

Environmental Assessment and Management Strategy

Hammond Quarter West: Local Structure Plan Amendment

Project No: EP24-053(01)

**Prepared for Qube Property Group
July 2024**



Environmental Assessment and Management Strategy

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Executive Summary

This *Environmental Assessment and Management Strategy* (EAMS) has been prepared in support of the proposed amendment to the Hammond Quarter Structure Plan (SPN/2348) to incorporate Hammond Quarter West, which comprises Lots 813 and 815, and parts of Lots 78 and 80 Wattleup Road, Hammond Park (herein referred to as 'the site'). The proposed Structure Plan (SP) amendment prepared by Hatch is attached as **Appendix A** and outlines the proposed residential development of the site.

The SP layout indicates that the future development of the site will include residential (standard), residential (transition), public open space (POS), and a local road network. This SP provides an intended development layout for the site and is generally in accordance with the *Southern Suburbs District Structure Plan – Stage 3, Hammond Park/Wattleup* (DSP) (CoC 2012).

This EAMS has been prepared to address the requirements of the Western Australian Planning Commission's (WAPC) *Structure Plan Framework* (WAPC 2015b) to support the preparation and implementation of the proposed SP. This report synthesises information from a range of sources to determine the environmental features of the site.

The site comprises a total area of approximately 8.16 hectares (ha) and is located approximately 25 km south of the Perth Central Business District (CBD), as shown in **Figure 1**. The site is zoned 'Development' under the Local Planning Scheme No. 3, and 'Urban' under the Metropolitan Region Scheme (MRS). The lots immediately to the east are identified for residential development under the previously approved portion of the SP, and the lots immediately to the north are currently being developed under the Hammond Park West Structure Plan. The south of the site has been identified for the future extension of Rowley Road.

The relevant environmental attributes and values of site are summarised as follows:

- Topography across the site ranges between 17 m and 23 m Australian height datum.
- The site has been historically cleared and doesn't support any native vegetation, but areas of non-native vegetation.
- There is no black cockatoo habitat within the site.
- No wetlands are mapped as occurring within or in close proximity to the site.
- No Registered Aboriginal Heritage Sites or Other Heritage Places are mapped within the site.
- The site is generally vacant, but until recently supported a steel distributor ('Best Buy Steel') and a rural-residential dwelling.
- There are no existing land uses in proximity to the site would be incompatible with the proposed residential land uses within the site.

The SP has been developed with specific consideration to the identified environmental values of the site. Management responses have been incorporated into the SP, including:

- Preparation of an Urban Water Management Plan (UWMP) addendum to support the future subdivision of the site.

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- Preparation of a Bushfire Management Plan (BMP), which outlines how the SP responds the bushfire protection criteria specified in the *Guidelines for Planning in Bushfire Prone Areas* (WAPC and DFES 2015).
- Preparation of the Transport Noise Assessment (TNA), which outlines how the SP responds to the noise impacts presented by the future Rowley Road extension.

This EAMS also outlines the environmental framework to be implemented across the site as part of future subdivision and development phases of the residential development process, including:

- Completion of detailed Bushfire Attack Level (BAL) assessment and imposition of determined BAL ratings on affected lots. New dwellings within 100 m of the bushfire threat should demonstrate compliance with AS 3959 corresponding to the assigned BAL rating.

Overall, the environmental factors can be managed appropriately through the future subdivision and development phases in line with the relevant state and local government legislation, policies and guidelines and best management practices.

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Appendix A

Hammond Quarter West Structure Plan Amendment (Hatch 2024)

Appendix B

Transport and Noise Assessment (Lloyd George Acoustics, 2024)

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1 Introduction

1.1 Background

Hatch, on behalf of Qube Property Group (the proponent), have prepared an amendment to the approved Hammond Quarter Structure Plan (SPN/2348) which adds the previously excluded Lots 813 and 815, and the northern section of Lots 78 and 80 Wattleup Road, Hammond Park (herein referred to as 'Hammond Quarter West' or 'the site') to the approved structure plan (SP) area. (**Appendix A**). This Environmental Assessment and Management Strategy (EAMS) has been prepared to support the proposed SP amendment and the future development of the site.

The SP layout indicates that the future development of the site will include residential (standard), residential (transition), public open space (POS), and a local road network. This SP provides a more detailed layout for the site and is in accordance with the *Southern Suburbs District Structure Plan – Stage 3, Hammond Park/Wattleup* (DSP) (CoC 2012).

The site is located within the City of Cockburn (CoC) approximately 25 km south of the Perth Central Business District, as shown in **Figure 1**. The site comprises a total area of 8.16 ha and is zoned 'Development' under the CoC Local Planning Scheme No. 3, and 'Urban' under the Metropolitan Region Scheme (MRS) as shown in **Figure 2**. Land to the west is characterised by rural land uses and is zoned 'Rural' under the MRS. Land immediately to the south of the site is zoned 'Urban deferred' under the MRS and has been identified for the future extension of Rowley Road. The east of the site is identified for development under the approved SP, and is zoned 'Urban' under the MRS.

1.2 Purpose of this report

The purpose of this EAMS is to provide a synthesis of information regarding the environmental values and attributes of the site. It is a key supporting document for the SP amendment process, facilitating the consideration of any environmental issues by the various State agencies and the CoC. This EAMS has been prepared to be consistent with the EPA's current *Guidance Statement No. 33 Environmental Guidance for Planning and Development* (EPA 2008) and the Western Australian Planning Commission's (WAPC) *Structure Plan Framework* (WAPC 2015b). This EAMS:

- Identifies the existing environmental values and attributes of the site (**Section 2**).
- Discusses the land use planning context and the proposed SP (**Section 3**).
- Discusses how the SP design responds to the existing environment and outlines the future environmental management framework (**Section 4**).
- Outlines how the environmental management framework will be implemented (**Section 5**).

1.3 Scope of work

Emerge Associates (Emerge) was engaged by the proponent to undertake an environmental assessment to document the existing environmental attributes and values of the site and ensure any relevant environmental values can be accommodated within by SP layout, as well as through the

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future stages of subdivision and development within the site. This involved utilising a range of information sources including local and regional assessments, databases, publicly available mapping, and site-specific investigations.

The assessment incorporated a comprehensive desktop review of the available information on environmental conditions within and surrounding the site. The outcomes of these findings include information on the following attributes:

- Landforms and soils.
- Biodiversity and natural assets.
- Terrestrial fauna.
- Hydrology.
- Heritage.
- Historical and existing land uses within and surrounding the site.
- Bushfire hazards.
- Land use compatibility and potential noise impacts.

In addition to the preparation of this EAMS, Emerge have prepared, commissioned or reviewed the following documents to support the updated SP:

- *Bushfire Management Plan (BMP)* (Emerge Associates 2020).
- *Transport and Noise Assessment (TNA)* (Lloyd George Acoustics 2024).

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2 Existing Environment

2.1 Landform and soils

2.1.1 Topography

The elevation of the site ranges from 17 metres (m) relative to the Australian Height Datum (m AHD) in the central northern portion of the site, to 23 m AHD in the central southern portion (DoW 2008). The topographic contours for the site and surrounding areas are shown in **(Figure 3)**.

As part of the proposed development, it is unlikely that the topographic contours of the site will change significantly to accommodate engineering and service infrastructure (i.e. sewer, power, water) requirements.

More broadly, the site is located within an area where urban development is currently being progressed and connects with an existing/established road network.

2.1.2 Regional geomorphology

The site located on the Swan Coastal Plain, which is approximately 500 km long and 20 to 30 km wide and is roughly bound by the Indian Ocean to the west and the Darling Scarp to the east. Broadly, the Swan Coastal Plain consists of two sedimentary belts of different origin. Its eastern side has formed from the deposition of alluvial material washed down from the Darling Scarp, while its western side is comprised of three dune systems that run roughly parallel to the Indian Ocean coastline (Seddon 2004). These dune systems, referred to as Quindalup, Spearwood and Bassendean associations, represent a succession of coastal deposition that has occurred since the late Quaternary period (approximately two million years ago) (Kendrick *et al.* 1991) and, as a result, they contain soils at different stages of leaching and formation.

The site is situated at the interface between the Spearwood and Basendean associations, but is situated within and characterised by the Spearwood association.

2.1.3 Landform, soils, and geology

The *Perth Metropolitan Region 1: 50,000 Environmental Geology Series, Rockingham (Part of sheets 2033 II and 2033 III)* (Gozzard 1983) maps the site as 'sand' (map unit S7). Areas to the north and south-east of the site include 'peaty clay' (map unit Cps) and areas to the south-west include 'sandy silt' (map unit Ms5). The descriptions of these soil types are provided in **Table 1** and their spatial extent are shown in **Figure 4**.

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Table 1: Environmental Geology Series map unit descriptions (Gozzard 1983).

Map unit	Name	Description
S7	Sand	Pale yellowish brown, medium to coarse-grained sub-angular quartz, trace of feldspar, moderately sorted, of residual origin.
Cps	Peaty clay	Dark grey and black, soft, variable organic content, some quartz sand in places, of lacustrine origin.
Ms5	Sandy silt	Dark brownish grey silt, with disseminated fine-grained quartz sand, firm, variable clay content, of lacustrine origin.

The best available soil landscape mapping from the Department of Primary Industries and Regional Development (DPIRD) places the site within the Spearwood association (**Figure 5**). Refined soil mapping places the site largely within the Spearwood S4a Phase, which consists of flat to gently undulating sandplain with deep, pale, and sometimes bleached sands with yellow-brown subsoils. The north-eastern corner of the site is within the Spearwood S1b Phase, which consists of dune ridges with deep siliceous yellow-brown sands or pale sands with yellow-brown subsoil and slopes up to 15%.

The site is not known to contain any restricted landforms or unique geological features.

2.1.4 Acid sulfate soils

Acid sulfate soils (ASS) is the name commonly given to naturally occurring soils and sediment containing iron sulfide (iron pyrite) materials. In their natural state, ASS are generally present in waterlogged anoxic conditions and do not present any risk to the environment. ASS can present issues when oxidised, producing sulfuric acid, which can impart a range of impacts on the surrounding environment, infrastructure, and human health. Projects involving the disturbance of ASS must therefore assess the risk associated with disturbance by considering potential impacts.

Mapping prepared by the Department of Water and Environment Regulation (DWER) (2024) to support the WAPC's *Planning Bulletin No. 64: Acid Sulfate Soils* (2009) provides broad-scale mapping indicating areas of potential ASS risk. The mapping identifies the following ASS risk classification areas as:

- Class 1 – high to moderate risk of ASS occurring within 3 m of natural soil surface.
- Class 2 – moderate to low risk of ASS occurring within 3 m of natural soil surface but high to moderate risk of ASS beyond 3 m of natural soil surface.

The risk maps do not describe the actual severity of ASS in a particular area but provide an indication of whether ASS could be present based on surface elevations and landforms. For each classification, the maps identify the type of works likely to present an environmental risk.

The mapping indicates that the site has no known risk of ASS occurring, although there is high-moderate risk of ASS occurring to the immediate central-north of the site and to the south-east and south-west of the site (**Figure 6**).

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2.2 Biodiversity and natural assets

2.2.1 Flora and vegetation

At a national scale, the *Interim Biogeographic Regionalisation of Australia* divides the Swan Coastal Plain into two floristic subregions (Environment Australia 2000). The site is contained within the Perth subregion, which is characterised as mainly containing *Banksia* low woodland on leached sands with *Melaleuca* swamps where ill-drained; and woodland of *Eucalyptus gomphocephala* (tuart), *E. marginata* (jarrah) and *Corymbia calophylla* (marri) on less leached soils (Beard 1990).

Heddle *et al.* (1980) mapping shows the site as comprising the 'Bassendean central and south complex' which is described as vegetation ranging from woodland of *Eucalyptus marginata* - *Allocasuarina fraseriana* - *Banksia* spp. to low woodland of *Melaleuca* spp. and sedgelands on the moister sites.

A review of relevant databases has revealed that the site has been historically cleared and does not contain any remnant native vegetation. Therefore, the native flora and vegetation values associated with the site are non-existent.

2.2.2 Terrestrial fauna

As the site is historically cleared and does not contain any native remnant vegetation, it is of very limited value to terrestrial fauna from a habitat perspective.

2.2.3 Bush Forever

The Government of Western Australia's *Bush Forever* policy is a strategic plan for conserving regionally significant bushland within the Swan Coastal Plain portion of the Perth Metropolitan Region. The objective of *Bush Forever* is to protect comprehensive representations of all original ecological communities by targeting a minimum of 10% of each vegetation complex for protection (Government of WA 2000). The *Bush Forever* policy is only applicable within the Swan Coastal Plain portion of the Metropolitan Region Scheme (MRS).

No *Bush Forever* sites occur within the site.

2.2.4 Ecological linkages

Ecological or biodiversity linkages are described as areas of native vegetation which provide a corridor or linkage (typically linear) between patches of vegetation to allow movement of flora and fauna and their genetic material through the landscape, helping to maintain metapopulations. Ecological linkages are often continuous or near-continuous as the more fractured a linkage is, the less ease flora and fauna have in moving within the corridor (Alan Tingay and Associates 1998).

The Perth Biodiversity Project, supported by the Western Australia Local Government Association (WALGA), have identified and mapped Regional Ecological Linkages within the Perth Metropolitan Region (PBP 2007). In order to extend this study outside of the Perth Metropolitan Region, the South

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West Biodiversity Project was established, resulting in the identification and mapping of the South West Regional Ecological Linkages (Molloy *et al.* 2009).

A review of the data from the Perth Biodiversity Project reveal that a regional ecological linkage occurs around 200m to the west of the site (WALGA and PBP 2004) (**Figure 7**). These ecological linkages connect areas of *Bush Forever* and intact vegetation located in the wider local area. The development of the site is unlikely to impact the function of this ecological linkage.

2.2.5 Environmentally sensitive areas

Within Western Australia, the clearing of native vegetation can only be undertaken once a Clearing Permit has been attained under Part V of the EP Act, or if the clearing activity is in accordance with a valid exemption, including:

- Exemptions listed in Schedule 6 of EP Act. These include, but are not limited to:
 - Clearing undertaken in accordance with a subdivision approval.
 - Clearing that is required under other laws (for example, Local Governments may require landholders to establish and maintain firebreaks under the *Bush Fires Act 1954*).
- Exemptions listed in the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (the Regulations). These are associated with low impact land management practices and include, but are not limited to:
 - Clearing to allow for the construction of fence-lines.
 - Clearing for vehicular and walking tracks.
 - Burning to reduce fire hazards.
 - The collection of firewood.

‘Environmentally sensitive areas’ (ESAs) are prescribed under the Regulations to protect native vegetation values in proximity to significant threatened flora, ecological communities, wetlands or ecosystems. Within ESAs, exemptions listed in the Regulations (i.e. those associated with low impact land management practices) do not apply and a Clearing Permit is required to undertake such clearing activities. The relevance of ESAs is limited to this specific context.

There are no ESAs within the site, and there is no native vegetation pursuant to the EP Act occurring within the site.

2.3 Hydrology

2.3.1 Groundwater

The *Perth Groundwater Map* indicates that the historical maximum groundwater levels (MGL) range between 10 m AHD in the south-west of the site and 13 m AHD in the north-east of the site.

Existing groundwater levels are shown in **Figure 8**.

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2.3.2 Surface water

No defined streamlines or floodways occur within or in close proximity to the site. This is consistent with the high permeability of the underlying sand. Surface runoff is unlikely to occur, however in extreme rainfall events could result in sheet flow directed towards the lower lying areas of the site.

2.3.3 Wetlands

The *Geomorphic Wetlands Swan Coastal Plain dataset* indicates that there are no identified wetlands within the site.

2.3.4 Public Drinking Water Source Areas

PDWSAs are proclaimed by DWER to protect identified drinking water sources, which can be surface water or groundwater sources (DoW 2009). They are proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* or the *Country Areas Water Supply Act 1947* as Water Reserves, Catchment Areas or Underground Water Pollution Areas. PDWSAs provide Western Australia with a significant portion of its drinking water supplies and can be vulnerable to contamination from a range of land uses and water-based activities. Once an area is identified as a PDWSA, consideration needs to be given to the intended land use and associated activities to ensure that they are appropriate in meeting the water protection quality objectives of the area.

The site is not located within or in proximity to any proclaimed or proposed Public Drinking Water Source Areas (PDWSAs).

2.4 Heritage

2.4.1 Aboriginal heritage

The *Aboriginal Heritage Inquiry System* (AHIS) is maintained pursuant to Section 38 of the *Aboriginal Heritage Act 1972* (AH Act) by the Department of Planning, Lands and Heritage (DPLH), containing information on Registered Aboriginal Heritages Sites and Other Heritage Places throughout Western Australia. In accordance with the *Aboriginal Heritage Due Diligence Guidelines* (DAA 2013), a search of the AHIS online database (DPLH 2024) was undertaken.

No Registered Aboriginal Heritage Sites or Other Heritage Places are mapped by the DPLH over any part of the site.

2.4.2 Non-indigenous heritage

To determine the actual or potential presence of sites or features of non-indigenous heritage significance within the site, a review of readily available information at a federal, state, and local government level was undertaken to determine if any of the following occur within the site:

- World Heritage Sites.
- National Heritage Places.
- Commonwealth Heritage Places.

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- Sites listed in the State Register of Heritage Places.
- Sites listed in the City of Mandurah Heritage Register.

The review did not identify any such features within the site.

2.5 Land use considerations

2.5.1 Historical land uses

2.5.1.1 Changes in land use

Review of historical images available from 1953 (Landgate 2024) onwards shows that the site was completely cleared of remnant vegetation between 1965 and 1989.

Lot 80 appears to have been the first lot to be completely cleared, with a shed being built within it between 1965 and 1970.

Lot 78 appears to have been progressively cleared between 1965 and 1974, and a residence being built on the north side of the lot between 1970 and 1977.

Lot 815 was cleared between 1974 and 1977. Vegetation regrowth occurred before the lot was cleared again between 1985 and 1989, and a shed was built on the north side of the lot. There appears to be evidence of light industrial activity on this lot between 2008 and 2017.

Lot 813 was completely cleared of vegetation between 1985 and 1989, and appears to have been progressively built-up between 1995 and 2004 and until recently supported a steel distributor ("Best Buy Steel").

2.5.1.2 Potential contamination

A desktop study of the potential presence of historical contamination within the site was conducted. The State Government, through the DWER, has the overall responsibility for developing, administering, and enforcing the *Contaminated Sites Act 2003* and its associated procedures. Part of this responsibility includes maintenance of the *Contaminated Sites Database* which holds information on known, previously or potentially contaminated sites within Western Australia. The *Contaminated Sites Database* holds information on known contaminated sites that have been classified by the DWER as:

- Contaminated – remediation required.
- Contaminated – restricted use.
- Remediated for restricted use.

A search of the *Contaminated Sites Database* indicated the site is not recorded on the database, and there are no sites classified as contaminated within 1 km of the site (DWER 2024).

2.5.2 Surrounding land uses

The site is surrounded by a variety of existing land uses, including:

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- Wattleup Road to the north of the site.
- Rural land uses to the west.
- Future urban land use (residential) to the east.
- The future extension of Rowley Road to the south.

None of the identified land uses surrounding the site would preclude the site from being suitable for residential development, however the future Rowley Road will need consideration in terms of potential noise impacts on the proposed residential (i.e. noise sensitive) uses within the site.

State Planning Policy 5.4 Road and Rail Noise (WAPC 2019) requires a Transport Noise Assessment (TNA) to be undertaken prior to subdivision works being commenced within the site. A TNA has been prepared by Lloyd George Acoustics to support the amendment to the SP.

2.6 Bushfire hazard

The site is partially designated as a 'Bushfire Prone Area' in the *Map of Bush Fire Prone Areas* (Office of Bushfire Risk Management 2021) (**Figure 9**). *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (WAPC 2015a) sets out a requirement for the preparation of a Bushfire Management Plan (BMP) to support any planning proposal (such as a SP or subdivision application) which intersects a designated bushfire prone area. On this basis, a BMP has been prepared to support the lodgement of the updated SP.

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2.7 Summary of relevant environmental factors

The environmental factors that have been investigated for the site, and those that will require further specific consideration as part of the future development within the site, are summarised in **Table 2**. These considerations are discussed further in **Section 4**.

Table 2: Relevant environmental factors and considerations for the proposed SP.

Environmental factor	Relevant considerations
Climate	No issues posed and therefore no further consideration of this factor is required.
Topography	No issues posed and therefore no further consideration of this factor is required.
Geology	No issues posed and therefore no further consideration of this factor is required.
Landform and soils	No issues posed and therefore no further consideration of this factor is required.
Acid sulfate soils	No issues posed and therefore no further consideration of this factor is required.
Flora and vegetation	No issues posed and therefore no further consideration of this factor is required.
Terrestrial fauna	No issues posed and therefore no further consideration of this factor is required.
Bush Forever	No Bush Forever sites occur within the site and therefore no further consideration of this factor is required.
Ecological linkages	No issues posed and therefore no further consideration of this factor is required.
ESAs	No ESAs and no native vegetation is located within the site and therefore no further consideration of this factor is required.
Groundwater	The MGL for the site ranges between 10 m AHD and 13 m AHD. This is discussed further in Section 4.1 .
Surface water	No surface water features have been identified within, or within proximity to the site and therefore no further consideration of this factor is required.
Wetlands	No wetlands have been identified within, or within proximity to the site and therefore no further consideration of this factor is required.
PDWSAs	No PDWSAs are located within, or within proximity to the site and therefore no further consideration is required.
Aboriginal heritage	No indigenous heritage values have been identified within, or within proximity to the site and therefore no further consideration of this factor is required.
Non-indigenous heritage	No non-indigenous heritage values have been identified within, or within proximity to the site and therefore no further consideration of this factor is required.
Historic land uses	No potentially contaminating land use is known to have occurred on the site. No further consideration of this factor is required.
Bushfire hazard	The site is partially designated as a 'Bush Fire Prone Area'. This is addressed further in Section 4.2 and within the updated BMP.
Surrounding land uses	The extension of Rowley Road to the south of the site requires a TNA to be prepared. This is addressed further in Section 4.3 and within the TNA.

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3 Planning Framework and Proposal

3.1 Historical planning and environmental assessment context

The *Southern Suburbs District Structure Plan Stage 3* (SSDSP3) was released by the CoC in September 2012 (CoC 2012). The SSDSP3 acts as a guiding document, providing a broad land use framework and basis for co-ordinating and considering SPs which may be prepared within the district area. The SP has been designed to generally align with the relevant SSDSP, which considers areas for conservation, such as regional open space (ROS) and wetlands within its defined spatial extent. The SSDSP3 does not identify any conservation areas (through ROS or POS) within the site.

3.2 Updated Structure Plan

The current proposal is for an amendment to the Hammond Quarter SP (SPN/2348). The Hammond Quarter SP currently comprises Lots 117, 200, 803, 805, 816, 1000, 1001, 9001, 9002, and 9003 Wattleup Road, Hammond Park. The proposed amendment will add Lots 813 and 815, and the northern section of Lots 78 and 80 Wattleup Road, Hammond Park to the Hammond Quarter SP.

The proposed amendment to the SP is provided in **Appendix A**.

3.3 Future planning approvals and environmental management framework

The SP will be submitted to the CoC for consideration, with final approval to be given by the WAPC. Following SP approval, subdivision and development will be progressed in accordance with the SP.

It is usual for SP approval to involve the imposition of subdivision conditions in accordance with the WAPC's *Model Subdivision Conditions Schedule* (WAPC 2024) which cover the following relevant areas:

- Administrative
- Amenity
- Buildings and use
- Drainage and site works
- Electricity and gas pipelines
- Environmental conditions
- Fire and emergency infrastructure
- Heritage (indigenous, state and local)
- Lot design
- Reserves
- School sites
- Transport roads and access
- Water and sewers
- Telecommunications advice.

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A key component of implementing the future subdivision and development of the site is the environmental management framework. Where required, subdivision conditions will implement the identified environmental management requirements. The future environmental management framework is discussed further in **Section 4**.

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4 Environmental Assessment and Management Framework

4.1 Hydrology

The *Perth Groundwater Map* indicates that the historical maximum groundwater levels (MGL) range between 10 m AHD in the south-west of the site and 13 m AHD in the north-east of the site.

4.1.1 Policy framework and management objective

The documents *State Water Strategy for Western Australia* (Government of WA 2003) and *Better Urban Water Management* (WAPC 2008) endorse the promotion of integrated water cycle management and application of water sensitive urban design (WSUD) principles to provide improvements in the management of stormwater, and to increase the efficient use of other existing water supplies. The key principles of integrated water cycle management include:

- Considering all water sources, including wastewater, stormwater, and groundwater.
- Integrating water and land use planning.
- Allocating and using water sustainably and equitably.
- Integrating water use with natural water processes.
- Adopting a whole of catchment integration of natural resource use and management.

The EPA's *Environmental Assessment Guideline No. 8* (2015) outlines the following key objectives for the management of groundwater:

- To maintain the hydrological regimes of groundwater so that existing and potential uses, including ecosystem maintenance, are protected.
- To maintain the quality of groundwater, sediment and biota so that the environmental values, both ecological and social, are protected.

State Planning Policy 2.9 Water Resources (WAPC 2006) outlines the following key policy objectives:

- Protect, conserve and enhance water resources that are identified as having significant economic, social, cultural and/or environmental values.
- Assist in ensuring the availability of suitable water resources to maintain essential requirements for human and all other biological life with attention to maintaining or improving the quality and quantity of water resources.
- Promote and assist in the management and sustainable use of water resources.

4.1.2 Structure Plan considerations for hydrology

The proposed SP amendment does not require the preparation of a Local Water Management Strategy but will require an addendum to the existing UWMP that has been prepared and approved for the existing and approved SP. The UWMP Addendum has been prepared by Hyd2o Hydrology (Hyd2o Hydrology, 2024).

Environmental Assessment and Management Strategy

Hammond Quarter West: Local Structure Plan Amendment



4.1.3 Future groundwater management requirements

Depth to groundwater varies between 10 m and 13 m below the natural surface. Groundwater level management measures are therefore not required.

A key objective for the management of the surface water and groundwater quality is to maintain or improve the existing groundwater quality. This can be achieved by reducing the total nutrient load into the groundwater that originates from the development compared to historic and existing land uses. Improving groundwater quality can be achieved by the treatment of surface runoff prior to infiltrating to groundwater. The retention and infiltration of surface runoff also helps to recharge the superficial aquifer.

4.1.4 Predicted environmental outcomes

The UWMP addendum provides the framework for the SP to manage water quality in accordance with the WAPC and EPA guidelines and policy frameworks. The UWMP addendum provides the framework based on *Better Urban Water Management* (WAPC 2008) practices to support future subdivision and will contribute to improvement in water quality and the sustainable use of groundwater resources.

4.2 Bushfire management

4.2.1 Policy framework and management objective

State Planning Policy 3.7 Planning in Bushfire Prone Areas (WAPC 2015a) stipulates that any development proposal which occurs partly or wholly within a bushfire prone area is considers effective, risk-based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure.

4.2.2 Structure Plan considerations for bushfire management

The south-west corner of the site is deemed 'bushfire prone' (**Figure 9**). Therefore, a Bushfire Management Plan (BMP) has been prepared by MBS Environment (MBS Environment, 2024) to support the LSP. Further discussion is provided in the BMP.

4.2.3 Future bushfire management requirements

Per the requirements of SPP 3.7, any future subdivision applications for the site must be accompanied by a new or updated BMP specific to the application. In addition, the WAPC may include standard conditions relating to bushfire risk management on any future subdivision approval for the site.

Future development of lots within 100 m of classified vegetation will require a final Bushfire Attack Level (BAL) assessment to be completed and certified prior to dwelling construction. This BAL assessment will inform any requirement for increased construction standards in accordance with AS 3959, which will then be implemented through the building licence process. An indicative BAL

Environmental Assessment and Management Strategy

Hammond Quarter West: Local Structure Plan Amendment



assessment has been completed as part of the BMP and indicates that no future dwelling will be subject to a BAL rating higher than BAL-29.

As part of future subdivision and development, roads will be provided to support access routes, hydrants will be constructed, and POS will be implemented and maintained as 'low threat' in accordance with Clause 2.2.3.2(f) of AS 3959.

4.2.4 Predicted environmental outcomes

By preparing a BMP at this early stage of planning process, the LSP has been able to incorporate bushfire hazard management considerations into the design of the development. This will assist in ensuring that future dwellings will not be subject to an unacceptable level of risk (such that BAL-29 is not exceeded), and that if there is a bushfire within or near the site, the threat to residents, property and emergency response personnel will be reduced.

There is no requirement to clear native vegetation within or immediately adjacent to the site to achieve the bushfire management requirements as specified in the BMP, and therefore the bushfire management requirements in themselves do not create any environmental impacts or considerations.

4.3 Land use compatibility

4.3.1 Policy framework and management objective

State Planning Policy 5.4 Road and Rail Noise requires that development proposals account for acoustic impacts presented by the surrounding area. The objectives of SPP 5.4 are to:

- Protect the community from unreasonable levels of transport noise.
- Protect strategic and other significant freight transport corridors from incompatible urban encroachment.
- Ensure transport infrastructure and land-use can mutually exist within urban corridors.
- Ensure that noise impacts are addressed as early as possible in the planning process.
- Encourage best practice noise mitigation design and construction standards.

4.3.2 Structure plan considerations for acoustic impacts

The site occurs immediately adjacent to the the proposed Rowley Road extension, which is considered a 'Strategic Freight/Major Traffic Route'. This places the site within a road and rail noise-affected area (**Figure 10**). Therefore, a TNA has been prepared by Lloyd George Acoustics to support the LSP. Further discussion is provided in the TNA (**Appendix B**).

4.3.3 Future acoustic impact management requirements

The application of *State Planning Policy 5.4* requires that the TNA considers future developments and associated increases in traffic anticipated for the next 20 years. The TNA provides information on the noise controls proposed for the site.

Environmental Assessment and Management Strategy

Hammond Quarter West: Local Structure Plan Amendment



4.3.4 Predicted environmental outcomes

By preparing a TNA at this early stage of planning process, the LSP has been able to incorporate acoustic impact considerations into the design of the development. This will assist in ensuring that future dwellings will not be subject to an unacceptable level of risk, i.e. that 55 dB $L_{Aeq(Day)}$ and 50 dB $L_{Aeq(Night)}$ is not exceeded.

Environmental Assessment and Management Strategy

Hammond Quarter West: Local Structure Plan Amendment



5 Implementation

A summary of the LSP responses to the environmental values and attributes within the site is provided in **Table 3**. The table also outlines the proposed future management required as part of the subdivision and development process.

Table 3: Environmental management framework implementation.

Factor	SP phase	Subdivision phase	Development phase
Hydrology	Preparation of an Urban Water Management Plan addendum.	Incorporation of stormwater management infrastructure in subdivision designs in accordance with the UWMP addendum.	Implementation/delivery of proposed stormwater management infrastructure.
Bushfire management	- Preparation of BMP. - Provision of POS and road reserves to accommodate appropriate APZs.	- Prepare/update BMP to support subdivision application/s. - Complete detailed BAL assessment to support dwelling construction.	- Dwellings within 100 m of bushfire threat to demonstrate compliance with AS 3959. - POS to be maintained as low threat in accordance with Clause 2.2.3.2(f) of AS 3959.
Noise management	Preparation of TNA.	Update TNA to support subdivision application/s	Implementation of the TNA requirements.

Environmental Assessment and Management Strategy

Hammond Quarter West: Local Structure Plan Amendment



6 Conclusions

This *Environmental Assessment and Management Strategy* (EAMS) which relates to Lots 813 and 815, and the northern section of Lots 78 and 80 Wattleup Road, Hammond Park, has been prepared in support of the proposed amendment to the Hammond Quarter Structure Plan (SPN/2348).

The SP amendment will include the site into the currently approved SP area. Management responses have been incorporated into the SP, including:

- Preparation of an UWMP addendum.
- Preparation of a BMP, which outlines how the SP responds the bushfire protection criteria specified in the *Guidelines for Planning in Bushfire Prone Areas* (WAPC and DFES 2015).
- Preparation of the TNA, which outlines how the LSP responds to the noise impacts presented by the Rowley Road extension.

This EAMS also outlines the environmental framework to be implemented across the site as part of future subdivision and development phases of the residential development process, including:

- Completion of detailed BAL assessment and imposition of determined BAL ratings on affected lots. New dwellings within 100 m of the bushfire threat should demonstrate compliance with AS 3959 corresponding to the assigned BAL rating.

Overall, the environmental attributes and values of the site can be accommodated within the SP design or can be managed appropriately through the future subdivision and development phases in line with the relevant state and local government legislation, policies and guidelines and best management practices.

Environmental Assessment and Management Strategy

Hammond Quarter West: Local Structure Plan Amendment



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Environmental Assessment and Management Strategy

Hammond Quarter West: Local Structure Plan Amendment



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Figures



Figure 1: Site Location

Figure 2: Metropolitan Region Scheme Zones and Reserves

Figure 3: Topography

Figure 4: Geology

Figure 5: Soils

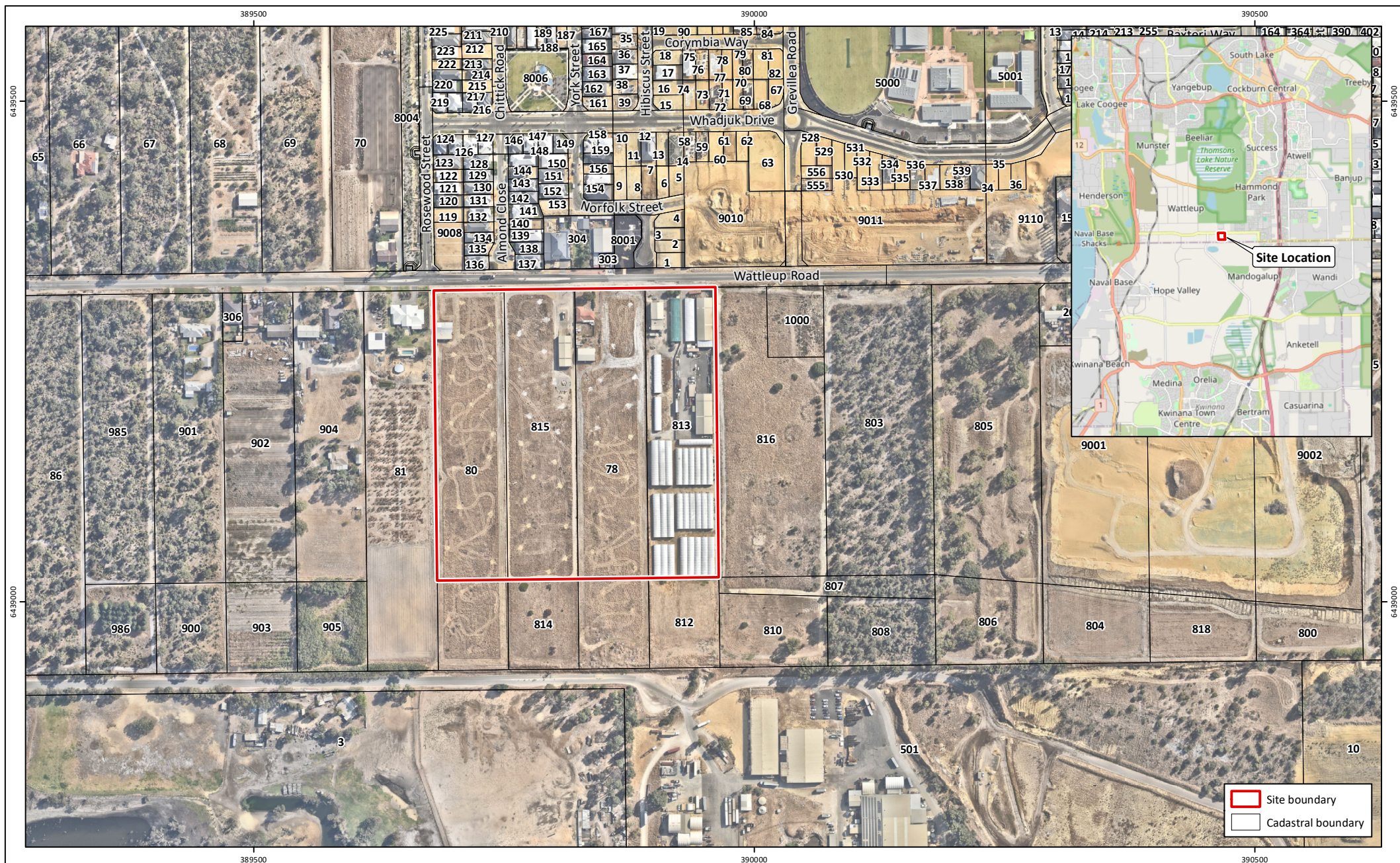
Figure 6: Acid Sulfate Soils

Figure 7: Regional Ecological Linkages

Figure 8: Groundwater Contours

Figure 9: Bushfire Prone Areas

Figure 10: Road and Rail Noise



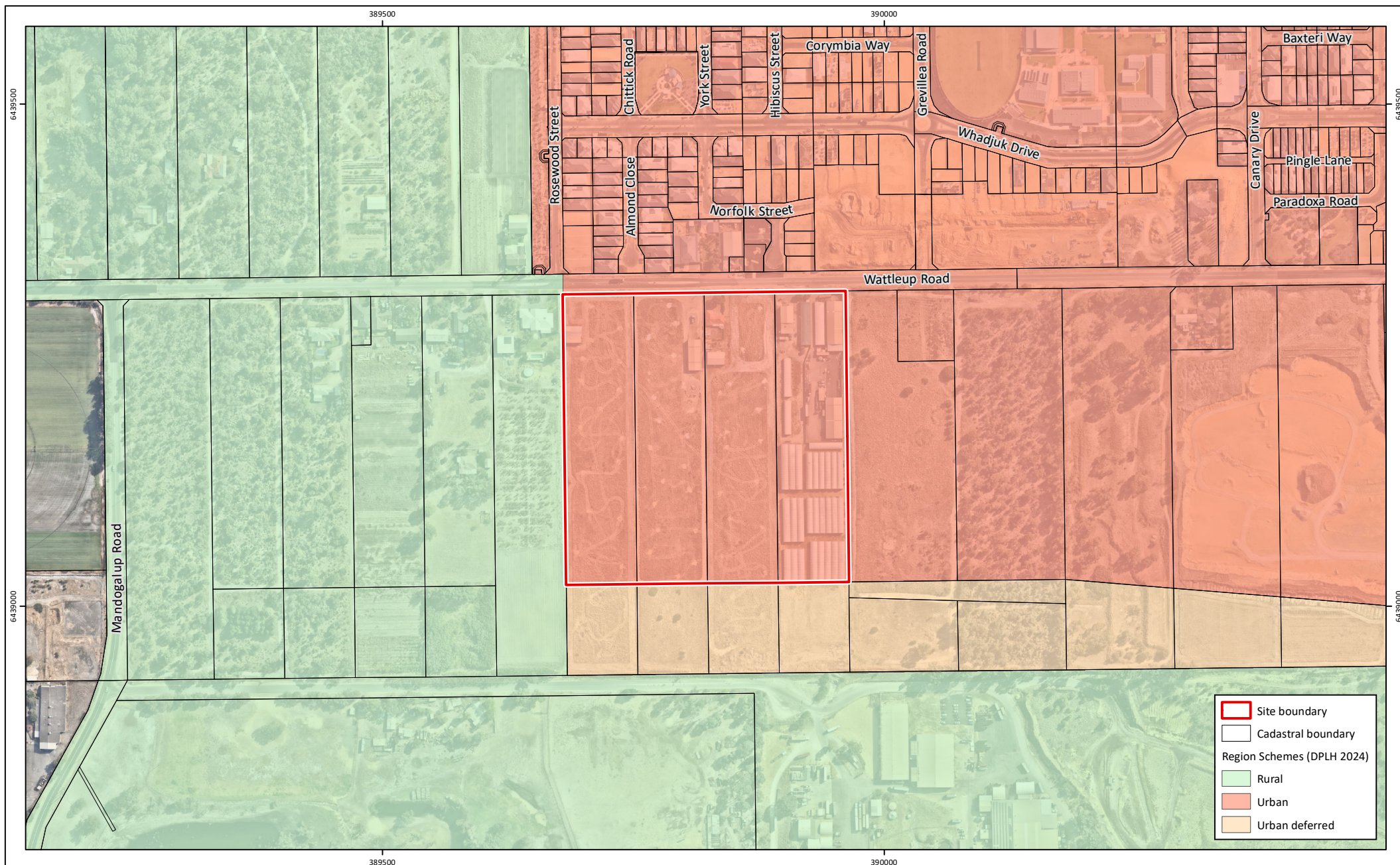


Figure 2: Metropolitan Region Scheme Zones and Reserves

Project: Environmental Assessment and Management Strategy
Hammond Quarter West

Client: Qube Property Group

Plan Number:
EP24-053(01)--F02

Drawn: AS

Date: 06/05/2024

Checked: JDH

Approved: JDH

Date: 08/07/2024



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Scale: 1:5,000@A4

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emerge
ASSOCIATES

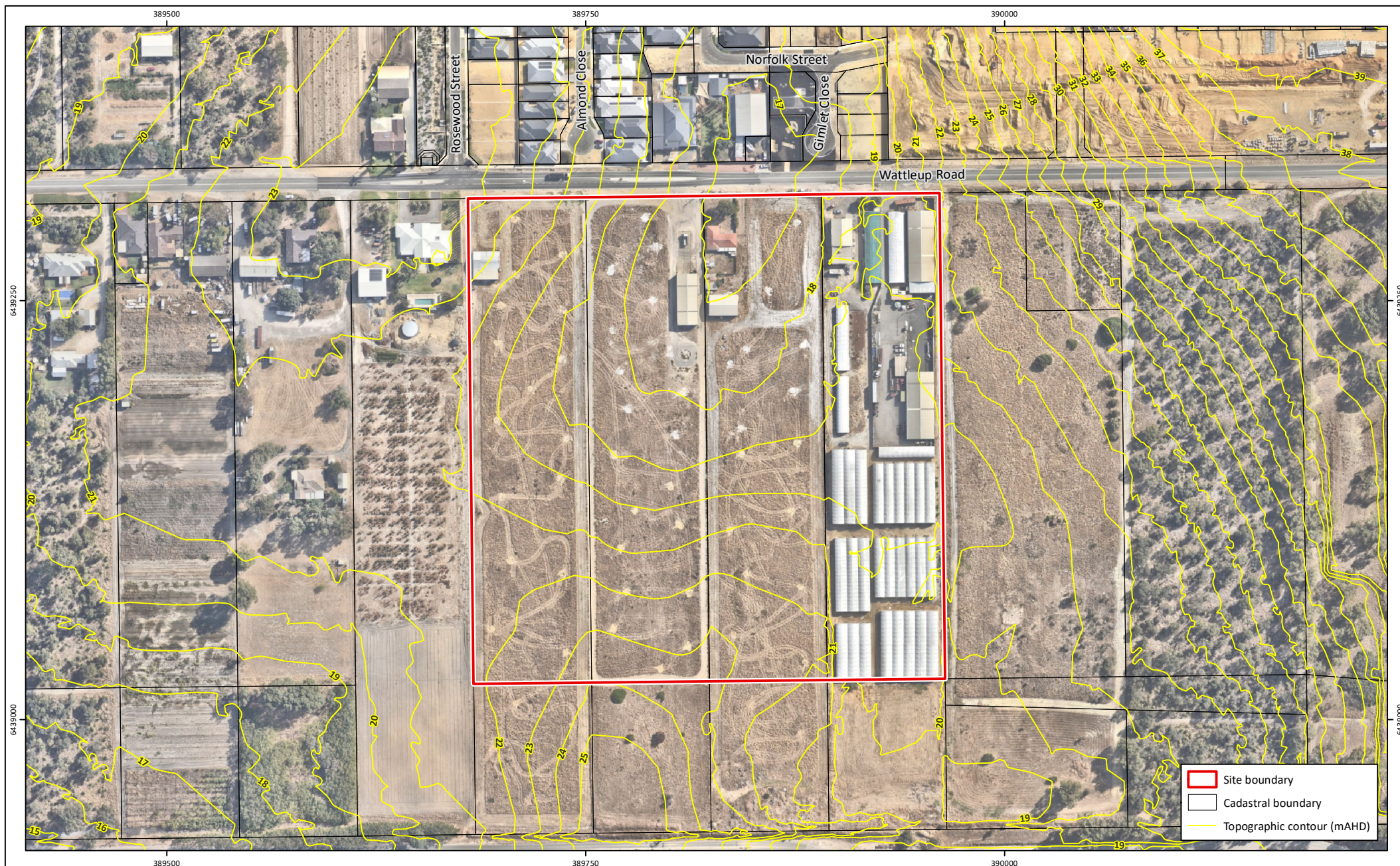


Figure 3: Topography

Project: Environmental Assessment and Management Strategy
Hammond Quarter West

Client: Qube Property Group

Plan Number:
EP24-053(01)--F03

Drawn: AS

Date: 06/05/2024

Checked: JDH

Approved: JDH

Date: 08/07/2024



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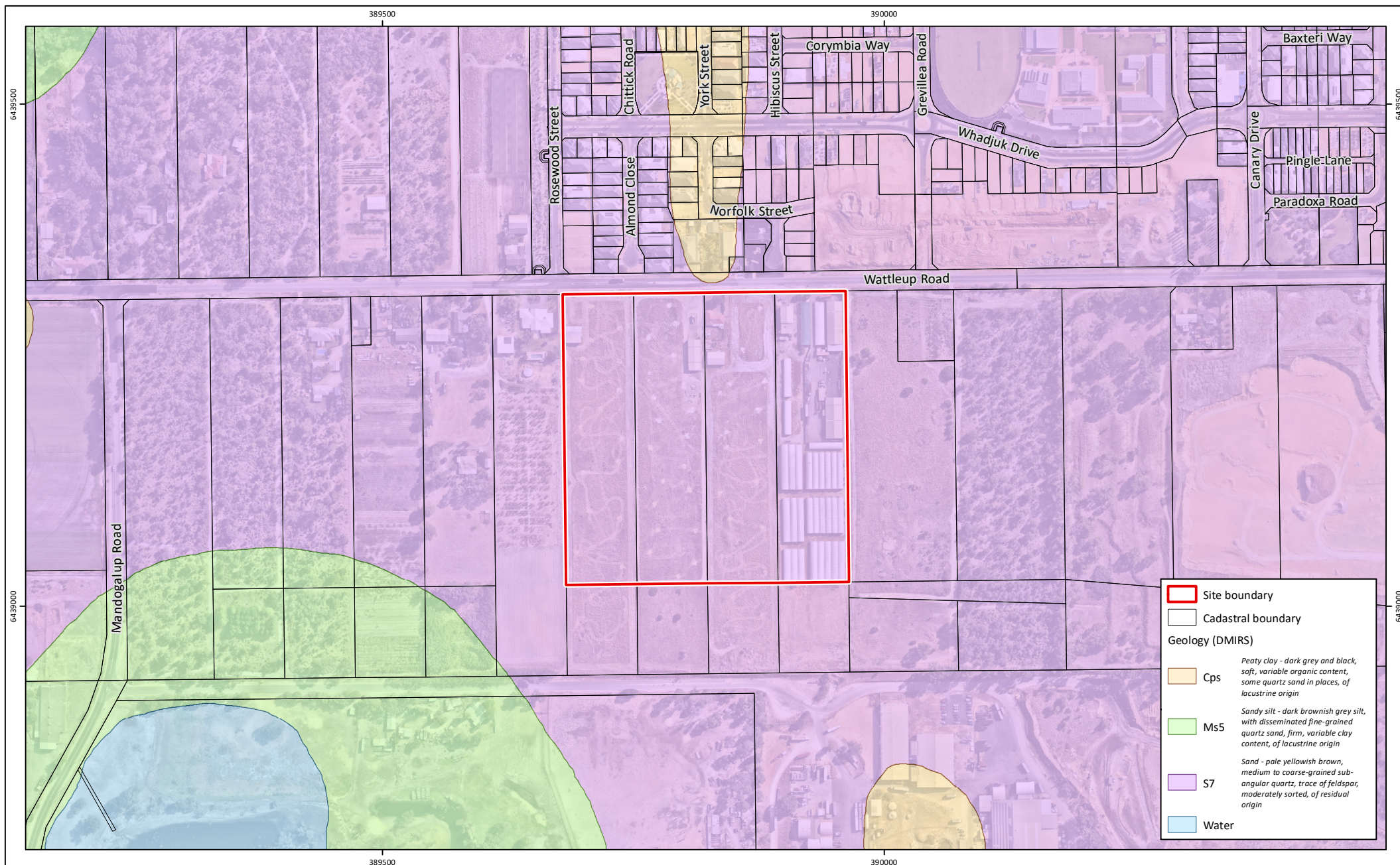


Figure 4: Geology

Project: Environmental Assessment and Management Strategy
Hammond Quarter West

Client: Qube Property Group

Plan Number:
EP24-053(01)--F04

Drawn: AS

Date: 06/05/2024

Checked: JDH

Approved: JDH

Date: 08/07/2024



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ASSOCIATES

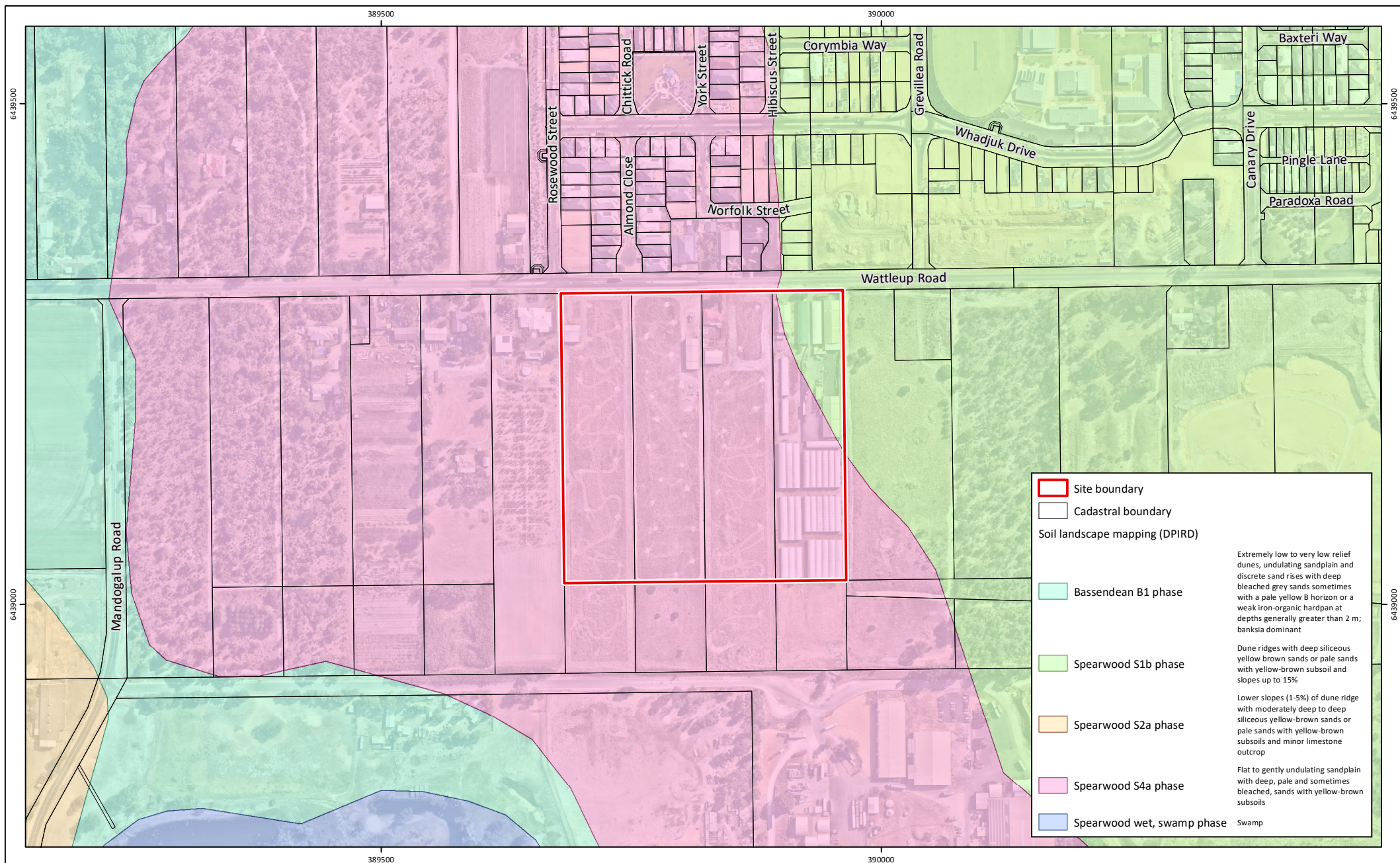


Figure 5: Soils

Project: Environmental Assessment and Management Strategy
Hammond Quarter West

Client: Qube Property Group

Plan Number:
EP24-053(01)--F05

Drawn: AS

Date: 06/05/2024

Checked: JDH

Approved: JDH

Date: 08/07/2024



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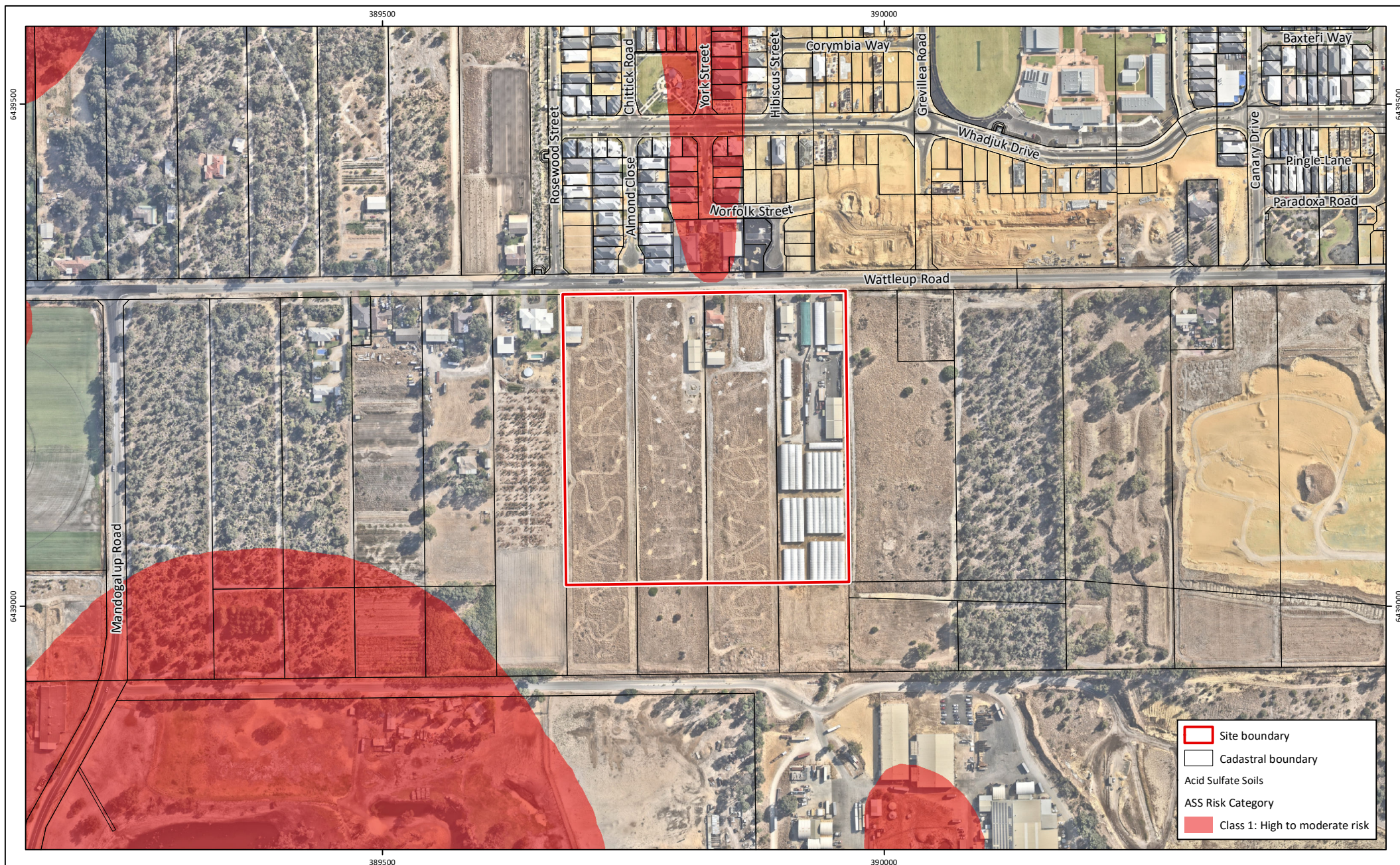


Figure 6: Acid Sulfate Soils

Project: Environmental Assessment and Management Strategy
Hammond Quarter West

Client: Qube Property Group

Plan Number:
EP24-053(01)--F06

Drawn: AS

Date: 06/05/2024

Checked: JDH

Approved: JDH

Date: 08/07/2024



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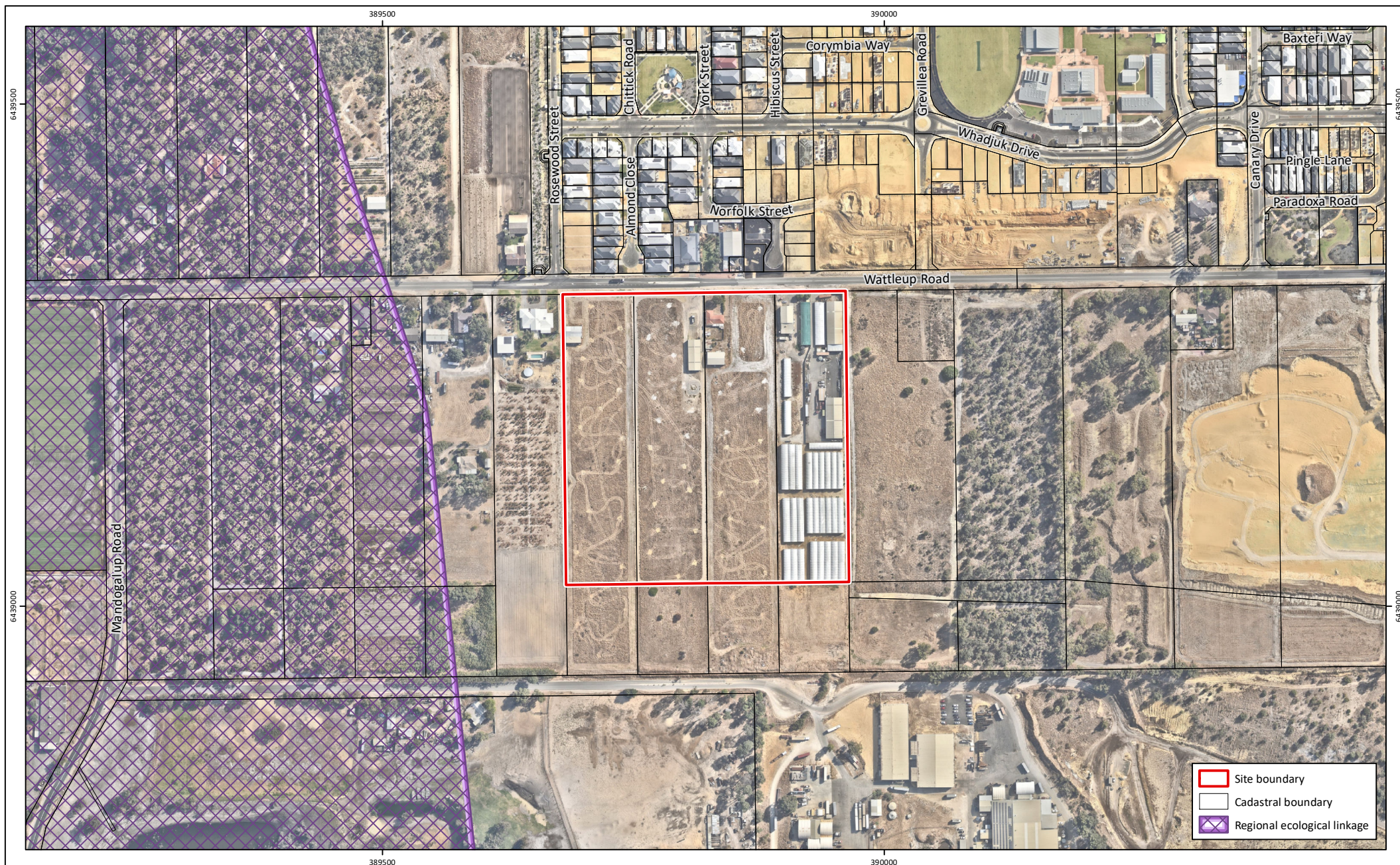


Figure 7: Regional Ecological Linkages

Project: Environmental Assessment and Management Strategy
Hammond Quarter West

Client: Qube Property Group

Plan Number:
EP24-053(01)--F07

Drawn: AS

Date: 06/05/2024

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Date: 08/07/2024



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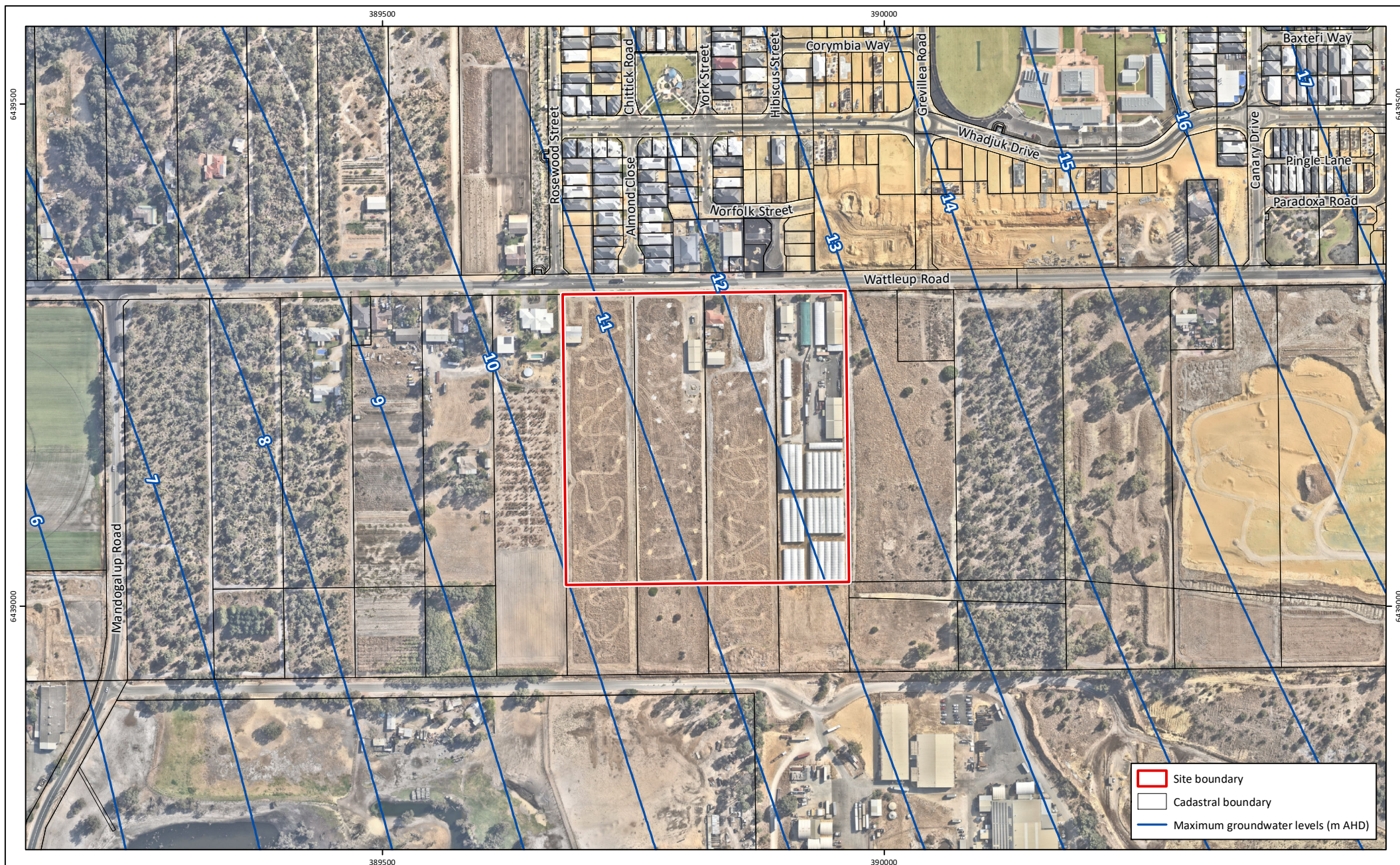


Figure 8: Groundwater Contours

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Hammond Quarter West
Client: Qube Property Group

Plan Number:
EP24-053(01)--F08
Drawn: AS
Date: 06/05/2024
Checked: JDH
Approved: JDH
Date: 08/07/2024



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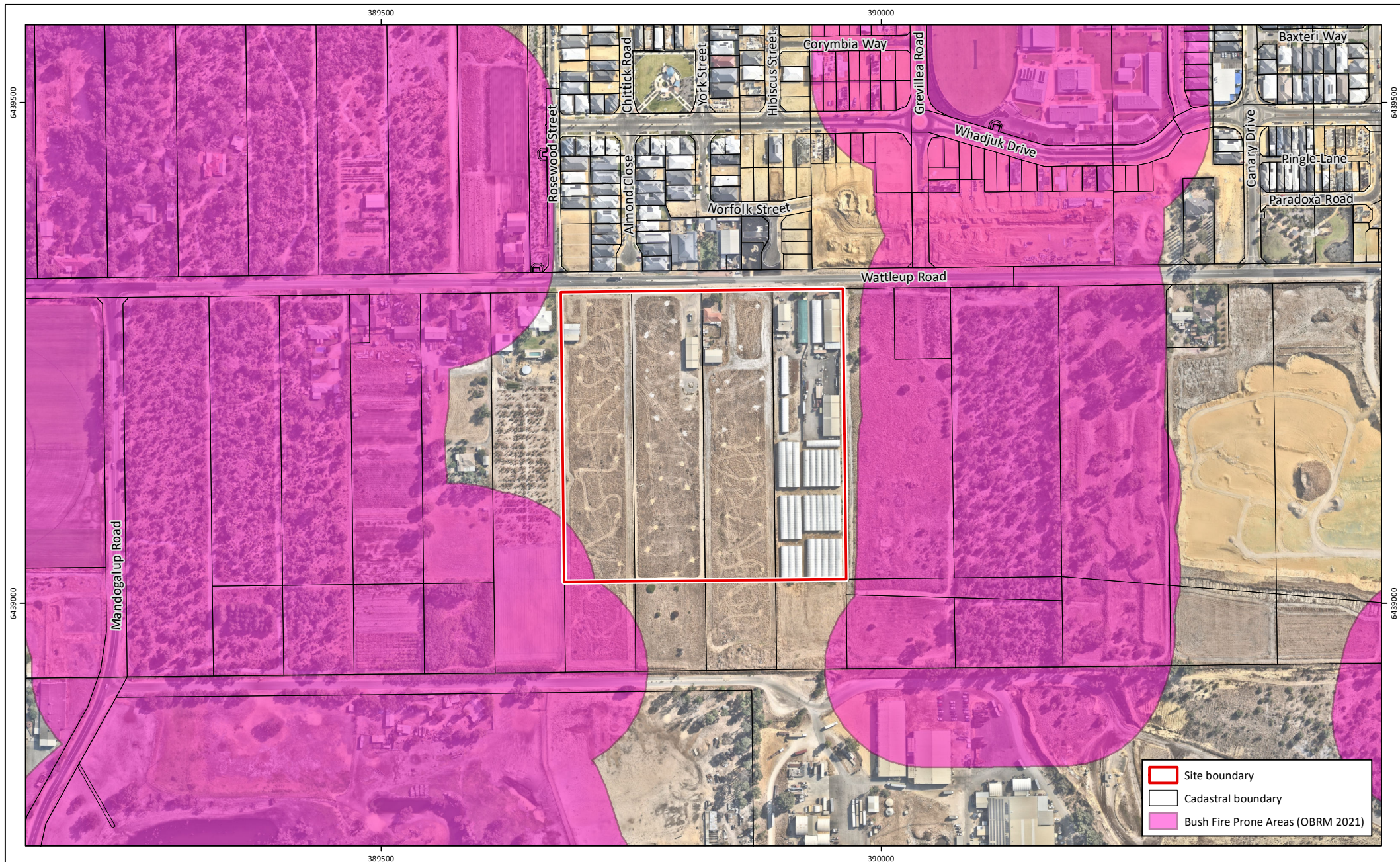


Figure 9: Bush Fire Prone Areas

Project: Environmental Assessment and Management Strategy
Hammond Quarter West
Client: Qube Property Group

Plan Number:
EP24-053(01)--F09
Drawn: AS
Date: 06/05/2024
Checked: JDH
Approved: JDH
Date: 08/07/2024



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emerge
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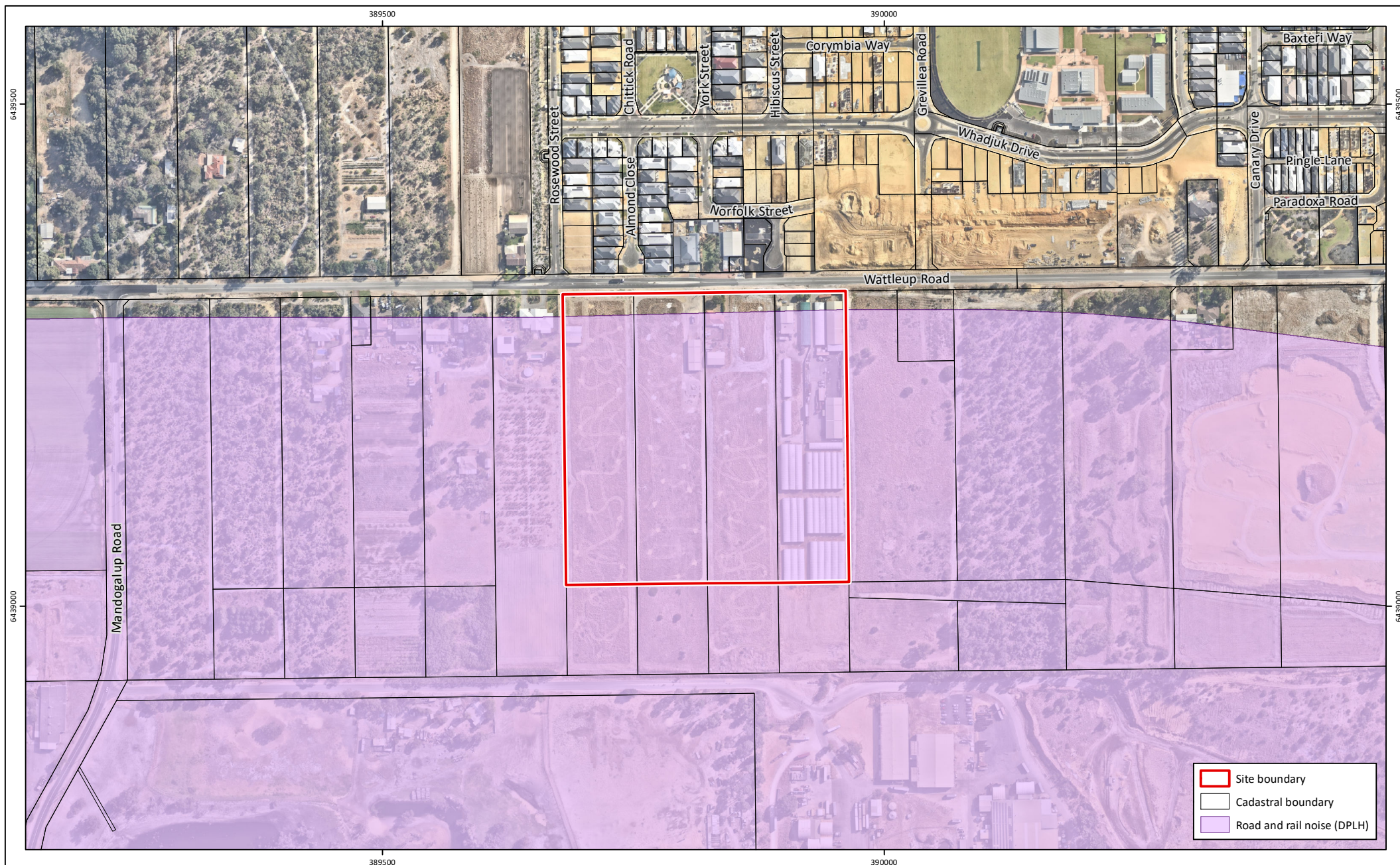


Figure 10: Road and Rail Noise

Project: Environmental Assessment and Management Strategy
Hammond Quarter West
Client: Qube Property Group

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Drawn: AS
Date: 16/05/2024
Checked: JDH
Approved: JDH
Date: 08/07/2024



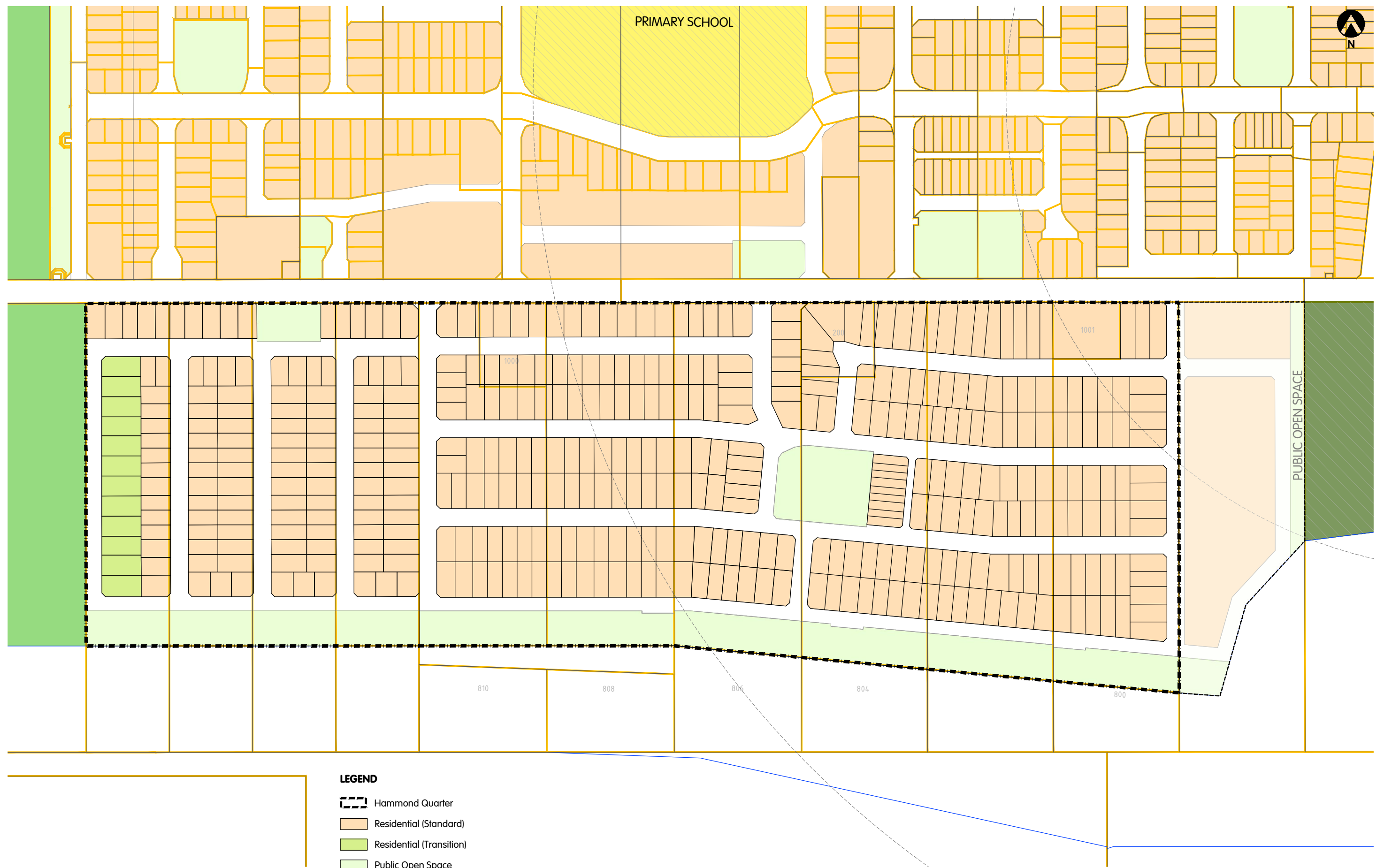
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Appendix A

Hammond Quarter West Structure Plan Amendment (Hatch
2024)





QUBE

HATCH

CADASTRAL INFORMATION
SOURCE: LANDGATE SLIP
YYMMDD: 230619
DWG REF: LGATE-001
PROJECTION: PCG94

SIZE A3_1:2500



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M	REMOVE TEMP ROAD NOTATION	240313	SB	TP
L	COLOUR TEMP CONNECTION AS RESI	240214	SB	TP
REV	DESCRIPTION	YYMMDD	DRAWN	APPR'D

CONCEPT PLAN - WATTLEUP NEIGHBOURHOOD
Hammond Quarter Structure Plan
City of Cockburn

JOB CODE DRAW NO. REV.
QUB WAT RD1 010 N

DISCLAIMER: ISSUED FOR DESIGN INTENT ONLY. ALL AREAS AND DIMENSIONS ARE SUBJECT TO DETAIL DESIGN AND SURVEY



LEGEND

- Area of Modification
- Residential (Standard)
- Residential (Transition)
- Public Open Space

YIELD TABLE

Existing Lots 4

Proposed Lots

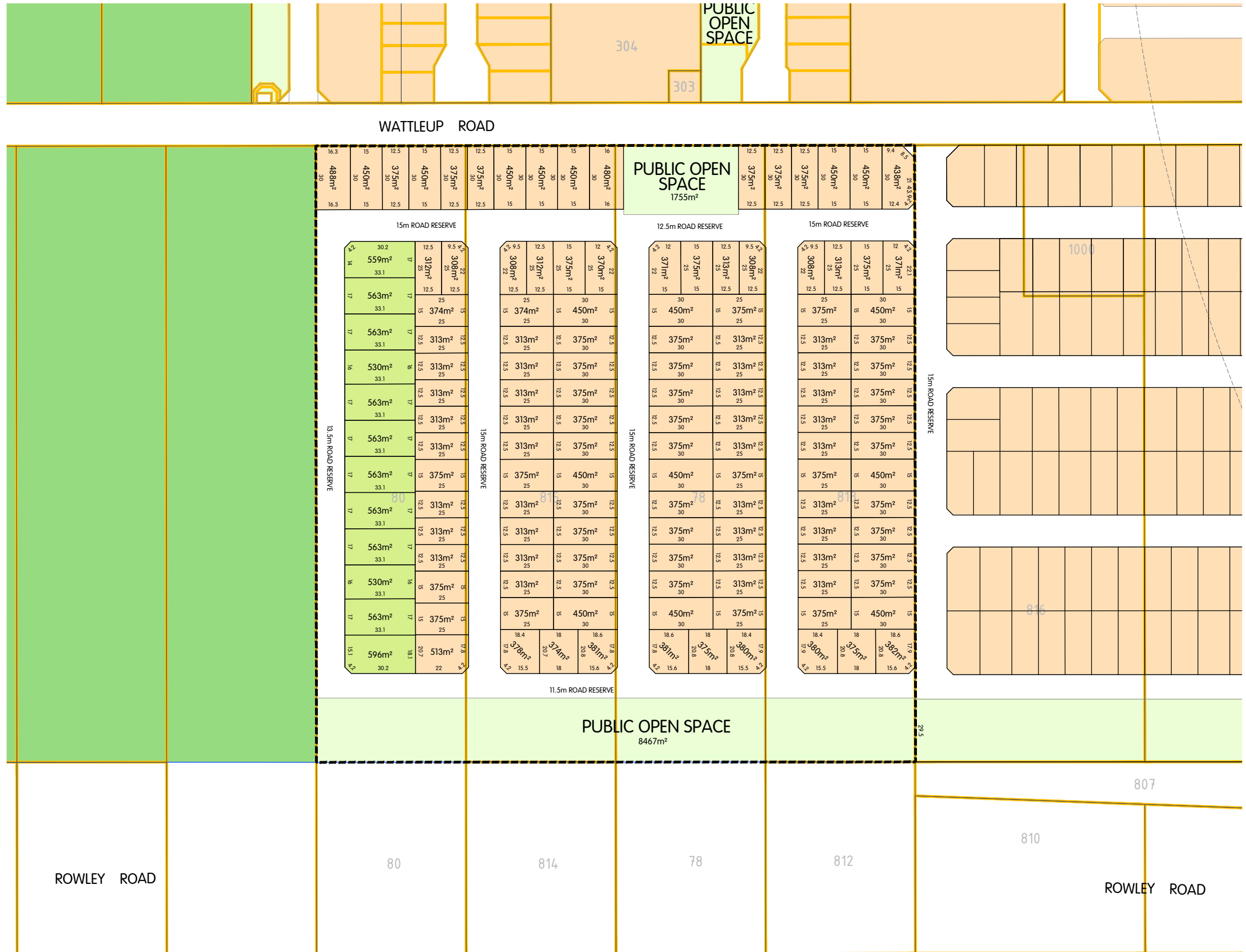
Residential (Standard) 125

Residential (Transition) 11

TOTAL 136

Public Open Space 2

Note: Totals include proposed lots used for temporary road access.



QUBE

HATCH

CADASTRAL INFORMATION
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YYMMDD: 230619
DWG REF: LGATE-001
PROJECTION: PCG94

SIZE A3 1:2000



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M	REMOVE TEMP ROAD NOTATION	240313	SB	TP
L	COLOUR TEMP CONNECTION AS RESI	240214	SB	TP
REV	DESCRIPTION	YYMMDD	DRAWN	APPR'D

CONCEPT PLAN - WATTLEUP NEIGHBOURHOOD
City of Cockburn

JOB CODE DRAW NO. REV.
QUB WAT RD1 010 N

DISCLAIMER: ISSUED FOR DESIGN INTENT ONLY. ALL AREAS AND DIMENSIONS ARE SUBJECT TO DETAIL DESIGN AND SURVEY

Appendix B

Transport and Noise Assessment (Lloyd George Acoustics,
2024)



Transportation Noise Assessment

Lot 813, Lot 78, Lot 815 and Lot 80 Wattleup Rd, Hammond Park

Reference: 24058981-01

Prepared for:
Qube

Reference: 24058981-01

Lloyd George Acoustics Pty Ltd

ABN: 79 125 812 544

PO Box 717

Hillarys WA 6923

www.lgacoustics.com.au

Contacts	General	Daniel Lloyd	Terry George	Matt Moyle
E:	info@lgacoustics.com.au	daniel@lgacoustics.com.au	terry@lgacoustics.com.au	matt@lgacoustics.com.au
P:	9401 7770	0439 032 844	0400 414 197	0412 611 330
Contacts	Rob Connolly	Daryl Thompson	Hao Tran	Matt Nolan
E:	rob@lgacoustics.com.au	daryl@lgacoustics.com.au	hao@lgacoustics.com.au	matt.nolan@lgacoustics.com.au
P:	0410 107 440	0420 364 650	0438 481 207	0448 912 604

This report has been prepared in accordance with the scope of services described in the contract or agreement between Lloyd George Acoustics Pty Ltd and the Client. The report relies upon data, surveys, measurements and results taken at or under the particular times and conditions specified herein. Any findings, conclusions or recommendations only apply to the aforementioned circumstances and no greater reliance should be assumed or drawn by the Client. Furthermore, the report has been prepared solely for use by the Client, and Lloyd George Acoustics Pty Ltd accepts no responsibility for its use by other parties.

Date	Rev	Description	Author	Verified
8-May-24	0	Issued to Client	Terry George	Matt Moyle

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1. INTRODUCTION

It is proposed to subdivide land at Lot 813, Lot 78, Lot 815 and Lot 80 Wattleup Rd, Hammond Park (refer *Figure 1-1*) with the proposed subdivision plan shown in *Figure 1-2*. To the south is the future extension of Rowley Road, which is considered a 'Strategic Freight/Major Traffic Route' as shown on PlanWA Maps (red dashed line), such that a noise assessment is required in accordance with *State Planning Policy No. 5.4 Road and Rail Noise*, being the subject of this report.

A previous assessment¹ was undertaken for a similar proposed subdivision (refer *Figure 1-1*), such that this current assessment uses similar methodology by updating the previous noise model with the subject site subdivision.

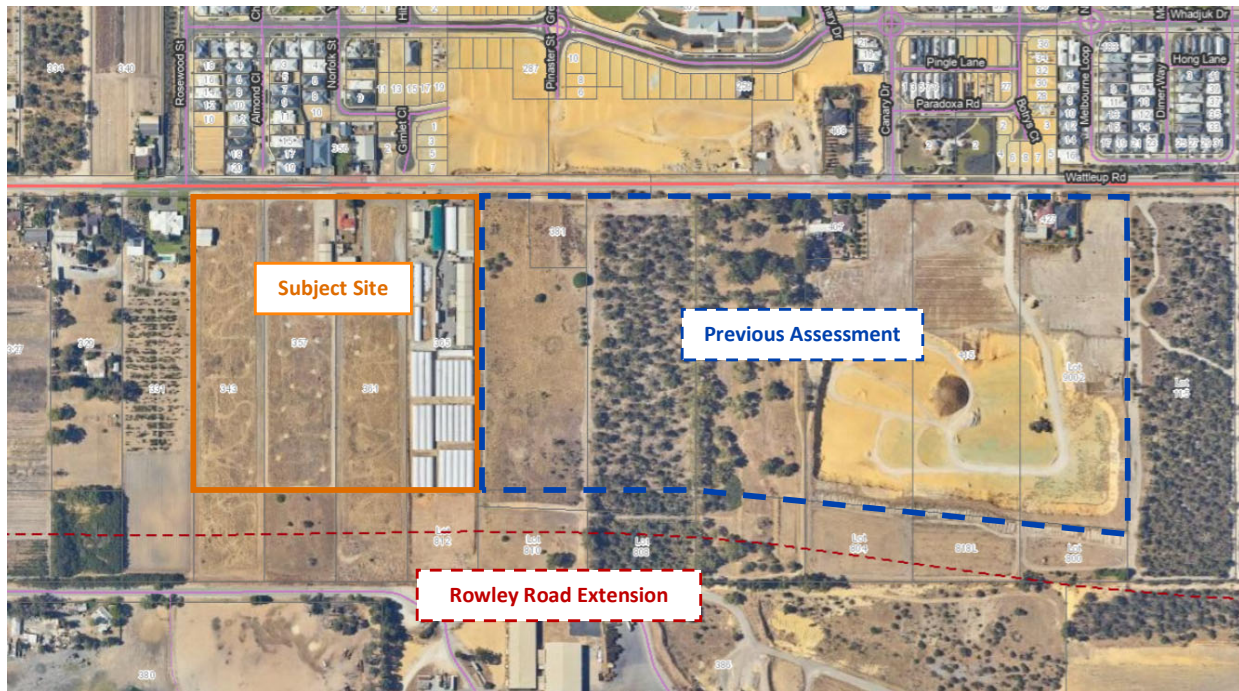


Figure 1-1: Subdivision Location (Source: DPLH PlanWA)

Appendix B contains a description of some of the terminology used throughout this report.

¹ Transportation Noise Assessment, Lots 9003, 809, 805, 9001, 117 & 9002 Hammond Park; Reference: 21026117-01e, 27 October 2023



Figure 1-2: Subdivision Layout

2. CRITERIA

The criteria relevant to this project is provided in *State Planning Policy No. 5.4 Road and Rail Noise* (hereafter referred to as SPP 5.4) produced by the Western Australian Planning Commission (WAPC). SPP 5.4 is supported by the *Road and Rail Noise Guidelines* (the Guidelines) and the Department of Planning, Lands and Heritage mapping. The objectives of SPP 5.4 are to:

- Protect the community from unreasonable levels of transport noise;
- Protect strategic and other significant freight transport corridors from incompatible urban encroachment;
- Ensure transport infrastructure and land-use can mutually exist within urban corridors;
- Ensure that noise impacts are addressed as early as possible in the planning process; and
- Encourage best practice noise mitigation design and construction standards.

Table 2-1 sets out noise targets that are to be achieved by proposals under which SPP 5.4 applies. Where the targets are exceeded, an assessment is required to determine the likely level of transport noise and management/mitigation required.

Table 2-1: Noise Targets for Noise Sensitive Land-Use

Scenario	Outdoor Noise Target		Indoor Noise Target	
	55 dB L _{Aeq} (Day)	50 dB L _{Aeq} (Night)	40 dB L _{Aeq} (Day) (Living and Work Areas)	35 dB L _{Aeq} (Night) (Bedrooms)
Noise-sensitive land-use and/or development				

Notes:

- Day period is from 6am to 10pm and night period from 10pm to 6am.
- The outdoor noise target is to be measured at 1-metre from the most exposed, habitable² facade of a noise sensitive building.
- For all noise-sensitive land-use and/or development, indoor noise targets for other room usages may be reasonably drawn from Table 1 of Australian Standard/New Zealand Standard AS/NZS 2107:2016 *Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors* (as amended) for each relevant time period.
- Outdoor targets are to be met at all outdoor areas as far as is reasonable and practicable to do so using the various noise mitigation measures outlined in the Guidelines.

The application of SPP 5.4 is to consider anticipated traffic volumes for the next 20 years from when the noise assessment has been undertaken.

² A habitable room is defined in *State Planning Policy 3.1* as a room used for normal domestic activities that includes a bedroom, living room, lounge room, music room, sitting room, television room, kitchen, dining room, sewing room, study, playroom, sunroom, gymnasium, fully enclosed swimming pool or patio.

Table 2-2 sets out noise targets that are to be achieved by new or upgraded roads, under which SPP 5.4 applies.

Table 2-2: Noise Targets for Roads

Scenario	Outdoor Noise Target	
Road Upgrade	60 dB $L_{Aeq}(\text{Day})$	55 dB $L_{Aeq}(\text{Night})$

Notes:

- Day period is from 6am to 10pm and night period from 10pm to 6am.
- The outdoor noise target is to be measured at 1-metre from the most exposed, habitable¹ facade of a noise sensitive building.
- Outdoor targets are to be met at all outdoor areas as far as is reasonable and practicable to do so using the various noise mitigation measures outlined in the Guidelines. For example, it is likely unreasonable for a transport infrastructure provider to achieve the outdoor targets at more than 1 or 2 floors of an adjacent development with direct line of sight to the traffic.

In this case, Rowley Road extension will be a new road and therefore the 55 dB $L_{Aeq}(\text{Day})$ and 50 dB $L_{Aeq}(\text{Night})$ criteria of Table 2-2 are applicable. If these criteria were achieved by the road builder, there would be no mitigation requirements to the subdivision, although such performance may not be practicable.

3. METHODOLOGY

Noise modelling has been undertaken in accordance with the requirements of SPP 5.4 and associated Guidelines. As this section of Rowley Road does not yet exist, noise monitoring has not been undertaken.

To predict the noise emissions, the computer program *SoundPLAN 8.2* was utilised incorporating the *Calculation of Road Traffic Noise* (CoRTN) algorithms, modified to reflect Australian conditions. The modifications included the following:

- Vehicles were separated into heavy (Austroads Class 3 upwards) and non-heavy (Austroads Class 1 and 2) with non-heavy vehicles having a source height of 0.5 metres above road level and heavy vehicles having two source heights at 1.5 metres and 3.6 metres above road level;
- A -0.8 dB correction has been applied to the lower level heavy vehicle noise source and -8.0 dB to the higher level noise source based on the *Transportation Noise Reference Book*; Paul Nelson (1987), so as to provide consistent results with the CoRTN algorithms;
- Adjustments of -0.8 dB and -1.7 dB have been applied to the predicted levels for the 'free-field' and 'at façade' cases respectively, based on the findings of *An Evaluation of the U.K. DoE Traffic Noise Prediction*; Australian Road Research Board, Report 122 ARRB – NAASRA Planning Group (March 1983).

Predictions are made at heights of 1.4 metres above ground floor level for single storey buildings and 4.2 metres above ground floor level for possible first floors of double storey buildings. The noise is predicted at 1-metre from an assumed building façade, resulting in a + 2.5 dB correction due to reflected noise.

Various input data are included in the modelling and these are discussed in *Section 3.1* to *Section 3.2*.

3.1. Ground Topography

The road design data was provided by Cossill & Webley dated 17 May 2022, as a 3D AutoCAD file and is understood to be the latest provided by Main Roads WA, however is subject to change noting there is no planned timeframe for the construction of this road. This was the same road design used for the future subdivision to the east of the subject site. Finished lot levels for the subject site subdivision were provided by Cossill & Webley, dated 1 May 2024, as a 3D AutoCAD file which has been merged with the existing topography in the area.

Indicative building outlines have been included as these can provide barrier attenuation when located between a source and a receiver, in much the same way as a hill or wall. All buildings are assumed to be single storey with heights of 3.5 metres. This means where modelling is undertaken to a possible upper floor, the noise is predicting above these building outlines.

3.2. Road Surface

The corrections applied for different road surface finishes are provided in *Table 3-1*.

Table 3-1: Noise Relationship Between Different Road Surfaces

Chip Seal				Asphalt			
14mm	10mm	5mm	Slurry	Dense Graded	Novachip	Stone Mastic	Open Graded
+3.5 dB	+2.5 dB	+1.5 dB	+1.0 dB	0.0 dB	-0.2 dB	-1.5 dB	-2.5 dB

Given the obligations for a new road to achieve the outdoor noise target, the assumed road surface is:

- Rowley Road – Dense Graded Asphalt.

3.3. Vehicle Speed

The posted speed is assumed to be:

- Rowley Road – 80 km/hr.

3.4. Traffic Volumes

Forecast 2041 traffic volumes were obtained from Main Roads WA to City of Cockburn (Lang Fong, Planning Information Manager, Email dated 24 January 2022). A 2046 plot was also more recently obtained from Main Roads WA (Scott Hazebroek, Traffic Modelling Analyst, Reference: #42809, dated 7 February 2024), showing volumes within a few hundred vehicles of those previously provided. *Table 3-2* provides the traffic volume input data in the model.

Table 3-2: Traffic Information Used in Noise Modelling

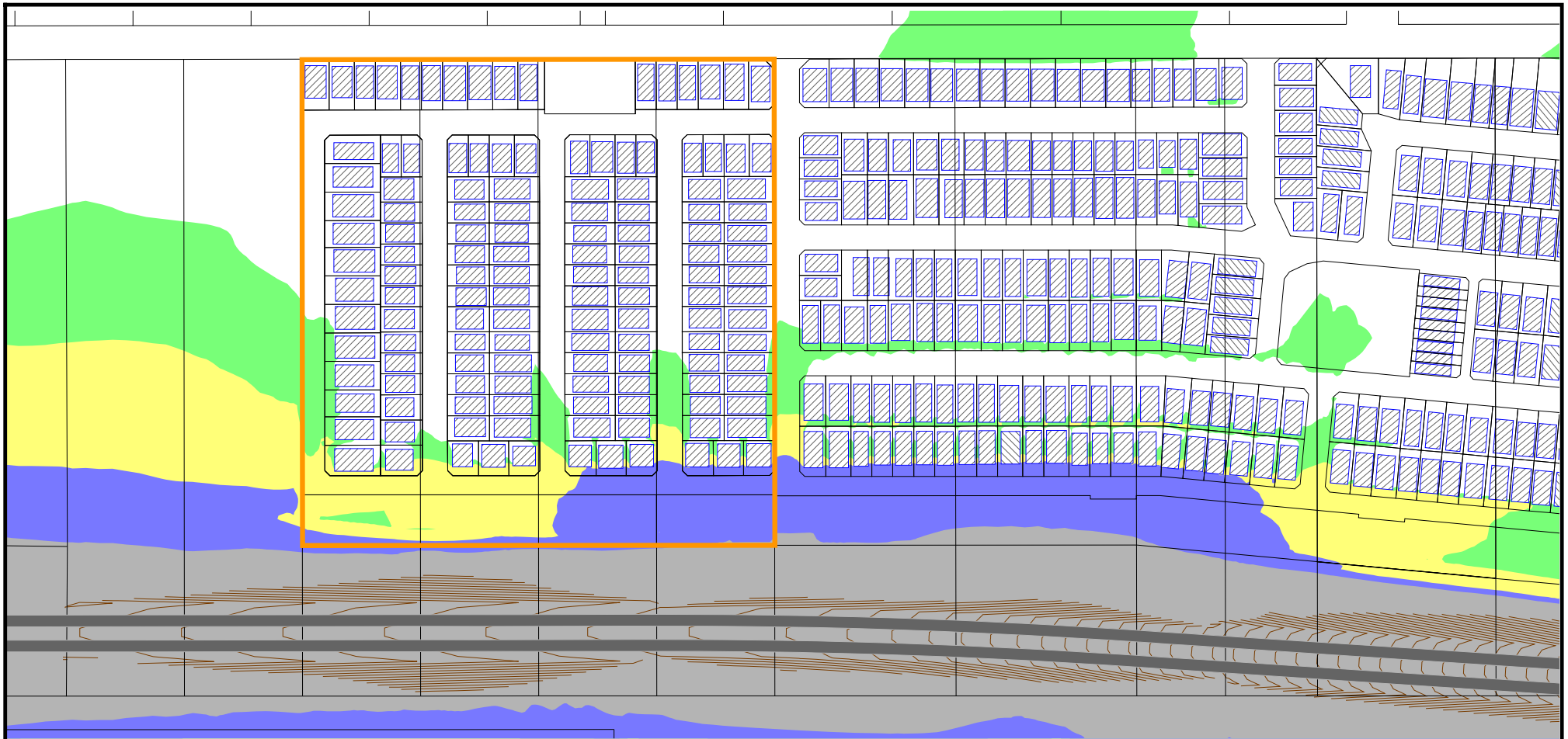
Road	Section	Direction	Traffic Volume	% Heavy Vehicles
Rowley Road	West of Hammond Road	Eastbound	19,200	19
		Westbound	14,900	19

3.5. Ground Absorption

The ground absorption has been assumed to be 0.0 (0%) for the roads and 0.5 (50%) through the subdivision, noting that 0.0 represents hard reflective surfaces such as water and 1.0 represents absorptive surfaces such as grass.

4. RESULTS

The noise modelling results are provided in *Figure 4-1* and *Figure 4-2* as $L_{Aeq(Day)}$ noise level contour plots, being for the future traffic conditions at ground floor height and first floor height level. It can be seen that the outdoor noise target will be exceeded assuming no mitigation.



Lots 813, 78, 815 & 80, Hammond Park -
Future 2046 $L_{Aeq}(Day)$ Noise Level Contours to Ground Floor

Assumed Road Surfaces are:
Rowley Road: Dense Graded Asphalt

SoundPLAN v8.2
CoRTN Algorithms

8 May 2024



Lloyd George Acoustics
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HILLARYS WA 6923
(08) 9401 7770

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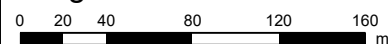


Figure 4-1

Signs and symbols

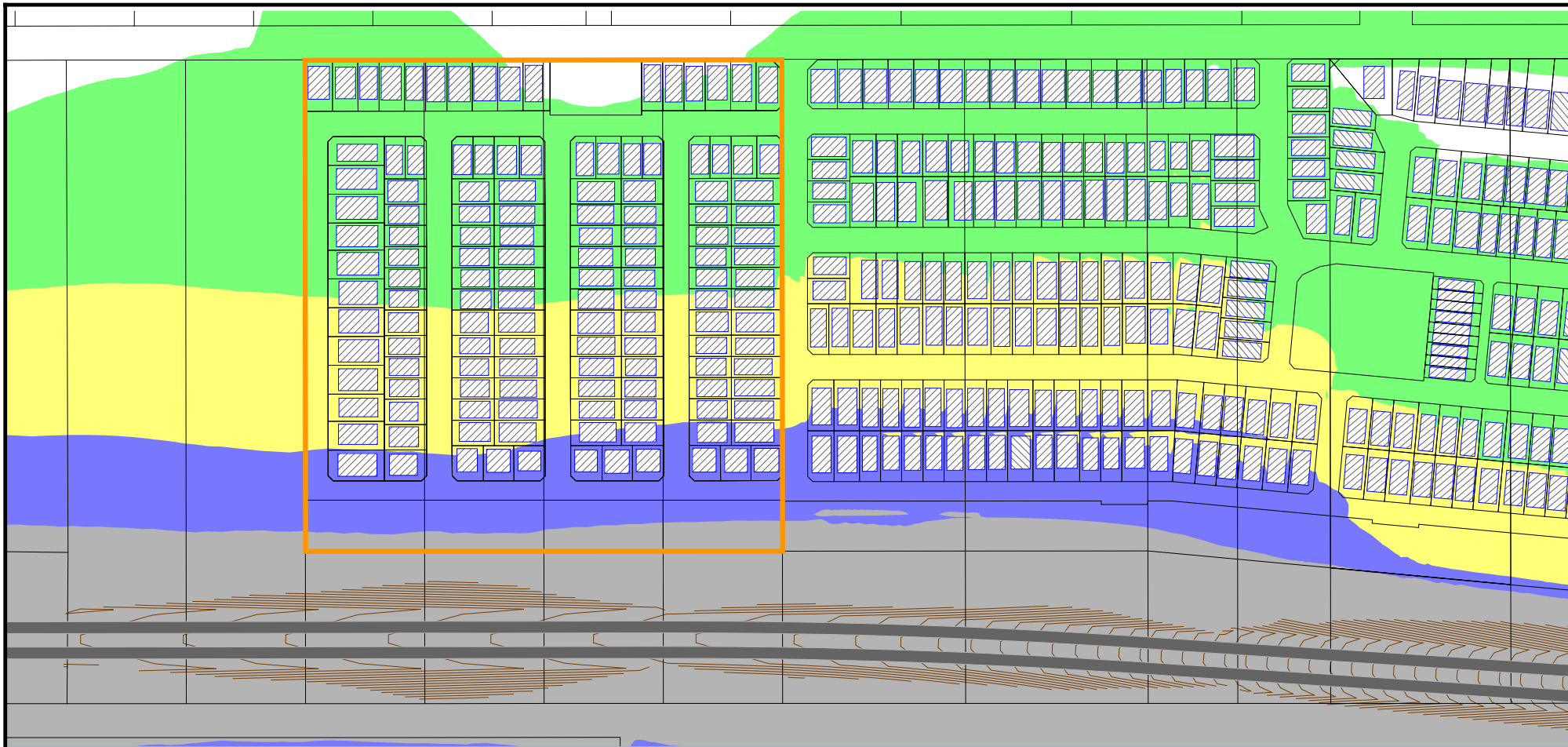
- Road
- Indicative Building
- Subject Site



Noise levels
 $L_{Aeq}(Day)$ dB

	≤ 55	
	≤ 56	Exposure A
	≤ 57	
	≤ 58	
	≤ 59	Exposure B
	≤ 60	
	≤ 61	
	≤ 62	
	≤ 63	Exposure C
	≤ 64	
	≤ 65	
	≤ 66	
	> 66	Exposure D

SPP 5.4 (Sep 2019)



Lots 813, 78, 815 & 80, Hammond Park -
Future 2046 $L_{Aeq}(Day)$ Noise Level Contours to Ground Floor

Assumed Road Surfaces are:
Rowley Road: Dense Graded Asphalt

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Figure 4-2

Signs and symbols

- Road
- Indicative Building
- Subject Site



Noise levels
 $L_{Aeq}(Day)$ dB

- ≤ 55
- ≤ 56 Exposure A
- ≤ 57
- ≤ 58
- ≤ 59 Exposure B
- ≤ 60
- ≤ 61
- ≤ 62
- ≤ 63 Exposure C
- ≤ 64
- ≤ 65
- ≤ 66
- > 66 Exposure D

SPP 5.4 (Sep 2019)

5. ASSESSMENT

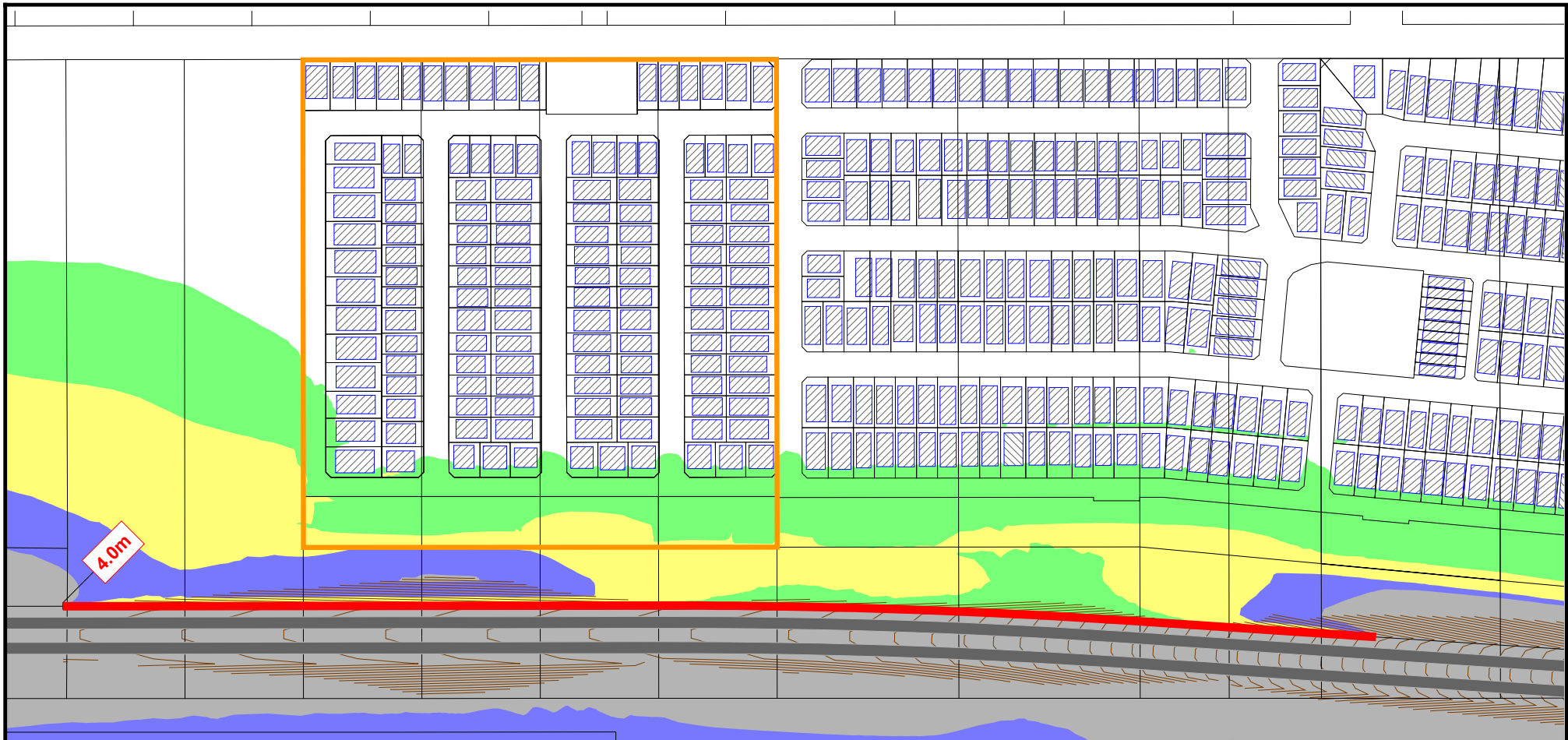
The objectives of SPP 5.4 are to achieve:

- Indoor noise levels specified in *Table 2-1* in noise-sensitive areas (e.g. bedrooms and living rooms of houses); and
- A reasonable degree of acoustic amenity for outdoor living areas on each residential lot.

Where the outdoor noise targets of *Table 2-1* are achieved, no further noise controls are necessary. With reference to *Section 4*, it is evident the outdoor noise target will be exceeded at some lots. Following discussions between stakeholders for the subdivision to the east, the preferred noise mitigation strategy is:

- Road builder to construct a 4-metre high wall alongside the road or mitigation to provide an equivalent result; and
- Developer is to incorporate Quiet House Packages to affected lots, including notifications on lot titles. *Appendix A* provides the Quiet House Packages, as taken from the SPP 5.4 Guidelines. Alternatives to the provided Packages can be accepted if supported by a report from a suitably qualified acoustical consultant (member firm of the Association of Australasian Acoustical Consultants (AAAC)) once the specific house plans for the lot are available.

The noise contours associated with the above are provided in *Figure 5-1* (ground floor) and *Figure 5-2* (first floor) with the noise mitigation shown on *Figure 5-3* (ground floor) and *Figure 5-4* (first floor).



Lots 813, 78, 815 & 80, Hammond Park -
 Future 2046 $L_{Aeq(Day)}$ Noise Level Contours to Ground Floor
 Includes 4.0m High Wall to Achieve Exposure A at Ground Floor

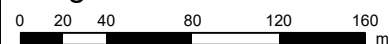
Assumed Road Surfaces are:
 Rowley Road: Dense Graded Asphalt

SoundPLAN v8.2
 CoRTN Algorithms



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Figure 5-1

Signs and symbols

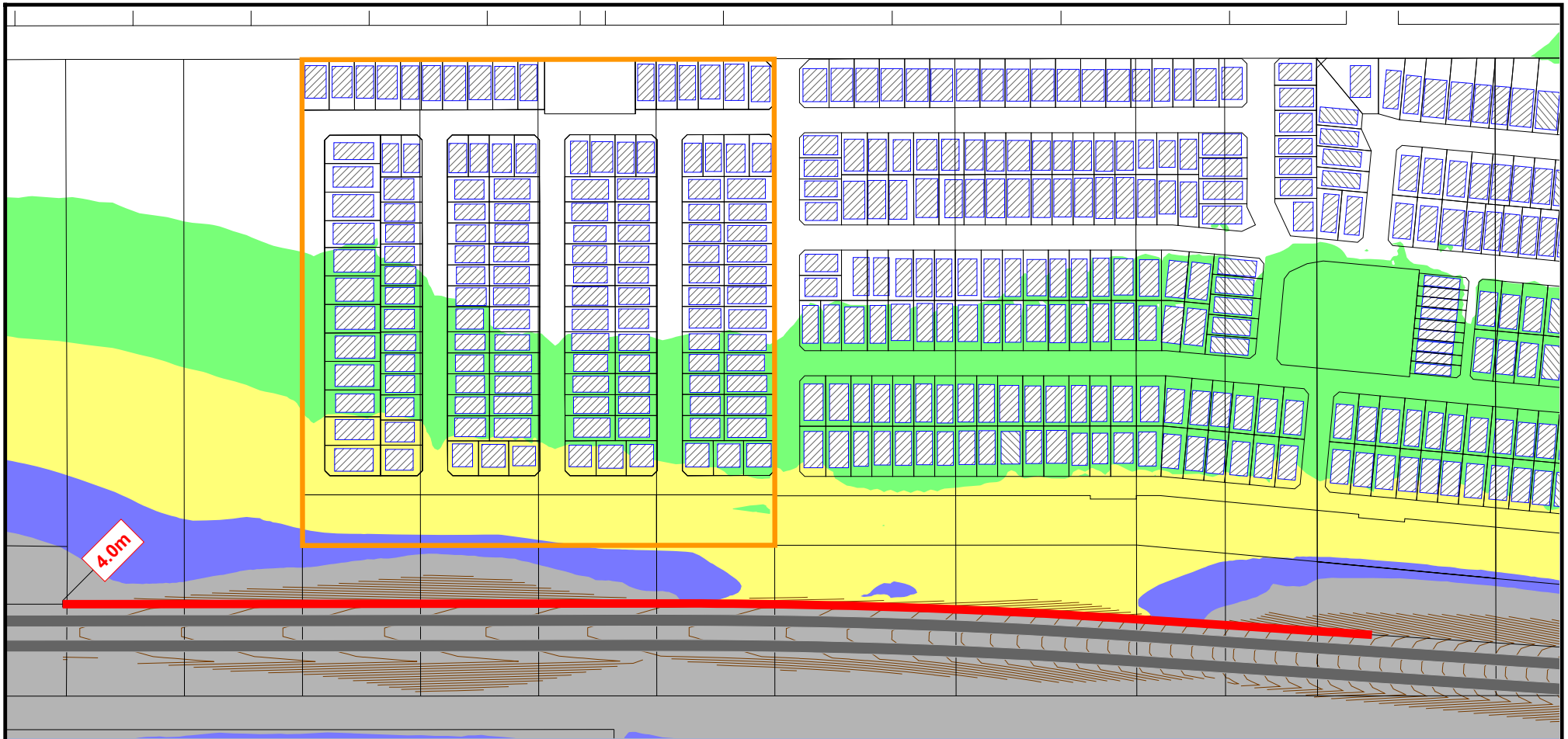
- Road
- Indicative Building
- Wall
- Subject Site



Noise levels $L_{Aeq(Day)}$ dB

- | | | |
|--|-----------|------------|
| | ≤ 55 | Exposure A |
| | ≤ 56 | |
| | ≤ 57 | |
| | ≤ 58 | Exposure B |
| | ≤ 59 | |
| | ≤ 60 | |
| | ≤ 61 | Exposure C |
| | ≤ 62 | |
| | ≤ 63 | |
| | ≤ 64 | Exposure D |
| | ≤ 65 | |
| | ≤ 66 | |
| | > 66 | |

SPP 5.4 (Sep 2019)



Lots 813, 78, 815 & 80, Hammond Park -
 Future 2046 $L_{Aeq(Day)}$ Noise Level Contours to First Floor
 Includes 4.0m High Wall to Achieve Exposure A at Ground Floor

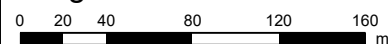
Assumed Road Surfaces are:
 Rowley Road: Dense Graded Asphalt

SoundPLAN v8.2
 CoRTN Algorithms



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Figure 5-2

Signs and symbols

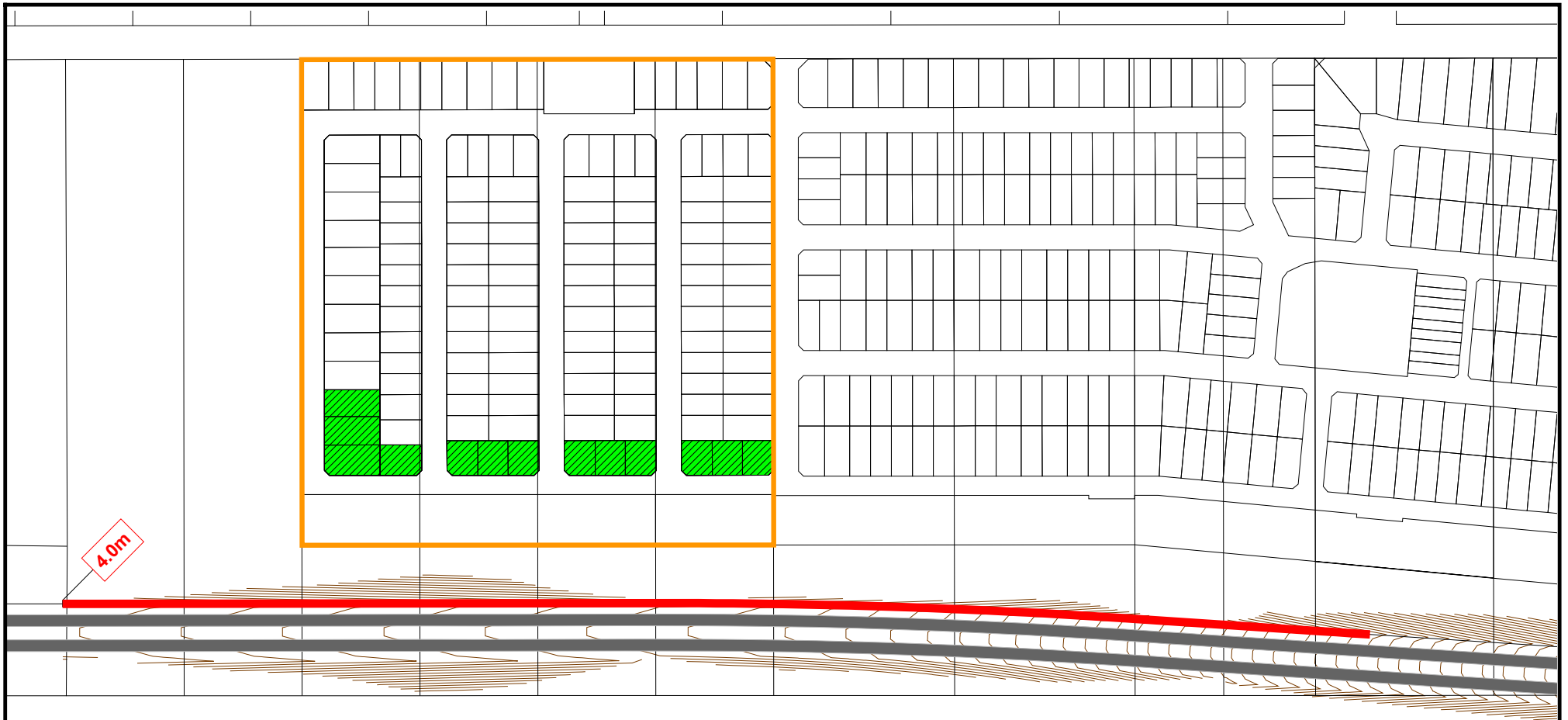
- Road
- Indicative Building
- Wall
- Subject Site



Noise levels $L_{Aeq(Day)}$ dB

	≤ 55	
	≤ 56	Exposure A
	≤ 57	
	≤ 58	
	≤ 59	Exposure B
	≤ 60	
	≤ 61	
	≤ 62	
	≤ 63	Exposure C
	≤ 64	
	≤ 65	
	≤ 66	
	> 66	Exposure D

SPP 5.4 (Sep 2019)



Lots 813, 78, 815 & 80, Hammond Park -
 Noise Mitigation to Ground Floor
 Includes 4.0m High Wall to Achieve Exposure A at Ground Floor

Assumed Road Surfaces are:
 Rowley Road: Dense Graded Asphalt

SoundPLAN v8.2
 CoRTN Algorithms

Signs and symbols

- Road
- Wall
- Subject Site
- Package A
- Package B



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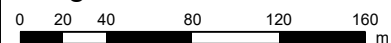
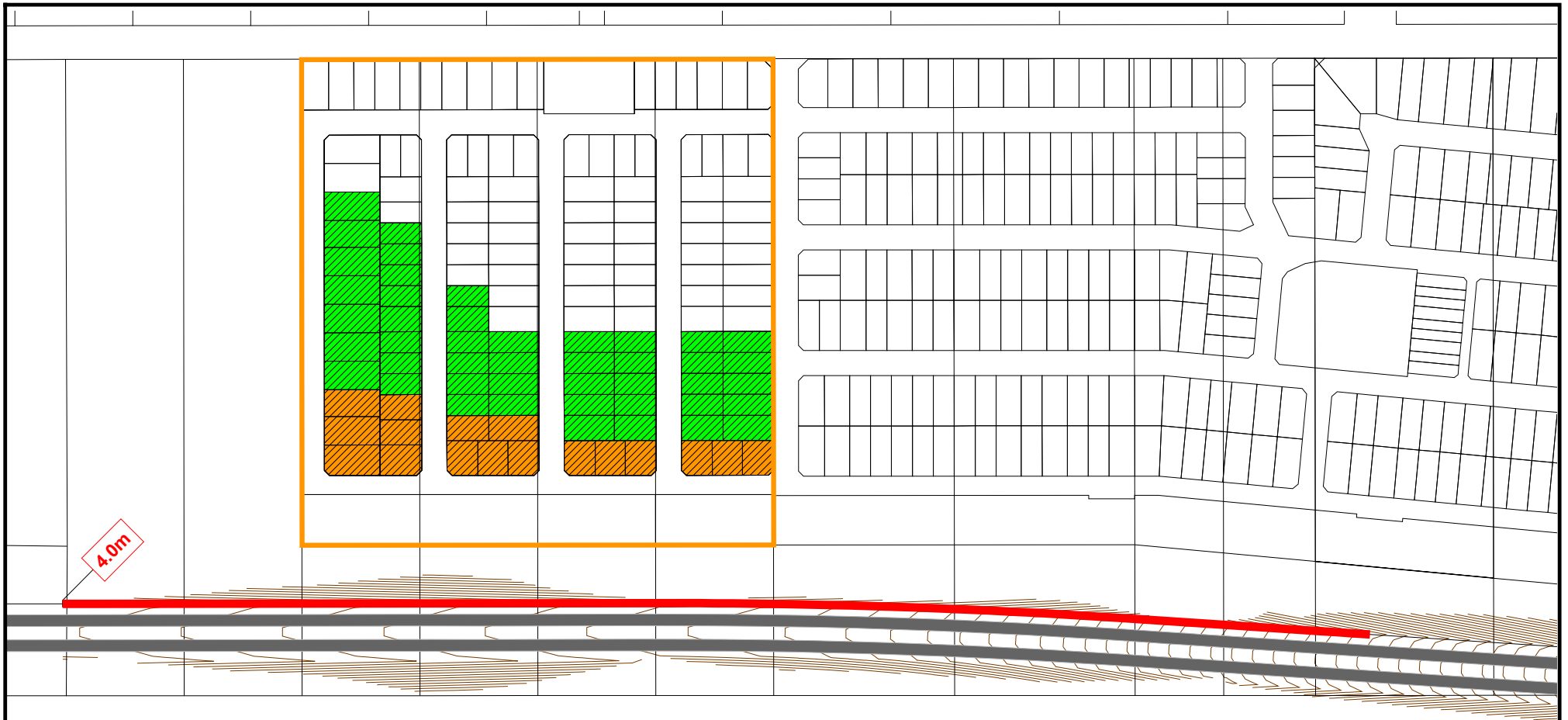


Figure 5-3



Lots 813, 78, 815 & 80, Hammond Park -
 Noise Mitigation to First Floor
 Includes 4.0m High Wall to Achieve Exposure A at Ground Floor

Assumed Road Surfaces are:
 Rowley Road: Dense Graded Asphalt

SoundPLAN v8.2
 CoRTN Algorithms

Signs and symbols

- Road
- Wall
- Subject Site
- Package A
- Package B



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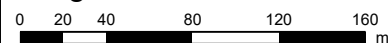


Figure 5-4

6. FURTHER DISCUSSION

When the subdivision to the east was assessed, the subject site proposed subdivision was not included. With the wall extension and additional houses, these change the noise impacts to the previous subdivision. *Figure 6-1* and *Figure 6-2* are the extracts from the previous report showing the recommended noise mitigation. *Figure 6-3* and *Figure 6-4* show the new recommendations taking into account the presence of the subject site subdivision, with some changes towards the western end.

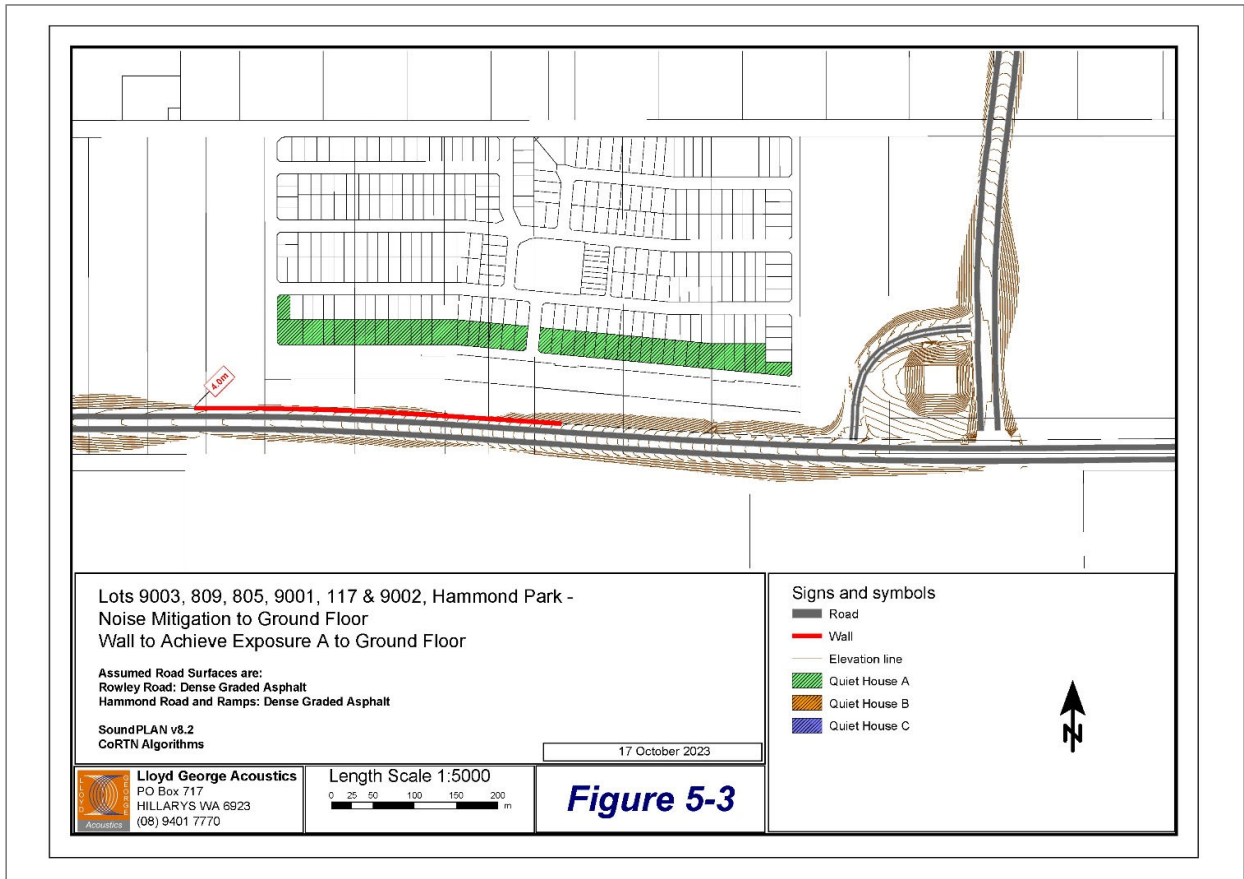


Figure 6-1: Eastern Subdivision Previous Noise Mitigation – Ground Floor Level

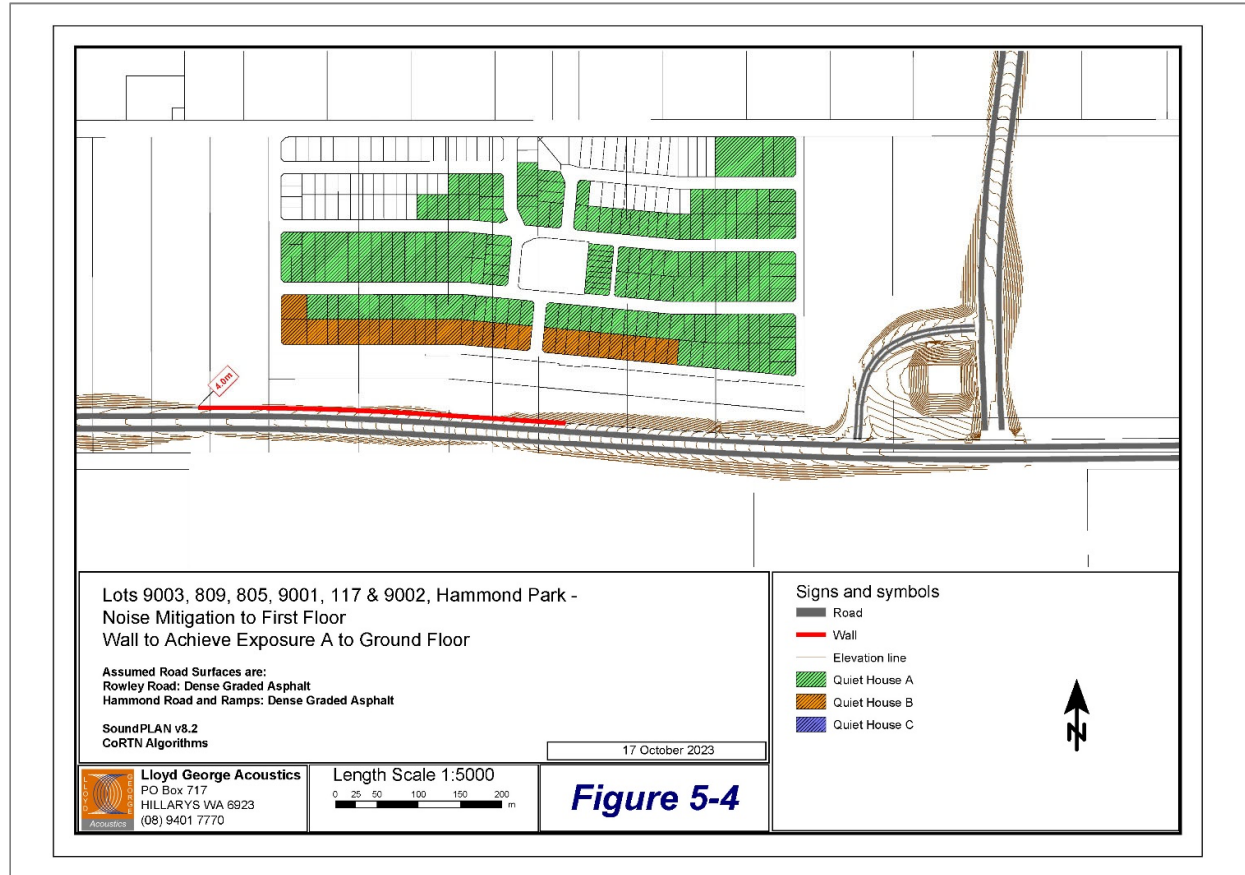


Figure 6-2: Eastern Subdivision Previous Noise Mitigation – First Floor Level



Lots 9003, 809, 805, 9001, 117 & 9002, Hammond Park -
 Noise Mitigation to Ground Floor
 Wall to Achieve Exposure A to Ground Floor

Assumed Road Surfaces are:
 Rowley Road: Dense Graded Asphalt
 Hammond Road and Ramps: Dense Graded Asphalt

SoundPLAN v8.2
 CoRTN Algorithms

Signs and symbols

-  Road
-  4.0m Wall
-  Elevation line
-  Quiet House A
-  Quiet House B
-  Quiet House C



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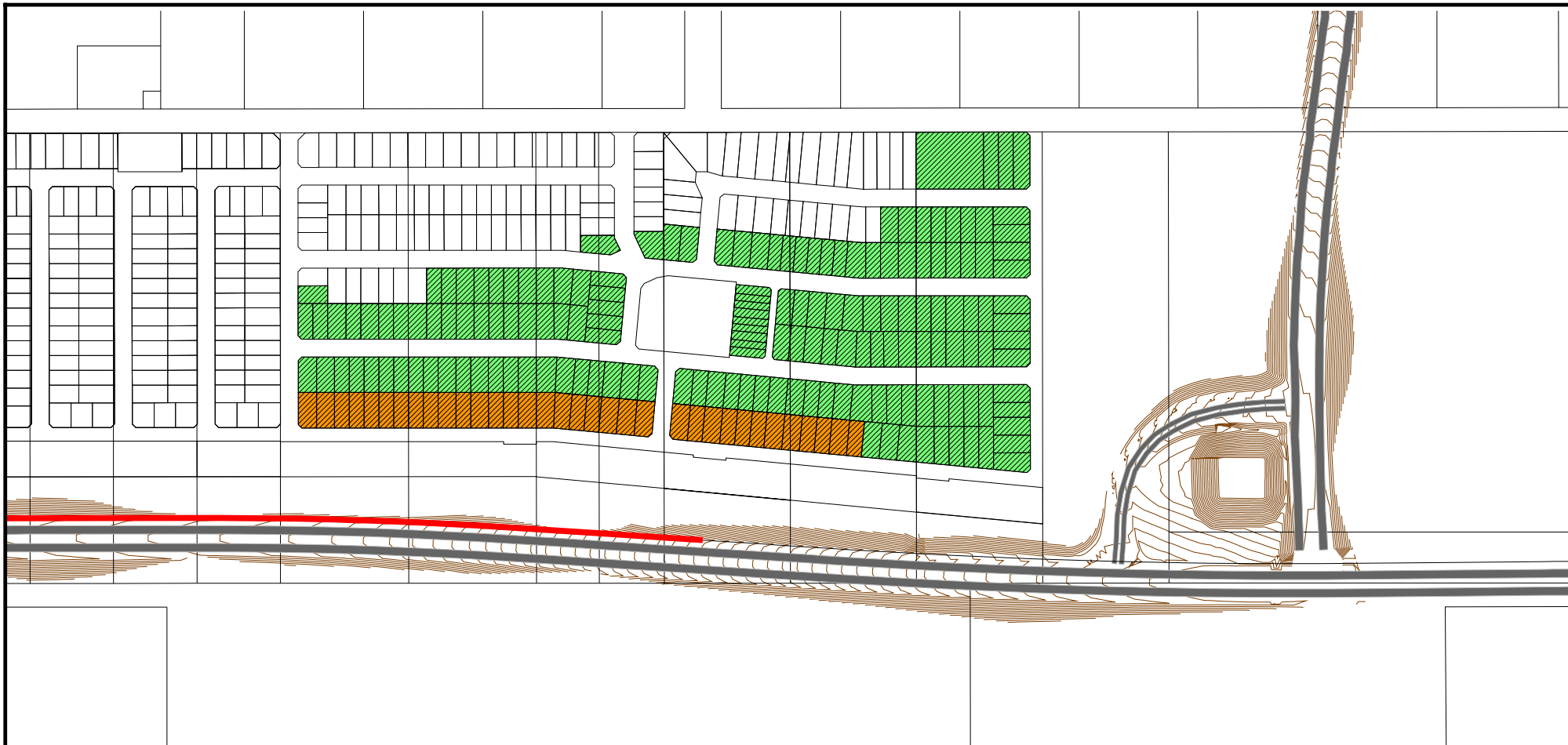


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Figure 6-3



Lots 9003, 809, 805, 9001, 117 & 9002, Hammond Park -
Noise Mitigation to First Floor
Wall to Achieve Exposure A to Ground Floor

Assumed Road Surfaces are:
Rowley Road: Dense Graded Asphalt
Hammond Road and Ramps: Dense Graded Asphalt

SoundPLAN v8.2
CoRTN Algorithms

8 May 2024



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Length Scale 1:5000



Figure 6-4

Signs and symbols

- Road
- 4.0m Wall
- Elevation line
- Quiet House A
- Quiet House B
- Quiet House C



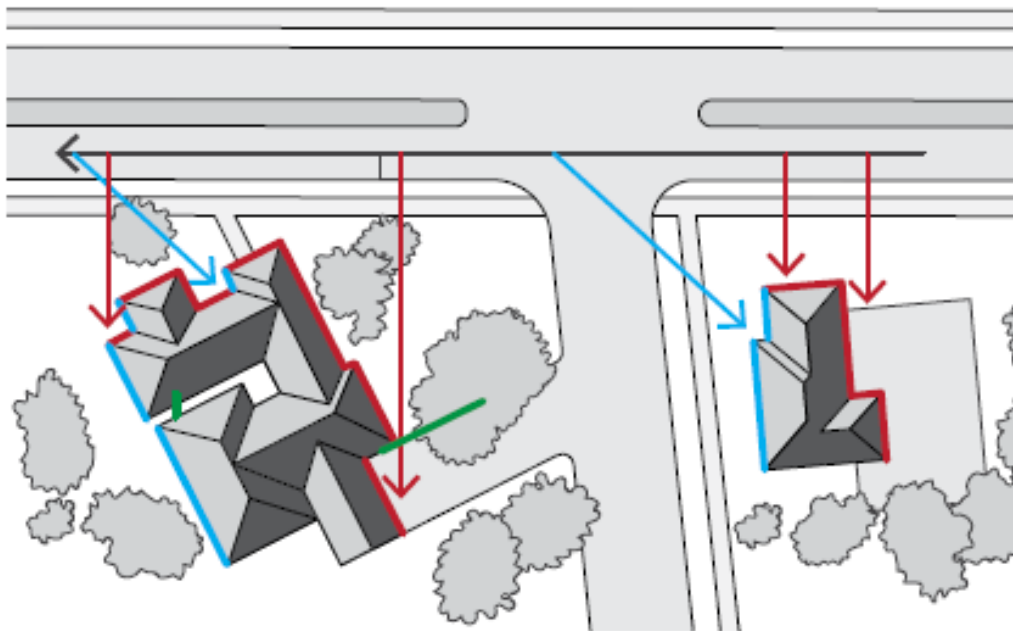
Appendix A – Quiet House Packages

The packages and information provided on the following pages are taken from *Road and Rail Noise Guidelines* (September 2019).

Where outdoor and indoor noise levels received by a noise-sensitive land-use and/or development exceed the policy's noise target, implementation of quiet house requirements is an acceptable solution.

With regards to the packages, the following definitions are provided:

- **Facing** the transport corridor (red): Any part of a building façade is 'facing' the transport corridor if any straight line drawn perpendicular (at a 90 degree angle) to its nearest road lane or railway line intersects that part of the façade without obstruction (ignoring any fence).
- **Side-on** to transport corridor (blue): Any part of a building façade that is not 'facing' is 'side-on' to the transport corridor if any straight line, at any angle, can be drawn from it to intersect the nearest road lane or railway line without obstruction (ignoring any fence).
- **Opposite** to transport corridor (green): Neither 'side on' nor 'facing', as defined above.



Quiet House Package A

56-58 dB $L_{Aeq}(\text{Day})$ & 51-53 dB $L_{Aeq}(\text{Night})$

Element	Orientation	Room	
		Bedroom	Indoor Living and Work Areas
External Glazing	Facing	- Up to 40% floor area ($R_w + C_{tr} \geq 28$): - Sliding or double hung with minimum 10mm single or 6mm-12mm-10mm double insulated glazing; - Sealed awning or casement windows with minimum 6mm glass. - Up to 60% floor area ($R_w + C_{tr} \geq 31$): - Sealed awning or casement windows with minimum 6mm glass.	- Up to 40% floor area ($R_w + C_{tr} \geq 25$): - Sliding or double hung with minimum 6mm single or 6mm-12mm-6mm double insulated glazing; - Up to 60% floor area ($R_w + C_{tr} \geq 28$); - Up to 80% floor area ($R_w + C_{tr} \geq 31$).
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	No specific requirements	
External Doors	Facing	Fully glazed hinged door with certified $R_w + C_{tr} \geq 28$ rated door and frame including seals and 6mm glass.	- Doors to achieve $R_w + C_{tr} \geq 25$: 35mm Solid timber core hinged door and frame system certified to $R_w 28$ including seals; - Glazed sliding door with 10mm glass and weather seals.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less.	
	Opposite	No specific requirements	
External Walls	All	$R_w + C_{tr} \geq 45$: - Two leaves of 90mm thick clay brick masonry with minimum 20mm cavity; or - Single leaf of 150mm brick masonry with 13mm cement render on each face; or - One row of 92mm studs at 600mm centres with: - Resilient steel channels fixed to the outside of the studs; and 9.5mm hardboard or fibre cement sheeting or 11mm fibre cement weatherboards fixed to the outside; 75mm thick mineral wool insulation with a density of at least 11kg/m³; and 2 x 16mm fire-rated plasterboard to inside.	
Roofs and Ceilings	All	$R_w + C_{tr} \geq 35$; - Concrete or terracotta tile or metal sheet roof with sarking and at least 10mm plasterboard.	

Quiet House Package B

59-62 dB $L_{Aeq}(\text{Day})$ & 54-57 dB $L_{Aeq}(\text{Night})$

Element	Orientation	Room	
		Bedroom	Indoor Living and Work Areas
External Glazing	Facing	- Up to 40% floor area ($R_w + C_{tr} \geq 31$): - Fixed sash, awning or casement with minimum 6mm glass or 6mm-12mm-6mm double insulated glazing. - Up to 60% floor area ($R_w + C_{tr} \geq 34$): - Fixed sash, awning or casement with minimum 10mm glass or 6mm-12mm-10mm double insulated glazing.	- Up to 40% floor area ($R_w + C_{tr} \geq 28$): - Sliding or double hung with 6mm-12mm-10mm double insulated glazing; - Sealed awning or casement windows with minimum 6mm glass. - Up to 60% floor area ($R_w + C_{tr} \geq 31$); - Up to 80% floor area ($R_w + C_{tr} \geq 34$).
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	As above, except $R_w + C_{tr}$ values may be 6 dB less or max % area increased by 20%.	
External Doors	Facing	Fully glazed hinged door with certified $R_w + C_{tr} \geq 31$ rated door and frame including seals and 10mm glass.	- Doors to achieve $R_w + C_{tr} \geq 28$: 40mm Solid timber core hinged door and frame system certified to $R_w 32$ including seals; - Fully glazed hinged door with certified $R_w + C_{tr} \geq 28$ rated door and frame including seals and 6mm glass.
	Side On	As above, except $R_w + C_{tr}$ values may be 3 dB less or max % area increased by 20%.	
	Opposite	As above, except $R_w + C_{tr}$ values may be 6 dB less or max % area increased by 20%.	
External Walls	All	$R_w + C_{tr} \geq 50$: - Two leaves of 90mm thick clay brick masonry with minimum 50mm cavity between leaves and 25mm glasswool or polyester (24kg/m³). Resilient ties used where required to connect leaves. - Two leaves of 110mm clay brick masonry with minimum 50mm cavity between leaves and 25mm glasswool or polyester insulation (24kg/m³). - Single leaf of 220mm brick masonry with 13mm cement render on each face. 150mm thick unlined concrete panel or 200mm thick concrete panel with one layer of 13mm plasterboard or 13mm cement render on each face. - Single leaf of 90mm clay brick masonry with: - A row of 70mm x 35mm timber studs or 64mm steel studs at 600mm centres; - A cavity of 25mm between leaves; 50mm glasswool or polyester insulation (11kg/m³) between studs; and - One layer of 10mm plasterboard fixed to the inside face.	
Roofs and Ceilings	All	$R_w + C_{tr} \geq 35$: - Concrete or terracotta tile or metal sheet roof with sarking and at least 10mm plasterboard ceiling with R3.0+ fibrous insulation.	

Mechanical Ventilation requirements

In implementing the acceptable treatment packages, fresh air requirements of the National Construction Code must be satisfied on the basis of windows closed. Whilst not the only solution, the most common is mechanical ventilation / air-conditioning is installed with the following considerations:

- Acoustically rated openings and ductwork to provide a minimum sound reduction performance of R_w 40 dB into sensitive spaces;
- Evaporative systems require attenuated ceiling air vents to allow closed windows;
- Refrigerant based systems need to be designed to achieve National Construction Code fresh air ventilation requirements;
- Openings such as eaves, vents and air inlets must be acoustically treated, closed or relocated to building sides facing away from the corridor where practicable.

Notification

Notifications on title advise prospective purchasers of the potential for noise impacts from major transport corridors and help with managing expectations.

The Notification is to state as follows:

This lot is in the vicinity of a transport corridor and is affected, or may in the future be affected, by road and rail transport noise. Road and rail transport noise levels may rise or fall over time depending on the type and volume of traffic.

Appendix B – Terminology

The following is an explanation of the terminology used throughout this report:

- **Decibel (dB)**

The decibel is the unit that describes the sound pressure levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

- **A-Weighting**

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A , dB.

- **L_{eq}**

The L_{eq} level represents the average noise energy during a measurement period.

- **L_1**

The L_1 level represents the noise level exceeded for 1 percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

- **L_{10}**

The L_{10} level represents the noise level exceeded for 10 percent of the measurement period and is considered to represent the “intrusive” noise level.

- **L_{90}**

The L_{90} level represents the noise level exceeded for 90 percent of the measurement period and is considered to represent the “background” noise level.

- **$L_{Aeq(Day)}$**

The $L_{Aeq(Day)}$ level is the logarithmic average of the L_{Aeq} levels from 6.00am to 10.00pm.

- **$L_{Aeq(Night)}$**

The $L_{Aeq(Night)}$ level is the logarithmic average of the L_{Aeq} levels from 10.00pm to 6.00am.

- **$L_{A10,18hour}$**

The $L_{A10,18hour}$ level is the arithmetic average of the hourly L_{A10} levels between 6.00am and midnight.

- **$L_{Aeq,24hour}$**

The $L_{Aeq,24hour}$ level is the logarithmic average of the L_{Aeq} levels from over an entire day.

- **Noise-sensitive land use and/or development**

Land-uses or development occupied or designed for occupation or use for residential purposes (including dwellings, residential buildings or short-stay accommodation), caravan park, camping ground, educational establishment, child care premises, hospital, nursing home, corrective institution or place of worship.

- **R_w**

This is the weighted sound reduction index. It is a single number rating determined by moving a grading curve in integral steps against the laboratory measured transmission loss until the sum of the deficiencies at each one-third-octave band, between 100 Hz and 3.15 kHz, does not exceed 32 dB. The higher the R_w value, the better the acoustic performance.

- **C_{tr}**

This is a spectrum adaptation term for airborne noise and provides a correction to the R_w value to suit source sounds with significant low frequency content such as road traffic or home theatre systems. A wall that provides a relatively high level of low frequency attenuation (i.e. masonry) may have a value in the order of – 4 dB, whilst a wall with relatively poor attenuation at low frequencies (i.e. stud wall) may have a value in the order of -12 dB.

- **About the Term ‘Reasonable’**

An assessment of reasonableness should demonstrate that efforts have been made to resolve conflicts without comprising on the need to protect noise-sensitive land-use activities. For example, have reasonable efforts been made to design, relocate or vegetate a proposed noise barrier to address community concerns about the noise barrier height? Whether a noise mitigation measure is reasonable might include consideration of:

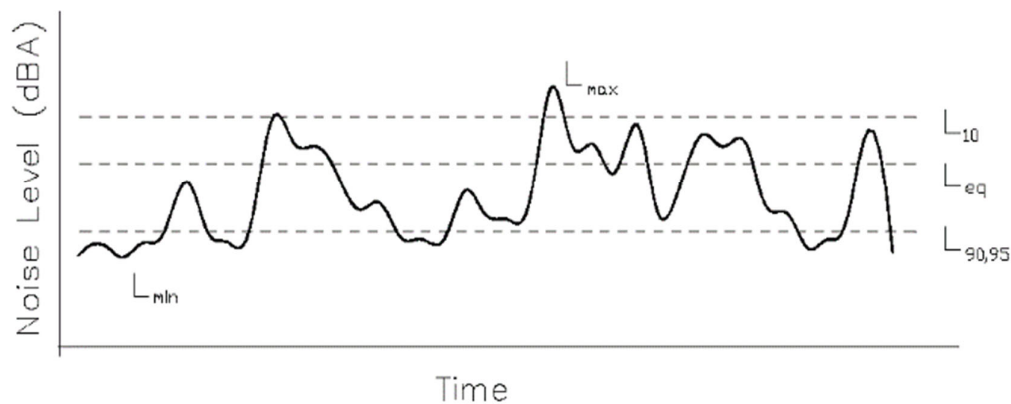
- The noise reduction benefit provided;
- The number of people protected;
- The relative cost vs benefit of mitigation;
- Road conditions (speed and road surface) significantly differ from noise forecast table assumptions;
- Existing and future noise levels, including changes in noise levels;
- Aesthetic amenity and visual impacts;
- Compatibility with other planning policies;
- Differences between metropolitan and regional situations and whether noise modelling requirements reflect the true nature of transport movements;
- Ability and cost for mobilisation and retrieval of noise monitoring equipment in regional areas;
- Differences between Greenfield and infill development;
- Differences between freight routes and public transport routes and urban corridors;
- The impact on the operational capacity of freight routes;
- The benefits arising from the proposed development;
- Existing or planned strategies to mitigate the noise at source.

- **About the Term 'Practicable'**

'Practicable' considerations for the purposes of the policy normally relate to the engineering aspects of the noise mitigation measures under evaluation. It is defined as "reasonably practicable having regard to, among other things, local conditions and circumstances (including costs) and to the current state of technical knowledge" (*Environmental Protection Act 1986*). These may include:

- Limitations of the different mitigation measures to reduce transport noise;
- Competing planning policies and strategies;
- Safety issues (such as impact on crash zones or restrictions on road vision);
- Topography and site constraints (such as space limitations);
- Engineering and drainage requirements;
- Access requirements (for driveways, pedestrian access and the like);
- Maintenance requirements;
- Bushfire resistance or BAL ratings;
- Suitability of the building for acoustic treatments.

- **Chart of Noise Level Descriptors**



- Austroads Vehicle Class

VEHICLE CLASSIFICATION SYSTEM	
AUSTROADS	
CLASS	LIGHT VEHICLES
1	SHORT Car, Van, Wagon, 4WD, UTV, Bicycle, Motorcycle
2	SHORT - TOWING Trailer, Caravan, Boat
HEAVY VEHICLES	
3	TWO AXLE TRUCK OR BUS *2 axle
4	THREE AXLE TRUCK OR BUS *3 axle, 2 axle groups
5	FOUR (or FIVE) AXLE TRUCK *4 (5) axle, 2 axle groups
6	THREE AXLE ARTICULATED *3 axle, 3 axle groups
7	FOUR AXLE ARTICULATED *4 axle, 3 or 4 axle groups
8	FIVE AXLE ARTICULATED *5 axle, 3+ axle groups
9	SIX AXLE ARTICULATED *6 axle, 3+ axle groups or 7+ axle, 3 axle groups
LONG VEHICLES AND ROAD TRAINS	
10	8 DOUBLE or HEAVY TRUCK and TRAILER *7+ axle, 4 axle groups
11	DOUBLE ROAD TRAIN *7+ axle, 5 or 6 axle groups
12	TRIPLE ROAD TRAIN *7+ axle, 7+ axle groups

- Typical Noise Levels

