piers and headstocks and superstructures including beams, girders, decks and barriers
- Pavement widening works within the road median
- Finishing works including asphalting the carriageway surface, line marking, signage, permanent barriers and median infill, adjustments to noise walls, installation of communications infrastructure and landscaping treatments.

Construction would likely commence in 2023 and continue through to the end of 2025. The construction program for the M12 Motorway, and how this interfaces with the Westlink M7, has been considered in the development of this program. It is proposed to construct the proposed modification at this interchange at the same time as the M12 Motorway project works to minimise disruption and achieve efficiencies during construction.

Earthworks

Earthworks to facilitate construction of the proposed modification include:

- Topsoil stripping
- Excavation for new cut and fill areas
- Excavation for retaining structures
- Construct pavement layers
- Excavation of piers and abutments for bridge works
- Trenching for utilities and drainage
- Excavation of footings for noise barriers and retaining walls
- Temporary waterway diversions and/or waterway crossings during construction at the following crossings (with Transport bridge number):
    - Maxwells Creek Bridge 1 (B9817)
    - Maxwells Creek Bridge 2 (B9821)
    - Cabramatta Creek Bridge (B9825/B9826)
    - Hoxton Park Road Bridge (B9829/B9830)
    - Aviation Road (B9839/B9840)
    - Hinchinbrook Creek (B9841/B9842)
    - Villiers Road (B9851/B9852)
    - Reedy Creek (B9870/B9871)
    - Reedy Creek Tributary Bridge (B9873/B9874)
    - Angus Creek (B9898/B9899)
- Earthworks at disturbed areas to establish the finished landform
- Stockpiling and temporary storage of excavated materials.

Generally, earthworks would be undertaken using common civil earthwork methods. These works would involve bulk excavation, excavation to accommodate road widening within the existing median and placement and compaction of fill material.

Excavated material would be placed into trucks, which would either remove and dispose of the material or stockpile the material for future use. Material excavated during earthworks would be re-used in construction where possible. Potential spoil for re-use would be confirmed during detailed design.

During earthworks, water trucks would be used to assist the compaction of the material and to control dust being generated.

It is estimated that earthworks would likely result in a net amount of cut material (estimated at about 174,000 cubic metres) that would need to be exported. Table 2 outlines the estimated types and volumes of materials that would be managed during construction and provides the recommended management approach for each type of material.

Table 2 Estimated earthworks quantities required for the proposed modification

Type of material	Estimated quantity (cubic metres)	Management approach
Total fill material required	30,000	Where possible, source on site from cuts required for the construction of the proposed modification. Alternatively, use imported material, to be sourced locally where practical.
Total cut material to be excavated	204,000	It is anticipated that all suitable excavated material would be reused within the site as general fill either within the same section of work or elsewhere along the construction footprint. Where it cannot be reused on site, material would be managed in the following order of priority: 1. Transfer to other Transport projects for reuse in accordance with the NSW EPA's excavated public road resource recovery order and exemption 2. Transfer to approved Transport stockpile sites for reuse on a future project if a specific project was identified and statutory/regulatory requirements under the *Protection of the Environment Operations Act 1997* are met 3. Transport off-site for reuse by a third party in accordance with relevant NSW EPA resource recovery order and exemption or to a NSW EPA licensed waste recovery facility 4. Dispose at licenced materials recycling or waste disposal facility. Where excavated material is deemed unsuitable for reuse or emplacement due to soil contamination, in accordance with the spoil management procedure in the Soil and Water Management Plan (SWMP), the impacted material would be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste* (NSW EPA, 2014) and taken to a waste facility licensed to accept the waste.
Total net spoil to be exported offsite	174,000	Not applicable.

Type of material	Estimated quantity (cubic metres)	Management approach
Topsoil imported	25,000	Where possible, topsoil stripped would be reused on site. Any material to be removed from site would be managed in accordance with the waste management measures.
Select material zone (SMZ) import	122,000	Import material, locally sourced where practicable.

3.0 Method of assessment

This section describes the method of assessment used in this technical assessment report, and also outlines the legislation, guidelines and policy that are relevant to the assessment.

3.1 Relevant legislation, guidelines and policy

The relevant legislation and policies for contaminated land in NSW that have been considered during the preparation of this report include:

- *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* (the UPSS Regulation)
- *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, 2017)
- *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), 2002)
- *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 (HEPA), 2020, *PFAS National Environmental Management Plan*, January (NEMP), as amended in January 2020.
- Journal of Australian Geomechanics Society (AGS), Vol. 42: No 1, 2007, *Practice Note Guidelines for Landslide Risk Management*
- *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) and *Volume 2* (A. Installation of Services; B. Waste Landfills; C. Unsealed Roads; D. Main Roads; E. Mines and Quarries) (DECC, 2008)

3.2 Method of assessment

The construction of the proposed modification would result in the disturbance and excavation of surface and subsurface soils.

An assessment of the presence of potential contamination within the study area was completed via desktop review of available information. The assessment methodology is presented in the following sections.

3.2.1 Study area

The study area for this assessment comprised the Westlink M7 lease area and non-M7 land nominated for use as construction ancillary facilities during construction plus a 100-metre buffer around these locations. The study area has been broken down into five distinct precincts for the purposes of this report. The precincts cover the study area south to north into sections of between five and 10 kilometres long. The study area precincts are presented in Table 3 and illustrated in Figure 3-1 to Figure 3-5. Details of the construction ancillary facilities outside of the Westlink M7 are listed in Table 4.

Table 3 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)

Table 4 Construction ancillary facilities outside of the Westlink M7 in study area

Ancillary facility name	Site address	Identifier	Site owner	Site use	LGA	Area
Zone D-2	345 Hoxton Park Road, Hinchinbrook	Lot 1 DP1083454	Transport	Vacant undeveloped lot	Liverpool	0.9 ha
Zone A-2	Chainage (Ch)-6400 Local road level at western side of Blackbird Close 20 Blackbird Close, Len Waters Estate 30 Blackbird Close, Len Waters Estate	Lot 402 DP1141990 Lot 403 DP1141990	Private landowner (Len Waters Estate)	Vacant and undeveloped	Liverpool	1.6 ha
Zone A-3	Ch-6700 Local road level at Aviation Road	Part Lot 101 DP1158385/ Aviation Road Reserve	Council	Reserve for flood detention basin	Liverpool	0.5 ha
AF8 (site approved under M12 Motorway project) Western Sydney Parklands (south of AF8)	Western Sydney Parklands (east of Westlink M7, south of Elizabeth Drive) (M12 Motorway project area)	Lot 3 DP1087825	Western Sydney Parklands	Western Sydney Parklands Trust	Liverpool	0.23 ha
AF17 (site approved under M12 Motorway project)	125-151 Wallgrove Road, Cecil Hills (M12 project area)	Lot 24 DP1152887	Western Sydney Parklands	Vacant paddock	Fairfield	0.45 ha
AF18 (site approved under M12 Motorway project)	87-95 Wallgrove Road, Cecil Park (M12 project area)	Lot 26B DP387529	Western Sydney Parklands	Vacant paddock	Fairfield	0.12 ha
Zone B (site approved M12 Motorway project as AF9)	Ch-11500 (M12 Motorway project area) 84 Wallgrove Road, Cecil Park 144 Wallgrove Road, Cecil Park 112-128 Wallgrove Road, Cecil Park	Lot 11 DP1021940 Lot 12 DP1021940 Lot 14 DP1021940 Lot 13 DP1021940	Western Sydney Parklands	Agricultural	Fairfield	1.40 ha

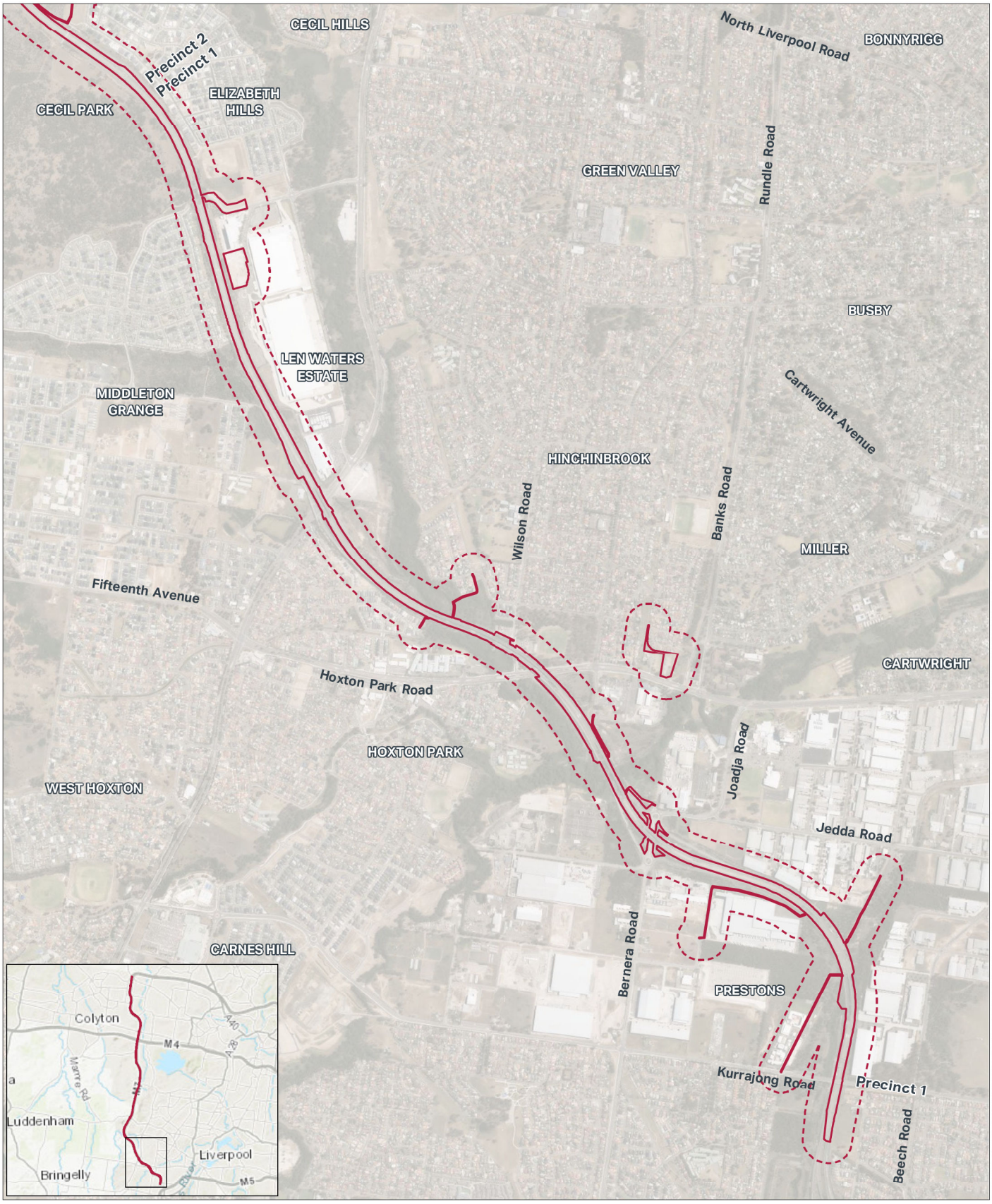

FIGURE 3-1: STUDY AREA (SHEET 1 OF 5)

N

0 400 800 m

AECOM

Legend

- Construction footprint
- Study area

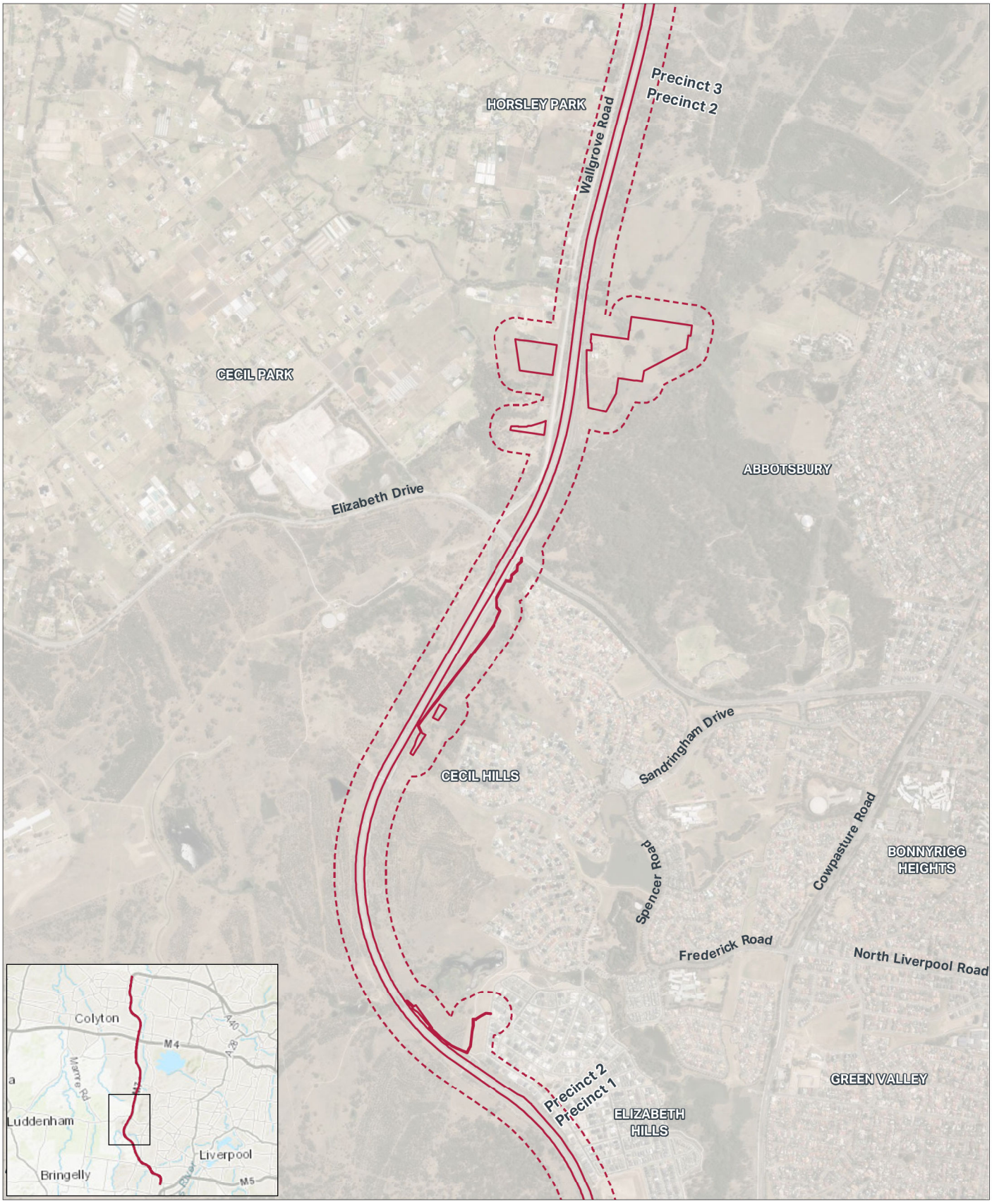

FIGURE 3-2: STUDY AREA (SHEET 2 OF 5)

N 0 400 800 m

AECOM

Legend

- Construction footprint
- Study area

Source: imagery © Department of Customer Service 2020
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance

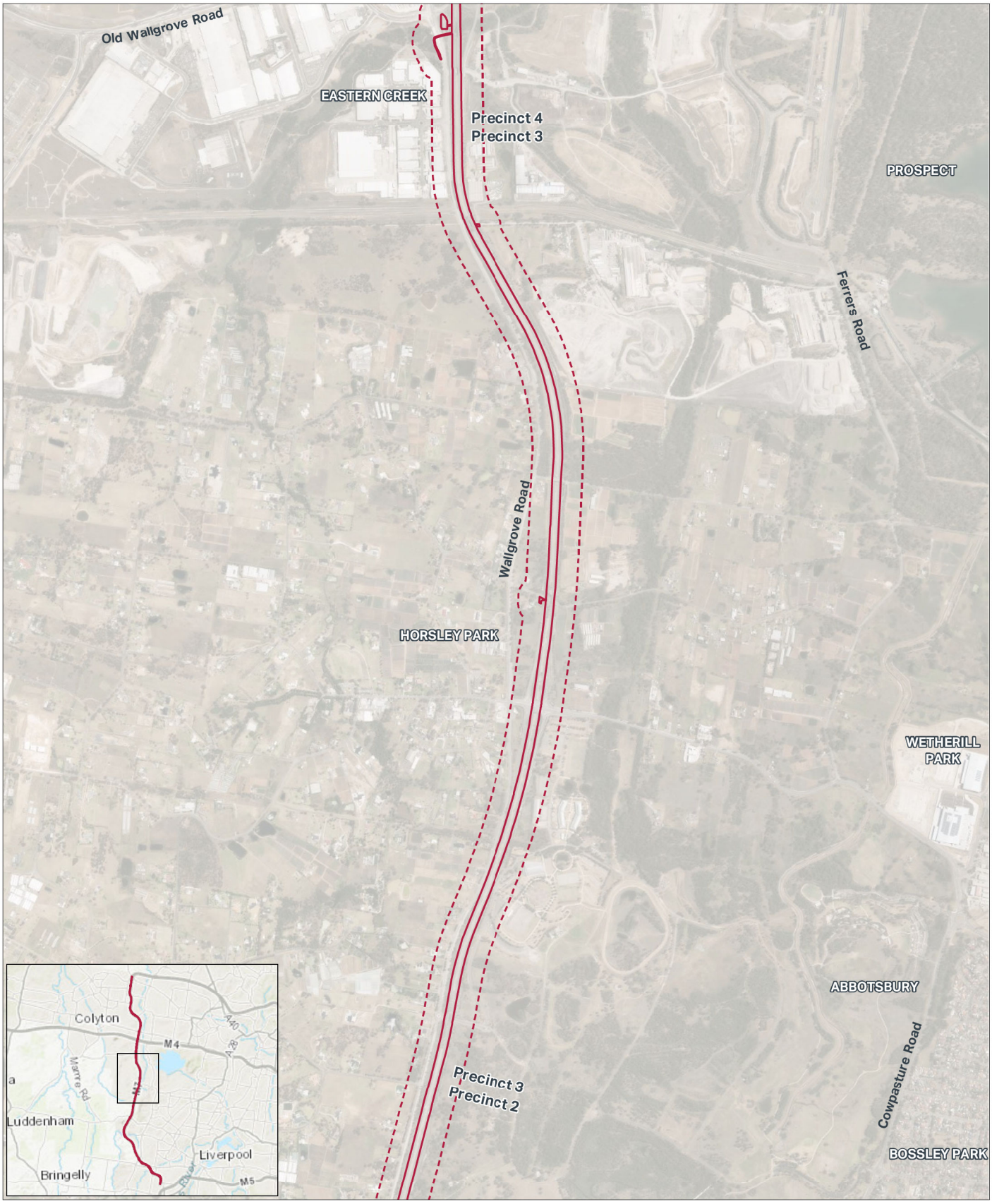

FIGURE 3-3: STUDY AREA (SHEET 3 OF 5)

N 0 400 800 m

AECOM

Legend

- Construction footprint
- Study area

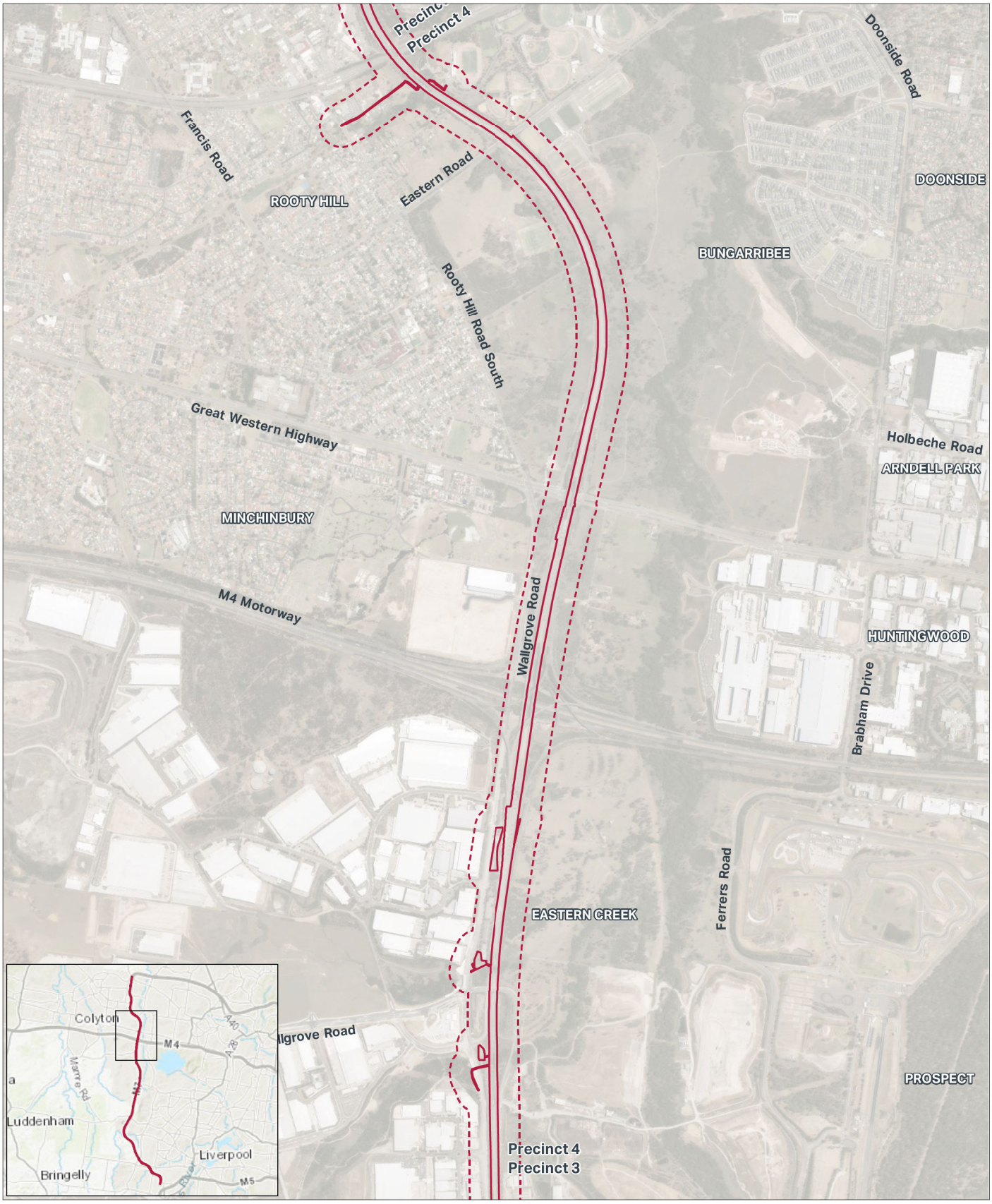

FIGURE 3-4: STUDY AREA (SHEET 4 OF 5)

N 0 400 800 m

AECOM

Legend

- Construction footprint
- Study area

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FIGURE 3-5: STUDY AREA (SHEET 5 OF 5)

Legend

- Construction footprint
- Study area

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3.2.1 Data sources

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 land use (using current aerial imagery and zoning maps) and historical land use (using 1943 aerial imagery[1]) to identify areas of 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
- Lotsearch Pty Ltd (Lotsearch) reports for the entire study area. A total of five Lotsearch reports were provided and reviewed (one report per precinct). The Lotsearch reports were conducted within a 500-metre buffer from the Westlink M7. The information reviewed included:
  - NSW EPA records for:
    - contaminated sites notified to the NSW EPA under Section 60 of the CLM Act
    - contaminated sites currently or formerly regulated by the NSW EPA (Record of Notices)
    - licenced activities under the POEO Act, as well as former licenced activities, now reworked or surrendered
    - former gasworks sites
    - EPA Per- and Poly-Fluoroalkyl Substances (PFAS) investigation program
    - Australian Department of Defence sites under Defence three-year Regional Contamination Investigation Program
    - other sites with known contamination issues
    - sites listed on the National Waste Management site database (DAWE, 2012).
  - available historical business activities from *Universal Business Directories (UBD) Business to Business Directory* including dry cleaners, motor garages and service stations (for the years 1991, 1986, 1982, 1978, 1975, 1970, 1965, 1961, 1950)
  - available historical aerial photographs (for the years 2020, 2015, 2014, 2009, 2000, 1991, 1982, 1970, 1965, 1961, 1955, 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.

[1] https://maps.six.nsw.gov.au/

3.2.2 Cumulative impact assessment

A cumulative impact assessment has been undertaken for both construction and operation, to assess the potential cumulative contamination impacts of the proposed modification with other projects in the area. This was undertaken based on a screening of other nearby projects to identify those that have the potential to cause cumulative contamination impacts. The screening took into account projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed. The screening process is described further in **Chapter 7.18** (Cumulative impacts) of the Modification Report.

The cumulative impact assessment was based on the residual contamination impacts of the proposed modification (i.e. those that are expected to exist after application of management and mitigation measures).

4.0 Existing environment

This section provides a description of the existing environment as it relates to contamination.

4.1 Topography and drainage

Topography and drainage across the study area are summarised in Table 5 and shown on Figure 4-1 to Figure 4-5.

Table 5 Drainage and topography summary

Precinct	Elevation range	Drainage
1 - Prestons to Elizabeth Hills	26 metres Australian height datum (AHD) (Prestons) to 54 metres AHD (Elizabeth Hills)	Intercepts various water bodies including Maxwells Creek (north of Kurrajong Road), Cabramatta Creek, Hinchinbrook Creek, and Douglas Creek tributaries (between south of Hoxton Park Road to north of Cowpasture Road).
2 - Elizabeth Hills to Horsley Park including interchange with approved M12 Motorway interchange	54 metres AHD (Elizabeth Hills) to 112 metres AHD (Horsley Park). Ridge of 136 metres AHD just south of the approved M12 Motorway interchange	Intercepts man-made water body north of Middleton Drive. Intercepts Ropes Creek north of Elizabeth Drive. Intercepts an upper canal system at the approved M12 Motorway interchange. Intercepts Hinchinbrook Creek and tributaries at various locations near Elizabeth Hills (within Western Sydney Parklands). Intercepts Ropes Creek about one kilometre north of Elizabeth Drive.
3 - Horsley Park to Eastern Creek	114 metres AHD (Horsley Park) to 64 metres AHD (Eastern Creek)	No major water bodies identified.
4 - Eastern Creek to Rooty Hill, including interchange with M4 Motorway	60 metres AHD (Eastern Creek) to 38 metres AHD (Rooty Hill)	Intercepts Reedy Creek at the Old Wallgrove (OWG) Road interchange. Intercepts Eastern Creek tributaries at various locations north of the OWG interchange up to the intersection with The Great Western Highway.
5 - Rooty Hill to Dean Park	38 metres AHD (Rooty Hill) to 42 metres AHD (Dean Park). Ridges of 50 to 54 metres AHD throughout.	Intercepts Angus Creek south of the rail line at Rooty Hill.

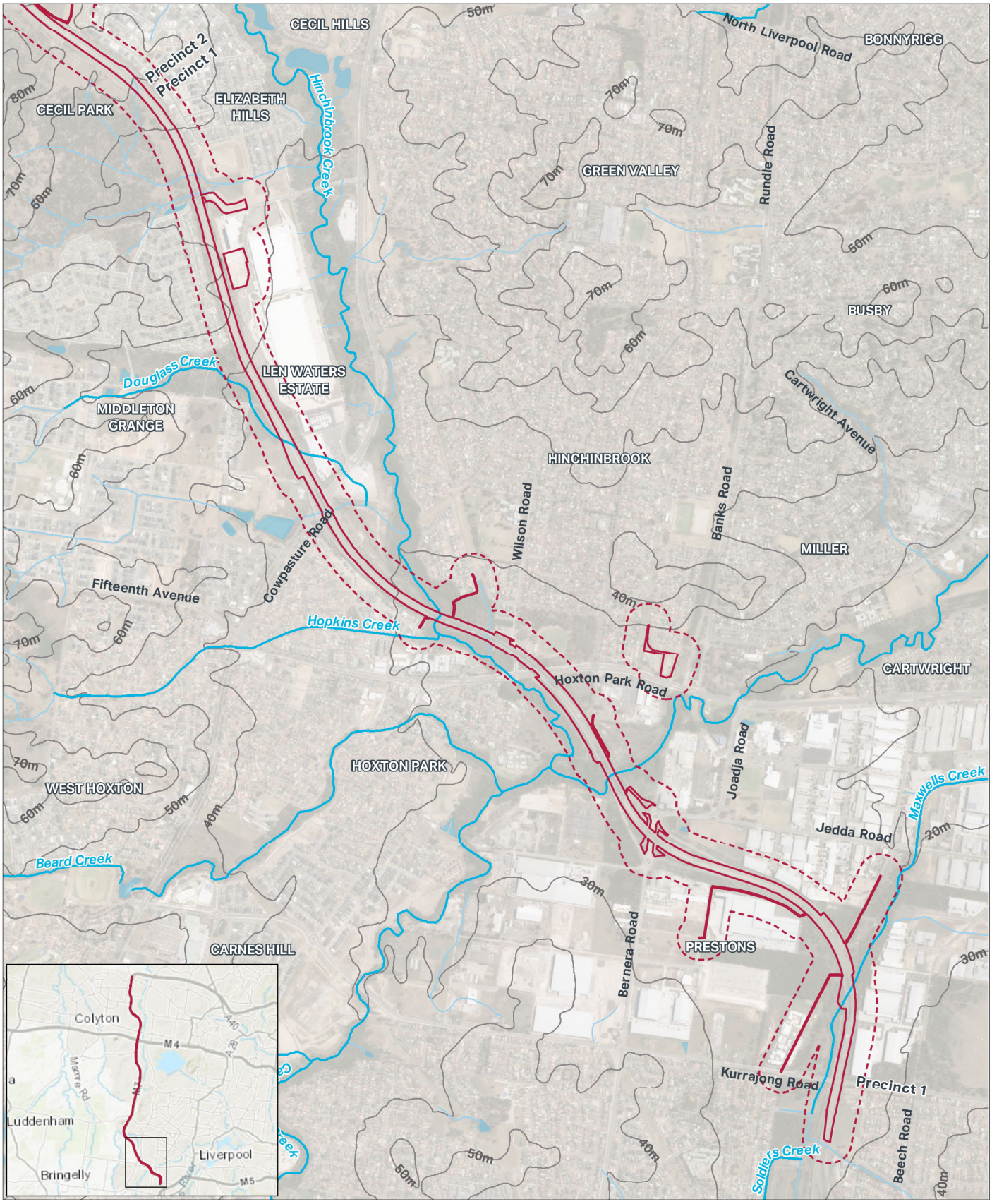

FIGURE 4-1: DRAINAGE AND TOPOGRAPHY WITHIN STUDY AREA (SHEET 1 OF 5)

N

0 400 800 m

AECOM

Legend

- Construction footprint
- Study area
- Waterbody
- Watercourse
- Drainage line
- 10m contour

Source: magery © Department of Customer Service 2020
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance

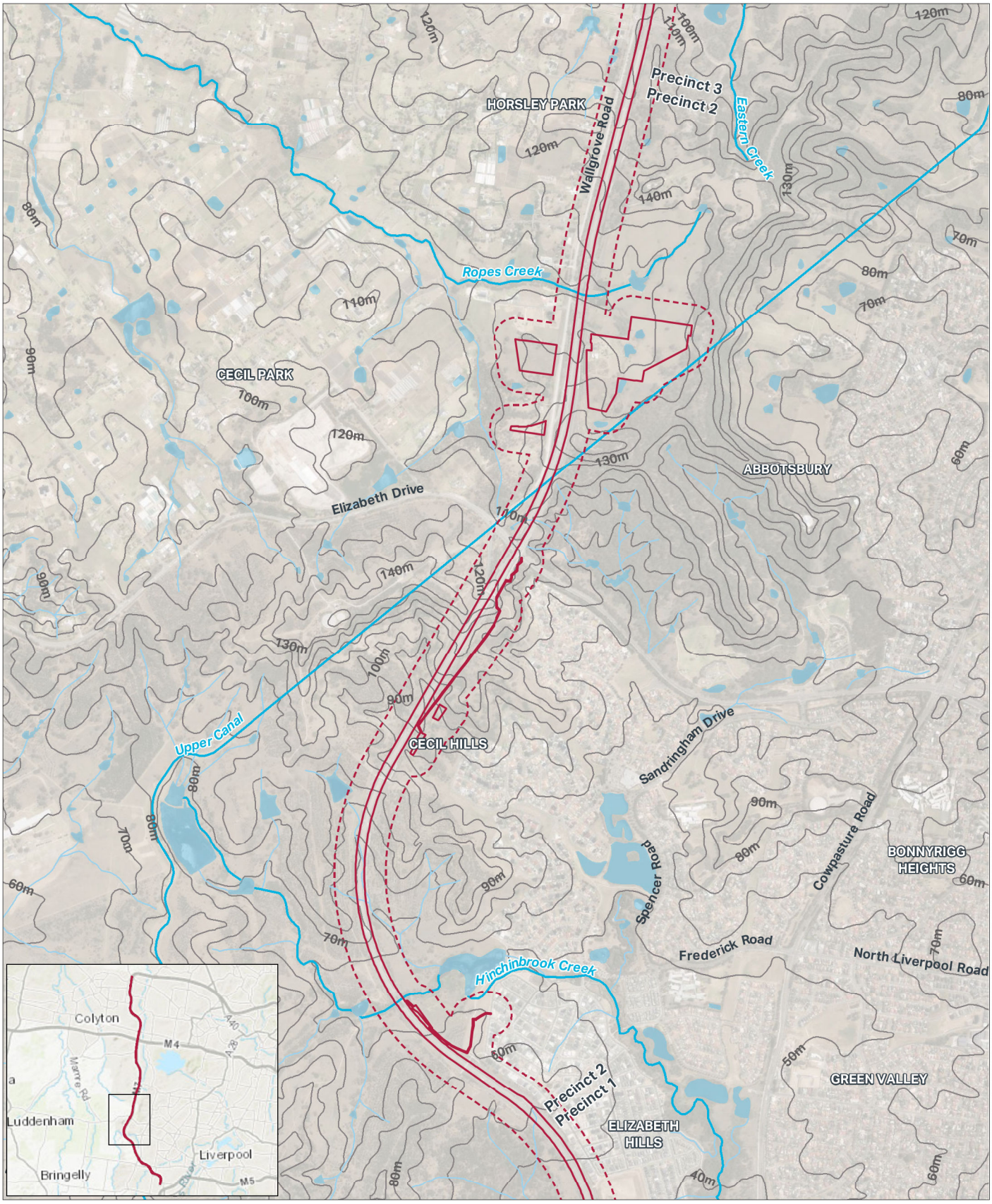

FIGURE 4-2: DRAINAGE AND TOPOGRAPHY WITHIN STUDY AREA (SHEET 2 OF 5)

N

0 400 800 m

AECOM

Legend

- Construction footprint
- Study area
- Waterbody
- Watercourse
- Drainage line
- 10m contour

Source: imagery © Department of Customer Service 2020
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance

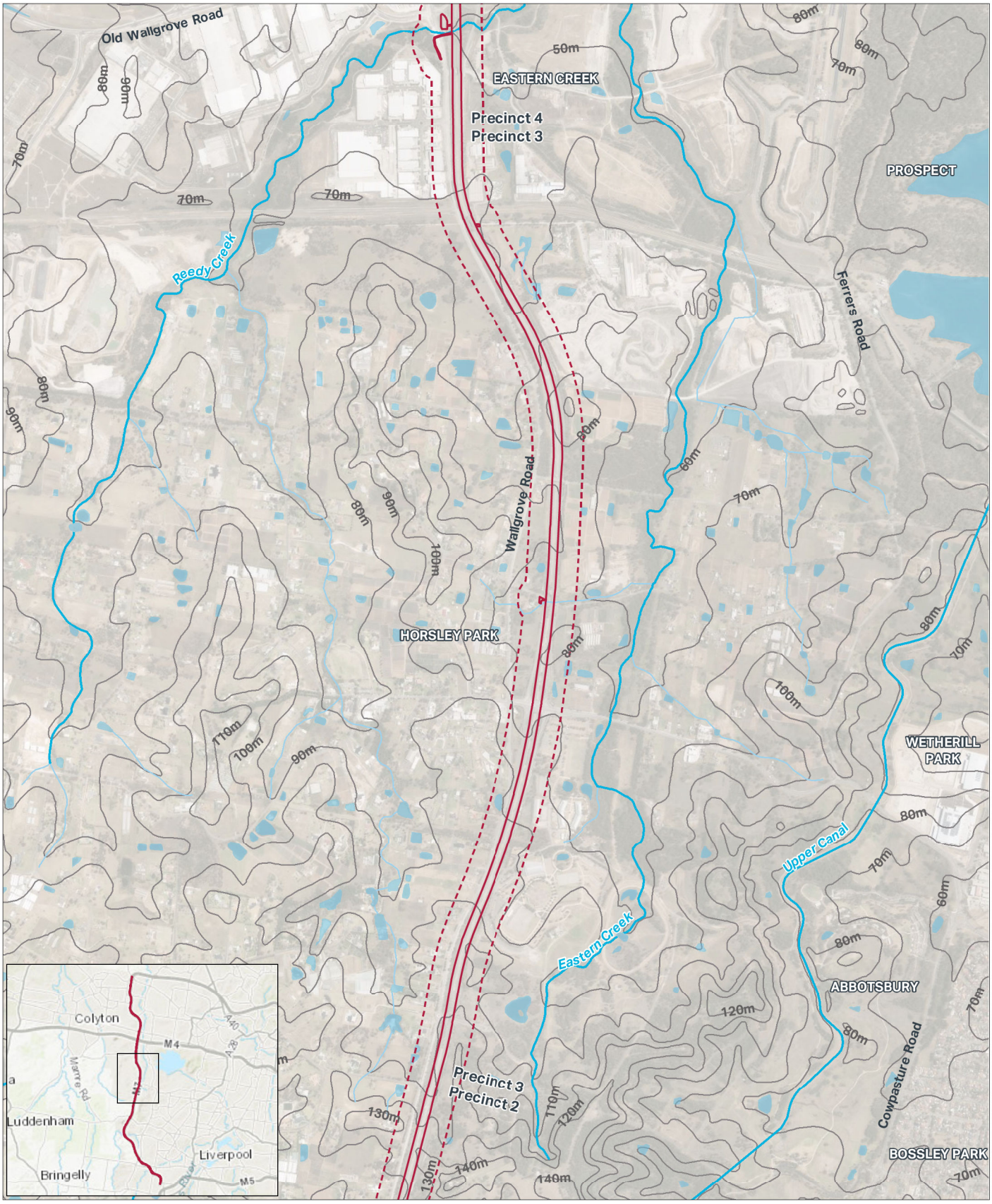

FIGURE 4-3: DRAINAGE AND TOPOGRAPHY WITHIN STUDY AREA (SHEET 3 OF 5)

N 0 400 800 m

AECOM

Legend

- Construction footprint
- Study area
- Waterbody
- Watercourse
- Drainage line
- 10m contour

Source: imagery © Department of Customer Service 2020
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance

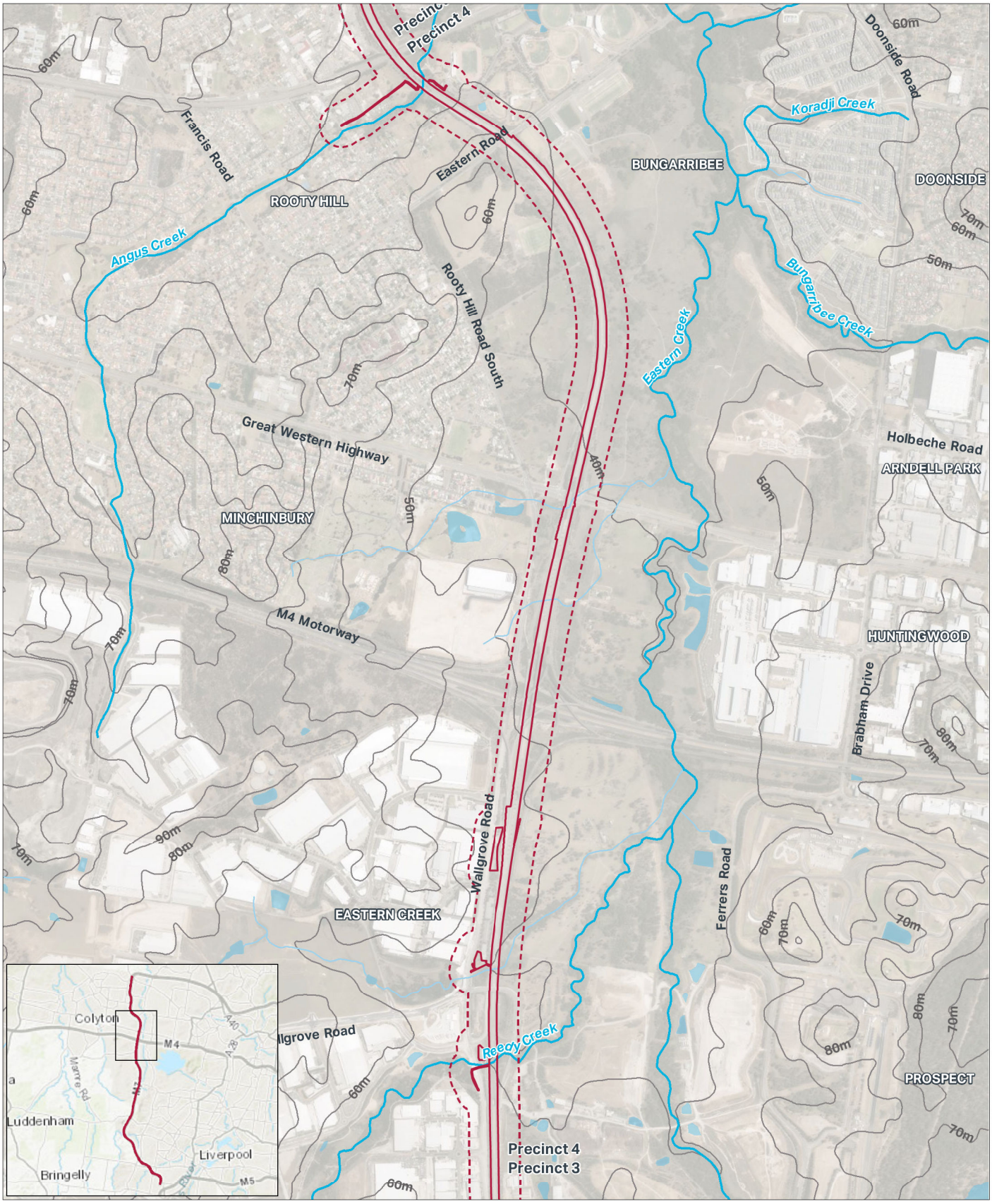

FIGURE 4-4: DRAINAGE AND TOPOGRAPHY WITHIN STUDY AREA (SHEET 4 OF 5)

N

0 400 800 m

AECOM

Legend

- Construction footprint
- Study area
- Waterbody
- Watercourse
- Drainage line
- 10m contour

Source: magery © Department of Customer Service 2020
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance

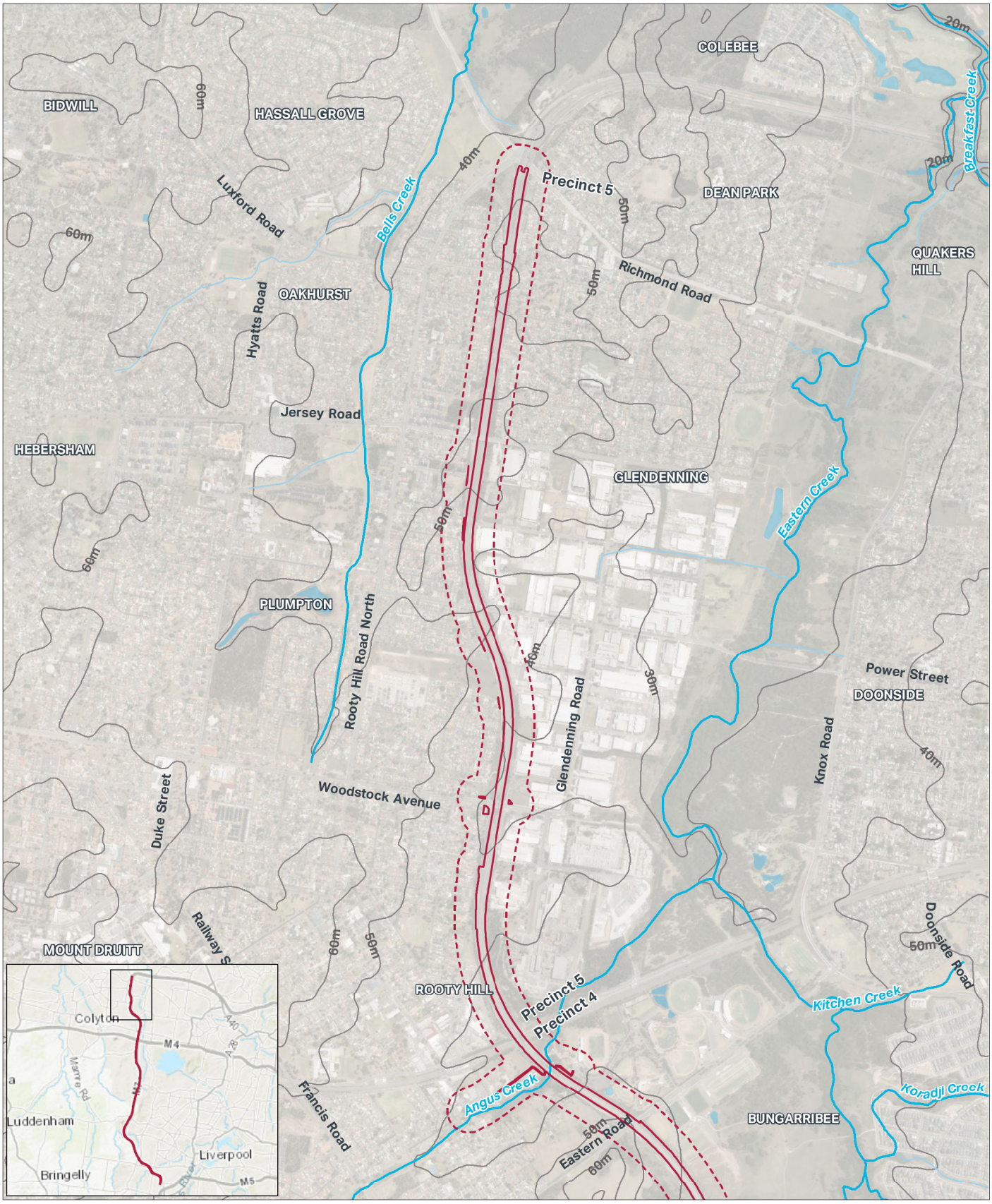

FIGURE 4-5: DRAINAGE AND TOPOGRAPHY WITHIN STUDY AREA (SHEET 5 OF 5)

N

0 400 800 m

AECOM

Legend

- Construction footprint
- Study area
- Waterbody
- Watercourse
- Drainage line
- 10m contour

4.2 Soils

4.2.1 Soil landscapes and erosion potential

The dominant soil units within the study area are Kudosols (Pb12 and Pb13). Kudosols generally comprise hard acidic red soils (clays) with hard neutral and acidic yellow mottled soils on lower slopes and in valleys (clays). Localised ironstone gravels are likely to occur in some places. Chromosols (Sp1) are identified at the intersection with Richmond Road. These soils have similar profile to Kudosols (clays) and commonly contain ironstone gravels throughout the soil profile.

The following soil landscapes are present across the study area and are shown on Figure 4-6 to Figure 4-10:

- Berkshire Park Alluvial (ALbp)
- Blacktown Residual (REbt)
- Disturbed Terrain (DTxx)
- Luddenham Erosional (ERlu)
- Picton Colluvial (COpn)
- South Creek Alluvial (ALsc).

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.

4.2.2 Disturbed terrain

Disturbed terrain (DTxx) has been identified within the study area at the intersection of the Westlink M7 with Bernera Road (refer to Figure 4-6). Disturbed terrain is described as an area disturbed by human activity to a depth of at least 100 centimetres below ground level. Most of these areas have been levelled to slopes of less than five per cent, and the original vegetation has been completely cleared. The original soils have been removed, greatly disturbed or buried. Landfill included soil, rock, building and waste material (including asbestos).

Disturbed terrain is expected to be intercepted during the construction of the proposed modification for about 500 metres (in length), starting from Bernera Road (northern extent) towards the south.

4.2.3 Salinity

The study area is located in Western Sydney, where salinity is known to occur. Salinity potential of Western Sydney (NSW DIPNR, 2002) identified that the soils within the study area range from medium to high salinity potential. High hazard or risk from dryland salinity has been identified throughout the study area and is shown on Figure 4-11 to Figure 4-15.

4.2.4 Acid sulfate soils

Acid sulfate soils is the common name given to a range of soil types containing iron sulfides, the most common being pyrite. Acid sulfate soils may be present as actual acid sulfate soils (AASS) or potential ASS (PASS).

PASS are sulfidic soils formed in coastal lowlands subject to tidal inundation or saline groundwater that have not been oxidised. PASS form where conditions are conducive for accumulation of iron sulfides in soils (e.g. source of sulfate, source of iron, reducing conditions, and stable low energy environment). When exposed to air due to drainage (watertable lowering/dewatering) or disturbance during earthworks, these soils produce sulfuric acid, often releasing toxic quantities of iron, aluminium and heavy metals. The heavy metals and acid can leach into soil and groundwater or impacted runoff can enter waterways and have negative impacts on water quality and aquatic ecosystems.

AASS occur where natural (e.g. groundwater level changes) or anthropogenic (e.g. land development, drainage works, etc.) activity has resulted in PASS to being exposed to air, resulting in releasing acidity and reaction products (iron, sulfate, calcium, magnesium, aluminium etc.).

NSW Office of Environment and Heritage (OEH, 2012) acid sulfate soils risk maps show areas of acid sulfate soils risk. The acid sulfate soils classification is assigned based on the probability and depth of occurrence of acid sulfate soils. The classes trigger when an acid sulfate soil management plan (ASSMP) should be prepared and are as follows:

- Class 1: Any works require an ASSMP
- Class 2: Works below the natural ground surface and/or works by which the watertable is likely to be lowered require an ASSMP
- Class 3: Works more than one metre below the natural ground surface and/or works by which the watertable is likely to be lowered more than one metre below the natural ground surface require a ASSMP
- Class 4: Works more than two metres below the natural ground surface or works by which the watertable is likely to be lowered more than two metres below the natural ground surface require an ASSMP
- Class 5: Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below five metres Australian Height Datum, where the watertable is likely to be lowered below one metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land, require an ASSMP.

The acid sulfate soils risk class within the study area is Class 5 (indicating no risk of intercepting acid sulfate soils for activities which do not lower the water table by more than one metre).

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 (Precinct 2), 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.

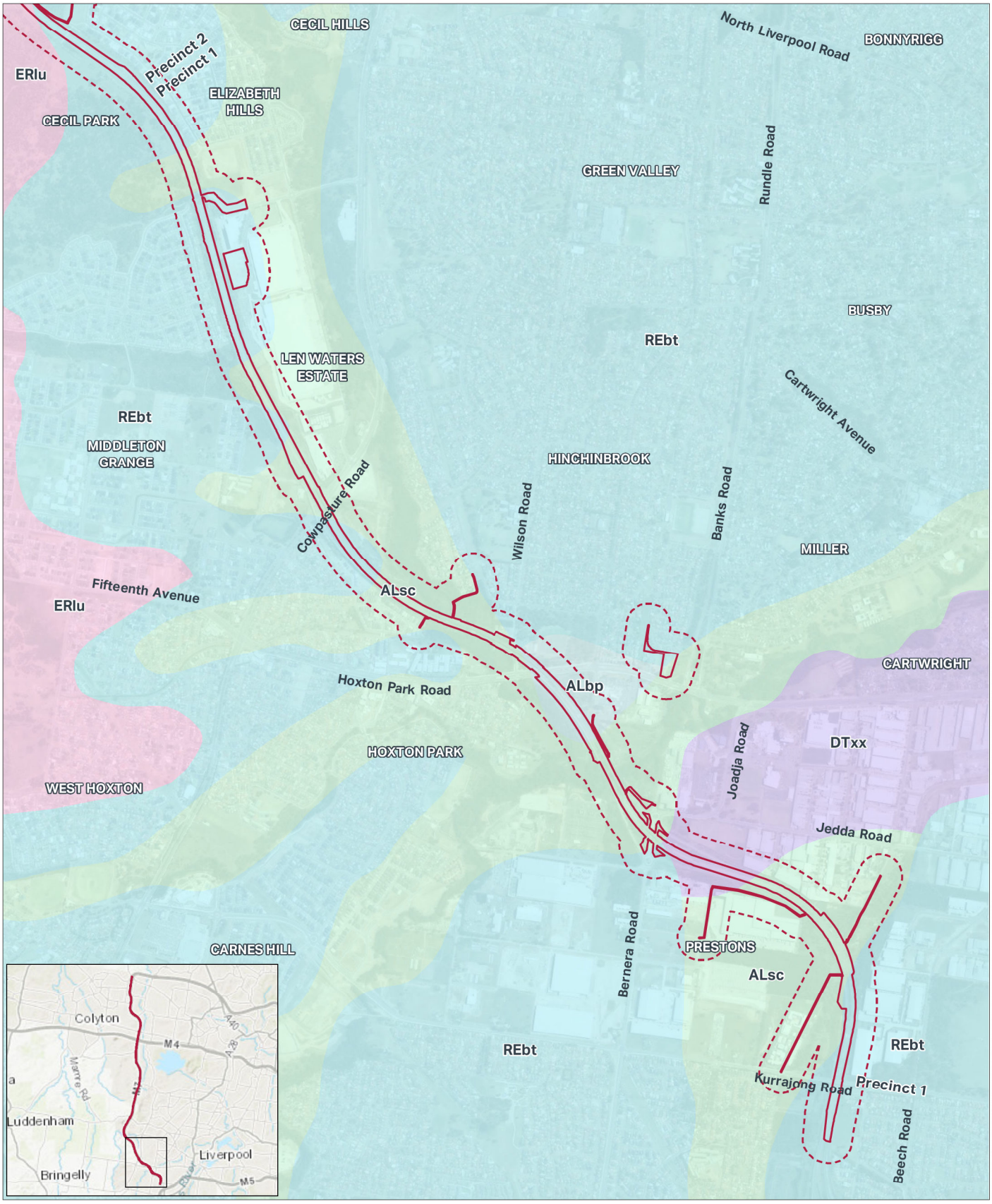

FIGURE 4-6: SOIL LANDSCAPES WITHIN THE STUDY AREA (SHEET 1 OF 5)

N

0 400 800 m

AECOM

Legend

- Construction footprint
- Study area

Soil Landscapes

- ALbp
- ALsc
- DTxx
- ERlu
- REbt

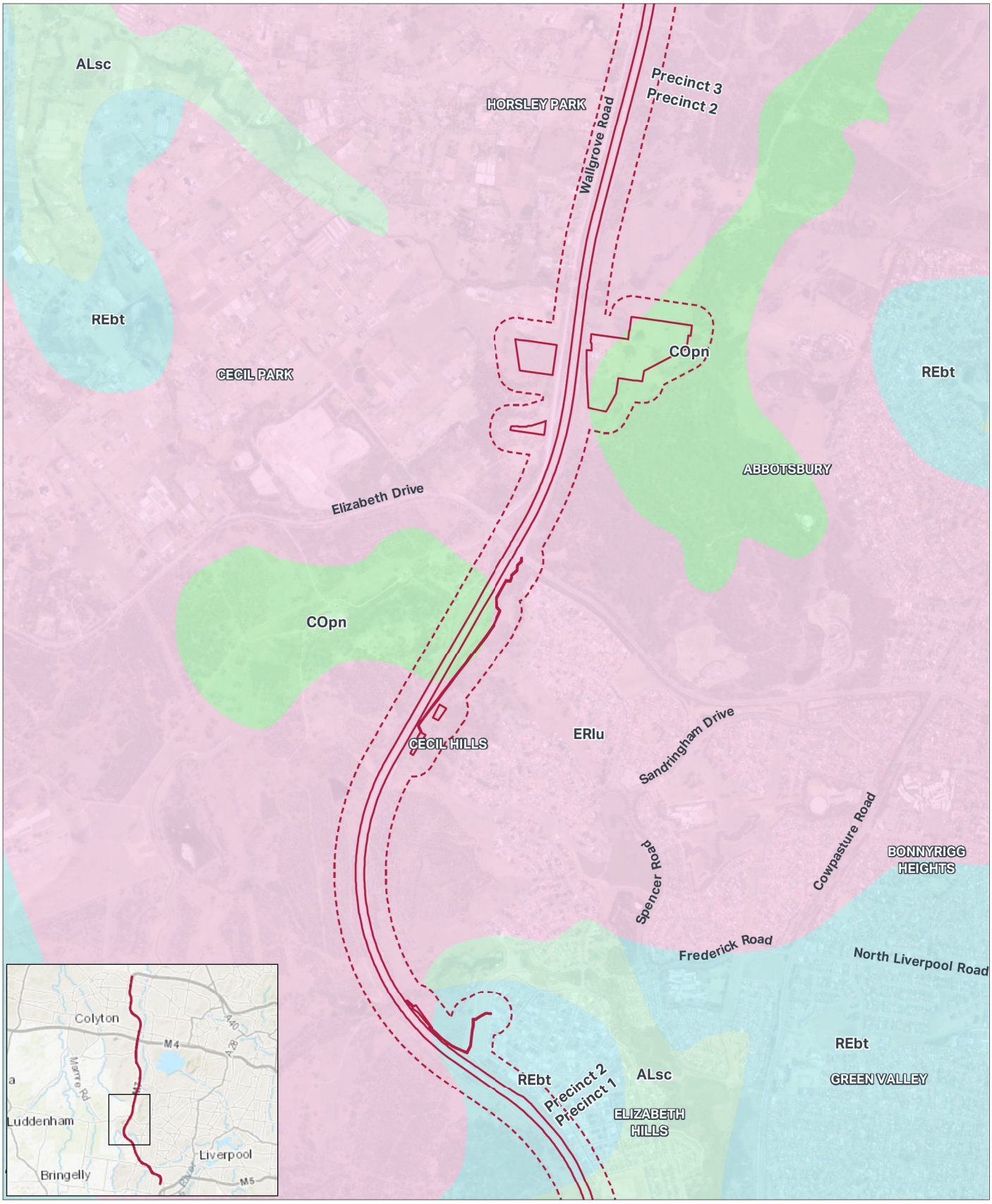

FIGURE 4-7: SOIL LANDSCAPES WITHIN THE STUDY AREA (SHEET 2 OF 5)

N

0 400 800 m

AECOM

Legend

- Construction footprint
- Study area

Soil Landscapes

- ALsc
- COpn
- ERlu
- REbt

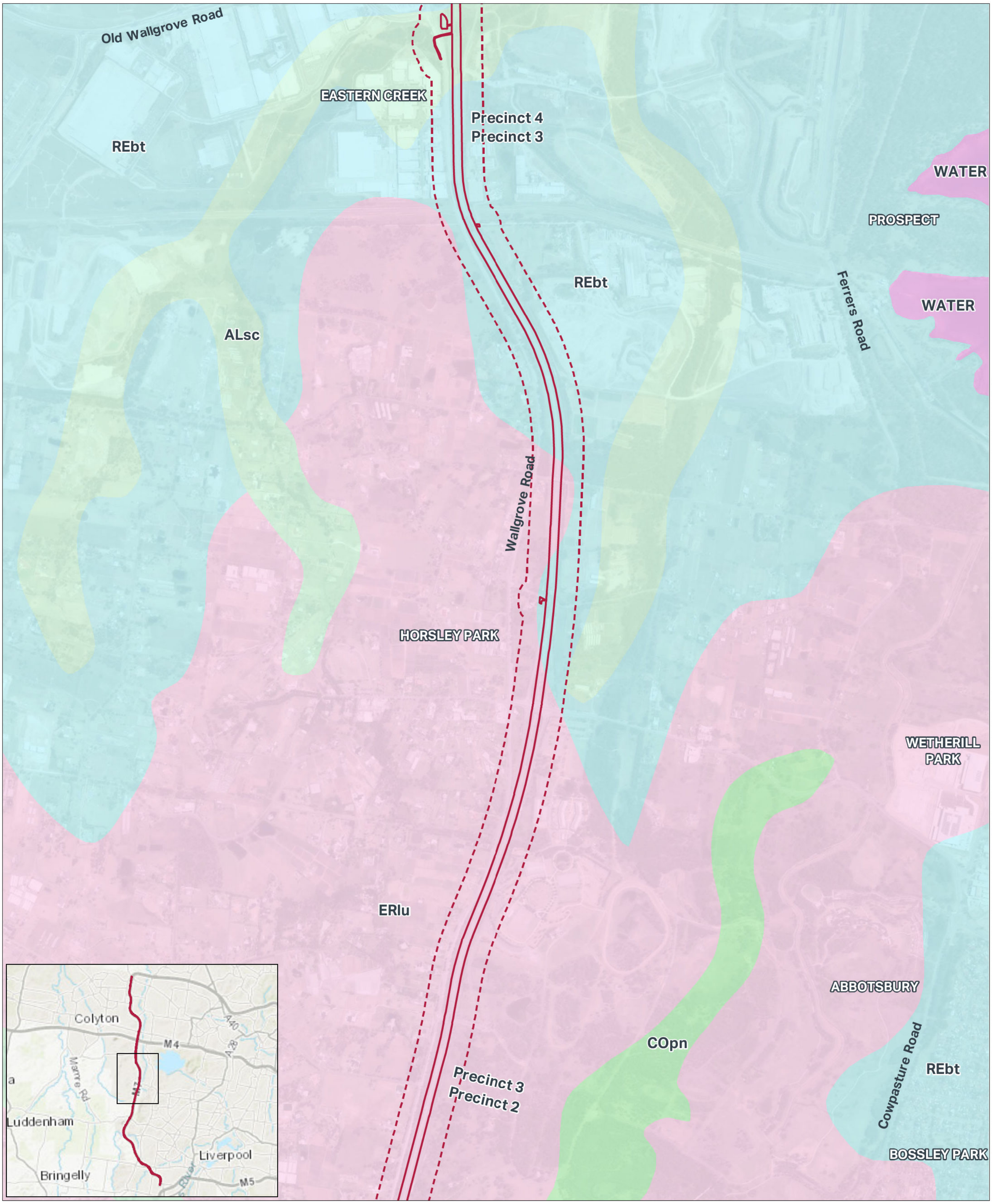

FIGURE 4-8: SOIL LANDSCAPES WITHIN THE STUDY AREA (SHEET 3 OF 5)

0 400 800 m

Legend

- Construction footprint
- Study area

Soil Landscapes

- ALsc
- COpn
- ERlu
- REbt
- WATER

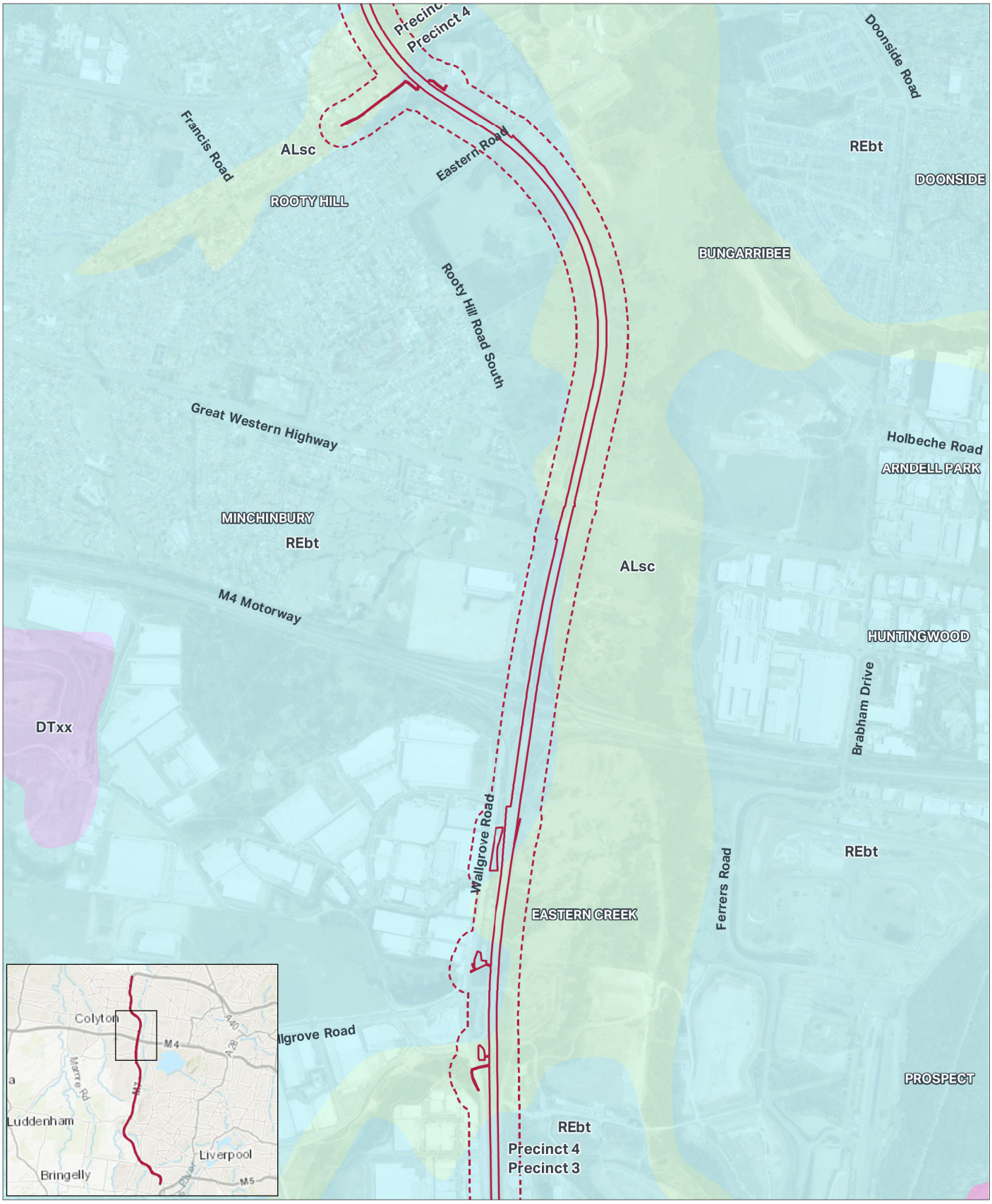

FIGURE 4-9: SOIL LANDSCAPES WITHIN THE STUDY AREA (SHEET 4 OF 5)

N 0 400 800 m

AECOM

Legend

Construction footprint

Study area

Soil Landscapes

ALsc

DTxx

REbt

WATER

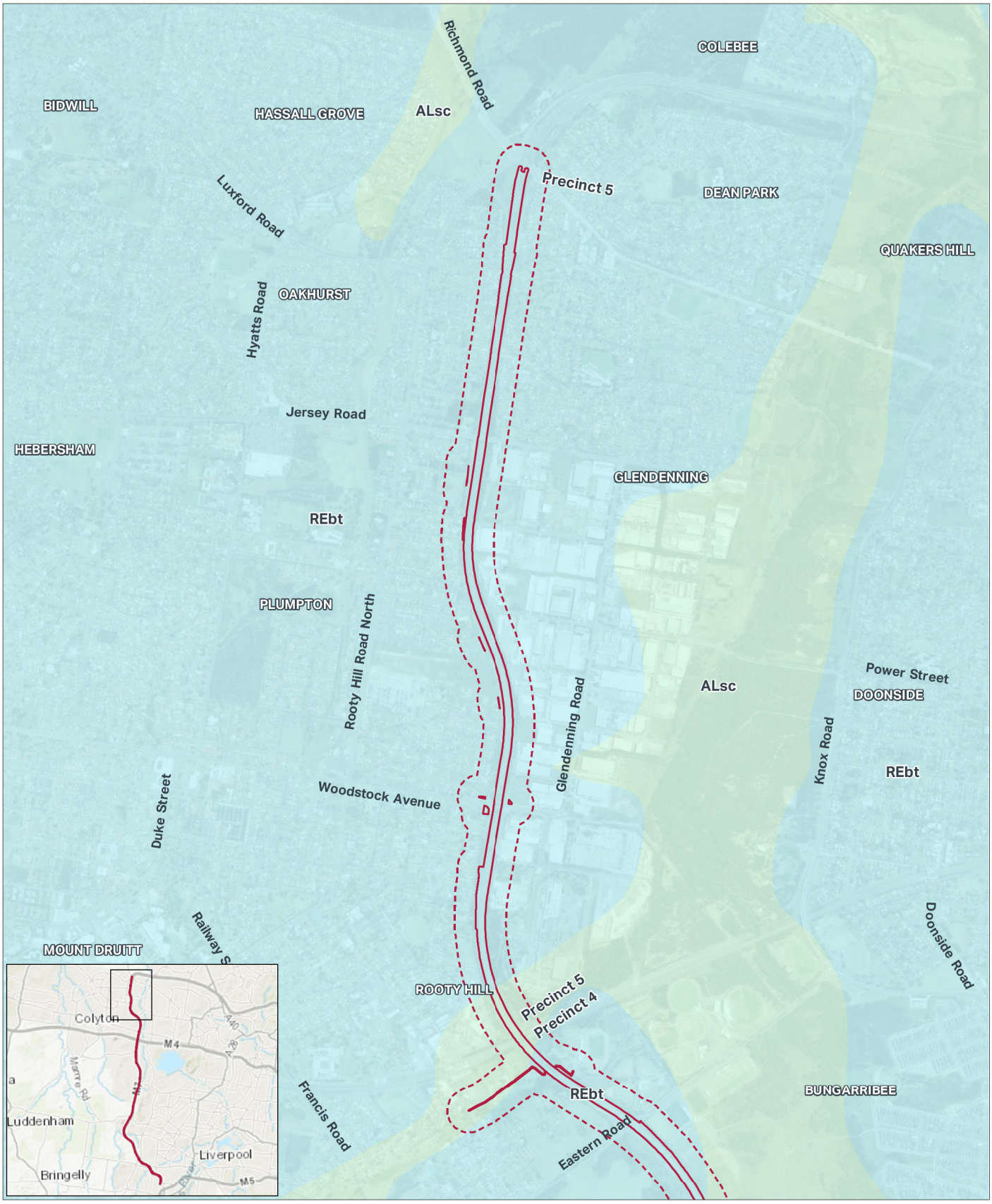

FIGURE 4-10: SOIL LANDSCAPES WITHIN THE STUDY AREA (SHEET 5 OF 5)

N 0 400 800 m

AECOM

Legend

- Construction footprint
- Study area

Soil Landscapes

- ALsc
- REbt

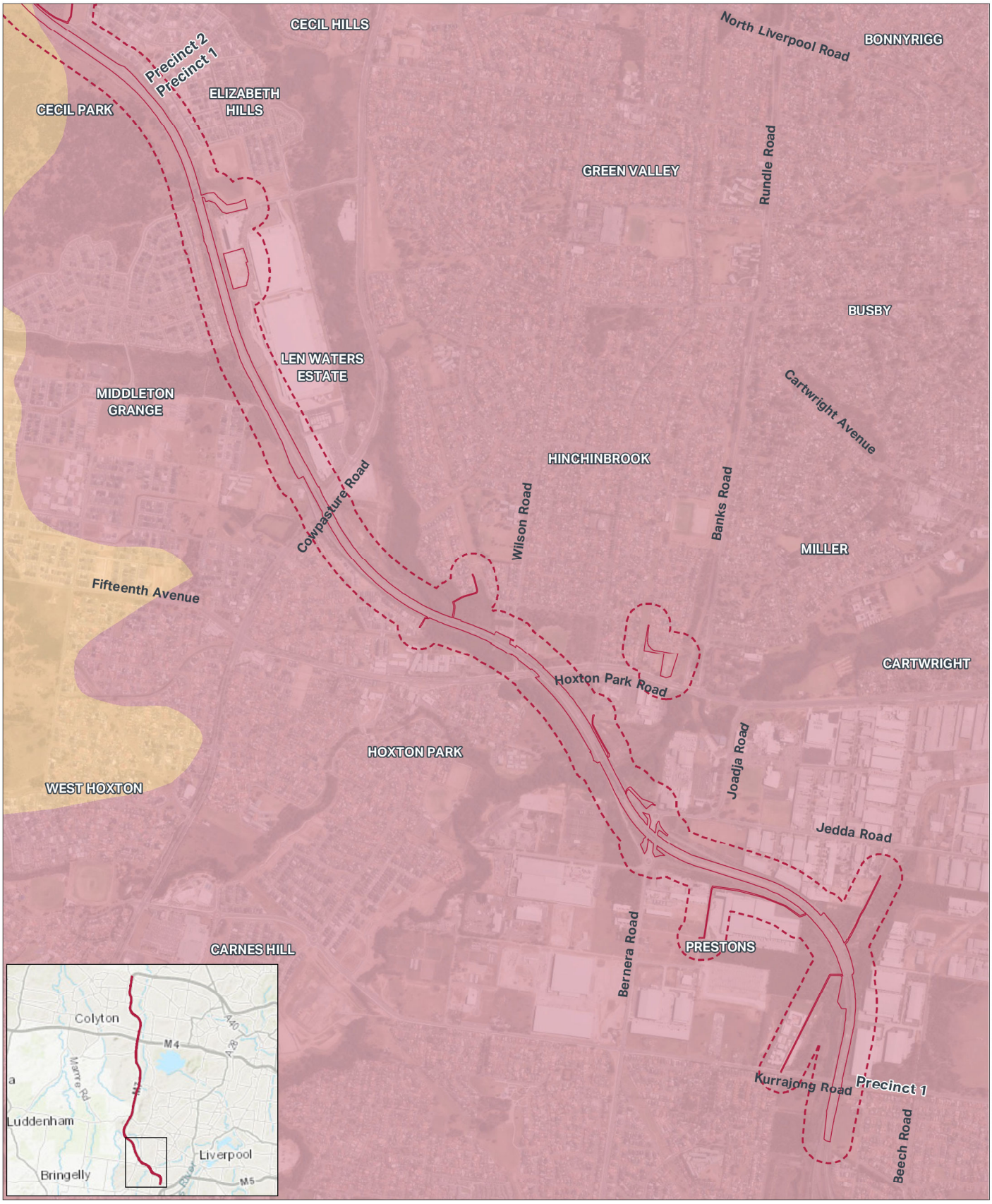

FIGURE 4-11: SALINITY HAZARDS WITHIN THE STUDY AREA (SHEET 1 OF 5)

N

0 400 800 m

AECOM

Legend

- Construction footprint
- Study area

Soil Salinity Hazard

- Very High
- Moderate

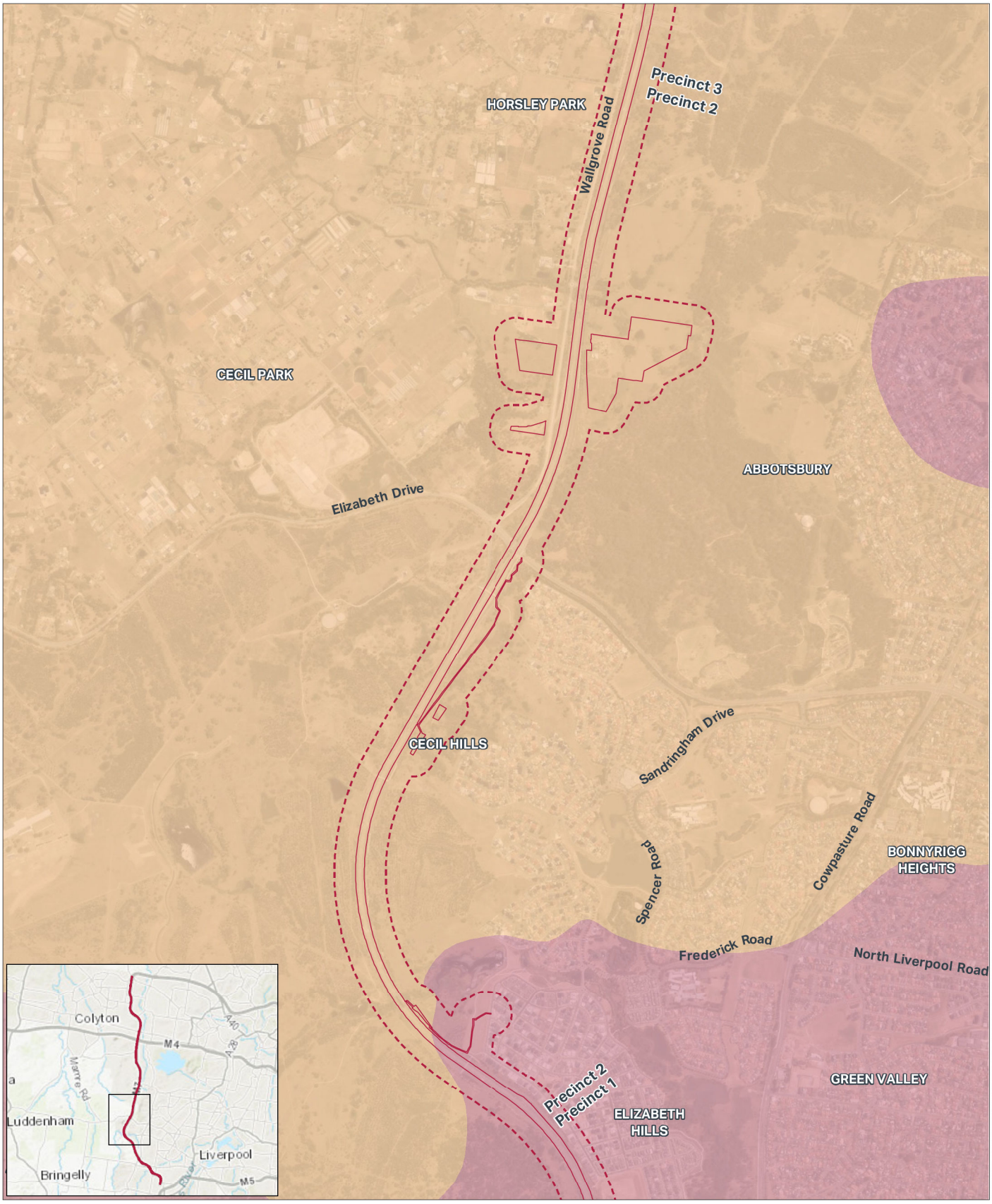

FIGURE 4-12: SALINITY HAZARDS WITHIN THE STUDY AREA (SHEET 2 OF 5)

N

0 400 800 m

AECOM

Legend

- Construction footprint
- Study area

Soil Salinity Hazard

- Very High
- Moderate

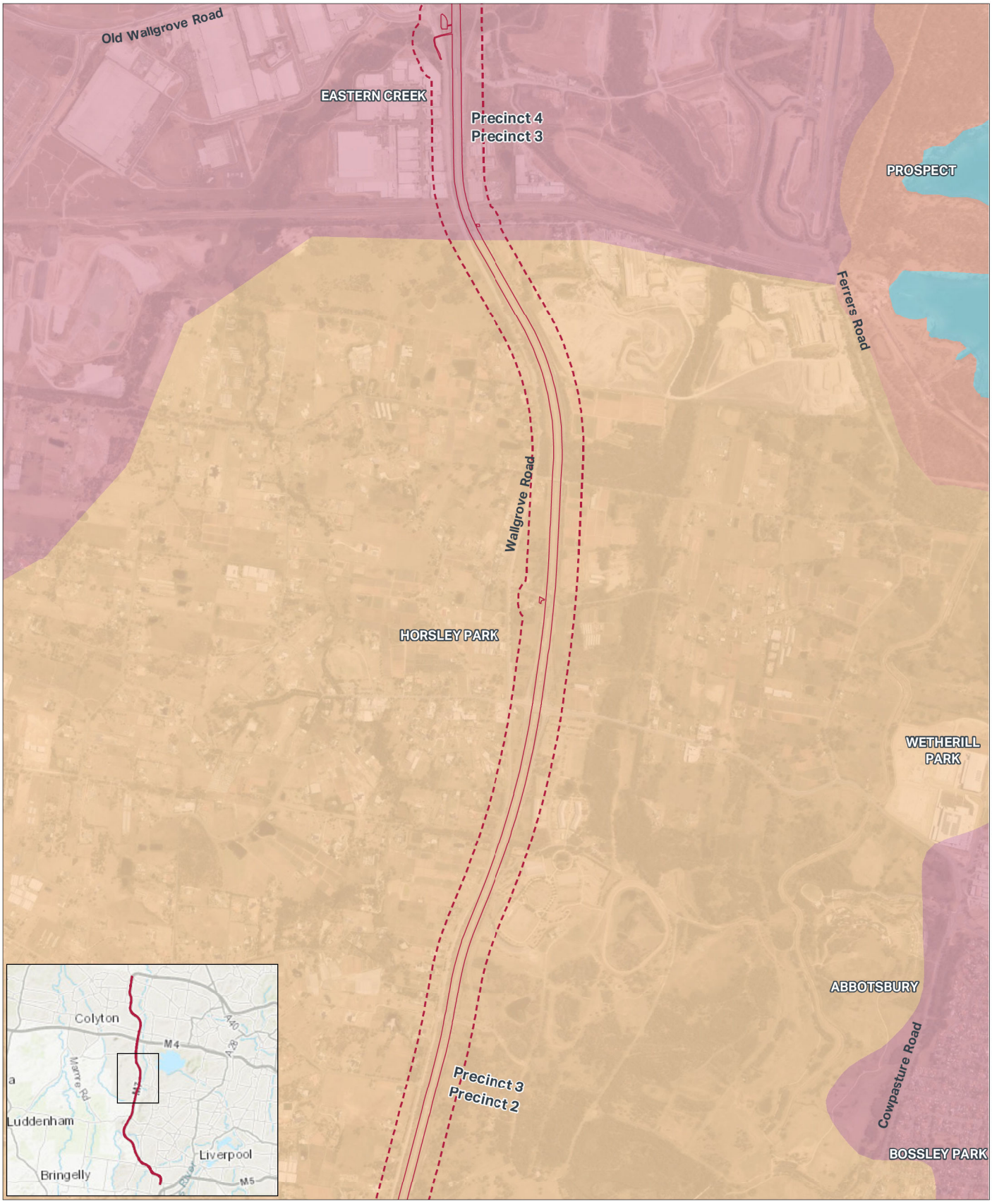

FIGURE 4-13: SALINITY HAZARDS WITHIN THE STUDY AREA (SHEET 3 OF 5)

Legend

- Construction footprint
- Study area

Soil Salinity Hazard

- Very High
- High
- Moderate
- Water

Source: imagery © Department of Customer Service 2020
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance

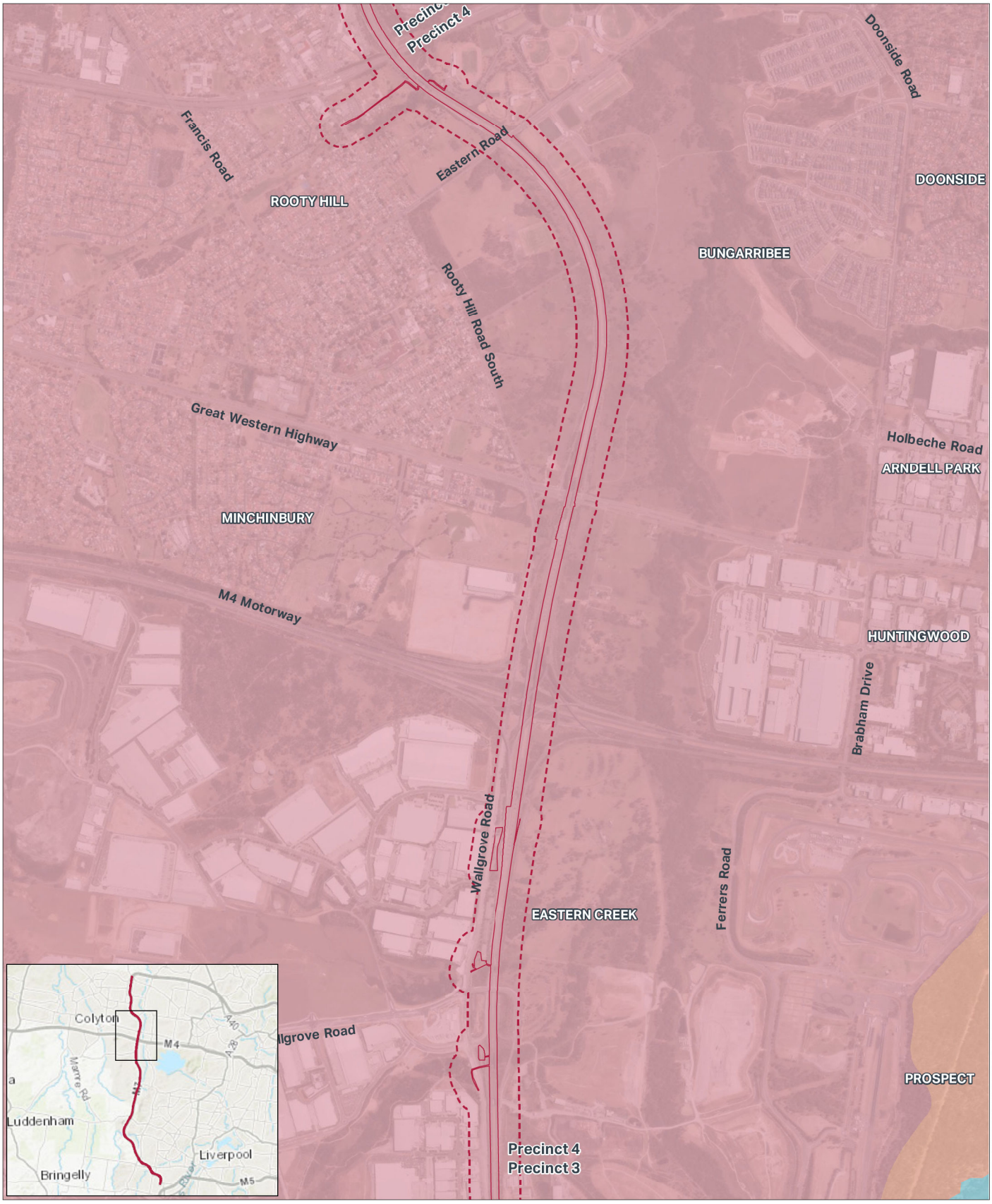

FIGURE 4-14: SALINITY HAZARDS WITHIN THE STUDY AREA (SHEET 4 OF 5)

N 0 400 800 m

AECOM

Legend

- Construction footprint
- Study area

Soil Salinity Hazard

- Very High
- High
- Water

Source: imagery © Department of Customer Service 2020
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance

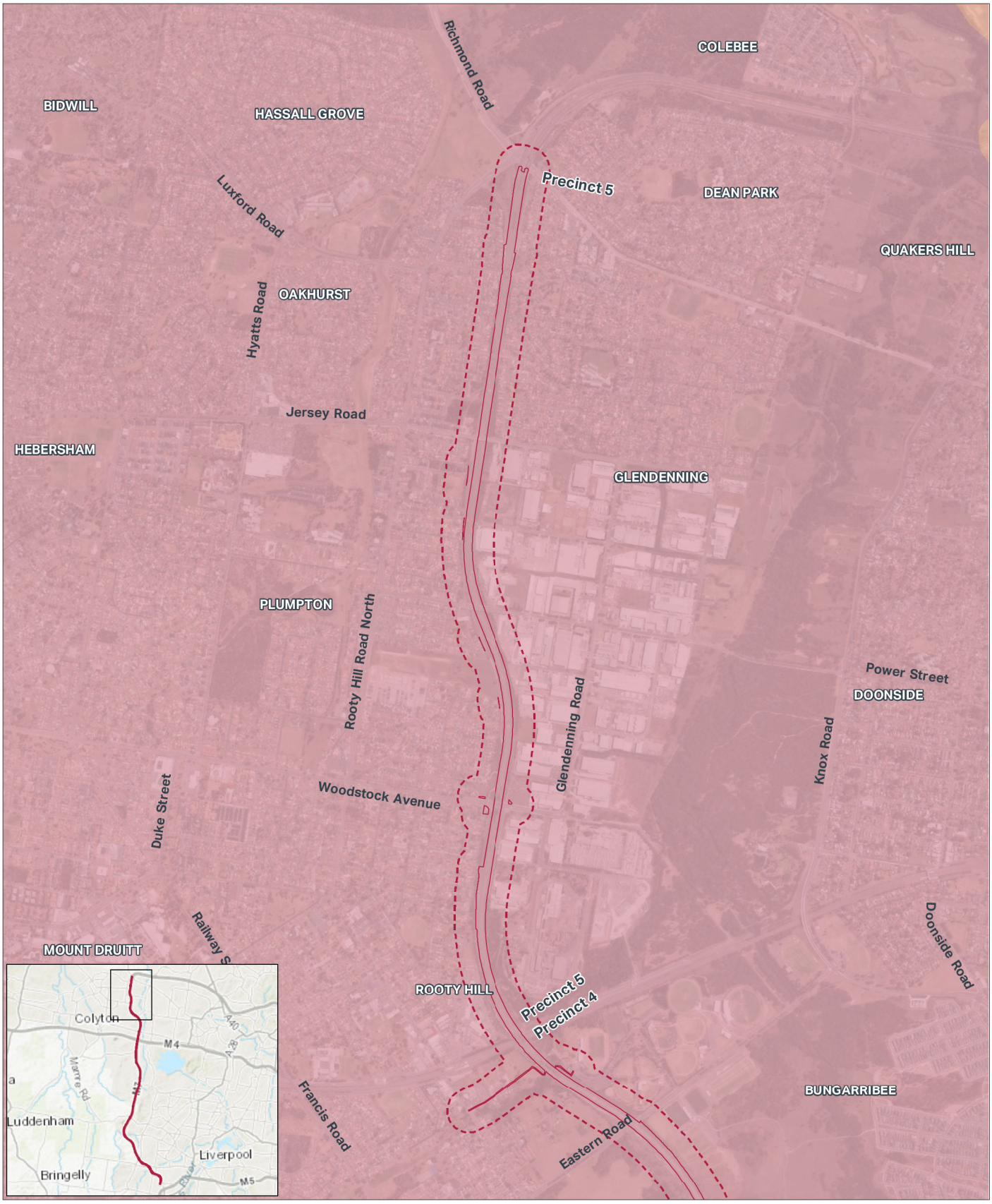

FIGURE 4-15: SALINITY HAZARDS WITHIN THE STUDY AREA (SHEET 5 OF 5)

AECOM

Legend

- Construction footprint
- Study area

Soil Salinity Hazard

- Very High
- High

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