Attachments Excluded from Agenda

Burwood Local Planning Panel Meeting

Tuesday, 25 February, 2025

6:00 PM

Table of Contents

General Business

GB1/25 Planning Proposal for 166-204 Parramatta Road and 1-1A Cheltenham Road Croydon

Attachment 1: Attachment 1 - Planning Proposal Report 3
Attachment 2: Attachment 2 - Urban Design Report 87
Attachment 3: Attachment 3 - Landscape Concept Report..... 226
Attachment 4: Attachment 4 - Public Art Plan 264
Attachment 5: Attachment 5 - Social and Economic Impact Assessment..... 290
Attachment 6: Attachment 6 - Transport Assessment 359
Attachment 7: Attachment 8 - Consultation Outcomes Report 408
Attachment 8: Attachment 9 - ESD Report..... 467
Attachment 9: Attachment 10 - Contamination Investigation 478
Attachment 10: Attachment 11 - Flood Risk and Drainage Statement..... 797
Attachment 11: Attachment 12 - Economic Impact Assessment - Retail 800
Attachment 12: Attachment 13 - Geotechnical Assessment..... 831
Attachment 13: Attachment 14 - Draft Development Control Plan..... 896
Attachment 14: Attachment 15 - Proposed LEP Mapping 908
Attachment 15: Attachment 16 - Staging Plan..... 912
Attachment 16: Attachment 17 - TfNSW Referral Response..... 913
Attachment 17: Attachment 18 - Submission Summary - Community Feedback provided by Ethos Urban 918

Development Applications

DA1/25 DA.2024.51 - 60 Burwood Road, Burwood - Use of the rooftop of an existing hotel development as a licensed premises (Sky Lounge).

Attachment 1: Attachment 1 - Plan of Management..... 930
Attachment 2: Attachment 2 - Rooftop Plan 932
Attachment 3: Attachment 3 - Acoustic Report..... 933
Attachment 4: Attachment 4 - Draft Conditions of Consent 959

DA2/25 BD.2018.048 - 4.56 modification of 319-321 Liverpool Road, Strathfield.

Attachment 1: Attachment 1 - Recommended Conditions of Approval 967
Attachment 2: Attachment 2 - Architectural Plans 996
Attachment 3: Attachment 3 - Statement of Environmental Effects 1017

Planning Proposal

Amendments to Burwood Local Environmental Plan 2012 and Burwood Development Control Plan 2012

166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon

On behalf of
LSH Property (Alexandria) Pty Ltd

Ethos Urban

LSH PROPERTY AUSTRALIA

Prepared by Ethos Urban
Submitted to Burwood Council

21 June 2023 | 2210896

'Gura Bulga'
Liz Belanjee Cameron

'Gura Bulga' – translates to Warm Green Country. Representing New South Wales.

By using the green and blue colours to represent NSW, this painting unites the contrasting landscapes. The use of green symbolises tranquillity and health. The colour cyan, a greenish-blue, sparks feelings of calmness and reminds us of the importance of nature, while various shades of blue hues denote emotions of new beginnings and growth. The use of emerald green in this image speaks of place as a fluid moving topography of rhythmical connection, echoed by densely layered patterning and symbolic shapes which project the hypnotic vibrations of the earth, waterways and skies.

Ethos Urban acknowledges the Traditional Custodians of Country throughout Australia and recognises their continuing connection to land, waters and culture.

We acknowledge the Gadigal people, of the Eora Nation, the Traditional Custodians of the land where this document was prepared, and all peoples and nations from lands affected.

We pay our respects to their Elders past, present and emerging.

Contact	Project Director. Associate Director	sgouge@ethosurban.com

This revision of the document has been prepared and reviewed

Stephen Gouge

Version No.	Date of issue	Prepared By	Approved by
1.0 (DRAFT)	-	ZC/SG	SG
2.0 (DRAFT)	29/11/2022	ZC/SG	SG
3.0 (FINAL)	02/12/2022	ZC/SG	SG
4.0 (FINAL – REVISED)	22/12/2022	SG	SG
5.0 REVISED	21/06/2023	SG	SG

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Contents

1.0 Introduction 6
1.1 The Proponent 7
1.2 The Vision 7
1.3 Project Team 7

2.0 Background 8
2.1 Background 8

3.0 The Site 12
3.1 Site Location and Context 12
3.2 Site Description 13
3.3 Site Conditions 14
3.4 Existing Development Consent 14
3.5 Parramatta Road Corridor Urban Transformation Strategy 2016 14
3.6 Surrounding Development 15

4.0 Existing Planning Framework 21
4.1 Burwood Local Environment Plan 2012 (BLEP 2012) 21

5.0 The Proposal 24
5.1 Urban Design Report 24
5.2 Summary of Proposal 27
5.3 Built Form and Density 27
5.4 Landscape and Public Domain 29
5.5 Public Art 34

6.0 **Part 1** - Objectives and Intended Outcomes 36
6.1 Vision 36
6.2 Key Objectives 36
6.3 Intended Outcomes 36

7.0 **Part 2** - Explanation of Provisions 37
7.1 Proposed Amendments to Burwood LEP 2012 37
7.2 Alternate Height of Building and Floor Space Approach 38
7.3 Proposed Clauses 38
7.4 Proposed Amendments to Burwood Development Control Plan 2012 40

8.0 **Part 3** - Justification of Strategic and Site-Specific Merit 42
8.1 Strategic Merit 43
8.2 Site-Specific Merit 71
8.3 Social Impacts and Benefits 71
8.4 Economic Impacts and Benefits 72
8.5 Market Demand Analysis 72
8.6 Public Benefits and Planning Agreement 73
8.7 Affordable Housing Provision 74
8.8 Commercial Viability and Feasibility Testing 74
8.9 **Part 4** – Maps 76
8.10 **Part 5** – Community Consultation 76
8.11 **Part 6** - Project Timeline 78

9.0 Environmental Assessment 79

9.1 Traffic, Access, and Transport 79
9.2 Flooding and Stormwater 80
9.3 Geotechnical 81
9.4 Contamination 81
9.5 Visual Impact Assessment 82
9.6 Residential Amenity Impacts 82
9.7 Ecologically Sustainable Development 83
9.8 Potential Environmental Impacts 83

10.0 Conclusion 84

Table of Figures

Figure 1 Planning Proposal Process 10
Figure 2 Site Context Plan 12
Figure 3 Precinct Aerial Photograph 13
Figure 4 Site Aerial 13
Figure 5 Site Photos – Salvos Site (left), Hoarding to Paramatta Road (right) 14
Figure 6 Site Aerial 14
Figure 7 Parramatta Road Frontage (left), existing site excavation (right) 14
Figure 8 Canada Bay Council Planning Proposal – Kings Bay and Burwood North 16
Figure 9 Sydney Metro Line – combined (left), illustration of Burwood North Metro Station (right) 17
Figure 10 Proposed Burwood North Metro Station arrangement 17
Figure 11 Burwood North Masterplan Frame Area 18
Figure 12 Concord Oval Redevelopment 19
Figure 13 Concord Oval Redevelopment – Layout and pedestrian connections 20
Figure 14 Land Use Zoning Map extract from Burwood LEP 2012 23
Figure 15 Building Height Map extract from Burwood LEP 2012 23
Figure 16 Floor Space Ratio Map extract from Burwood LEP 2012 23
Figure 17 Urban Design Principles for the Site 25
Figure 18 Perspective of the proposed site arrangement 26
Figure 19 Perspective of the proposed ground plane and publicly accessible open space 26
Figure 20 Proposed Building Massing 28
Figure 21 Landscape Masterplan (above) Landscape Typologies (below) 30
Figure 22 Section through Central open space 31
Figure 23 The Commons (publicly accessible open space to the south of the site) 32
Figure 24 Public Domain Plan 33
Figure 25 Public Art Opportunities 34
Figure 26 Structure Plan 41
Figure 27 Proposed Layout Plan 41
Figure 28 Greater Sydney Region Plan 45
Figure 29 Eastern City District Plan 48
Figure 30 Eastern City District Plan – Priorities and Actions 51
Figure 31 Parramatta Road Corridor Urban Transformation Strategy extent 52
Figure 32 Kings Bay/Burwood Precinct and Key Actions 53
Figure 33 PRCUTS Recommended Land Use and Development Controls 54
Figure 34 PRCUTS Vision and Strategic Actions 55
Figure 35 Burwood LSPS Structure Plan 65

Table of Tables

Table 1 Relevant controls pursuant to the Burwood LEP 2012 21
Table 2 Summary of Proposed Amendments to the Burwood LEP 2012 37
Table 3 Summary of Proposed Structure Plan 40
Table 4 Consistency with GSRP directions 46
Table 5 Consistency with key GSRP objectives 47
Table 6 Consistency with the Eastern City District Plan Planning Priorities 49
Table 7 BLEP 2012 Zone MU1 Land Use Table 54
Table 8 PRCUTS Principles 55
Table 9 PRCUTS Strategic Actions Assessment 56
Table 10 PRCUTS – Key Actions for the Kings Bay Precinct 59
Table 11 PRCUTS – Out of Sequence Checklist 61
Table 12. Proposed Maps for Planning Proposal 76
Table 13. Council's Scoping response requirements for engagement 77
Table 14. PRCUTS 'Out of Sequence Checklist' – Criteria 3. Stakeholder Engagement. 77
Table 15. Proposed Project Timeline – Planning Proposal 78

Appendices

A Design Report
Architectus

B Landscape Concept Report
Arcadia

C Public Art Plan (including Connecting to Country)
FCAD

D Social and Economic Impact Assessment
Ethos Urban

E Transport Assessment
JMT Traffic

F Commercial Viability and Feasibility Testing
Charter Keck Cramer

G Consultation Outcomes Report
Ethos Urban

H ESD Report
Aspire Sustainability Consulting

I Contamination Investigation
Douglas Partners

J Flood Risk and Drainage Statement
SCP

K Economic Impact Assessment – Retail
GapMaps

L Geotechnical Assessment
Douglas Partners

M Draft Development Control Plan
Ethos Urban

N Proposed LEP Mapping
Ethos Urban

1.0 Introduction

This Planning Proposal requests amendments to the *Burwood Local Environmental Plan 2012* (Burwood LEP 2012) relating to 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon. Ethos Urban has prepared this Planning Proposal on behalf of LSH Property Alexandria Pty Ltd.

The broad intent of the Planning Proposal is to achieve a vibrant, mixed-use precinct that places greenery at its heart, combining all the elements that make a great Sydney neighbourhood within a single precinct. Realising a considered mix of neighbourhood retail, community amenity, generous open green space and much-needed housing, the proposal will uplift the local community and unlock great public spaces for current and future residents. The proposal will also delivery crucial housing supply adjacent to key transport infrastructure.

The future redevelopment of the site will act as a catalyst for planned future developments along one of Sydney's most critical transport corridors which will assist in the reinvigoration of the Parramatta Road corridor, stimulate the local economy, and contribute to housing supply (including affordable housing), social infrastructure, retail, and hospitality offering.

The following amendments to the Burwood Local Environmental Plan 2012 (LEP 2012) are sought by the Planning Proposal.

- Amending the Burwood LEP 2012 Zoning (including mapping) to change the zoning of the site to MU1 Mixed Use.
- Including a new Burwood LEP 2012 Alternate Floor Space Ratio Map to change the maximum permissible floor space ratio (FSR) across the site to 3.4:1 (including a range of land uses)
- Including a new Burwood LEP 2012 Alternate Height of Buildings Map to allow maximum building height from 8.5m to 72.5m (maximum 22 storeys) to allow for, and control, the delivery of proposed built form in line with the design principles for the site.
- Inclusion of additional local provisions applying to the site, which required that community infrastructure is provided for any development that seeks to use the Alternate controls, including elements such as publicly accessible open space in quantum, and location relative to built form (approximately 2,700sqm) and community facilities (approximately 100sqm).
- Identification as a Key Site and requirements for Design Excellence to be included in the Burwood LEP 2012.
- Incorporation of site-specific provisions relating to the mix of land uses (FSR maximum and/or minimum) built form controls and requirements.

The Planning Proposal proposes a responsive and broad mix of land uses to meet the identified demand and supply, which is expected to change in response to the Sydney Metro West station at Burwood North. The Planning Proposal will provide community and public benefits as well as the contribution towards the provision of affordable housing stock within the LGA .

In summary, the Planning Proposal

- demonstrates strategic merit and supports the aims and objectives of the relevant strategic plans and policies, including the *Eastern District Plan*, *Burwood Local Strategic Planning Statement*, and the *Burwood Housing Strategy*.
- will enable a development that can comply with relevant statutory plans and policies, including the Burwood LEP 2012 and the Housing SEPP 2021.
- is consistent with the Ministerial Planning Directions that commenced on 1 March 2022 – particular with regard to transit orientated development and the Parramatta Road Urban Transformation Corridor.
- demonstrates site-specific merit and will address relevant site-specific planning matters.
- will enable a development that can effectively minimise any potential adverse environmental impacts.
- will deliver social and economic benefits.
- will provide for increased housing diversity and supply (contribution to affordable housing stock), employment, and tourist and visitor accommodation close to public transport infrastructure, jobs and amenities.

1.1 The Proponent

LSH Property (Alexandria) Pty Ltd is a wholly owned subsidiary of Lei Shing Hong Limited (LSH). LSH is a major international conglomerate based in Hong Kong. LSH stands at the forefront of innovation and design, collaborating with market-leading partners to deliver quality, first to market projects in commercial, retail, lifestyle and industrial spaces.

1.2 The Vision

166-204 Parramatta Road will be Croydon's Urban Village – a mixed-use building that places greenery at its heart, combining all the elements that make a great Sydney neighbourhood within a single precinct.

The project vision is for the development of a vibrant, mixed-use precinct which will assist in the regeneration of the Parramatta Road corridor, stimulate the local economy, and contribute to the area's current social infrastructure, retail, and hospitality offering. The development would deliver this, along with residential apartments, a high-quality hotel, and commercial floorspace, in a highly accessible location, strategically positioned on a large site, fronting Parramatta Road and in proximity to the planned Burwood North Metro Station.

The desired future character of the site consists of five key elements

- **A green heart** - A focus for community and an oasis in the inner west
- **A green address** - Generous new landscaped setbacks will transform Parramatta Road
- **Local dining & retail** - An active 18-hour community
- **Community spaces and jobs** - New opportunities for the precinct

1.3 Project Team

LSH PROPERTY AUSTRALIA	Proponent
architectus	Architecture Urban Design
Aspire Sustainability Consulting	ESD Strategy
Ethos Urban	Planning Engagement Social and Economics
scp engineers and development consultants	Flood Risk and Drainage
ARCADIA	Landscape Public Domain
neoscape	Project Management
FCAD Fellingham Consultancy and Design	Public Art
JMT Consulting	Traffic
Douglas Partners Geotechnics / Environment / Groundwater	Contamination Geotechnical
CHARTER. KECK CRAMER	Commercial Viability
RIGHT ANGLE	Placemaking Strategy
GapMaps YOU'RE IN THE RIGHT PLACE	Data Consultant

2.0 Background

2.1 Background

Parramatta Road is one of Sydney's most critical transport corridors and with the continued evolution of Western Sydney, the arterial passage and its surrounding neighbourhoods are in the middle of transformative change.

Alongside the Western Sydney Metro and WestConnex, 166–204 Parramatta Road represents a unique opportunity to shape the future of this evolving area at scale. As the neighbourhood continues to grow, there is a clear requirement for local housing supply and community facilities to meet its varied and changing needs.

The mixed-use development will respond to the increasing accessibility of the area and maximise its potential as a convenient mid-point between the Parramatta and Sydney CBDs, as well a complementing the growth of Kings Bay and Burwood North.

With the arrival of the Burwood North Metro Station 400-600 metres away, this is the perfect time to revitalise the Parramatta Road Corridor and prepare for the inevitable growth that will follow. Croydon is forecast to undergo significant population growth in the next ten years. With it, there will be an increased need for varied housing requirements to meet the needs of the new residents. There will also be significant workforce growth, particularly within a 3km radius of the site. Croydon's increasing population will call for a greater demand for amenity, retail, public space and community infrastructure.

2.1.1 Scoping Proposal and Council Feedback

On 1 June 2022, a Scoping Proposal report was submitted to Burwood Council. The report was accompanied by preliminary technical reports including Architectural Report and Drawings, a Transport Assessment, A Social and Economic Assessment and Strategy (Summary Findings and Advice), Economic Impact Assessment (Retail) and Place and Vision Document. On 2 August 2022, a response to the Scoping Proposal was received from Council, raising the following issues which have been addressed in this Proposal:

- Connection To Country
- PRCUTS Vision
- Affordable Housing
- Transport And Access
- Active Transport
- Parking
- Sustainability And Resilience
- Design Quality
- Urban Design
- Massing Analysis
- Visual Impact
- Public Spaces And Landscaping
- Public Art
- Flood Risk And Drainage
- Contamination
- Tunnel Infrastructure
- Housing That Meets Community Needs
- Public Benefit
- Engagement
- Staging Plan
- Draft Development Control Plan

Council confirmed the Scoping Proposal had been referred to Transport for NSW for review and comment. On 8 August 2022, comments from TfNSW were received regarding the following. These have been address in the Planning Proposal

- Integrating Land Use And Transport,
- Proposed Non-Residential Uses
- Proposed Access Arrangement
- Freight And Servicing
- Proposed Shared Zone
- Active Transport
- Car Parking
- Transport Impact Assessment
- Proposed Green Edge Setback
- Funding And Implementation

2.1.2 Community Engagement – Pre-Lodgement of Planning Proposal

On behalf of the proponent, Ethos Urban carried out local community and stakeholder consultation throughout October and November 2022.

The purpose of engagement on the Planning Proposal at the early stage prior to lodgement, was to:

- Seek feedback from immediate neighbours and the wider community to better understand local views and potential concerns.
- Provide clear, timely and accessible information and opportunities for neighbours to provide feedback during the initial planning phases of the project.
- Explain how the proposed design concept and site planning approach addresses key community issues and long terms NSW Government strategic planning priorities.
- Create effective lines of communication between the local community and the project team.

This early engagement process provided opportunities for open conversations and feedback from:

- immediate neighbours to the site,
- community located within a 200m+ radius of the site; and
- several key government agencies and service providers.

A high-level summary of the engagement activities undertaken is provided below, with more detail included in the Consultation Outcomes Report, prepared by Ethos Urban (**Appendix G**).

Letterbox drop

- Letterbox notification to approximately 36 immediate neighbours and approximately 219 wider community members on 5 November 2022

Stakeholder correspondence

- Several formal and informal project briefings with Burwood City Council planning team.
- Consultation with Transport for NSW, Sydney Water and Ausgrid.

Community drop-in sessions (in-person)

- Five registrants and four attendees at an immediate neighbour session held on the 17 November 2022.
- 22 registrants and 15 attendees at a wider community session held on 21 November 2022.

Community webinar (online)

- 20 registrants and 15 attendees at an online community webinar held on 22 November 2022.

Project email and phone

Five enquiries received through community engagement channels during the consultation period.

2.1.3 Local Environmental Plan - Plan Making Guideline 2021

The Planning Proposal has been prepared and structured in the format prescribe by the Local Environmental Plan Making Guidelines published by the NSW Department of Planning and Environment (DPE) in 2021. The following flowchart (**Figure 1**) forms part of the LEP Plan Making Guidelines and is provided for reference. To date, the process required of the Guideline to undertake early engagement with Council via a scoping report has been completed.

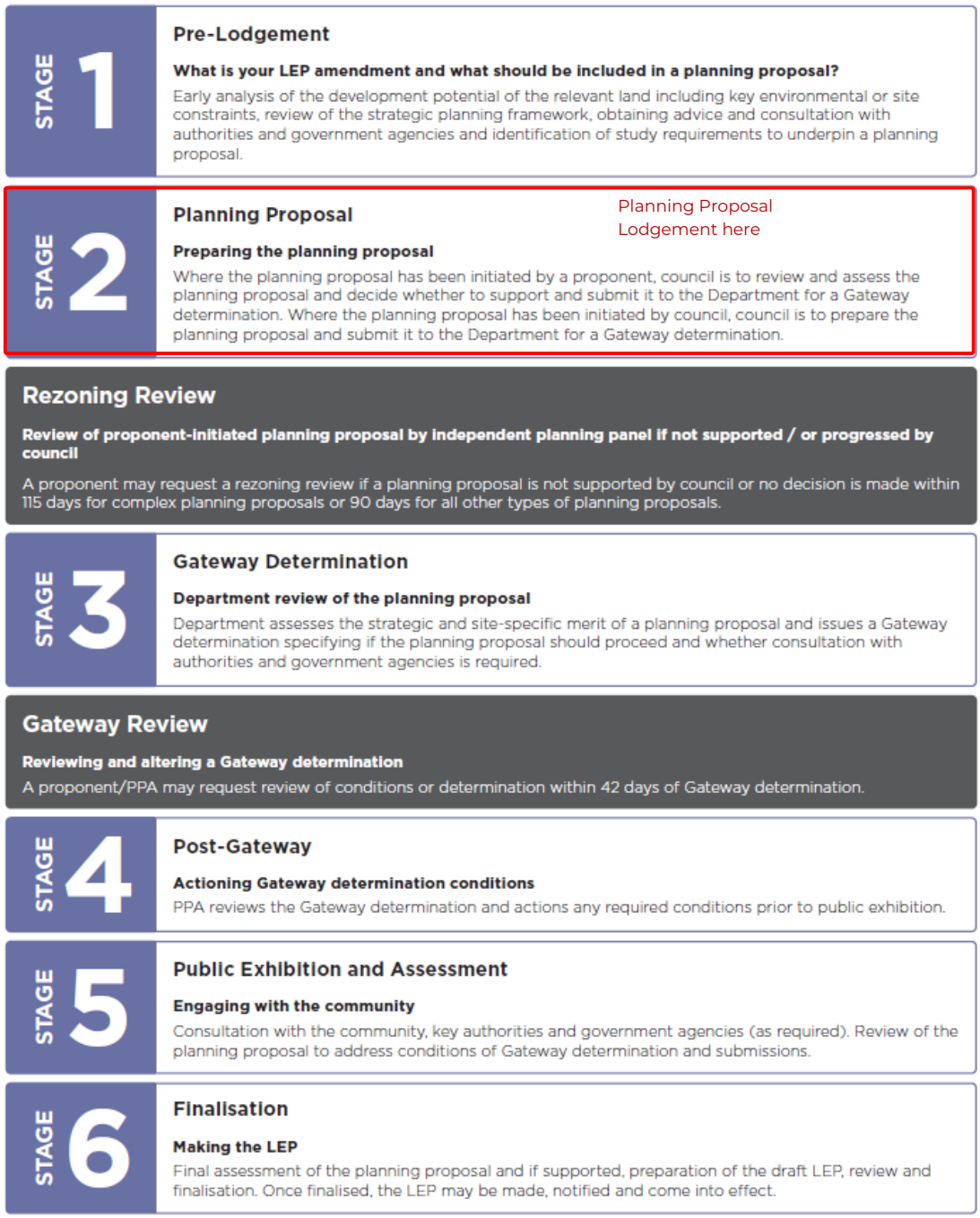


Figure 1 Planning Proposal Process
Source/Notes: DPE LEP Plan Making Guideline

2.1.4 Burwood Design Review Panel

Burwood Council have recently formulated the Burwood Design Review Panel (BDRP) to examine, evaluate and comment on the design aspects of development applications and planning proposal referred to the BDRP under the terms of the referral triggers established by Council.

The panel is tasked with providing advice to Council and considering Design Excellence Clause contained in section 6.5 of the Burwood Local Environmental Plan and relevant State Environmental Planning Polices as part of this. In the case of Planning Proposals, strategic and site-specific considerations in the terms of the Plan Making Guidelines are expected to be considered.

On 23 February 2023, the Burwood Design Review Panel met, along with the proponent and project team, to hold a Design Review Panel meeting. The proposal, strategic alignment and site-specific merits were presented, and feedback provided from the Panel. Written comments were provided to the proponent on 22 March 2023 and have all been carefully reviewed and addressed within the Planning Proposal.

3.0 The Site

3.1 Site Location and Context

The site is located at 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon, and within the Burwood LGA. Over recent years, Parramatta Road has experienced increased vehicular congestion, a degrading public realm, economic decline, a lack of coherent delivery to a strategy, and the undervaluing of placemaking.

The Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) has prescribed a number of actions and considerations to regenerate Parramatta Road, establishing several precincts to transform the Corridor into an active community precinct. The proposal will contribute positively to the renewal of the Parramatta Road Corridor, acting as a catalyst for regeneration in the Burwood-Concord and Kings Bay portion of this important Corridor.

The site has excellent access to Westconnex, in close proximity to the entrance to the future extension to M4/M5, and Rozelle Interchange due to open in 2023 which will provide faster access to Sydney International Airport and the Sydney CBD.

The opening of Sydney Metro West, 400-600m west of the subject site, will mean that the site is highly accessible by rail, with faster travel times to key employment precincts and other community hubs including between Parramatta and the Sydney CBD (10min to Sydney CBD). As such, redevelopment of the site will act as a catalyst project and help to support planned and ongoing investment and uplift in this part of Sydney.

The character of the site's immediate context includes large bulky goods retail, showrooms and light industrial sites. Immediately to the south of the site the context is low scale residential dwellings including two storey townhouses. The Site and its local context are shown in **Figure 2** and **3**.

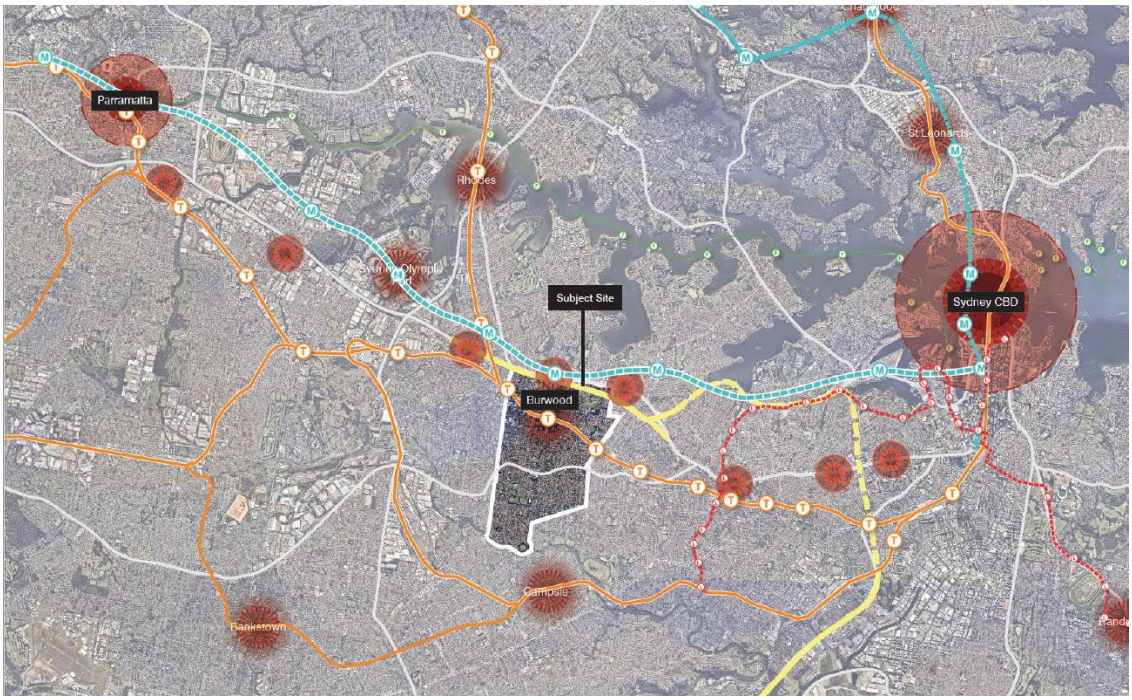


Figure 2 Site Context Plan
Source/Notes: Architectus

3.2 Site Description

The Site is located at 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon (Lot 1 DP206411, Lot 1 DP86926, Lots A-C DP84812, Lot 1 DP 86033, Lots 100-101 DP850953 and Lot 1 DP 817488) on the southern side of Parramatta Road and is bound by Lucas Road and Cheltenham Rd in the Burwood local government area. The Site is approximately 1km from Burwood Station and Town Centre and 150m east of Concord Oval. The site has an area of approximately 10,499sqm

The site is not a heritage listed item nor within or adjacent to a heritage conservation area. The Site includes 1-1A Cheltenham Road which currently contains a single storey brick dwelling. A context photograph of the surrounding precinct is provided in **Figure 3** and an aerial photo of the site is shown in **Figure 4**.

Figure 3 Precinct Aerial Photograph
Source: Google/Ethos Urban

Figure 4 Site Aerial
Source: Google/Ethos Urban

3.3 Site Conditions

The majority of the site is currently vacant and is excavated to basement level, excluding the Salvation Army site at the eastern edge of the site as shown in **Figure 5** and 1-1A Cheltenham Road in the south-eastern corner of the site. Photographs of the current conditions of the site are shown below, including the substantial hoarding surrounding the boundary to Parramatta Road.

Figure 5 Site Photos – Salvos Site (left), Hoarding to Paramatta Road (right)
Source: Google/Ethos Urban

Figure 7 Parramatta Road Frontage (left), existing site excavation (right)
Source: Google/Ethos Urban

3.4 Existing Development Consent

On 15 April 2018, development approval DA 89/2017 was granted by Burwood Council for the construction of a 4-storey car sales showroom, storage and service facility at the site. The facility was to be operated by Mercedes-Benz. The consent was activated and works commenced. Accordingly, the majority of the site is currently vacant and is excavated to basement level, with the exception of 1-1A Cheltenham Road which currently contains a single storey brick dwelling. No 166-176 Parramatta Road consists of the "Salvation Army" building.

3.5 Parramatta Road Corridor Urban Transformation Strategy 2016

The site is situated within the Kings Bay Precinct, as defined by the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS). The PRCUTS was released in November 2016 and seeks to coordinate the renewal of land and neighbourhoods along Parramatta Road in the context of reduced congestion associated with the implementation of the WestConnex transport project, which is expected to remove significant traffic volume, in particular heavy vehicles, from the corridor.

PRCUTS forecasts that the Kings Bay Precinct will support some +5,200 new residents, including +2,500 new homes and +2,900 new jobs by 2050. The Strategy envisions the Kings Bay Precinct as a new residential urban village with a Parramatta Road address having a dense network of streets and an identity.

Of relevance to the site, PRCUTS notes that there are significant urban renewal opportunities for land immediately fronting Parramatta Road, and identifies the site as 'mixed use' in its vision. The plan also recognises that there is an opportunity in Kings Bay Precinct to capitalise on rapid transit, and that the amalgamation of sites in appropriate locations should be encouraged to promote opportunities for redevelopment.

3.6 Surrounding Development

The current surrounding development is defined by large bulky goods retail, showrooms, and light industrial sites to Parramatta Road and medium to low density residential south of the site along Cheltenham and Lucas Roads.

- **North:** to the north across Parramatta Road are car dealerships and areas of future transformation through the PRCUTs (including parts of the Kings Bay precinct to the north-west)
- **East:** to the east the Site adjoins a warehouse development on the opposite side of Cheltenham Road
- **South:** to the south is residential development in the form of two storey townhouses with single detached dwellings beyond that
- **West:** To the west across Lucas Road, is located a Kennards hire store. Lucas Road has a left-in left-out intersection with Parramatta Road while Cheltenham Road has a fully signalised intersection with Parramatta Road providing for left and right turning movements out of Cheltenham Road and left turn movements from Parramatta Road into Cheltenham Road.

3.6.1 Future Development/Precincts

Several recent or proposed developments/proposals are in proximity and relevant to the subject site, which bear relevance to the site and the changing nature of the precinct.

Kings Bay and Burwood North Precincts, City of Canada Bay Council

Canada Bay City Council has identified Kings Bay and Burwood as two of three precincts for urban renewal as part of the Parramatta Road Corridor Urban Transformation Strategy. It is proposed as a new residential and mixed-use urban village on Parramatta Road, with a vibrant main street and strong links to the open space network along Sydney Harbour.

Project Status: Public exhibition of the Parramatta Road Corridor Urban Transformation Strategy Planning Proposal occurred in early 2022. Supporting documentation relating to Kings Bay/Burwood included the Draft PRCUTS DCP – and the Urban Design Masterplan. The Planning Proposal was gazetted on 16 December 2022.

Figure 8 Canada Bay Council Planning Proposal – Kings Bay and Burwood North
Source: Canada Bay Council

Burwood North Metro and Station, Sydney Metro

The future Burwood North Station has been identified to be located on the corner of Burwood and Parramatta roads. It will strengthen the business and retail centre to the South of Parramatta Road and provide a new fast, frequent and reliable transport link for the community north of Parramatta Road. In addition, it aims to alleviate pressure off the existing bus network along Burwood and Parramatta roads and Burwood Station.

Project Status: The Sydney Metro West is a rapid transit railway connection being constructed between Sydney CBD and Westmead, with a station planned at Burwood North on the corner of Parramatta and Burwood Roads. When completed, the route "will move more than 40,000 people an hour in each direction between Westmead and the

Sydney CBD", cut road congestion on Parramatta and Victoria Roads, create over 80,000 direct and indirect jobs, and enable faster travel for commuters.

Sydney Metro was granted planning approval to construct twin underground rail tunnels between Westmead and The Bays for Sydney Metro West in March 2021. The Sydney Metro West State Significant Infrastructure Application, including the detail and anticipated over station development for the Burwood North Metro Station was public exhibited from March 2022 to 4 May 2022.

Set to be opened in 2030, the Sydney Metro West will dramatically transform the precincts in which each station is situated. This is likely to drive further investment in these areas, as public transport connectivity allows for greater liveability for existing and prospective residents, and greater economic viability for businesses.

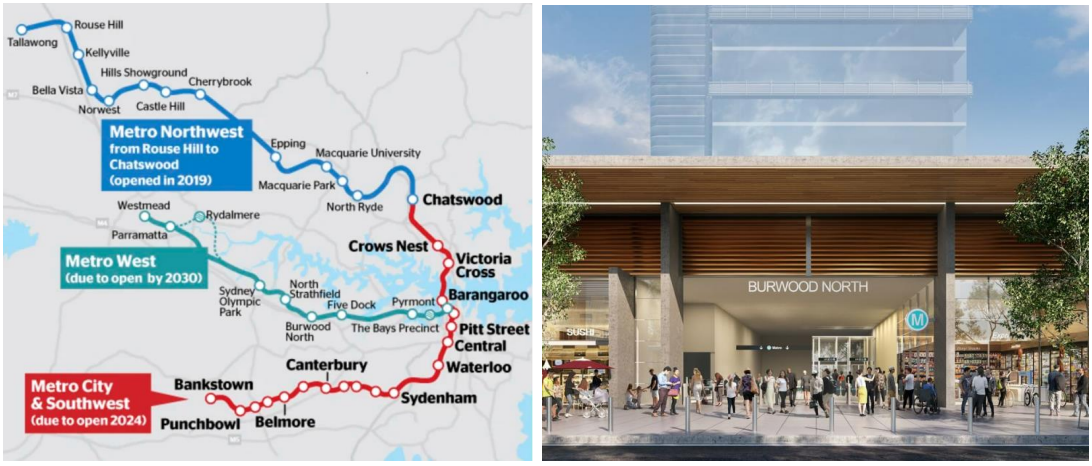


Figure 9 Sydney Metro Line – combined (left), illustration of Burwood North Metro Station (right)
Source: Sydney Morning Herald (left) Sydney Metro West EIS (right)

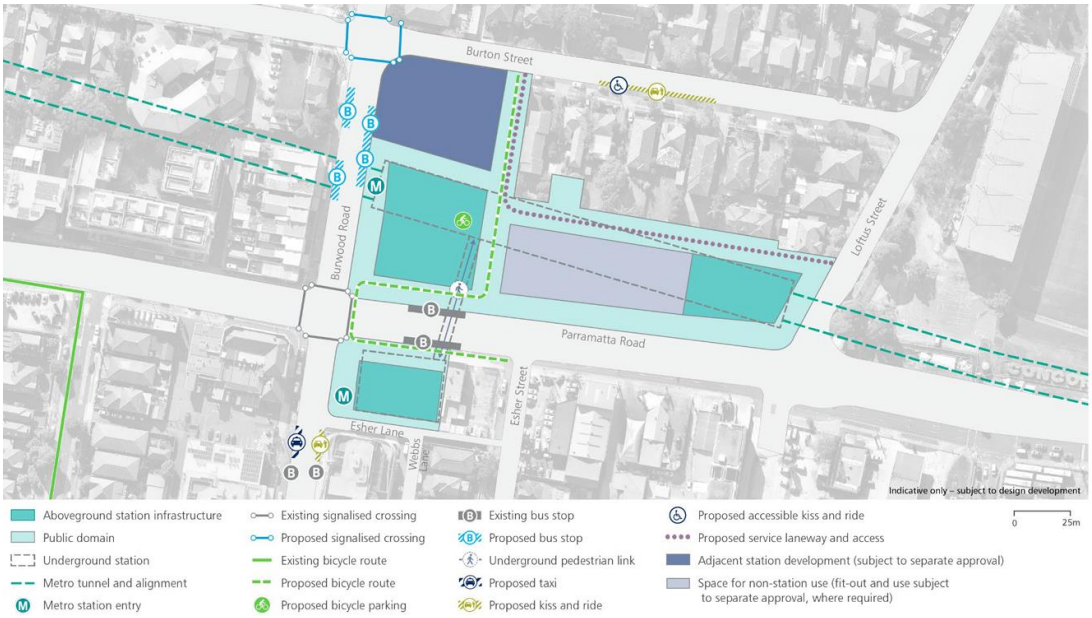


Figure 10 Proposed Burwood North Metro Station arrangement
Source: Sydney Metro West EIS

Burwood North Planning Proposal

Burwood Council is working on developing a masterplan which will inform the planning framework to deliver a new and vibrant neighbourhood at Burwood North, in line with the intent set out in the Local Strategic Planning Statement. Council have recently appointed a consultant team and engagement has been undertaken throughout the end of 2022 and early 2023. Council has previously conducted community consultation on the principles for the Burwood North Precinct in early phases of the masterplan formulation.

On 18 October 2022, Council endorsed a report that provided an update of the preparation of the Burwood North Precinct masterplan, along with an affordable housing policy. Unanimously endorsed by the Councillors in attendance at the meeting, the report provided an update on the appointment of the consultants who will be undertaking the work relating to the preparation of the Burwood North Precinct Masterplan and the Burwood Affordable Housing Policy and Contributions Scheme.

The actions agreed out of the meeting were as follows:

- Prepare Planning Proposal for 2021 Local Environmental Plan (LEP) Amendment
- Develop an Affordable Housing Policy
- Research plans and opportunities for the creation of public open spaces as part of the planning of the Burwood North Precinct
- Undertake initiatives that support new economic growth in the Burwood North Precinct and Burwood Town Centre
- Undertake comprehensive community engagement programs to seek community input on Council projects, operations, initiatives and major decisions.

The Masterplan will be used to inform new planning controls in an update to Burwood Local Environmental Plan 2012 and Burwood Development Control Plan. It will also have recommendations that could be included in broader strategic directions of Burwood Council. It will set a long-term vision and strategic directions to make sure future growth is well planned, sustainable and meets the changing needs of our community. Within 10 minutes of Parramatta and the Sydney CBD, the new metro is stimulating new opportunities to build on the lifestyle, cultural and economic offerings of Burwood.

According to Council's community participate website, the intended timeline for endorsement of the masterplan and Planning Proposal by Council is June 2023.

Figure 11 Burwood North Masterplan Frame Area
Source/Notes: Burwood Council

Concord Oval Redevelopment, City of Canada Bay Council

The redevelopment of Concord Oval will create recreation spaces to accommodate the anticipated population growth of the Burwood-Concord and Kings Bay precincts. The development includes open green spaces, enhanced outdoor public areas, a new plaza, new indoor recreation centre, public art, café, community meeting rooms and halls, new matchday facilities for local sporting clubs, and a new head office and Centre of Excellence for the West Tigers.

The design and construction for the oval includes improved pedestrian connections along Parramatta Road as shown in Figure 13

Project Status: Construction commenced in November 2020. Part of the precinct and key buildings have opened in 2022, with the remainder of the precinct completed and officially opened in January 2023.

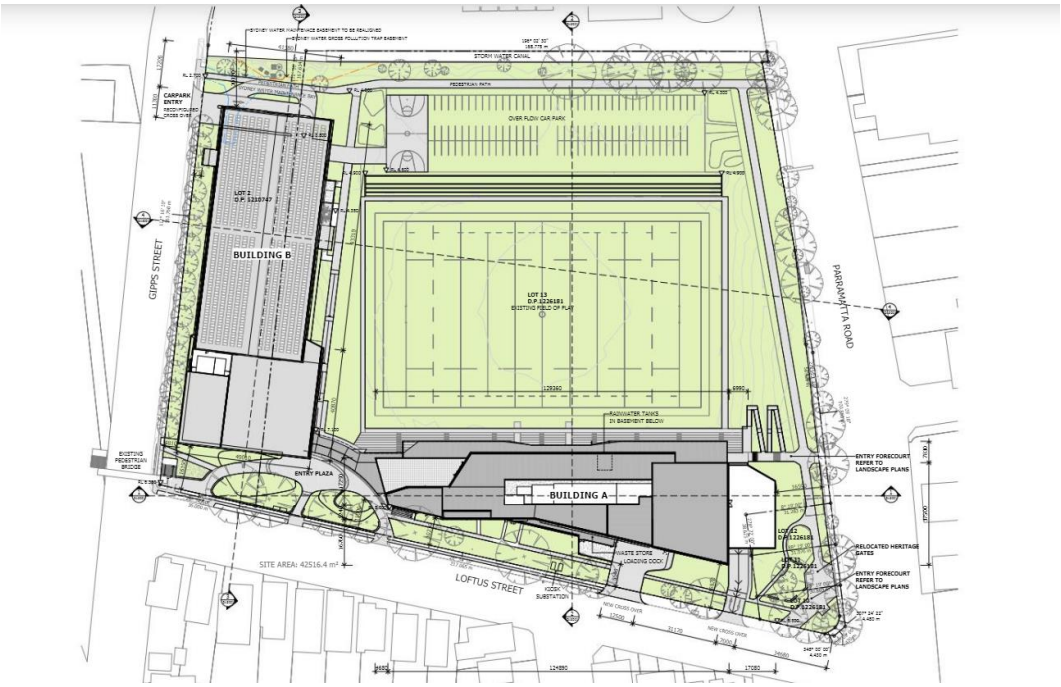


Figure 12 Concord Oval Redevelopment
Source: City of Canada Bay Council

Figure 13 Concord Oval Redevelopment – Layout and pedestrian connections
Source: Nearmap + Ethos Urban

4.0 Existing Planning Framework

4.1 Burwood Local Environment Plan 2012 (BLEP 2012)

The key Environmental Planning Instrument (EPI) applying to the site is the Burwood Local Environment Plan 2012 (BLEP 2012). A summary of the relevant existing controls in the BLEP 2012 is provided in **Table 1**.

Map extracts from the BLEP 2012 are shown in **Figures 14-16** . As set out in this scoping report, and discussed with Council, the current planning controls are required to be reviewed and considered in light of the principles of the Parramatta Road Corridor Urban Transformation Strategy (PRCUTs), discussed later in this document.

Table 1 Relevant controls pursuant to the Burwood LEP 2012

Clause		Control
Clause 2.1 – Land use zones		The site is predominantly zoned E3 Productivity Support with one lot (Cheltenham Road) zoned R3 medium density residential
E3 Productivity Support	Permitted without consent	Home occupations; Roads
	Permitted with consent	Animal boarding or training establishments; Backpackers' accommodation; Boarding houses; Boat building and repair facilities; Business premises; Centre-based child care facilities; Community facilities; Depots; Food and drink premises; Function centres; Garden centres; Group homes; Hardware and building supplies; Hostels; Hotel or motel accommodation; Industrial retail outlets; Industrial training facilities; Information and education facilities; Landscaping material supplies; Light industries; Local distribution premises; Markets; Mortuaries; Neighbourhood shops; Office premises; Oyster aquaculture; Passenger transport facilities; Places of public worship; Plant nurseries; Recreation areas; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Research stations; Respite day care centres; Rural supplies; Service stations; Serviced apartments; Shop top housing; Specialised retail premises; Storage premises; Take away food and drink premises; Tank-based aquaculture; Timber yards; Vehicle body repair workshops; Vehicle repair stations; Vehicle sales or hire premises; Veterinary hospitals; Warehouse or distribution centres; Wholesale supplies; Any other development not specified [as permissible without consent or prohibited].
	Prohibited	Agriculture; Air transport facilities; Airstrips; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Commercial premises; Correctional centres; Crematoria; Eco-tourist facilities; Electricity generating works; Environmental facilities; Environmental protection works; Exhibition homes; Exhibition villages; Extractive industries; Farm buildings; Forestry; Heavy industrial storage establishments; Helipads; Highway service centres; Home occupations (sex services); Industries; Jetties; Marinas; Mooring pens; Moorings; Open cut mining; Residential accommodation; Rural industries; Sewerage systems; Tourist and visitor accommodation; Transport depots; Waste disposal facilities; Water recreation structures; Water storage facilities; Water treatment facilities; Wharf or boating facilities
R3 Medium Density Residential (1-1 Cheltenham Street)	Permitted without consent	Home occupations; Roads
	Permitted with consent	Attached dwellings; Boarding houses; Building identification signs; Business identification signs; Centre-based child care facilities; Community facilities; Dual occupancies; Dwelling houses; Group homes; Home industries; Multi dwelling housing; Neighbourhood shops; Oyster aquaculture; Places of public worship; Respite day care centres; Semi-detached dwellings; Seniors housing; Shop top housing; Tank-based aquaculture; Any other development not specified in item 2 or 4
	Prohibited	Advertising structures; Agriculture; Air transport facilities; Airstrips; Amusement centres; Animal boarding or training establishments; Biosolids treatment facilities; Boat building and repair facilities; Boat launching ramps; Boat sheds; Camping grounds; Car parks; Caravan parks; Cemeteries; Charter and tourism boating facilities; Commercial premises;

Clause	Control
	Correctional centres; Crematoria; Depots; Eco-tourist facilities; Electricity generating works; Entertainment facilities; Environmental facilities; Environmental protection works; Exhibition villages; Extractive industries; Farm buildings; Forestry; Freight transport facilities; Function centres; Heavy industrial storage establishments; Helipads; Highway service centres; Home occupations (sex services); Industrial retail outlets; Industrial training facilities; Industries; Information and education facilities; Jetties; Local distribution premises; Marinas; Mooring pens; Moorings; Mortuaries; Open cut mining; Passenger transport facilities; Public administration buildings; Recreation facilities (indoor); Recreation facilities (major); Recreation facilities (outdoor); Registered clubs; Research stations; Residential accommodation; Restricted premises; Rural industries; Service stations; Sewage treatment plants; Sex services premises; Storage premises; Tourist and visitor accommodation; Transport depots; Truck depots; Vehicle body repair workshops; Vehicle repair stations; Veterinary hospitals; Warehouse or distribution centres; Waste or resource management facilities; Water recreation structures; Water recycling facilities; Water storage facilities; Water treatment facilities; Wharf or boating facilities; Wholesale supplies
Clause 4.3 – Height of buildings	The maximum building height control for the site is 15m which applies to land fronting Parramatta Road in the E3 zone and 12.5m at 1-1A Cheltenham Road. Residential zoned land to the south of the Site has a height limit of 8.5m.
Clause 4.4 – Floor space ratio	1.75:1 (1.5:1 Cheltenham Road) Maximum Floor Space Ratio (FSR) for the site is 1.75:1 applies to all of the site, excluding 1-1A Cheltenham Road which is 1.5:1
Clause 6.1 – Acid sulfate soils	Class 5
Clause 6.7 - Development on land at 1–1A Cheltenham Road, Croydon	This clause applies to land at 1–1A Cheltenham Road, Croydon, being Lot 1, DP 817488. Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that the proposed development will adequately address vehicular and service access.
Schedule 1 – Additional Permitted Use - land at 1–1A Cheltenham Road, Croydon	Development for the following purposes is permitted with development consent— a) food and drink premises, b) garden centres, c) hardware and building supplies, d) landscaping material supplies, e) plant nurseries, f) specialised retail premises, g) timber yards, h) vehicle sales or hire premises

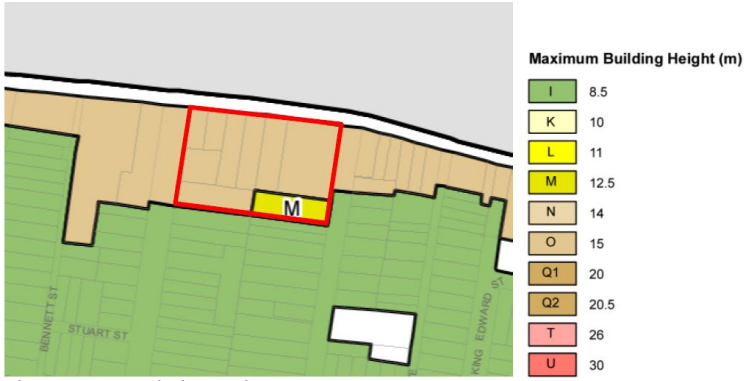
4.1.1 Key Planning Maps – Burwood LEP 2012

Zoning

The Site:
Zoned E3 Productivity Support and R3 Medium Density Residential

Figure 14 Land Use Zoning Map extract from Burwood LEP 2012
Source/Notes: Burwood LEP 2012

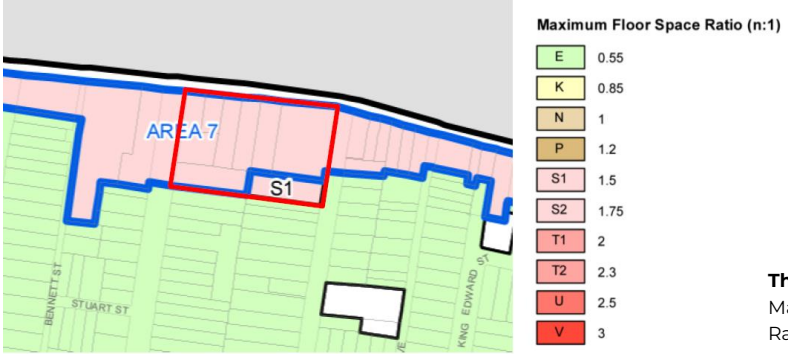
Maximum Building Height



The Site:
Building Height control of 15m and 12.5m

Figure 15 Building Height Map extract from Burwood LEP 2012
Source/Notes: Burwood LEP 2012

Floor Space Ratio



The Site:
Maximum Floor Space Ratio of 1.75:1 and 1.5:1

Figure 16 Floor Space Ratio Map extract from Burwood LEP 2012
Source/Notes: Burwood LEP 2012

5.0 The Proposal

5.1 Urban Design Report

The proposed amendments to the Burwood LEP 2012 are supported by a Design Report, which is provided at **Appendix A**. The Design Report includes a concept design scheme for the future redevelopment of the site, detailed analysis of opportunities and constraints, and testing of alternatives. The built form and land use activities reflected in the concept design scheme demonstrate how a quality design outcome can be delivered at the site.

The Design Report (**Appendix A**) provides a comprehensive review of the existing physical, strategic, and future settings and potential for the site. In addition to the planning context and setting, the report covers the following key aspects.

- **Site Analysis**
  - Opportunities of the site, as well as the context character and built form are considered, setting up a sound analysis on which to consider renewal.
- **Vision**
  - Articulating the vision and aspirations for the future of the site.
- **Future Development Context**
  - Placing the site and future development in the context of the existing and planning transport connections and growth around the corridor and Burwood North Metro Station. This section also considers comparable development contexts throughout the Sydney Metropolitan Area where the delivery of key infrastructure, including Sydney Metro, has necessitated and supported transformation of precincts and key sites.
- **Developing the Masterplan**
  - Establishing the Urban Design Principles, the inform the proposal and envelope testing
- **The Proposal**
  - This sets out the principles of the design, being the key moves and shaping of the built form and design rationale. It sets out the components of the proposal, with a focus on the public domain, designated future character and how the layout of the future uses can be delivered within the established Urban Design principles.
- **Testing and Assessment**
  - Visual Impact Assessment
  - Testing of Alternatives

The Concept Design illustrates how the site could be developed and would be refined as part of a future development application and design review/excellence process. The scheme (including indicative apartment numbers and mix) has been prepared to demonstrate the quality design outcome and the suitability of impacts of the proposed planning controls for the site.

5.1.1 Vision

The proposal has been designed to maximise the public benefit of a consolidated central open space. Podiums wrap the open space, protecting it from Parramatta Road, whilst still providing opportunities for access. Minimising the building footprints at the southern end of the site allows for large openings to Lucas and Cheltenham Roads which provide visual and physical connections to the expansive open space at the centre of the site. Two towers are oriented north-south with large separation to increase solar access to the publicly accessible open space and minimise overshadowing to the southern neighbours. A recessed carpark entry/exit to the basement area.

The Vision for the site as set out in the Design Report (**Appendix A**) is to create an urban oasis that is a genuine mixed use precinct that responds to the needs of current and future residents, combining all the elements that make a great Sydney neighbourhood within a single precinct. The vision includes:

- **A Green, Safe and Generous Public Realm** –
  - A new 2,700sqm+ public open space in Croydon will provide relief from Parramatta Road with green spaces to dwell, a network of gardens, and indoor and outdoor rooms for the community to enjoy.
  - The activation of the ground plane will contribute to the creation of a better Parramatta Road for all through providing what Croydon currently lacks – a new open space, greenery, public art installations, plentiful seating and shading to cool the neighbourhood – identified through our analysis.

- **Community Infrastructure –**
  - The proposal provides a strategic and site specific contextual response to a detailed community needs and opportunities study, as well as feedback from community engagement, and will provide formal and informal community spaces to promote local business, community health and social life.
  - The site will become a focal point of the local neighbourhood by providing a variety of services and amenities separate from its retail offer. These will create a sense of vitality within the site as well as add a sense of attractiveness and welcoming to visitors and residents alike.
  - The non-residential floor space in addition to retail/food and beverage activation offers the potential for co-working spaces, a dedicated senior's space, allied health offerings, local open space and play spaces integrated with the landscape.

- **Housing and Short-Term Accommodation and Jobs** –
  - Setting a precedent for the Parramatta Road corridor, the project will provide a residential offer and boutique hotel opportunities in close proximity to infrastructure, whilst also providing facilities and services that meet the needs of the local community.
  - The proposed hotel component on the site will leverage the number of visitors to the area and will offer 160 rooms, conference and event facilities, bars potential for top floor restaurant. Making the most of the site's proximity to the M8/M4 motorway connections (including to Sydney Airport) and 10 minute Sydney Metro commute to both the Sydney and Parramatta CBDs from Burwood North.
  - The hotel will positively contribute and complement the local economy through increased employment and spending due to tourism visitation, as well as encouraging community participation - making the F&B offerings and social spaces open to everyone, not just hotel guests.
  .
- **An 18 Hour Place** –
  - Providing formal and informal community spaces to promote local business, community health and social life, day and night.

- **Neighbourhood Retail** –
  - A carefully chosen neighbourhood mix of social retail including local F&B, well-being, showrooms and small-scale grocery, designed to appeal to current and emerging audiences without competing against other retail spaces in the local catchment area.

5.1.2 Urban Design Principles

The following urban design principles have been applied to the site (see **Appendix A**), which form the foundation of the design rational and unique response to built form which underpin the approach to renewal of the site. These principles consider and respond to the constraints of the site, whilst maximising the opportunities and public benefits. The approach to built form, open space, access and permeability are unique to the scale, geometry and depth of the site which, as identified elsewhere in this Proposal, in unlikely to be easily replicated on other sites within the precinct.

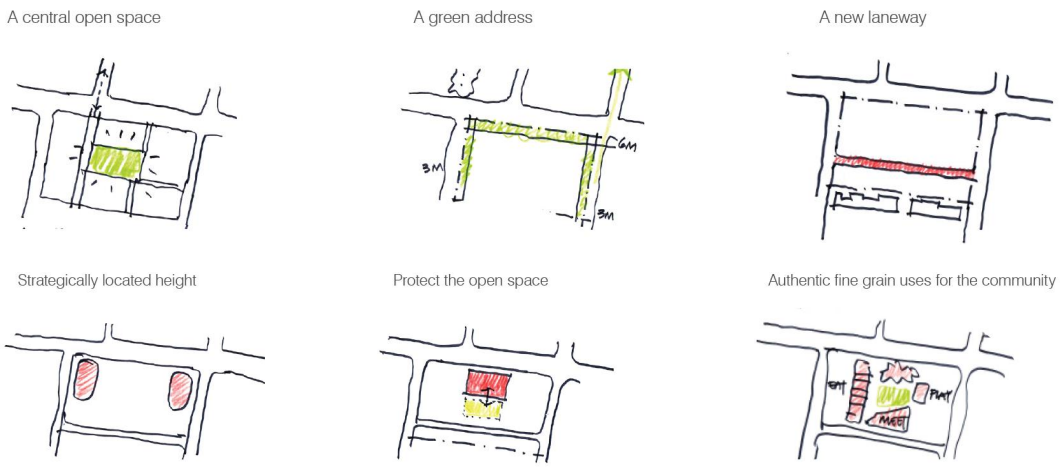


Figure 17 Urban Design Principles for the Site
Source: Architectus

Figure 18 Perspective of the proposed site arrangement
Source: Architectus

Figure 19 Perspective of the proposed ground plane and publicly accessible open space
Source: Architectus

5.2 Summary of Proposal

The Concept Scheme for the site is summarised as follows, with full details provided at **Appendix A** and represented visually in **Figures 18** and **19**.

Construction of a high-quality genuine mixed-use scheme.

- Four storey podium height to the Street frontage brokering into three building forms along Parramatta Road.
- 2 x towers of 16 and 22/14 storeys at the east and west of the site (up to a maximum height of 72.5.m), stepping in building envelope/footprint and height as shown.
- Landscaped setbacks of between 3-6m to Parramatta Road, Lucas Road and Cheltenham Road.
- Through site link and laneway within the site to facilitate permeability's servicing and connectivity.
- Large activated publicly accessible open space (2,700sqm+) at the centre of the site receiving ample solar access throughout the year.
- Mix of Land uses across the site including:
  - Residential
  - Hotel
  - Retail
  - Commercial
  - Community facilities
- Basement car parking across the site, with entry and exit from Lucas Road and Cheltenham Road (no access from Parramatta Road).

The proposed Gross Floor Area (GFA) of 35,581sqm that comprises the FSR of 3.4:1 is broken down as shown below in **Figure 20.**

5.3 Built Form and Density

The reference scheme prepared as part of the Urban Design Report considers the visual impact and solar access assessment of the recommended building form. The scheme has been prepared with a detailed understanding of the site's surrounding planning context, together with physical, technical, and topographical parameters and feedback stemming from Council's assessment process. Key built form features include:

- The location of taller building height at the corners of the site to frame the edges, and provide greater building separation between towers
- The siting of lower scaled building to sit between the two towers to maximise solar amenity to the new central open space and the neighbouring residential properties to the south.
- Ensure appropriate building height transition and use along the south boundary to have a more sensitive interface with the neighbouring residential properties.

5.3.1 Building Mass

From the outset, the proposal has been designed to mitigate external impact, respond to the strategic merits of the site and maximise the public benefit, including the consolidated central 2,700sqm + open space within built form layout. The siting of the podiums are intended to wrap the open space protecting it from Parramatta Road. Two towers are oriented north-south with large separation to increase solar access to the publicly accessible open space and minimise overshadowing to the southern neighbours.

The indicative massing seeks for a range of 4-22 storey building heights, with location of taller building heights (22/14 storeys and 16 storeys) at the corners of the site to frame the edges, and provide greater building separation between towers. The siting of lower scaled building (4 storey) is to sit between the two towers to maximise solar amenity to the new central open space and the neighbouring residential properties to the south, as well as provide an acoustic shield to the new town square.

The proposal employs a number of massing and articulation strategies which seek to visually break down the bulk and sale of the buildings allowing for a slenderer appearance, refined in response to commentary of Council in the scope report process. The strategies are as follows:

- **Floating Tower**: Floating towers are used to reinforce the lower street datum, responding to the surrounding sites, recessing the first storey of the tower breaks down the massing into the podium and tower components. Division between tower and podium elements has been integrated through setback level and changes in façade detailing.
- **Breaking down tower composition:** The tower composition has been broken down into discrete elements assisting in breaking down the visual bulk of tower. Varying heights, physically separating and varying facade detailing and materials between these elements can further enhance this effect.
- **Bring tower element to the ground:** Through extending the tower element to the ground, the slenderer portion of the tower can be emphasised. This can be achieved through reducing podium/tower setbacks and the continuation of facade detailing and materials
- **Variation in depth:** The building mass has been articulated through shifting elements with additional setbacks breaking down the perceived bulk and scale of the buildings while maintaining contiguous floorplates.

Uses	GFA (m²)
Retail	3,362
Showroom	719
Commercial	1,197
Community Facilities	97
Residential	17,365
Hotel	12,841
Total	35,581

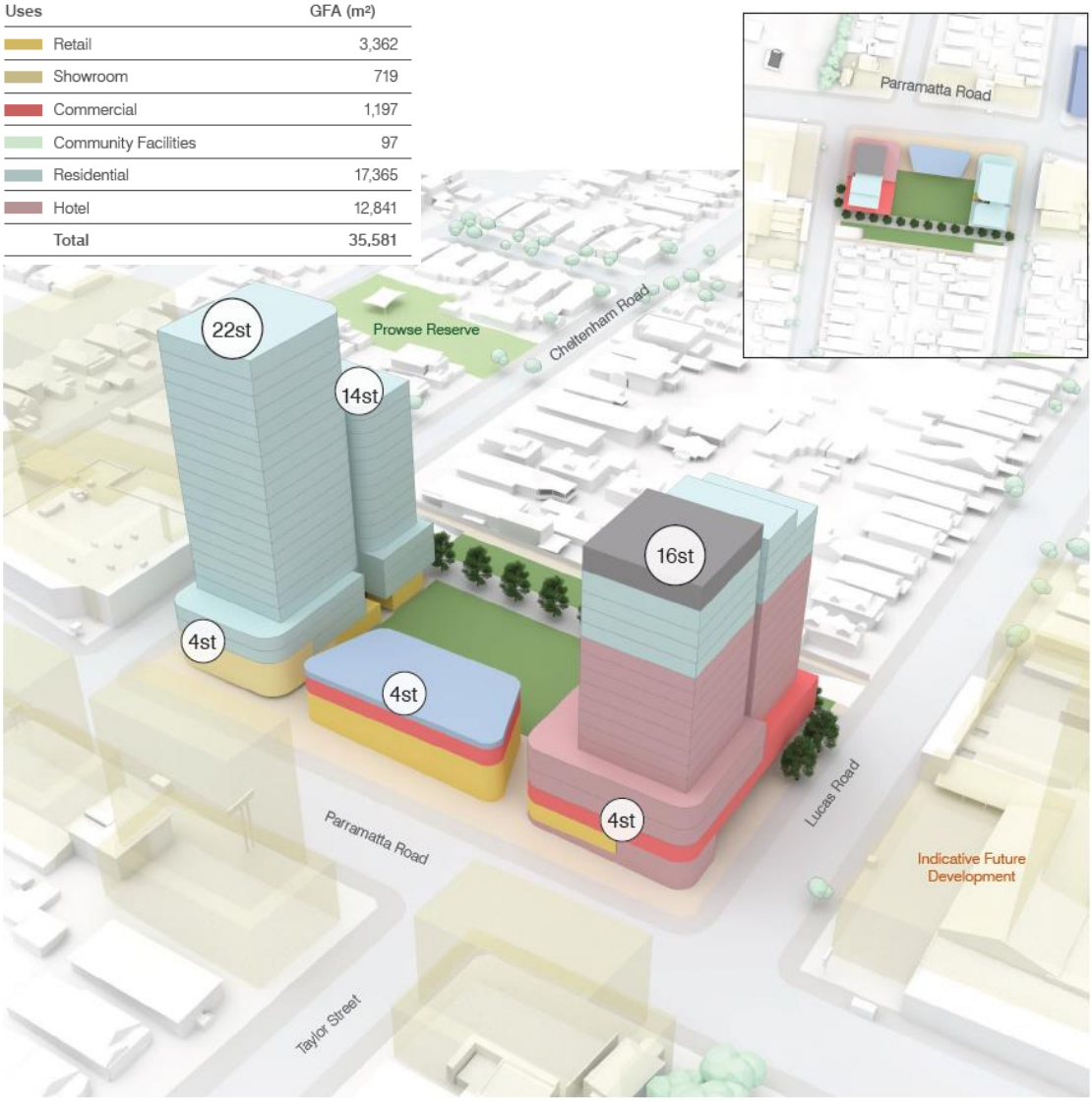


Figure 20 Proposed Building Massing
Source: Architectus

5.4 Landscape and Public Domain

The proposed Landscape Vision for the site as show in **Figure 21** and discussed below seeks to create:

- A vibrant and green mixed-use precinct which draws upon and celebrates the environs and diverse history of the local area
- A landscape that enriches the cultural fabric and emerging future character of Croydon.
- A landscape that is immersive and engaging of its natural surroundings. Connecting people to place and encouraging community wellness; rest, play, exchange, lifestyle and work.

The composition of landscaping on the site is central to the design, and includes areas internal and external to the site, minimising the development footprint and maximising potential for movement, activation and space.

5.4.1 Open Space

The central open space has an area of approximately 2,700+sqm. As set out in the Landscape Concept Report prepared by Acadia (**Appendix B**), the following components of landscaping will be dispersed across the site, with these zones created provided for within the Structure Plan and future DCP.

Community Forecourt
The plaza is a space of flexible use for restaurant alfresco, events and other congregations. This provides potential to bring people into the site through creating a landmark point. The circulation strategy prioritises fluid pedestrian movement, with the community plaza operating as central nodal point for the ground floor pedestrian connections.

Waterplay and Social Terraces
Beyond a playground itself, there is the intention to establish a public space for meeting and communication among the users. Additionally younger generations can rejoice at the variety of play opportunities integrated through the site. Paying attention to details and the overall scale, it has to be comfortable for the smaller children. As for the landscape solutions, preference to natural materials and natural relief with higher play value should be at the forefront.

Village Lawn
The village lawn is a central hub of the open space. Its flexibility and openness allow a variety of social activities and events. It provides opportunities for outdoor cinema, markets as well as daily congregation for the families, workers, dog walkers and other general users.

Eat Street
Retail frontages and alfresco dining within the site will attract a diverse group of users and bring revenue to the precinct. Elements of public art, lighting and way finding will facilitate a cosy, comfortable character - with similarities to other iconic Sydney laneways such as Steam Mill Lane and Kensington Street.

The Shareway
Adjacent to plaza space, on its southern edge, will be a shared street prioritising the movement of people with infiltration points into the laneways of the site. A vegetated setback with integrated seating will facilitate areas of rest. The shared way would allow for emergency service access and limited loading and public parking spaces at grade whilst maximising usable public space.

The Commons
The Commons is an extension of the central green space. Complementary to the expansive landscaped zones of the Village Green and the Social Terrace, the Commons offers a mix of smaller, intimate spaces for residents and visitors to dwell in. Set in close proximity to food and beverage offerings, perch on the seated edge with a coffee and watch people passing by. A series of turfed and paved areas gently terraces to follow the natural level change across the site, however, remains accessible to everyone; offering a multitude of places for people to come to and stay.

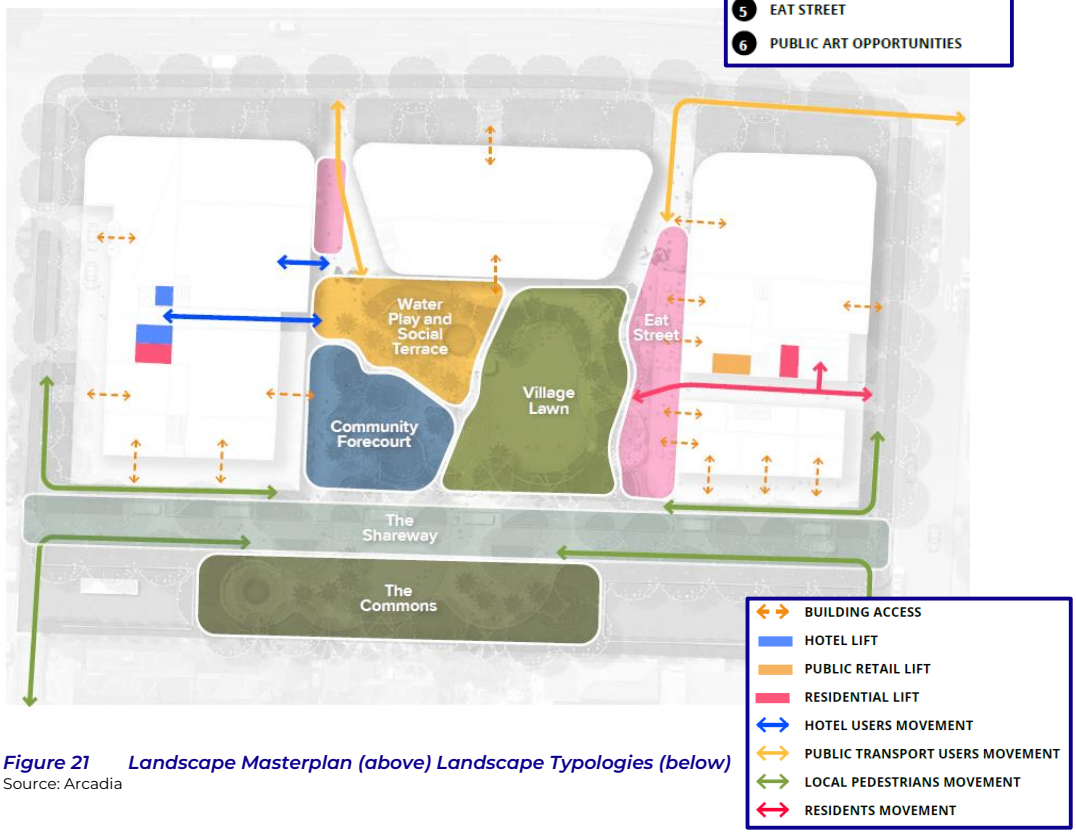


Figure 21 Landscape Masterplan (above) Landscape Typologies (below)
Source: Arcadia

Central Open Space - Village Lawn, Community Forecourt and Waterplay/Social

KEY

1. ALFRESCO
2. WATER PLAY
3. RAISED PLANTER BED
4. FEATURE PLAM TREES
5. PLAY EQUIPMENT
6. CENTRAL LAWN
7. PUBLIC ART OPPORTUNITIES

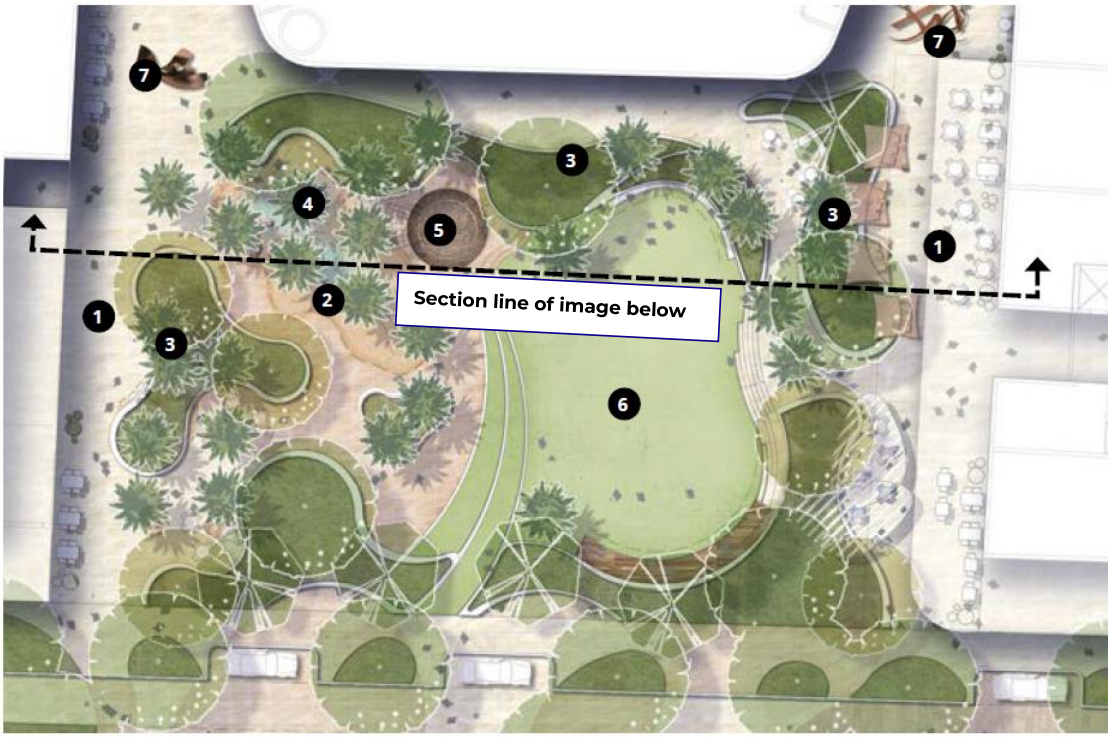
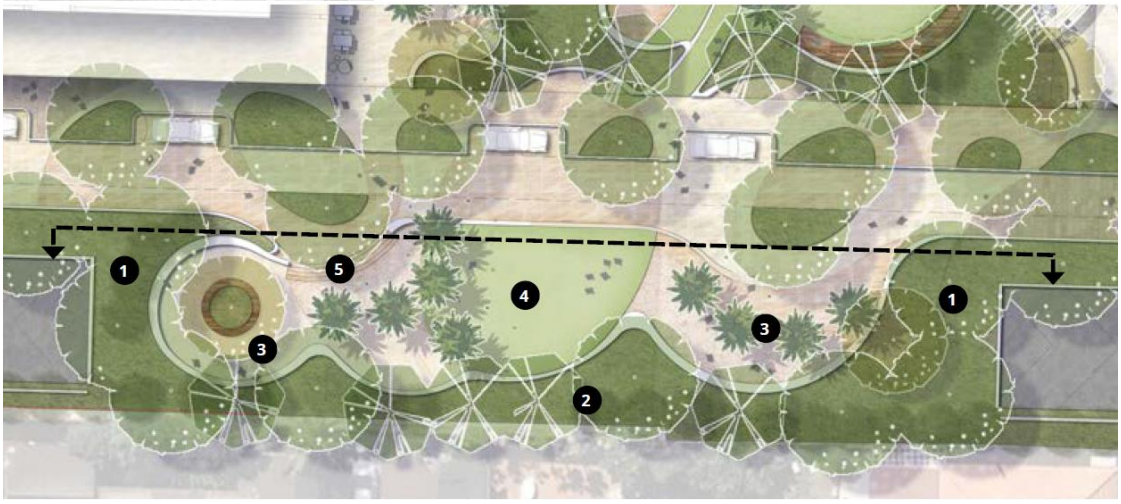


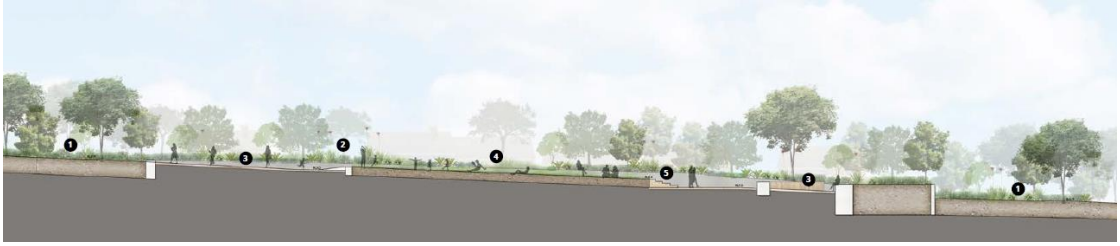
Figure 22 Section through Central open space
Source: Arcadia

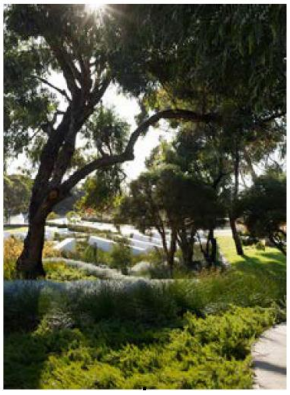
The Commons

KEY

1. BUFFER PLANTING TO DRIVEWAY
2. BUFFER PLANTING TO EXISTING NEIGHBOURING PROPERTIES
3. PAVED AREA WITH SEATING EDGE. FLEXIBLE GROUND PLANE.
4. LEVEL KICKABOUT LAWN COMPLEMENTARY TO VILLAGE LAWN
5. STEPS TO SHARED LANE







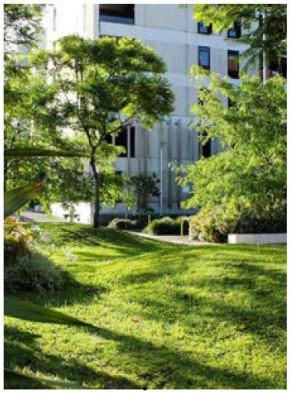


Figure 23 The Commons (publicly accessible open space to the south of the site)
Source: Arcadia

Public Domain

The public domain of more than 2,700sqm is proposed. The frontages to the open space will be activated through integration of retail and food and beverage offerings on the ground floor including entry to supermarket. Pedestrian laneways with fine grain retail provides pedestrian routes away from Parramatta Road. Additionally, it is proposed a new shared laneway for pedestrian, cyclist, and car connections and provides a through site link and permeability to the site.

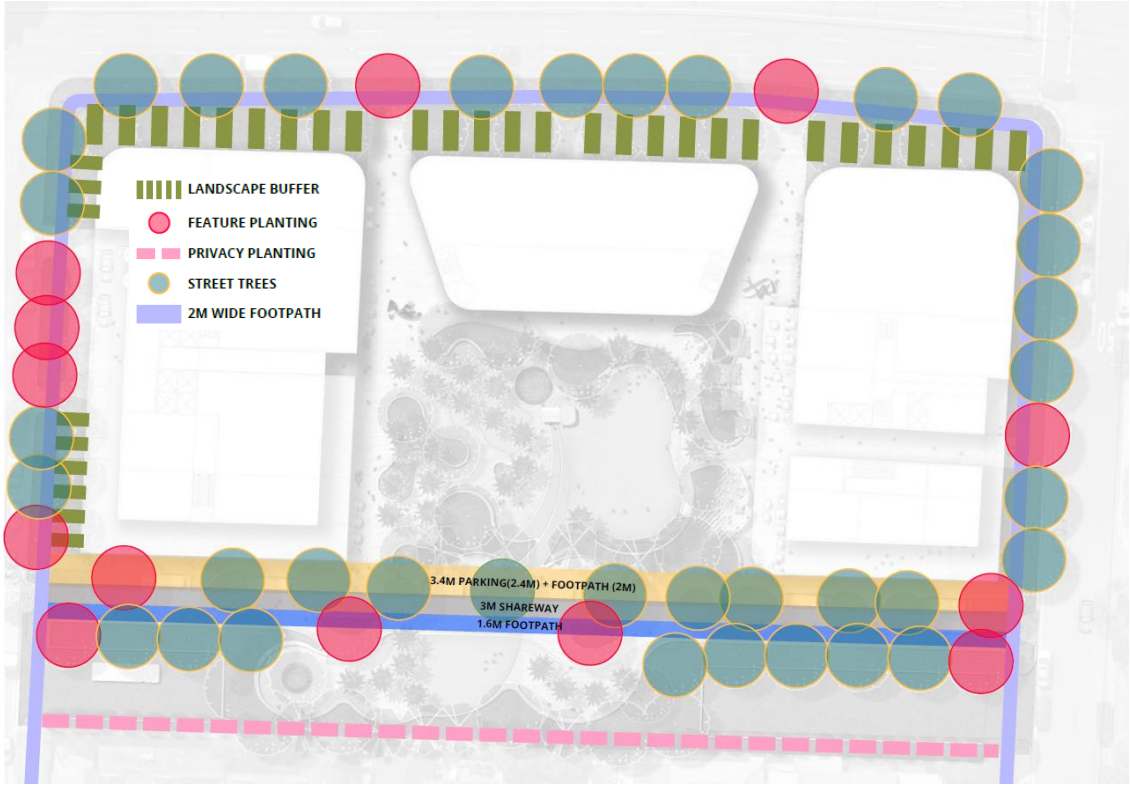


Figure 24 Public Domain Plan
Source: Arcadia

5.5 Public Art

The proposal has been formulated with recognition and consideration of the NSW Government Architects Draft Connecting with Country Framework, a framework for understanding the value of Aboriginal knowledge in the design and planning of places.

As part of this process, and discussions with the Architects, proponent, and landscape Architects, a Public Art Strategy has been development by FCAD (**Appendix C**). The strategy outlines the context and principles that underpin the delivery of interpretative public art and offers a framework to ensure it authentically contributes to reflecting and celebrating the rich stories of the site, the surrounding area and its people.

Strategy sets out a detailed and action-oriented approach for planning, implementing, and delivering high-quality interpretative public art throughout the site, recognising the early stages as a Planning Proposal. The following countries or type of interpretive public art opportunities are identified within the Plan.

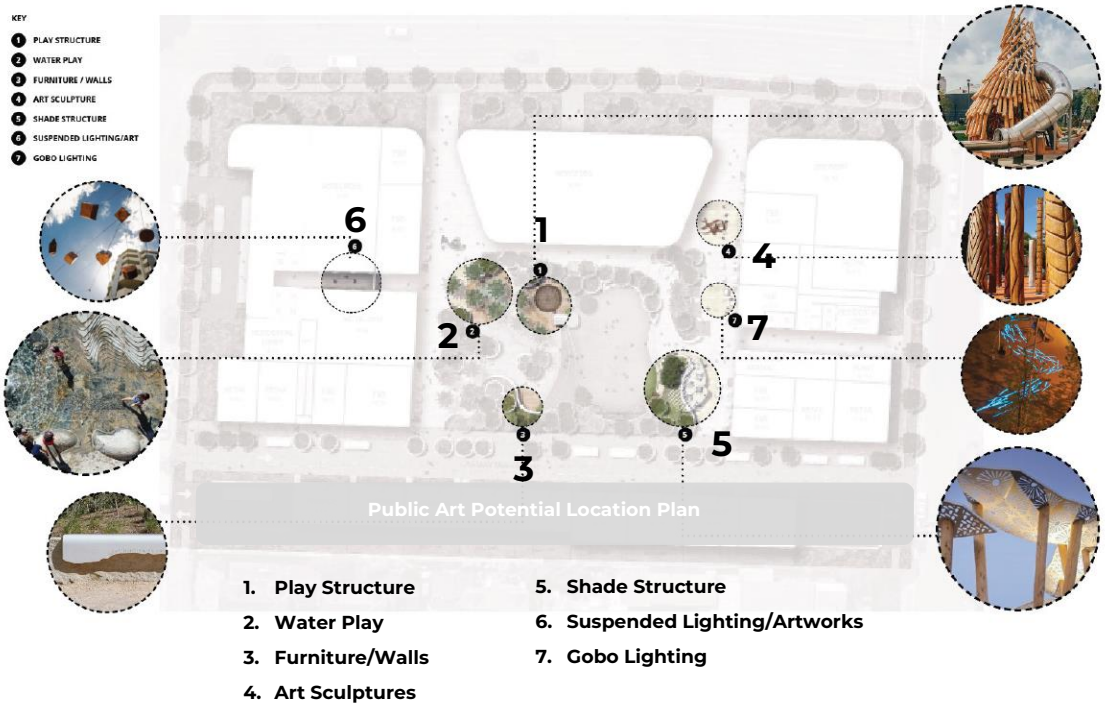
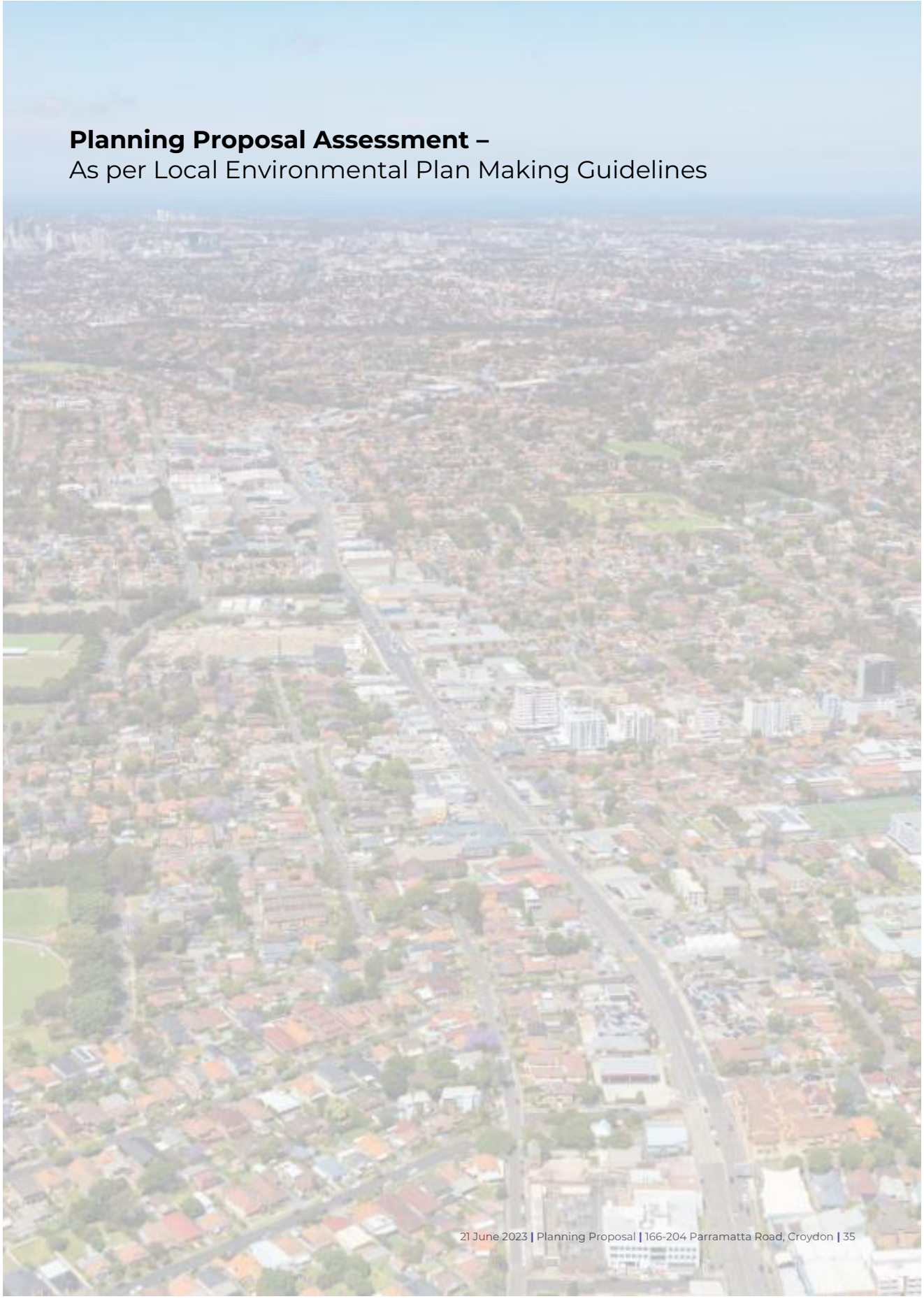


Figure 25 Public Art Opportunities
Source: FCAD

A selection process for future public art is also incorporated within the Public Art Plan, based on the following criteria

- Ability to compliment and enhance the existing proposed Aboriginal and non-Aboriginal interpretation within the landscape, as well as the proposed architectural design
- Relevance and appropriateness of the work to the context of its site
- Demonstrates through the artwork a grounded understanding of the site's significant cultural heritage layering over time
- Standards of excellence and innovation
- Integrity of the work
- The way in which people will experience, interpret and interact with the proposed artwork
- Consistency with current planning, heritage and environmental policies and Plans of Management
- Consideration of public safety and the public's access to and use of the public domain
- Consideration of maintenance and durability requirements



Planning Proposal Assessment –
As per Local Environmental Plan Making Guidelines

6.0 Part 1 - Objectives and Intended Outcomes

As required by the Local Environmental Plan Making Guidelines, this section provides a clear and concise description of the Planning Proposal, written in plain English. The objectives and intended outcomes, along with the amendments to Burwood LEP 2012 provide the basis of the request sought as part of this Planning Proposal. The proposed amendments to the planning controls, as drafted, allow for the intent and key commitments and themes to be secured, whilst providing flexibility in its delivery, as well as ensuring design excellence.

6.1 Vision

As set out in the Design Report (**Appendix A**), the vision is for the site as a mixed-use development that places greenery at its heart, combining all the elements that make a world-class Sydney neighbourhood within a single precinct.

Responding to the needs of current and future residents, the site will provide neighbourhood retail, great public spaces, short term accommodation, community facilities and much-needed diversity of housing.

6.2 Key Objectives

The objective of the Planning Proposal is to amend the Burwood LEP 2012 to provide for the urban renewal of the subject site at 166-204 Parramatta Road, Croydon (including 1-1A Cheltenham Avenue, Croydon) to accommodate a future mixed-use development and introduce specific additional 'Local Provisions' in Part 6 of Burwood LEP 2012 which established key urban design and community infrastructure required to be delivered in order to realise additional development potential. The proposal also includes a requirement to ensure design excellence for any development that seeks to take up the proposed controls, alongside other amendments set out in Part 2.

6.3 Intended Outcomes

- Contribute to the site's role within the evolving strategic centre by providing a diversity of much needed housing, employment, short term accommodation and services in a mixed-use development
- To facilitate delivery of public domain improvement and community infrastructure, including active street frontages, pedestrian linkages and improved connectivity to Burwood North Metro Station
- To permit a mixed-use development with an appropriate balance of commercial/retail, hotel, residential and community uses to contribute to the social connectivity of Burwood and Croydon.
- Contribute to the rejuvenation of Parramatta Road, responding to the changing context of the area, transport infrastructure and opportunities to provide required housing, employment and open space.

7.0 Part 2 - Explanation of Provisions

This section sets out how the objectives and outcomes will be achieved, and the mechanisms required to be amended/included in the Burwood LEP 2012 (and DCP 2012) to facilitate these, providing certainty to Council, the community and landowner of outcomes for future development.

7.1 Proposed Amendments to Burwood LEP 2012

The following amendments to the Burwood LEP 2012 are sought under this Planning Proposal:

Table 2 Summary of Proposed Amendments to the Burwood LEP 2012

Control	Existing	Proposed
Part 2 – Permitted or Prohibited Development		
Clause 2.1: Land Use Zone	B6 Productivity Support R3 Medium Density Residential	MU1 Mixed Use
Part 4 Permissible Development Standards		
Clause 4.3: Building Height	15m 12.5m	Alternate Height of Building Map + Local Provisions of 11m (rear boundary) and 64m (west tower) and maximum 72.5m (east tower). Built form and DCP provisions are also recommended in a new site-specific clause
Clause 4.4: Floor Space Ratio	1.75:1 1.5:1	Alternate Height of Building Map + Local Provisions Up to a maximum of 3.4:1 or 35,581m² GFA.
Part 6 - Additional Local Provisions		
Clause 6.5: Design Excellence in Zones (B4) E1 and MU1	N/A	Clause to apply to the site with the proposed change to MU1 Mixed Use Zone
Clause 6.7: Development on land at 1–1A Cheltenham Road, Croydon	Development on land at 1–1A Cheltenham Road, Croydon to consider vehicle movement	Remove clause and include in new site-specific clause for 166-204 Parramatta Road.
***New Clause:* 166-204 Parramatta Road, Croydon**	N/A	Site Specific Clause – See below for further detail – this will include alternate Height of Buildings Map and Alternative Floor Space Ratio Map, as well as identifying key "community infrastructure" required to be demonstrated in any development which seeks to take up the alternate controls.
***New Clause:* Key Site Map**	N/A	Identify site on a new Key Site Map that relates to the site - specific clauses and requirements for a design excellence and Community Infrastructure Provisions
***New Clause:* Arrangements for designated State public infrastructure**	N/A	clause to require satisfactory arrangements to be made for the provision of designated State public infrastructure before the development of land wholly or partly for residential purposes to satisfy needs that arise from development on the land – to be identified on a Key Site Map
Schedule 1 – Additional Permitted Uses		
Clause 3 - Use of certain land at 1–1A Cheltenham Road, Croydon	Allows for additional permitted uses	Recommend this is removed provided the uses specified are permissible with consent in the E3 zone.

7.2 Alternate Height of Building and Floor Space Approach

The proposal seeks to include an Alternate Height of Buildings Map and Alternate Floor Space Ratio Map to coincide with the existing Height and FSR maps. This methodology has been applied in other LGAs across NSW, and endorsed by the DPE and Parliamentary Counsel. The approach ensures that any potential increases in density must coincide with a clear delivery of community infrastructure – tying this growth to outcomes.

The alternate maps are identity building heights and FSR beyond the current controls (15m and 1.75:1) that would be permissible if community infrastructure, which is identified as part of the Design Report (**Appendix A**) and defined in the proposed LEP clause, is delivered. It is proposed that this community infrastructure is in the form of the following, which would be incorporated into the Burwood DCP 2012:

- Location and size of publicly accessible open space
- Location and width of through site links
- Space and size for a future community use (of which details would be confirmed)
- Size of street frontage setbacks to Parramatta Road, Lucas Road, and Cheltenham Road
- Location and number of vehicle access points
- Embellishments of the public domain
- Provision of public art

7.3 Proposed Clauses

Recommended New Clause: *166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon*

The following clause (or similar) is proposed to facilitate the proposed amendments to Burwood LEP 2012, which will coincide with maps to be created including a Key Site Map, Alternative Height of Building Map and Alternative Floor Space Ratio Map

(1) The objective of this clause is to provide for additional building height and floor space for development on certain land for the purposes of commercial premises, hotel or motel accommodation, residential uses, entertainment facilities and the provision of publicly accessible open space.

(2) This clause applies to 166-204 Parramatta Road, Croydon (including 1-1A Cheltenham Road, Corydon) and as identified on the Key Site Map.

*(3) A building on land to which this clause applies may exceed the maximum height shown for the land on the Height of Buildings Map—provided the height of the building does not exceed the height shown for the land on the **Alternate Height of Buildings Map.***

(4) *A building on land to which this clause applies may exceed the maximum floor space ratio shown for the land on the Floor Space Ratio Map—provided floor space ratio of the building does not exceed the floor space ratio shown for the land on the **Alternate Floor Space Ratio Map**.*

(5) Subclauses (3) and (4) do not apply unless the consent authority is satisfied—
- *a. the development provides, or will provide, **community infrastructure***
- *b. the development includes an area of publicly accessible open space of at least 2,700sqm (final area to be confirmed with Council)*
- *c. the development includes a mix of uses*
- *d. provision of affordable housing (either in kind or monetary contribution)*
- *e. if the development is BASIX affected development—the building is capable of meeting the BASIX commitments (commitment to be confirmed with Council)*

(6) Development consent must not be granted for development on land to which this clause applies unless a development control plan that provides for the matters specified in subclause (7) has been prepared for the land.

(7) The development control plan must provide for all of the following—
- *a. Podium height and build form to the site edges, including*
- *b. pedestrian and cycle connections between Cheltenham Road and Lucas Road, including the layout of those connections,*
- *c. public open space, such as public plazas at street level,*
- *d. improvements to the public domain, including street paving, street lighting, street furniture and public art,*
- *e. landscaping and landscape setbacks to street frontages*
- *f. location of vehicle entries to the site at grand and into any basement*
- *g. stormwater drainage.*

(8) Development consent must not be granted to development to which this clause applies unless, in the opinion of the consent authority, the proposed development exhibits design excellence.

(9) Development consent must not be granted to the following development to which this clause applies unless a competitive design process has been held in relation to the proposed development—
- *a. development in respect of a building that has, or will have, a height above ground level (existing) greater than25 metres; or*
- *b. development for which the applicant has chosen such a process.*

(10) A building demonstrating design excellence is eligible for an amount of additional floor space, to be determined by the consent authority, of up to 10% of the amount permitted as a result of the floor space ratio shown for the land on—
- *a. The **Alternate Floor Space Ratio Map**; or*
- *b. otherwise—the Floor Space Ratio Map*

(11) In this clause—
***community infrastructure** means development for the purpose of recreation areas, recreation facilities (indoor), recreation facilities (outdoor), public roads (including landscape setbacks), drainage or flood mitigation works.*

***Recommended New Clause:** Arrangements for designated State public infrastructure*

It is proposed to include a 'satisfactory arrangement' clause in relation to relevant state and regional infrastructure to allow for coordination with any precinct wide considerations as part of the Burwood North precinct and Burwood North Metro Station. This would allow the planning proposal to progress whilst ensuring that any necessary arrangements for the provision of infrastructure through the Planning Proposal. This is particularly relevant given the changing nature of development contributions and the introduction of the Sydney Metro West Burwood North Station.

(1) The objective of this clause is to require satisfactory arrangements to be made for the provision of designated State public infrastructure before the development of land wholly or partly for residential purposes to satisfy needs that arise from development on the land, but only if the land is developed intensively for urban purposes.

*(2) Despite all other provisions of this Plan, development consent must not be granted for development for the purposes of residential accommodation (whether as part of a mixed use development or otherwise) on a site identified on the **Key Sites Map** that results in an increase in the number of dwellings in that area, unless the Secretary has certified in writing to the consent authority that satisfactory arrangements have been made to contribute to the provision of designated State public infrastructure in relation to the land on which the development is to be carried out.*

(3) This clause does not apply to a development application to carry out development on land on the Key Site Map if all or any part of the land to which the application applies is a special contributions area (as defined by section 7.1 of the Act).

(4) In this clause
designated State public infrastructure means public facilities or services that are provided or financed by the State (or if provided or financed by the private sector, to the extent of any financial or in-kind contribution by the State) of the following kinds—
- *a. State and regional roads,*
- *b. bus interchanges and bus lanes,*
- *c. land required for regional open space,*
- *d. social infrastructure and facilities (such as schools, hospitals, emergency services and justice purposes).*

7.4 Proposed Amendments to Burwood Development Control Plan 2012

A site-specific Development Control Plan for the precinct is proposed to be endorsed by Council following gazettal of the Planning Proposal. As noted above, it is anticipated that the site specific DCP will provide the guiding development controls regarding built form and articulation with the alternate height of building and alternate FSR controls. The suggested Additional Local Provision clause of the Burwood LEP 2012 that requires a DCP to be prepared specifically for the site will also ensure that no development can occur until this DCP (adopted by Council) is in place.

A Draft DCP for the site has been prepared and is provided at **Appendix M** attached. As proposed in the site specific LEP provisions. the following items are considered appropriate for inclusion in a site-specific chapter of the Burwood DCP 2012.

- street wall heights
- setbacks above street wall heights;
- built form dimensions and separation distances between buildings;
- height of buildings
- façade composition and articulation
- publicly accessible open space, such as public plazas at street level; and
- improvements to the public domain, including street paving, street lighting, street furniture and public art
- promoting movement, legibility and wayfinding through the site;
- ensuring safety and security, activation and casual surveillance;
- amenity of the publicly accessible open space including solar access;
- active frontages
- public art
- a staging plan for future development; and
- consideration of environmental impacts such as overshadowing, solar access and visual and acoustic privacy.

It is considered appropriate that the draft DCP be updated (as/if required) following the review of the proposal by the Burwood Design Review Panel, but prior to any public exhibition.

7.4.1 Proposed Structure Plan

A proposed structure plan for the site has been prepared by Architectus and included in the Design Report (**Appendix A**). The components are set out in **Table 3** and shown in **Figure 26** and **27**.

Table 3 Summary of Proposed Structure Plan

Feature	Detail
Structure Plan – Key Features	
Access & Movement:	▪ Locate vehicular access off Parramatta Road and provide a combined basement entry. ▪ Create internal laneways that prioritise pedestrian movement, provides access to the open space, east-west connectivity and encourage activity on both sides.
Open Space	▪ Provide a green landscaped setback along the street frontages to enhance the streetscape and street address. ▪ Provide a centralised public open space that is protected from Parramatta Road for community use with active frontages. ▪ Create a large open space of 2,700m²+ with soft landscape, shade and water play to encourage activation.
Built Form	▪ Locate taller building height at the corners of the site to frame the edges, and provide greater building separation between towers ▪ Allow for a lower scaled building to sit between the two towers to maximise solar amenity to the new central open space and the neighbouring residential properties to the south. ▪ Transition building height and use along the south boundary to have a more sensitive interface with the neighbouring residential properties.
Tower Form	▪ Towers to be oriented north-south to minimise overshadowing. ▪ No overshadowing to Prowse Reserve for the period between 9am-3pm mid-winter. ▪ Residential floorplates to approximately 750m² GFA. Hotel floorplates to be approximately 750m² GFA. ▪ Align with standards and market typical floorplate sizes.

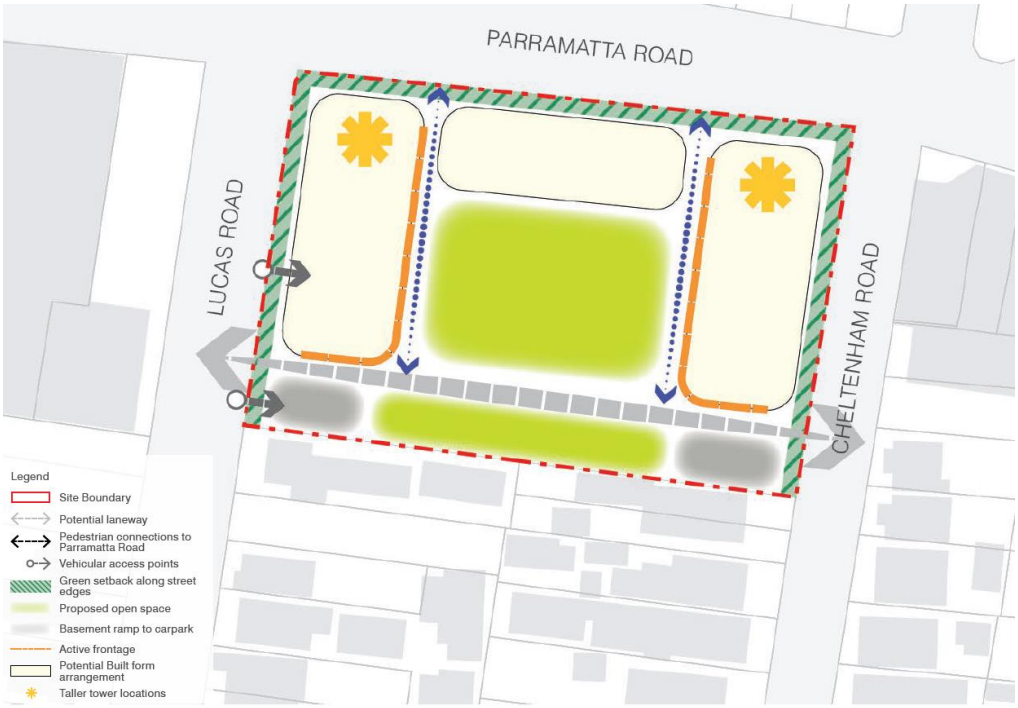


Figure 26 Structure Plan
Source/Notes: Architectus

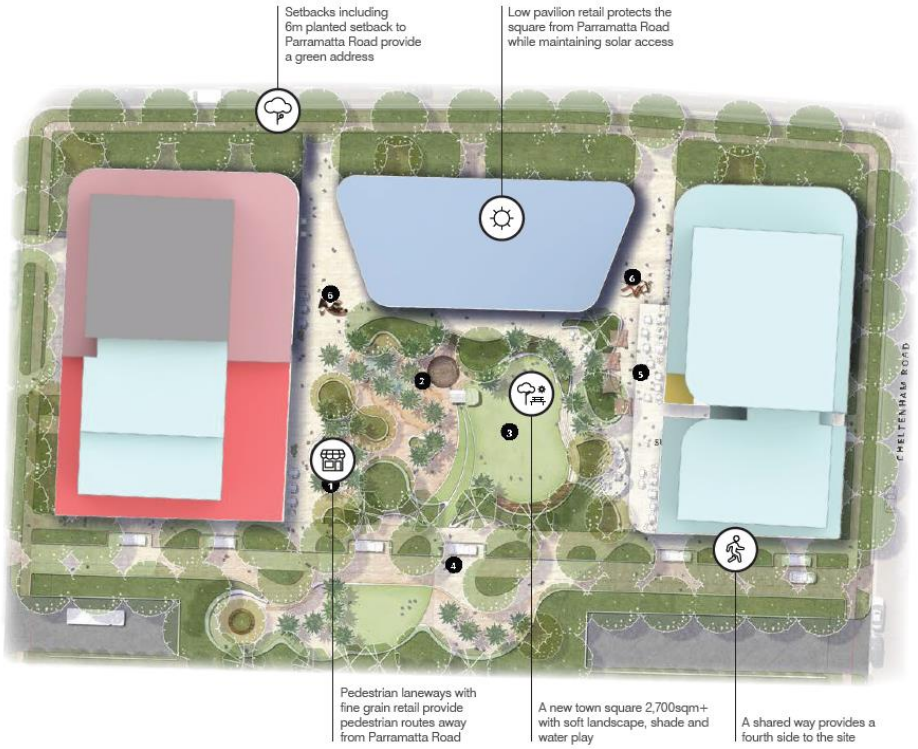


Figure 27 Proposed Layout Plan
Source/Notes: Architectus

8.0 Part 3 - Justification of Strategic and Site-Specific Merit

This section provides a detailed assessment of the proposal's strategic and site-specific merit, warranting support for the proposal. The assessment integrates findings from supporting studies and investigations and provides justification for the proposed amendments to Burwood LEP.

The assessment demonstrates that the proposal aligns with the strategic planning framework and suitably considers and response to the site-specific merits of the site. The proposal is supported by a number of technical studies and detailed investigations to consider the social, economic, environmental, amenity and infrastructure impacts in context, supporting the proposals suitability for the site.

This section is structured to respond to the questions established in the Departments of Planning and Environment's LEP Plan Making Guidelines 2021 as follows:

Part 3 – Justification of strategic and site-specific merit

Section A – Need for the Planning Proposal

1. *Is the planning proposal a result of an endorsed LSPS, strategic study or report?*
2. *Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?*

Section B – relationship to the strategic planning framework

3. *Will the planning proposal give effect to the objectives and actions of the applicable regional or district plan or strategy (including any exhibited draft plans or strategies)?*
4. *Is the planning proposal consistent with a council LSPS that has been endorsed by the Planning Secretary or GSC, or another endorsed local strategy or strategic plan?*

Section B – relationship to the strategic planning framework

5. *Is the planning proposal consistent with any other applicable State and regional studies or strategies?*
6. *Is the planning proposal consistent with applicable SEPPs?*
7. *Is the planning proposal consistent with applicable Ministerial Directions (section 9.1 Directions)?*

Section C – environmental, social and economic impact

8. *Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected because of the proposal?*
9. *Are there any other likely environmental effects of the planning proposal and how are they proposed to be managed?*
10. *Has the planning proposal adequately addressed any social and economic effects?*

Section D – Infrastructure (Local, State and Commonwealth)

11. *Is there adequate public infrastructure for the planning proposal?*

Section E – State and Commonwealth Interests

12. *What are the views of state and federal public authorities and government agencies consulted in order to inform the Gateway determination?*

8.1 Strategic Merit

The demonstration of strategic merit can be summarised as the proposals alignment with the suite of local, regional, state (and federal) policies, specifically relating to planning, environment, land use and infrastructure.

The following policies, legislation and strategies have been considered in the preparation of the Planning Proposal, both in this section and the appendix Social and Economic Impact Assessment (**Appendix D**). The align of the proposal to these policies which demonstrates its strategic merits and justification for support:

- *Premier's Priorities* (NSW Government, 2022)
- *State Environmental Planning Policy (SEPP) (Housing) 2021* (NSW Government, 2021)
- *NSW Housing Strategy* (NSW DPIE, 2021)
- *Greener Places* (NSW Government Architect, 2020)
- *The Greater Sydney Region Plan – A Metropolis of Three Cities* (Greater Sydney Commission, 2018)
- *Sydney 24-hour Economy Strategy* (Global NSW, 2020)
- *NSW Visitor Economy Strategy 2030* (Destination NSW, 2020)
- *The Eastern City District Plan* (Greater Sydney Commission, 2018)
- *Burwood Local Strategic Planning Statement* (Burwood Council, 2020)
- *Burwood Community Facilities and Open Space Strategy* (Cred for Burwood Council, 2019)
- *Burwood2036 Community Strategic Plan* (Burwood Council, 2022)
- *Burwood Cultural Plan* (Burwood Council, 2015)
- *Parramatta Road Corridor Urban Transformation Strategy* (NSW Government, 2016)
- *Parramatta Road Corridor Urban Transformation Urban Amenity Improvement Plan* (NSW Government, 2016)

8.1.1 Section A – Need for the Planning Proposal

Q1: Is the planning proposal a result of an endorsed LSPS, strategic study or report?

The site at 166- 204 Parramatta Road is a unique opportunity as one of the largest sites in this area, to become a catalyst project in response to game changing rapid transport infrastructure of the Sydney Metro West. The Burwood-North Metro Station will be one of the most well-connected stations in all of Sydney, arguably at the centre of the line to both the Sydney CBD and Parramatta, Sydney's second CBD

The Planning Proposal is responsive to the changing nature of the precinct and is responsive to the infrastructure delivery of Sydney Metro West. The Planning Proposal is required, in order to enable development into the future, that is commensurate to this infrastructure and go beyond the previous setting of the BLEP 2012 or PRCUTS, now some 7 years old.

The Planning Proposal seeks to set the standard of future development through generous public domain offerings and community benefits, whilst providing commensurate land uses, and density appropriate for this context.
The planning proposal is consequential to, and consistent with, the State Government's Parramatta Road Corridor Urban Transformation Strategy (PRCUTS), which is approved by the Secretary of the Department of Planning, Industry and Environment. The Masterplans are consistent with PRCUTS, with some minor variations where recommended by the studies and to ensure best urban design and community outcomes.

As se out in **Section 8.1**, the Planning Proposal is consequential to, and consistent with the principles of the State Government's Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) (albeit revising the built form and density). The future development of the site presents a significant opportunity to deliver on the strategic objectives and priorities of the community, Council and State Government. The proposal gives effect to the underlying aims of the LSPS and supporting Council strategies such as housing and affordable housing (being developed by Council as part of the North Burwood investigations).

The Planning Proposal will also provide for the delivery of well-located and high amenity housing, along with tourist and visitor accommodation, employment, retail and community floor space. As discussed throughout Section 6, this compliments the strategic planning framework for Burwood LGA, including the Burwood Housing Strategy and provides the opportunity to realise positive social and economic impacts.

Finally, the mechanism of a Planning Proposal allows for the outcomes, and commitments to be secured through mechanisms that provide clarity to community, Council and stakeholders through site specific provisions and infrastructure commitments, ensuring the vision can be delivered into the future.

Q2: Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

The planning proposal is the only means to achieve the intended outcome, as the proposal is seeking to make changes to the Burwood Council Local Environmental Plan 2011.

8.1.2 Section B – Relationship to the strategic planning framework

Q3 Does the proposal have Strategic Merit? -will the planning proposal give effect to the objectives and actions of the applicable regional or district plan or strategy (including any exhibited draft plans or strategies)?

Greater Sydney Regional Plan

The Planning Proposal will give effect to the goals and directions of *The Greater Sydney Region Plan – A Metropolis of Three Cities*. The Plan sets out key directions that collectively form a framework for liveability, productivity and sustainability that underpins the growth of Sydney. Key themes and directions applicable to the proposal include:

- Accelerating housing supply across Sydney.
- Improving housing choice to suit different needs and lifestyles.
- Integration of land use and transport planning to foster a '30-minute city'.
- Creating healthy built environment and encouraging the adaption to the impacts of urban and natural hazards and climate change.
- Protecting the natural environment and biodiversity.
- The site is located within the Eastern City District, in which an additional 157,500 dwellings are required to 2036.

The proposed amendments to the BLEP 2012 will support and facilitate the direction of the Greater Sydney Region Plan by:

- Respond to the low demand to maintain industrial and business operations on site. The proposed suite of population serving retail and employment uses integrated with high density housing represents an appropriate use of the site given its location within Burwood North and its proximity to high frequency public transport.
- Build on the site's location by providing housing proximate or well connected to important employment centres including Burwood, the CBD and Parramatta.
- Respond to the critical need for additional dwellings to be provided within the Eastern City District by 2036.
- Provide for housing diversity and affordability through a mix of suitable apartment sizes and configurations that is compatible with the surrounding built form typology close to Burwood North Metro Station.
- Provide for high quality housing and amenities within walking distance of nearby services and public transport.
- Facilitate a responsive and sympathetic development that respects and steps down towards the natural environment and existing development of the surrounding area.
- Optimising the delivery of housing, well located to transport unrestricted without significant impacts on the environment.
- Increasing the diversity of dwelling types to support the population's changing needs.
- Enhancing community wellbeing on an existing site, in an accessible location that is proximate to high-frequency public transport options.
- Building on the site's location near Burwood CBD, Burwood North, Kings Bay and surrounding local services, amenities, and recreation facilities.
- Enabling the delivery of an enhanced open space and retail offering at the site, which will provide for a healthy, resilient, and socially connected community.

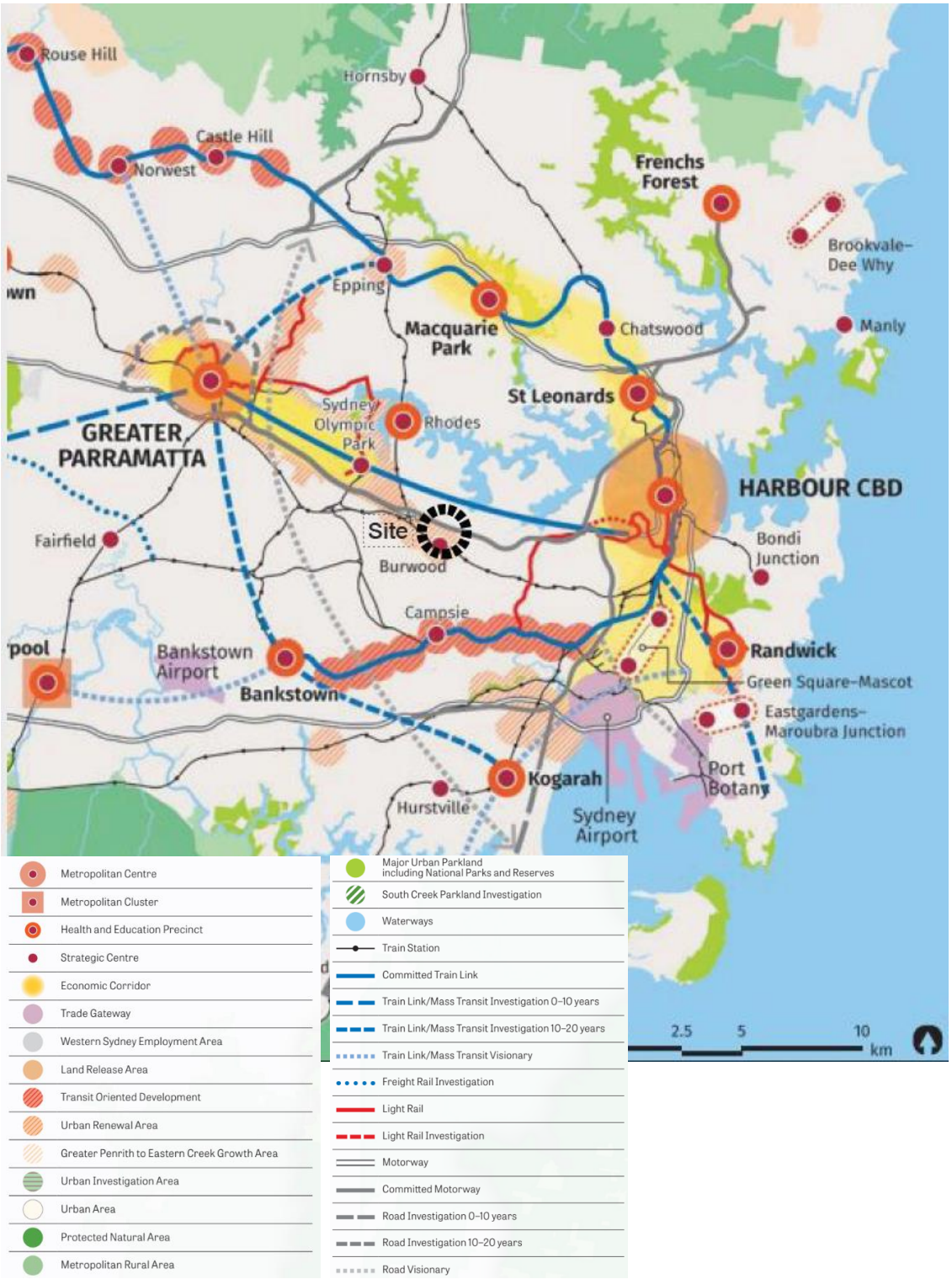


Figure 28 Greater Sydney Region Plan
Source/Notes: Greater Cities Commission

The proposal is consistent with the following directions under the Plan, which govern growth and development in Sydney (refer to **Table 4**).

Table 4 Consistency with GSRP directions

Direction	Consistency of the proposal with the Direction
A city supported by infrastructure	• The proposal supports the delivery of higher capacity development in line with existing heavy rail infrastructure and investment being undertaken in the area by local and State government (most notably Sydney Metro West).
A city for the people	• The proposal supports people to walk, cycle and use public transport through improved pedestrian connections, new and upgraded cycling links and urban renewal providing housing and retail proximate to public transport.
Housing the city	• The site is strategically positioned to accommodate expanded residential uses within an existing urban renewal area, increasing supply within close proximity to public transport infrastructure, and incorporating the provision of open space. • Provision of a suitable residential and hotel offering above the retail, community and public domain will create a level of activation which will support the success of the neighbourhood centre. • Further, redevelopment of the site to increase housing supply presents the opportunity to improve housing diversity, with the indicative scheme providing a range of apartment sizes and typologies, including walk-up townhouse style apartments. The proposal will also provide for additional contributions towards affordable housing supply.
A city of great places	• The proposal will transform a large, vacant and impermeable block into new high-quality streetscapes and new public domain and open space. Subject to timing, it would set a benchmark of high-quality urban design, provision of infrastructures and suitable uses to the transformation for the remainder of the Parramatta Road Corridor, including Burwood North.
A well-connected city	• The proposal will seek to deliver additional housing supply and population serving jobs in close proximity to rapid transit, existing services and open space. This will take advantage of existing public transport and nearby future transport infrastructure and support the achievement of a '30-minute city'.
A city in its landscape	• The proposal does not affect any protected biodiversity or remnant or significant vegetation. Opportunities for increased public domain planting will be explored.
An efficient city	• The proposal will require high standards of efficiency, and has considered the maximisation of efficiency in the urban design form and layout. • By optimising utilisation of proximate public transport, alongside investment in new active transport infrastructure, the development will minimise unnecessary personal vehicle emissions.
A resilient city	• The proposal has sought to minimise exposure to natural hazards by delivering a suitable development on land that is not impacted or constrained by flooding, thus reducing pressure on Council and the state government to deliver necessary supply on affected properties. • The design and ESD initiatives implemented through the development will contribute to enhanced environmental outcomes and seek to mitigate impacts related to climate change.

Table 5 Consistency with key GSRP objectives

Objective	Consistency of the proposal with the Direction
Objective 10 – Greater housing supply	• The proposal meets the objective by providing new homes in a suitable location.
Objective 11 – Housing is more diverse and affordable	• Affordable housing (minimum 5%) • Housing choice – emphasis on townhouse style apartments as well as apartment mix in Burwood/Croydon vs median house price
Objective 30 – Urban tree canopy cover is increased	• The proposal is seeking to provide more than 2,700m+ of open space, providing the potential for substantial planting and canopy cover across the site. In addition to this, substantial setbacks to all street frontages that have the capacity to support canopy cover, are proposed.
Objective 36 – People and places adapt to climate change and future shocks and stresses	• Support initiatives that respond to the impacts of climate change.

Eastern City District Plan

The Eastern City District Plan underpins the Greater Sydney Region Plan - Metropolis of Three Cities. As demonstrated below, the Planning Proposal will give effect to strategic objectives of the Eastern City District Plan.

The District Plan is the sub-regional strategic planning layer that translates the outcomes and actions of the Region Plan into the six districts that make up the Greater Sydney Region. Site is located in the Burwood LGA, within the Eastern Harbour City. The District Plan establishes a number of planning priorities and actions to manage growth to support the vision for Greater Sydney.

In particular, the District Plan aims to improve both productivity and liveability, supporting the development of well-designed housing that meets the needs of the community, the creation of vibrant public places, and increasing the supply of recreational and open space areas.
As with the Region Plan, the District Plan identifies Burwood as a strategic centre. The plan also states about Burwood (p83):

> *The centre is developed around the train station with the main retail strip anchored by Westfield and Burwood Plaza. The western rail corridor divides the centre. The Parramatta Road Corridor Urban Transformation Strategy proposes further development along Burwood Road. Capacity to meet job targets must be protected, accompanied by a diverse mix of uses and a strong night-time economy.*

The key action in the plan with regard to the strategic planning direction for Burwood is to:

> 47. Strengthen Burwood through approaches that:
> a) protect capacity for job targets and a diverse mix of uses to strengthen and reinforce the economic role of the centre
> b) consider development initiatives that encourage the development of large floorplate mixed use buildings
> c) improve connections across the centre, including permeability of the rail line
> d) expand the function and type of land uses in the centre
> e) investigate opportunities to improve and diversify night-time economy offerings
> f) promote place-making initiatives to improve the quality of public spaces.

The Greater Cities Commission (previous Greater Sydney Commission) has identified the PRCUTS area as one where Council will be required to collaborate with the Commission on the implementation of the strategy. The District Plan also acknowledges that the Strategy area is one where additional capacity for housing supply is well progressed.

The District Plan allocated 5-year housing targets for the period 2019-2021 to each LGA in the District. The housing target for Burwood is 2,600 dwellings. When set in 2018, the targets largely reflected the existing pipeline of dwellings either approved or under construction. Longer term housing targets were not provided in the plan for individual LGAs, rather the plan set 20 year district targets.

The 20 year housing target for Eastern City is 157,500 dwellings. To achieve this target, each Council is required to formulate its own 20 year target following preparation of a housing strategy – see section below for discussion on the Burwood Housing Strategy.

The District Plan and associated housing targets reflect point in time demand. Given the growing pressure on housing and affordability within NSW and across the nation more recently, announcements are being made by governments to maximise opportunities to increase housing supply – particularly on land in close proximity to governments investment in transport, services and open space.

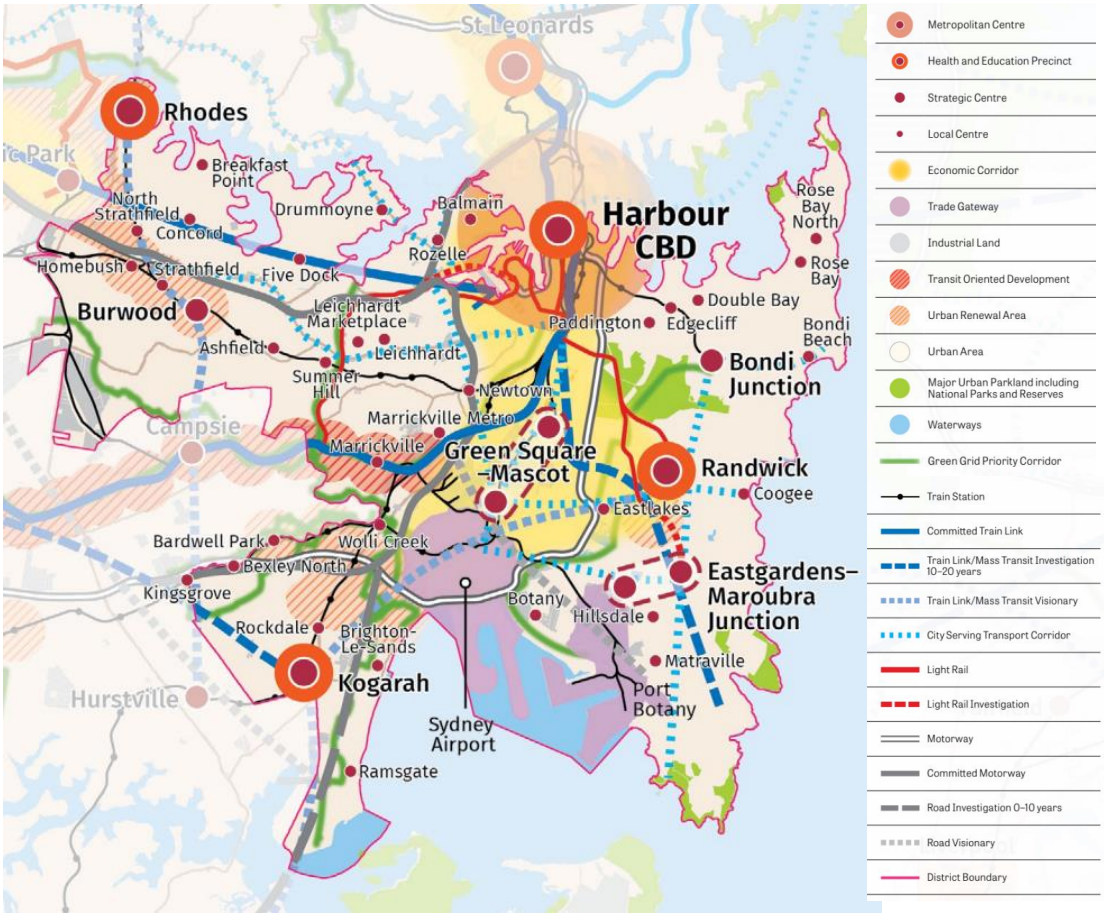


Figure 29 Eastern City District Plan
Source/Notes: Greater Cities Commission

The Planning Proposal responds to the applicable priorities, strategies and actions of the Eastern City District Plan as:

- It responds to the critical need for additional housing supply within the Eastern City by 2036.
- The Planning Proposal will enable the delivery of needed housing, employment and tourist and visitor accommodation for the local area, corridor and precinct, suitably responding to the changing nature of major transport intrafraction through the Parramatta Road Corridor.
- It supplies housing that has optimal access to public transport.
- The co-location of housing, employment, retail and tourist and visitor accommodation with open space infrastructure provision, not readily achievable within the corridor. This configuration is a considered design outcome that will improve liveability and enhance people's quality of life, including the existing community
- The urban renewal of the site will ensure residents are able to access a diverse recreation offering on site, while being able to access nearby services, amenities. As discussed, the site is serviced by a high frequency metro, which is a game changer to the way transport and connectivity is to be considered in the Sydney Metropolitan context.

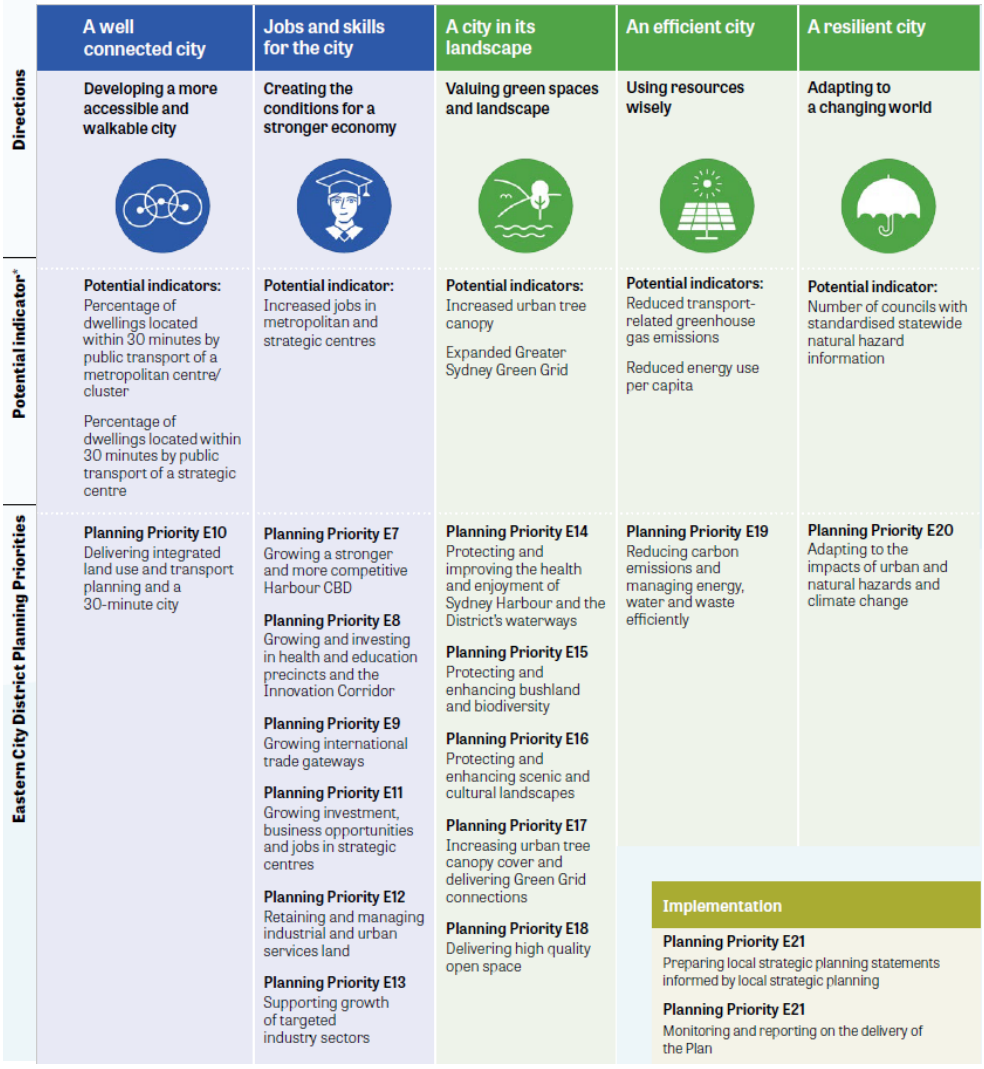
- The Planning Proposal provides for a high-quality landscape design outcome that will incorporate open green space and as a valuable recreation asset for the broader community.

Table 6 Consistency with the Eastern City District Plan Planning Priorities

Directions and Objectives	*Comment*
Priority E1 – Planning for a city supported by infrastructure	• The proposal leverages close proximity to the Burwood North Metro Station a part of Sydney Metro West. The District plan envisages increasing the utilisation of existing and future infrastructure.
Priority E3 – Providing services and social infrastructure to meet people's changing needs	• As set out in the Plan, A 102 per cent proportional increase in people aged 85 and over and a 64 per cent increase in the 65-84 age group, is expected by 2036. As the population of the district grows older, appropriate locations to downsize to within the area is an important consideration to allow older people to age in place with appropriate housing options. This also frees up other housing stock for new families to move into. • The urban design and through site links will create a walkable neighbourhood and create opportunities for older people to continue living in their communities, where being close to family, friends and established health and support networks improves people's wellbeing. Notably, the proposal marks a substantial improvement over the existing walking options in the area. • The proposal will be fully accessible in both a residential and public domain capacity. Much of the surrounding apartment stock is not accessible and thus inappropriate for the 37,000 people with a disability in the Eastern City.
Priority E4 – Fostering healthy, creative, culturally rich and socially connected communities	• The area surrounding the site is currently socially and culturally isolated, lacking a neighbourhood centre of its own. The proposal responds to the unique, site specific and place-based opportunity for development, which include the opportunity to provide large activated ground plane, publicly accessible open space, and community uses. It is anticipated that many other developments within the Burwood LGA (either Parramatta Road or Burwood North) will not be readily capable of delivering all of these components due to costs associated with land amalgamations and other site constraints.
Priority E5 – Providing housing supply, choice and affordability with access to jobs, services and public transport	• The proposed redevelopment of the site seeks to increase housing supply and improve housing diversity, with the indicative scheme providing a range of apartment sizes and typologies, including walk-up townhouse style apartments as well as approximately 30% allocated to hotel, to meet the existing and future needs of the community as identified in **Appendix D**. • The site is very well located to provide access to existing and future transport options. It is also noted that the pedestrian access path from the site to the Burwood North metro station along the northern side of Parramatta Road adjacent Concord Oval provides one of the largest stretches of separated and uninterrupted (by driveways and/or roads) travel distances in the precinct.
Priority E6 – Creating and renewing great places and local centres, and respecting the District's heritage.	• As identified in the Social and Economic Impact Assessment (**Appendix D**), Burwood Council is made up of diverse communities and there exists opportunities for the future use of the site to promote social cohesion and celebrate local culture, including opportunities for future non residential uses
Priority E10 – Delivering integrated land use and transport planning and a 30 minute city	• The site is strategically positioned to accommodate expanded residential uses within an existing urban renewal area, increasing supply within close proximity to public transport infrastructure and delivering on a '30 minute city' with strong connections to employment hubs. • The future built form will deliver a local population serving neighbourhood centre that will accommodate the basic daily needs of the community, without the need for car-based trips to other centres.

Directions and Objectives	*Comment*
Priority E12 – Retaining and managing industrial and urban services land	• It is noted that subject to Planning Priority E12, Objective 23, Industrial and urban services land is planned, retained and managed, however, land subject to the PRCUTS is exempt from this direction. Notwithstanding this, the site was identified to transform from E3 to MU1 Mixed use zoning in the PRCUTS.
Priority E18 – Delivering high quality open space	• The proposal includes the delivery of more than 2,700sqm of new high quality publicly accessible open space which is proposed to help meet the existing and future community's local open space needs, and additionally acts to increase block permeability. In addition to the communal space, residential and hotel uses will have separate areas to meet the respective necessary requirements.
Priority E19 – Reducing carbon emissions and managing energy, water and waste efficiency	• The efficient use of well-located land that is well designed and required to achieve/exceed industry standard ESD benchmarks (as they develop over time) achieves this object

Diargams of District Plan Priorities



	A city supported by infrastructure	A collaborative city	A city for people	Housing the city	A city of great places
Directions	**Infrastructure supporting new developments**	**Working together to grow a Greater Sydney**	**Celebrating diversity and putting people at the heart of planning**	**Giving people housing choices**	**Designing places for people**
Potential indicator*	**Potential indicator:** Increased 30-minute access to a metropolitan centre/cluster	**Potential indicator:** Increased use of public resources such as open space and community facilities	**Potential indicator:** Increased walkable access to local centres	**Potential indicators:** Increased housing completions (by type) Number of councils that implement Affordable Rental Housing Target Schemes	**Potential indicators:** Increased access to open space
Eastern City District Planning Priorities	**Planning Priority E1** Planning for a city supported by infrastructure	**Planning Priority E2** Working through collaboration	**Planning Priority E3** Providing services and social infrastructure to meet people's changing needs **Planning Priority E4** Fostering healthy, creative, culturally rich and socially connected communities	**Planning Priority E5** Providing housing supply, choice and affordability with access to jobs, services and public transport	**Planning Priority E6** Creating and renewing great places and local centres, and respecting the District's heritage

Figure 30 Eastern City District Plan – Priorities and Actions
Source/Notes: Greater Cities Commission

Parramatta Road Corridor Urban Transformation Strategy (PRCUTS)

The Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) was released in November 2016. The PRCUTS seeks to coordinate the renewal of land and neighbourhoods along one of the oldest arterial roads in NSW which connects the Sydney and Parramatta CBDs, the two largest and most important metropolitan city centres in NSW. The PRCUTS creates opportunities to facilitate urban renewal in the context of reduced congestion associated with the implementation of the West Connex Project which is expected to remove significant traffic volumes along Parramatta Road, in particular heavy vehicles.

The finalisation of the PRCUTS followed public exhibition of the draft strategy in September 2015. The draft strategy provided for significantly greater uplift in densities along the corridor than the final strategy. The densities were revised down following community and local government concern as to the lack of supporting public transport infrastructure.

PRCUTS provides for the provision of community infrastructure facilities, and creates well-designed walkable, connected precincts along Parramatta Road as well as significant uplift opportunities for 8 precincts along the corridor. The Site is located within the Kings Bay Precinct which is envisaged as a new residential urban village with a Parramatta Road address. The key actions that apply to Kings Bay under the strategy are outlined in **Figure 31** below.

The PRCUTS proposes that 2,500 new homes will be built in the precinct and 2,900 jobs created up to 2050. Land immediately fronting Parramatta Road is identified as an urban renewal opportunity.

The Implementation Toolkit that forms part of the PRCUTS includes Planning and Design Guidelines that prescribe preferred land use and built form outcomes including height and FSR. For the Site, the guidelines propose a B4 mixed use zone with a floor space ratio of 1.8:1 and a maximum building height of 21m. The recommended controls are shown in **Figure 32** below. It is noted that 1-1A Cheltenham Road is currently outside of the boundary but will be considered within the Planning Proposal and be included in the MU1 Mixed Use zoning.

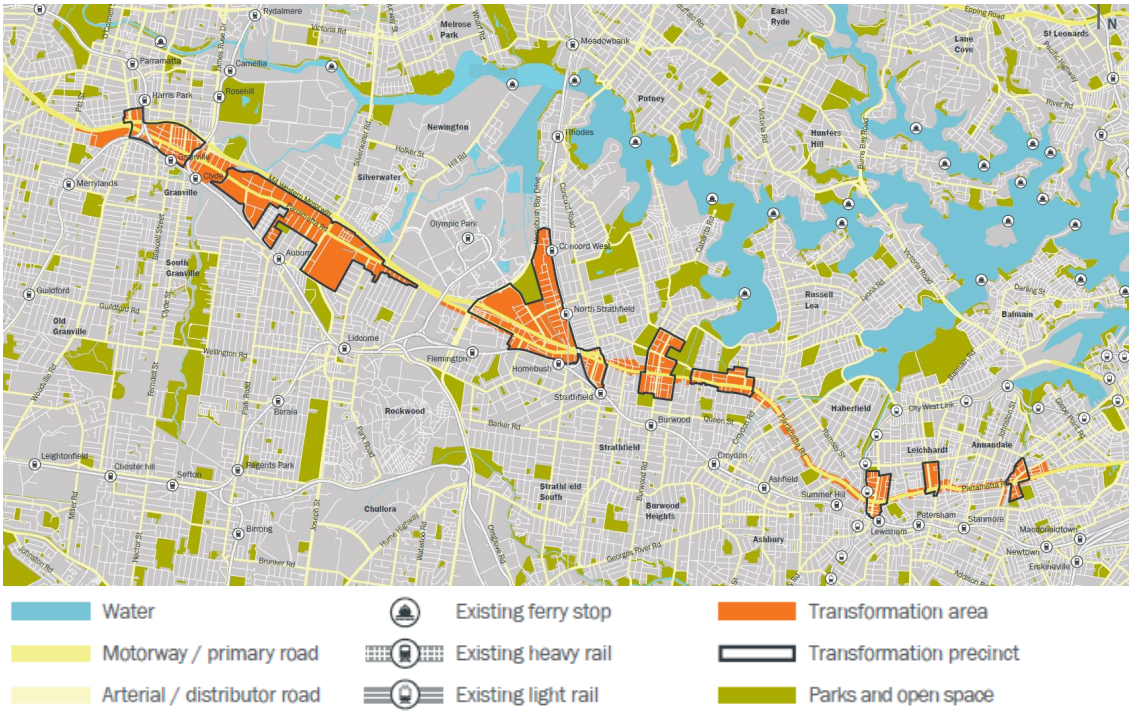


Figure 31 Parramatta Road Corridor Urban Transformation Strategy extent
Source/Notes: UrbanGrowth NSW

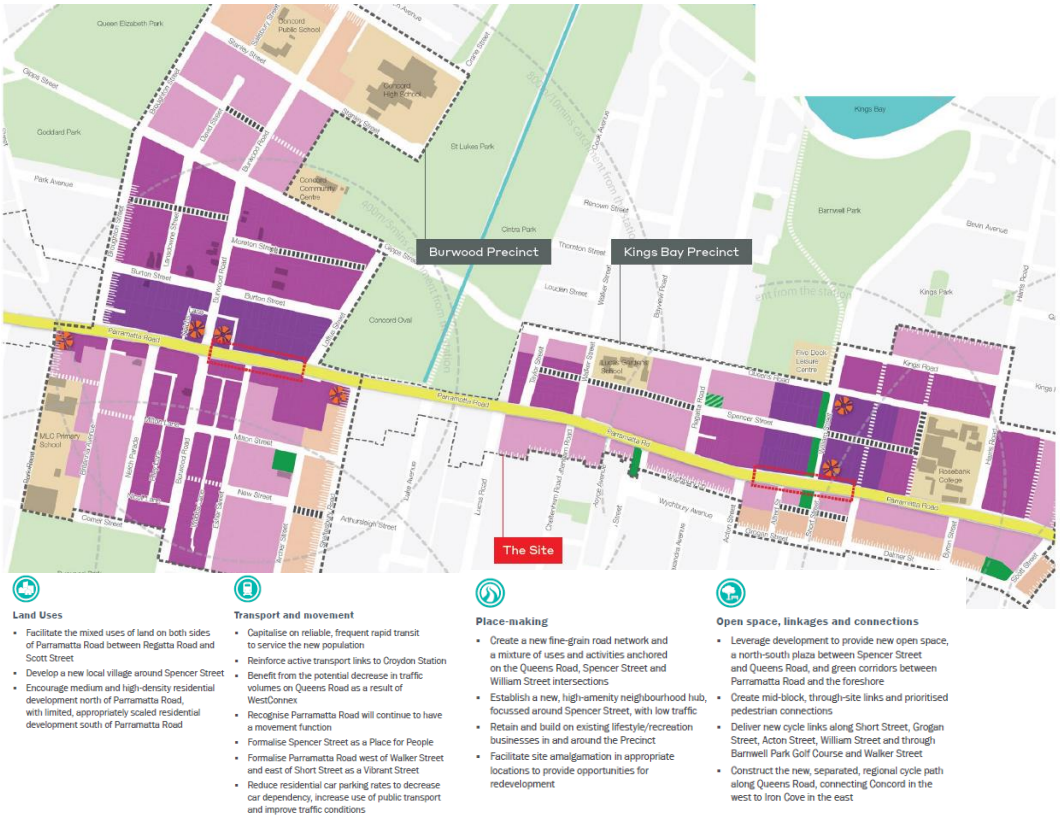


Figure 32 Kings Bay/Burwood Precinct and Key Actions
Source/Notes: Parramatta Road Corridor Urban Renewal Strategy

PRCUTS – Revised Planning Controls

The Implementation Toolkit that forms part of the PRCUTS includes *Planning and Design Guidelines* that prescribe preferred land use and built form outcomes including height and FSR. For the Site, the guidelines propose a B4 mixed use zone with a floor space ratio of 1.8:1 and a maximum building height of 21m. The recommended controls are shown in **Figure 33**. It is noted that 1-1A Cheltenham Road is current outside of the boundary but will be considered within the Planning Proposal and be included in the MU1 Zoning.

Table 7 outlines the land uses that are permissible with consent or prohibited under the MU1 Mixed Use zone. The zone provides for a wide range of permissible land uses including residential flat buildings, shop top housing, commercial, retail and community uses.

Table 7 BLEP 2012 Zone MU1 Land Use Table

Permissibility	Defined Land Use Type
Permitted without consent	Home occupations, Roads
Permitted with consent	Amusement centres; Attached dwellings; Boarding houses; Car parks; Centre-based child care facilities; Commercial premises; Community facilities; Entertainment facilities; Function centres; Group homes; Hostels; Information and education facilities; Light industries; Local distribution premises; Medical centres; Oyster aquaculture; Passenger transport facilities; Places of public worship; Recreation areas; Recreation facilities (indoor); Registered clubs; Residential flat buildings; Respite day care centres; Restricted premises; Shop top housing; Tank-based aquaculture; Tourist and visitor accommodation; Vehicle repair stations; Any other development not specified in item 2 or 4 [development without consent or prohibited].
Prohibited	Agriculture; Air transport facilities; Animal boarding or training establishments; Boat building and repair facilities; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cemeteries; Charter and tourism boating facilities; Correctional centres; Crematoria; Depots; Eco-tourist facilities; Electricity generating works; Environmental facilities; Environmental protection works; Exhibition homes; Exhibition villages; Extractive industries; Farm buildings; Forestry; Freight transport facilities; Heavy industrial storage establishments; Helipads; Highway service centres; Home occupations (sex services); Industrial retail outlets; Industrial training facilities; Industries; Jetties; Marinas; Mooring pens; Moorings; Open cut mining; Recreation facilities (major); Recreation facilities (outdoor); Research stations; Residential accommodation; Rural industries; Rural supplies; Sewerage systems; Sex services premises; Storage premises; Transport depots; Truck depots; Vehicle body repair workshops; Warehouse or distribution centres; Waste or resource management facilities; Water recreation structures; Water storage facilities; Water treatment facilities; Wharf or boating facilities; Wholesale supplies

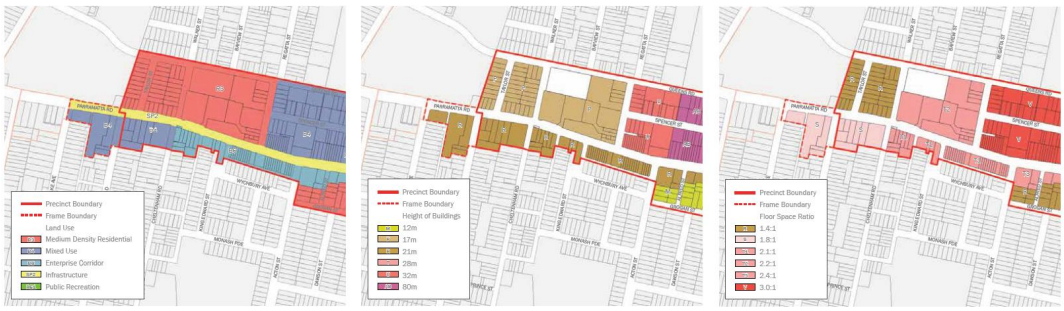


Figure 33 PRCUTS Recommended Land Use and Development Controls
Source/Notes: Parramatta Road Corridor Urban Transformation Strategy Implementation Toolkit: Planning and Design Guidelines

PRCUTS Principles and Actions
The following Tables (**Table 8** and **9**) set out the key principles of the plan, as well as the relevant actions.

Table 8 PRCUTS Principles

	PRCUTS Principle	Planning Proposal
	Vision	
	A high quality multi-use corridor with improved transport choices, better amenity and balanced growth of housing and jobs	As set out throughout this Planning Proposal and the Urban Design Report in particular, the proposal provides for a considered mix of uses (in the form of housing, short term accommodation and non-residential) in a form and scale that is both responsive to the context and capacity of the site, amenity and impacts.
	Principles	
1	**Housing choice and affordability**	The proposal provided for new and diverse housing to support a growing population with diverse needs.
2	**Diverse and resilient economy**	The 55lan55itized55on of Parramatta Road will attract new businesses and support existing businesses that create a diversity of jobs closer to home. The proposal recognises the need for a diversity of offering and uses, whilst also understanding and responding to the hierarchy of other existing and proposed centres for retail and employment.
3	**Accessible & connected**	The proposal provides a mix of land uses in a location that is accessible and connected, responding to the sites opportunity to realise the strategic planning intent.
4	**Vibrant communities and places**	The considered approach to the layout, ground plane and built form, promotes quality places and will act as a benchmark of excellence as the remainder of the precinct and corridor transforms overtime in line with the intent of government.
5	**Green spaces and links**	Enhanced and new open spaces and green setbacks are provided on the site to support healthy lifestyle and provide places for people to gather and relax.
6	**Sustainability and resilience**	The site provides a liveable local site within the precinct along that is sustainable (both in design, operation and efficient use of land, whilst balancing impacts) to make Sydney a better place
7	**Delivery**	The proposal seeks to deliver on the evolving priorities and strategic planning policy in the precinct, particularly with the presence of Sydney Metro West.

Figure 34 PRCUTS Vision and Strategic Actions
Source/Notes: Parramatta Road Corridor Urban Transformation Strategy Implementation Toolkit: Planning and Design Guidelines

Table 9 PRCUTS Strategic Actions Assessment

Relevant PRCUTS Strategic Actions	Planning Proposal Response
Principle 1: Housing choice and affordability	
Housing Diversity	
Provide 'diverse housing' for both purchase and rental markets that satisfies the objectives and Design Criteria of the Apartment Design Guide, that may include: ▪ lower cost market housing for rent or purchase, including new generation boarding houses with high quality shared spaces ▪ moderately priced housing that is affordable to purchase for households earning up to $150,000 or 80-90% of the median income ▪ rental properties with long-term tenures and optional extensions in place ▪ housing that uses design innovations, resulting in new products such as decoupled/ optional car parking, which are suited to essential service workers, young 'city makers' early in their careers looking for 'starter homes', families with children, and downsizers/seniors ▪ student accommodation ▪ aged-care housing ▪ housing that promotes innovation in other ways across type, tenure, construction methodology or other mechanisms to make such housing more attainable to a diversity of income groups.	The proposal incorporates these actions by proposing a varied mix of uses and services on the site that is underpinned by supply/demand and social/economic needs assessments. As discussed, it also seeks to provide shared spaces throughout the site for the benefit of all. The provision of affordable housing contributions (as negotiated with Council) will align with the PRCUTs and any subsequent negotiation with Council and the progression of its Affordable Housing Policy.
Establish a mix of dwelling sizes, including studios, one bedroom and three bedroom dwellings to be delivered in residential, mixed use and shop-top developments that cater to the future population profile of the Precincts and Frame Areas, having regard to any recommendations of the Local Housing Strategy, the requirements of State Environmental Planning Policy No 65 – Design Quality of Residential Apartment Development, and the Apartment Design Guide.	In the reference scheme, a mix of unit types and sizes is envisaged, and has been considered in the supporting technical assessments. The final layout and mix will be subject to a Development Application, as well as input from the Design Review Panel
Explore incentives such as value sharing where rezoning is necessary to achieve renewal of private sites to capture a proportion of the increased land value to fund affordable, diverse and social housing projects.	The proposal incorporates crucial urban design elements and offers that are embedded in the Planning Proposal and site specific controls. A Planning Agreement for the delivery and maintenance of these, along with the necessary state, regional and local infrastructure as well as suitable affordable housing contributions. In summary, this will ensure that the proposal, and the associated increase in density, does not unduly impact on planned services and infrastructure.
Housing Affordability	
Provide a minimum of 5% of new housing as Affordable Housing, or in-line with Government policy of the day.	The provision of affordable housing contributions will align with the PRCUTs and any subsequent negotiation with Council and the progression of its Affordable Housing Policy.
Principle 2: Diverse and resilient economy	
Planning for Jobs	
Update Local Environmental Plan(s) to permit a wider range of employment uses, consistent with the recommended land uses, heights and densities identified in the *Parramatta Road Corridor Planning and Design Guidelines*. This includes: ▪ tailoring commercial and business zones to provide greater flexibility and opportunity ▪ for the establishment of new business models particularly for small to medium business enterprises	The proposal seeks to designate a specified mix of residential, short term accommodation and non-residential land uses, as well as components in the design controls that will mandate elements such as activate frontages and through site links

Relevant PRCUTS Strategic Actions	Planning Proposal Response
▪ facilitating increased densities to encourage the co location of multiple uses in one building, including industrial functions, where appropriate.	
Implement the built form controls identified in the *Parramatta Road Corridor Planning and Design Guidelines* to encourage new typologies that overcome these challenges and facilitate evolving and innovative employment uses.	The proposal has carefully considered these controls, and where variations are proposed, they are supported by analysis that demonstrates the outcomes/impacts have a net benefit.
Principle 3: Accessible and connected	
Integrated Transport Network	
Implement the *Sydney CBD to Parramatta Strategic Transport Plan*.	The proposal delivers transit oriented development that directly supported the applicable transport plan of government – noting the progression of the plan in 2016 with the announcement and commencement of construction on the Western Sydney Metro and Burwood North Station.
On-street rapid transit for Parramatta Road	
Amend the State Environmental Planning Policy (Infrastructure) 2007 to identify Parramatta Road between Burwood and the Sydney CBD as a strategic corridor, inserting provisions that require planning proposals and development applications along the Corridor to be referred to Transport for NSW for comment, particularly at and around future super stop locations.	TfNSW have provided initial commentary to the Scoping Report provided to Council in June 2022. This information and feedback has been considered. Ongoing engagement will take place with TfNSW throughout the PP process.
Street function framework	
Apply the road planning framework to guide the planning, development, management and operation of the Parramatta Road Corridor road network according to 'movement– place' principles.	These have been considered by the Traffic Consultant (**Appendix E**) and Design Report (**Appendix A**) in establishing the entry points to the site for vehicle and pedestrians, with recognition of the restrictions on access from Paramatta Road.
Principle 4: Vibrant communities and places	
15 minute Neighbourhoods	
Deliver each Precinct along the Corridor as a '15 minute neighbourhood' through land use changes that implement the following principles: ▪ improved walkability, cycling and safety to support healthier communities ▪ improved housing choice and diversity ▪ increased usability of, and access to, safe open spaces ▪ improved local economic opportunities ▪ adequate local services and infrastructure ▪ access to public transport.	The proposal is focused on providing services and offering to the neighbourhood community, as well as the new residents and visitors. It is not proposed to position itself in the hierarchy of centres to compete with Burwood or Kings Bay Town Centres. The urban design framework and design analysis, along with the community facilities, public space and non-residential uses deliver on all of the adjacent principles for a 15 minute neighbourhood.
Implement planning provisions to deliver active frontages in and around appropriate locations as illustrated on the Precinct Plans within the *Parramatta Road Corridor Planning and Design Guidelines*.	Activated frontages are incorporated within the proposal in locations that align with the Planning and Design Guideline of the Strategy.
Community infrastructure	
Implement development controls that incentivise the delivery of social infrastructure, such as floor space bonuses, and discounting or excluding floor space provided as social infrastructure.	The proposal is a vacant/excavated site and has the capacity to deliver on the combination of housing, employment, services, open space and importantly, community infrastructure, to meet the needs of the community. This is explored in further detail in the Social and Economic Impact Assessment (**Appendix D**).

Relevant PRCUTS Strategic Actions	Planning Proposal Response
Heritage and unique Neighbourhoods + heritage conservation and community facilities incentives	
	The actions identified in the Strategy are not directly applicable to the site. However, the interface and relationship with the characterises of the precinct have been considered in detail by the project team. As set out in this planning proposal and Urban Design Report, the identification of the site for transport in the 2016 Plan earmarked a future change. With the introduction of the Sydney Metro West and Burwood North Station, and the Implementation Update in July 2021, the suitability for additional capacity identified.
Design Excellence	
Prepare and implement a design excellence strategy.	The proposal seeks to identify the requirements for future development to be subject to a design excellence process. The design excellence process will include a review of a project by an established Design Review Panel, or establishment of a Design Integrity Panel in accordance with the Director General's Design Excellence Guidelines (2010) (the Design Excellence Guidelines).
Noise and air quality	
Incorporate the range of design approaches and measures identified in the *Parramatta Road Corridor Design Guidelines* to attenuate the effects of noise and air pollution.	The proposal has been designed with consideration of the Strategy Design Guideline and SEPP 65/Apartment Design Guidelines. The design approach of the proposed buildings will be considered in more detail by the DRP, through the Design Excellence process and the future development application(s).
Use the development typology examples in the *Parramatta Road Corridor Planning and Design Guidelines* to inform future development controls.	
Principle 5: Green spaces and links	
New neighbourhood parks and open space	
Strategically rezone parts of the Corridor for open space purposes, with a view to allocating land to create a high quality interconnected network of publicly accessible open space throughout the Corridor.	The site is not identified within the Strategy Design Guidelines and being required for public open space. Notwithstanding, more than 2,700sqm is proposed as discussed in **Section 5**, consistent with this Action.
Strategically rezone parts of the Corridor for open space purposes, with a view to allocating land to create a high quality interconnected network of publicly accessible open space throughout the Corridor.	
Greening the Parramatta Road Corridor	
Implement building setbacks as identified on the Precinct Plans within the *Parramatta Road Corridor Planning and Design Guidelines*.	The proposal as submitted adheres to the Design Guidelines and requirement for increased setbacks to Parramatta, Lucas and Cheltenham Roads.
Principle 6: Sustainability and resilience	
Adaptive Sustainability Practices	
Commence the amendment of State Environmental Planning Policy (Sustainability Building Index: BASIX) 2004 to increase the water and energy targets as identified within the *Parramatta Road Corridor Planning and Design Guidelines*.	The proposal is supported by an ESD statement that identified the capability of the proposed future built to achieve sustainability and efficiency targets.
Principle 7: Delivery	
Implementation	
Implement the *Implementation Plan 2016 – 2023*.	The proposal enables delivery of the PRCUTs intent, consistent with the implementation plan, including updates made in 2021.

Key Actions for the Kings Bay Precinct

The following table (**Table 10**) details the proposal consistency with the Key actions identified for Kings Bay.

Table 10 PRCUTS – Key Actions for the Kings Bay Precinct

Key Actions – Kings Bay	Planning Proposal Response
Kings Bay is envisaged as a new residential urban village with a Parramatta Road address. It will have a dense network of streets and an identity built on its proximity to Sydney Harbour.	
Land Uses	
▪ Facilitate the mixed uses of land on both sides of Parramatta Road between Regatta Road and Scott Street ▪ Develop a new local village around Spencer Street ▪ Encourage medium and high-density residential development north of Parramatta Road, with limited, appropriately scaled residential development south of Parramatta Road	The proposal delivers on the actions to ensure that both sides of Parramatta Road are provided with mixed use development, with appropriately scaled development on the southern side of Parramatta Road, responsive to the context, built form approach, open space provision and proximity to transport infrastructure.
Transport and Movement	
▪ Capitalise on reliable, frequent rapid transit to service the new population ▪ Reinforce active transport links to Croydon Station ▪ Benefit from the potential decrease in traffic volumes on Queens Road as a result of WestConnex ▪ Recognise Parramatta Road will continue to have a movement function ▪ Formalise Spencer Street as a Place for People ▪ Formalise Parramatta Road west of Walker Street and east of Short Street as a Vibrant Street ▪ Reduce residential car parking rates to decrease car dependency, increase use of public transport and improve traffic conditions	The proposal recognizes the movement function required for Paramatta Road (including as required by TfNSW) and is of a size and scale to provide vehicle access from Lucas and Cheltenham Roads. The proposal has the capacity to provide minimum car parking rates under Burwood DCP for the various uses (with access controlled for each use as appropriate), and maximums specified by TfNSW whilst also exploring the potential for reductions cognizant of the rapid transit transport infrastructure within 500m of the site and traffic implications.
Place Making	
▪ Create a new fine-grain road network and a mixture of uses and activities anchored on the Queens Road, Spencer Street and William Street intersections ▪ Establish a new, high-amenity neighbourhood hub, focused around Spencer Street, with low traffic ▪ Retain and build on existing lifestyle/recreation businesses in and around the Precinct ▪ Facilitate site amalgamation in appropriate locations to provide opportunities for redevelopment	The proposal incorporates permeability of sight and access through the site, responding to the three street frontages on the property, and the scale of the land. By doing so, the proposal provides a genuine place making opportunity which is then supported by the detailing of ground plane, access points, activation and open space.
Open space, linkages and connections	
▪ Leverage development to provide new open space, a north-south plaza between Spencer Street and Queens Road, and green corridors between Parramatta Road and the foreshore ▪ Create mid-block, through-site links and 59lan59itized pedestrian connections ▪ Deliver new cycle links along Short Street, Grogan Street, Acton Street, William Street and through Barnwell Park Golf Course and Walker Street ▪ Construct the new, separated, regional cycle path along Queens Road, connecting Concord in the west to Iron Cove in the east	The proposal provides substantial open space on the site, as well as providing generous street setbacks (in line with the Strategy Guidelines). It also ensures that existing cycleways can be retained and enhanced.

Implementation – Inclusion of the PRCUTS as a Ministerial Directions

The strategy was given weight by a Ministerial Direction (s9.1) which must be considered in the assessment of any Planning Proposal (see further discussion below). The Direction states that:

A planning proposal may be inconsistent with the terms of this Direction only if the relevant planning authority can satisfy the Secretary of the Department of Planning & Environment (or an officer of the Department nominated by the Secretary) that the planning proposal is:

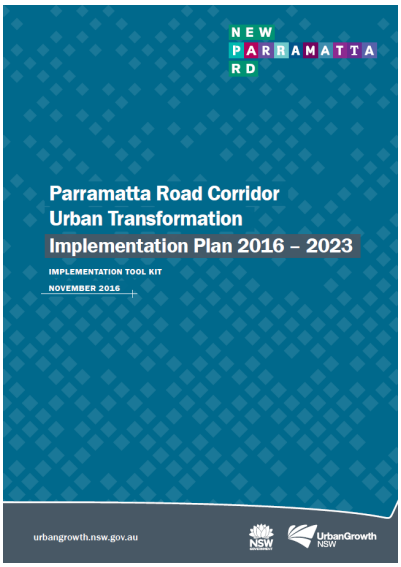
a) consistent with the Out of Sequence Checklist in the Parramatta Road Corridor Implementation Plan 2016 – 2023 (November 2016), or
b) justified by a study (prepared in support of the planning proposal) that clearly demonstrates better outcomes are delivered than identified in the Parramatta Road Corridor Urban Transformation Strategy (November 2016) and Parramatta Road Corridor Implementation Plan 2016-2023 (November 2016) having regard to the vision and objectives, or

Proposals that depart from this staging need to be considered against the PRCUTS 'Out of Sequence Checklist' to ensure that changes to the land use zones and development controls can be justified against the underlying Principles and Strategic Actions of the Strategy. These include provision of necessary transport, services and social infrastructure to service a new population. The Checklist also aims to ensure the established benchmarks for the quality of development and public domain outcomes desired for the Corridor are achieved.

For a Planning Proposal to be consistent with the Out of Sequence Checklist, it must demonstrate (without relying on any future development application) that it will:

- Satisfactorily meet all the underlying Principles and Strategic Actions of the Strategy; and
- Achieve the established benchmarks for the quality of development and public domain outcomes desired for the Corridor.

These have been addressed in this Planning Proposal.

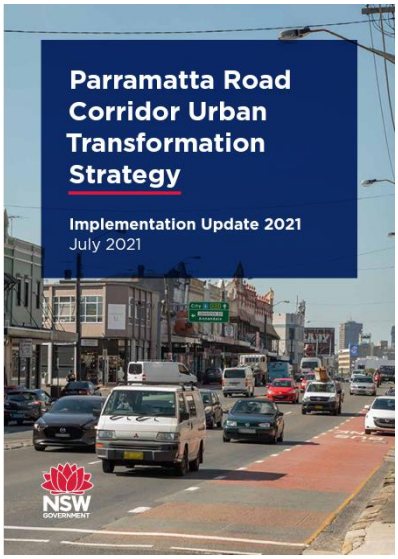


PRCUTS Implementation Update July 2021

In July 2021 the Minister for planning released an update to the implementation package for the PRCUTS. Rather than updating the existing Implementation Plan 2016-2023 or reviewing the PRCUTS wholistically, the update was proposed as an addition to the suite, outlining updated implementation actions to suit the contemporary planning and policy context and changes since 2016 (5 years) – particularly the NSW Governments announcement of the Delivery of Sydney Metro West (October 2019) and progression of precinct traffic studies.

The Implementation Actions will be considered in the Planning Proposal, but allow progress to gateway determination, notwithstanding the status of any precinct wise traffic study.

Planning proposals for land within Frame Areas must satisfy the requirements of the Out of Sequence Checklist. The requirement for Frame Areas to utilise the Out of Sequence Checklist will ensure growth of the corridor is aligned with priority delivery of infrastructure within the corridor.



Implementation Plan – Out of Sequence Checklist

A summary of the Proposals alignment with the Out of Sequence Checklist below. A detailed assessment of this is provided against **Table 11**.

Table 11 PRCUTS – Out of Sequence Checklist

Checklist Requirement	Response – Planning Proposal
Criteria 1 Strategic objectives, land use and development	
The planning proposal can demonstrate significant delivery or contribution towards the Strategy's Corridor wide and Precinct specific vision.	The PP is consistent with the Corridor and precinct specific visions as demonstrated in **Section 8.1.**
The planning proposal satisfies the Strategy's seven land use and transport planning principles and fulfills the relevant Strategic Actions for each Principle.	Principles and the relevant strategic actions are addressed in this PP at **Section 8.1.**
The planning proposal can demonstrate significant net community, economic and environmental benefits for the Corridor and the Precinct or Frame Area within which the site is located.	Yes, this is demonstrated in the combined social, economic, and open space provision in the scheme, to be expanded in the PP. This is proposed to be incorporated through the implementation of alternate planning controls linked to site specific provisions. A public benefit offer will also be made by the proponent subject to commercial viability of the proposal as discussed in **Section 8.6** and **Appendix F.**
The planning proposal is consistent with the recommended land uses, heights, densities, open space, active transport and built form plans for the relevant Precinct or Frame Area.	The proposal seeks to demonstrate the appropriateness of alternative controls in accordance with the relevant Ministerial Direction for the corridor as a result of this planning study (Planning Proposal and accompanying documents).
The61laning proposal demonstrably achieves outcomes aligned to the desired future character and growth projections identified in the Strategy.	The Proposal given consideration to the projections, with due consideration given to the introduction of the Sydney Metro West. See **Section 8.3 – 8.5** and the Social and Economic Impact Assessment at **Appendix D** for more detail.
The planning proposal demonstrates design excellence can be achieved, consistent with councils adopted design excellence strategy or the design excellence provisions provided in the Parramatta Road Corridor Planning and Design Guidelines (Planning and Design Guidelines).	Yes, the built form and urban design principles have considered the guidelines and overall amenity outcomes. The BDRP process has also provided (and will continue to provide) input into the design at the Planning Proposal, as well as any subsequent Development Application.
Criteria 2 – Integrated Infrastructure Delivery Plan	
An Integrated Infrastructure Delivery Plan, which identifies advanced infrastructure provision and cost recovery for the local and regional infrastructure identified in the Infrastructure Schedule, must support the planning proposal. The Integrated Infrastructure Delivery Plan must demonstrate a cost offset to council and agency costs for a set period that aligns with the anticipated timing for land development identified in the Implementation Plan 2016 – 2023. Infrastructure to be considered includes: ▪ public transport ▪ active transport ▪ road upgrades and intersection improvements ▪ open space and public domain improvements ▪ o community infrastructure, utilities and services.	It is proposed to include a satisfactory arrangement clause for relevant state and regional infrastructure to allow for coordination with any precinct wide considerations as part of the Burwood North precinct and Burwood North Metro Station. This would allow the planning proposal to progress whilst ensuring that any necessary arrangements for the provision of infrastructure through the Planning Proposal This is particularly relevant given the changing nature of development contributions and the introduction of the Sydney Metro West Burwood North Station.
Criteria 3 – Stakeholder Engagement	
Consultation and engagement with relevant stakeholders (council, government agencies, business, community, adjoining properties and user or interest groups, where relevant) have been	Engagement with member of the local community, Council and TfNSW have been undertaken in the process of preparing the Planning Proposal. See **Section 8.10** and

Checklist Requirement	Response – Planning Proposal
undertaken, including any relevant pre-planning proposal engagement processes required by local council. ▪ An appropriate level of support or agreement is documented. ▪ Provision of documentary evidence outlining the level of planning or project readiness in terms of the extent of planning or business case development for key infrastructure projects.	Engagement Report (**Appendix G**) for more information.
Criteria 4 – Sustainability	
The planning proposal achieves or exceeds the sustainability targets identified in the Strategy.	An ESD Report has been prepared by Aspire Sustainability Consulting (**Appendix H**) which confirms the proposal ability to achieve and exceed the sustainability targets identified in the strategy.
Criteria 5 – Feasibility	
The planning proposal presents a land use and development scenario that demonstrates economic feasibility with regard to the likely costs of infrastructure and the proposed funding arrangements available for the Precinct or Frame Area.	This has been considered by Charter Keck Cramer in line with the Criteria and the Scoping Report request of Council. **Section 8.8** and **Appendix F** where this is discussed in more detail
Criteria 6 – Market Viability	
The planning proposal demonstrates a land use and development scenario that aligns with and responds to market conditions for the delivery of housing and employment for 2016 to 2023. Viability should not be used as a justification for poor planning or built form outcomes.	This has been considered by Charter Keck Cramer in line with the Criteria and the Scoping Report request of Council. **Section 8.8** and **Appendix F** where this is discussed in more detail

Consistency with Parramatta Road Corridor Urban Amenity Improvement Plan

The Urban Amenity Improvement Program (UAIP) is a $198 million initiative under the Parramatta Road Corridor Urban Transformation Program to stimulate the transformation of the Corridor.

The UAIP works will deliver tangible public benefits, contributing to the delivery of liveable communities and neighbourhoods, will stimulate development and assist to rectify the market failure that currently occurs along parts of the Corridor.

The proposed UAIP works fall into three categories, with the delivery of these being secured through Planning Proposals and DAs

- Streetscape upgrades including tree planting, multi-purpose lighting, new pavements and north/south pedestrian and cycle crossings.
- Creation of new or improved open spaces, urban plazas and town squares, which are important in a high density environment.
- New walking and cycling links to key transport nodes and open spaces, which connect to strategic regional and local networks.

For the Kings Bay precinct, and adjoining Burwood Precinct, there are no UAIP works identified on the site or surrounds.

Consistency with Parramatta Road Corridor Infrastructure Schedule

As identified in the Schedule, the Infrastructure items identified will be funded by a range of sources including local Council Contributions and Planning Agreements (as part of Planning proposal and DAs**). Housing and Productivity Contributions** have also been announced by the current Government (currently intended to be implemented in October 2023, subject to support of parliament). These will apply to development on the site in addition any transport project components (current referred to as Special Infrastructure Contributions (SIC)) that are likely to apply to the areas surrounding Burwood Metro Station. The Proposal has considered necessary development contributions to both Council and the State Government in order to facilitate and fund relevant local, district and regional infrastructure, as well as taking these into consideration as part of the Planning Agreement that accompanies this Proposal.

Given the potential changes in the corridor, particularly surrounding Burwood North and Metro Station – to built form/density, infrastructure requirements and contributions regimes (potential SIC surrounding Metro and changes to affordable housing provision) – the Planning Proposal seeks to include a "satisfactory arrangements" clause for designated state and regional infrastructure – see **Section 7.3**.

Q4: Does the proposal have Strategic Merit? -Is the planning proposal consistent with a council LSPS that has been endorsed by the Planning Secretary or GSC, or another endorsed local strategy or strategic plan?

Burwood Local Strategic Planning Statement

The Burwood Local Strategic Planning Statement (LSPS) was prepared by Burwood Council and endorsed in May 2020. Local Strategic Planning Statements are required under Clause 3.9 of the EP&A Act, will form the basis of Local Environmental Plans (LEPs) and must be updated every seven years.

The Burwood LSPS provides the basis for Council's decision on use of land, resources and assets to achieve the community's broader goals and set the 20-year vision for the Local Government Area, in combinations with the relevant Ministerial directions and application of the PRCUTs. The LSPS document is underpinned by the following four themes:

- Infrastructure and collaboration.
- Liveability.
- Productivity; and
- Sustainability.

The Burwood LSPS identifies sixteen Planning Priorities, which respond to the four themes. Each theme also consists of several Planning Actions, which are intended to respond to and implement the findings of their respective Planning Priorities.

The document makes specific reference to the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) under Planning Priority 4 to '*Provide high quality planning and urban design outcomes for key sites and precincts. Burwood-Concord, which contains the subject site, is a renewal precinct identified in PRCUTS and the LSPS, set to contain '5,500 new homes and 3,800 new jobs [...] by 2050'*. Action 4.1 of the LSPS is to implement PRCUTS, whilst Action 4.2 is to work with the NSW Government on the governance framework for the delivery of PRCUTS:

4.1 *Implement the Parramatta Road Corridor Urban Transformation Strategy generally in accordance with the 2016-2023 Implementation Plan, following finalisation of a precinct wide traffic and transport study and an urban design study, including preparation of a:*

- *Precinct wide Planning Proposal*
- *Draft Development Control Plan*
- *Affordable Housing Contributions Scheme*
- *Local Contributions Plan.*

4.2 *Work with the NSW Government on the governance framework for the delivery of the Parramatta Road Corridor Urban Transformation Strategy where appropriate and in accordance with the Section 9.1 Direction 7.3 Parramatta Road Corridor Urban Transformation Strategy regarding supportive infrastructure.*

As discussed in **Section 8.1** of this Proposal, Council are in the process of progressing these actions for the Burwood North precinct, between Parramatta Road and Burwood Town Centre.

The document also discusses the future Burwood North Metro West station, with Action 1.2 of the document being to work with the NSW Government on planning for the Sydney Metro West project. The site appears to have been included in, or on the periphery of, the rough boundaries of the 'Sydney Metro West Station investigation area' within the LSPS (noting that the document was released before Metro West station locations were confirmed); the document reads that 'A priority for Council is to ensure that the Burwood North Station is connected to the Burwood train station, enabling easy interchange between the two forms of transport'.

The LSPS Structure Plan includes a proposed "Future Transport Investigation Area" being a corridor linking Parramatta Road to Campsie. The intent of the corridor will be to improve transport access to Burwood North Metro Station for all parts of Burwood LGA. The LSPS states:

> *Council has defined a potential investigation area for this north-south connection, running from Campsie (a Strategic Centre) in the south to the Burwood North Station in the north. Council will work with the NSW Government and neighbouring councils to develop options for new and improved public and active transport options along the investigation area.*

The Planning Proposal responds to the applicable priorities, strategies and actions of the BLSPS, whilst also being responsive to the changing circumstances of key transport infrastructure. The proposed scheme, built form and configuration, demonstrates how additional density, employment, short term accommodation and services can be delivered on the site to deliver on these priorities.

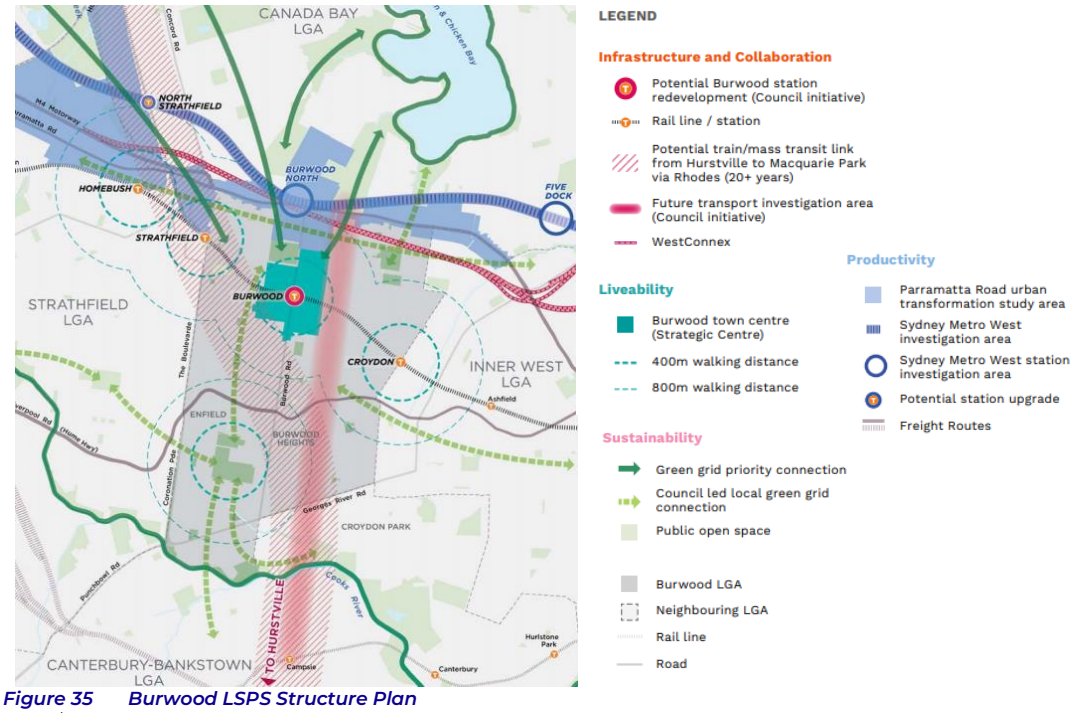


Figure 35 Burwood LSPS Structure Plan
Source/Notes: Burwood Council

Burwood Housing Strategy

The *Burwood Housing Strategy* was endorsed by Council in February 2020 and conditional approval in May 2021 from the NSW DPIE. The Strategy guides the quantity, location and type of future residential development within Burwood. Specifically, the Housing Strategy identifies "*continued development of well-designed high-density housing around the Burwood and Strathfield Town Centres. Redevelopment at Burwood North will occur in the longer term, taking advantage of the new Metro Station to extend the Burwood Town Centre to the north*". The following are the objectives for housing in Burwood:

- Increase housing diversity and choice to meet the community's changing needs
- Make housing more affordable, including through development contributions (SEPP 70 and voluntary planning agreements), advocacy and partnerships
- Preserve local character by preventing extensive redevelopment in those parts of the LGA which have heritage significance or a significant local character
- Plan for longer term housing needs, preserving opportunities for medium and high density housing development beyond 2036 near centres and public transport
- Support the vibrancy, vitality, and activity of centres, including the Burwood Town Centre, local centres and neighbourhood centres

The Planning Proposal request supports applicable priorities, strategies and actions of the *Burwood Housing Strategy* as:

- It appropriately locates high quality housing to meet the changing needs to the community within a 400-600m of rapid transport.
- It will deliver quality housing that contributes positively to residents' quality of life and surrounding public spaces.

- The proposed co-location of housing, services, visitor accommodation, employment, community facilities and much needed open space, reflecting a balanced approach that will deliver a substantial benefit to the local community of Burwood and Croydon.
- The Planning Proposal does not reduce the supply of traditional family housing with gardens, but rather provides a diversity of housing typology within and area identified for growth, and which is supported by transport infrastructure.

Q5: Does the proposal have Strategic Merit? -Is the planning proposal consistent with any other applicable State and regional studies or strategies?

Connecting/Designing with Country

The proposal has been formulated with recognition and consideration of the NSW Government Architects Draft Connecting with Country Framework, a framework for understanding the value of Aboriginal knowledge in the design and planning of places.

As part of this process, and discussions with the Architects, proponent, and landscape Architects, a Public Art Strategy has been developed by FCAD (**Appendix C**). The strategy outlines the context and principles that underpin the delivery of interpretative public art, and offers a framework to ensure it authentically contributes to reflecting and celebrating the rich stories of the site, the surrounding area and its people.

The strategy, in conjunction with the Landscape Concept Report (**Appendix B**) sets out a detailed methodology and action-oriented approach for planning, implementing, and delivering high-quality interpretative public art throughout the site, recognising the early stages as a Planning Proposal.

It is also recognised that collaboration is central to the development of the Public Art Strategy over time . This includes collaboration between the heritage consultant, public domain designers, artists, local communities and stakeholders. The action-orientated approach identifies working with artists to think broadly about location, context and opportunities for integration with heritage interpretation

As set out in the Public Art Strategy, interpretive public art throughout the site will provide:

- opportunity for Aboriginal artists to tell their stories and the importance and connection to the land
- locals and visitors with relevant art that will generate pride, ownership and a sense of belonging
- new audiences with a multi-layered and accessible approach to storytelling that engages people of all ages and backgrounds
- unique and engaging stories of people and place that evoke discussion
- attractive, safe and enjoyable spaces that are uniquely Wangal

Q6: Does the proposal have Strategic Merit? -Is the planning proposal consistent with applicable SEPPs?

As part of any future development, all relevant SEPPs will need to be considered as they relate to the design and land uses. The following key State Environmental Planning Policies have been identified for consideration pertinent to this planning proposal.

State Environmental Planning Policy No 65 and Apartment Design Guide

The State Environmental Planning Policy No 65 (SEPP 65) applies to independent living units as part of a residential flat building containing at least 4 or more dwellings. In accordance with the Standard Instrument LEP a residential flat building is defined as a building containing 3 or more dwellings but does not include an attached dwelling or multi dwelling housing.

In accordance with SEPP 65, an assessment against the Apartment Design Guide (ADG) will be undertaken to support any development application subsequent to this proposal and discussion with the Burwood DRP. The concept design scheme reflected at **Appendix A** will enable a detailed design that is capable of achieving consistency with the ADG.

State Environmental Planning Policy (Resilience and Hazards) 2021

Chapter 4 of the SEPP (Resilience and Hazards) 2021 promotes the remediation of contaminated land and specifies considerations for the assessment of rezoning and development proposals. The Planning Proposal is accompanied by necessary documentation, including Preliminary and/or Detailed Site Investigations (as required) – see **Appendix I**.

State Environmental Planning Policy (Biodiversity and Conservation) 2021

The Planning Proposal enables future development that can support the aims and objectives of the SEPP (Biodiversity and Conservation) 2021 as it relates to the Sydney Harbour Catchment. Construction activities and the ongoing operation of the proposed development would be capable of supporting the following key objectives under Chapter 10 of the SEPP (Biodiversity and Conservation) 2021, including:

- Ensure a healthy, sustainable environment on land and water.
- Achieve a high quality and ecologically sustainable urban environment.
- Ensure the protection, maintenance and rehabilitation of watercourses, wetlands, riparian lands, remnant vegetation and ecological connectivity.

State Environmental Planning Policy (Transport and Infrastructure) 2021

As discussed, the site has a frontage to Parramatta Road, which is classified as a State Road. Under Schedule 3 of the SEPP (Transport and Infrastructure) 2021, the proposed development is traffic generating development. As such, referral to Transport for NSW (TfNSW) will be required.

Further to this, the development will be subject to Clause 2.121 (Division 17) of the SEPP (Transport and Infrastructure) 2021, which requires the consent authority to consider the submission of feedback from TfNSW.

State Environmental Planning Policy (Housing) 2021

Consistent – Any future development on this site will be required to consider and comply with this SEPP, as necessary, depending on the type of development. Any provisions available to future development of the site under the Housing SEPP will be considered as part of the future Development Application.

State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004

Consistent – Any future development on this site will be required to consider and comply with this SEPP, as necessary, depending on the type of development.

State Environmental Planning Policy (Industry and Employment) 2021

Consistent – Any future development on this site will be required to consider and comply with this SEPP, as necessary, depending on the type of development.

State Environmental Planning Policy (Sustainable Buildings) 2022

Consistent. The concept design to inform the Planning Proposal has been designed to align with the aims of the SEPP and focus on the delivery of sustainable and energy efficiency development, as well as the efficient use of resources and well located land to services and transport.

State Environmental Planning Policy (Planning Systems) 2021

Consistent – Any future development on this site will be required to consider and comply with this SEPP, as necessary, depending on the type of development.

Q7: Does the proposal have Strategic Merit? -Is the planning proposal consistent with applicable Ministerial Directions (section 9.1 Directions)?

The Planning Proposal is consistent with the applicable Ministerial Directions as set out below. The proposal consistency, and requisite justification will be provided in full as part of the Planning Proposal. It is noted that as per the LEP Plan Making Guidelines additional information may be required after a Gateway determination has been issued to demonstrate consistency with a direction.

Ministerial Directions

- **Focus Area 1 – Planning Systems:**
  - *Direction 1.2 – Implementation of Regional Plans:*

    Direction 1.2 establishes the objective to give legal effect to the vision, land use strategy, goals, directions and actions contained in Regional Plans.

    The Planning Proposal gives effect to the goals and directions of *The Greater City Regional Plan* and the *Eastern City District Plan*, and is therefore considered to support this objective in respect to LEP plan making.
  - *Direction 1.4 – Site Specific Provisions:*

    Direction 1.4 discourages unnecessarily restrictive site-specific planning controls. This direction applies to all relevant planning authorities.

    (1) A planning proposal that will amend another environmental planning instrument in order to allow particular development to be carried out must either:

    (a) allow that land use to be carried out in the zone the land is situated on, or

    (b) rezone the site to an existing zone already in the environmental planning instrument that allows that land use without imposing any development standards or requirements in addition to those already contained in that zone, or

    I allow that land use on the relevant land without imposing any development standards or requirements in addition to those already contained in the principal environmental planning instrument being amended.

    (2) A planning proposal must not contain or refer to drawings that show details of the proposed development.

    Consistency

    A planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the provisions of the planning proposal that are inconsistent are of minor significance

    Response

    The Planning Proposal proposes a standard format for rezoning the site – zoning, height and FSR in alternate controls tied to the provision of community infrastructure, a common approach across Sydney Councils. The Planning Proposal does not propose unnecessarily restrictive provisions but would seek to provide clarity to Council and community of the future built form outcomes, including the provision of open space. The Proposal is consistent with the Direction (1)(b) by rezoning the site to an existing land use zone (B4/Future Employment Zone), without imposing any development standards that would impact land (other than the site) in the zone.
- **Focus Area 1: Planning Systems – Place Based**
  - *Direction 1.5 – PRCUTS*

    This direction states that a planning proposal may be inconsistent with the terms of this direction only if the relevant planning authority can satisfy the Planning Secretary (or an officer of the Department nominated by the Secretary) that the planning proposal is:

    (a) consistent with the 'Out of Sequence Checklist' in the Parramatta Road Corridor Implementation Plan 2016 – 2023 (November, 2016), or

    (b) justified by a study (prepared in support of the planning proposal) that clearly demonstrates better outcomes are delivered than identified in the Parramatta Road Corridor Urban Transformation Strategy (November, 2016) and Parramatta Road Corridor Implementation Plan 2016-2023 (November, 2016) having regard to the vision and objectives, is

    I of minor significance.

    The Planning Proposal provides the requisite justification to satisfy the Planning Secretary of the appropriateness of the inconsistencies with the PRCUTs and realises a substantially better outcome to meet the context of the site – see **Section 8.1** of this document for further assessment and discussion.

- **Focus Area 3 – Biodiversity and Conservation:**
  - *Direction 3.1 – Conservation Zones:*

    The Planning Proposal consistent with Direction 3.1, which establishes the objective to protect and conserve environmentally sensitive areas.
- **Focus Area 4 – Resilience and Hazards:**
  - *Direction 4.1 – Flooding:*

    The site is located on identified flood prone land but flooding will be considered in the Planning Proposal. Notwithstanding, a Flood Risk and Drainage Statement has been provided by SCP (**Appendix J**) which confirmed the land is not flood identified lots and as such is not subject to flood planning requirements under the NSW Floodplain Risk Manual. Future Development Applications will be designed in accordance with Burwood Council's Stormwater Management Code (as amended) including stormwater quantity and quality management to ensure the development is compatible with overland flow behaviour and does not have any adverse or cumulative impacts on downstream environments.
  - *Direction 4.2 – Coastal Management:*

    As discussed in response to Direction 4.1, impacts to the nearby Coastal Management Area considered unlikely and are capable of being addressed at the detailed design phase and DA – including stormwater management and quality.

    In accordance with this direction, the Planning Proposal does not seek to:
    - Rezone land which would enable increased development or more intensive land-use on land within a coastal vulnerability area identified in the Resilience and Hazards SEPP, LEP or DCP.
    - Rezone land which would enable increased development or more intensive land-use on land within a coastal wetlands and littoral rainforests are of the Resilience and Hazards SEPP.
    - Amend and LEP mapping of the Hazards and Resilience SEPP.
  - *Direction 4.4 – Remediation of Contaminated Land:*

    The objective of Direction 4.4 is to reduce the risk of harm to human health and the environment by ensuring that contamination and remediation are considered by Planning Proposal authorities.

    A Report on Contamination Investigation has been undertaken by Douglas Partners (**Appendix I**) who concluded that the site can be made suitable, from a contamination perspective, for the proposed development provided further analysis undertaken in the Development Application phase of the project.
  - *Direction 4.5 – Acid Sulfate Soils*

    The objective of this direction is to avoid significant adverse environmental impacts from the use of land that has a probability of containing acid sulfate soils.

    Assessment of potential acid sulphate soils has been provided with the Planning Proposal, allowing the relevant planning authority to assess the appropriateness of the change of land use. The assessment suggests that there is an extremely low probability of occurrence of acid sulfate soils (ASS) at the site, and no proposed amendments of the current Class 5 mapping is proposed. On the basis of the study provided (**Appendix L**) the proposal is consistent with this direction.
- **Focus Area 5 – Transport and Infrastructure:**
  - *Direction 5.1 – Integrating Land Use and Transport:*

    Direction 5.1 establishes that a rezoning request/Planning Proposal must locate zones for urban purposes and include provisions that give effect to and are consistent with the aims, objectives and principles of the following documents prepared by the former Department of Urban Affairs and Planning (DUAP):

    (a) *Improving Transport Choice – Guidelines for planning and development* (2001).

    (b) *The Right Place for Business and Services – Planning Policy* (2001).

    As discussed, the site is located 400-600m from the future Sydney Metro Station at North Burwood. The site is also proximate to a numerous local amenities and bus services, in addition to open space and recreation infrastructure.

    The site can accommodate the uplift sought with respect to the integration of land use and transport. The Planning Proposal is consistent with Direction 5.1.

- **Focus Area 6 – Housing:**
  - *Direction 6.1 – Residential Zones:*

    Direction 6.1 establishes the following objectives:

    (a) Encourage a variety and choice of housing types to provide for existing and future housing needs.

    (b) Make efficient use of existing infrastructure and services and ensure that new housing has appropriate access to infrastructure and services.

    (c) Minimise the impact of residential development on the environment and resource lands.

    The proposed delivery of housing is discussed throughout this report to address housing Objective (a) above, which relates to housing variety and choice, in addition to future housing needs. It is also discussed in response to Direction 5.1 above that the Planning Proposal enables future development with appropriate access to infrastructure and services, as emphasised by Objective (b).
- **Focus Area 7 – Industry and Employment**
  - *Direction 7.1 – Business and Industrial Zones*

    Direction 7.1 encourage employment growth in suitable locations, protect employment land in business and industrial zones, support the viability of identified centres.

    The Planning Proposal demonstrates that the appropriate and suitable non-residential and employment floor space is provided in the development, balanced with the short-term accommodation (hotel), including the employment quantity and type this brings. and residential dwellings.

8.2 Site-Specific Merit

This Section identifies the site-specific merits of the proposal on a particular site. It identifies the potential environmental, social, and economic impacts of the proposal and outline proposed mitigation measures and justification. The assessment below, and information accompanying this Planning Proposal demonstrate that the amendments and future development are suitable on the site.

8.2.1 Section C – Environmental, Social, and Economic impact

Q8: Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected because of the proposal?

No. The site is largely vacant and excavated.

Q9: Are there any other likely environmental effects of the planning proposal and how are they proposed to be managed?

Refer to **Section 9.0** of this Planning Proposal for consideration of potential environment effects of the proposal and mitigation/management.

Q10: Has the planning proposal adequately addressed any social and economic effects?

Yes, the following sections address the social and economic impacts, market demand assessment of the potential need for, and appropriate scale of, retail and ancillary non-retail uses, public benefit, affordable housing and commercial viability and feasibility testing.

As part of addressing these components, a Social and Economic Impact Assessment has been prepared by Ethos Urban (**Appendix D**). The report sets out the key drivers for the Planning Proposal and future development from a social and economic perspective, aligned with relevant local, regional, and state-level strategic policy drivers. The report assesses the potential social and economic impacts and benefits associated with the project. A summary of the key impacts are set out below in the following sections.

On the whole, the site and future development is strategically positioned to capitalise on the construction of Burwood North Metro Station. Development in proximity to public transport infrastructure supports policy direction for co-location and the "30-minute" city.

The proposal seeks to catalyse the site in transforming the urban realm into an accessible live, work and play destination setting an exemplar for future development along Parramatta Road. The composition of the development has been sensitively considered in relation to the immediate suburban context in benefitting the community. Key strategic directions for optimising social and economic benefits through the project include:

- Catalysing renewal and activation of the Parramatta Road Corridor to benefit current and future communities – the development will breathe new life into Parramatta Road, attracting further investment, and pedestrian activity.
- Improving community infrastructure for local residents – the development will meet local demand for additional facilities while contributing diverse new community offerings not currently available within the dilapidated Parramatta Road area of Croydon.
- Supporting local socio-economic development – the development will deliver new local job opportunities for current and future residents of the study areas while enhancing local vibrancy and the economy.

8.3 Social Impacts and Benefits

The key social benefits of the proposal include:

- Improved way of life for new residents, workers, and visitors, of the site, as well as the existing community, associated with a new mixed-use development providing community facilities, daily living needs, employment opportunities, and open space in close proximity to planned public transport infrastructure
- Enhanced surroundings associated with the delivery of public domain improvements and provision of amenity on Parramatta Road. It is noted that this has been a long-term state government priority
- Increased accessibility to new local open space. It is an aspiration of the local community to see increased green open spaces and recreational opportunities in Burwood LGA.

Potential negative social impacts of the proposal include:

- The proposal will introduce a change in density, consistent with anticipating change within the PRCUTS. Whilst heights and density are proposed to increase beyond those concurrently anticipated in the PRCUTS, the proposal is responsive to the introduction of Burwood Metro Station. It is noted that the proposed development complies with relevant development controls for overshadowing, and that sufficient mitigation measures will be employed to prevent modest traffic impacts (as compared to the PRCUTs anticipated proposal) as discussed in **Section 9.1.**

8.4 Economic Impacts and Benefits

The key economic impacts and benefits of the proposal include:

- Based on direct construction costs of approximately $284 million, the construction phase is expected to directly support employment 410 jobs years, and deliver a direct value add to the economy of $61.5 million. When the multipliers are taken into account, total state-wide value add to the economy over the construction period are to be; employment of 1,690 job-years and a direct value add to the economy of around $231.4 million.
- On completion, the proposal will support ongoing jobs estimated at 300 FTE direct jobs, contributing direct value added to the economy of $29.5 million per annum. Taking into account the multiplier effect, total ongoing economy-wide effects are estimated at; FTE employment of 460 jobs supported, and total direct value added to the economy of $50.8 million per annum.
- Taking into account the proposed mix of residential dwellings at the site, there is a potential for the site to accommodate some 480 residents once complete and fully occupied. These residents will support additional retail expenditure in the local economy of around +$26.4 million each year, directly benefitting local retail business and services.
- The site will act as catalyst for growth and renewal in this part of the Parramatta Road corridor and will contribute towards ongoing investment in the local area. The proposal will support government investment in the area by delivering much needed housing, visitor accommodation and retail facilities within close proximity to transport and respond positively to the needs of the local area.
- The economic impact assessment concluded that the proposal overall would result in a net benefit to the community, and will not impact on the viability or continued operation of any existing or proposed facility within the region.

8.5 Market Demand Analysis

8.5.1 Retail demand

In the pre-lodgement discussion with Council, the impact of the proposed retail, commercial and employment floorspace in the proposal to the viability and operation of existing centres was an aspect raised to considered in the Planning Proposal. In response, GapMaps have prepared an Economic Impact Assessment (**Appendix K**) to look at the need and impacts focus on the retail and commercial components of the proposal. The report presents an assessment of the potential need for, and appropriate scale of, retail and ancillary non-retail uses as proposed in the Planning Proposal.

A summary of the key findings and commentary of this assessment is provided in the report with the key takeaways being

- The estimated impact on the Burwood precinct is expected to be negligible, estimated at around $8.6m in 2024/25, equivalent to an impact of around 1.2% (one point two percent), in the context of an estimated $680m of annual sales within this precinct. There is no risk of any noticeable adverse effects on this centre, noting in particular the relative scale of the proposed offer is less than 5% the size of the Burwood precinct.
- Other precincts in the primary sector, i.e., Five Dock and Concord, are estimated to absorb a combined 35% of the proposed development's sales, equating to impacts of around 5% or lower respectively on their future estimated turnover in 2024/25.
- The centres within the secondary sectors are expected to absorb around 20 –25% of sales, equivalent to around $8m, or an average of about 2%, with Strathfield and North Strathfield expected to absorb the greatest share of impact at a combined share of 20%, with impacts estimated to be 5% or less.
- There are three significant retail precincts located just beyond the periphery of the trade area to the north-east (Drummoyne), south-east (Leichhardt) and south (Ashfield). Ashfield and Leichhardt contain both Aldi, Coles and Woolworths supermarkets, with the latter also supporting a Harris Farm Markets. These precincts are estimated to

be impacted negligibly (1% or less), and there will also be a proportion of spend that will be redistributed from other undefined centres.

GapMaps concluded that the scale of the retail component of the proposed development is considered appropriate and that the development could be added to the market while preserving the existing centres hierarchy. Any estimated impacts on other surrounding centres are expected to be negligible.

In terms of non-retail uses, the scale envisaged is small, with the gym/fitness component likely to consist of 1 –2 operators and the medical/health/wellness offer likely to consist of several operators, across a range of specific specialties within this broad group (e.g., physiotherapy, dental, preventative health, alternative health, psychology). Any impacts from these types of uses would be widely dispersed across a range of operators, noting medical/health and gym/fitness uses tend to be a small component of any of the surrounding centres and are not key anchors underpinning the vibrancy/vitality of any given centre.

8.6 Public Benefits and Planning Agreement

The Planning Proposal will provide significant public benefit through the delivery of high quality residential, hotel, retail and commercial spaces with access to public transport, services, and employment. As discussed, the proposal will provide a direct and distinct community benefit in the form of expansive open spaces on the site (approximately 25% of the site area) as well as multiple through sit link connection that will provide direct access to retail and commercial uses.

Should the Planning Proposal progress to LEP Gateway, the proponent is willing to enter into a Voluntary Planning Agreement (VPA) with Council. The proponent proposes to deliver the following public benefits as part of the Planning Proposal, which is proposed to be progressed to agreement in further discussion with Council:

- Funding and construction of a centrally located publicly accessible open space, and ongoing management for a period of time to be negotiated with Council .
- Funding and construction of a landscaped setbacks and through site links through the site, including the shared laneway and through site links.
- Construction of a community facility to be accommodated on the site and dedicated to Council, or retained by the owner and structured with a lease arrangement for use by Council.
- Contributions towards affordable housing stock.

As discussed within this Planning Proposal, the proposed statutory mechanisms for the land is by way of a site-specific clause that sets out objectives, and items and components of the development that cannot be approved unless other aspects are satisfied. The proposed uplift to FSR and building height (alternative floor space and height) are tied to these components. This mechanism has been used successfully within NSW across other LGAs.

The proposed arrangement is clear and robust and provides clarity to community and stakeholders of the amount and type of public benefit that must be delivered with any redevelopment of the land. The community benefit is inherently tied to any development.

These components of community benefit are secured with any development on the land through the proposed alternate floor space and building height maps and associated site-specific requirements for Community Infrastructure.

This proposed arrangement provides abundant certainty to the community, Council and landowners, that no additional/alternate development can occur on the site, unless the components of public benefit set out in the controls are provided. The proposed site-specific incentive clauses guarantees that when any substantial development takes place on the site, that the public and community benefit identified in the draft clause and future, will be delivered upon development completion.

Further necessary arrangements with the State Government for state and regional infrastructure, including the consideration of the Housing and Productivity Contributions (including a transport project component, currently referred to as a SIC) will be negotiated concurrently with the Planning Agreement to Council. The remainder, as required, will be incorporated into the Planning Agreement with Council – ensuring that the impost of additional contributions payable to the State Government have a bearing of viability and feasibility the proposal and extent of the proposal planning agreement with Council.

8.7 Affordable Housing Provision

As set out in the Burwood Council business papers of November 2022, to support the work being undertaken in relation to the Burwood North Master Plan, Council is in the process of preparing an Affordable Housing Policy and Contributions Scheme. This will provide recommendations on affordable housing delivery both for Burwood North and LGA wide in addition to advising on options to improve housing diversity outcomes. It is anticipated that the requisite contributions will be established in the Policy and the separate necessary amendments to Burwood LEP 2012 to enable the levying of these contributions.

At this stage, it is understood that the contributions scheme is seeking to facilitate the delivery of a minimum 5% of affordable rental housing in future development, in line with the requirements of the PRCUTS. This is proposed to be incorporated in a planning agreement as mentioned above, provides on site supply.

8.8 Commercial Viability and Feasibility Testing

As request by Council in the Scoping Report comments, Charter Keck Cramer have prepared a Financial Feasibility Assessment (**Appendix F**) as part of Commercial Viability Testing associated with the Planning Proposal for the site. This analysis considers the feasibility of the proposal when considering the existing PRCUTs vision.

8.8.1 Net Increase in residential and employment yield

The analysis considers the net increase in residential and employment yield as compared to the anticipated PRCUTs. When considering the additional demand in infrastructure. With regard to the quantum of floor space and allocation of usage, the potential dwelling yield within the PRCUTS scheme is 42 dwellings with the Planning Proposal scheme featuring a dwelling yield of 187 dwellings. The Planning Proposal Scheme thus reflects a net increase of 145 private dwellings (excluding the hotel).

Having regard to the quantum of space for each non-residential use and the benchmarked FTE staff potential, the PRCUTS Scheme is expected to produce circa 20 additional FTE staff compared to the Planning Proposal Scheme.

8.8.2 Financial Feasibility

In undertaking financial feasibility testing, hypothetical development assessments to test the financial viability of the PRCUTS and Planning Proposal Schemes based on market-based assumptions along with information from a range of specialist consultants has been undertaken. This includes the consideration of the following:

- Property market related factors both at a macro level and micro level (specific to both development schemes) – including increases in construction costs and high interest rates which through 2022 have negatively impacted consumer sentiment contributing to limited (if any) capital growth.
- Development Contributions
- Affordable Housing Contributions
- State and Regional Infrastructure arrangements for infrastructure (State VPA)
- Public Benefit/Works in Kind (open space etc)
- Long Service Levy
- Potential Transport infrastructure Contributions (considered separately to State and Regional Infrastructure Arrangements)

In light of the above market considerations, the potential impact of the identified developer contributions has been tested for each scheme. The Planning Proposal Scheme results in an increase of 88% to gross floor area when compared to the PRCUTS Scheme. Assessment of the developer contributions for each scheme based on the respective hypothetical development exercises indicates a substantial contributions premium under the Planning Proposal scheme. In real terms, the developer contributions as a dollar amount increase by 660% under the Planning Proposal Scheme which significantly impedes financial viability of the project.

The main reasons for the increase are in part due to the increased residential yield and an assumption of potentially higher contribution rates under the Planning Proposal Scheme (such as affordable housing).

It is acknowledged that as part of the Planning Proposal, and future Development Applications, it could be expected that not all of the potential contributions would be levied to the proponent, particularly where viability is compromised. These may include elements such as offsets / reductions relating to the provision and delivery of land and Works in Kind

for publicly accessible open space, and / or possible reductions in the apportionment of contributions to State and Regional infrastructure to reflect increased development potential likely to result from the introduction of the Sydney Metro Burwood North station.

8.8.3 Additional Demand for Infrastructure

The proposal will generate additional demand on infrastructure. In order to calculate this with any accuracy, benchmarking of existing agreements for State and Regional Infrastructure in the Parramatta Road Corridor have been used to determine the associated dollar value attributed to the additional growth (considered in the financial viability assessment) Based on the current anticipated growth within the immediate precinct and wider corridor, the delivery of the Western Sydney Metro, it is also anticipated that the rate to which the additional infrastructure is needed is proportionally less.

8.8.4 Section D – Infrastructure (Local, State and Commonwealth)

Q11: Is there adequate public infrastructure for the planning proposal?

Local Infrastructure

As part of the Social and Economic Impact Assessment provided at **Appendix D**, a Social and Cultural Infrastructure needs Assessment has been undertaken. Taking into account the community profile, forecast population, the current and planned supply of infrastructure and its' spatial distribution, the following infrastructure provision is recommended, in addition to open space:

- Multipurpose community space, which can support the following uses:
  - General community use (i.e., meetings, programs, community bookings)
  - Creative and cultural use (i.e., makerspace, exhibition/event space)
  - Community health service delivery by the Local Health District.
- Co-working space, leasing available retail/commercial space to a co-working operator in order to account for the lack of equivalent space in the locality.

Through discussions with Council and the community it was also clear that the community has a need/desire for additional open space that is focused towards, and caters for, the community. Whilst other open spaces exist within the catchment, the ability to provide activated spaces adjacent of services and retailing has been supported.

State and Regional Infrastructure

It is proposed to include a 'satisfactory arrangement' clause in relation to relevant state and regional infrastructure to allow for coordination with any precinct wide considerations as part of the Burwood North precinct and Burwood North Metro Station. This would allow the planning proposal to progress whilst ensuring that any necessary arrangements for the provision of infrastructure through the Planning Proposal. This is particularly relevant given the changing nature of development contributions and the introduction of the Sydney Metro West Burwood North Station.

8.8.5 Section E – State and Commonwealth Interests

Q12: What are the views of state and federal public authorities and government agencies consulted in order to inform the Gateway determination?

The Scoping Report was provided to DPE by Council for referral to relevant agencies for feedback and comments. As set out in **Section 8.10,** a response was provided by Transport for NSW. The relevant considerations and comments have been incorporated into this Planning Proposal. As set out in the Engagement Report, Ausgrid and Sydney have been contacted in relation to the Planning Proposal.

8.9 Part 4 – Maps

The following maps, as set out int **Table 12** and **Appendix N** are proposed to be amended and/or included in the Burwood LEP to facilitate the Planning Proposal. Following the initial consideration by Council and the Burwood Design Review Panel, these maps may be revised or amended.

Table 12. Proposed Maps for Planning Proposal

Map	Action	Detail
Land Zoning	Amend	Amend to MU1 Mixed Use Zone
Floor Space Ratio Map	No change	-
Building Height Map	No chance	-
Key Site Map	New Map	To identify the site and coincide with the proposed local provisions clause
Alternate Floor Space Ratio Map	New Map	Details of maximum FSR to be included on the map – with maximum FSR for residential use proposed to be included as a site specific clause in the local provisions
Alternate Building Height Map	New Map	Height of buildings to be identified – which may includer perimeter height and location of heights for towers to match RL or height in metres.

8.10 Part 5 – Community Consultation

Formal consultation with the community and public will be undertaken in accordance with the terms of the Gateway Determination, as set out in the LEP Plan Making Guideline. Details of community consultation and engagement activities undertaken to date are provided below.

As part of the early conversations with Council the intent for initial community engagement to be undertaken prior to lodgement of the Planning Proposal was identified. The aim was to develop and deliver a consultation program that constructively engaged with site neighbours, government agencies and service providers to ensure the project team has an understanding of local issues, and record feedback for consideration during the ongoing refinement of the proposal.

As set out in the Consultation Outcomes Report (**Appendix G**), the following activities have been undertaken.
A high level summary of the engagement activities undertaken:

- Letterbox notification to approximately 36 immediate neighbours and approximately 219 wider community members on 5 November 2022
- Several formal and informal project briefings with Burwood City Council planning team.
- Consultation with Transport for NSW, Sydney Water and Ausgrid.
- 2 x community information sessions held on 17 November 2022 and 22 November 2022 attended by 20 people.
- 1 x community webinar attended by 15 people
- Project Enquiry email and phone line with five enquiries received through community engagement channels during the consultation period.

The purpose of engagement undertaken was to:

- Seek feedback from immediate neighbours and the wider community to better understand local views and potential concerns.
- Provide clear, timely and accessible information, as well as opportunities for close neighbours to provide feedback during the early planning phases.
- Explain how the proposed design concept and site planning approach addresses key community issues and long terms strategic planning priorities
- Create effective lines of communication between the local community, stakeholders, and the project team.

Burwood Council identified a number of items that required consideration and response in the lodgement of the Planning Proposal These issues were summarised in council's scoping response to the Scoping Proposal submitted by LSH on 1 June 2022 and are included in this Planning Proposal. The Engagement Item is considered in **Table 13** below.

Table 13. Council's Scoping response requirements for engagement

Item	Requirement	Project Response
Engagement	Details of any engagement undertaken, including feedback from agencies and public authorities, and how issues have been considered.	Details on the various communications tools and engagement activities utilised to share project information, including channels and opportunities for providing feedback is summarised above and included in the Consultation Outcomes Report. Details of consultation with Government agencies, service providers, and neighbouring residents as well as how issues raised have been addressed are detailed in this report.

The PRCUTS 'Out of Sequence' checklist criteria for Stakeholder Engagement – Criteria 1-3 is also addressed in **Table 14**.

Table 14. PRCUTS 'Out of Sequence Checklist' – Criteria 3. Stakeholder Engagement.

No.	Criteria – Stakeholder Engagement	Project Response
1.	Consultation and engagement with relevant stakeholders (council, government agencies, business, community, adjoining properties and user or interest groups, where relevant) have been undertaken, including any relevant pre-planning proposal engagement processes required by local council.	LSH has undertaken preliminary stakeholder consultation as a part of the Planning Proposal process. This is in line with Burwood Council's pre-planning proposal response to the scoping report to the applicant dated 2 August 2022.
2.	An appropriate level of support or agreement is documented.	**Burwood Council:** Refer to Council's response to the pre-planning proposal scoping report dated 2 August 2022. Key concerns have been addressed within the Planning Proposal Report accompanying this application. **TfNSW:** Refer to TfNSW's response to the pre-planning proposal scoping report dated 8 August 2022. Key concerns have been addressed within the Planning Proposal Report accompanying this application. **Ausgrid and Sydney Water:** Contact with these agencies has been made in preparation of the Planning Proposal.
3.	Provision of documentary evidence outlining the level of planning or project readiness in terms of the extent of planning or business case development for key infrastructure projects.	Given the condition of the site, the Planning Proposal, if approved, would be 'project ready' immediately.

8.11 Part 6 - Project Timeline

The following in an anticipated project timeline for the Planning Proposal – **Table 15.**

Table 15. Proposed Project Timeline – Planning Proposal

Stage	Timeframe and/or Date
Lodgement	December 2022
Burwood Design Review Panel	February 2023
Response + Lodgement	June 2023
Consideration by Council	July-August 2023
Council Decision	September 2023
Gateway Determination	November 2023
Pre-Exhibition	December-January 2023/2024
Commencement and completion of public exhibition	January-February 2024
Consideration of submissions	February-March 2024
Post Exhibition work	February-April 2023
Post Exhibition Council Endorsement	May 2024
Submission to the Department for finalisation	June 2024
Gazettal of LEP Amendments + DCP	August 2024

9.0 Environmental Assessment

This chapter provides an overview of the key planning and technical assessment issues relating to the Planning Proposal. This assessment collectively addresses matters which form the basis for the adequacy of in order to confirm the site-specific merit of the proposal.

9.1 Traffic, Access, and Transport

A Transport Assessment has been prepared by JMT Consulting. This report is appended to this Planning Proposal at **Appendix E**. The assessment has considered the current site conditions, transport assessment, parking, loading and servicing and impacts of the Proposal on the road network and key intersections. The Assessment considers the following items

- Existing transport conditions around the site
- Site access arrangements
- Forecast travel demand
- Forecast traffic volumes
- Traffic modelling and road network impacts
- Loading and servicing
- Potential car parking provision

Lastly, as set out in the July 2021 Implementation update of the PRCUTS the Planning will have regard to the necessary road improvements and upgrades identified in completed precinct-wide traffic studies and TfNSW and Council endorsed local plans for active transport.

9.1.1 Existing Transport Conditions

2016 Journey to Work census data shows that a strong proportion of people travelling from Croydon to work use public transport (more than 50%), accounting for over half of the trips to work. Private vehicles are the dominant mode of transport for people travelling to Croydon for work, likely to be as a result of the current employment generators and capacity to park on site/street.

9.1.2 Vehicle Access

The access strategy has been developed so as to minimise impacts to Parramatta Road by locating the car park access points on the site's southern boundary, as well as by providing multiple access points so as to distribute traffic movements across the site.

The access strategy can be summarised as follows:

- General vehicle access to the basement car park via access points on the southern frontage of the site on both Lucas Road and Cheltenham Road.
- Separate hotel porte-cochere access via Lucas Road for the purpose of taxi pick up and drop off.
- One-way shared zone to support access and permeability through the site. Should the shared zone become dedicated as a public road the speed limit will need to be approved by TfNSW through a separate application. It is the current intent however that this road remains a private road.

Given Parramatta Road is a State Classified road, in accordance with Clause 2.118 of *State Environmental Planning Policy (Transport and Infrastructure) 2021* no direct access is proposed from Parramatta Road - with all vehicle access to be via the local road network.

9.1.3 Parking

Given the configuration of the site, and existing basement conditions, the Concept Scheme anticipates the potential to provide car parking at rates that are generally consistent with Burwood DCP 2012, with the exception of hotel parking which has been adopted at a rate of 0.3 space/ room (rather than 1/room).

While there is the ability to achieve the minimum parking numbers required under Burwood DCP 2012, the proposed maximum parking rates including in the Transport Assessment (**Appendix E**) provide for flexibility to reduce car parking (if warranted) to minimise the traffic impacts of the development and reflect the site's accessibility to public transport nodes, in line with the scoping report comments of Council.

9.1.4 Bicycle Parking and Car Share

The site is located on an existing cycleway. The concept proposal provides opportunities for resident, worker and public bicycle parking, as well as end of trip facilities. The ability for these to be provided as part of a future DA will encourage a greater take up of bicycle usage. The provision for carsharing is also capable with the basement.

9.1.5 Loading

Based on the TfNSW Urban Freight Forecasting model and the yields envisaged under the Planning Proposal, a future detailed Development Application for the site would need to make provision for the following service vehicle provision, which can be accommodated on the site, within the basement

- 6 small vehicle parking spaces (B99 / vans / utes)
- 2 medium size vehicle parking spaces (SRV / small trucks)
- 1 large size vehicle parking size (MRV / HRV)

9.1.6 Traffic Impact Assessment

The traffic modelling has indicated that the Planning Proposal would have only minor impacts on the surrounding road network, with overall intersection level of service remaining at Level of Service D or better in the future year 2036. The proposal itself does not substantially change the operation of the signalised intersections on Parramatta Road.

Traffic movements expected to be generated under the Planning Proposal would be lower (in the AM peak hour) and comparable (in the PM peak hour) when compared to a development scenario under current planning controls for the site, given the types of uses, trip generation rates and travel times.

While potential road network upgrades were considered in the early planning phase of the project as the reference design was being refined, the traffic modelling has demonstrated that no traffic upgrades are necessary to accommodate the yields envisaged under the Planning Proposal. It is noted that TfNSW are separately exploring options for improvements to the traffic network.

9.2 Flooding and Stormwater

9.2.1 Flood Risk

A Flood Risk and Drainage advice letter has been prepared by SCP and is provided at **Appendix J**. The purpose of the letter is to identify and review the existing flood risk that impacts the site and to propose potential management strategies if required based on floodplain risk management requirements. The review found several flood studies have been engaged by Council to assist in identifying flood affected lots. The information from Council was then combined into a Consolidated Flood Identification (CFI) map identifying the lots which are subject to flood planning requirements.

SCP concluded that the site is not considered a flood identified lot and as such is not subject to flood planning requirements under the NSW Floodplain Risk Manual. It was recommended the stormwater drainage be developed as in accordance with Council's Stormwater Management Code to ensure no adverse or cumulative impacts on downstream environments.

9.3 Geotechnical

A desktop geotechnical assessment has been undertaken and report has been prepared by Douglas Partners and is provided at **Appendix L.** Previous geotechnical investigations of the western portion of the site have been carried by Douglas Partners for the previous car showroom development (Ref: 85862.00. R.001.Rev1 dated 20 June 2017).

- Based on the Sydney 1:100 000 Geological Series Sheet, the site is underlain by Ashfield Shale of the Wianamatta Group which typically comprises black to dark grey shale and laminate.
- Based on Water NSW records there are 26 groundwater bores within 2 km of the site, three bores are present within 500 m of the site, however no data on standing water level or intended use was available.
- Surface water is expected to collect within the excavated portion of the site or sheet into nearby stormwater channels present in the vicinity of the low-lying St Lukes Park and Concord Oval located approximately 160-250 m to the north-west. These drains flow into Parramatta River and hence would be the likely source of any site run-off via the local stormwater network.
- Groundwater was encountered at varying depths within the bedrock profile across the site in the standpipe monitoring wells, which suggests the presence of temporary 'perched' groundwater, rather than a regional groundwater table.

9.4 Contamination

Douglas Partners have undertaken a Contamination Investigation Report (**Appendix I**) to guide the concept development phase of the future planning for the site. Prior to this investigation a number of preliminary, detailed site investigations were undertaken to facilitate the previous plans for development in Area 1 and Area 2. After LHS acquired Area 3, a phase 1 environmental due diligence desktop investigation completed by Greencap in 2021. The objective of the CI is to assess the suitability of the site for the proposed development and whether further investigation and/or management is required based on review of available data from the previous investigations undertaken at different areas of the site and incorporating the relevant fieldwork results of the original DSI (DP, 2017a).

Scope

The scope of works for the CI comprised the following:

- Review of previous reports provided to DP.
- Review of the following site history information / records, obtained by DP including Registered groundwater bores; Historical and current aerial photographs; and NSW EPA databases held under the CLM and POEO Acts for the site and adjoining properties.
- A walkover of the site to observe and record current land uses, signs of historical uses, hydrogeological features (i.e., streams, dams, water wells, catchments, and drainage), presence of fill, waste disposal practices, etc compared to the results of previous investigations.
- Based on the above information, identify areas of environmental concern and contaminants of potential concern (CoPC)
- Preparation of a conceptual site model (CSM)
- Provision of this CI report describing the methodology and results of the previous investigations. The report includes the conclusions with respect to the contamination status of the site, and recommendations for further work as deemed necessary.

Findings

The following likely subsurface conditions and recommendations have been noted based on previous work and field work results:

- A hazardous building materials survey of the existing buildings to be demolished must be undertaken prior to disturbance. The results should identify potential contaminants (e.g., asbestos and lead) that may be present as improper demolition could spread the contamination to surface soils;
- Clearance of the building disturbance following the removal of identified hazardous materials, and upon demolition of the building (where proposed to be demolished) should be undertaken by a qualified occupational hygienist / licensed asbestos assessor; and
- Upon demolition of existing buildings, a supplementary investigation should be undertaken targeting the sub soils beneath Area 3 and demolished structures and hardstand in Area 2. It is anticipated that this supplementary

investigation will satisfy the data gaps of this DSI. Given that the site is currently occupied by existing structures / buildings, it is considered that the recommended for intrusive investigation should ideally be undertaken following demolition of the site structures.

9.5 Visual Impact Assessment

The corridor along Parramatta Road has long been recognised as providing a different built form treatment to the remainder of the residential areas adjoining. In part, this allows for the changes to be confined to this strip of land, and removes the need for development to blend into the existing residential, but also recognises the appropriateness of this land to provide for development

Whilst acknowledging a physical difference in building height and form, the concept scheme (**Appendix A**) illustrates how the future development can achieve a built form outcome that can appropriately transition and speak to surrounding low density residential character form. A series of visual impact assessment views will be prepared for the Planning Proposal to illustrate the compatibility of the bulk and scale of the proposal with its context.

Architectus' methodology for the assessment of visual impact used in this report has been developed based on the New South Wales Land and Environment Court Planning Principles as written in *Tenacity Consulting v Warringah Council [2004]* and *Rose Bay Marina Pty Limited v Woollahra Municipal Council and anor [2013]*.

In this Design Report (**Appendix A**), a detailed qualitative assessment of each view is set out under the following principles:

- Importance of the view;
- Visual absorption capacity; and
- Likely view change.

Three visual simulations (photo-montages) have been prepared for each view to determine the visual impact of the proposed development. Each view is given an overall view impact rating taking into consideration the above three principles. It should be noted the photo-montages shown demonstrate the building form only; they do not show detailed articulation or material selection.

Whilst the proposal will be visible, and of greater visual impact from that of the PRCUTs or current planning controls, with the indicative future context of Kings Bay and Burwood Precinct, the proposal's height is consistent with the future built form located along Parramatta Road. When considering the view change, the proposal is considered to integrate into the skyline of Parramatta Road, particularly from more distant views.

From some vantage points, the proposed form and massing impacts existing views and outlook in the form of height. However, with the substantial separation between towers on the site, the relief create at the centre of the site is also considered to be greater than a somewhat comparable scheme (or less density) – which also does not provide for the potential to deliver large areas of public accessible open space.

9.6 Residential Amenity Impacts

The Planning Proposal seeks to minimise the potential impacts to surrounding properties, whilst providing a built form that is responsive to the context.

The scale and depth of the site allow for consideration separation between building both on the site and adjoining, in order to mitigate the direct impacts of amenity such as overlooking and solar access. The intentional and considered approach to the separation of towers on the site, east and west, with a relatively low four storey podium ensure that physical separation provides relief and mitigates overlooking and privacy impacts

Within the site, the proposed building envelopes and orientation, allow for SEPP 65/ADG compliance to be achieved to the residential portions of the site, as well as providing high quality amenity to the hotel and short stary components on the west. The podium design, coupled with the dimensions of the site, allows for any residential to be elevated and set back from the parapet below, whilst also providing a buffer to the area of public accessible open space on the site and further beyond to the south.

As demonstrate in the Design Analysis and alternatives testing, consideration has been given the Urban Design Guidelines of the PRCUTs, and how these could be applied to different building typologies.

9.6.1 Solar Access and Overshadowing

According to the analysis included in the Design Report (**Appendix A**), the proposed building envelopes, which incorporate a large separation at the centre of the site, ensure that minimum solar access requirements to living room windows are provided as a result of the proposal, while evenly distributing any impacts across southern neighbours and retaining high proportions of 2+ hours of solar access. The planning proposal envelopes also ensures areas of all private open spaces adjoining the site receive 2 hours or greater solar access.

As a foundational principle of the proposal, the envelopes were considered to ensure that there is no overshadowing impact on Prowse Reserve at any time of the day on any day of the year.

9.7 Ecologically Sustainable Development

An Ecologically Sustainable Design (ESD) strategy report has been prepared by Aspire Sustainability Consulting and is provided at **Appendix H**. The report outlines the sustainable design initiatives being explored for the development, demonstrating a commitment to satisfy national & state legislation in addition to local planning controls.

Aspire Sustainability concluded the proposed development provides great opportunity to showcase sustainable design and provide a space that meets the needs of the present, whilst protecting the future. It was recommended that the ESD strategy is further refined during the design development detailed investigations.

9.8 Potential Environmental Impacts

With reference to the relevant considerations set out within the NSW DPE's Plan Making Guideline, it is noted that:

- The Planning Proposal would not adversely impact critical habitat or threatened species, populations or ecological communities or other habitats. The site is located within an established urban area.
- The potential for environmental effects can be readily managed, including by way of appropriate massing, design and setbacks as demonstrated by the accompanying Design Report (**Appendix A**).
- Provision will be made for adequate car parking and a future traffic analysis will confirm that the surrounding road network can accommodate additional traffic generated. The Transport Assessment confirms that the proposal will have minimal impact on the existing road network, and the scope, scale and mix of uses does not generate a need for any updates to road network or intersections.
- The various hazards impacting the site are deemed able to be managed by suitable mitigation or design measures as demonstrated by the associated report attached to the Planning Proposal.
- The scale of the development is responsive to its strategic setting and physical context, noting the future character of the area and the large size of the site. The proposal is considered to result in acceptable visual impacts in the existing and potential future surrounding context.
- The proposal will result in positive social and economic effects for the local area through public realm improvements, increasing the availability and mix of apartment types, community facilities, open space and economic benefits for Croydon, Burwood and the wider LGA.

10.0 Conclusion

This Planning Proposal requests amendments to the *Burwood Local Environmental Plan 2012* (Burwood LEP 2012) relating to 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon. Ethos Urban has prepared this Planning Proposal on behalf of LSH Property Alexandria.

The broad intent of the Planning Proposal is to achieve a vibrant, mixed-use precinct that places greenery at its heart, combining all the elements that make a great Sydney neighbourhood within a single precinct. Realising a considered mix of neighbourhood retail, community amenity, generous open green space and much-needed housing, the proposal will uplift the local community and unlock great public spaces and public benefit for current and future residents.

The future redevelopment of the site will act as a catalyst for future developments along one of Sydney's most critical transport corridors which will assist in the reinvigoration of the Parramatta Road corridor, stimulate the local economy, and contribute to the area's current social infrastructure, retail, and hospitality offering.

The following amendments to the Burwood LEP 2012 are sought by the Planning Proposal.

- Amending the Burwood LEP 2012 Zoning Maps to change the zoning of the site to MU1 Mixed Use Zoning
- Including a new Burwood LEP 2012 Alternate Floor Space Ratio Map to change the maximum permissible floor space ratio (FSR) across the site to 3.4:1 (including a range of land uses)
- Including a new Burwood LEP 2012 Alternate Height of Buildings Map to allow maximum building height from 8.5m to 72.5m (maximum 22 storeys) to allow for, and control, the delivery of proposed built form in line with the design principles for the site.
- Inclusion of an additional local provisions applying to the site, which requires that community infrastructure is provided for any development that seeks to use the Alternate controls, including elements such as publicly accessible open space in quantum, and location relative to built form (approximately 2,700sqm).
- Identification as a Key Site and requirements for Design Excellence to be included in the Burwood LEP 2012.
- Incorporation of site-specific provision relating to the mix of land uses (FSR maximum and/or minimum) built form controls and requirements.

The Planning Proposal proposes a responsive and broad mix of land uses to meet the identified demand and supply, which is expected to change in response to the Sydney Metro West station at Burwood North. The Planning Proposal will provide community and public benefits as well as the contribution towards affordable housing within the LGA .

In summary, the Planning Proposal

- supports the aims and objectives of the relevant strategic plans and policies, including the *Eastern District Plan*, *Burwood Local Strategic Planning Statement*, and the *Burwood Housing Strategy*.
- will enable a development that can comply with relevant statutory plans and policies, including the BLEP 2012 and the Housing SEPP 2021.
- is consistent with the Ministerial Planning Directions that commenced on 1 March 2022 – particular with regard to transit orientated development and the Parramatta Road Urban Transformation Corridor.
- demonstrates site-specific merit and will address relevant site-specific planning matters.
- will enable a development that can effectively minimise any potential adverse environmental impacts.
- Will deliver social and economic benefits.
- will provide for increased housing diversity and supply, employment, and tourist and visitor accommodation close to public transport infrastructure, jobs and amenities.

We look forward to the opportunity to discuss that Planning Proposal further with Council.

architectus™

166-204 PARRAMATTA ROAD

Croydon's urban village

Prepared for: LSH Property Australia
Date: May 26, 2023

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We pay our respects to Elders, past and present and emerging.

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Contents

1 **Introduction & urban context** 4
1.1 Overview 8
1.2 Strategic Context 9
1.3 Local Context 10

2 **Planning context** 11
2.1 Greater Sydney Region Plan 12
2.2 Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) 13
2.3 Sydney Metro West 14
2.4 Burwood LSPS 15
2.5 Planning controls 16

3 **Analysis** 19
3.1 Access and Movement 20
3.2 Opportunity Site 21
3.3 Existing open space and setbacks 22
3.4 PRCUTS Proposed open space and setbacks 23
3.5 Character & Built Form 24
3.6 Retail 26
3.7 Constraints 28
3.8 Opportunities 29

4 **Vision** 31
4.1 Vision 34

5 **Future Development Context** 39
5.1 Existing context 40
5.2 A catalyst for renewal 42
5.3 Development in comparable locations in Sydney 44
5.4 Approach to renewal 49

6 **The proposal** 56
6.1 Urban Design Principles 57
6.2 Envelope testing 59
6.3 Proposed structure plan 61

7 **The proposal** 62
7.1 The Proposal 63
7.2 Public Domain 65
7.3 Desired future character 67
7.4 Sections 72
7.5 Massing and Articulation Strategies 74
7.6 Architectural Plans 76
7.7 The proposal in the future development context 87

Contents

8 **Planning context** **88**
8.1 Introduction 90
8.2 Visual Impact Assessment Methodology 90
8.3 Visual Context 92
8.4 Visual Impact Assessment 94
8.5 Solar Analysis Overview 110
8.6 Solar Analysis - Living Room Windows 112
8.7 Solar Analysis - Private Open Space 114
8.8 Solar Analysis - Prowse Reserve 116

A **Appendix** **118**
A.1 Milestone 119
A.1 Responses to DRP Feedback 120
A.1 Laneway and terrace house study 122
A.1 Summary of Scoping Report feedback 125
A.1 Laneway and Access Study 126
A.1 Evolution of the envelope testing 128
A.1 Floorplate Study 138

Sydney CBD
Site
Parramatta
Road Corridor
Burwood
M
M
Parramatta Road

1
INTRODUCTION & URBAN CONTEXT

1.1 Overview

Purpose of this report

Architectus has been engaged on behalf of LSH, the proponent and owner of the subject site, to prepare an urban design approach and reference architectural scheme for the subject site.

The amalgamated site, known as 166-204 Parramatta Road and 1-1A Cheltenham Road Croydon. Croydon is located in Sydney's inner west, in the Burwood Local Government area, between Sydney CBD, and Parramatta. The site is located in the Parramatta Road corridor and forms part of the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS). It is also located 600m from the Metro Station at Burwood North.

This Urban Design Report has been developed around a series of urban design principles which have determined the master plan and re-development approach to the site. This report presents a reference design to demonstrate the proposed distribution of land uses, massing, building form, and an overall building height and floor space ratio for the site. The scheme has been developed to achieve and exceed SEPP 65, and the Apartment Design Guidelines, with respect to building separation, open space, deep soil, cross ventilation and solar access.

Study objectives

- Investigate and respond to the site's strategic role in the context of being within the proposed Burwood North metro station catchment
- Understand the role of the site with the Parramatta Road transformation corridor strategy (PRCUTS)
- Identify scope to contribute to housing and jobs targets in the LGA
- Investigate opportunities presented by improved amenity of the site since the opening of WestConnex
- Respond to the existing and future local character including open space, connections, and mixed use clusters

Collaboration with Council

The proponent has collaborated closely with Council during the evolution of the reference design. A scoping report was lodged in June 2022, and the proposal subsequently updated to respond to Council's comments.

In December 2022 the Planning Proposal was lodged with Council, after which Council requested some additional material from the proponent.

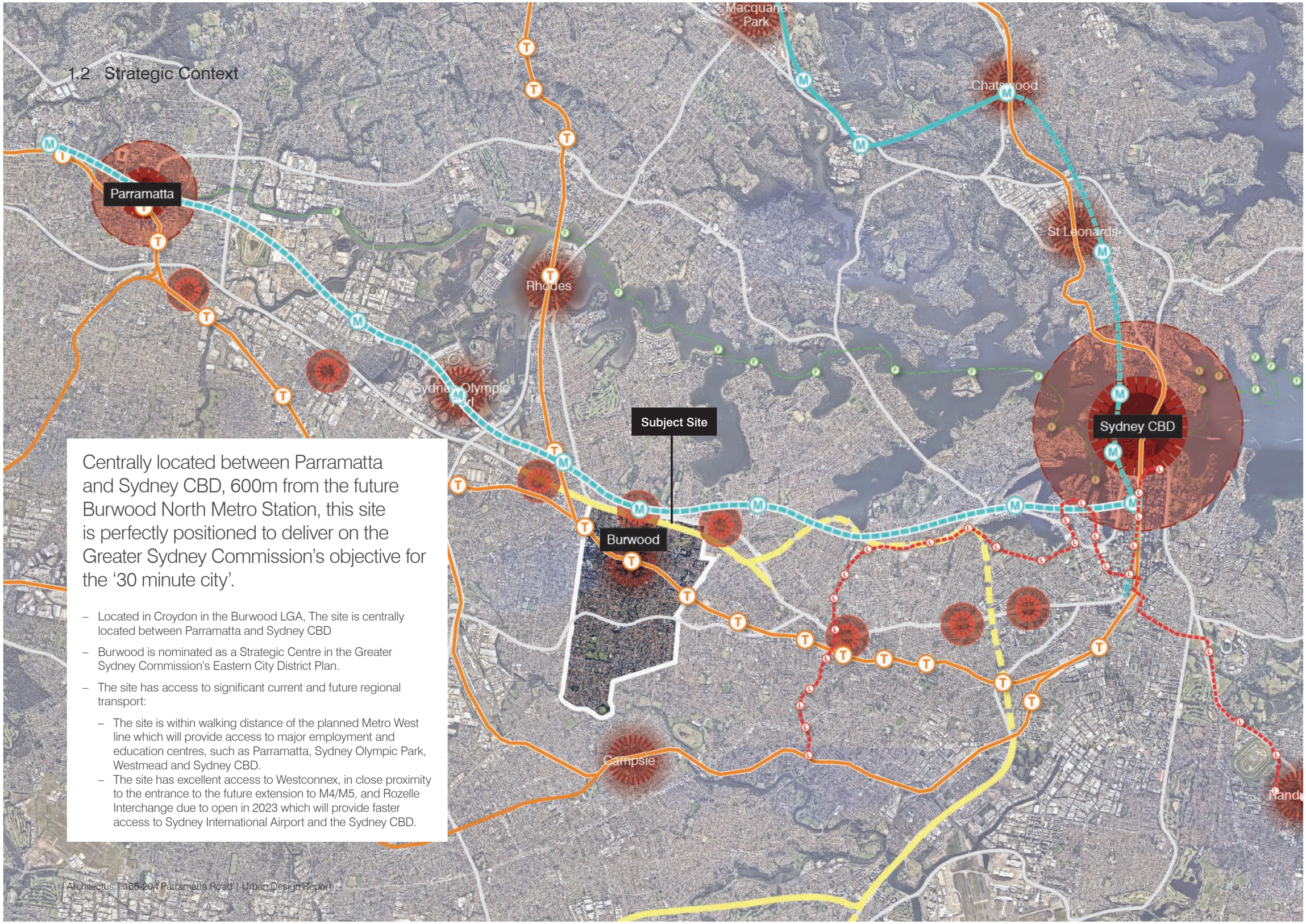
In February 2023 the proponent presented to the Design Review Panel (DRP) and received verbal and written feedback. The DRP and Council feedback in summary included commentary on the terrace house interface with the future context on the southern boundary, as well as a request for further justification for the proposed density and scale, and some more detailed design questions..

The reference design has been updated to respond to the DRP and Council's feedback, and is incorporated in this Urban Design Report which accompanies the revised planning proposal. A matrix cross-referencing the DRP comments and the responses is provided in the Appendix.

Project Team

LSH has engaged a comprehensive team of specialist consultants to prepare the reference design and planning proposal for the subject site.

Consultants include:
- Urban Design and Architecture- Architectus
- Landscape, Connecting with Country and Public Art Strategy- Arcadia and FCAD
- Traffic Report- JMT
- Environmental, Social and Economic Impact Report- Ethos Urban
- GeoTech Report- Douglas Partners
- ESD Report- Aspire
- Flooding Statement- SCP
- Retail Demand Report- GapMaps
- CVT Report- Charter Keck
- Staging Plan- Neoscape
- Place making- Right Angle Studio
- Project manager- Neoscape



1.2 Strategic Context

Centrally located between Parramatta and Sydney CBD, 600m from the future Burwood North Metro Station, this site is perfectly positioned to deliver on the Greater Sydney Commission's objective for the '30 minute city'.

- Located in Croydon in the Burwood LGA, The site is centrally located between Parramatta and Sydney CBD
- Burwood is nominated as a Strategic Centre in the Greater Sydney Commission's Eastern City District Plan.
- The site has access to significant current and future regional transport:
  - The site is within walking distance of the planned Metro West line which will provide access to major employment and education centres, such as Parramatta, Sydney Olympic Park, Westmead and Sydney CBD.
  - The site has excellent access to Westconnex, in close proximity to the entrance to the future extension to M4/M5, and Rozelle Interchange due to open in 2023 which will provide faster access to Sydney International Airport and the Sydney CBD.

1.3 Local Context

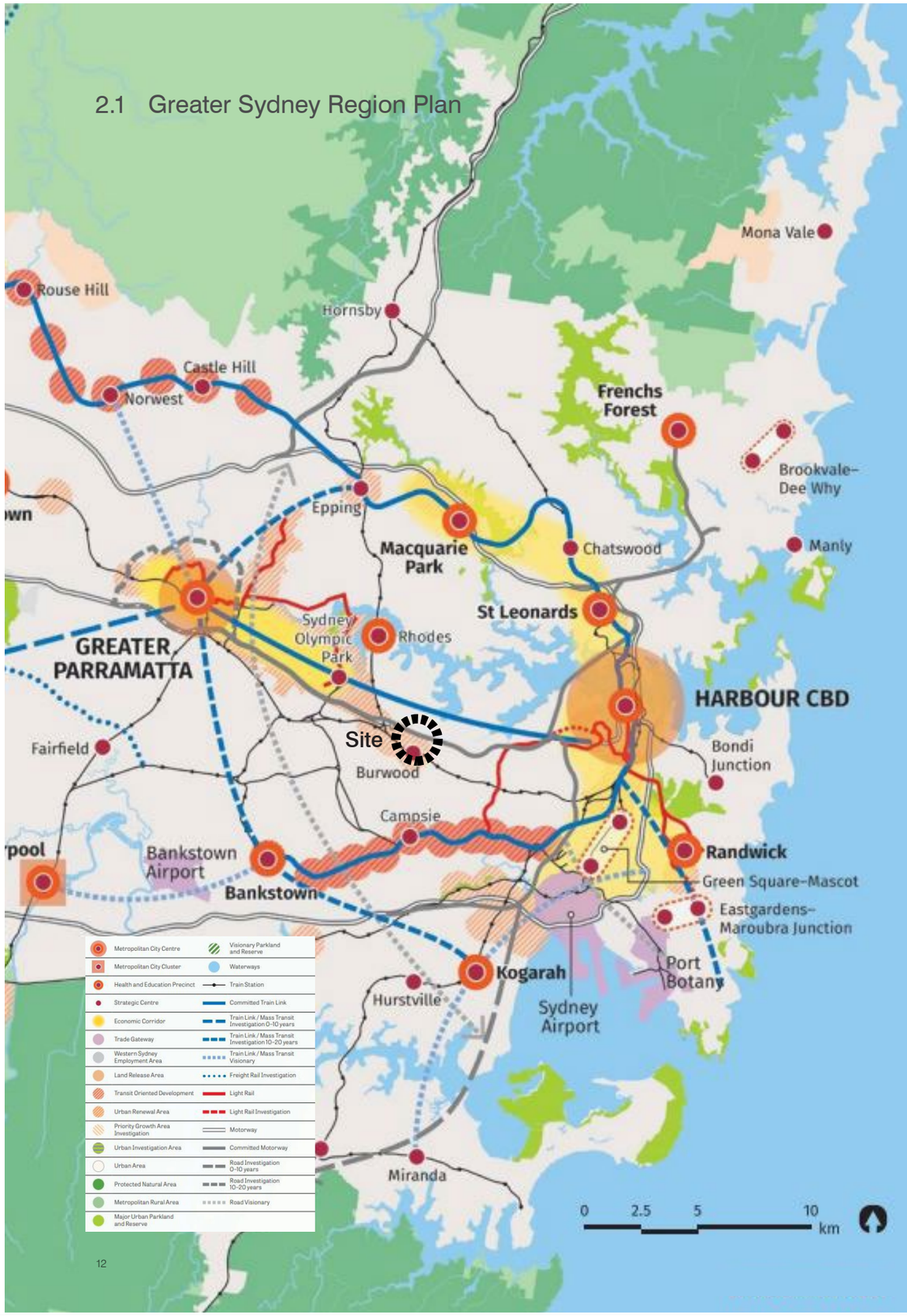
Located just 600m from the future Burwood North Metro Station and in the heart of significant emerging development in the Parramatta Road Corridor

Key features of the local context include:

- The site is located approximately 600m from the planned Burwood North Metro Station. The Parramatta Road Corridor will undergo significant change with the arrival of the new Sydney West Metro line connecting Sydney CBD to Parramatta and Westmead. This will connect a number of centres which Parramatta Road currently serves.
- The site is located within the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) investigation area, within the Kings Bay Precinct.
- The Burwood-Concord Precinct, located to the west of the site, includes the new Burwood North Metro Station. As such, Burwood will be one of the few centres that will be connected by both heavy rail, metro and bus.
- Both Kings Bay and Burwood-Concord Precincts include Stage 1 precincts nominated for significant growth in the Corridor.
- The site's northern boundary fronts Parramatta Road which has improved amenity since the completion of the Westconnex tunnel and the resulting reduction in traffic volumes along Parramatta Road.
- The character of the site's immediate context includes large bulky goods retail, showrooms and light industrial sites. Immediately to the south of the site the context is low scale residential dwellings including two storey townhouses.

2 PLANNING CONTEXT

2.1 Greater Sydney Region Plan



The Greater Sydney Commission's *Greater Sydney Region Plan* (2018) organises Greater Sydney into three key geographic areas. Burwood forms part of the vision for the Eastern Harbour City, which is further described through the Eastern City District Plan.

The Greater Sydney Region Plan provides a 40-year vision of Sydney for a city where people will live within 30 minutes of jobs, education and health facilities, services and great places. A particular focus of the Plan is providing housing diversity around centres and transit nodes.

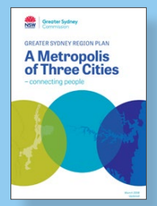
Growth in the Eastern Harbour City will bring increased urban renewal and infill development, with a need for more housing that is well-connected.

Key objectives relevant to the site include:

- Objective 6: Services and infrastructure meet communities changing needs
- Objective 7: Communities are healthy, resilient and socially connected
- Objective 14: Integrated land use and transport creates walkable and 30 minute cities

The Greater Sydney Commission's recent Discussion Paper for the Six Cities Region, which is a precursor to the updated *Greater Sydney Region Plan* (2018) due in 2023, states:

- Priority housing to be proximate to future transport hubs; and
- It will set targets for housing within 800m of transport hubs.
- It also introduces a new priority for 15 minute neighbourhoods.



Source: The Greater Sydney Region Plan- *A Metropolis of Three Cities (2018) NSW Government*

2.2 Parramatta Road Corridor Urban Transformation Strategy (PRCUTS)

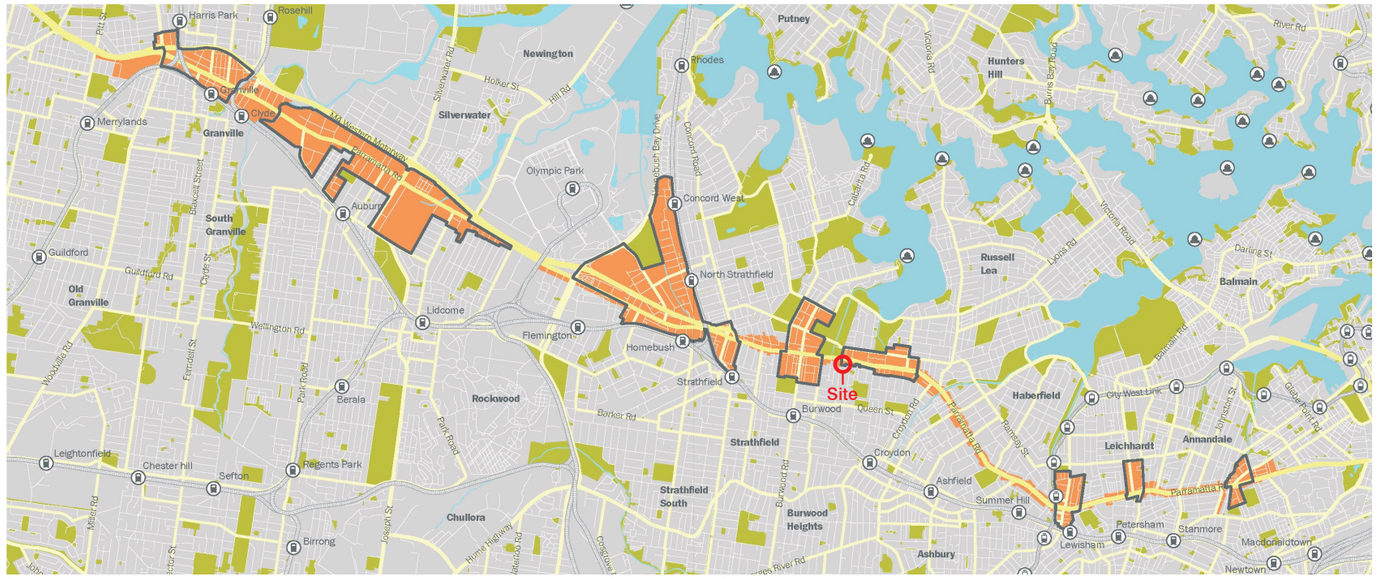
Located in the heart of the emerging urban renewal corridor, the site and the planned development will contribute significantly to achieving the vision set out in the Parramatta Road Corridor Urban Transformation Strategy.

The Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) was released in November 2016 and seeks to coordinate the renewal of land and neighbourhoods along Parramatta Road between Granville in the west and Camperdown in the east. PRCUTS has been developed in the context of significant transport and infrastructure investment including the WestConnex, which will change the role and character of Parramatta Road, whilst also improving access and connectivity. The more recent announcement of Sydney Metro West will provide greater impetus for renewal along the corridor.

PRCUTS was finalised in 2016 following public exhibition. This was followed by a Planning Proposal and draft DCP for target areas such as the Homebush North Precinct, Burwood-Concord Precinct and Kings Bay Precinct, of which the site forms part of the latter. The Planning Proposal was recently placed on exhibition early in 2022.

The site is located at the western edge of the Kings Bay Precinct and within walking distance to the Burwood-Concord Precinct where the location of the Burwood North metro station has been announced. Increased height and density is proposed around the new Kings Bay village hub and at the intersection of Burwood Road and Parramatta Road, where the metro station will be located.

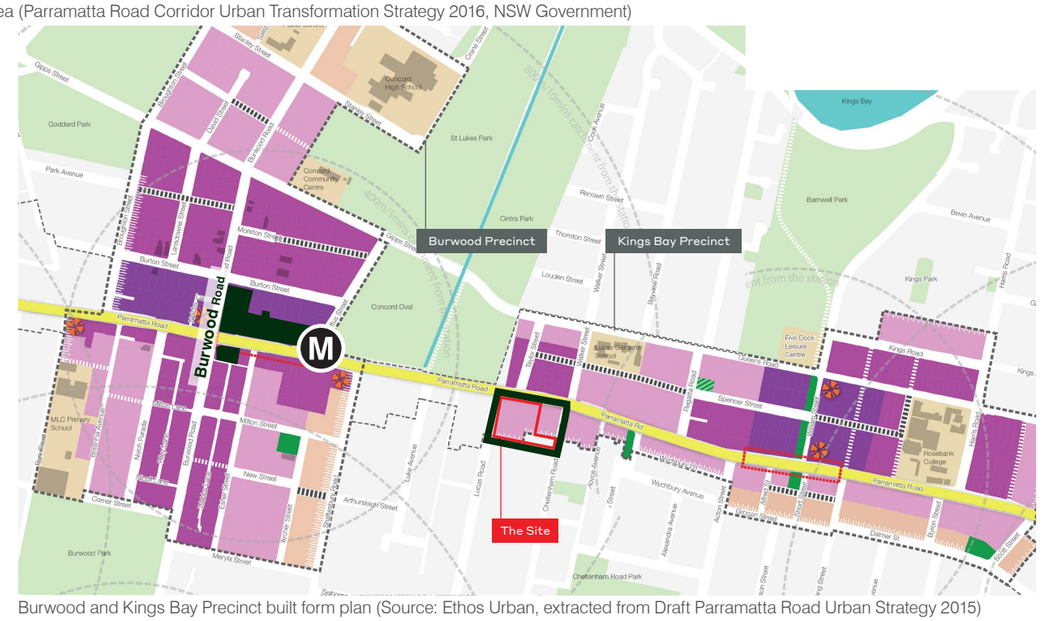
Given the proximity of the new Burwood North metro station, and the proposed renewal for the area, the site is well-positioned to contribute to achieving the vision and principles set out in the Parramatta Road Corridor Urban Transformation Strategy.



Parramatta Road Corridor Transformation Area (Parramatta Road Corridor Urban Transformation Strategy 2016, NSW Government)

The Proposal satisfies the Strategy's seven land use and transport planning principles

1. Housing choice and affordability
2. Diverse and resilient economy
3. Accessible and connected
4. Vibrant communities and places
5. Green spaces and links
6. Sustainability and resilience
7. Delivery


Burwood Precinct
Kings Bay Precinct
Burwood Road
Parramatta Road
The Site
M
Kings Bay
St Lukes Park
Concord Oval
Burwood Park
Cintra Park
Kings Park
Barnwell Park
Cheltenham Road Park
Five Dock Leisure Centre
Rosebank College
Concord High School
Burwood Public School
Lucas Heights Public School
Burwood Community Centre
Goddard Park
Park Avenue
Burton Street
Morton Street
Mitton Street
New Street
Renown Street
Thornton Street
Louden Street
Spencer Street
Kings Road
Wychbury Avenue
Arthur Leigh Street
Cheltenham Road
Lucas Road
Beverley Road
Bevin Avenue
Hope Road
Glade Street
Glaze Street
Courage Street
Marylia Street
Burton Street
Coral Street
Cove Avenue
Water Street
Stanley Street
Shaftesbury Road
Burwood Road
Concord Road
Queen Street
Alexandra Avenue
Burton Street
Boldt Street
Kings Road
Kings Avenue
Hope Road
Bevin Avenue
Barnwell Park
Cintra Park
Kings Park
Five Dock Leisure Centre
Rosebank College
Cheltenham Road Park
Burwood Public School
Lucas Heights Public School
Burwood Community Centre
Concord High School
Burwood Park
Parramatta Rd
Parramatta Road
Burwood Road
Kings Bay
St Lukes Park
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Cintra Park
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New Street
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Louden Street
Water Street
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Kings Road
Kings Avenue
Wychbury Avenue
Arthur Leigh Street
Cheltenham Road
Lucas Road
Beverley Road
Bevin Avenue
Hope Road
Cove Avenue
Alexandra Avenue
Queen Street
Burwood Road
Concord Road
Stanley Street
Shaftesbury Road
Coral Street
Boldt Street
Courage St
Burton

2.3 Sydney Metro West

' Align population growth and public transport investment... When we get the opportunity to deliver more affordable and key worker housing near metro stations, we should be taking it.'

Paul Scully, Planning Minister NSW, (paraphrased)

It is important to note that the PRCUTS strategy was finalised prior to the announcement of the Metro West project. Metro is a game-changer for the precinct.

As the site is located approximately 600m from the future Burwood North metro station, there is now strong justification for a potential reconsideration of PRCUTS outcomes for higher heights and densities than what is provided for in the Strategy.

Sydney Metro West was announced in November 2016 and is considered to be one of the largest public transport investments in recent times. The Sydney Metro West corridor stretches between Westmead and Sydney CBD and will effectively double public transport capacity upon its expected opening in the late 2020s.

Burwood North has been announced as a station along the Metro West corridor, to be located at the intersection of Burwood Road and Parramatta Road, and would be an approximate 10 minute commute from both the Sydney and Parramatta CBDs. The site is within a 7 minute walking catchment of the proposed location of Burwood North metro station.

PRCUTS was finalised prior to the announcement of the Sydney Metro West corridor, and a review of the Strategy has not been undertaken by the Government in light of this new information. The boundaries of the Burwood- Concord Precinct were set by natural, geographic urban analysis issues because at the time, the station location was not known. If it had been, the boundaries of this precinct would almost certainly be different and would extend to within at least 800m of the station.

This catchment also aligns with the recent Greater Sydney Commission's Discussion Paper for the Six Cities Region, which identifies best practise for development concentrated within 800m of new station. The future Metro will unlock and change the renewal opportunities for the Parramatta Road corridor, increasing access and connectivity, and is aligned with the broader Greater Sydney Region Plan to focus renewal around transit nodes and centres. There is strong justification to reinvestigate the development potential in terms of heights and densities within the corridor, which includes the subject site.

Proposed Sydney Metro West corridor and station locations (Source: NSW Government)

Proposed Burwood North metro location

2.4 Burwood LSPS

The Burwood Local Strategic Planning Statement is supportive of the outcomes of the Parramatta Road Corridor Urban Transformation Strategy.

The Burwood Local Strategic Planning Statement (LSPS) was prepared by Burwood Council and publicly exhibited in August 2019. The document was adopted in February 2020.

The Burwood LSPS provides a basis for Council's decision on use of land, resources and assets to achieve the community's broader goals and set the 20-year vision for the Local Government Area. Key elements of the vision that align with the aspirations of this project include:

- Centres and neighbourhoods are connected and strengthened
- A strong and thriving centre for jobs and investment and a leading entertainment destination
- Green open space and tree lined streets provide comfort and respite.

The document is underpinned by the following four themes:

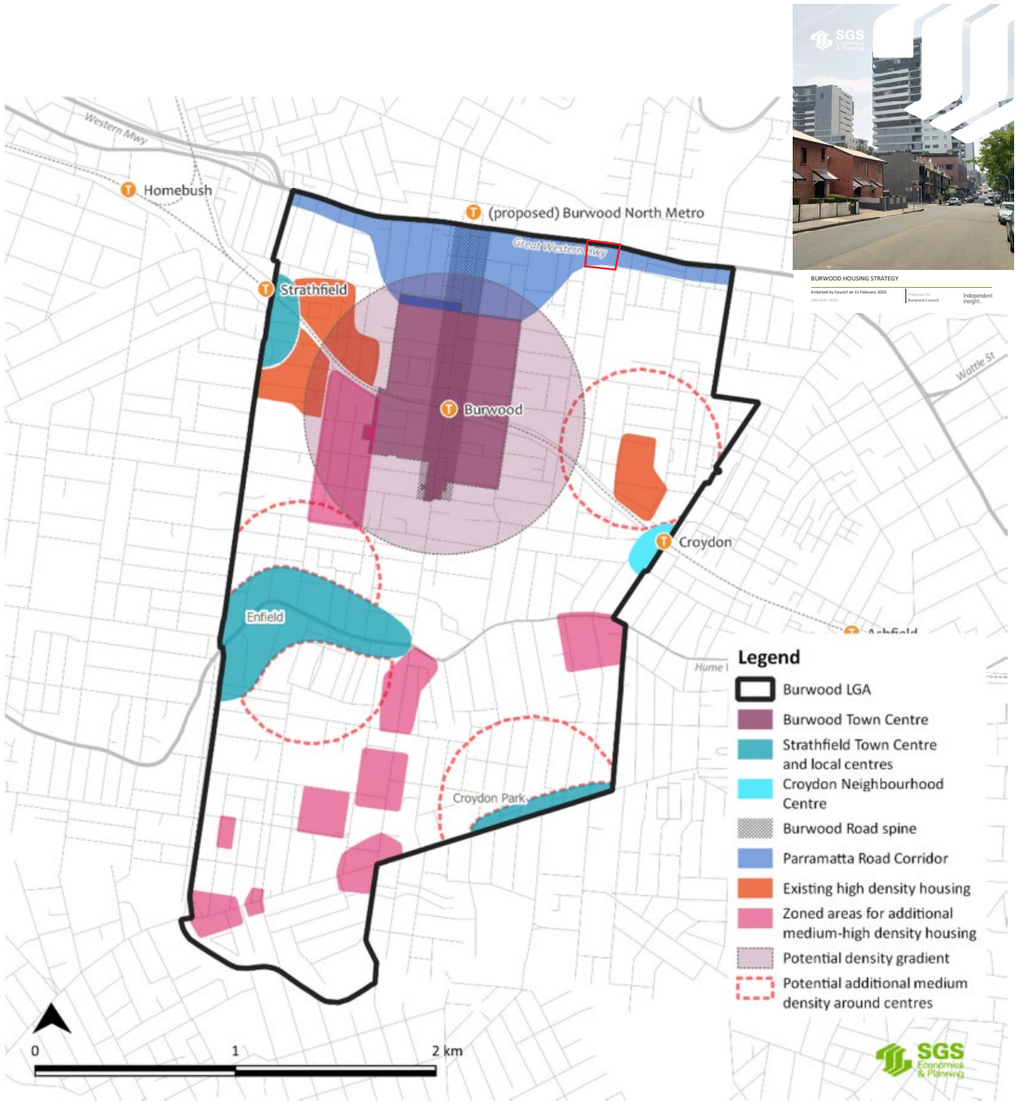
- Infrastructure and collaboration;
- Liveability;
- Productivity; and
- Sustainability.

The Burwood LSPS identifies sixteen Planning Priorities, which respond to the four themes. Each theme also consists of several Planning Actions, which are intended to respond to and implement the findings of their respective Planning Priorities.

The document makes specific reference to the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) under Planning Priority 4 to 'Provide high quality planning and urban design outcomes for key sites and precincts'. Burwood-Concord, located immediately west of the subject site, is a renewal precinct identified in PRCUTS and the LSPS, and is planned to create 5,500 new homes and 3,800 new jobs for the precinct by 2050.

Action 4.1 of the LSPS is to implement PRCUTS, whilst Action 4.2 is to work with the NSW Government on the governance framework for the delivery of PRCUTS.

It is evident that the Burwood LSPS is strongly supportive of the outcomes of PRCUTS with the two documents being largely consistent with each other. The LSPS is supported by a Local Housing Strategy (LHS) that informs the housing outcomes of the LSPS. The Strategy was endorsed by Council in February 2020 and approved by the Department of Planning, Industry & Environment in May 2021. The LHS outlines a plan for medium density housing development to be focused on the LGA's centres, supplemented by the continued development of high-density housing around the Burwood and Strathfield Town Centres, and redevelopment at Burwood North, taking advantage of the new Metro Station to extend the Burwood Town Centre to the north. The subject site is identified within Councils Parramatta Road Corridor housing growth area.

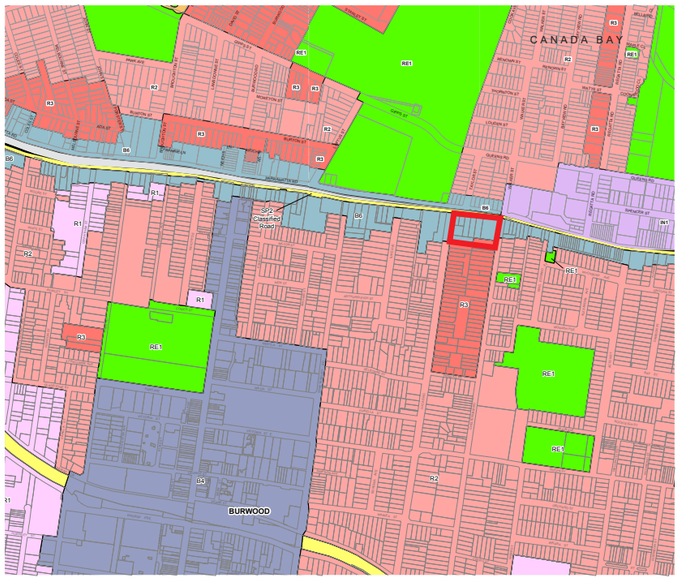


Housing structure Plan (Source: Burwood Housing Strategy 2020, Burwood Council)

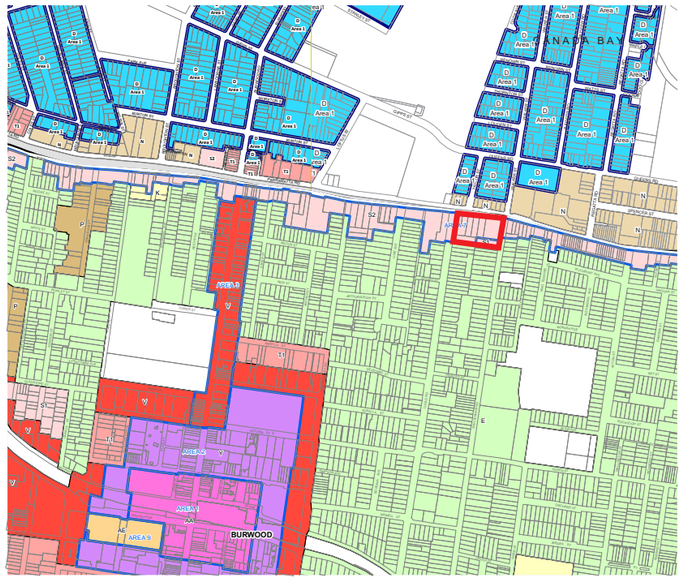
2.5 Planning controls

Existing planning controls

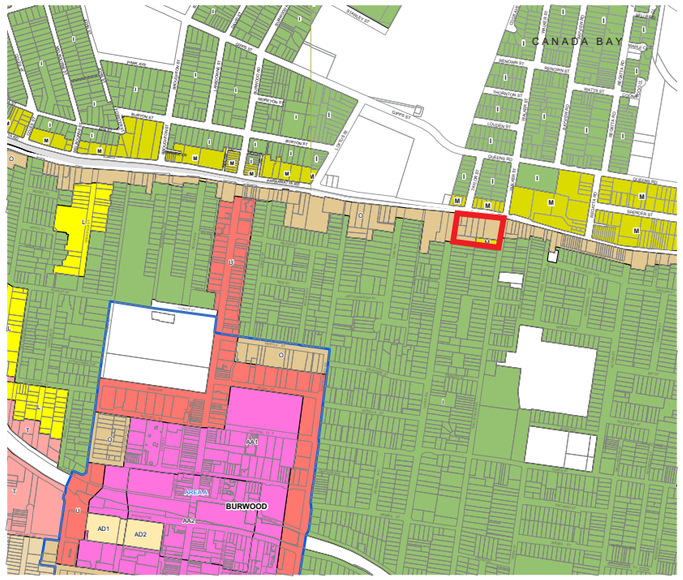
The zoning maps below are extracted from the Burwood Local Environmental Plan 2012 (BLEP 2012) and the Canada Bay Local Environmental Plan 2013 (CLEP 2013). The BLEP 2012 applies to the subject site.



Existing land use zoning map



Existing floor space ratio map



Existing height of buildings map

Land Use

- The Site which includes 166-204 Parramatta Road is zoned B6 Enterprise Corridor, as is most of the land fronting Parramatta Road. 1-1A Cheltenham Road at the southeast corner of the site is zoned R3 Medium Density Residential.
- The street block that extends south of the site is zoned R3 Medium Residential, while most of the surrounding residential areas is zoned R2 Low Density Residential. There are some pockets zoned R3 north of Parramatta Road near Croydon.
- There are some areas zoned for industrial uses within the Parramatta Road corridor.

Legend

	Site Boundary
B4	Mixed Use
B6	Enterprise Corridor
IN1	General Industrial
R1	General Residential
R2	Low Density Residential
R3	Medium Density Residential
RE1	Public Recreation

Floor Space Ratio

- The current floor space ratio along the southern side of Parramatta Road corridor, which includes the site, is 1.75:1. An FSR of 1:5 is permitted at the south east corner of the site that is zoned R3. This area is also subject to Clause 4.4 where the ratio of the gross floor area for the purpose of residential accommodation must not exceed 0.2:1.
- The northern side of Parramatta Road consists of mixed FSR controls.
- Surrounding residential areas have an FSR of 0.55:1, while Burwood City Centre enables an FSR between 2:1 up to 10.54:1.

Legend (n:1)

	Site Boundary
D	0.5
E	0.55
K	0.85
N	1
P	1.2
S1	1.5
S2	1.75 (BLEP) 1.6 (CLEP)
T1	2
V	3 (BLEP) 3.3 (CLEP)
Y	4.5
AA	6
AE	10.54
	Refer to Clause 4.4A of BLEP 2012
	Refer to Clause 4.4A of CBLEP 2012

Height of building

- The current maximum building height applicable to land along the southern and northern side of Parramatta Road is 15m, or approximately 4 storeys, and 12m, or approximately 3 storeys, respectively. The land at the southeast corner of the site zoned residential has a permissible height of 12.5m, or approximately 4 storeys.
- Burwood City Centre allows for buildings heights generally 30 to 70m (between approximately 8 to 20 storeys). Two key sites south of Burwood Station along Railway Parade are zoned 136 to 144m (or up to approximately 45 storeys).
- The immediate surrounding residential areas currently allow for a maximum of 8.5m or 2 storeys.

Legend (m)

	Site Boundary
I	8.5
L	11
M	12.5 (BLEP) 12 (CLEP)
O	15
T	26
U	30
AA1	60
AA2	70
AD1	136
AD2	144
	Refer to Clause 4.3A of BLEP 2012

Planning controls

Proposed planning controls under PRCUTS
The following proposed planning controls accompanied the Parramatta Road Corridor Transformation Strategy realised in 2016, and contribute to realising and implementing the vision and renewal potential described in the Strategy.

Land Use
- The Strategy proposes to rezone the majority of land adjoining the corridor from B6 Enterprise Corridor to B4 Mixed Use. There is a portion of land to the east of the site retained as B6.
- Residential areas within the Parramatta Road corridor are proposed to be up-zoned to R3 Medium Density Residential.

Floor Space Ratio
- The FSR on the site is proposed to be minimally increased to 1.8:1, while adjacent land identified to be rezoned B4 Mixed Use is proposed for a floor space ratio between 1.8:1 to 4:1. The highest floor space ratios are focussed around the proposed new centres at Kings Bay centre and at the site of the planned metro.

Height of building
- The maximum building height on the site is proposed to be increased to 21m or approximately 6 storeys. Land within the corridor identified to be rezoned B4 Mixed Use proposes a maximum building height between 21m and 42m. Similar to the proposed FSR control, greater buildings heights are proposed around future centres and transit nodes.

Proposed land use zoning (Source: Parramatta Road Corridor Urban Transformation Planning and Design Guidelines 2016, NSW Government)

Proposed floor space ratio (Source: Parramatta Road Corridor Urban Transformation Planning and Design Guidelines 2016, NSW Government)

Proposed height of building (Source: Parramatta Road Corridor Urban Transformation Planning and Design Guidelines 2016, NSW Government)

Planning controls

3
ANALYSIS

3.1 Access and Movement

There is the opportunity for new active transport routes to create a network of connections between the site, the planned metro and the green grid.

Key Findings

- The site is very well connected, just 600m from the future Burwood North Metro Station which will offer connections to Sydney CBD and Parramatta within 10 and 12 minutes respectively. Burwood Station is located around a 10-15 minute walk from the site, connecting to wider Sydney.
- An off-road pedestrian/cycle shareway runs along the site's northern boundary on Parramatta Road. There is also an existing on-road shared cycle route on Lucas Road.
- To the north of Parramatta Road, there are proposed Green Grid connections linking to the Parramatta River through existing open spaces including Concord Oval, Cintra Park and Barnwell Park Golf Club. The river is a 12 minute walk from the site.
- Parramatta Road is one of the main east-west regional connectors across Greater Sydney, linking Sydney CBD with Parramatta. As a result, there is a high volume of traffic and associated noise.
- There is a signalised intersection across Parramatta Road at Cheltenham Road.
- There is a through site link from Cheltenham Road to Wangal Park

Access and Movement corridor diagram

Existing cycle path along western boundary of site on Lucas Road

Signalised intersection on site's north east corner on Cheltenham and Parramatta Roads

An off-road shareway on the site's Parramatta Road frontage is of poor pedestrian amenity

3.2 Opportunity Site

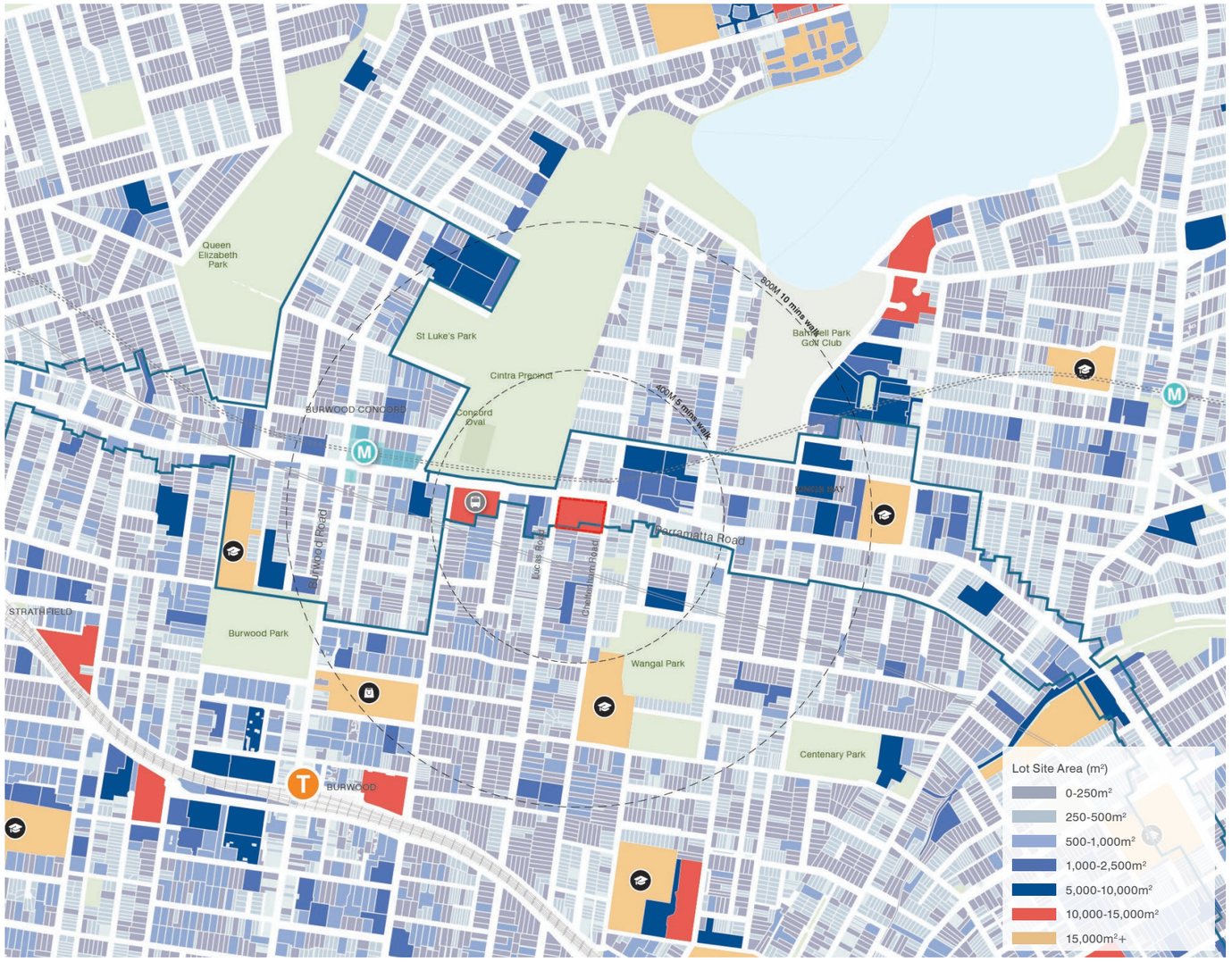
The site presents a unique opportunity for renewal as one of the largest sites under single ownership in the Parramatta Road corridor

Key Findings

- One of the only sites over 10,000m² within the Parramatta Road Corridor.
- There are very few larger (10,000m²+) sites within close proximity to new metro stations. The ones that do exist are not develop-able, being the bus layover and schools.
- The site is in the rare position of having three frontages: Parramatta Road, Lucas Road and Cheltenham Road. These street frontages provide the unusual advantage of being able to contribute to renewal of the precinct and street-scape.
- The site's significant 85m depth is also very rare in the corridor.

Opportunities

- The site's depth unblocks a significant opportunity for renewal. With 85m in depth a transformational new environment oriented away from Parramatta Road can be created. It also enables the PRCUTS' proposed 6m setbacks to be delivered.
- The site's triple street frontage provides the opportunity to deliver a number of though-site connections and high quality street-scapes that will renew the character of the precinct.
- There is potential to add a fourth street with a new shared lane-way through the site. Together these frontages will reduce pressure on vehicular access from Parramatta Road to the site.



Lot size diagram

The site boasts 3 frontages, a rarity in the PRC

The bus layover to the west of the site is the only other large scale site in the Parramatta Road Corridor

3.3 Existing open space and setbacks

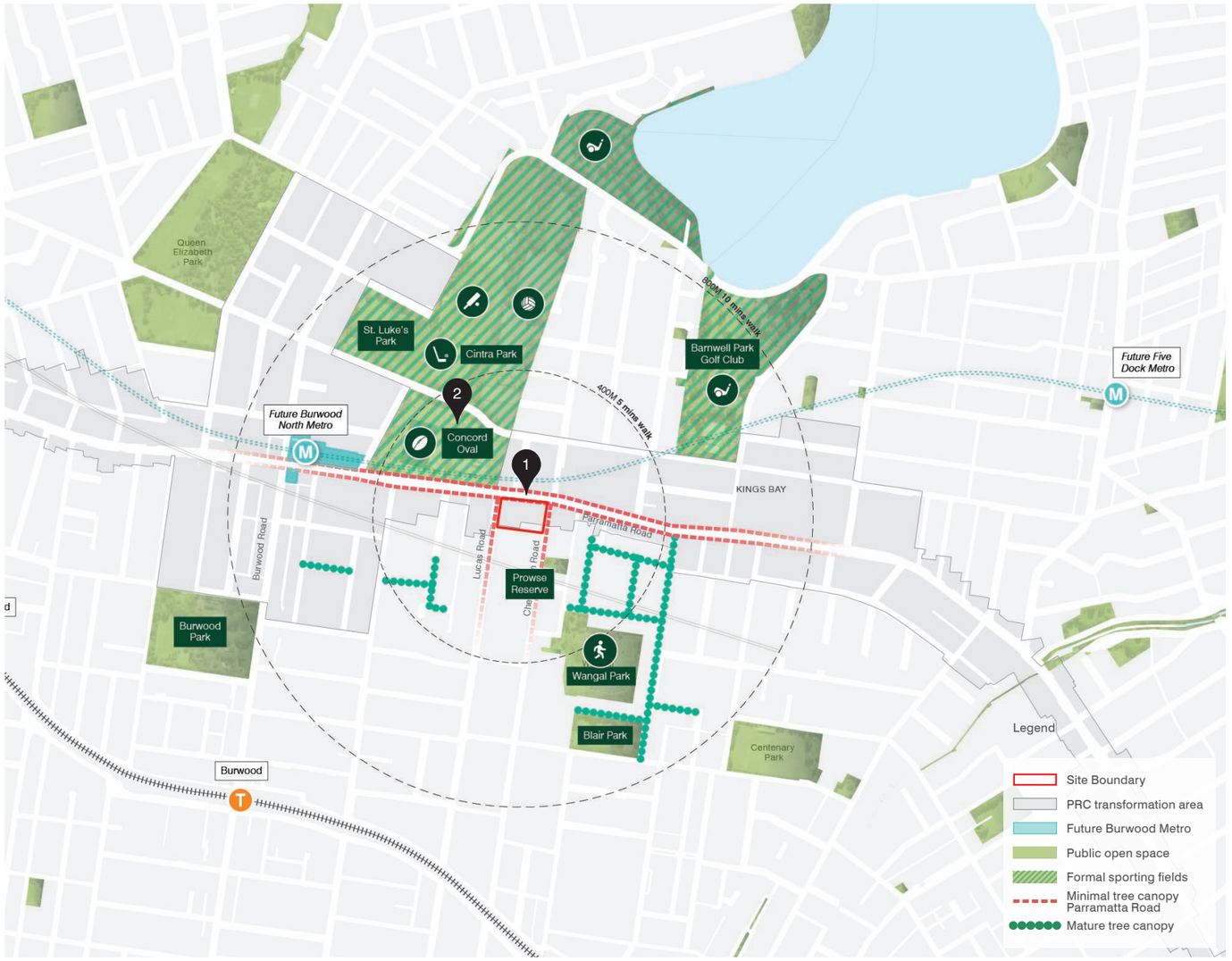
Existing open space consists mostly of formal sporting fields. There is a need for a new type of public space offering informal community uses along the Parramatta Road corridor.

Key Findings

- Parramatta Road is a harsh urban environment with little tree canopy, shade or pedestrian amenity.
- The tree canopies on Lucas and Cheltenham Roads are inconsistent. Leafy mature tree canopy can be found along neighbouring roads south of the site particularly around Wangal Park.
- There are existing sporting and recreational facilities within a 10-minute walk north-west of the site, including the Concord Oval redevelopment, which will include an improved playing field and indoor recreation centre. These are largely used for organised sports and not available for informal community recreation.
- The large green space occupied by Barnwell Park Golf Club, fronting the Parramatta River is not open to the public.
- Wangal Park is a large 4.2ha suburban park with access from Cheltenham Road. It features a variety of fitness equipment, playgrounds, a skate-park, and seating and barbecue facilities, connected by board-walks and cycle paths. Home to 3 wetlands, the park has ecological significance. Wangal Park presents the site's nearest opportunity for passive recreation.
- Prowse Reserve is the local neighbourhood park closest to the site and provides grass, shade and small play equipment.

Opportunities

- Opportunity for publicly accessible, activated open space linked to retail and food and beverage offerings, providing a mix of un-programmed community uses including informal recreation, shade, and respite from the Parramatta Road environment.
- Opportunity to introduce substantial new tree canopy around the site edges and contribute early to the vision for a greener Parramatta Road corridor. An enhanced tree canopy on Cheltenham road could provide an improved pedestrian path to Wangal Park.



Open space and setbacks diagram

No tree canopy along site's Parramatta Road frontage

Concord Oval redevelopment - formal sports fields

Link from Cheltenham Road to Wangal Park. The road has an inconsistent tree canopy which is sparse near the corridor.

3.4 PRCUTS Proposed open space and setbacks

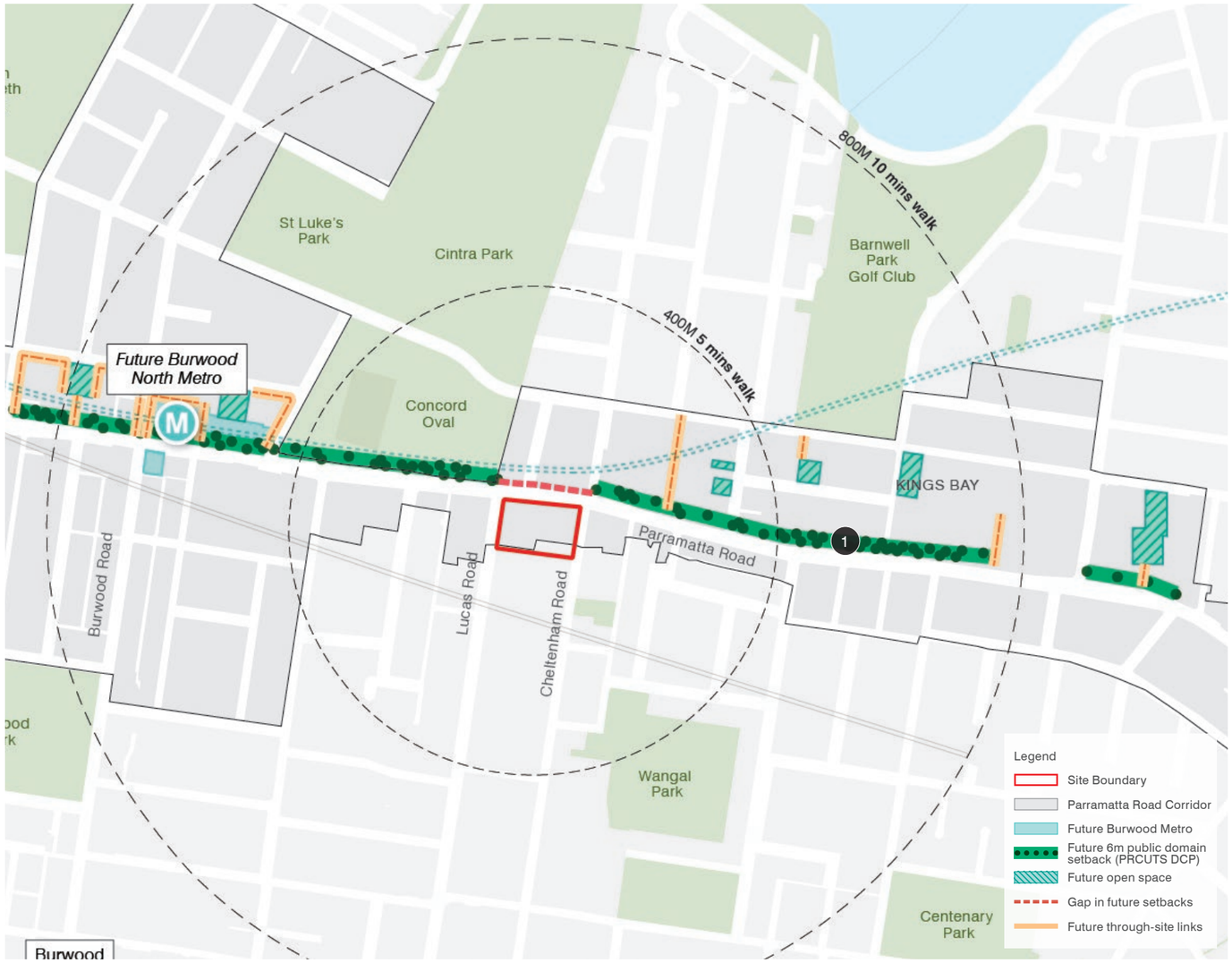
The site would be a catalyst for renewal and deliver on an number of the ambitions outlined in PRCUTS.

Key Findings from PRCUTS

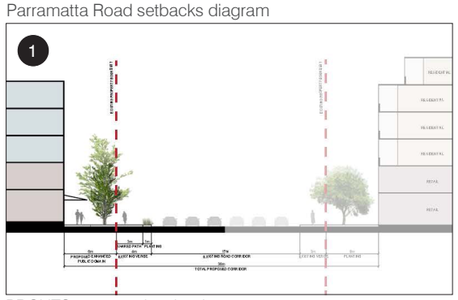
- Future development in Kings Bay, Concord Oval redevelopment and the Metro will provide 6m (minimum) green setbacks along Parramatta Road that will provide wider footpaths and facilitate street tree planting.
- PRCUTS identifies several new open spaces that run parallel to Parramatta Road between Kings Bay and Metro. Proposed through site links connect the precincts to Parramatta Road, open spaces and public transport stops and offer wider accessibility to the bay.
- Proposed trees along the corridor will enhance pedestrian amenity as well as contribute to transforming the character of Parramatta Road.

Opportunities

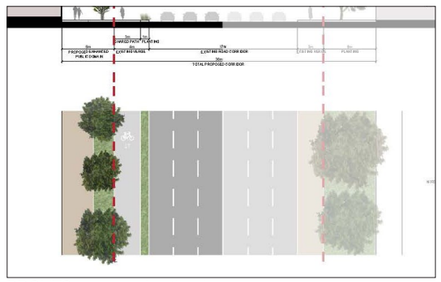
- Opportunity as a catalyst site on the southern side of the Parramatta Road Corridor to implement 6m PRCUTS setback to mirror the northern side.
- Opportunity to provide setbacks for tree planting and generous public domain on Lucas and Cheltenham Roads
- Opportunity to provide a new piece of much needed public open space in the southern corridor.



Parramatta Road setbacks diagram



PRCUTS proposed setbacks



PRCUTS proposed setbacks

3.5 Character & Built Form

The site is characterised by its Parramatta Road location, but is also adjacent to a residential area with it's own particular character.

Key Findings

- Parramatta Road Corridor has its own unique character, comprised of larger lots and building footprints for commercial, bulky goods and light industrial uses. It is a harsh urban environment with sparse vegetation and poor visual and pedestrian amenity.
- The site's southern context including Lucas and Cheltenham Roads is primarily low scale residential consisting of 1-2 storey detached or attached dwellings. Some areas include dwellings with heritage character including Federation style and Californian Bungalows. Of particular significance are the dwellings along the site's southern boundary which are predominantly modern 2 storey town-houses – none of which are heritage items.
- Burwood Strategic centre contains a combination of a fine grain high street along Burwood Road, with emerging high density mixed-use development focused along the southern side of the station. Residential flat buildings range from 3 storey walk-ups to towers of approximately 30 storeys.
- Five Dock town centre, located 1.5km northeast of the site, is comprised of medium density, mixed-use 1-4 storey shop-tops which feature a mix of heritage-character and modern styles. The leafy high street offers high quality pedestrian amenity with landscaped verges and a tree-lined median.
- Croydon is a unique and charming heritage conservation village hub featuring 2 storey red-brick federation shop tops and a distinct palm tree lined median.
- The site is not constrained by heritage, however there are substantial pockets of heritage dwellings in the site's walking catchment, particularly in Croydon.

Opportunities

- Opportunity to be one of the first sites in the Parramatta Road corridor to transition from large format retail and light industrial to fine grain mixed use character with high quality public domain and amenity.
- Opportunity to provide new and unique mixed uses including community facilities for the neighbourhood.
- Opportunity for built form along the site's southern boundary to respond to the character and scale of the dwellings immediately to the south.

Character & Built Form diagram

Character & Built Form

01 Parramatta Road is characterised by bulky goods and light industrial uses
02 Parramatta Road is a harsh urban environment
03 Single storey federation dwellings and a pocket of two storey townhouses predominate south of the site

04 Burwood Strategic Centre grain - high density mixed use towers.
05 Burwood High Street
06 The state heritage listed Appian Way is recognised as one of the finest streets of Federation houses in Australia

07 Five Dock Town Centre grain - medium density
08 Five Dock Town Centre grain - medium density
09 Five Dock high street shop top housing

3.6 Retail

The retail within walking distance of the site is primarily big box shopping or bulky goods. There is a need for a finer grain local retail offer in the precinct.

Key Findings

- Burwood offers the closest significant retail within the site's walking catchment.
  - Westfield Burwood, located on Burwood Road is a regional shopping centre with David Jones, Kmart, Target, Coles, Woolworths, cinema and 230 specialties.
  - Burwood Road is a busy retail strip with a food and beverage focus, with fine grain restaurants and includes Burwood Chinatown – a dining and retail precinct with over 30 'hawker' style eateries.
- The site's immediate context in the Parramatta Road Corridor is primarily large format car showrooms and bulky goods retail including Fantastic Furniture and Officeworks.
- Five Dock town centre, approximately 1.5km north west of the site is characterised by fine grain retail high street along the Great North Road, and a supermarket. The Great North Road has good pedestrian amenity, defined by green verges and a tree lined median.
- The Croydon 'Strand' is a small fine grain neighbourhood centre consisting primarily of heritage character two storey shop-tops including bakeries, cafés and small essential goods.

Opportunities

- Opportunity to provide complementary mixed uses to renew the precinct and corridor and provide for local needs
- Opportunity to provide a destinational food and beverage offer that is unique to the locality and focused around a high quality public domain
- Opportunity to provide much needed finer grain mixed uses that complement the Westfield Shopping Centre and future Metro development including a small grocer.
- Catalyst for a new kind of retail experience in this portion of the Parramatta Road Corridor.

Local retail diagram

Retail

Retail within walking catchment - primarily big box retail, showrooms, bulky goods

Retail outside of walking catchment – fine grain

01 Burwood Westfield Shopping Centre
02 Fantastic Furniture, Parramatta Road
03 Officeworks, Parramatta Road

04 Patisseria Papa head office and production facility, Five Dock
05 Akasha Brewery, Five Dock
06 Phil Gilbert Toyota, Parramatta Road, Croydon

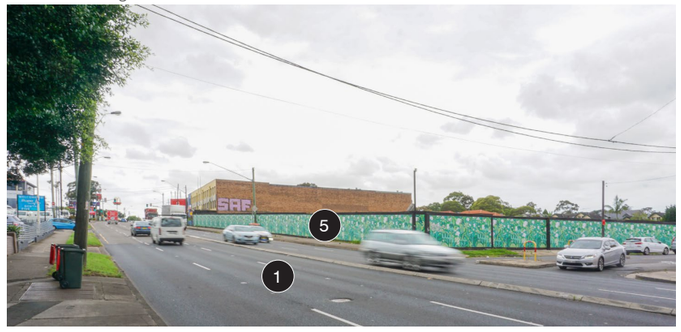
07 Burwood Chinatown 'eat street' - over 30 hawker style eateries
08 Croydon's fine grain heritage high street - the Strand
09 Patisseria Tamborino Italian bakery, Five Dock

3.7 Constraints

The urban and context analysis identified a number of key constraints on the site. These have informed the design approach and include:

1. The Parramatta Road corridor which the site fronts is one of the main arterial connectors in Sydney. As a result, there is a high volume of traffic and associated noise, which will need to be addressed with a considered response.
2. Existing desire lines from Lucas Road to Concord Oval are the missing link in the local active transport network.
3. Low scale 1-2 storey dwellings to the south.
4. Much of the open space within the site's immediate walking catchment is used for organised sports and not available for informal community recreation. There is a gap in the overall space provision between formal sporting fields and civic/regional parks in the site's immediate context. There is currently no open space linked to retail.
5. The precinct has a minimal tree canopy coverage.
6. Within the immediate walking catchment there is little to no neighbourhood retail offerings, with the exception of Westfield Burwood. Future communities in this area will require population-serving retail.

Constraints diagram

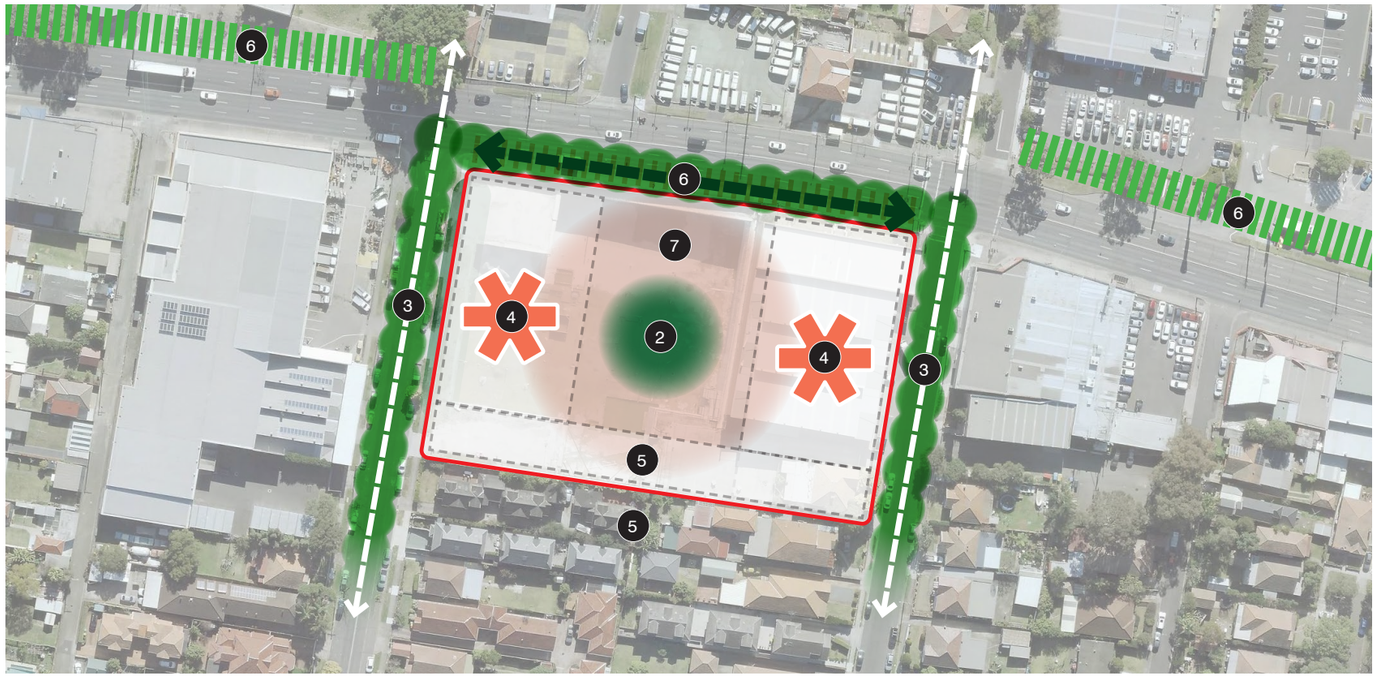


3.8 Opportunities

The urban and context analysis identified a number of key opportunities for the site. These have informed the design approach and include:

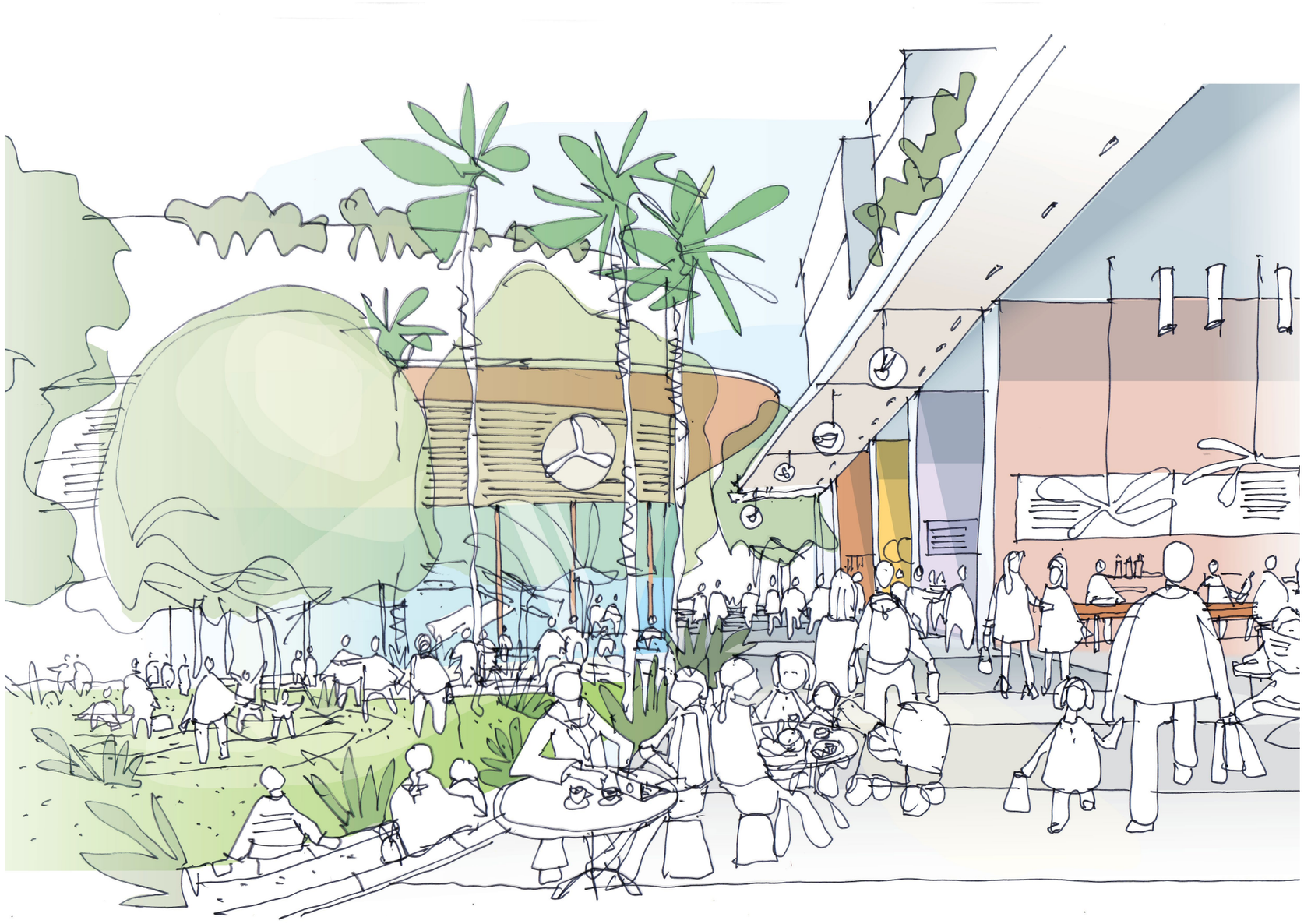
1. Close proximity to future Burwood metro station which is within a 7 minute walking catchment from the site.
2. It is one of the only sites large enough to be able to provide a transformational new public realm for the Parramatta Road corridor. The site has the unusual potential to provide a true respite from Parramatta Road.
3. The site can be the catalyst for new green connections to the bay and facilitate new active transport routes.
4. Density can be increased to align with the changing densities in the corridor, with height located strategically to minimise solar impacts.
5. Built form transition and solar amenity to the neighbouring low density residential neighbourhood can be achieved.
6. Contribute to the desired character of Parramatta Road by contributing tree canopy to bridge the gap between PRCUTS precincts, forming a continuous green corridor and increased amenity for Parramatta Road. Tree canopy can also be enhanced along Cheltenham Road for an improved pedestrian experience to Wangal Park.
7. Provide a retail offer that is unique and complementary to the surrounding context.
8. Potential to add a fourth street frontage to the site with an east-west shared way through the site. This will increase local permeability and provide options for east-west pedestrian connectivity away from the busy Parramatta Road environment.

Opportunities diagram



Opportunities

4 VISION



A CATALYST FOR FUTURE TRANSFORMATION

166-204 Parramatta Road will be Croydon's Urban Oasis – a mixed-use building that places greenery at its heart, combining all the elements that make a world-class Sydney neighbourhood within a single precinct.

Responding to the needs of current and future residents, 166–204 Parramatta Road will provide neighbourhood retail, great public spaces and much-needed housing.

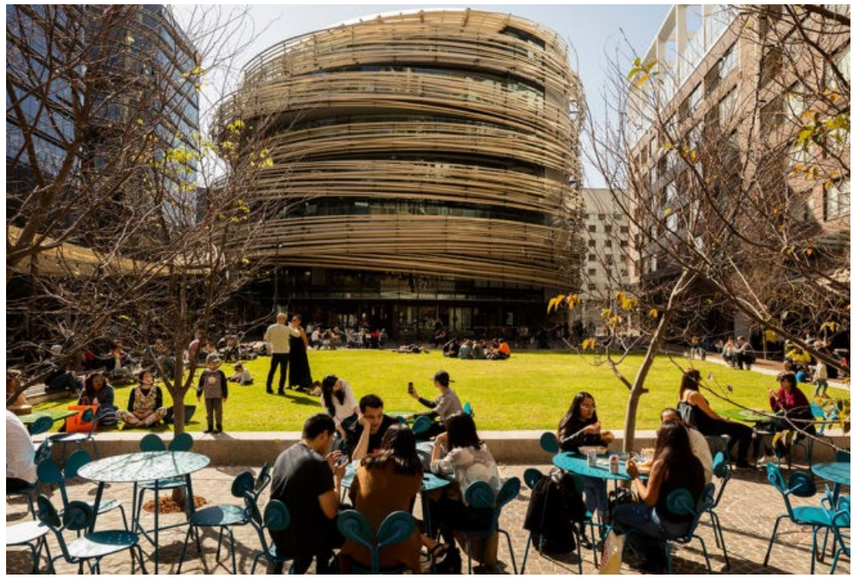
4.1 Vision

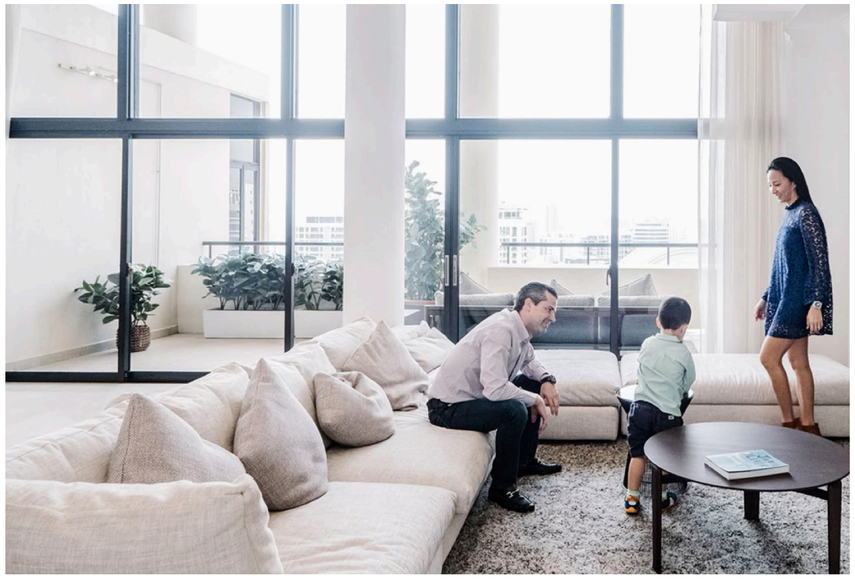
AN URBAN OASIS

Vision

A GREEN, SAFE AND GENEROUS PUBLIC REALM

A new public open space in Croydon will provide a much-needed community anchor. It will be a relief from Parramatta Road with green spaces to dwell, a network of gardens, and indoor and outdoor rooms for the community to enjoy.



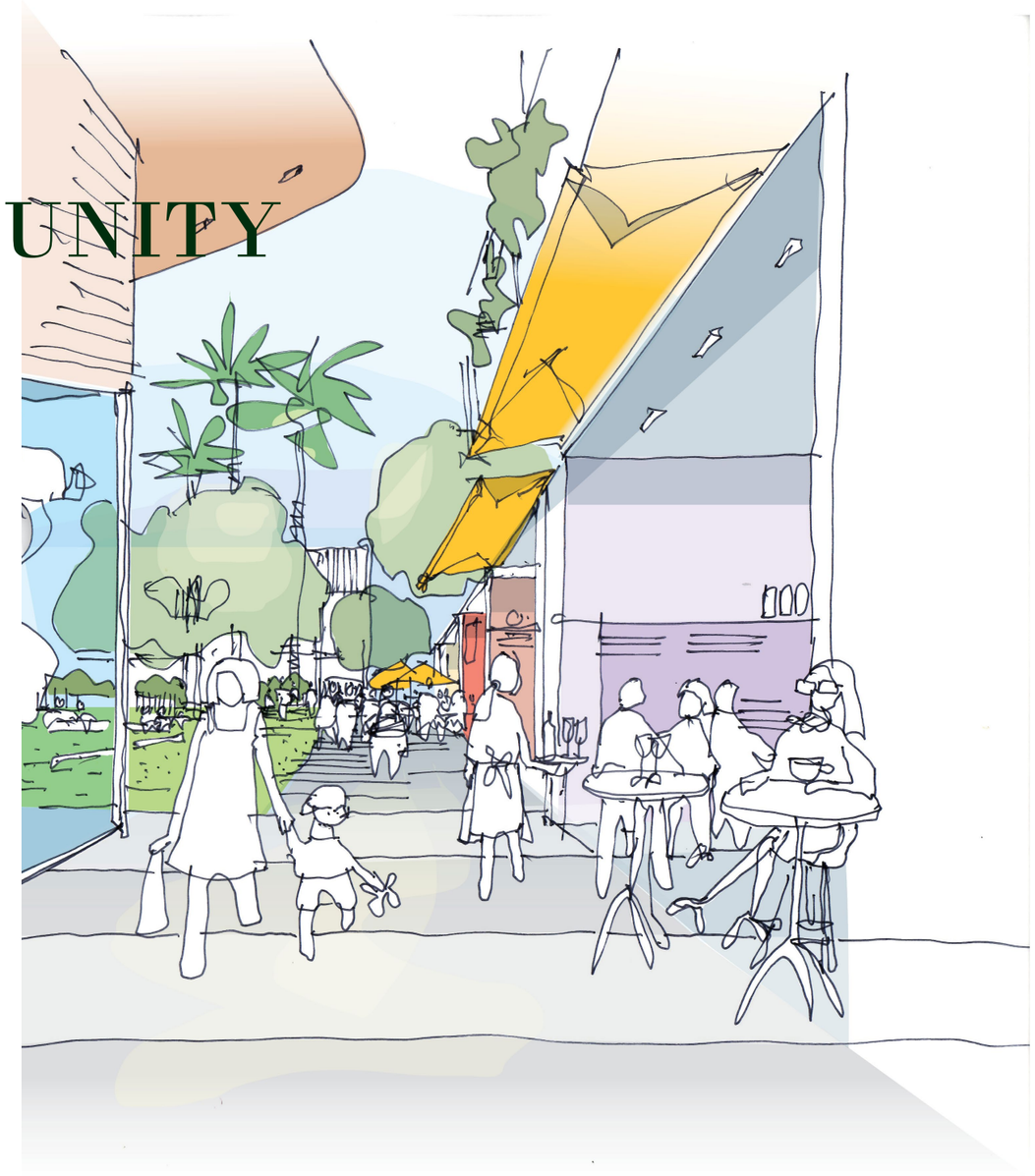


HOUSING AND SHORT-TERM ACCOMMODATION AND JOBS

Setting a precedent for the Parramatta Road corridor, the project will provide a residential offer and boutique hotel opportunities in close proximity to infrastructure.

Vision

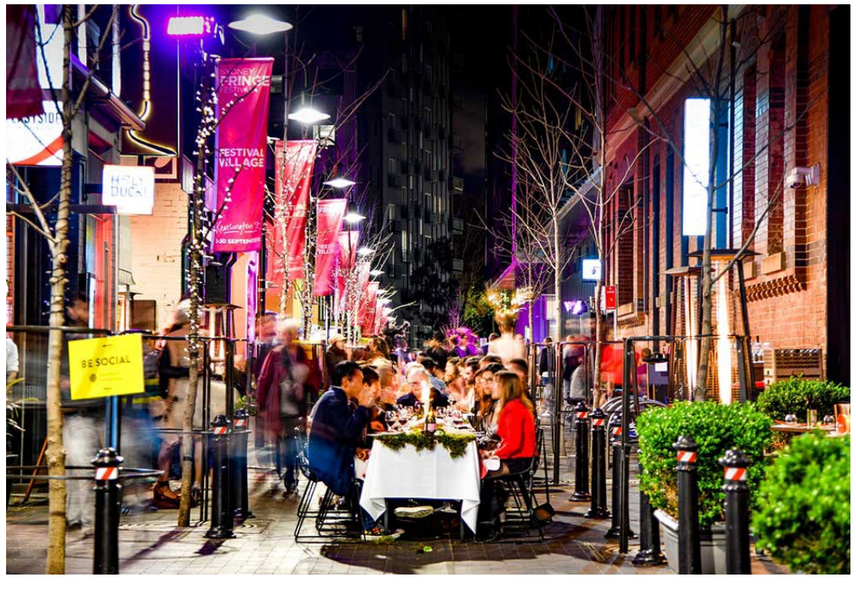
AN ACTIVE COMMUNITY



Vision

AN 18 HOUR PLACE

Providing formal and informal community spaces to promote local business, community health and social life, day and night.



NEIGHBOURHOOD RETAIL

A carefully curated mix of neighbourhood retail including local F&B, well-being, showrooms and small-scale grocery, designed to appeal to the current and emerging population without competing with other retail in the local area.

A NEW CENTRAL PUBLIC OPEN SPACE

5

FUTURE DEVELOPMENT CONTEXT

5.1 Existing context

There is a strong context of renewal around the site and Burwood, Canada Bay and Inner West LGAs.

Renewal distribution was largely considered before the announcement of the Burwood North Metro Station in 2019 which is anticipated to bring further growth.

Key Findings

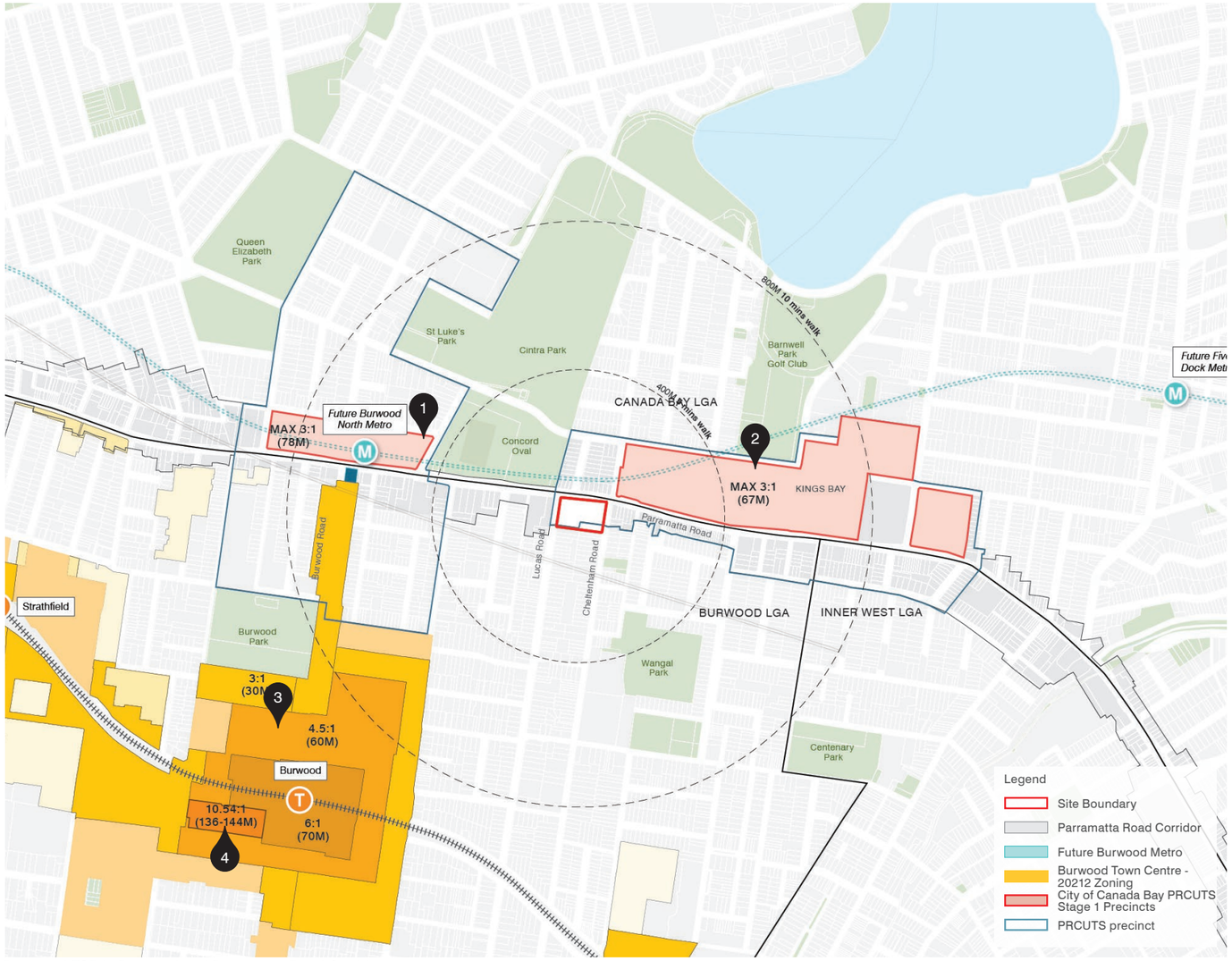
- The future Burwood North Metro is a catalyst for increased housing density in the corridor. Significant development is proposed in Burwood/Concord and Kings Bay Precincts.
- Burwood Town Centre is quite dense, with several 30+ towers
- Kings Bay has a substantially developed masterplan led by Canada Bay Council, ready for implementation.
- Burwood Place will be a revitalised high density commercial, retail and residential precinct, offering around 4,100sqm of new public spaces for the community

Future Development

Precinct	Maximum FSR	Maximum height
1 Future Metro Station	3:1	78m
2 Kings Bay	3:1	67m
3 Burwood Town Centre	6:1	70m
4 Burwood Place	10.54:1	136m

Opportunities

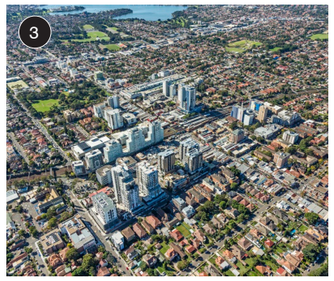
- The large amalgamated site has the opportunity to be a catalyst for renewal, positioned to bridge the gap between the proposed Burwood North Metro and Kings Bay Precincts with increased heights and density.



Proposed FSR in Burwood and Parramatta Road Corridor

Future Metro Station : Canada Bay Council draft Planning Proposal

Kings Bay: Canada Bay Council draft Planning Proposal


Burwood CBD

Burwood Place

Existing context

5.2 A catalyst for renewal

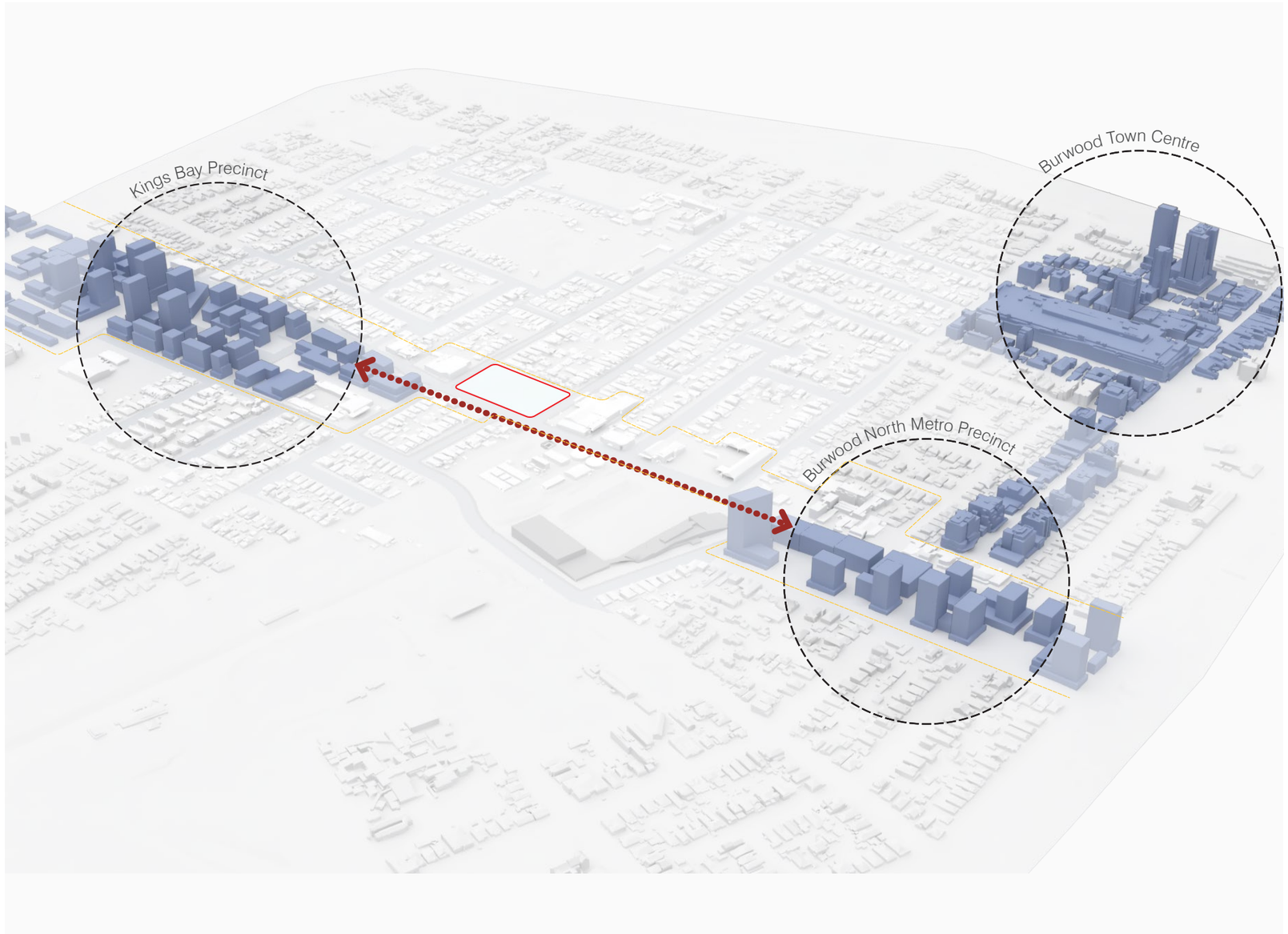
PRCUTS, identified growth nodes in Kings Bay and Burwood North. Burwood Town centre is and existing node continuing to increase in density. The subject site is ideally located to connect the nodes along Parramatta Road within the Metro station catchment.

A catalyst for renewal

The large amalgamated site has the opportunity to bridge the gap between the proposed Burwood North Metro and Kings Bay Precincts with increased heights and density. As the site is located approximately 600m from the future Burwood North metro station, there is now strong justification for a potential reconsideration of PRCUTS outcomes for higher heights and densities than what is provided for in the Strategy.

PRCUTS was finalised prior to the announcement of the Sydney Metro West corridor, and a review of the Strategy has not been undertaken by the Government in light of this new information. If the station location had been known, the boundaries of this precinct would almost certainly be different and would extend to within at least 800m of the station.

This proposal presents the opportunity to be the first to lead high quality renewal and instigate delivery of the corridor and Local Housing strategy vision.



Future development context under PRCUTS controls

Legend

- Site Boundary
- Identified Future centres/ precinct for uplift
- PRCUTS boundary
- Missing link between the centres

5.3 Development in comparable locations in Sydney

Similar sites in comparable centres within the Sydney Metropolitan area located within the catchment of a train or metro station have proposed densities around 3.5-4.5:1 FSR, providing much needed housing around transport nodes.

The following pages present development across Sydney in comparable locations to the site and the 'Parramatta Road east to Kings Bay' corridor noted in the previous section.

This analysis focusses on development around 600m linear metres distance (400-600m radius) from Metro Stations and Strategic Centres.

In considering this it should be noted that the Burwood North Station has some uniqueness from other centres as:

- Despite being in Sydney's 'middle ring', Burwood North will provide metro accessibility to Sydney City Centre (10 minutes) which is more comparable to 'inner ring' locations such as Green Square (9 minutes) than other 'middle ring' suburbs (e.g. North Ryde 15 minutes, Bankstown 30 minutes).
- Walking accessibility to the mainline Burwood Station provides much greater rail accessibility than all other centres considered.
- Burwood presents a unique context where stations in a single centre are significantly separated and (as shown on the previous page) linear rather than concentric development is likely.

Centre	Greater Sydney Region Plan - hierarchy	Rail connections	Travel time to Sydney City Centre (with Metro completion)	Density on comparable sites 600m linear distance (400-600m radius) from station entry
Burwood / Burwood North	Strategic Centre (Burwood)	3 Metro West (Burwood North) T1 North T9 Hornsby via Strathfield (Burwood Station)	10 minutes (Hunter St)	3:1 at Kings Bay Precinct, prior to Metro station announcement
North Ryde	-	1 Metro	15 minutes (Martin Place)	4.3:1 (Lachlan's Line)
Herring Road Precinct	Strategic Centre (Macquarie Park)	1 Metro	17 Minutes (Martin Place)	6.5:1 (112 Talavera Road) provides the upper end with 3.5:1-4.5:1 across a broad range of sites. 2.5:1 across all remaining sites.
Epping	Strategic Centre	1 Metro	23 minutes (Martin Place)	4.5:1 (26 Cambridge St)
Green Square / Zetland	Strategic Centre (Green Square/ Mascot)	1 T8 Airport	9 minutes (St James)	No clear comparison. Densities of 6.55:1 in the centre step down to the Heritage Conservation Area (at this 400-600m distance) then increase again to 5:1 in Zetland over 1km from the Metro station.
Sydney Olympic Park	Strategic Centre	2 Metro West T7 Olympic Park	13 Minutes (Hunter St)	3:1-6:1 densities throughout the 400-600m radius.
Bankstown	Strategic Centre	1 Metro (current T3 line)	30 minutes (Pitt St)	3.25:1 to 4.25:1 proposed in large areas of the 400m-600m radius from the Station

Development in comparable locations in Sydney

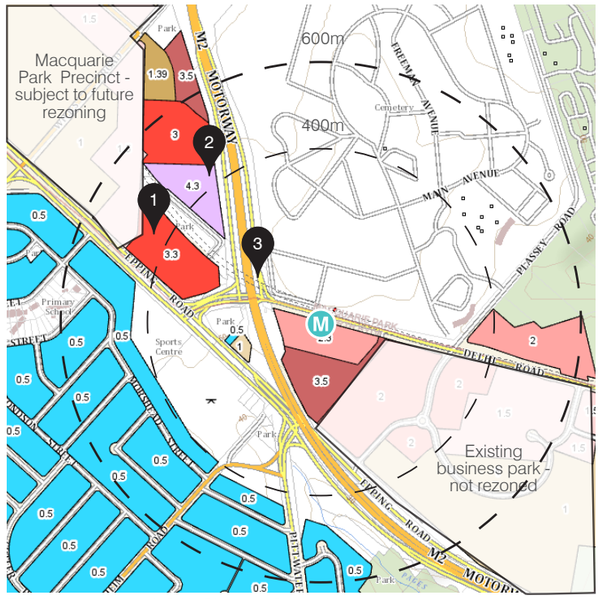
Location of centres selected for comparison, overlaid on Greater Sydney Region Plan for reference

' Align population growth and public transport investment... When we get the opportunity to deliver more affordable and key worker housing near metro stations, we should be taking it.'

Paul Scully, Planning Minister NSW,

Development in comparable locations in Sydney

North Ryde



FSR Maps (source: NSW ePlanning Spatial Viewer) annotated to show 400-600m radius from Metro Station and example developments.

1:12,500 0 100 200 300 400 500M

1 Lachlan's Line Stage 1 (3.3:1/57m)

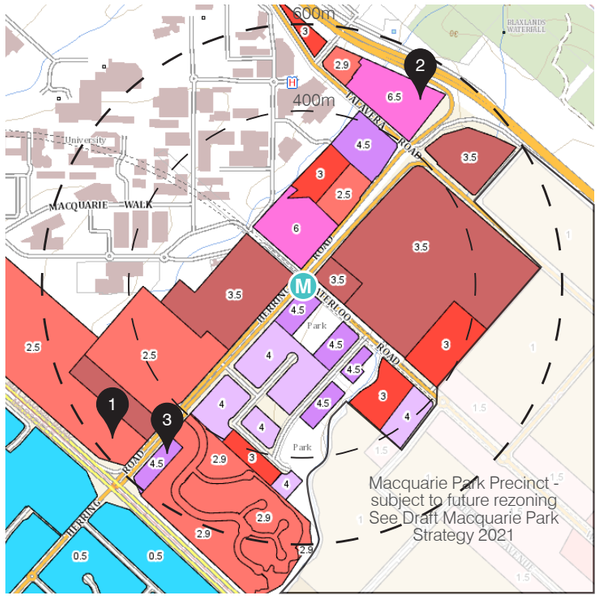
2 Lachlan's Line remaining stages (up to 4.3:1/99m)

3 Lachlan's Line pedestrian + cycle bridge

The North Ryde Station precinct was rezoned in 2013. Lachlan's Line is a new masterplanned community for over 5,000 residents.

The connection to the Metro Station is via a pedestrian and cycle bridge over a major intersection between the M2 Motorway and Delhi Road adjacent, which is a more complex and lower-amenity environment than Parramatta Road Burwood.

Herring Road Precinct, Macquarie Park

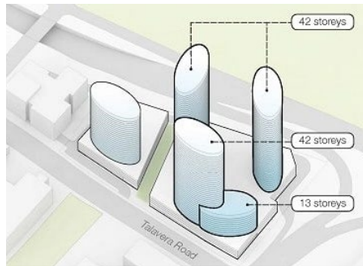


FSR Maps (source: NSW ePlanning Spatial Viewer) annotated to show 400-600m radius from Metro Station and example developments.

1:12,500 0 100 200 300 400 500M

1 Macquarie Park Village

2 112 Talavera Rd - 6.5:1, 3 towers of 42 storeys



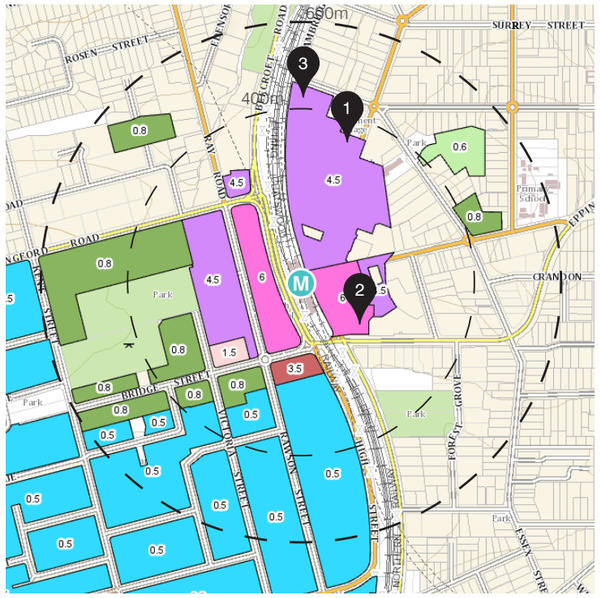
3 Neue by Coli - 4.5:1. SJB Architects

The Herring Road precinct was rezoned by DPIE in 2015. Macquarie Park is currently proposed for rezoning under the Draft Macquarie Park Place Strategy 2021.

Rezoning include sites up to 6:1 around 600m from the Station entry and in the context of major roads.

Development in comparable locations in Sydney

Epping



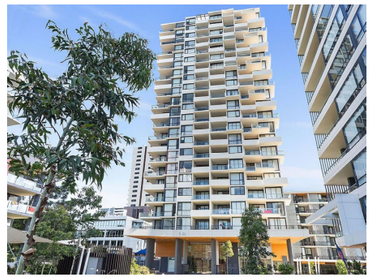
FSR Maps (source: NSW ePlanning Spatial Viewer) annotated to show 400-600m radius from Metro Station and example developments.

1:12,500 0 100 200 300 400 500M

1 Cambridge Street Epping (4.5:1/98m)

2 The Langston (6:1/86m)

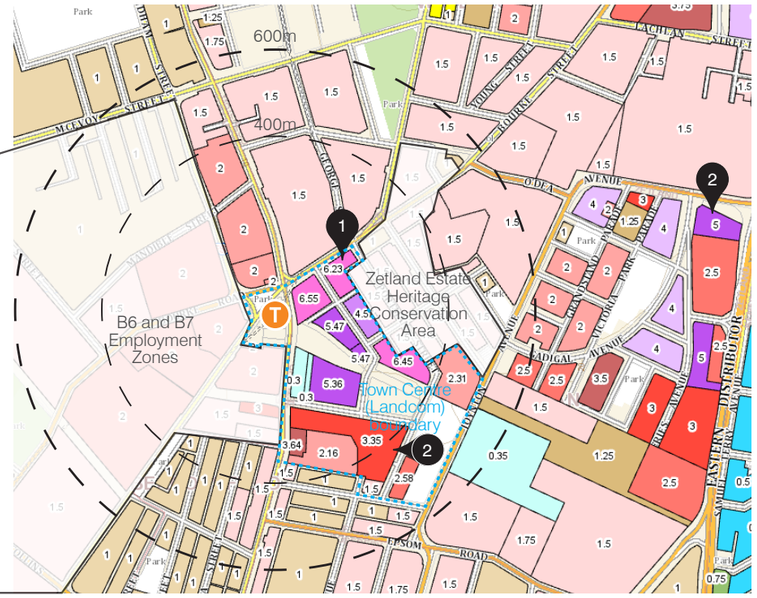
3 26 Cambridge St (4.5:1)



The Epping Town Centre Urban Activation Precinct was rezoned in 2013-14 following the construction of the North West Rail Link (now Sydney Metro Northwest).

The centre is already surrounded by substantial numbers of inter-war walk-up apartments. Larger sites in the centre were rezoned to 4.5:1 or 6:1.

Green Square / Zetland



FSR Maps (source: NSW ePlanning Spatial Viewer) annotated to show 400-600m radius from Metro Station and example developments.

1:12,500 0 100 200 300 400 500M

1 OVO Green Square (6.23:1)

2 6 Paul St (3.35:1)

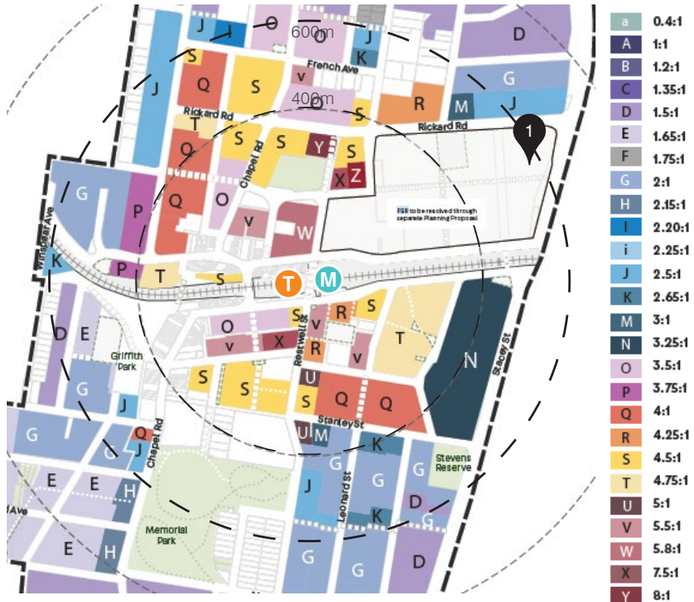
2 Victoria Square (5:1)

Development around Green Square Town Centre was led by Landcom in collaboration with the City of Sydney.

This Landcom high density development boundary is tightly focussed, generally within 400m of the Metro Station and bound by the Zetland Estate Heritage Conservation Area to the East and B6/B7 zones to the west, stepping down to them and surrounding established residences. However it also provides a connected development to Zetland to the east where heights and densities further increase.

Development in comparable locations in Sydney

Bankstown



Proposed FSR Map (source: Bankstown City Centre Masterplan adopted by Council March 2022) annotated to show 400-600m radius from Metro Station

1:12,500 0 100 200 300 400 500M

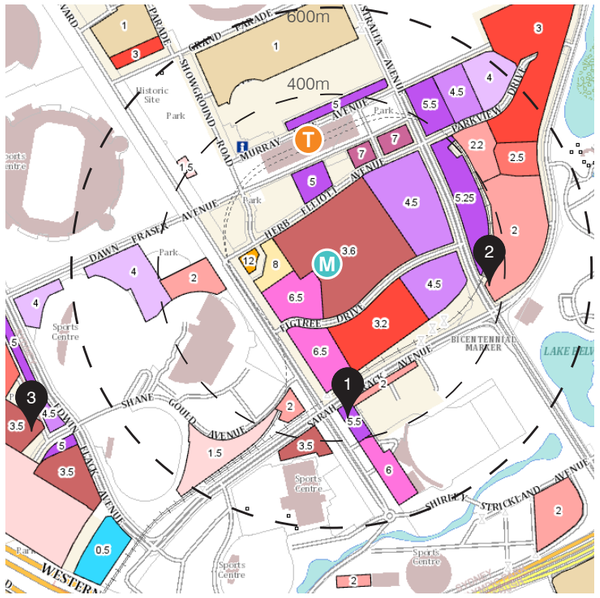
a 0.4:1
A 1:1
B 1.2:1
C 1.35:1
D 1.5:1
E 1.65:1
F 1.75:1
G 2:1
H 2.15:1
I 2.20:1
i 2.25:1
J 2.5:1
K 2.65:1
M 3:1
N 3.25:1
O 3.5:1
P 3.75:1
Q 4:1
R 4.25:1
S 4.5:1
T 4.75:1
U 5:1
V 5.5:1
W 5.8:1
X 7.5:1
Y 8:1
Z 8.5:1

1 Bankstown Central
Separate Planning Proposal

The draft Bankstown Masterplan was adopted by Council on 28 September 2021. It follows work by State Government on the Sydenham to Bankstown.

Generally 3.25:1-4.25:1 is proposed through most of the centre around 600m walking distance.

Sydney Olympic Park



FSR Maps (source: NSW ePlanning Spatial Viewer) annotated to show 600m radius from Metro Station and example developments.

1:12,500 0 100 200 300 400 500M

Sydney Olympic Park has been planned for density and renewal since before the Metro Station was announced, based on the existing T7 rail connection. Its sports and parkland setting provides a different context to other urban centres considered. Tall The Carter Street precinct to the west also provides high densities, further from the Metro Station.

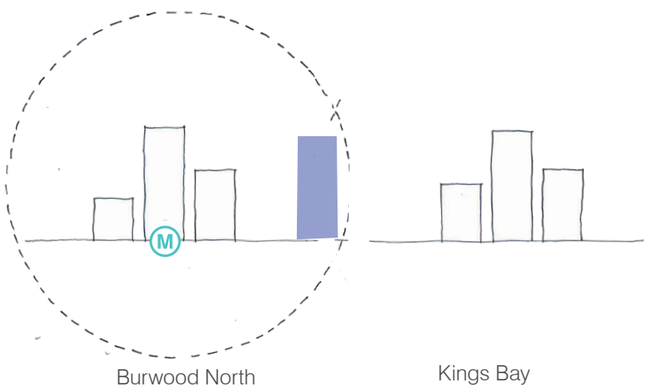
1 3 Olympic Boulevard (126m, 5.5:1)

2 Opal tower (117m, 2:1 zone)

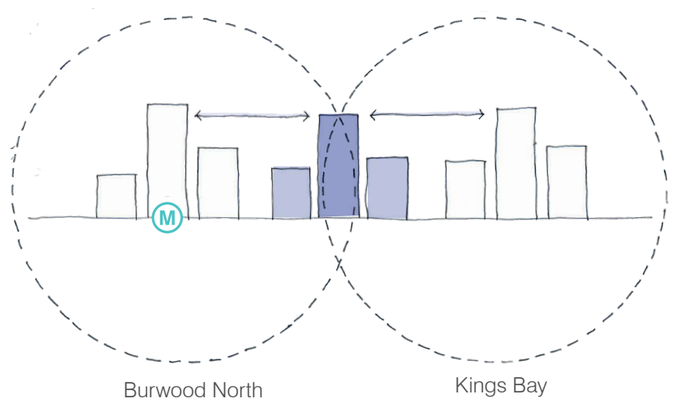
3 Aura, Carter St Precinct (3.5:1)

5.4 Approach to renewal

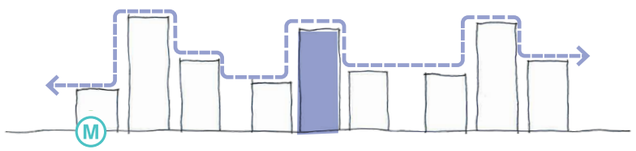
The approach to renewal in the corridor is illustrated by the following principles:



Locate density around transport nodes
The subject site is within the Metro station catchment and has a responsibility to provide new housing and jobs.

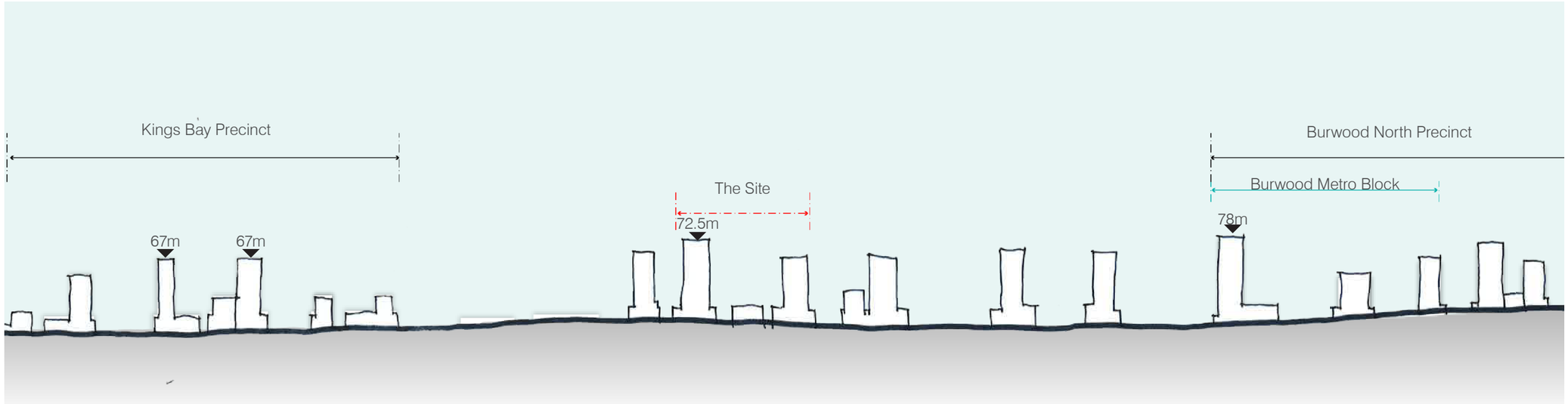


Bridge the gap
The subject site has capacity to bridge the gap between Burwood North and Kings Bay delivering on the corridor vision with a high amenity walkable precinct that will be transformational for this part of Sydney.



Contribute to the corridor skyline
The subject site will be an early catalyst in delivering renewal in the corridor with high quality development signalling positive change for what was once an overlooked strip.

Approach to renewal



Section along the Parramatta Road Corridor looking South illustrating height under PRCUTS

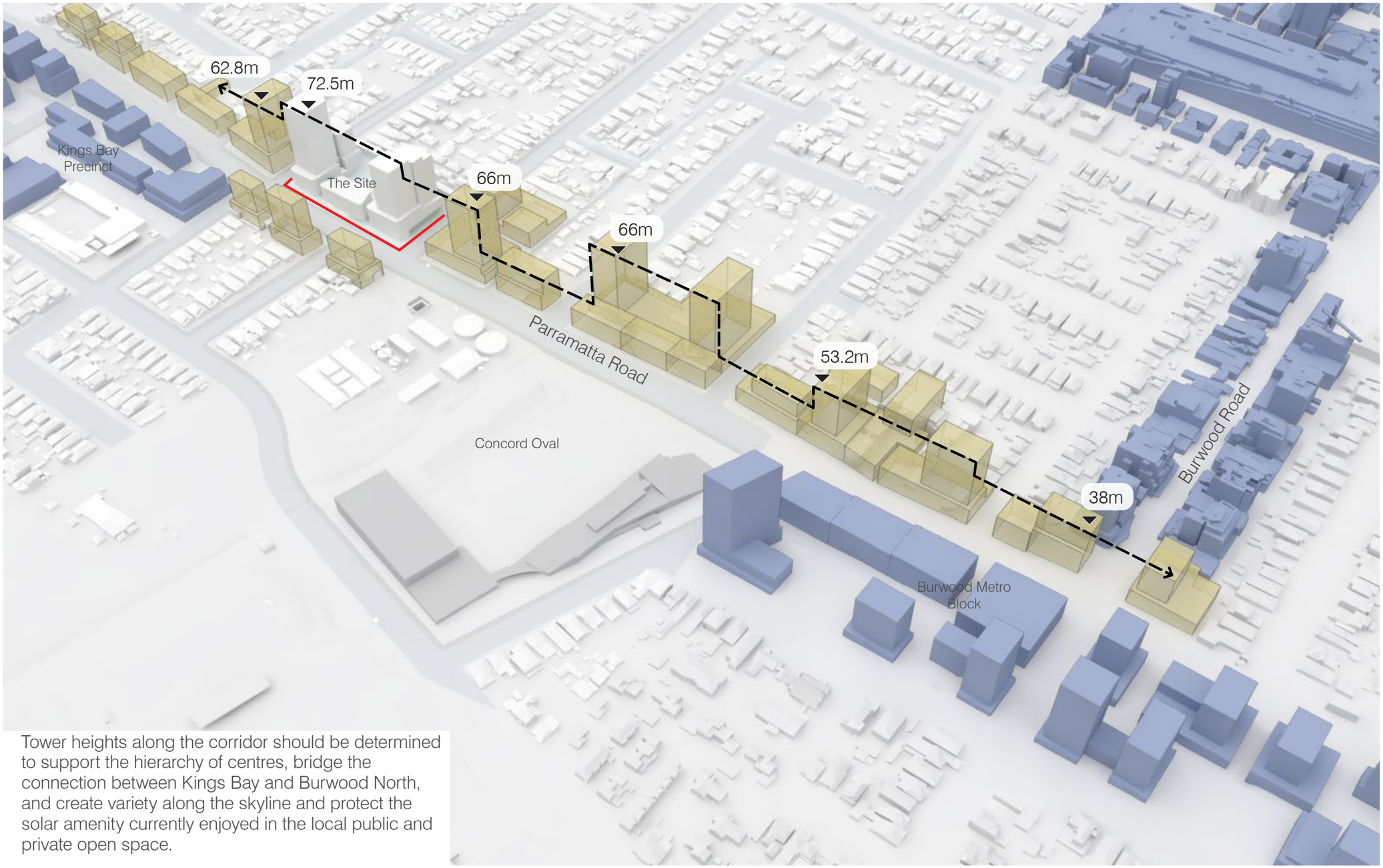
The subject site has potential to connect the corridor between Kings Bay and Burwood North, and would attract investment,new businesses and residents resulting in increased job opportunities and economic growth within the Metro catchment.

Approach to renewal

Section through Burwood Road looking east, illustrating the existing Burwood Town centre density and the proposed heights in Parramatta Road under PRCUTS

The subject site has potential to contribute to and support the growth node around Burwood North metro station, and compliments the Burwood Town centre with density distributed to protect open space and create great walkable amenity between nodes.

Approach to renewal



Tower heights along the corridor should be determined to support the hierarchy of centres, bridge the connection between Kings Bay and Burwood North, and create variety along the skyline and protect the solar amenity currently enjoyed in the local public and private open space.

Indicative future built form along Parramatta Road showing PRCUTS for Kings Bay and Burwood North Metro precincts (in blue), and likely future density at FSR 3.4:1 connecting the two precincts (in yellow)

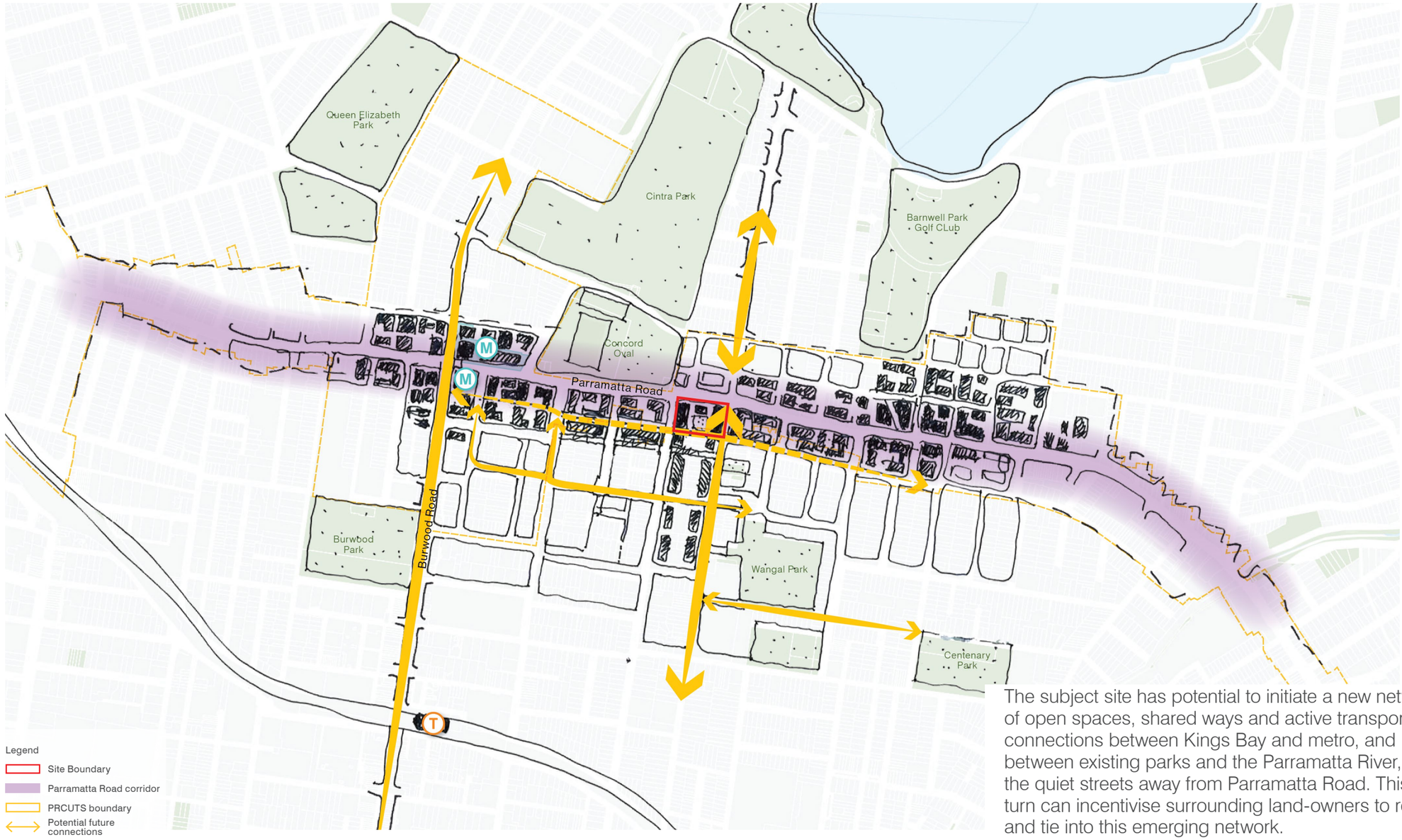
Approach to renewal

The subject site will be one of the first to deliver on the PRCUTS vision for a renewed public domain along the corridor. A 6m landscaped setback will set the benchmark for a high amenity boulevard character along Parramatta Road.

In terms of built form, the proposal will set a benchmark for human scale along the corridor with a 3-4 storey consistent podium height interfacing with the ground plane. Above this, tower height is difficult to appreciate, and should be designed to protect open space within the precinct.

View of built form envelopes looking west along Parramatta Road with proposed heights indicated under PRCUTS

Approach to renewal



The subject site has potential to initiate a new network of open spaces, shared ways and active transport connections between Kings Bay and metro, and between existing parks and the Parramatta River, along the quiet streets away from Parramatta Road. This in turn can incentivise surrounding land-owners to renew and tie into this emerging network.

Approach to renewal

Image: Aerial Render looking west down Parramatta Road.

Note: PRCUTS envelopes for Burwood North and Kings Bay shown in combination with Architectus indicative future development envelopes at an FSR of 3.5:1

6
DEVELOPING THE MASTERPLAN

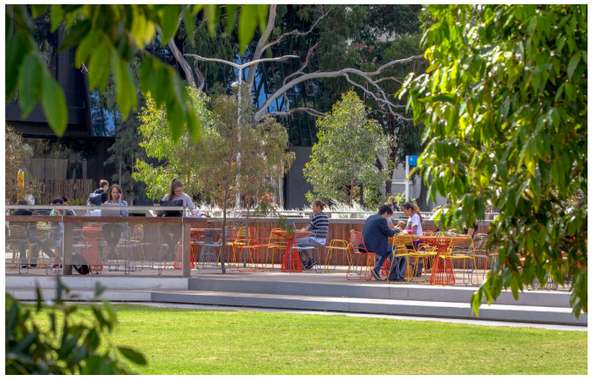
6.1 Urban Design Principles

Following review of the strategic planning context, the future context of Parramatta Road Corridor and surrounding precincts, and considering the opportunities, vision and community needs for the site, a number of key urban design principles were developed that underpin the approach to the renewal of the site

A central open space

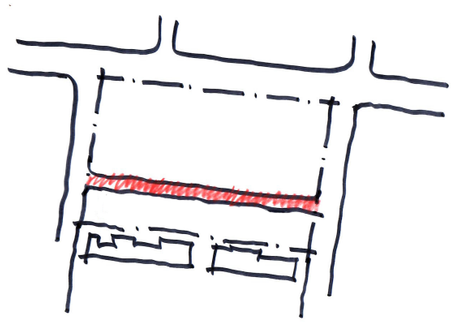
A new destination for Croydon, of a size and quality that can only be offered with a site of this size and depth

A green address



New green setbacks will be transformational not only for the Parramatta Road corridor but to the quality of the surrounding streets as well. They will be a catalyst for the entire neighbourhood

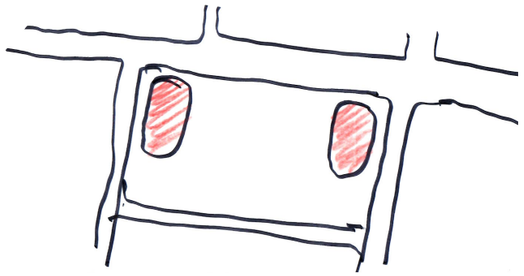
A new laneway



A shared lane-way will provide a fourth street frontage, unlocking through site connections and providing a transition to the residential context to the south

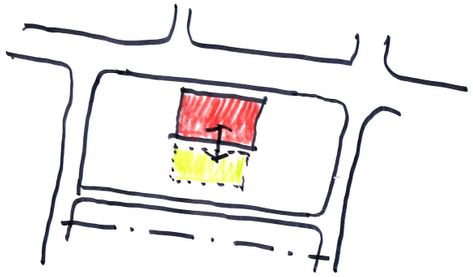
Urban Design Principles

Strategically located height



There is an opportunity to locate height in a way that aligns scale with the future corridor character and minimises impacts to the south

Protect the open space



Low scale built form provides a buffer from the harsh Parramatta environment, and interfaces with the activity of the open space

Authentic fine grain uses for the community

A bespoke indoor-outdoor offer that does not compete with Westfield and provides a premium activated 18-hour destination

6.2 Envelope testing

The following pages explore an approach to the renewal of the site that aligns with future density identified in the comparable centres and tests a more ambitious approach with significant public benefit.

A number of envelope options for were tested for the site, starting with an option that complies with existing controls. This was measured against the PRCUTS principles and the suitability of the development in the context future renewal and Metro.

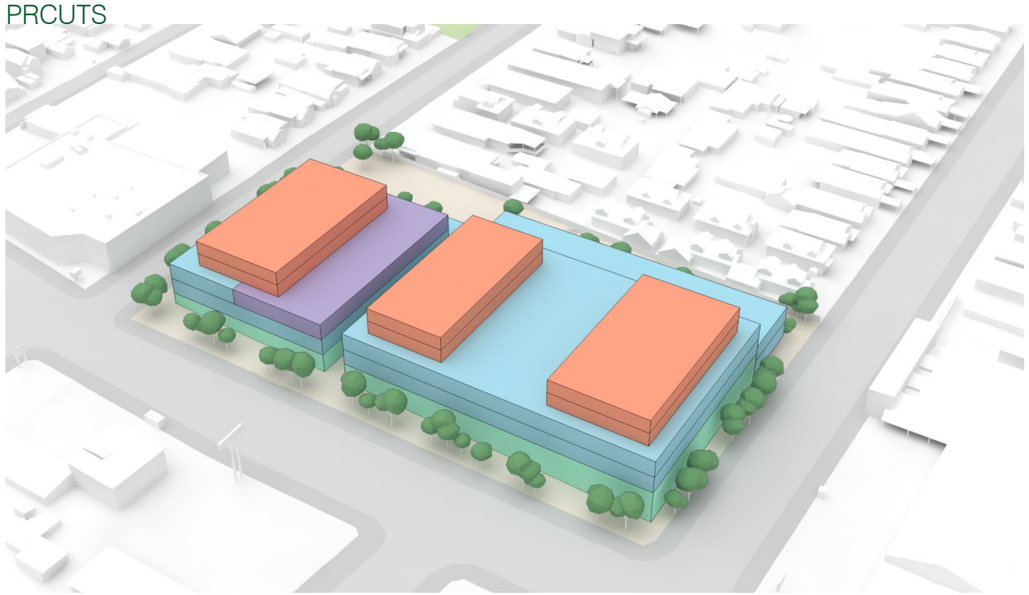
Taking the lessons learnt from the permissible scheme, and the analysis of comparable centres, it was found that an FSR of 3.4:1 of is at the conservative end of densities around Metro stations and constitutes are reasonable approach. It was found through testing envelope options that an FSR of 3.4:1 can offer a balance between minimising the solar and visual impacts to the existing surrounding context while providing uplift and substantially improved amenity and public benefit to the site.

The recommended new FSR of 3.4:1 is based on:
- The site being located well within the proposed maximum FSRs along the Parramatta Road corridor, with a proposed FSR of 3.0:1 in Kings Bay and 4.0:1 in Burwood.
- With the Metro located identified, the site sits well within the 800m catchment for increased density around a station.

Therefore, all options presented in the tower study show an FSR of 3.4:1 and maintain a similar proportion of each land use. The maximum height of buildings varies in some options and is recorded in each option.

It should be noted that these options present envelope massing. The bulk and scale of these buildings will be further refined through architectural resolution. For solar and VIA testing refer to Chapter 8, and for further detail on envelope testing and options refer to Appendix A.

PRCUTS



PRCUTS Complying
(no consolidated open space)

The PRCUTS, 2016 includes indicative controls for future developments in the corridor. These were prepared prior to the Metro station location being announced and will therefore most likely be subject to review.

A review of the complying PRCUTS envelope provided a baseline assessment to understand the opportunities and limitations for development. The key findings showed:

Pros:
- Suitable street wall height along Parramatta Road.
- Potential for a through-site link at the southern end of the site.

Cons:
- Bulky development not suitable for residential or commercial development, does not accommodate future demand.
- Lack of public benefit and amenity.
- Lack of deep soil required for ADG.
- Does not support the future growth and development of the corridor and Metro precinct.

A PRCUTS complying scheme is considered to present an overall poor outcome that is not capable of providing the benefits that an amalgamated site of this unique size and configuration otherwise could.

FSR 1.8:1, height 21m	
Height complies with PRCUTS direction	✓
Minimal overshadowing to adjacent residential	✓
No open space	✗
Few through site link opportunities	✗
Large format retail- lacks community focus	✗

Envelope testing

PRCUTS 3.4:1 option

PRCUTS FSR 3.4: 1 option

Using the complying PRCUTS built form control, a second envelope option was tested with an FSR of 3.4:1 to understand the implications and opportunities of the built form.

This option considers similar land uses, with the addition of community facilities while also complying with setbacks, transition zones and sensitive interfaces set out in PRCUTS. The key findings showed:

- The 45° solar plane from the southern boundary at 1.5m, limits higher development and results in a bulkier outcome with severe overshadowing impacts for the direct southern neighbours.
- Floor-plate dimensions result in a bulkier appearance when viewed from a northern and southern direction.
- Bulky development not suitable for residential or commercial development, does not accommodate future demand.
- High level of overshadowing to direct southern neighbours as there are longer building elements in an east-west direction.

In modelling this at 3.4:1 FSR, with complying PRCUTS built form controls, the testing has illustrated the built form is not optimal and alternative envelope testing with an FSR of 3.4: 1 should be explored further.

FSR 3.4:1, Height 50.8m	
Height complies with PRCUTS direction	✗
Minimal overshadowing to adjacent residential	✓
No open space	✗
Few through site link opportunities	✗
Large format retail- lacks community focus	✓

Balanced Outcome

Balanced FSR 3.4: 1

Taking the findings from the PRCUTS schemes testing, a preferred envelope integrating PRCUTS principles, providing substantial public open space, improved solar to southern neighbours and accommodating smaller floor-plates suitable for residential and commercial demand was developed.

The preferred envelope distributes the yield vertically into 2 slender tower forms to open the ground plane for a large 2,700sqm public open space, create new through-site connections and maintain solar amenity to key surrounding open spaces and neighbouring properties. The taller tower is broken into two components of varying heights to reduce the visual bulk and create a more slender appearance.

The reference scheme for this envelope is described in detail in Chapter 7.

FSR 3.4:1, Height 72.5m	
Height complies with PRCUTS direction	✗
Minimal overshadowing to adjacent residential	✓
No open space	✓
Few through site link opportunities	✓
Large format retail- lacks community focus	✓

6.3 Proposed structure plan

The proposed structure plan based on the preferred envelope for the site establishes the following key features:

Access & Movement:

- Locate vehicular access away from Parramatta Road and provide a combined basement entry.
- Create an internal laneway that prioritises pedestrian movement, provides access to the open space, and establishes east-west connectivity between Kings Bay and Metro
- Provide multiple through-site links into the open space from surrounding streets.

Open Space:

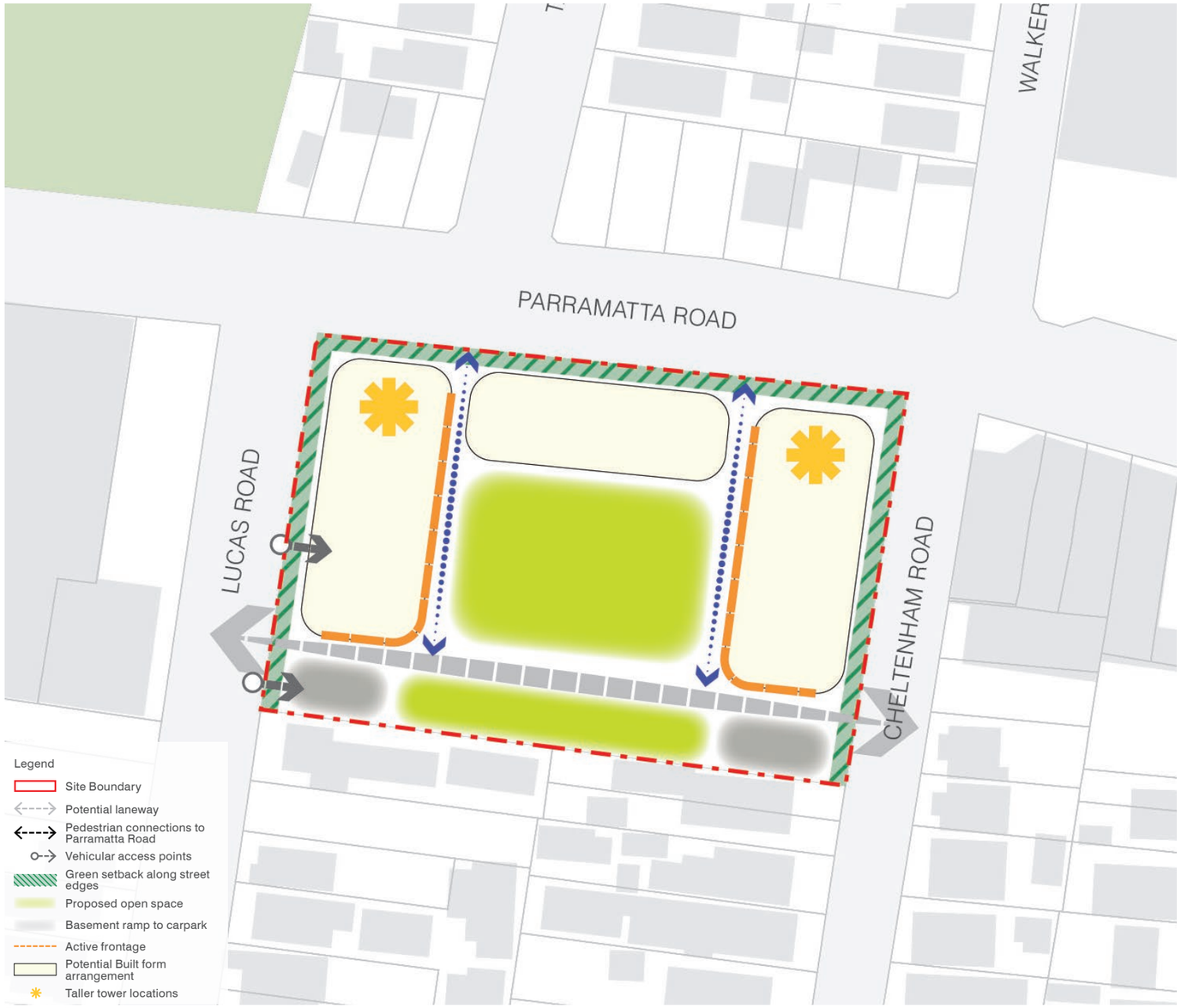
- Provide a 2,700m²+ central public open space that is protected from Parramatta Road for community use with active retail, food and beverage,soft landscape, and play areas.
- Provide a green landscaped setback along the street frontages to deliver on the PRCUTS vision.

Built Form:

- Locate towers on eater and western sides of the site to protect solar access to the southern neighbours and maximise building separation.
- Transition building height and use along the south boundary to provide a sensitive interface with the neighbouring residential properties.

Tower Form:

- Towers oriented north-south to minimise overshadowing.
- The envelopes have been design to ensure no overshadowing to Prowse Reserve between 9am-3pm mid-winter.
- Residential floorplates to be 750m² GFA, with 8 apartments on each floor. Hotel floorplates to be 750m² GFA.



Proposed structure plan

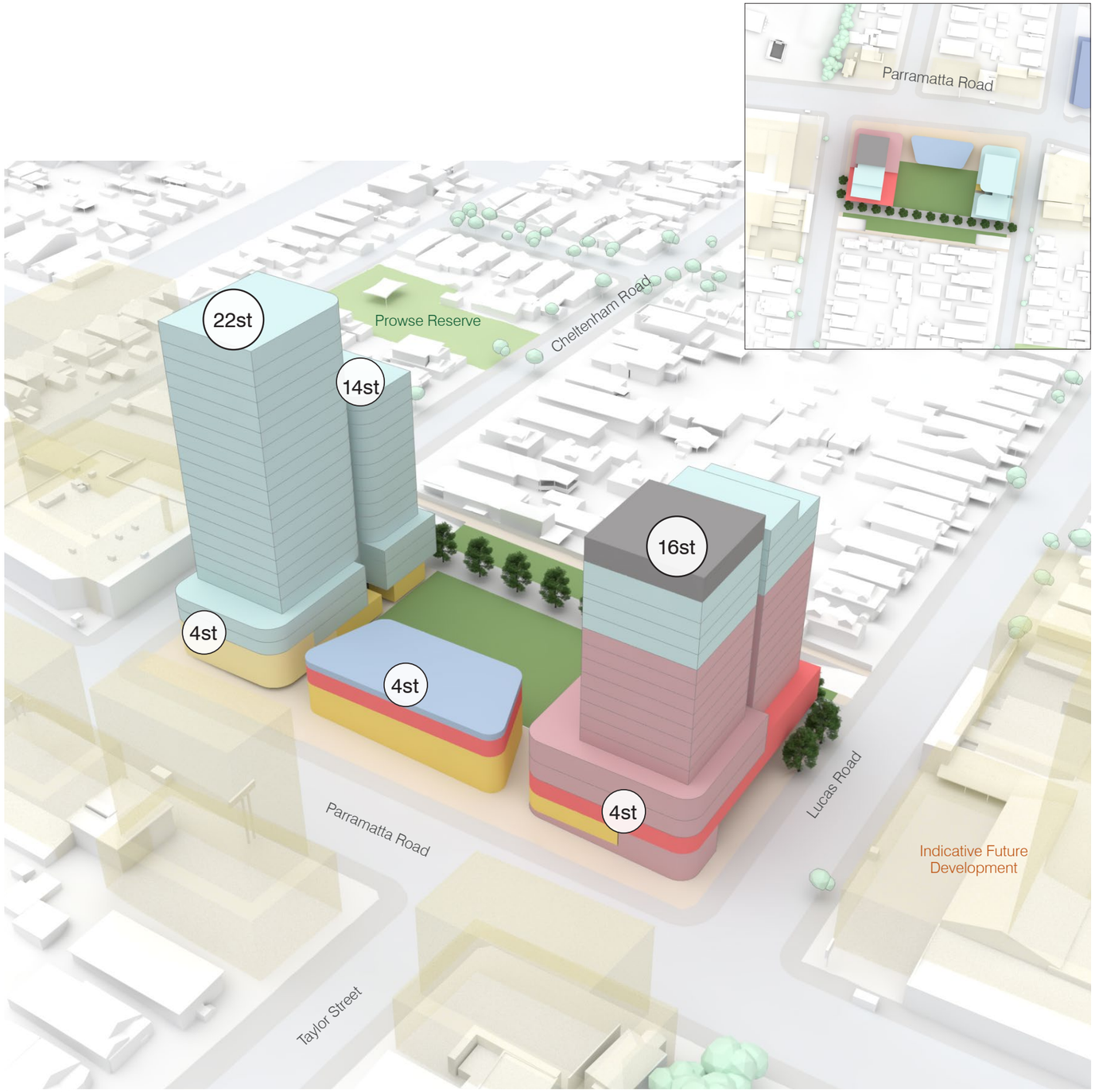
7
THE PROPOSAL

7.1 The Proposal

3.4:1 FSR | 72.5m HOB | 35,582m² GFA

Key Features of the proposal	
Large activated central open space	✓
6m planted setback along Parramatta Road and 3m setbacks on Cheltenham Road and Lucas Road	✓
Southern podia do not overshadow neighbours	✓
Excellent daylight, solar access and views to apartments	✓
Laneway provides through site connections and addresses for southern part of site	✓
Extended open space provides transition in scale from southern neighbours and future proofs the opportunity for the southern neighbours to redevelop.	✓
Retail floorplates include cores- suitable for fine grain retail	✓

Uses	GFA (m²)
Retail	3,362
Showroom	719
Commercial	1,197
Community Facilities	97
Residential	17,365
Hotel	12,841
Total	**35,581**



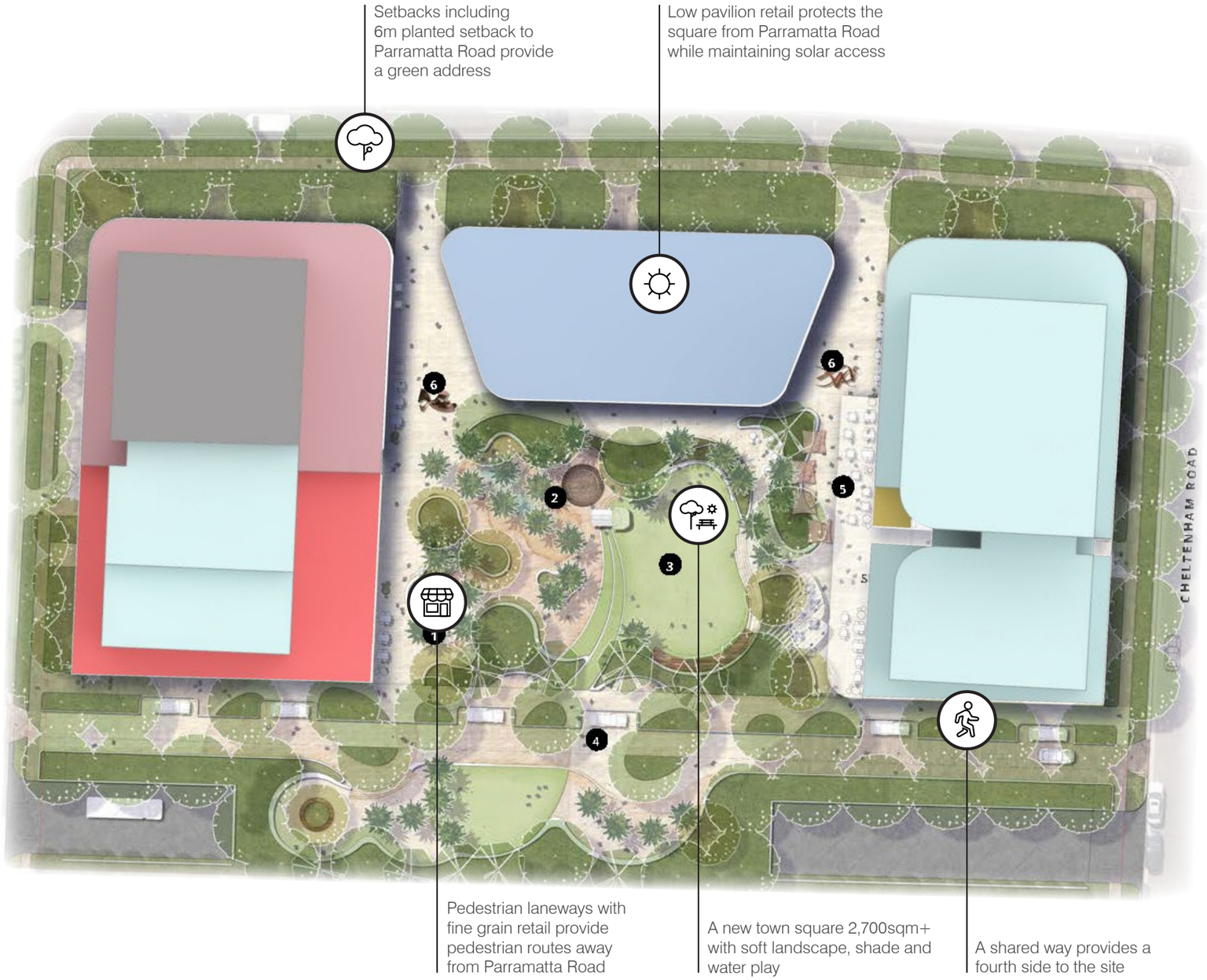
Axonometric model view

The Proposal

3.4:1 FSR | 72.5m HOB | 35,582m² GFA

The proposal has been designed to maximise the public benefit of a consolidated central open space.

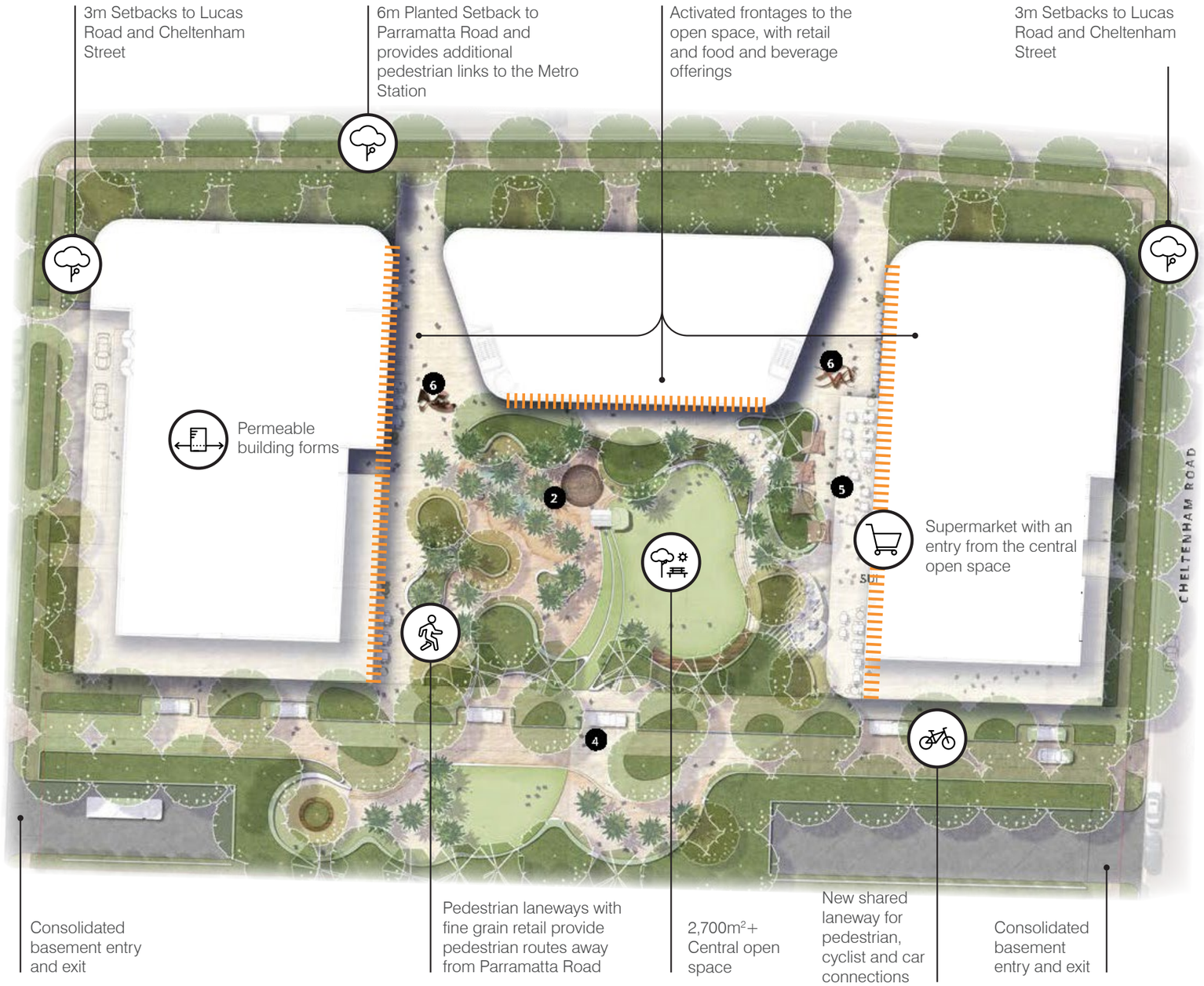
Podia with colonnades wrap the open space protecting it from Parramatta Road. Two towers are oriented north-south with large separation to minimise overshadowing to the southern neighbours. The open space extends across the shared way to the southern boundary, and multiple through site links invite people into the open space from the surrounding streets.



7.2 Public Domain

A new vibrant central open space, protected from Parramatta Road and activated by food and beverage and retail offerings.

Tiered landscape provides a natural amphitheatre for community events and festivals, a play area caters to young families and soft landscaping and shade provides and urban oasis for all ages to enjoy.



Public Domain

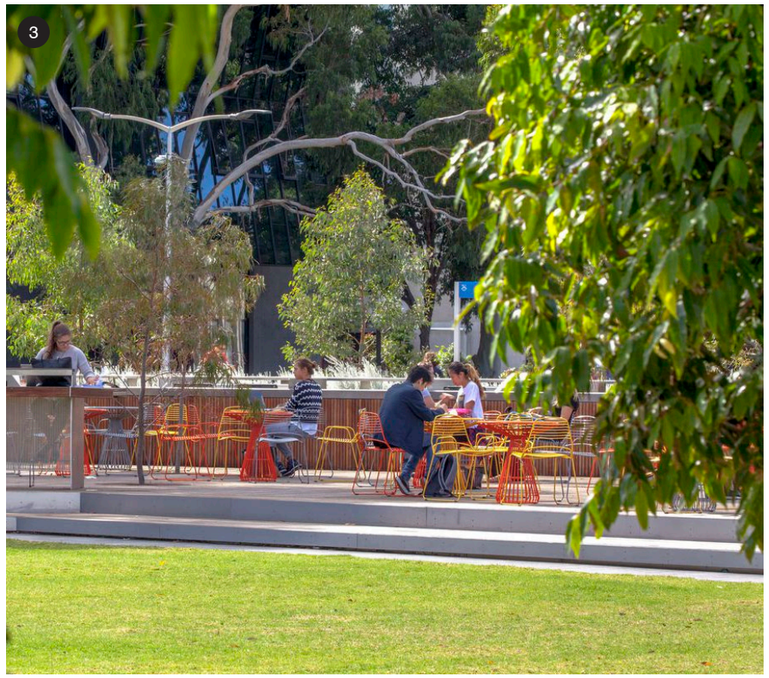
Artist's impression of the proposal looking into the green heart

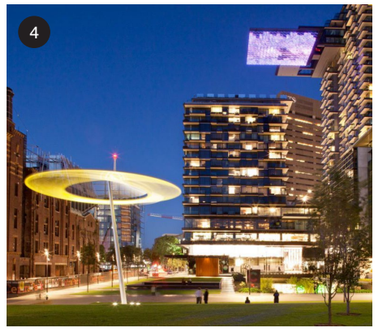
7.3 Desired future character

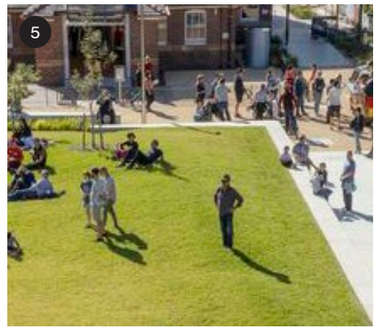
A green heart

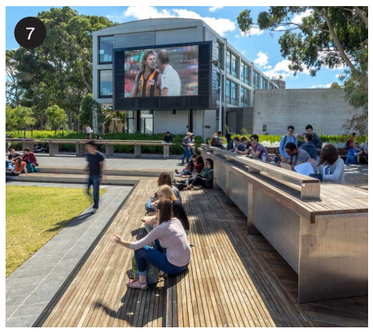
A focus for community and an oasis in the inner west

1. Soft landscaping with access to sun all year round
2. Mature trees providing shelter and shade
3. Quiet places to sit and meet
4. A cultural focus
5. Space for community events
6. Play spaces
7. Flexible event spaces









Desired future character

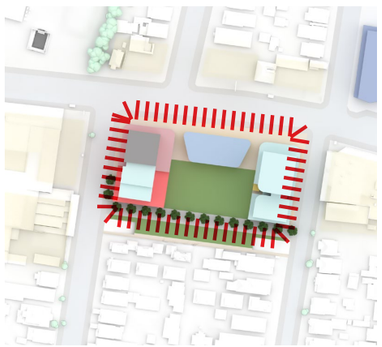
Artist's impression of the proposal looking into the green heart

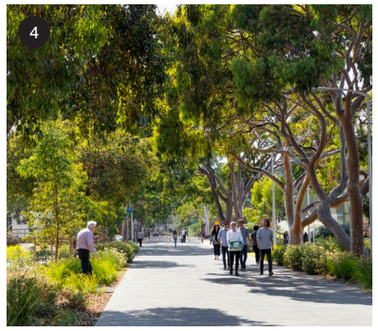
Desired future character

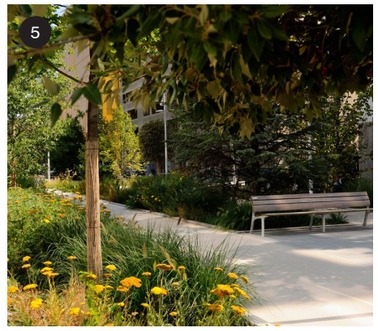
A green address

Generous new landscaped setbacks will transform Parramatta Road

1. A 6m setback will host mature street trees
2. Generous footpaths provide places to meet and interact
3. Street trees and wide footpaths provide shelter from traffic
4. Soft landscaping and WSUD events
5. Landscaped building addresses
6. Green 'lungs' on the side streets off Parramatta Road
7. The role of this new transformed space will provide direct links to Metro Station.





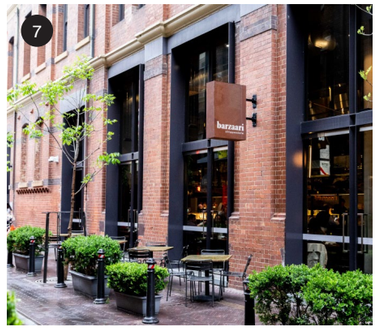


Desired future character

Local dining & retail

An active 18 hour community

1. Popular every day eateries
2. The joy of dining alfresco overlooking open space
3. 18 hour activity
4. Something for all demographics
5. A place for events and cultural festivals
6. People-watching
7. Special restaurants



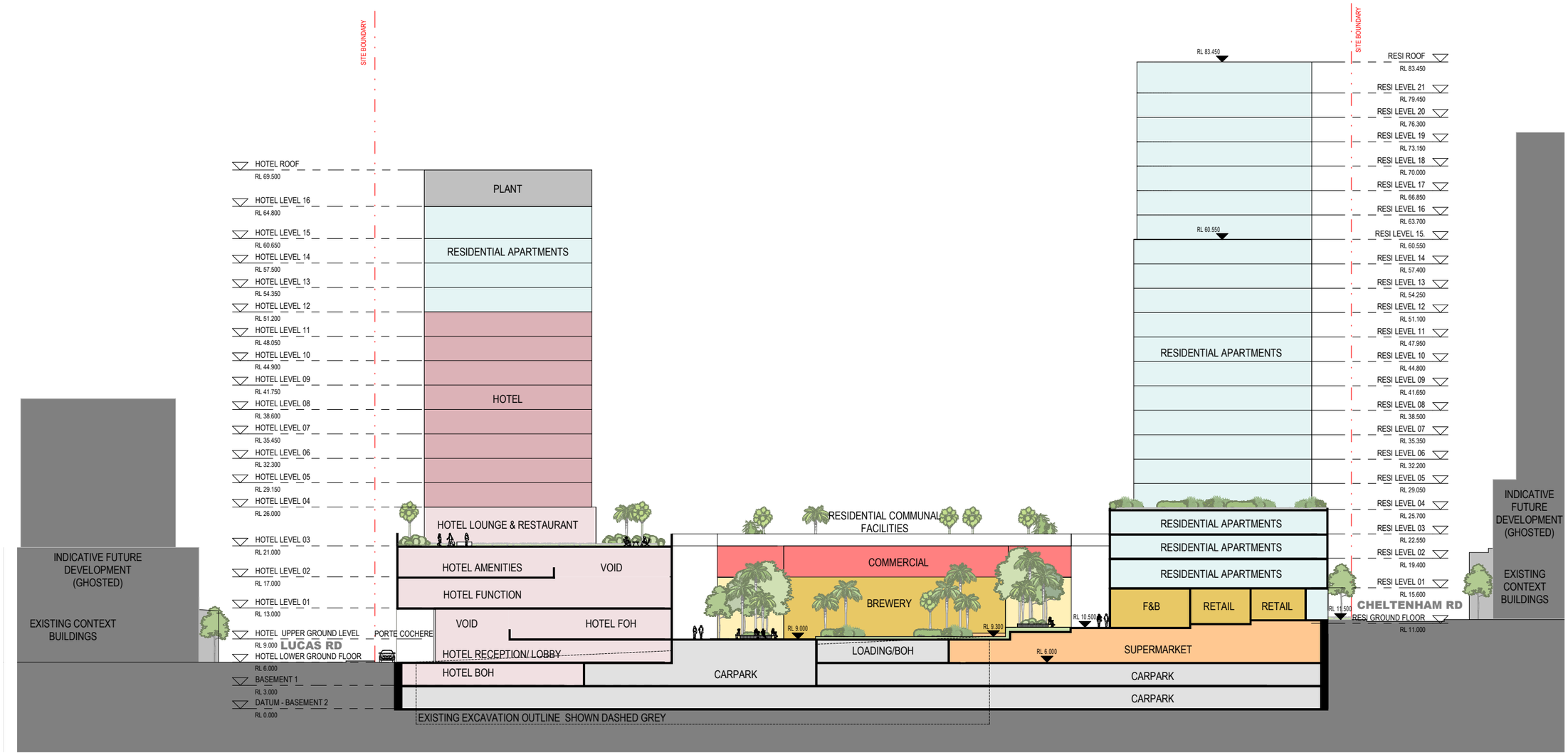
Desired future character

Community spaces and jobs

New opportunities for the precinct

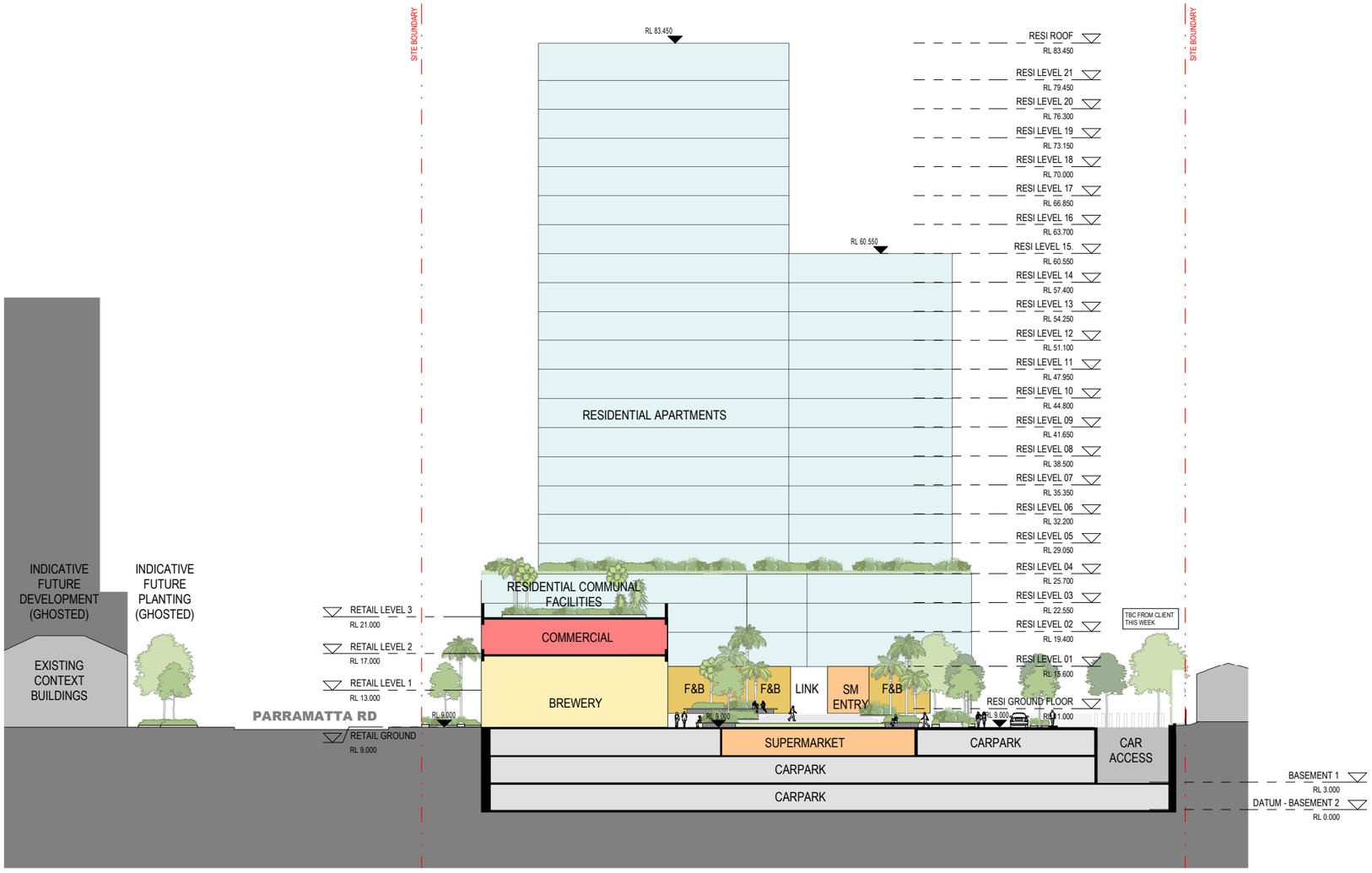
1. Maker spaces
2. Flexible community space
3. Large format performance and rehearsal spaces
4. Teaching and learning spaces
5. Flexible work-share opportunities

7.4 Sections



East-west section, looking North

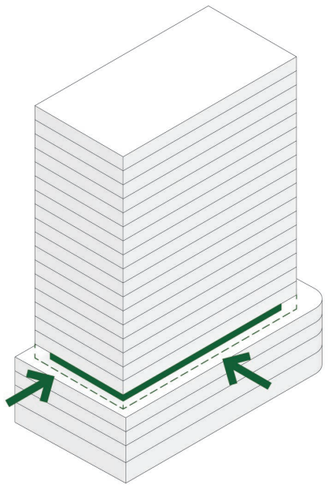
Sections

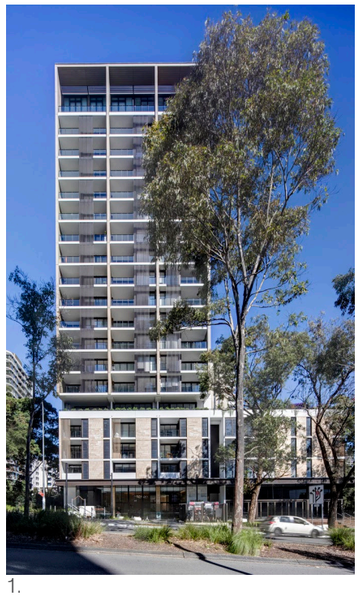


North-south section looking east

7.5 Massing and Articulation Strategies

A number of massing and articulation strategies are important on this site, to visually break down the bulk and scale of the buildings, resulting in more slender tower forms.



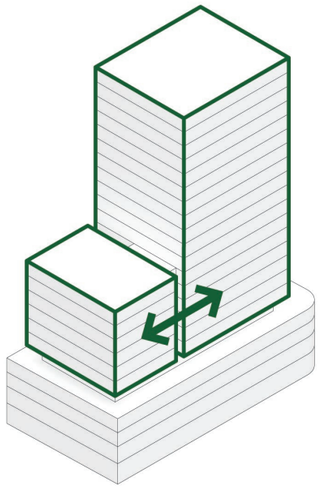


1.

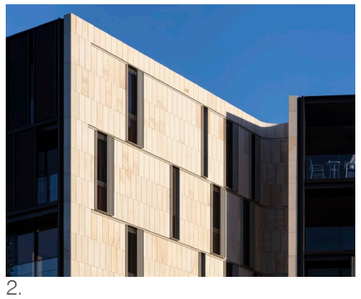
Floating Towers

Important to reinforce the lower street wall datum, responding to the surrounding sites, recessing the first storey of the tower breaks down the massing into the podium and tower components.

1. Division between tower and podium elements through setback level and changes in facade detailing. Natura, Macquarie Park.



1.



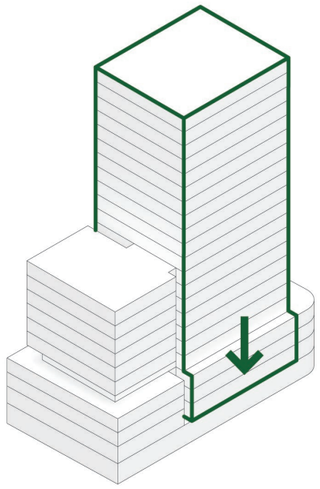
2.

Breaking down tower composition

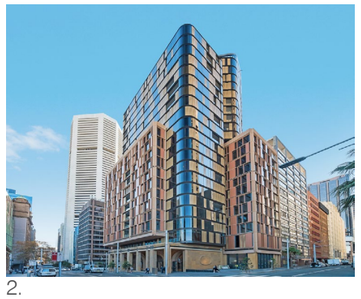
Breaking down the tower into discrete elements assists in breaking down the visual bulk of tower. Varying heights, physically separating and varying facade detailing and materials between these elements can further enhance this effect.

1. Variation in facade detailing between building elements. King and Phillip Residences, Sydney.
2. Separation between building elements. Harbord Diggers, Freshwater.

Massing and Articulation Strategies



1.

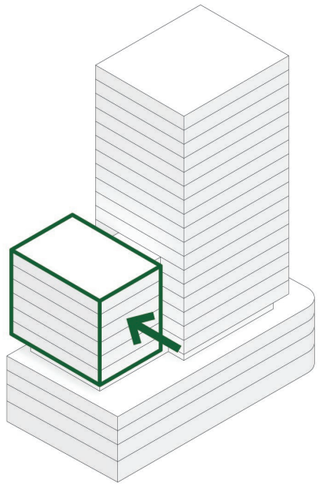


2.

Bring tower element to the ground

Through extending the tower element to the ground, the more slender portion of the tower can be emphasised, This can be achieved through reducing podium/tower setbacks and the continuation of facade detailing and materials.

1. Extension of tower setback and detailing into podium levels elongates tower element. Dahlerups Tower, Copenhagen.
2. Tower element brought to the ground on a corner between two podium elements. King and Phillip Residences, Sydney.



1.

Variation in depth

Articulating the mass through shifting elements with additional setbacks can further visually break down the perceived bulk and scale of the building while maintaining contiguous floorplates.

1. Breaking down a larger floorplate through offset building mass. Alviks Tower, Stockholm.

7.6 Architectural Plans

Drawing:	**Lower Ground Floor Plan**
Drawing no:	A.1099
Issue:	8
Scale@A1:	1 : 250
Date:	12/05/23

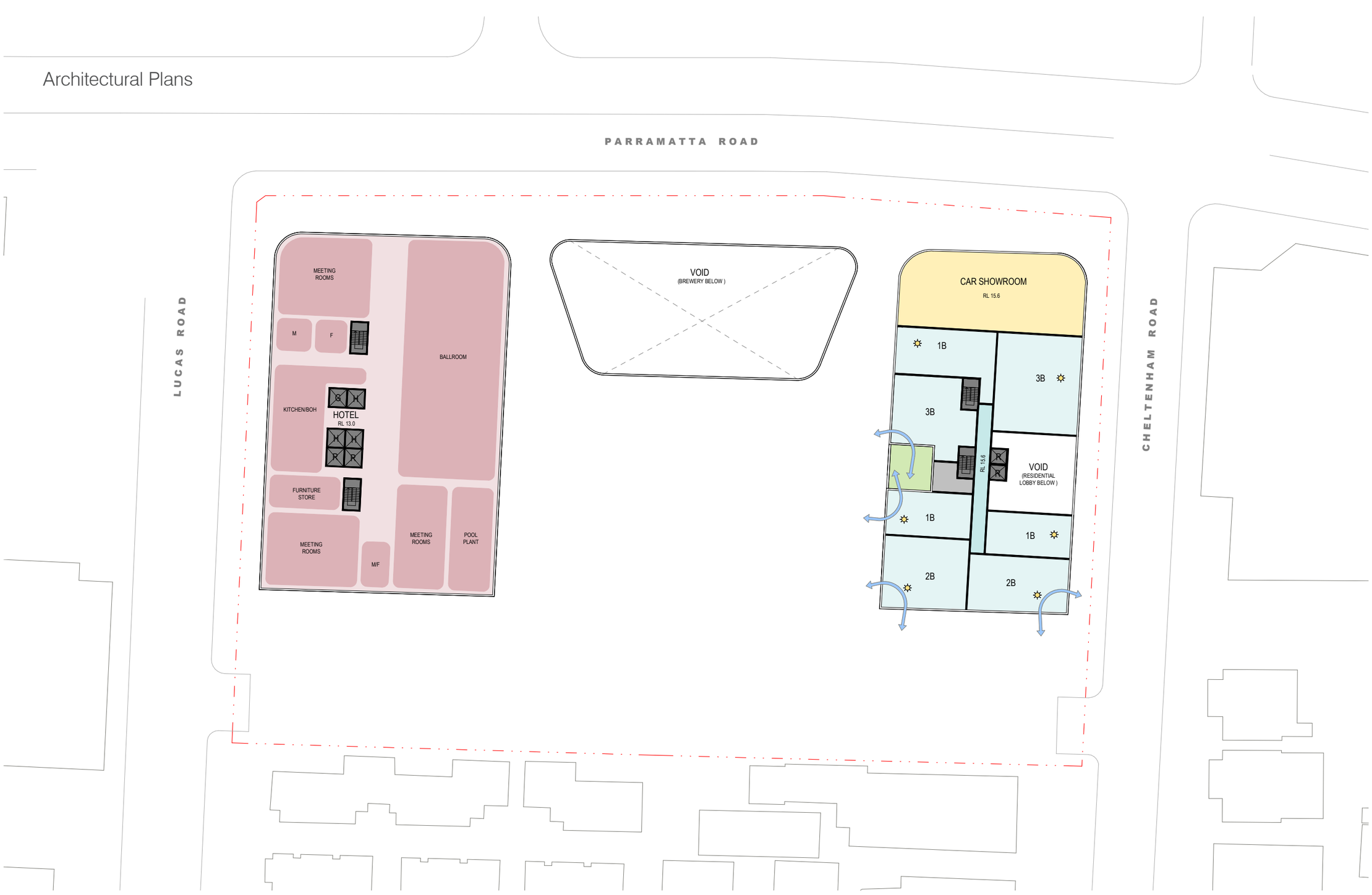
0 2.5 5 7.5 10 12.5 25 m

Do not scale drawings. Verify all dimensions on site

Architectural Plans

Drawing:	**Upper Ground Floor Plan**
Drawing no:	A.1100
Issue:	10
Scale @A1:	1 : 250
Date:	12/05/23

Architectural Plans

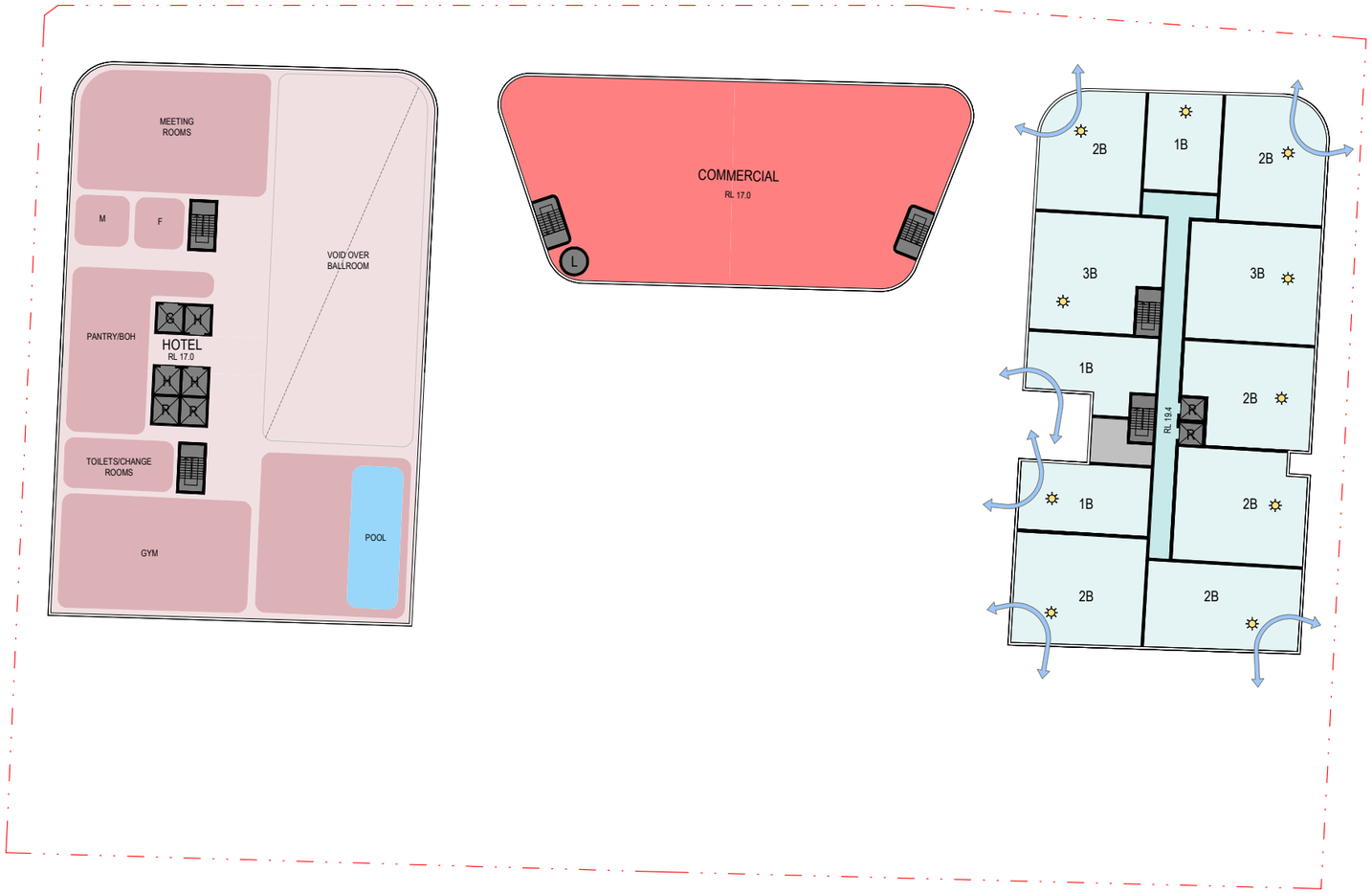


Drawing:	**Level 1 Floor Plan**
Drawing no:	A.1101
Issue:	8
Scale@A1:	1 : 250
Date:	12/05/23

0 2.5 5 7.5 10 12.5 25 m

Do not scale drawings. Verify all dimensions on site

Architectural Plans



Drawing:	**Level 2 Floor Plan**
Drawing no:	A.1102
Issue:	7
Scale @A1:	1 : 250
Date:	12/05/23

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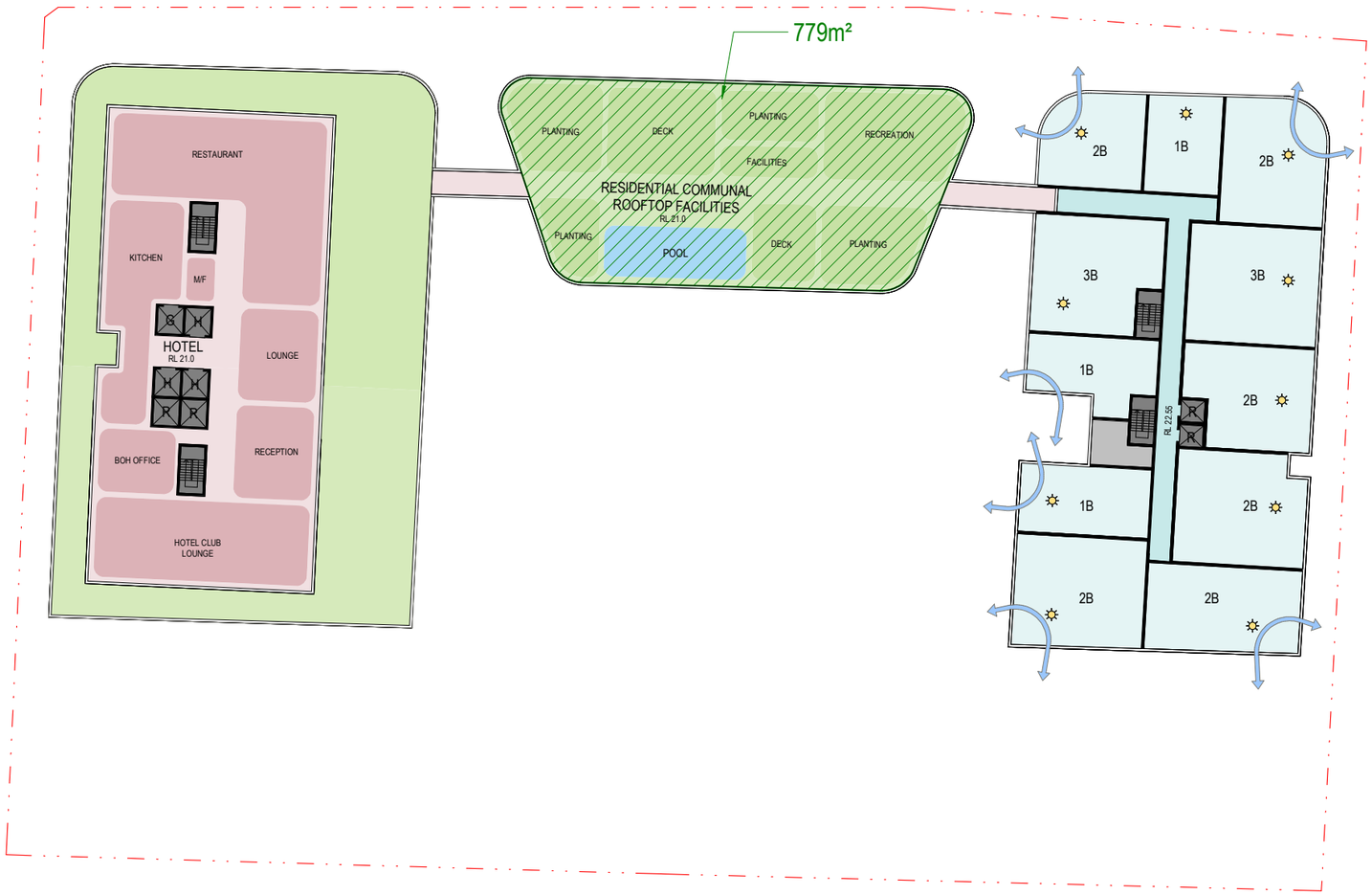
Do not scale drawings. Verify all dimensions on site

Architectural Plans

OPEN SPACE AREA LEGEND

779m² OPEN SPACE ABOVE BREWERY

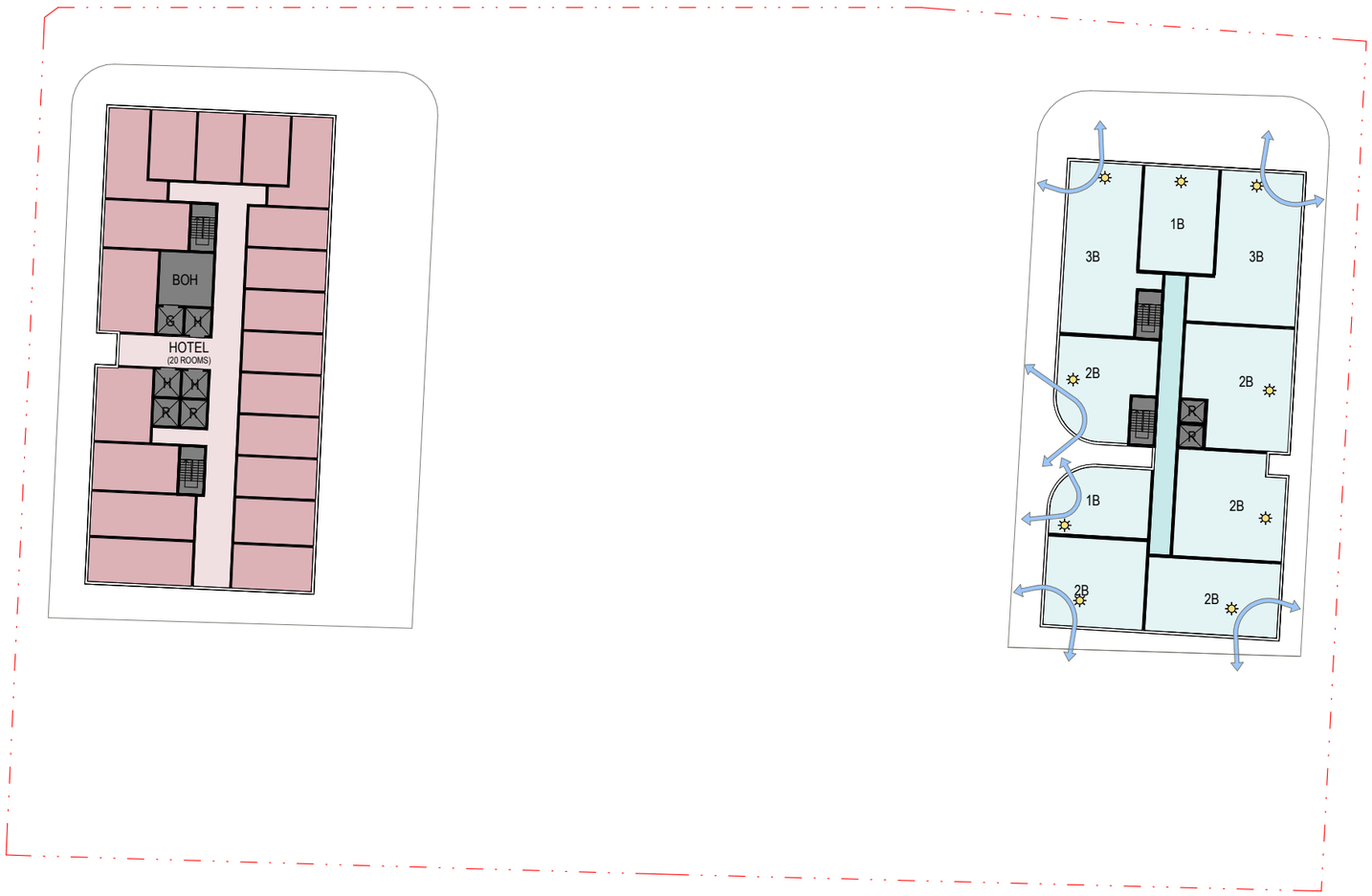


Drawing:	**Level 3 Floor Plan**
Drawing no:	A.1103
Issue:	9
Scale@A1:	1 : 250
Date:	12/05/23

0 2.5 5 7.5 10 12.5 25 m

Do not scale drawings. Verify all dimensions on site

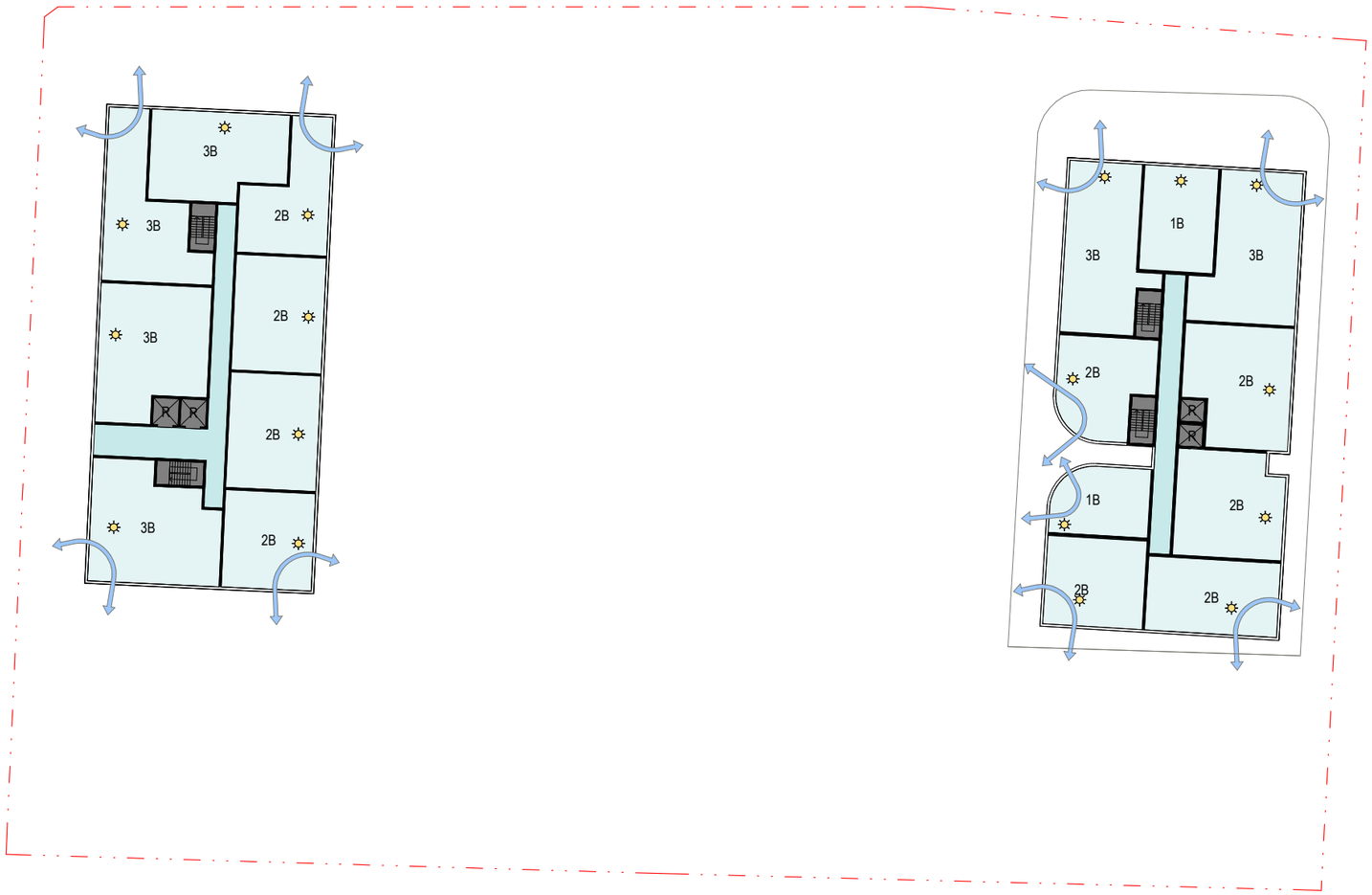
Architectural Plans



Drawing: **Level 4 - 11 Floor Plan**
Drawing no: A.1104
Issue: 8
Scale @A1: 1 : 250
Date: 12/05/23

0 2.5 5 7.5 10 12.5 25
m
Do not scale drawings. Verify all dimensions on site

Architectural Plans

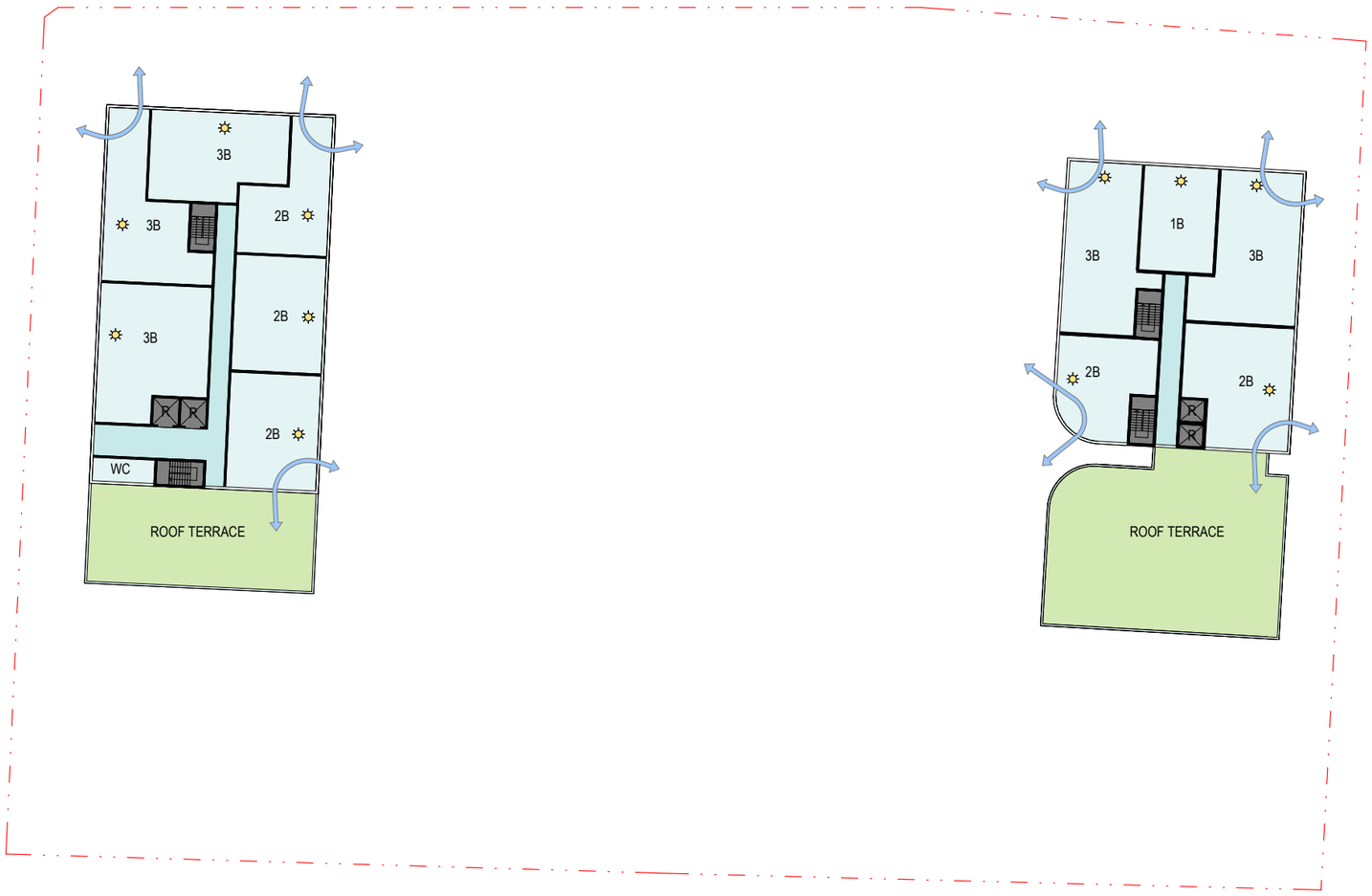


Drawing:	**Level 12 - 14 Floor Plan**
Drawing no:	A.1112
Issue:	5
Scale@A1:	1 : 250
Date:	12/05/23

0 2.5 5 7.5 10 12.5 25 m

Do not scale drawings. Verify all dimensions on site

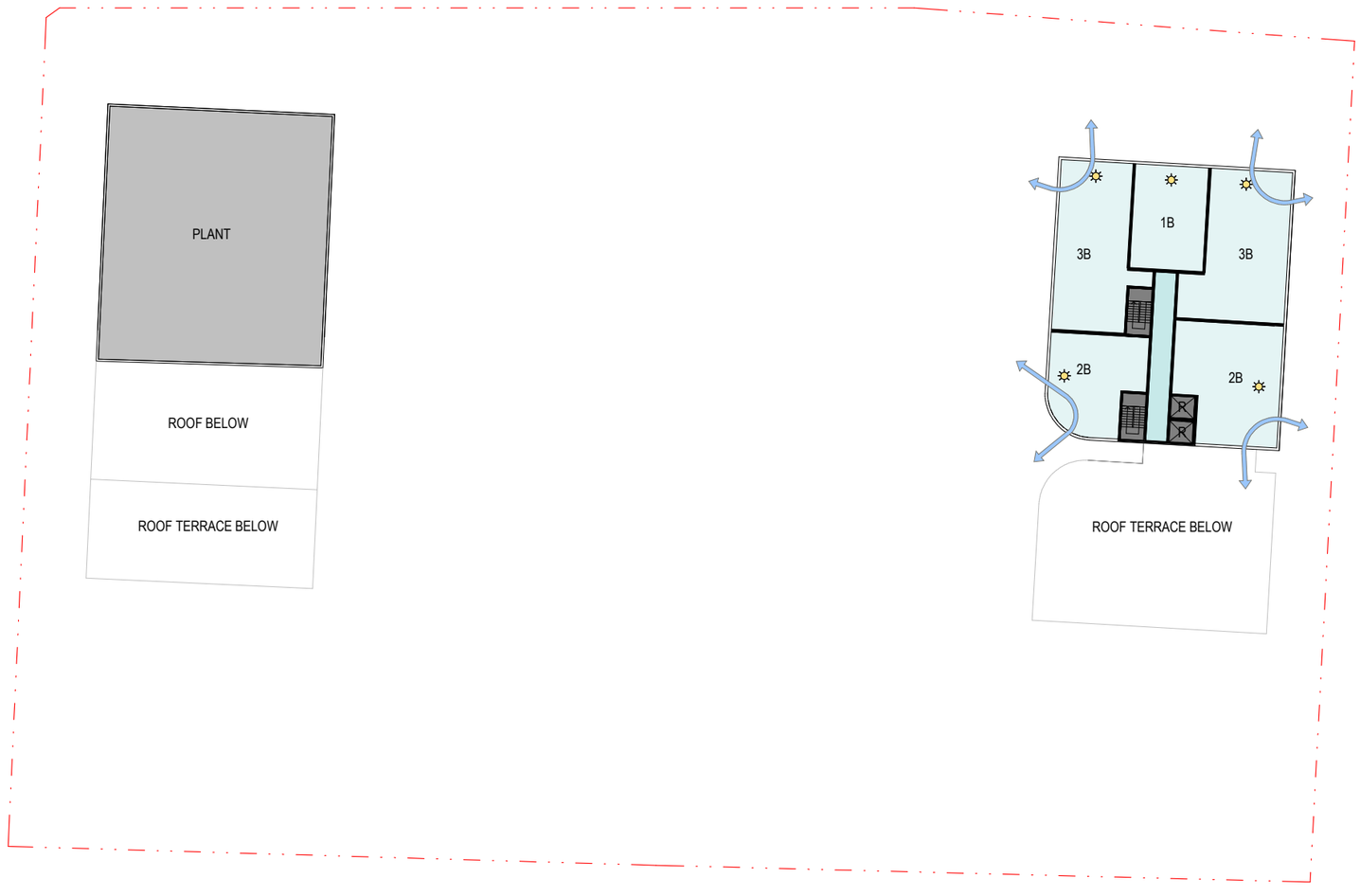
Architectural Plans



Drawing:	**Level 15 Floor Plan**
Drawing no:	A.1115
Issue:	5
Scale @A1:	1 : 250
Date:	12/05/23

0 2.5 5 7.5 10 12.5 25
Do not scale drawings. Verify all dimensions on site
m

Architectural Plans



Drawing:	**Level 16 Floor Plan**
Drawing no:	A.1116
Issue:	5
Scale@A1:	1 : 250
Date:	12/05/23

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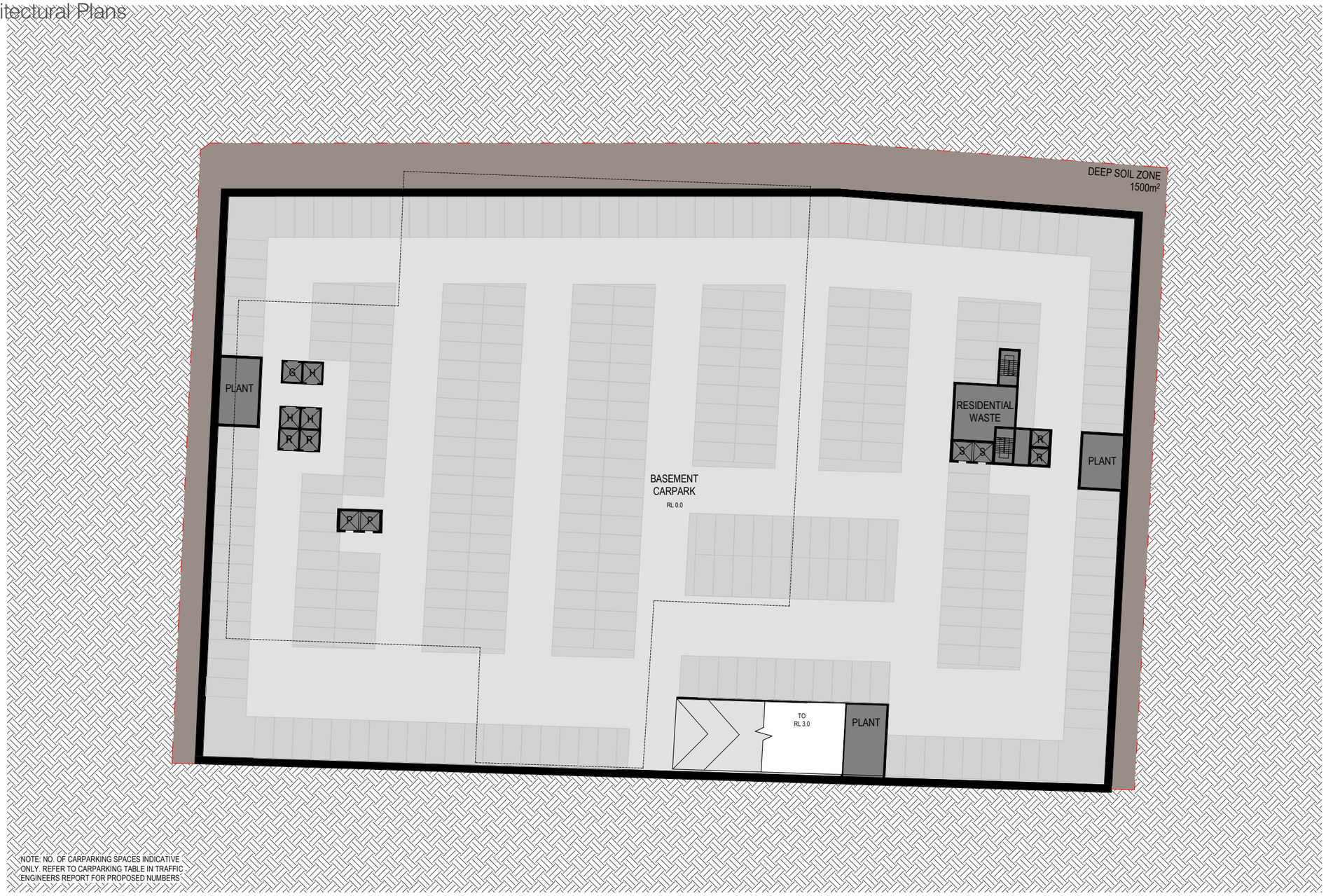
Do not scale drawings. Verify all dimensions on site

Architectural Plans

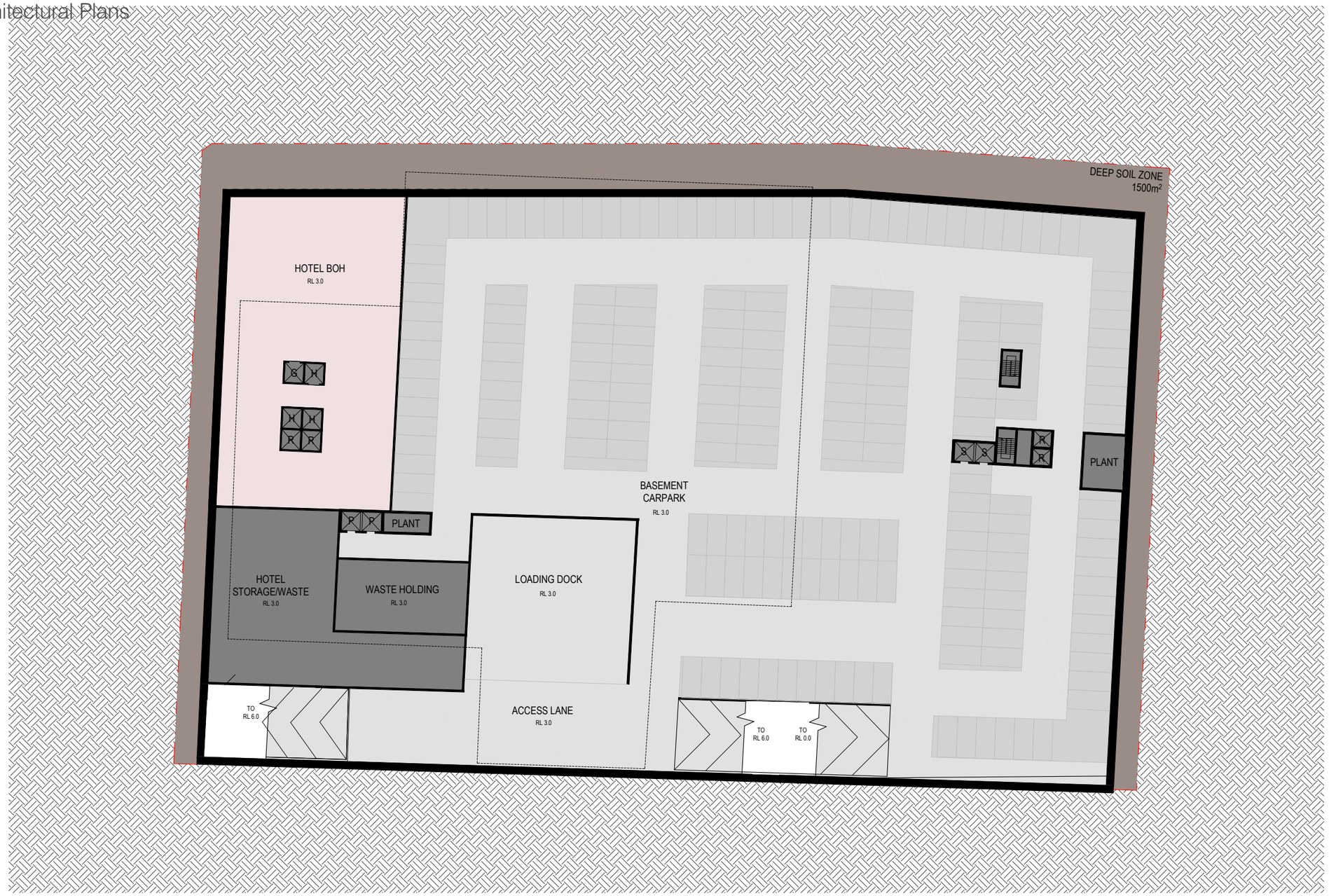


Drawing:	**Basement 2 Floor Plan**
Drawing no:	A.1097
Issue:	6
Scale @A1:	1 : 250
Date:	12/05/23

0 2.5 5 7.5 10 12.5 25 m

Do not scale drawings. Verify all dimensions on site

Architectural Plans



Drawing:	**Basement 1 Floor Plan**
Drawing no:	A.1098
Issue:	6
Scale@A1:	1 : 250
Date:	12/05/23

0 2.5 5 7.5 10 12.5 25
m
Do not scale drawings. Verify all dimensions on site

7.7 The proposal in the future development context

As outlined in Chapter 5, the link east down Parramatta Road from the Burwood-North Metro Station towards the proposed Kings Bay Precinct is a key area for future development for this area given its walking connections, less constrained sites and large existing lots. The image adjacent shows the proposal within the future corridor developed at an FSR of 3.5:1.

166- 204 Parramatta Road has a unique opportunity as one of the largest sites in this area will set the standard of future development through generous public domain offerings and community benefits.

Image: Aerial Render looking west down Parramatta Road.

Note: PRCUTS envelopes for Burwood North and Kings Bay shown in combination with Architectus indicative future development envelopes at an FSR of 3.5:1 and maximum height of 67m. See Future Development Context chapter for further detail.

8 TESTING & ASSESSMENT

8.1 Introduction

In order to demonstrate the impacts of the proposed scheme set out in the previous chapters, this section provides a comparison of selected scenarios through:

1. A visual analysis, described through:
   - Methodology
   - Visual context analysis
   - Photo-montage analysis of selected views
2. A solar analysis of potential impacts on private and public domain.

8.2 Visual Impact Assessment Methodology

Architectus' methodology for the assessment of visual impact used in this report has been developed based on the New South Wales Land and Environment Court Planning Principles as written in *Tenacity Consulting v Warringah Council [2004]* and *Rose Bay Marina Pty Limited v Woollahra Municipal Council and anor [2013]*.

In this report, a qualitative assessment of each view is set out under the following principles:

1. Importance of the view;
2. Visual absorption capacity; and
3. Likely view change.

Three visual simulations (photo-montages) have been prepared for each view to determine the visual impact of the proposed development. Each view is given a overall view impact rating taking into consideration the above three principles. It should be noted the photo-montages shown demonstrate the building form only; they do not show detailed articulation or material selection.

The views compared for each view location are:

1. A photo of the existing conditions;
1. PRCUTS complying scheme at 1.8:1 FSR;
1. PRCUTS complying scheme at 3.4:1 FSR;
2. Proposed scheme at 3.4 FSR.

<u>Standards for photography and photo-montages</u>
An understanding of the field of view of photographs and photo-montages is important in understanding impacts represented on a page.

One standard typically adopted in NSW is the use of a 35mm FX format camera at 50mm focal length (or equivalent) to represent a view on a page similar to how it would be perceived by the human eye at the location.

However, for this project, a 50mm focal length would not provide a clear understanding of the breadth of the view and/or the size of the proposal. Therefore, throughout our view impact assessment a wider-angle view has been used.

All photos were captured on a Sony A6000 which has an APS-C sized sensor (roughly 24mm), this results in a crop factor when compared to a 35mm FX (full frame) sensor. As such, although all photos were taken at 16mm, their equivalent 35mm focal length is 24mm.

Introduction

Importance of the public domain view
It includes consideration of the following factors:

The context of the viewer (including whether the view is static or dynamic, obtained from standing or sitting positions);

Elements within the view (including whether iconic elements are present, the existing composition of the view, and any existing obstructions to the view);
- The number of viewers;
- The distance to the proposal; and
- The period of view.

The features are described for each view and a final categorisation of view importance has been produced as a summary. The following table provides a definition of example use cases for each categorisation of the importance of the view:

	Definition
High	Unobstructed views of highly valuable or iconic elements from highly important locations in the public domain.
Moderate-High	Generally unobstructed views including important visual elements from well-used locations. The view attracts regular use of this location by the public.
Moderate	Views including elements of moderate importance with little obstruction which are obtained from moderately-well used locations. The view may assist in attracting the public to this location.
Low-Moderate	Views with some important elements which may be partially obstructed or from a less well used location. The view may be a feature of the location however is unlikely to attract the public to it.
Low	Views from spaces or streets with little pedestrian use or obstructed views or views with few important elements. Obtaining views is not a focus of using the space.

Visual absorption capacity
The visual absorption capacity is an estimation of the capacity of the landscape and built environment to absorb development without creating significant visual change that would result in a reduction of scenic or visual quality. This is usually dependent on vegetation cover, land form and existing built form and is influenced by the level of visual contrast between the proposed development and the existing elements within the physical environment.

The degree of contrast between the various elements of the development and the physical environment/ landscape setting in which they are located determine the level of visual absorption. Factors such as scale, shape, colour, texture and reflectivity of the development compared to the visual context define the degree of contrast. For the purpose of this study, the rating outlined in the table below has been used in the assessment of visual absorption capacity.

This rating concentrates on the bulk of the proposal in relation to screening factors and contextual development.

Rating	Definition
High	Existing landscape and built environment able to absorb development. Low degree of visual contrast will result from building envelopes.
Moderate	Existing landscape able to absorb some development. Some visual contrast will result from building envelopes.
Low	Existing landscape unable to absorb development. High degree of visual contrast will result from building envelopes.

Likely view change
The view change is a qualitative assessment of the change of the view. It includes consideration of:

The quantitative extent to which the view will be obstructed or have new elements inserted into it by the proposed development;–Whether any existing view remains to be appreciated (and whether this is possible) or whether the proposal will make the existing view more or less desirable, or locations more or less attractive to the public;

Any significance attached to the existing view by a specific organisation; and

Any change to whether the view is static or dynamic. A description of the rating for each view has been provided, with a final categorised assessment of the extent of view change provided under the categories provided in the table to the right.

The categorisation is focussed on retaining the qualities of an existing view. A highly prominent proposal does not necessarily result in a high view change where the existing qualities of the view are retained.

The approach taken is generally conservative in its consideration of these views for the purpose of highlighting maximum potential impacts for consideration in terms of acceptability.

A high extent of view change is not necessarily unacceptable. This may be the case when a proposal contributes to the desired future character of an area that may be different to the existing character.

	Definition
High	The proposal obscures iconic elements or elements identified as highly significant within the existing view.
Moderate-High	The proposal changes the quality of the existing view or obscures elements of significance within the view.
Moderate	The proposal obscures some elements of importance within the existing view or is highly prominent within the view
Low-Moderate	The proposal obscures minor elements within the view.
Low	The proposal is visible within the view however does not impact on any elements of significance within the view.
Negligible	The proposal will not be noticeable within the view without scrutiny.

8.3 Visual Context

Due to the large scale retail nature of Parramatta Road the visual context in which any redevelopment of this site should be considered can be divided into two categories, those views from and along Parramatta Road, and those from the residential areas north and south of Parramatta Road.

Parramatta Road
The composition of views along Parramatta Road are predominately low-scale industrial in nature, with some planting visible. These views are primarily long, looking down the vehicular dominated Parramatta Road, interrupted through bends in the road and rises and falls in topography.

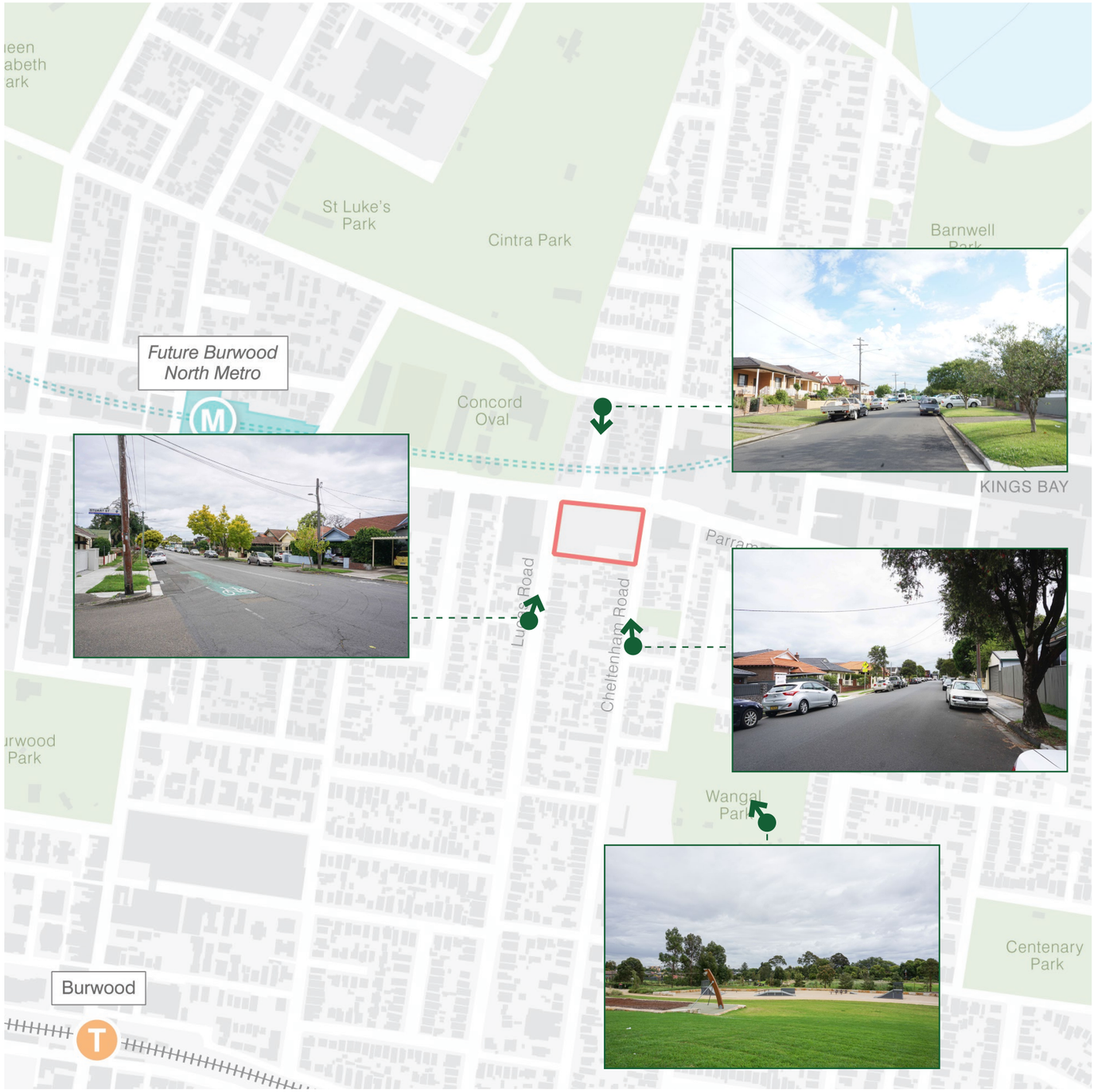
The site sits on a north-south ridge line and just after a bend when approaching from the east, this results in low visibility for the existing buildings on site until you reach the intersection of Parramatta Road and Cheltenham Road. From the west, the site is visible from a longer distance due to the lower ground level around the Concord Oval.

Visual Context

Residential areas
The residential areas have a number of north-south roads which provide views of and across the site. The views primarily comprise of one to two storey dwellings in the foreground with some occasional street planting and trees in front and rear yards.

The number of cars on the north-south streets vary. Roads which have a set of lights with Parramatta Road - such as Cheltenham Road- are busier than those without, due to allowing access to Parramatta Road in both directions.

The site has frontages to both Cheltenham Road and Lucas Road to the south of Parramatta Road. Views from these roads can be similar to those from private backyards and windows of the houses from the south of the site. Additionally, the topography rises to the south of the site, with some longer distance views to the north.



8.4 Visual Impact Assessment

Location Key Plan

Existing

Existing conditions. Photo taken 06/12/2021.

Existing view
This view is primarily seen by cars travelling east along Parramatta Road. The Concord Oval redevelopment can be seen to the left of the view (under construction when this photo was taken), and industrial uses, including the bus layover can be seen to the right of the view. The view is dominated by the busy Parramatta Road.

There is a long view down Parramatta Road, with the site just to the right of where the hill crests and disappears.

This view is rated low in importance given is transitional nature and is currently consistent with most views along the mostly industrial Parramatta Road.

PRCUTS massing (1.8:1 FSR)

PRCUTS 1.8:1

Photo-montage of PRCUTS massing at 1.8:1 FSR

View with PRCUTS massing at 1.8: 1 FSR

This image is for comparative review between the complying PRCUTS massing and the proposed scheme.

Visual Impact Assessment

PRCUTS 3.4:1 option

PRCUTS massing (3.4: 1 FSR)

Photo-montage of PRCUTS massing at 3.4:1 FSR

View with PRCUTS massing at 3.4: 1 FSR

This image is for comparative review between the improvements of the built form for proposed scheme against a similar FSR massing using the PRCUTS built form controls

Proposed Scheme 3.4:1

Proposed scheme

Photo-montage of proposed scheme at 3.4:1

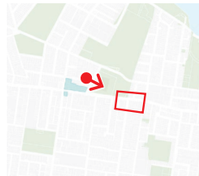
View with Proposed scheme
Importance of view
This view is predominately seen by those traveling in vehicles along Parramatta Road, with a smaller number of pedestrians along the footpath. The typical period of the view, from vehicles, is brief (up to 1-2 minutes)

View change
The proximity of the view to the proposal means it is apparent. As Kings Bay and Burwood Precinct develops in line with the future Parramatta Road Corridor Urban Transformation Strategy, t, the proposal's height will be consistent with surrounding context.

Refer to page 84-85 of this chapter to view proposed scheme with future development context.

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**High**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**Low**
Likely view change	**Low**

Visual Impact Assessment


Location Key Plan

Existing

Existing conditions. Photo taken 06/12/2021.

Existing view
This view is primarily seen by cars travelling along Parramatta Road. The area is predominately an industrial and bulky good retail area, with minimal foot traffic. The view is dominated by the busy Parramatta Road.

There is a long view down Parramatta Road, with the site just to the right of where the hill crests and disappears.

This view is rated low in importance given is transitional nature and is currently consistent with most views along the mostly industrial Parramatta Road.

PRCUTS 1.8:1

PRCUTS massing (1.8:1 FSR)

Photo-montage of PRCUTS massing at 1.8:1 FSR

View with PRCUTS massing at 1.8: 1 FSR

This image is for comparative review between the complying PRCUTS massing and the proposed scheme.

Visual Impact Assessment

PRCUTS 3.4:1 option

PRCUTS massing (3.4: 1 FSR)

Photo-montage of PRCUTS massing at 3.4:1 FSR

View with PRCUTS massing at 3.4: 1 FSR

This image is for comparative review between the improvements of the built form for proposed scheme against a similar FSR massing using the PRCUTS built form controls

Proposed Scheme 3.4:1

Proposed scheme

Photo-montage of proposed scheme at 3.4:1

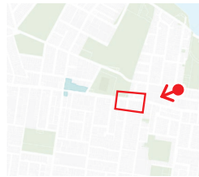
View with Proposed scheme
Importance of view
This view is predominately seen by those traveling in vehicles along Parramatta Road, with a smaller number of pedestrians along the footpath. The typical period of the view, from vehicles, is brief (up to 1-2 minutes)

View change
The proximity of the view to the proposal means it is apparent. As Kings Bay and Burwood Precinct develops in line with the future Parramatta Road Corridor Urban Transformation Strategy, the proposal's height will be consistent with surrounding context.

Refer to page 84-85 of this chapter to view proposed scheme with future development context.

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**High**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**Low**
Likely view change	**Low**

Visual Impact Assessment


Location Key Plan

Existing

Existing conditions. Photo taken 06/12/2021.

Existing view
This view is primarily seen by cars travelling along Parramatta Road, and some pedestrian along the footpaths or walking from the car park to Officeworks and/or the fast-food outlets. The view is dominated by the busy Parramatta Road.

There is a long view down Parramatta Road, with the site just to the left of the signalised intersection with the topography sloping down away from the site.

This view is rated low in importance given is transitional nature and is currently consistent with most views along the mostly industrial Parramatta Road.

PRCUTS massing (1.8:1 FSR)

PRCUTS 1.8:1

Photo-montage of PRCUTS massing at 1.8:1 FSR

View with PRCUTS massing at 1.8: 1 FSR

This image is for comparative review between the complying PRCUTS massing and the proposed scheme.

Visual Impact Assessment

PRCUTS 3.4:1 option

PRCUTS massing (3.4: 1 FSR)

Photo-montage of PRCUTS massing at 3.4:1 FSR

View with PRCUTS massing at 3.4: 1 FSR

This image is for comparative review between the improvements of the built form for proposed scheme against a similar FSR massing using the PRCUTS built form controls

Proposed Scheme 3.4:1

Proposed scheme

Photo-montage of proposed scheme at 3.4:1

View with Proposed scheme
Importance of view
This view is predominately seen by those traveling in vehicles along Parramatta Road, with a smaller number of pedestrians along the footpath or car park outside of Officeworks or fast-food chain. The typical period of the view, from vehicles, is brief (up to 1-2 minutes)

View change
The proximity of the view to the proposal means it is apparent. As Kings Bay and Burwood Precinct develops in line with the future Parramatta Road Corridor Urban Transformation Strategy, t, the proposal's height will be consistent with surrounding context.

Refer to page 84-85 of this chapter to view proposed scheme with future development context.

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**High**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**Low**
Likely view change	**Low**

Visual Impact Assessment

Existing

Location Key Plan

Existing conditions. Photo taken 06/12/2021.

Existing view
This view looks north towards Parramatta Road and the site from Cheltenham Road. The view comprises of one and two storey dwellings with some sporadic trees visible, primarily closer to Parramatta Road.

The signalised intersection at Parramatta Road allows traffic to head in both an eastern and western direction, these intersections are sparse along this section of Parramatta Road and Cheltenham Road therefore has more through traffic as a result. A similar view may be visible from the windows of some houses in this area.

This view is rated at an importance of low given its primarily from a residential area and the number of viewers is low, the period of viewers is low.

PRCUTS 1.8:1

PRCUTS massing (1.8:1 FSR)

Photo-montage of PRCUTS massing at 1.8:1 FSR

View with PRCUTS massing at 1.8: 1 FSR

This image is for comparative review between the complying PRCUTS massing and the proposed scheme.

Visual Impact Assessment

PRCUTS 3.4:1 option

PRCUTS massing (3.4: 1 FSR)

Photo-montage of PRCUTS massing at 3.4:1 FSR

View with PRCUTS massing at 3.4: 1 FSR

This image is for comparative review between the improvements of the built form for proposed scheme against a similar FSR massing using the PRCUTS built form controls

Proposed Scheme 3.4:1

Proposed scheme

Photo-montage of proposed scheme at 3.4:1

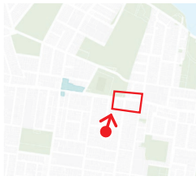
View with Proposed scheme
Importance of view
This view is predominately seen by as a short-term passing view (pedestrians and cyclists) and a potentially static view from private residential.

View change
The view is unlikely to attract public use; however, the proximity of the view to the proposal means it is apparent. The proposal does not obstruct views of any significant items, and as Kings Bay and Burwood Precinct develops in line with the future Parramatta Road Corridor Urban Transformation Strategy, the proposal's height will be consistent with surrounding context.

Refer to page 84-85 of this chapter to view proposed scheme with future development context.

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**Low**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**Low**
Likely view change	**Low**

Visual Impact Assessment


Location Key Plan

Existing

Existing conditions. Photo taken 06/12/2021.

Existing view
This view looks north towards Parramatta Road and the site from the intersection of Lucas Road and Stuart Road. The view comprises of one and two storey dwellings with some sporadic street planting.

Due to the intersection with Parramatta being left-in, left-out only, there is limited through traffic on this road. Additionally, an on-road cycleway runs along Lucas Road. A similar view may be visible from the windows of some houses in this area.

This view is rated as an importance of low given its primarily from a residential area and the number of viewers is low, the period of viewers is low.

PRCUTS 1.8:1

PRCUTS massing (1.8:1 FSR)

Photo-montage of PRCUTS massing at 1.8:1 FSR

View with PRCUTS massing at 1.8: 1 FSR

This image is for comparative review between the complying PRCUTS massing and the proposed scheme.

Visual Impact Assessment

PRCUTS 3.4:1 option

PRCUTS massing (3.4: 1 FSR)

Photo-montage of PRCUTS massing at 3.4:1 FSR

View with PRCUTS massing at 3.4: 1 FSR

This image is for comparative review between the improvements of the built form for proposed scheme against a similar FSR massing using the PRCUTS built form controls

Proposed Scheme 3.4:1

Proposed scheme

Photo-montage of proposed scheme at 3.4:1

View with Proposed scheme
Importance of view
This view is predominately seen by as a short-term passing view (pedestrians and cyclists) and a potentially static view from private residential.

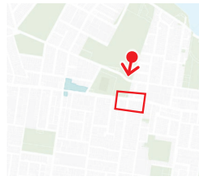
View change
The view is unlikely to attract public use; however, the proximity of the view to the proposal means it is apparent. The proposal does not obstruct views of any significant items, and as Kings Bay and Burwood Precinct develops in line with the future Parramatta Road Corridor Urban Transformation Strategy, the proposal's height will be consistent with surrounding context.

Refer to page 84-85 of this chapter to view proposed scheme with future development context.

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**Low**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**Low**
Likely view change	**Low**

Visual Impact Assessment

Existing


Location Key Plan

Existing conditions. Photo taken 06/12/2021.

Existing view
This view looks south towards Parramatta Road and the site from Taylor Street The view comprises of one storey dwellings with street trees visible within the verges..

Due to the intersection with Parramatta being left-in, left-out only, there is limited through traffic on this road.

This view is rated at an importance of low given its primarily from a residential area and the number of viewers is low, the period of viewers is low.

PRCUTS 1.8:1

PRCUTS massing (1.8:1 FSR)

Photo-montage of PRCUTS massing at 1.8:1 FSR

View with PRCUTS massing at 1.8: 1 FSR

This image is for comparative review between the complying PRCUTS massing and the proposed scheme.

Visual Impact Assessment

PRCUTS 3.4:1 option

PRCUTS massing (3.4: 1 FSR)

Photo-montage of PRCUTS massing at 3.4:1 FSR

View with PRCUTS massing at 3.4: 1 FSR

This image is for comparative review between the improvements of the built form for proposed scheme against a similar FSR massing using the PRCUTS built form controls

Proposed Scheme 3.4:1

Proposed scheme

Photo-montage of proposed scheme at 3.4:1

View with Proposed scheme
Importance of view
This view is predominately seen by as a short-term passing view (pedestrians) and a potentially static view from private residential.

View change
The view is unlikely to attract public use; however, the proximity of the view to the proposal means it is apparent. The proposal does not obstruct views of any significant items, and as Kings Bay and Burwood Precinct develops in line with the future Parramatta Road Corridor Urban Transformation Strategy, the proposal's height will be consistent with surrounding context.

Refer to page 84-85 of this chapter to view proposed scheme with future development context.

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**Low**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**Low**
Likely view change	**Low**

Visual Impact Assessment

Existing

Location Key Plan

Existing conditions. Photo taken 06/12/2021.

Existing view
This view looks north towards Parramatta Road and the site from Wangal Park. The view comprises of landscape planting and mature trees, a skate park and a playground.

Due to the existing trees framing the northern edge of the park, the change in topography sloping down to the north, the site is screened from visibility.

This view is rated at an importance of high given its from a significant public park with communities amenities and whilst the number of viewers is low, the period of viewers is low.

PRCUTS 1.8:1

PRCUTS massing (1.8:1 FSR)

Photo-montage of PRCUTS massing at 1.8:1 FSR

View with PRCUTS massing at 1.8: 1 FSR

This image is for comparative review between the complying PRCUTS massing and the proposed scheme.

Visual Impact Assessment

PRCUTS 3.4:1 option

PRCUTS massing (3.4: 1 FSR)

Photo-montage of PRCUTS massing at 3.4:1 FSR

View with PRCUTS massing at 3.4: 1 FSR

This image is for comparative review between the improvements of the built form for proposed scheme against a similar FSR massing using the PRCUTS built form controls

Proposed Scheme 3.4:1

Proposed scheme

Photo-montage of proposed scheme at 3.4:1

View with Proposed scheme
Importance of view
This view is seen as a static view given the function of this area of the park. Static users of this space are generally standing or seated for an extended period of time.
While there are no specific elements of significance within the view the surrounding built form is partially screened by the mature vegetation framing the park.

View change
The proposal does not obstruct views of any significant items, and will be apparent in this view with a context of Parramatta Road Corridor Urban Transformation Strategy, including Kings Bay and Burwood Precincts.

Refer to page 84-85 of this chapter to view proposed scheme with future development context.

Criteria	Ranking
Importance of view	
Period of view	**High**
Relative number of viewers	**Moderate**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**Moderate**
Likely view change	**Low**

Visual Impact Assessment

The following views assesses how the proposed scheme at 3.4: 1 sits within the proposed future context of Kings Bay Precinct and Burwood Precinct, as illustrated in the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) 2016.

As shown in the adjacent images, the proposed scheme at 3.4: 1 integrates within the surrounding context and does not negativity impact the visual amenity in each view.

Location Key Plan

Photo-montage of proposed scheme at 3.4:1 with future context

View change
With the indicative future context of Kings Bay and Burwood Precinct, the proposal will not be visible as it will be concealed behind the future built form located along Parramatta Road.

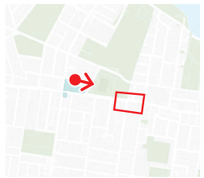
Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**High**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**High**
Likely view change	**Low**

Location Key Plan

Photo-montage of proposed scheme at 3.4:1 with future context

View change
With the indicative future context of Kings Bay and Burwood Precinct, the proposal's height will be consistent with the future built form located along Parramatta Road. The proposal will be integrate with the proposed skyline of Parramatta Road.

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**High**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**High**
Likely view change	**Low**



Location Key Plan

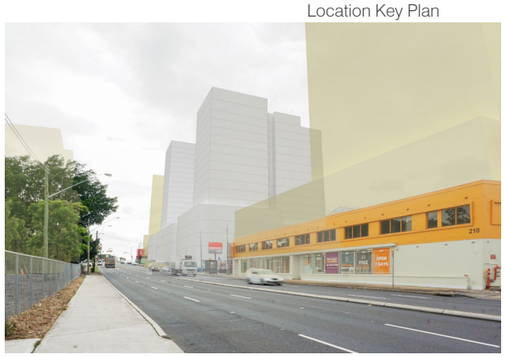


Photo-montage of proposed scheme at 3.4:1 with future context

View change
With the indicative future context of Kings Bay and Burwood Precinct, the proposal's height will be consistent with the future built form located along Parramatta Road. The proposal will be integrate with the proposed skyline of Parramatta Road.

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**High**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**High**
Likely view change	**Low**

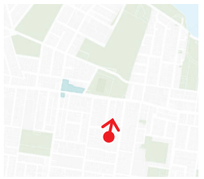
Visual Impact Assessment

Location Key Plan

Photo-montage of proposed scheme at 3.4:1 with future context

View change
With the indicative future context of Kings Bay and Burwood Precinct, the proposal's height will be consistent with the future built form located along Parramatta Road. The proposal will be integrate with the proposed skyline of Parramatta Road.

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**Low**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**Moderate**
Likely view change	**Low**

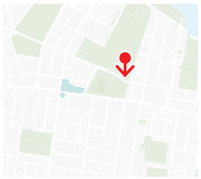


Location Key Plan

Photo-montage of proposed scheme at 3.4:1 with future context

View change
With the indicative future context of Kings Bay and Burwood Precinct, the proposal's height will be consistent with the future built form located along Parramatta Road. The proposal will be integrate with the proposed skyline of Parramatta Road

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**Low**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**High**
Likely view change	**Low**

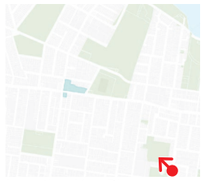


Location Key Plan

Photo-montage of proposed scheme at 3.4:1 with future context

View change
With the indicative future context of Kings Bay and Burwood Precinct, the proposal will be partially concealed behind the future built form located along Parramatta Road and will be consistent in building height.

Criteria	Ranking
Importance of view	
Period of view	**Low**
Relative number of viewers	**Low**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**High**
Likely view change	**Low**



Location Key Plan

Photo-montage of proposed scheme at 3.4:1

View change
With the indicative future context of Kings Bay and Burwood Precinct, the proposal's height will be consistent with the future built form located along Parramatta Road.

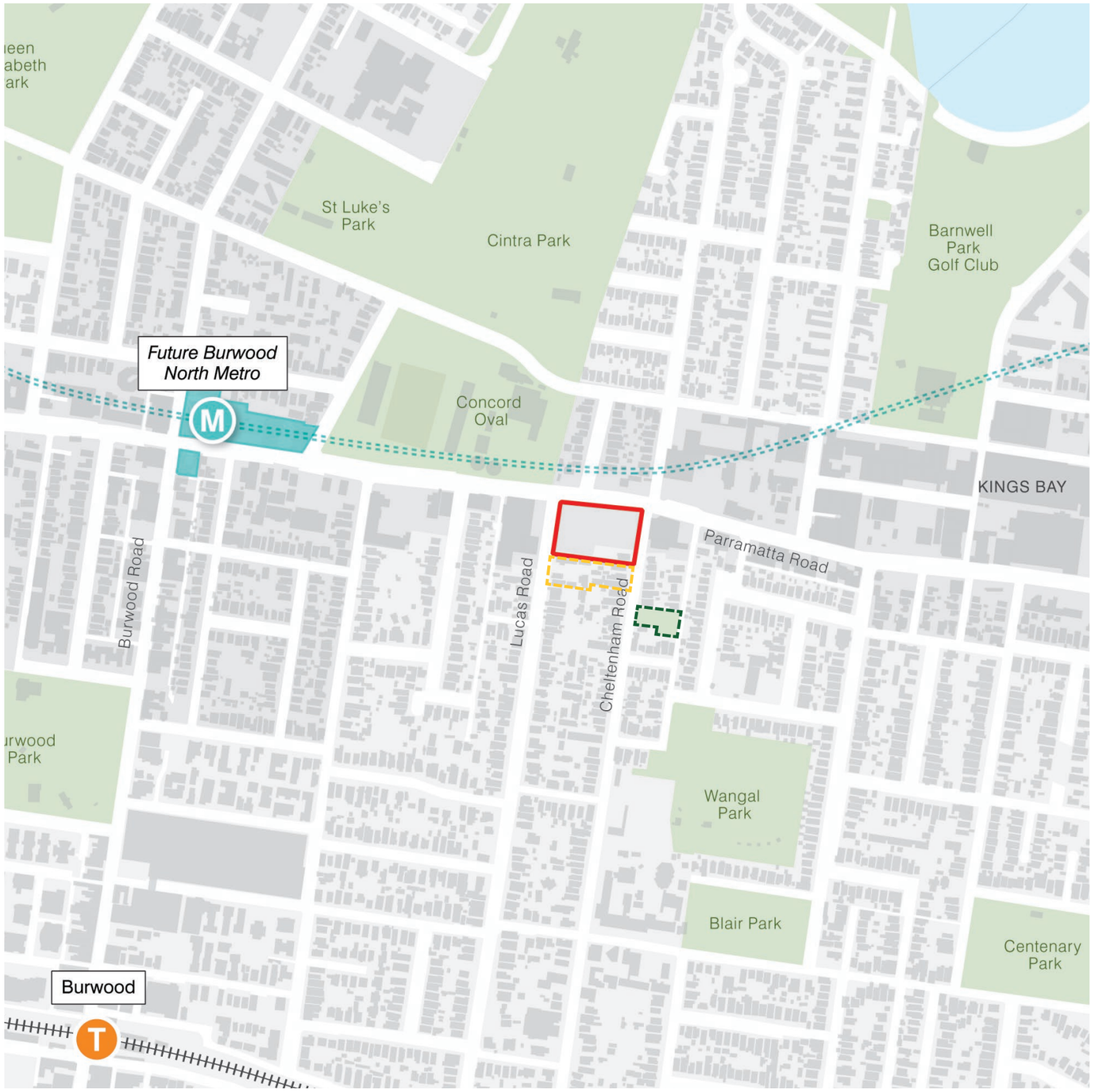
Criteria	Ranking
Importance of view	
Period of view	**High**
Relative number of viewers	**Moderate**
Overall importance of the public view	**Low**
View change	
Visual absorption capacity	**High**
Likely view change	**Low**

8.5 Solar Analysis Overview

There are two main areas of review for overshadowing impacts for the proposal, they are:

Private:
- Windows into living areas; and
- Principle private open spaces.

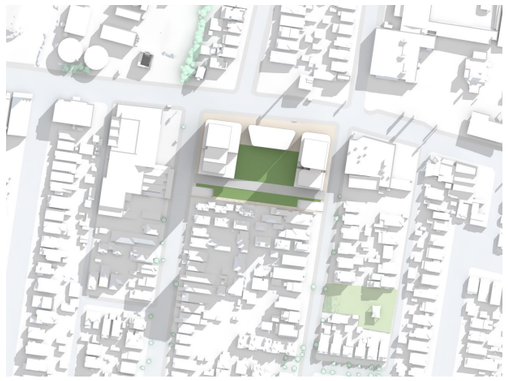
Public:
- Prowse reserve.



Legend
- Subject Site
- Solar testing on neighbouring residential properties
- Solar testing on Prowse reserve

Solar Analysis Overview

Solar testing of the proposed scheme at 3.4:1 on the surrounding context between 9am to 3pm on 21 June is shown adjacent at hourly intervals.



June 21st_9am

The shadow cast by the towers does extend to the residential properties along Lucas Road, however these are fast moving shadows and have a short-period of impact in the morning.

June 21st_10am

The shadow cast by the towers does impact some of the residential front-yards along the western edge Lucas Road and to the residential backyards along Cheltenham Road, however these are fast moving shadows and have a short-period of impact.

June 21st_11am

The shadow cast by the towers is reduced to a few residential properties located directly behind the proposal. The majority of the surrounding residential properties have are not impacted.

June 21st_12pm

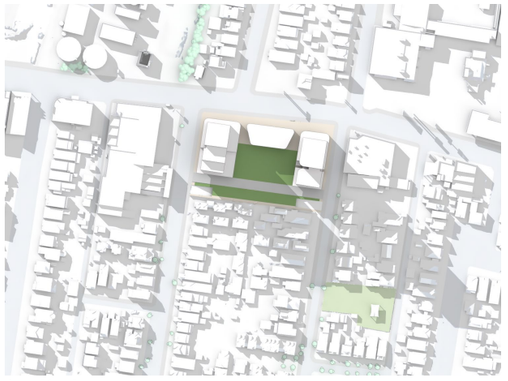
The shadow cast by the towers is reduced to a few residential properties located directly behind the proposal. The majority of the surrounding residential properties are not impacted.
The proposal does not impact Prowse Reserve. (Shadows sit within existing shadows from neighbouring properties and boundary fence).

June 21st_1pm

The shadow cast by the tower does extend to residential front-yards along the eastern edge of Cheltenham Road, however these are fast moving shadows and have a short-period of impact. The majority of the surrounding residential properties are not impacted.
The proposal does not impact Prowse Reserve (Shadows sit within existing shadows from neighbouring properties and boundary fence).

June 21st_2pm

The shadow cast by the towers does extend to the residential properties along Cheltenham Road and Royce Avenue, however these have a short-period of impact in the afternoon. The majority of the surrounding residential properties are not impacted.
The proposal does not impact Prowse Reserve. (Shadows sit within existing shadows from neighbouring properties and boundary fence).



June 21st_3pm

The shadow cast by the towers does extend to the residential properties along Cheltenham Road, Royce Avenue,and King Edward Street, however these have a short-period of impact in the afternoon. The majority of the surrounding residential properties are not impacted.
The proposal does not impact Prowse Reserve. (Shadows sit within existing shadows from neighbouring properties and boundary fence).

8.6 Solar Analysis - Living Room Windows

Window Locations
The location of the windows in dwellings to the south of the subject site, where possible, have been surveyed and 3D modelled. Windows on the northern side of 1-3/12 Lucas Road and 3 Cheltenham Road have been surveyed. Further research has been undertaken to identify if these windows were living room windows, where these have been unable to be identified this has been noted as 'unknown windows' and all windows have been included.

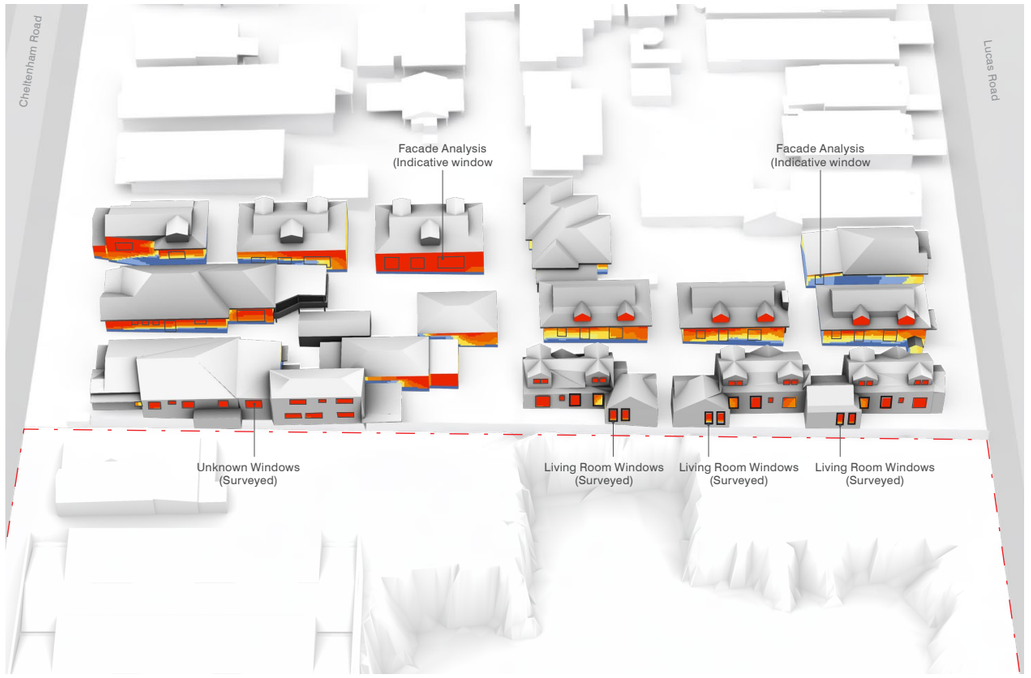
For the majority of properties, due to access constraints, a detailed survey was unable to be performed. Where this is the case it is noted as 'indicative window locations', these have been determined through a combination of texture mapped 3D models, aerial and ground photography. While the location of these windows are shown on the analysis a complete facade analysis has been conducted on those buildings to provide a more complete picture of any impacts.

Analysis Parameters
All testing for the windows has been performed on the 21st of June, between the hours of 9am-3pm, at 5 minute intervals.

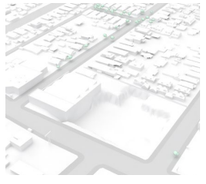
Note: The testing presented here excludes any impacts from the indicative future development scenarios on adjacent sites.

The proposed scheme maintains minimum solar access requirements to living room windows, while evenly distributing any impacts across southern neighbours and retaining high proportions of 2+ hours of solar access.

Existing



Existing- looking south over site



Key Findings:
- There is a High level of solar access to northern façades and windows, predominately 5+ hours.
- Due to the existing low scale development and currently excavated area on the western portion of the site.

Solar Analysis - Living Room Windows

Legend (hours)

0	0 - 1.9	2.0 - 2.9	3.0 - 3.9	4.0 - 4.9	5.0 - 5.9	6.0

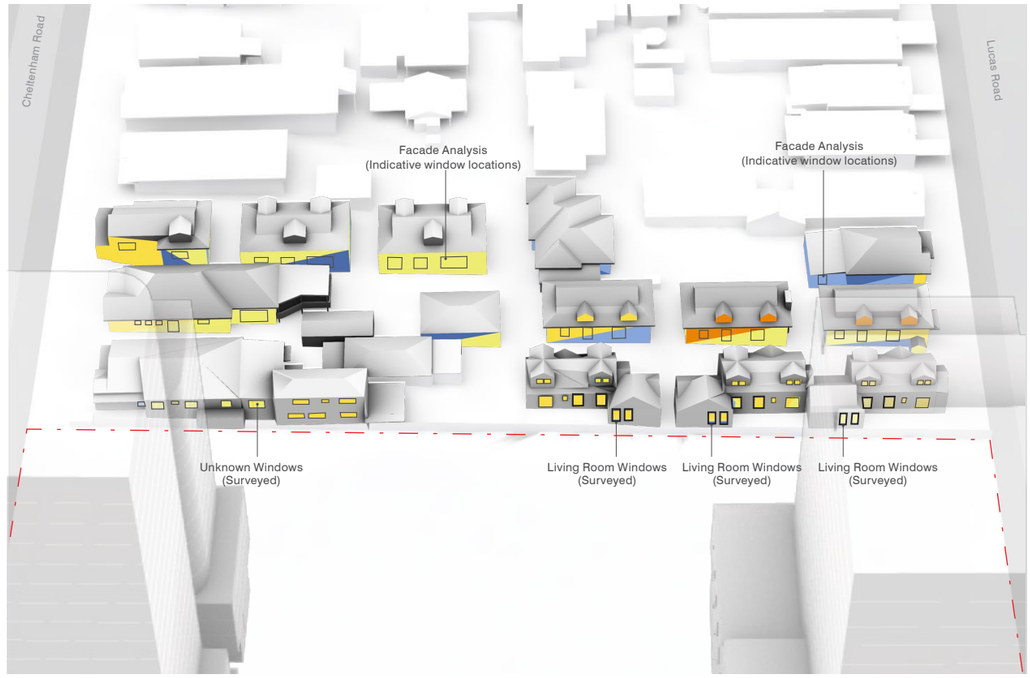
PRCUTS 1.8:1

PRCUTS massing at 1.8:1 FSR

Key Findings:

- Solar access is reduced to below the 2 hour threshold for all living room windows for 2-3/12 Lucas Road.
- Solar access is reduced to below the 2 hour threshold for all windows at 3 Cheltenham Road.
- Due to the orientation of the towers, a limited amount of sunlight can pass over and between the towers to provide direct solar access to the windows of the direct southern neighbours.

Proposed Scheme 3.4:1



Proposed scheme at 3.4:1

Key Findings:

- Generally even reduction of solar access across southern neighbours, with no significant portions being reduced below 2 hours solar access.
- 1-3/12 Lucas Road retain at least a portion of all living room windows greater than or equal to 2 hours solar access.
- 3 Cheltenham Road retains 2 hours solar access to most windows. Location of living room windows unknown at this stage.

8.7 Solar Analysis - Private Open Space

Private Open Space Locations
The location of the private open space for each property has been 3D modelled. Due to access constraints, a detailed survey was unable to be performed for each space. Their location has been determined through a combination of texture mapped 3D models, aerial and ground photography and where publicly available, floorplans.

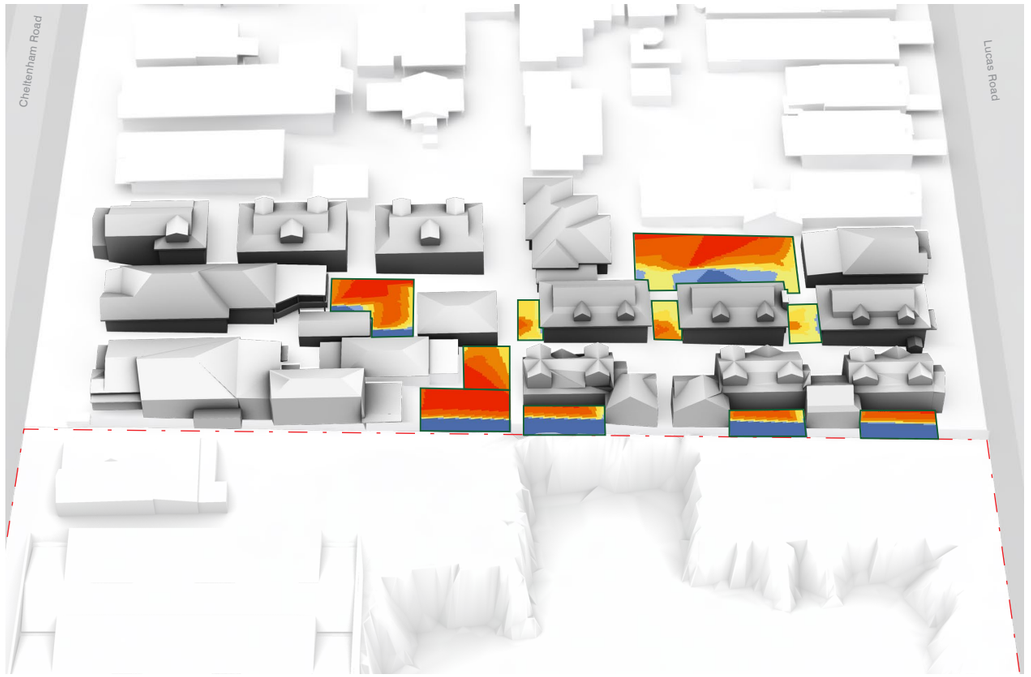
Analysis Parameters
All testing for the private open spaces has been performed on the 21st of June, between the hours of 9am-3pm, at 5 minute intervals.

1.8m fence assumed along southern site boundary (currently temporary hoarding) - can be seen as the dark blue band adjacent to the site boundary.

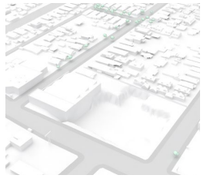
Note: The testing presented here excludes any impacts from the indicative future development scenarios on adjacent sites.

The proposed scheme ensures a portion of all private open spaces receive 2 hours or greater solar access.

Existing



Existing- looking south over site



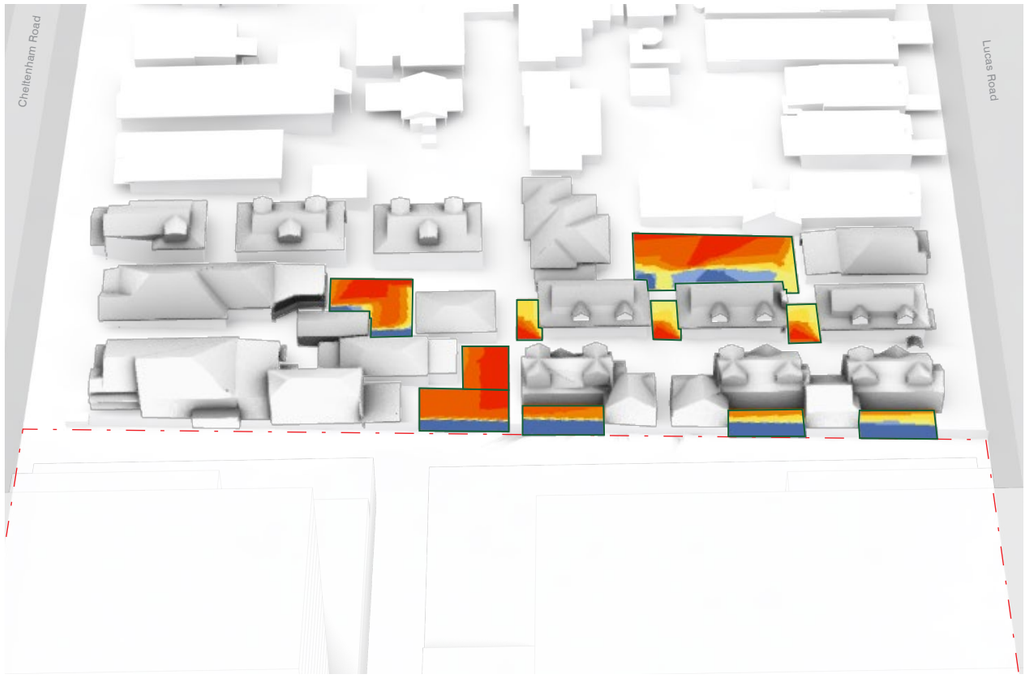
Key Findings:
- High levels of solar access for most private open spaces.
- Due to the existing low scale development and currently excavated area on the western portion of the site.

Solar Analysis - Private Open Space

Legend (hours)

0	0 - 1.9	2.0 - 2.9	3.0 - 3.9	4.0 - 4.9	5.0 - 5.9	6.0

PRCUTS 1.8:1

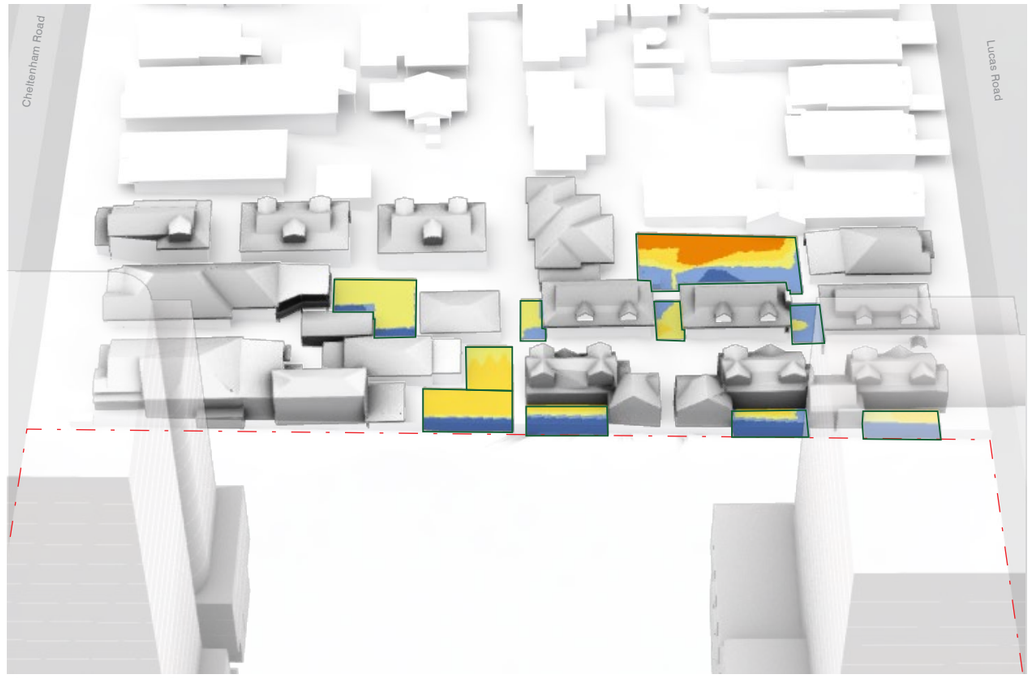


PRCUTS massing at 1.8:1 FSR

Key Findings:

- High levels of solar access for most private open spaces.
- Solar access is reduced to the private open space along the site boundary line.
- Due to the orientation of the built form, this impacts the amount of sunlight can pass over and between the built form to provide direct solar access to the private open spaces of the southern neighbours.

Proposed Scheme 3.4:1



Proposed scheme at 3.4:1

Key Findings:

- Generally even reduction of solar access across private open spaces, All retaining at some portion that receives greater than or equal to 2 hours solar access.
- Three private open spaces are impacted, although these retain a small portion of area receiving equal to or greater than 2 hours of solar access.

8.8 Solar Analysis - Prowse Reserve

Legend (hours)

0	0 - 1.9	2.0 - 2.9	3.0 - 3.9	4.0 - 4.9	5.0 - 5.9	6.0

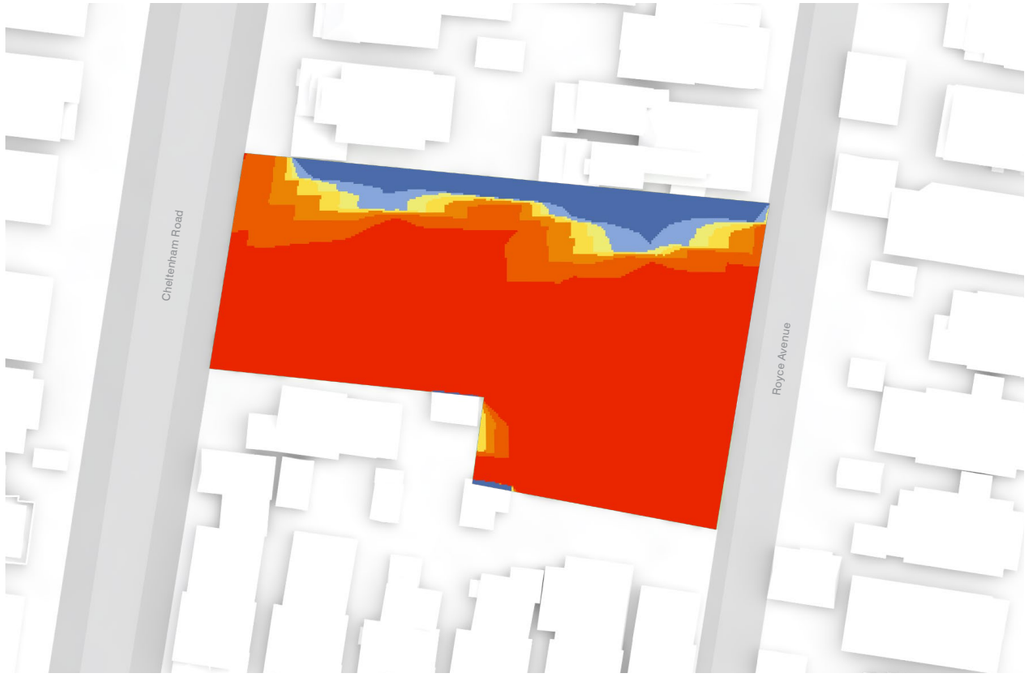
It is a key principle of this proposal that there is no overshadowing impact on Prowse Reserve - the analysis confirms that both the PRCUTS 3.4:1 option and the proposed scheme have no additional impact.

Analysis Parameters
All testing of the shadow impacts to Prowse Reserve has been performed on the 21st of June, between the hours of 9am-3pm, at 5 minute intervals.

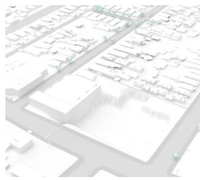
Analysis includes a 1.8m fence along the northern boundary of Prowse Reserve, in line with current conditions. The existing play equipment and associated shade shelter has been excluded from this analysis.

Note: The testing presented here excludes any impacts from the indicative future development scenarios on adjacent sites.

Existing



Existing- looking south over site



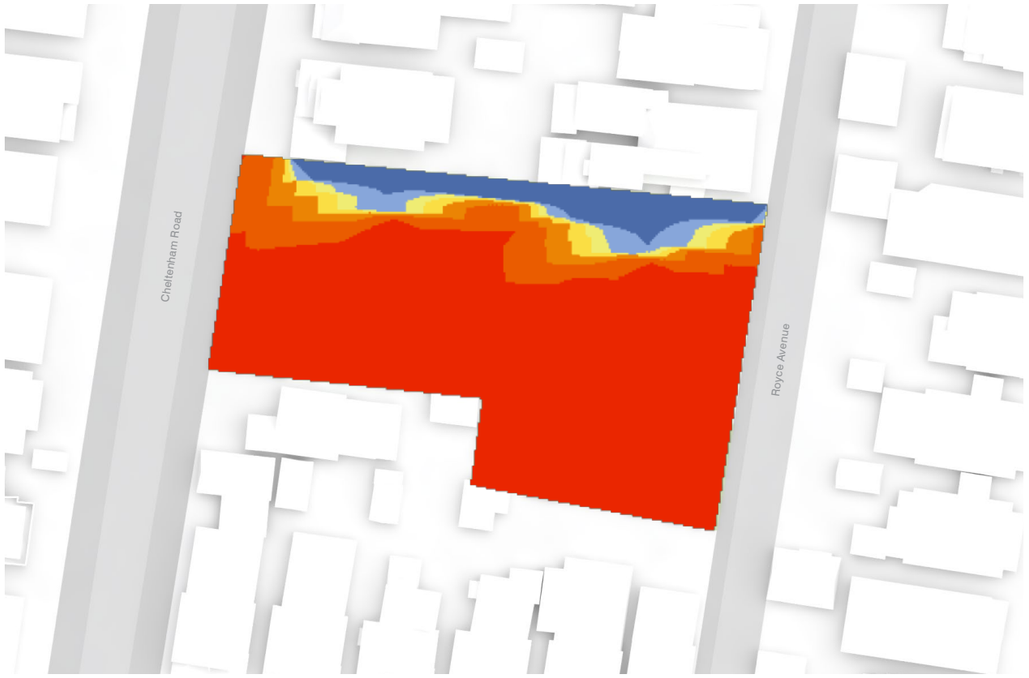
Key Findings:

- 85.28% of Prowse Reserve currently receives greater than or equal to 2 hours of sun during the analysis period.
- The two existing two storey houses to the north of the reserve are primarily responsible for the overshadowing.

Solar Analysis - Prowse Reserve

Legend (hours)

PRCUTS 1.8:1

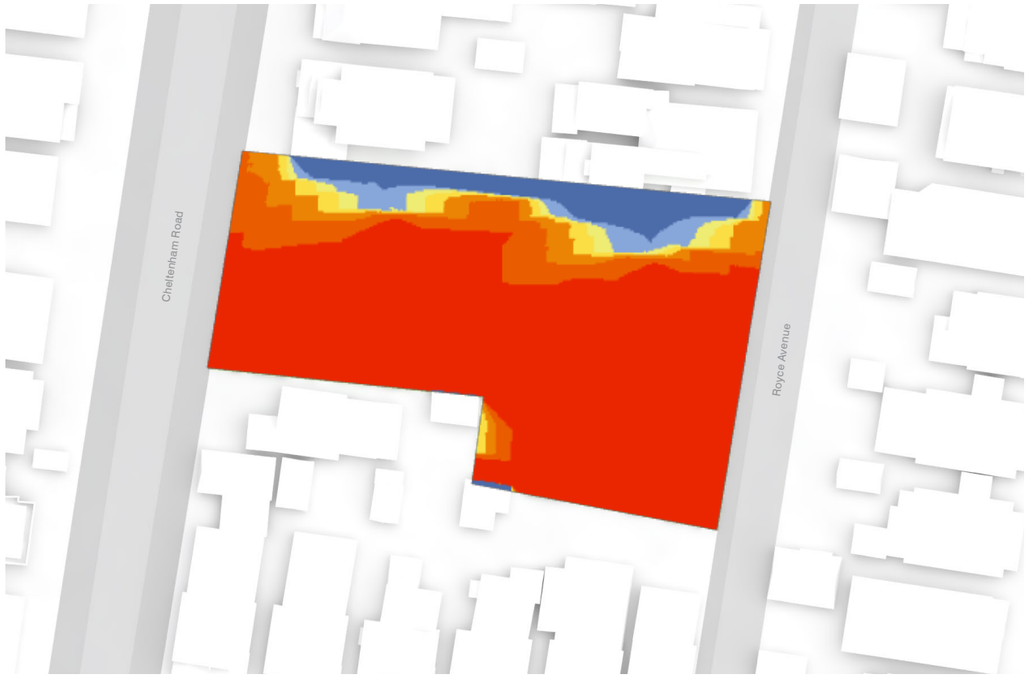


PRCUTS massing at 1.8:1 FSR

Key Findings:

– No additional impact caused by this scheme.

Proposed Scheme 3.4:1



Proposed scheme at 3.4:1

Key Findings:

– No additional impact caused by this scheme.

A
APPENDIX

A.1 Milestone

This chapter documents the development of the master plan and reference design in collaboration with Council.

The proponent and design team have collaborated with Council on a number of occasions during the evolution of the reference design around which the planning proposal is based. Key milestones include:

1 Responses to DRP and Council Feedback from DRP meeting

2. Responses to Council's Feedback on the Scoping Report

The reference design has been updated to incorporate Scoping Report feedback and DRP feedback. The evolution of the reference design to reflect the updates is documented in this chapter.

A.1 Responses to DRP Feedback

DRP Comment	Response	Report reference
Context and consequences for the corridor are not very well covered in the material that should be a broader consideration of the consequential built form and development outcomes for adjoining sites. The Panel needs to understand the view analysis along the Parramatta Road corridor. Long sections along Parramatta Road are required to drill down the massing test. This is to consider built-form outcomes between the site and the Burwood North precinct. Pedestrian & Cycle: what is the most desirable pedestrian route alternatively prioritising: shade, quietness, interest, safety and speed to nearby destinations (e.g. Burwood North, Kings Bay etc) and what is the prospect for improving these? Consider public domain improvements, missing links etc.	Refer to chapter 5, section 5.4 Approach to renewal	– page 41-46
How the proposed floor plate fits within “the destination vision”? How does the ground floor plate work in particular the Mercedes experience room vs the hotel lobby? Is this creating the lifestyle offering from LSH developments?	Revisions have been made to the proposal to maximise ground plane activation and permeability, and ensure a vibrant and attractive destination. Updates include: – Removing the terrace houses along the southern boundary to improve views into the square and invite people in – Swapping the brewery and showroom locations – Opening the hotel lobby to address the square – Creating a through-site link from Cheltenham road to the square and connected to the proposed supermarket entry	– pages 68- 72
The panel needs to understand the reasons why those particular building heights are proposed. The proponent explained the heights are proposed not from a design perspective but for viability, in particular factoring in the increase in building material and construction cost	Refer to chapter 5 section 5.2: A catalyst for Renewal	– page 31- 32
Publicness of the ground plane. Should not read as an enclave or commercial plaza, rather it should invite used by non-residents as a neighbourhood place. Also, differentiation from nearby larger town centres.	The ground plane, square and open space will be a highly public destination. This will be ensured with: – The land use and tenancy mix feature variety of uses: Hotel, retail- both small supermarket and fine grain specialty retail not available elsewhere in the neighbourhood, community brewery, showroom, residential, and co-working – The public domain offering: soft landscaping and shade trees will provide an oasis free from cars and protected from Parramatta Road or all ages and demographics of the community to enjoy. A children’s play space will cater to young families,the topography provides a natural amphitheatre for community gathering or film screenings, and the mix of hospitality venues provide an all day and evening destination. – The master plan has been developed so that the square is highly visible on approach from the south from both Lucas and Cheltenham Roads, as well as via through-site links from Cheltenham and Parramatta Roads, while providing a shield from Parramatta road noise and a perimeter of engaging active frontages addressing the open space.	

Responses to DRP Feedback

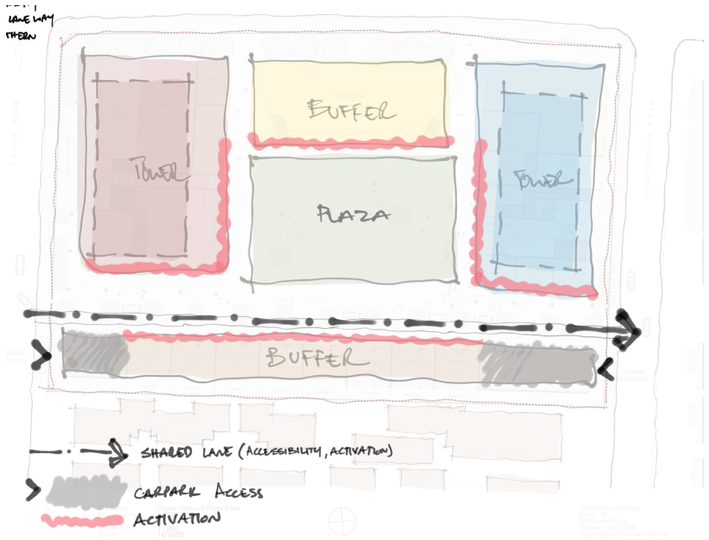
Measures to limit the overshadowing impacts toward the south by sculpting the tower form. \ Also, note height of the dealership building significantly overshadows the plaza	The building envelope has been designed using a solar plane that protects Refer to overshadowing studies Prowse reserve and ensures no overshadowing. Towers have been positioned to minimise overshadowing to the surrounding neighbours. Refer to section 8 of the report. Noting that this is a planning proposal seeking an envelope control only, and that the architecture will be developed in future stages within the approved envelopes. At this stage it may be possible to further reduce any overshadowing impacts.	– page 103
Absolute tower height is greater than expected given the height hierarchy of the surrounding centres.	Refer to chapter 5, section 5.4 of the report which describes the anticipated future development context for the precinct and corridor in context of surrounding centres as well as other relevant centres around Metro stations in Sydney. The proponent welcomes insights from Council on their plans currently being prepared for the precinct which would provide further intelligence on heights expected by Council.	– page 44-45
The communal open space on the roof of the dealership will be a sunny place and effective use of this high amenity location and the type of use is supported. However, it seems remote from the residents and will not feel contiguous with the common spaces of the residents. Consider its position and links to the residential common spaces and lobby. E.g. a link to the tower via a bridge, common room and generous lobby	Bridge links have been provided between podia and the roof of the pavilion building to ensure contiguous access>	– page 72
The 6m setback on Parramatta Road creates flexibility along this frontage, however, pedestrians remain hard against heavy traffic. Consider the quality of the walking/cycling environment along this edge. E.g. creating more separation, and a green buffer between noisy traffic and walkers.	Refer to the landscape plan in section 7.2 of the report. The public domain has been designed with soft landscaping and a buffer from traffic within the 6m zone The architectural plans have been updated to reflect this.	– page 56
Site slopes from east to west producing a level change of 2m across the northern and southern frontages of the dealership. Will the GFL step? How will the interface be resolved?	Refer to section 7.4 of the report where the section illustrates the transition. This will be further resolved at DA stage.	– page 64-65
The hotel building GFL interface with the plaza appears to produce a level mismatch (refer EW Section). How will these levels and uses be resolved?	Refer to section 7.4 of the report where the section illustrates the transition. This will be further resolved at DA stage.	– page 64-65
The EW Section shows a stepped profile over the supermarket. Noting that the gradual terracing of the plaza seems an important design characteristic. How will this be resolved?	Refer to section 7.4 of the report where the section illustrates the transition. This will be further resolved at DA stage.	– page 64

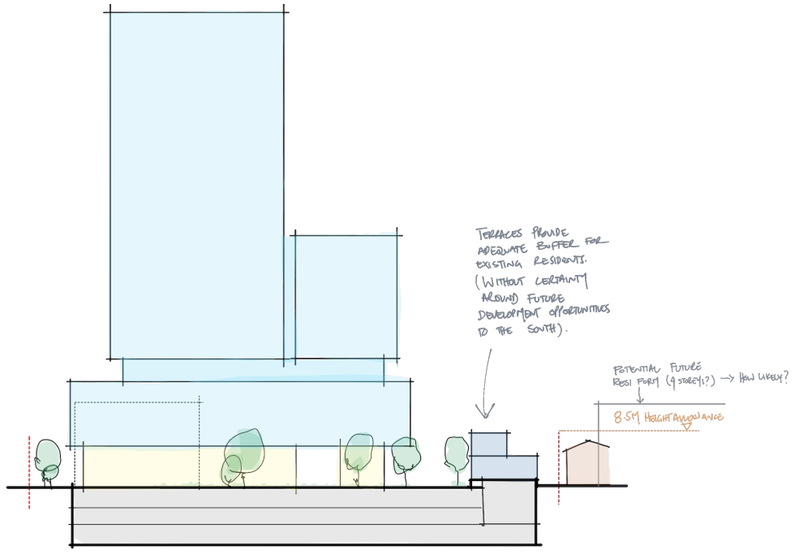
A.1 Laneway and terrace house study

Responding to Council's Comments
We understand from verbal DRP feedback and subsequent discussion with Council that there is a desire to remove the terraces houses proposed along the southern boundary in the October 2022 Planning Proposal scheme.

We understand that the ambition in removing the terrace houses is to increase the size of the open space, provide flexibility for renewal of properties south of the subject site, and further increase visibility from the surrounding streets into the open space.

Removal of the terrace houses results in a number of possible outcomes for the shared lane-way and the basement access ramps. Options were tested and are described in the following pages.





December 2022 Planning Proposal

The reference scheme illustrated in the planning proposal was designed to deliver the following principles:

Openness and accessibility
The laneway is open to the public, has pedestrian priority and invites people into the open space.

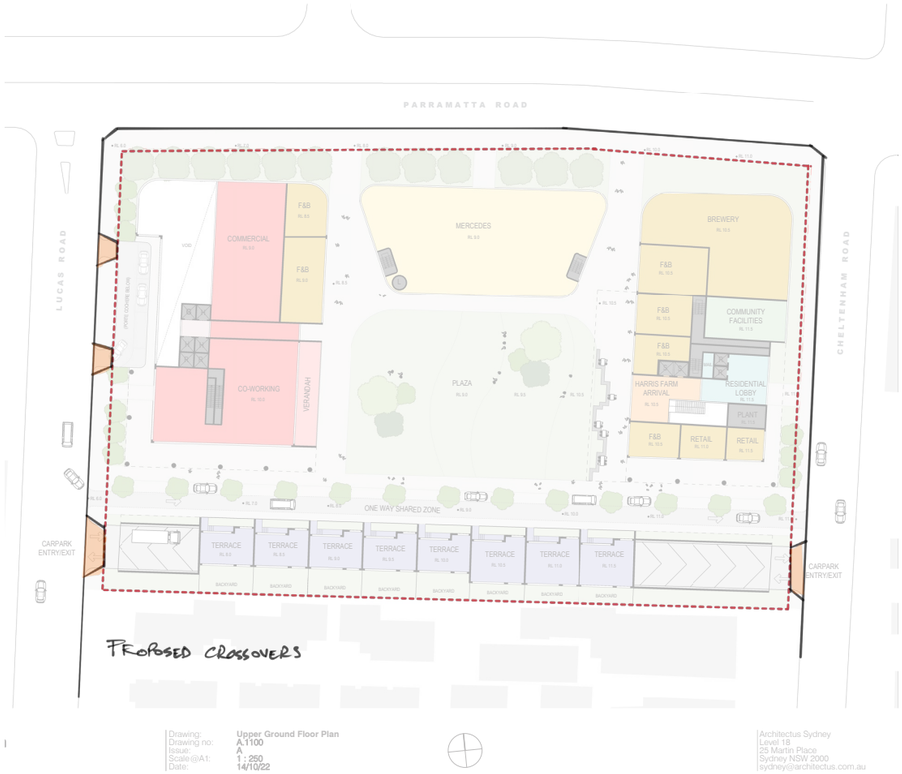
Activity and surveillance
Terraces fronting the laneway provide a high level of pedestrian activity and surveillance, and activity along the laneway and fronting the open space.

Buffer
The terraces buffer the southern neighbours from noise and activity generated in the open space.

Laneway and terrace house study

Existing driveway crossovers

There are 7 existing crossovers including a continuous driveway crossing for off street parking along the majority of the Lucas Road frontage.



Proposed driveway crossovers

It is proposed to consolidate and reduce the cross-overs to 4 driveway entries, plus the shared way access. This will prioritise pedestrians and improve the footpath amenity and experience.

Laneway and terrace house study

Options tested for driveway location

Three options were tested for incorporation of the driveway which was previously located under the terrace houses. The options were tested with the traffic planner.

1. Driveways under towers

✕ **Proximity to Parramatta Road**
The traffic strategy for the site should seek to maximise the distance of the basement access ramps to Parramatta Road. Moving the driveways north is problematic.

✕ **Reduced queuing distance**
Reduced available queuing space for vehicles from the site to Parramatta Road by approximately 25m in comparison to Option 2, which would in turn result in reduced safety and efficiency for all road users. The reduced queueing area on Cheltenham Road would also impact the operation of the traffic lights at Parramatta Road

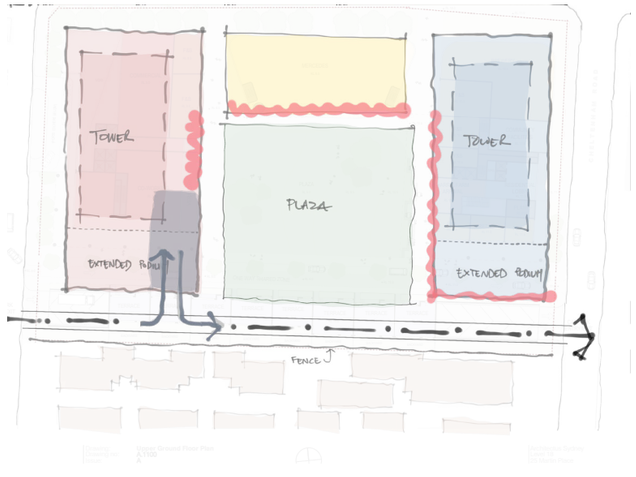
✕ **Sterislised frontages**
Driveways under the towers would result in blank frontages facing the laneway and the open space, where active uses can otherwise be located.

2. Independent driveways

✓ **Minimised traffic and queueing**
Traffic can access the ramp directly from side roads, not requiring vehicles to enter the site.

✓ **Maximised distance to Parramatta Road**
Maximises the distance of the basement access ramps to Parramatta Road. At least 25m more queueing distance than option 1.

✓ **Visibility and publicness**
Low driveways permit views over them and invite people into the public open space.



3. Driveway access via laneway

✕ **East/west access**
This option relies on all traffic entering the site from the west via Lucas Road and exiting to the east via Cheltenham Road with a one-way laneway retained.

✕ **Impacts surrounding roads**
The access strategy has been developed so as to minimise impacts to the surrounding road network by providing multiple access points so as to distribute traffic movements across the site. Option 3 would concentrate all entry movements through Lucas Road and all exit movements via Cheltenham Road.

✕ **Impacts laneway amenity and safety**
The proposal to provide access to the basement car park via the laneway would remove the ability for a low speed shared zone to be implemented given the volume of traffic that would be using the laneway

A.1 Summary of Scoping Report feedback

From early consultation with Council, we heard that:

- Further consideration should be given to access and egress locations and the possibility for consolidation to reduce the number of crossovers;
- The scheme looks inwards instead of connecting to the broader community;
- Consideration should be given to refining the proposal so as not to sterilise development opportunities along the southern boundary;
- Alternative opportunities should be tested to understand schemes that deliver improved outcomes such as reducing the bulk of taller building elements and the impacts of a similar FSR in different forms; and
- Potential measures to mitigate visual impacts.

A.1 Laneway and Access Study

It was found that a laneway which priorities pedestrian movement and activity through the site is the best outcome for the site and neighbouring sites.

After meeting with the DRP it was suggested by Council that removing the terraces along the southern boundary would increase the size of public domain, improve views into the open space, and provide opportunities for renewal for the lots to the south of the subject site.

This section documents the evolution of the reference design taking into account comments received on the scoping report and DRP presentation.

Responding to Council's Comments
Council's feedback to the Scoping Report included some considerations to investigating alternative arrangements for the laneway, terraces and basement access/egress. These points have been further considered in the following laneway and basement access study, and are addressed below.

In the laneway study the alternative design investigates:
- Retaining the shared street, but with the removal of terrace housing;
- Shared street or laneway relocated to the edge of the site to allow future development beyond the site boundaries to seamlessly integrate into the context of the development;
- A green edge to the southern boundary; and
- Other opportunities for housing, for example low rise apartments fronting both the open space and rear lane.

Laneway Study
This study illustrates two approaches to the location of the laneway in relation to the southern neighbours.

It was found that a laneway within the site allows a larger open space with better accessibility, improved surveillance and activity of the laneway, and higher amenity to southern neighbours when compared to a laneway along the southern boundary.

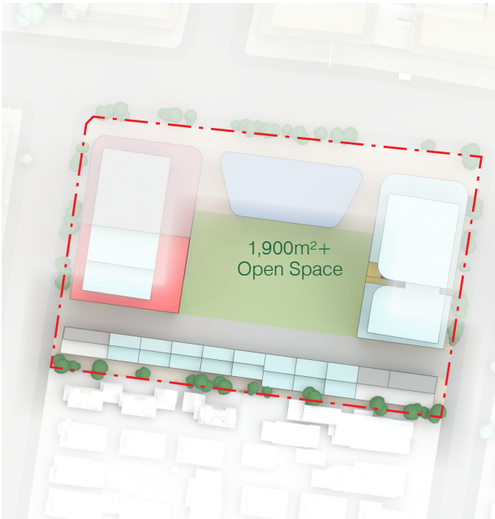
Both approaches maintain the same width of the laneway and the same FSR of 3.4:1. The two approaches are:

1. Scoping Report arrangement, where the south boundary is sleeved with terraces houses facing north onto the laneway and open space, with landscaped backyards.
2. Alternative design, where a laneway runs across the southern boundary with:
   - A 3m landscaping buffer to the south to accommodate future footpaths/verges;
   - Lower 2 storeys of podiums extended south by 8m, upper storeys not moved to ensure no additional overshadowing impacts.
   - An additional 3 storey building to the south of the open space to maintain the FSR from the removed terrace housing. For feasibility, a minimum 18m double loaded residential floorplate is required; and
   - A reduction of the open space to 1,350m^2, from the southern portion, previously the area which received the highest solar access in winter.

Removal of terrace houses
3. A third option developed in response to DRP comments describes a Laneway design without terrace housing (post DRP)
   - A 1m landscaping buffer to the south to provide visual buffer between neighbouring properties and an open driveway access to basement parking.
   - Removal of terraces along the southern boundary and replaced with additional public open space. An increase of the open space to 2,700 m^2, from the southern portion.
   - Relocation of the terraces GFA to 3 storeys in mid-rise levels of the residential tower.

The three design options for this study have been assessed on the following criteria:
- **Openness and accessibility**, the visual and physical connections to open space from Lucas Road and Cheltenham Road;
- **Activity and surveillance**, ability for passive surveillance of the laneway, uses that encourage activity along both sides and impacts of the laneway on its immediate neighbours; and
- **Renewal of southern sites**, the potential for the sites south of the laneway to redevelop.

Laneway and Access Study

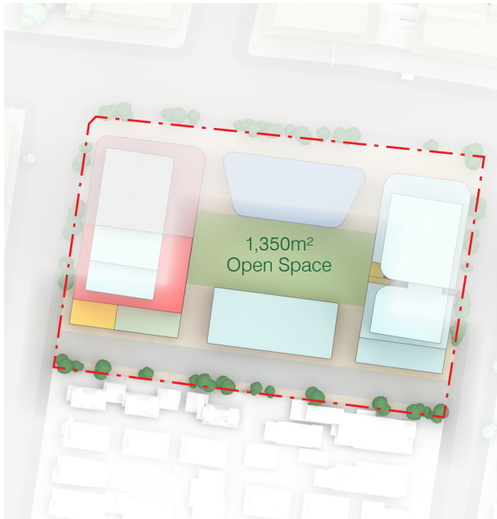


1. Scoping Report: Terraces and laneway

✓ **Openness and accessibility**
Laneway is open to the public and provides an excellent connection with the open space, inviting people in.

✓ **Activity and surveillance**
Terraces fronting the laneway and direct connection to the open space and integration to the development results in a higher level of pedestrian activity and surveillance of the laneway. Terraces buffer southern neighbours from traffic noise from laneway.

✕ **Renewal of southern sites**
By placing terraces here we can guarantee activation and renewal early on.

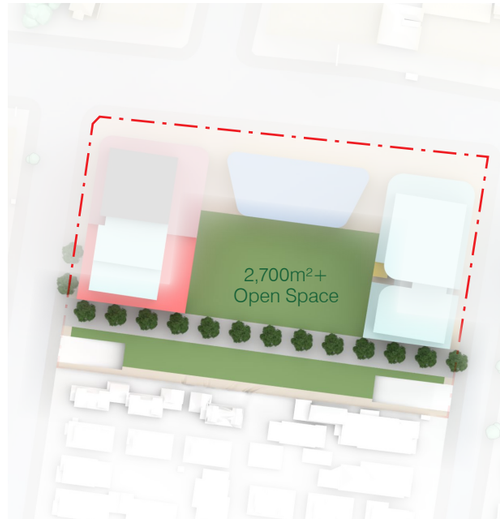


2. Alternative design: Low building and laneway

✕ **Openness and accessibility**
Terraces replaced with low building north of the laneway, even with a permeable ground floor the connection to the open space is lost and feels less accessible to the public.

✕ **Activity and surveillance**
Landscaped southern boundary and lack of connection to the open space results in the laneway being poorly activated and a low level of passive surveillance. Shareway will produce more traffic noise for southern neighbours.

✓ **Renewal of southern sites**
Allows southern neighbours to address laneway. However in the short to medium term the boundary presents as a blank fence.



3. Planning Proposal: No terraces

✓ **Openness and accessibility**
Laneway is open to the public and provides an excellent connection with the open space, inviting people in. The removal of the terraces widens the view into the open space from the side streets.

✓ **Activity and surveillance**
The extended open space along the southern part of the site has excellent visibility from Lucas and Cheltenham Roads and will feel integral with the activity of the Central open space.

✓ **Renewal of southern sites**
Provides the opportunity for southern neighbours to renew and front and benefit from the open space. However in the short term the boundary presents as a blank fence.

A.1 Evolution of the envelope testing

PRCUTS 3.4:1 option

PRCUTS Complying
(no consolidated open space)

Tower Study

Scoping Report Option

Small tower floorplates

Three towers

Hybrid - High Podiums

Hybrid - Tall Towers

Balanced (Previous Planning Proposal Dec 2022)

Balanced with no terraces outcome

Balance with no terraces

Through the investigation of a number of options it was recognised early on that the provision of open space was a key driver for this scheme. Therefore the distribution of GFA that was investigated through this study.

Following the DRP Meeting, Council suggested that the terrace houses be removed, and the open space be extended to the southern boundary. This change has been adopted in the reference design and is document here as the preferred option being submitted for the Planning Proposal.

The tower study was conducted to test a variety of tower forms and arrangements in order to test alternative arrangements for the site and assess the outcomes. A balanced option emerged as the most appropriate way to mitigate impacts and ensure design feasibility.

It should be noted that these options present envelope massing. The bulk and scale of these buildings will be further refined through architectural resolution, a number of strategies specific to this site are discussed at the end of this chapter.

All options presented in the tower study show an FSR of 3.4:1 and maintain the similar proportion of each land use. The maximum height of buildings varies in some options and is recorded on each option.

The options are assessed on the following criteria:

- **Bulk and scale,** visual appearance from surrounding streets and along Parramatta Road with consideration to potential future context; and
- **Overshadowing**, consideration to southern neighbours, Prowse Reserve and the proposed open space.

Summary of assessment:

	Bulk and Scale	Overshadowing
PRCUTS	×	×
Scoping Report Option	–	✓
Small Tower Floorplates	✓	×
Three Towers	✓	×
Hybrid - High Podiums	×	×
Hybrid - Tall Towers	✓	×
Balanced	✓	✓
Balanced with no terraces	✓	✓

Envelope testing

PRCUTS 3.4:1 Option

3.4:1 FSR | Max HOB 50.8m

This option tests a 3.4:1 FSR with a similar programmatic composition to the scoping report option, while complying with setbacks, transition zones and sensitive interfaces setout in PRCUTS. Primarily the 45° plane from the southern boundary at 1.5m, limits higher development and results in a bulkier outcome with severe overshadowing impacts for the direct southern neighbours.

× **Bulk and scale**
Floorplate dimensions result in a bulkier appearance when viewed from an northern and southern direction. This view will be most common from the residential areas to the south of the site.

From Parramatta Road, the corners will appear bulky and high due to the north-south lower tower elements.

× **Overshadowing**
Prowse Reserve not overshadowed from 9am-3pm midwinter.

High level of overshadowing to direct southern neighbours as longer building elements in an east-west direction have minimal gaps to allow sun through midwinter.

Envelope testing

Scoping Report Option

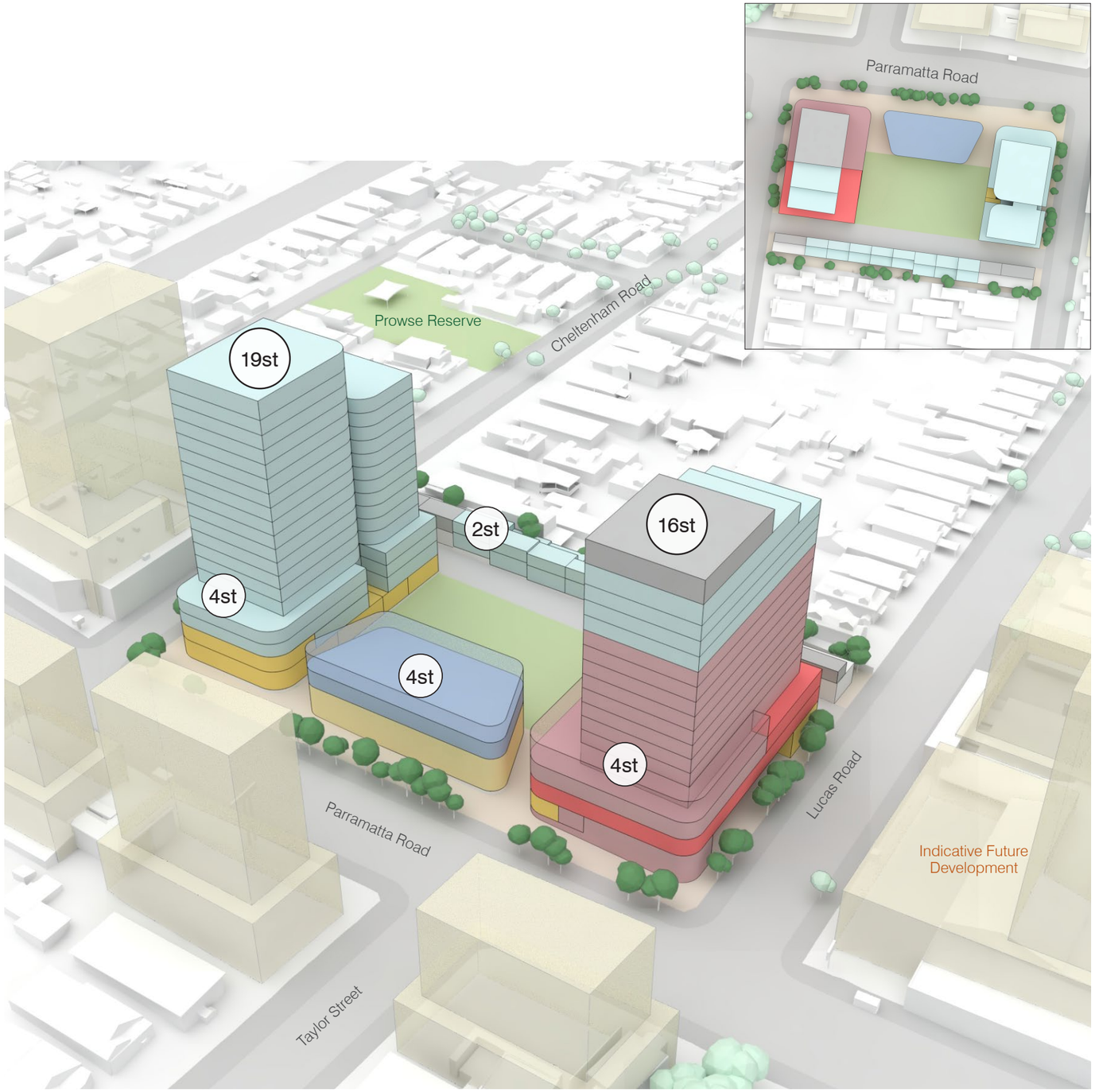
3.4:1 FSR | Max HOB 63.5m

Developed in collaboration with council, this option was documented in the scoping report. The provision of open space is a core principle of this scheme. The subsequent options are based off this scheme.

– **Bulk and scale**
Floorplate dimensions result in a bulkier appearance when viewed from an eastern and western direction. This view will be most common down Parramatta Road, however once neighbouring sites are redeveloped, they may be mostly concealed and form a part of the overall view.

✓ **Overshadowing**
Prowse Reserve not overshadowed from 9am-3pm midwinter.

Overshadowing to southern neighbours reduced through separation of towers and the transitional heights of the terrace houses.



Envelope testing

Small Tower Floorplates

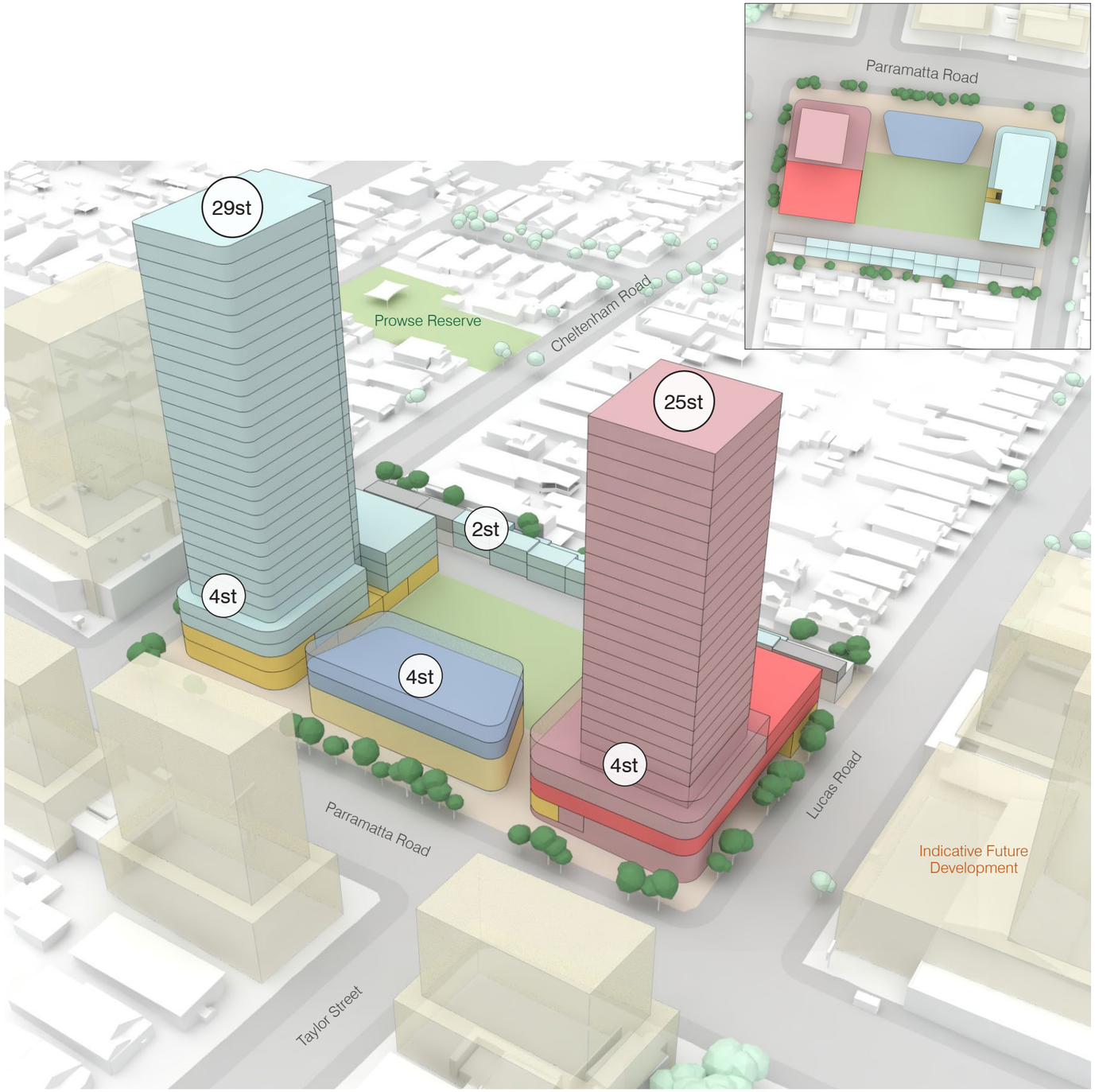
3.4:1 FSR | Max HOB 93.5m

Smaller floorplates were explored in this option to make the towers thinner, although they do present with less bulk, they are not feasible at 520m² GFA for the residential tower and 430m² GFA for the hotel tower, and have overshadowing impacts on Prowse Reserve.

✓ **Bulk and scale**
Residential tower bulk and scale reduced through reducing tower floorplates, reducing the width of the building when viewed from an eastern or western direction.

✕ **Overshadowing**
A portion of Prowse Reserve will be overshadowed by both towers between 12pm-3pm midwinter, due to increase in building height.

Overshadowing to southern neighbours increased due to additional height, additional impact to be fast moving shadows on houses further south. With a slight reduction of overshadowing on closer neighbours due to less bulk in the lower towers.



Envelope testing

Three Towers

3.4:1 FSR | Max HOB 63.5m

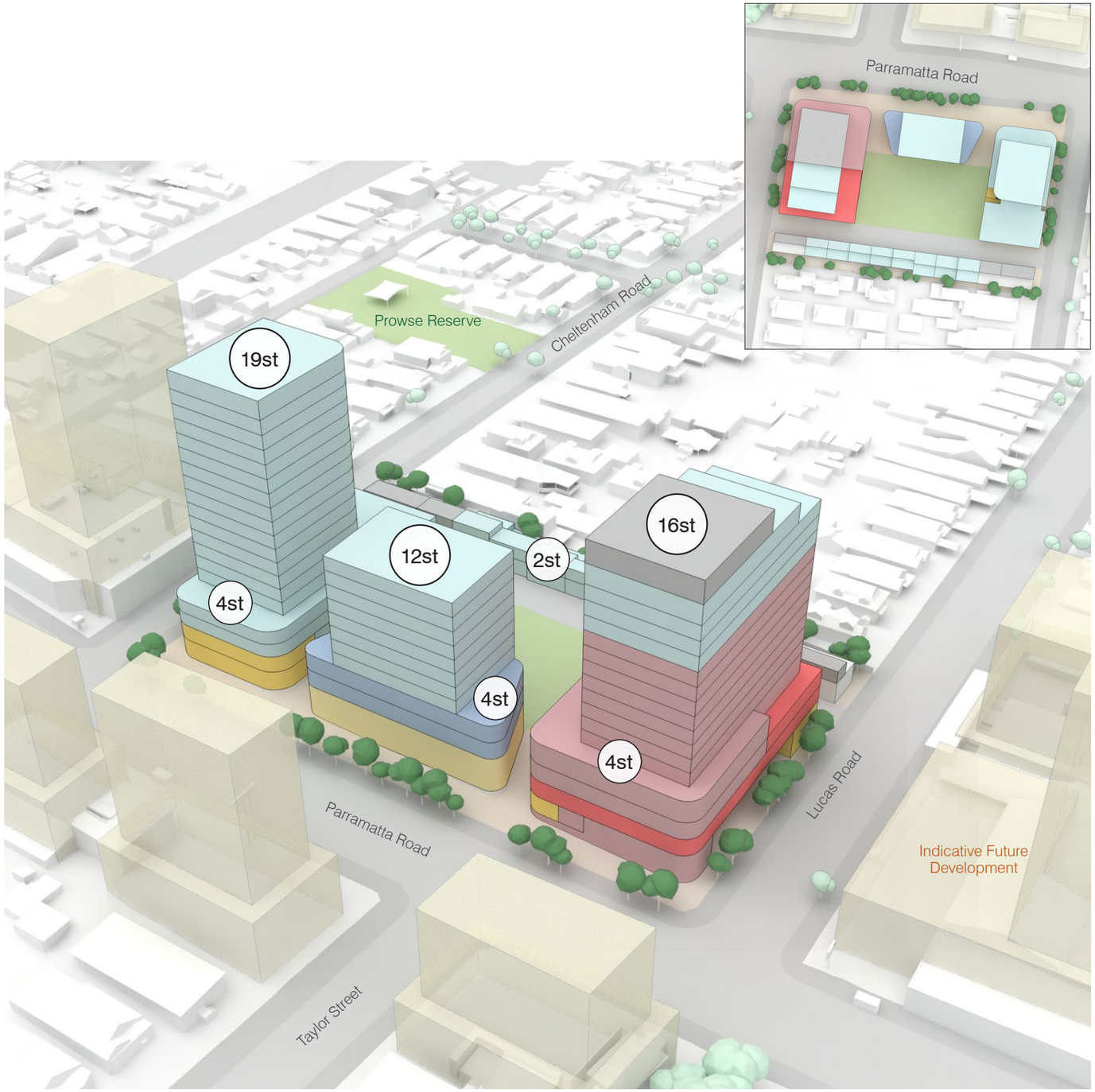
An additional tower was explored in this option to reduce the bulk of the towers. To retain the public open space and reduce overshadowing, the tower was placed along Parramatta Road, this severely overshadows the open space. Additionally the floorplates are too small to be feasible.

✓ **Bulk and scale**
Three towers result in a less bulky outcome for the residential towers, hotel tower unchanged due to maintaining public open space contribution.

Floorplate dimensions of hotel tower result in a bulkier appearance when viewed from an eastern and western direction. This view will be most common down Parramatta Road, however once neighbouring sites are redeveloped, they may be mostly concealed and form a part of the overall view.

✕ **Overshadowing**
Prowse Reserve not overshadowed from 9am-3pm midwinter.

Overshadowing to southern neighbours increased due to third tower. Proposed pubic open space to receive minimal sun with third tower directly to the north.



Envelope testing

Hybrid - High Podiums

3.4:1 FSR | Max HOB 63.5m

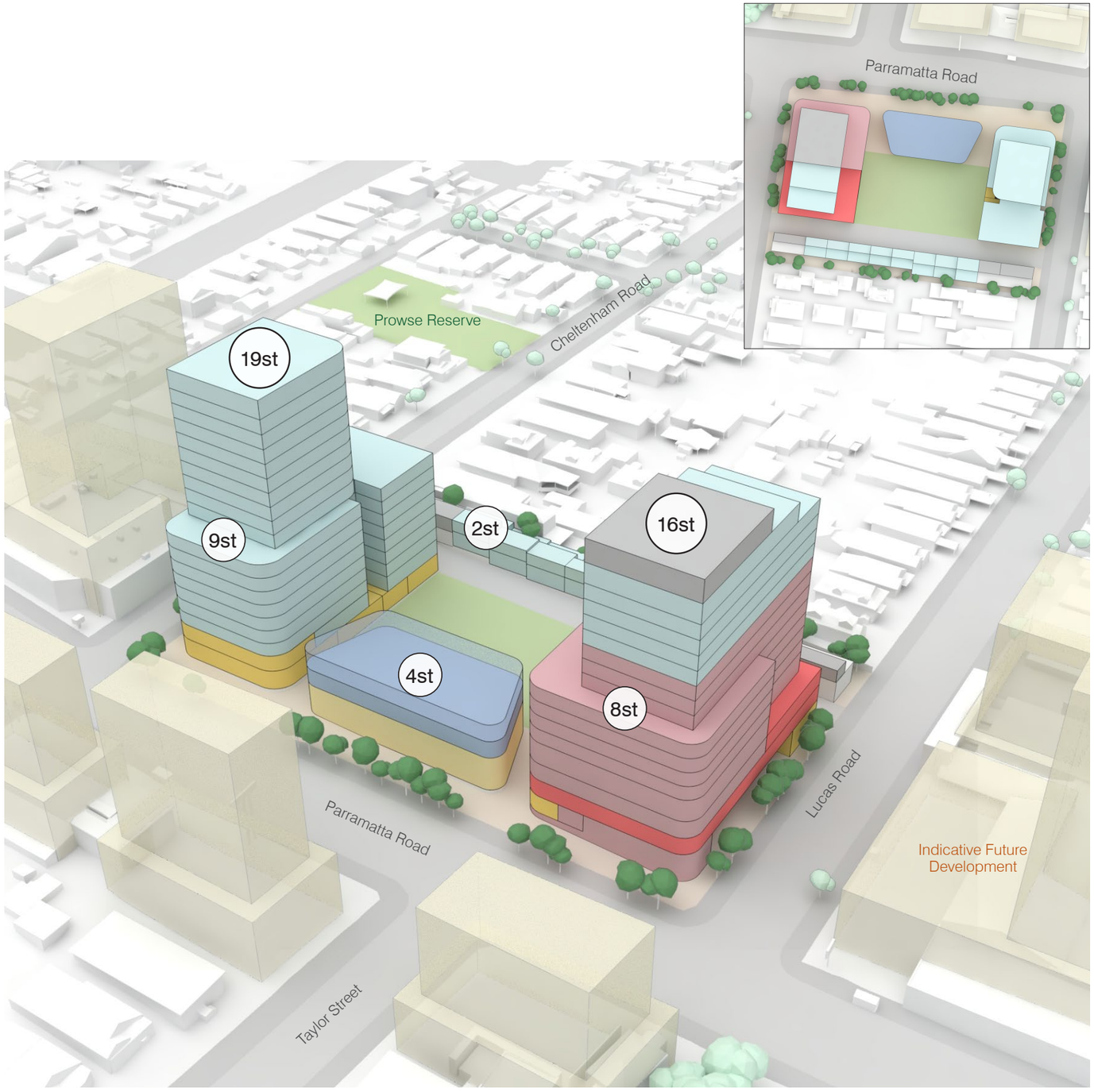
This option maintains the maximum building height and reducing the residential tower floorplate, resulting in higher podiums. The outcome is bulky and disproportionate, resulting in some additional overshadowing for southern neighbours.

× **Bulk and scale**
Larger podium floorplates up to 9 storeys with smaller floorplates in the towers above leads to higher visual bulk, particularly along Parramatta Road with the high streetwall heights. The podium heights contrast to the surrounding sites resulting in a poor transition to neighbours.

Floorplate dimensions result in a bulkier appearance when viewed from an eastern and western direction. This view will be most common down Parramatta Road, however once neighbouring sites are redeveloped, they may be mostly concealed and form a part of the overall view.

× **Overshadowing**
Prowse Reserve not overshadowed from 9am-3pm midwinter.

Overshadowing to southern neighbours reduced through separation of towers and the transitional heights of the terrace houses, however higher podiums close to the southern boundary will increase overshadowing.



Envelope testing

Hybrid - Tall Towers

3.4:1 FSR | Max HOB 82.4m

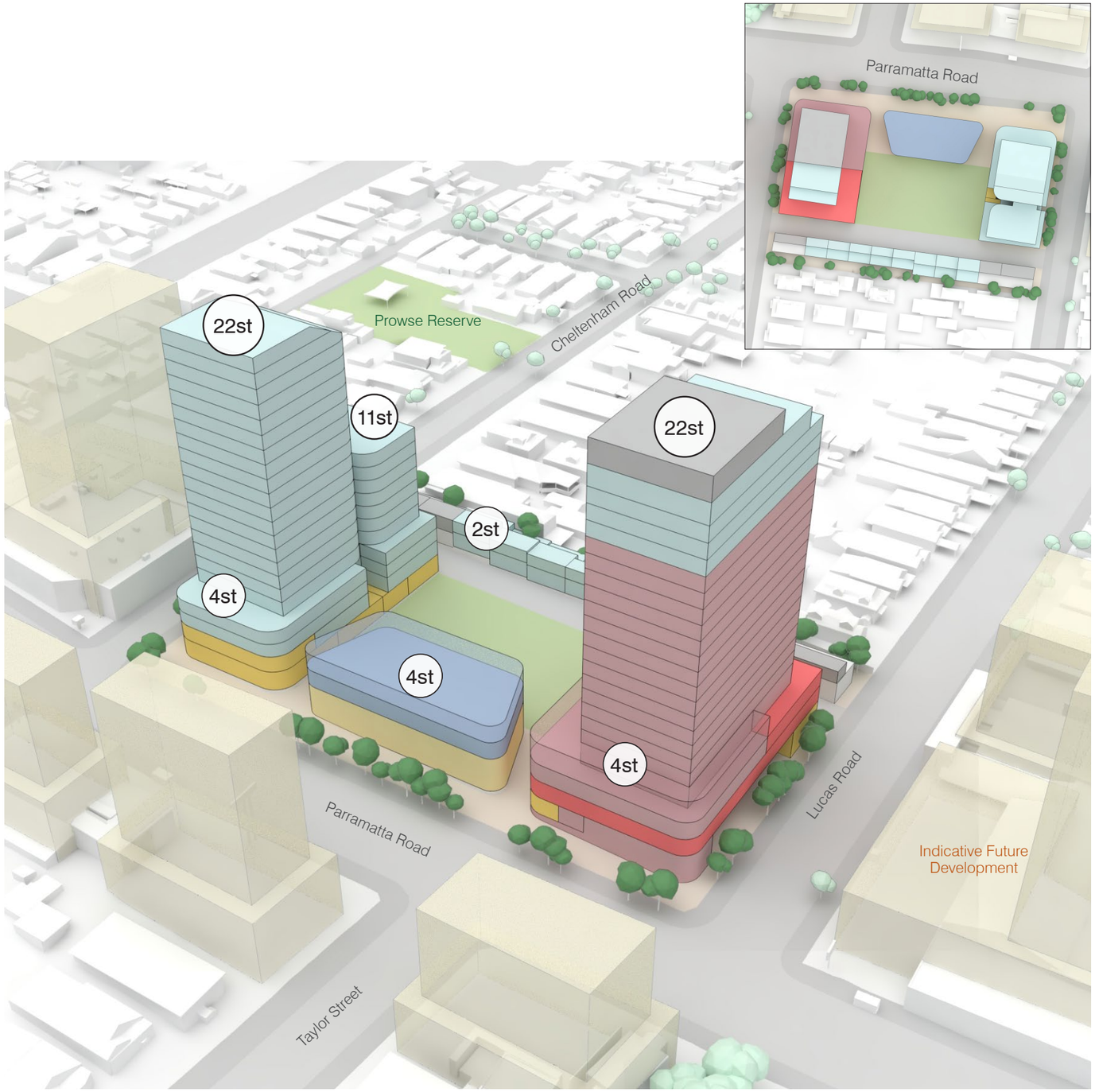
This option explores reducing the floorplate size of the hotel floorplate by 4m and reducing the lower tower element of the residential tower. This results in higher, more slender buildings, with an increase in overshadowing impacts on Prowse Reserve.

✓ **Bulk and scale**
Residential tower bulk and scale reduced through lowering southern portion, and increasing to 22 storeys. Hotel floorplate length reduced by 4m to increase slenderness ratio.

Floorplate dimensions of hotel tower result in a bulkier appearance when viewed from an eastern and western direction. This view will be most common down Parramatta Road, however once neighbouring sites are redeveloped, they may be mostly concealed and form a part of the overall view.

✕ **Overshadowing**
A portion of Prowse Reserve will be overshadowed by western tower between 2pm-3pm midwinter, due to increase in building height.

Overshadowing to southern neighbours increased due to additional height, additional impact to be fast moving shadows on houses further south.



Envelope testing

Balanced

3.4:1 FSR | Max HOB 71.6m

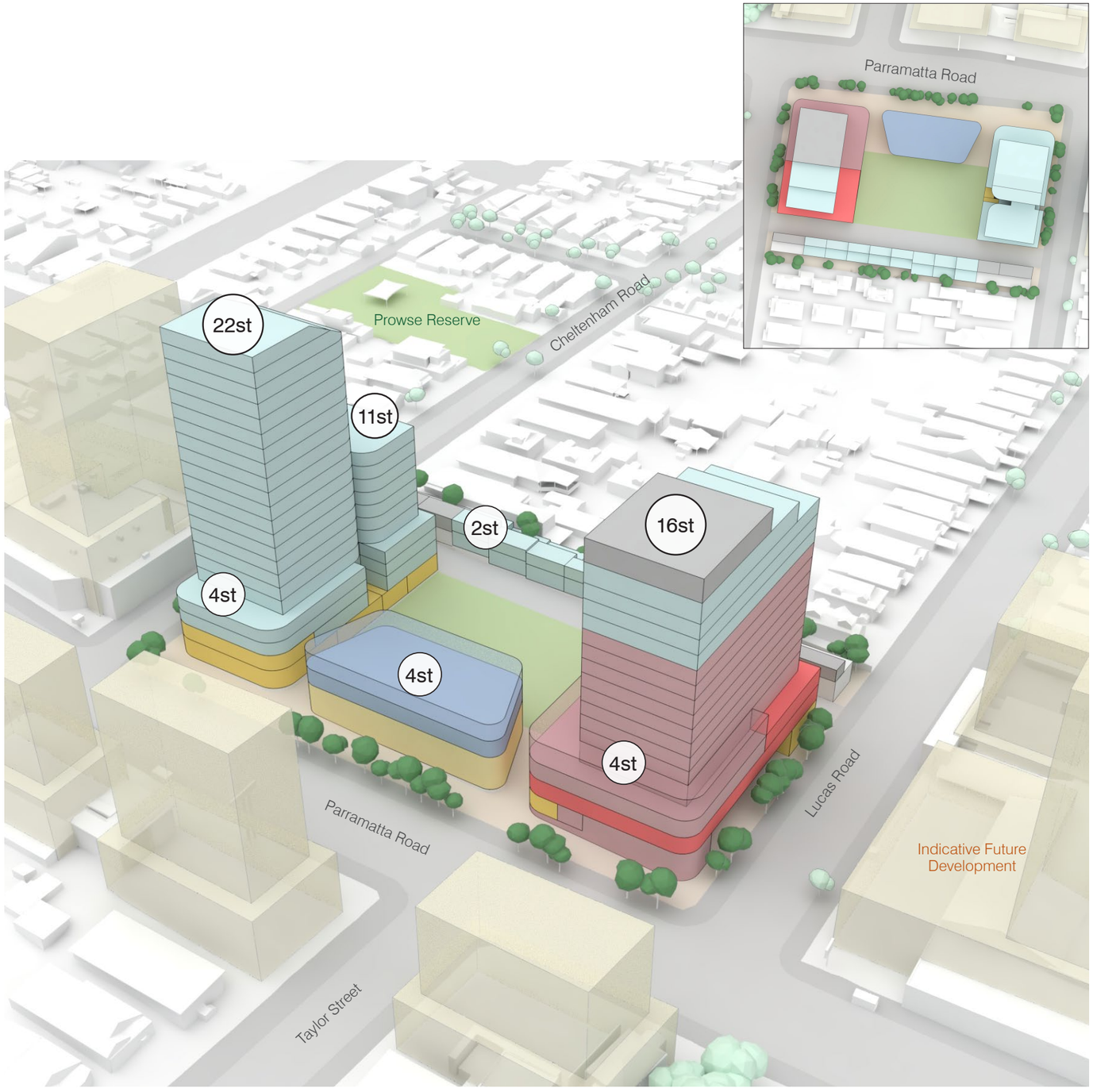
Responding to Council's initial feedback, this option balances reducing the bulk and scale of the residential building while ensuring no overshadowing to Prowse Reserve.

✓ **Bulk and scale**
Residential tower bulk and scale reduced through lowering southern portion, and increasing to 22 storeys.

Floorplate dimensions of hotel tower result in a bulkier appearance when viewed from an eastern and western direction. This view will be most common down Parramatta Road, however once neighbouring sites are redeveloped, they may be mostly concealed and form a part of the overall view.

✓ **Overshadowing**
Prowse Reserve not overshadowed from 9am-3pm midwinter.

Overshadowing to southern neighbours slightly increased due to additional height, additional impact to be fast moving shadows on houses further south.



Envelope testing

Balanced Plus

3.4:1 FSR | Max HOB 77.9m

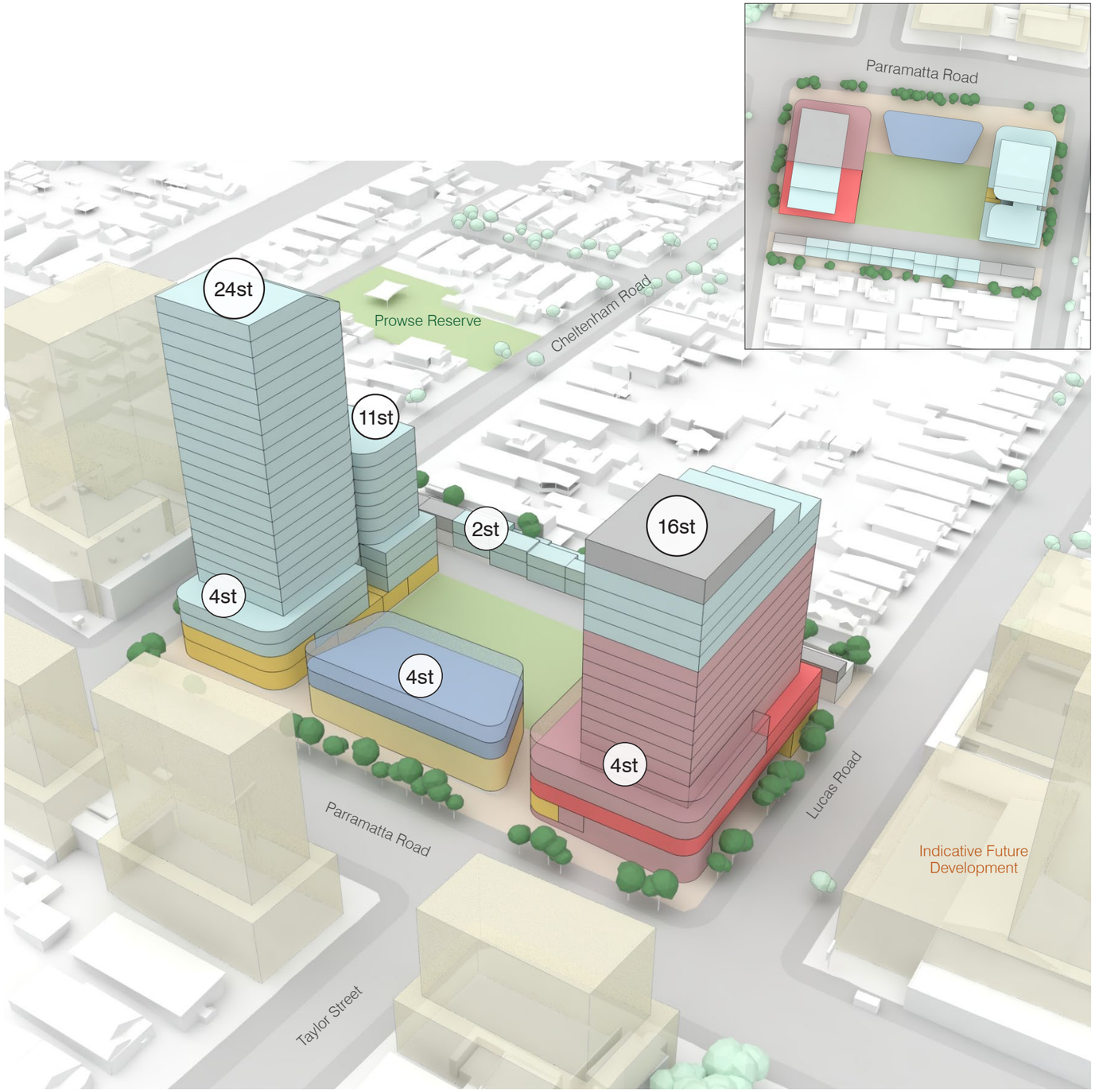
This option increases the height of the residential tower to 24 stories while ensuring no overshadowing to Prowse Reserve.

✓ **Bulk and scale**
Residential tower bulk and scale reduced through lowering southern portion, and increasing to 24 storeys.

Floorplate dimensions of hotel tower result in a bulkier appearance when viewed from an eastern and western direction. This view will be most common down Parramatta Road, however once neighbouring sites are redeveloped, they may be mostly concealed and form a part of the overall view.

✓ **Overshadowing**
Prowse Reserve not overshadowed from 9am-3pm midwinter.

Overshadowing to southern neighbours slightly increased due to additional height, additional impact to be fast moving shadows on houses further south.



Envelope testing

Balanced with no terraces

3.4:1 FSR | Max HOB 71.6m

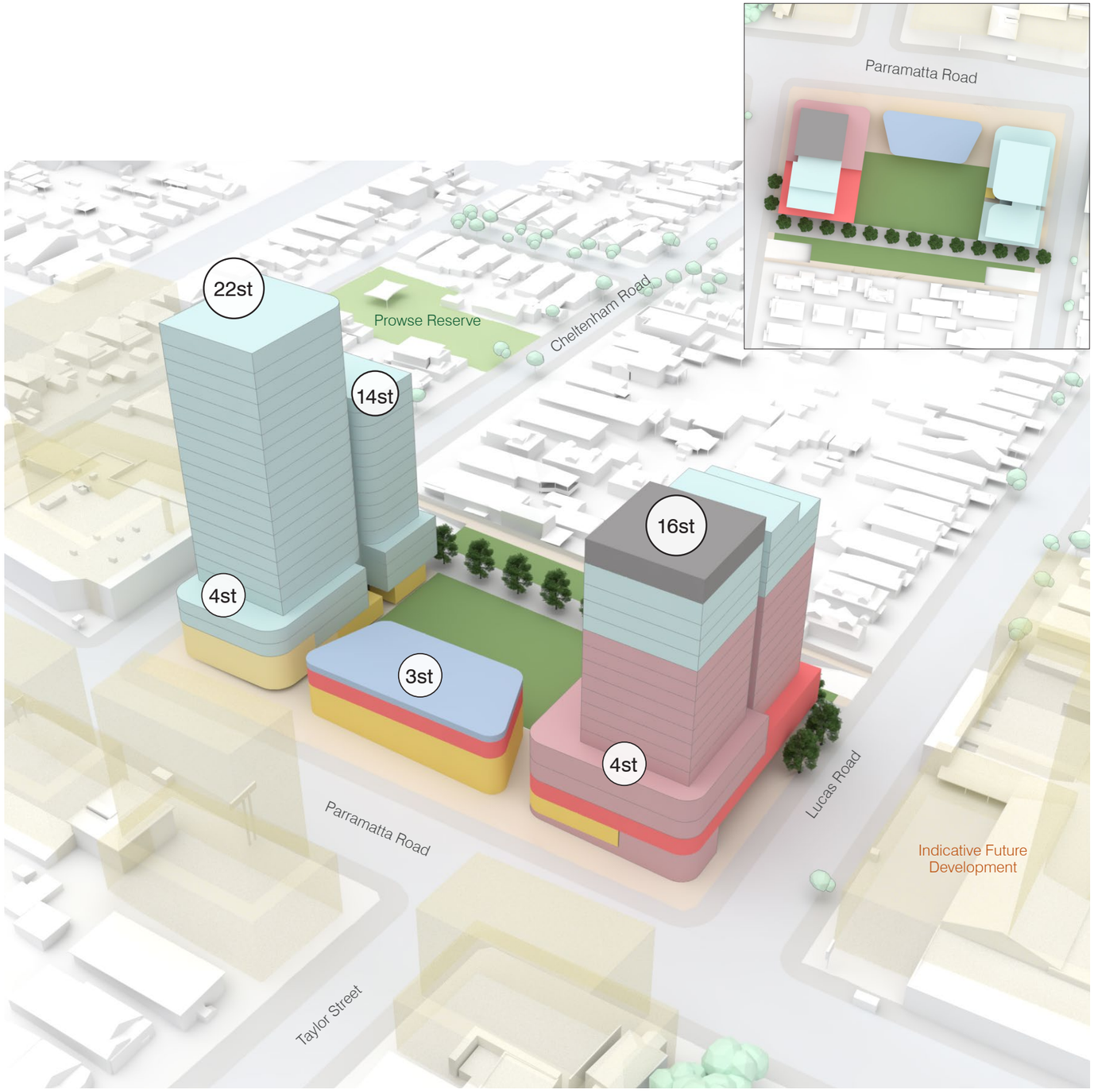
Responding to DRP's feedback, this option increases the area of open space through the removal of the terraces, with the GFA relocated within the mid-rise levels of the residential tower. There is no overshadowing to Prowse Reserve.

✓ **Bulk and scale**
Residential tower bulk and scale reduced through lowering southern portion, and increasing to 22 storeys.

Floorplate dimensions of hotel tower result in a bulkier appearance when viewed from an eastern and western direction. This view will be most common down Parramatta Road, however once neighbouring sites are redeveloped, they may be mostly concealed and form a part of the overall view.

✓ **Overshadowing**
Prowse Reserve not overshadowed from 9am-3pm midwinter.

Overshadowing to southern neighbours has not changed from the balanced option.



A.1 Floorplate Study

The two proposed tower floorplates have been designed to industry standard benchmarks incorporating design, operational and feasibility requirements. From this study, the subsequent requirements have been used in the design:

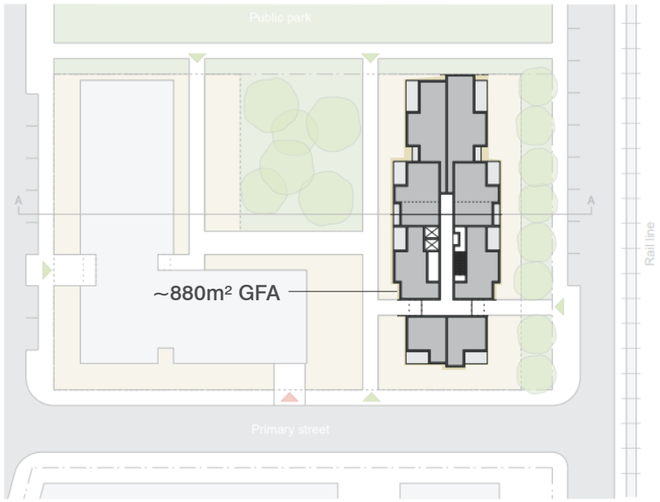
For the residential uses, a 750m² GFA floorplate with typically 8 apartments; and

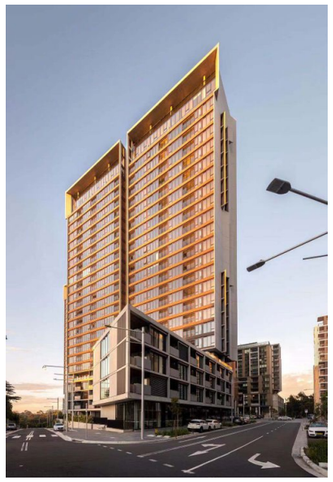
For the hotel uses, a 750m² GFA floorplate with typically 20 rooms.

Natura Park

Residential
Macquarie Park, NSW

21 stories with typically 10 apartments per floor

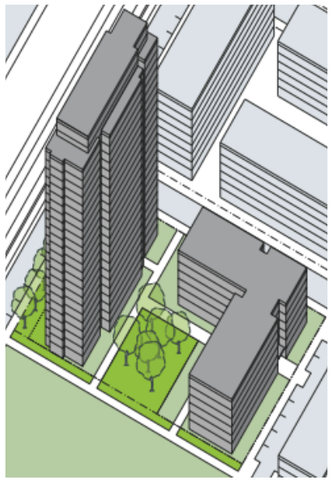




Ryde Garden

Residential

13,23 and 27 story towers



Apartment Design Guide Example

Residential

Free-standing tower apartments at 25 stories with 8 apartments per floor.

architectus™

LSH Croydon

Landscape and Public Domain Concept Plan

May 2023

We recognise the First Nations People of Australia and celebrate their continuing cultural practice and connection to Country.

We acknowledge the Traditional Custodians of the land that our site sits on today, the Wangal People of the Eora nation, as well as extending our respects to the Traditional Custodians of the lands we live and work on across Australia.

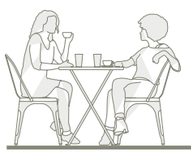
We are proud that we live in the country with the world's oldest continuous living cultures, and we are working on playing our part as allies to First Nations people across Australia.

Always was, always will be.

Rev A	Issued 25th March 2022	AS/CL/NW
Rev B	Issued 13th April 2022	AS/CL/NW
Rev C	Issued 23rd Sept 2022	AS/CL/NW
Rev D	Issued 21st Oct 2022	AS/CL/NW
Rev E	Issued 22nd May 2023	AS/CL/NW

Contents

Site Analysis 04
Local Context 05
Circulation and Movement 06
Solar and Wind 07
User Groups 08
24-Hour Activation 09



Designing with Country 10
Background Documents 12
Connection to Country 13
A Co-Design Approach 15
Country Principles 16
Public Art Opportunities 17
Materials 19

Vision 20
Landscape Vision 21
Design Principles 22

Landscape Masterplan 23
Masterplan Analysis 25
Landscape Typologies 25
Public Domain Strategy 26
Detail Plan 27
Community Forecourt 27
Water Play and Social Terrace 29
Village Lawn 31
Eat Street 32
The Commons 33
The Shareway 35
Planting Palette 37
Trees 37
Shrubs and Understorey 38

1.0

SITE ANALYSIS

Local Context

The site is located in the junction of Burwood, Croydon, Canada Bay and Concord. Situated on a main arterial road; Parramatta Road, the site has easy vehicular access from other suburbs and CBD area. The future Metro development will further enhance the public transport linkage to the site area, bringing in more and more diverse mix of visitors.

KEY

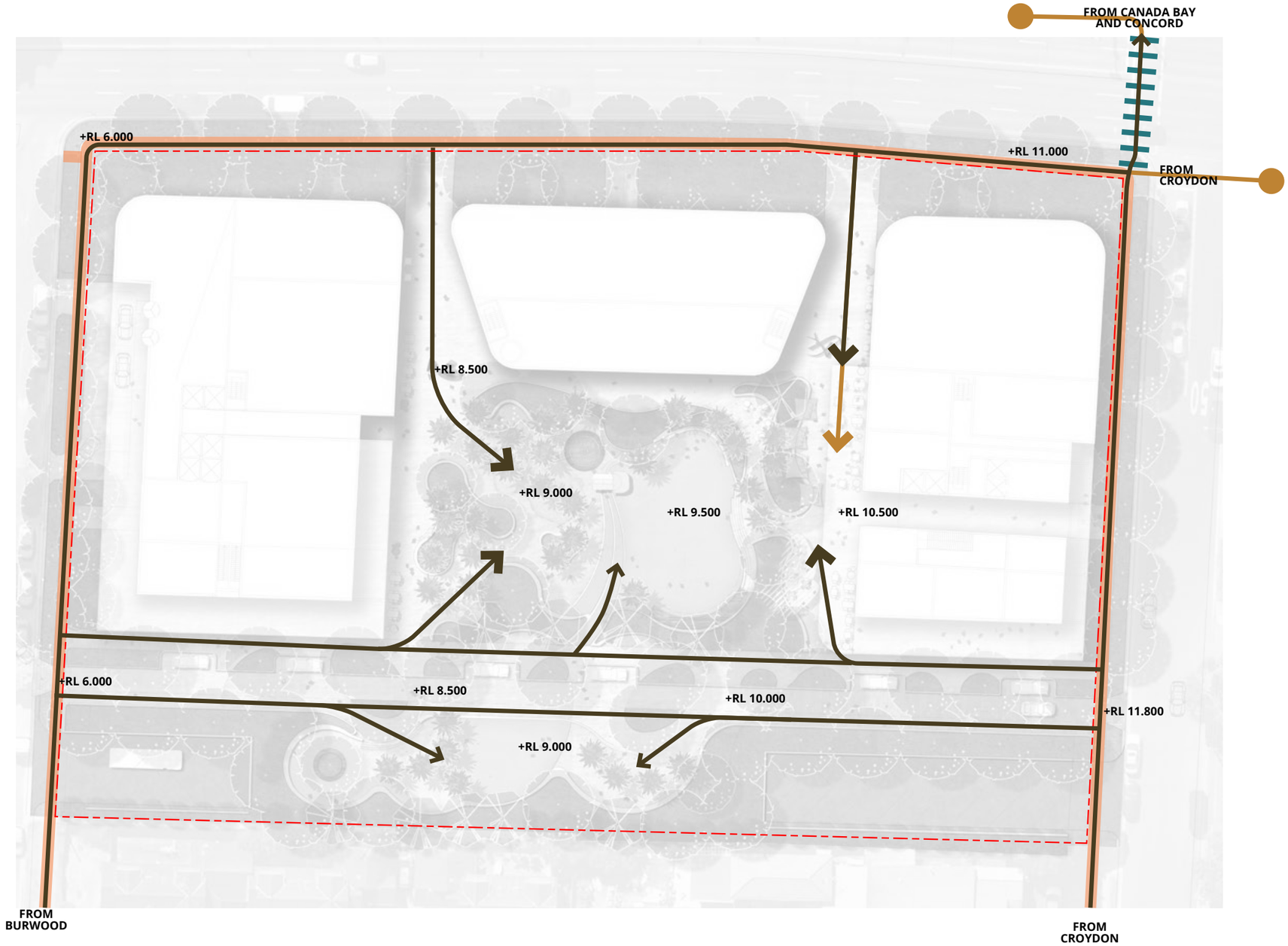
- SITE
- FURNITURE METRO LINE
- FUTURE METRO STATION
- EXISTING BUS STOP
- SPORTS FIELDS AND PARKS

ARCADIA

Circulation and Movement

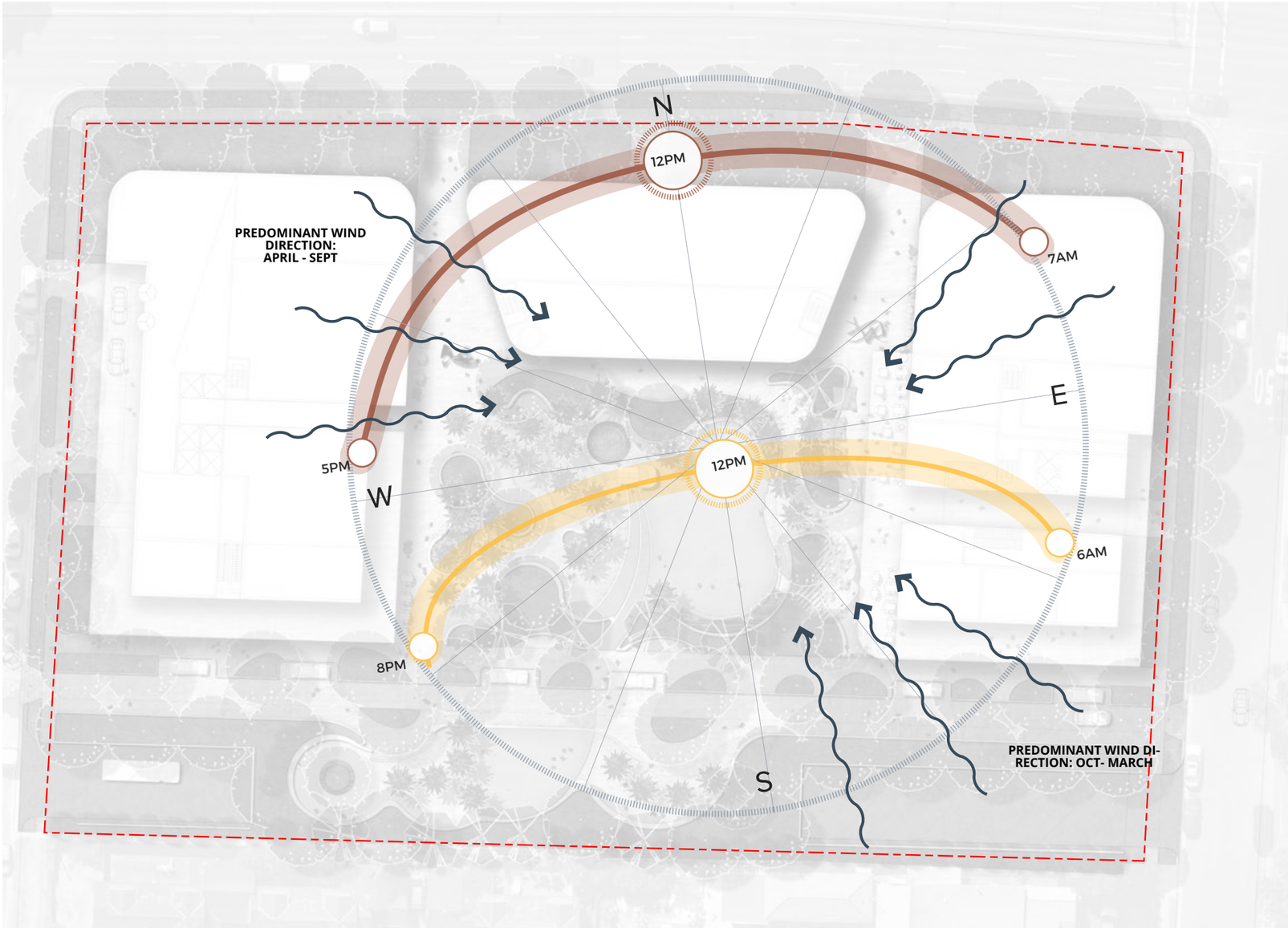
KEY

- SITE
- EXISTING PEDESTRIAN CROSSING
- LOCAL PEDESTRIAN MOVEMENT
- PUBLIC TRANSPORT USERS MOVEMENT
- EXISTING BUS STOP
- EXISTING PEDESTRIAN PATH

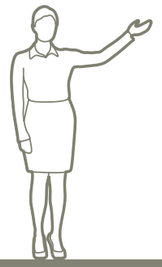


ARCADIA

Solar and Wind



User Groups



COMMERCIAL EMPLOYEES

WHO?

- White collar professionals
- Creative and cultural industries
- Retail and hospitality
- Event workers

AMENITIES

- Outdoor lunch break space
- Ease of access to local F&B's
- Outdoor bars and cafes
- Outdoor working opportunities
- Intimate breakout space
- Large group social space
- After work recreation and sport
- BBQ
- Green relief

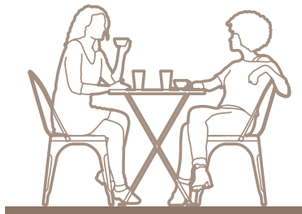
RESIDENTS

WHO?

- Young families
- Young singles and couples
- Elderly

AMENITIES

- Children's play
- Passive recreational space
- Shade/shelter
- BBQ and outdoor kitchen
- Gathering and social space
- Exercise facilities and space
- Dog walking space
- Viewing
- Sun loungers and hammocks
- Ease of access to local cafe's and restaurants
- Ease of access to commercial services (chemist, retail)



GENERAL PUBLIC

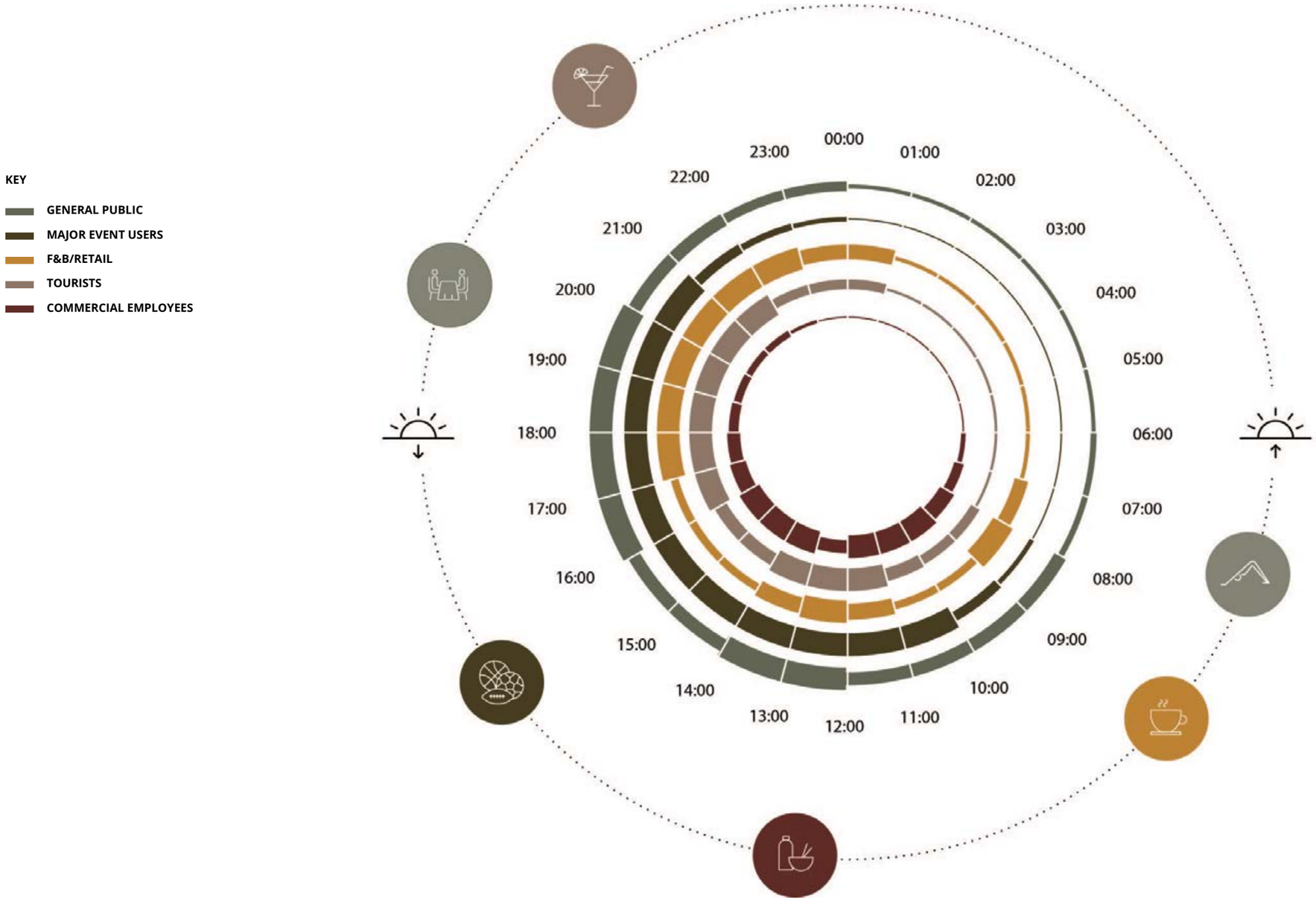
WHO?

- Local residents
- Retail and hospitality visitors
- Young families
- Tourists
- Parent groups

AMENITIES

- Children's play
- All ages play space
- Exercise and sports facilities
- Outdoor cafes and bars
- Water play
- BBQ
- Public gathering space
- Public art
  Outdoor art exhibitions
- Public markets
- Interpretive/educational elements
- Rest space/retreat
- Green space/park
- Flexible event space
- Outdoor sports display
- Outdoor cinema
- Festivals
- Amphitheater
- Outdoor art exhibitions
- Pop up bars and other sponsor events
- Viewing
- Lounging

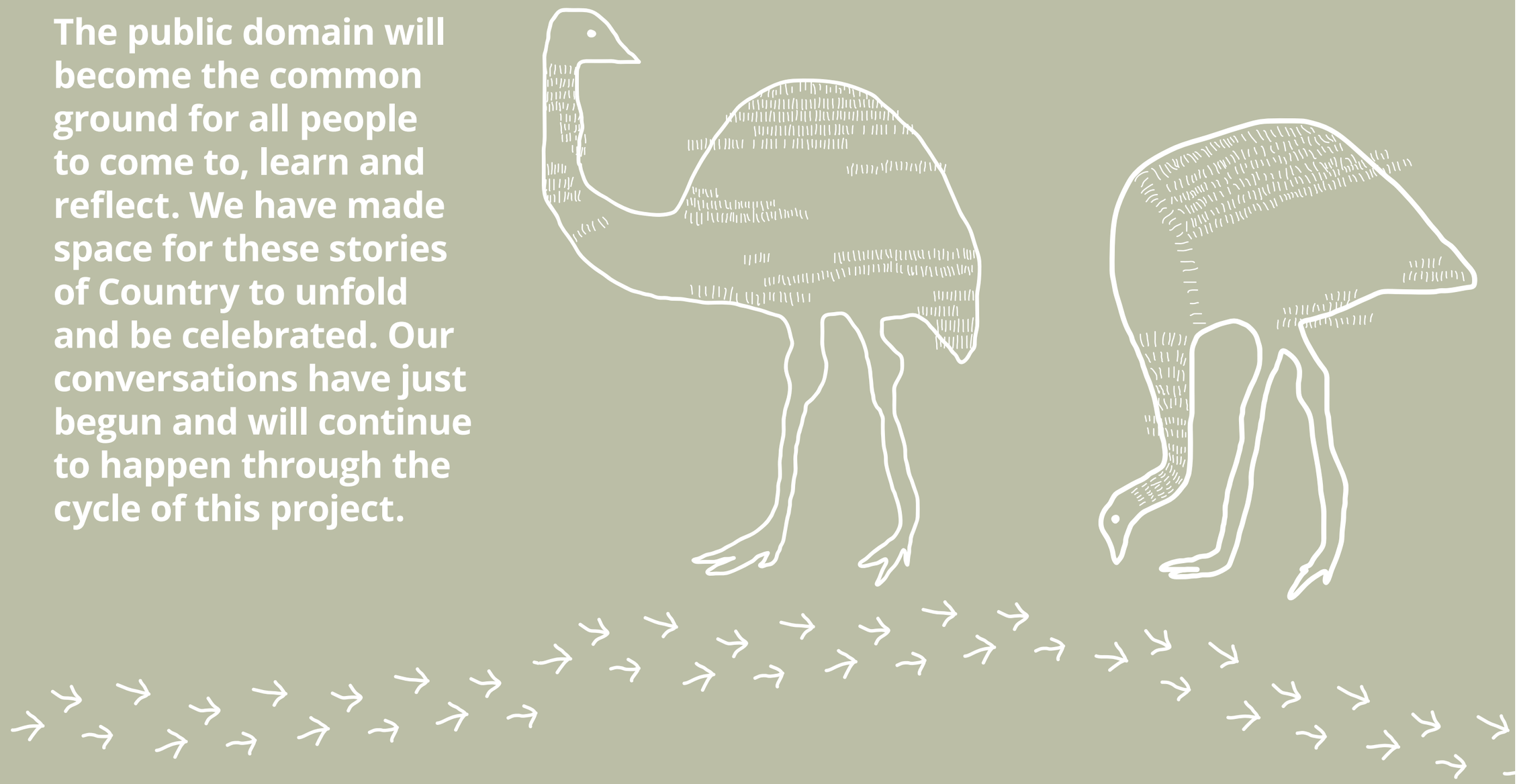
24-Hour Activation



2.0 DESIGNING WITH COUNTRY

Connection to Country

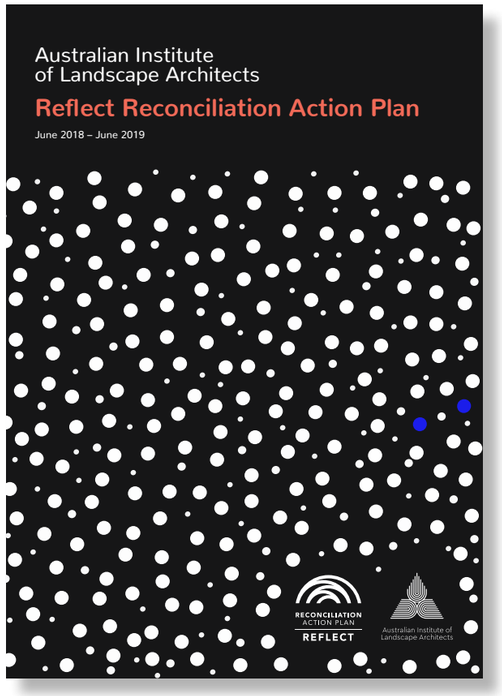
The public domain will become the common ground for all people to come to, learn and reflect. We have made space for these stories of Country to unfold and be celebrated. Our conversations have just begun and will continue to happen through the cycle of this project.



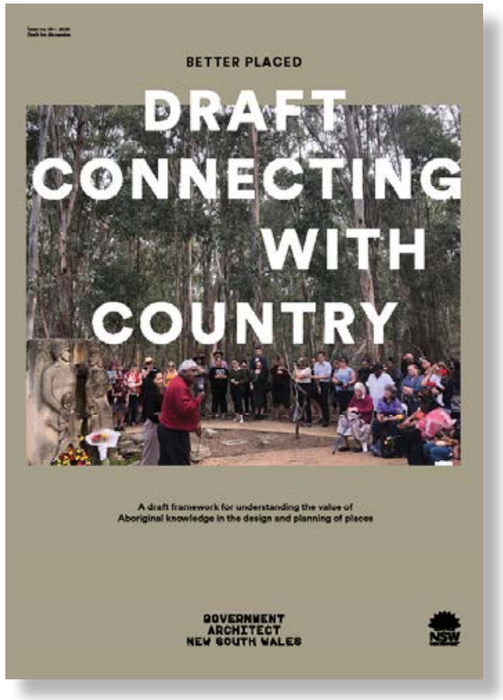
Background Documents

Design with Country

Recent industry and institutional moves to advance Aboriginal design signals a welcome change in the built environment practice. We have used these documents as departure points for formulating our framework for action.



AILA Reflect Reconciliation Action Plan (2019)



GANSW Draft Connecting with Country (2020)

GANSW Designing with Country (2020)

Connection to Country

The Wangal People

The Wangal People of the Eora Nation are the traditional custodians of the Burwood municipality including Croydon where the project site is located. The Wangal people occupied the land on the southern bank of Parramatta River and travelled about to trade and forage.

The Burwood municipality area is centrally located on the ridge between the Cooks and Parramatta Rivers and is an integral part of the Wangal people's territory. The area was also readily accessible to the Wangal People via the two rivers or by the native pathways from Sydney to Parramatta. It is believed that Parramatta Rd was built upon this native pathway which had probably been used for centuries.

The Burwood municipality once supported large forests of Eucalyptus trees with native grasses underneath. During kangaroo hunts (Walbunga), several clans would band together to form a large circle around their intended quarry. Then they would set fire to the grass, leaving only a narrow opening for the kangaroos to escape. As the kangaroos escaped the circle, the Wangal people would spear them. This method would probably have been used in Burwood as the flatter terrain made it easier to encircle the kangaroos.

After 1788, European invasion forced the retreat of the Wangal into alien territory, depriving them both of their source of food and spiritual connection with their country.

Connection to Country

On Eora Country

Why is connection to Country so important?

There is no part of the land we live on that was not once loved, cared for and nurtured by Aboriginal people.

As design consultants, we have the opportunity to collaborate with our First Nations Knowledge holders to form an authentic design narrative from the ground, up. Through this deep collaboration, we build relationships and meaningful dialogue which only results in built outcomes that are deeply embedded in culture and place.

We are committed to create a landscape and public domain that is inclusive of community and is Country-led. We don't want the sharing of stories and knowledge to be a "tick the box" activity. Connection to Country through the process of engagement and conversation is just as important as creating tangible elements in the ground plane. Our responsibility is to identify the best and most appropriate ways to (heal, celebrate and acknowledge) Country through design, and also discuss with the team other avenues of cultural engagement for the life cycle of the project.

Our design approach begins from identifying the site's history, reading and designing with Country, and also discussing long-term strategies of Indigenous engagement; through employment of First Nations businesses like, IndigiGrow for vegetation selection or Muru Mittigar, for landscape construction, management and stewardship of the public domain.

Our landscape and public domain response will continue to develop following Planning Proposal phase, through continued conversation between our design team, cultural collaborators and our Aboriginal elders, to embed a ground plane full of boundless curiosity, education and celebration.

The following pages identify opportunities in the landscape that would best celebrate Country. Next steps will include cultural engagement and collaboration with our First Nations Knowledge Holders to turn these opportunities into reality and ensure the stories of the Wangal People are translated meaningfully and respectfully.

Broadly, our connection to Country approach and process for LSH Croydon will be as follows:

Initiation to Concept Design (up to DA submission)

- Cultural research
- Identifying Indigenous underlays
- Cultural observations, recommendations and design references

Design Development (pos-DA)

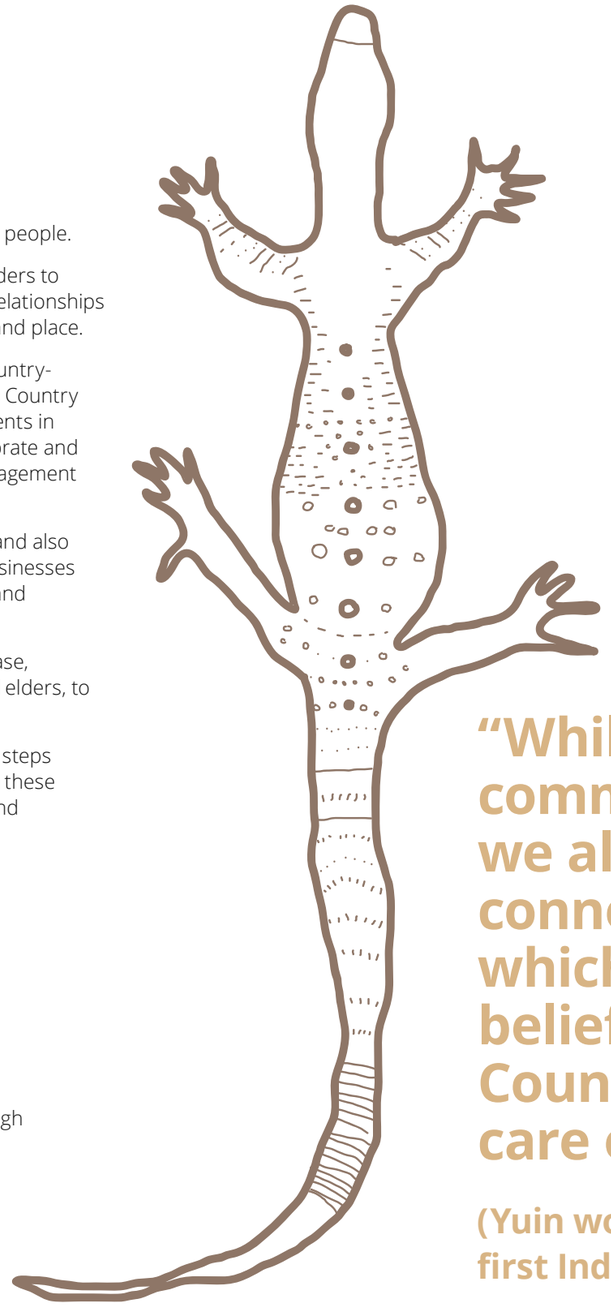
- Walking Country
- Yarning
- Deep listening
- Cultural design response
- Inclusive implementation

Design Delivery

- Indigenous overlay and conscious construction
- Regenerative materiality
- Indigenous interpretations

Post-Delivery

- Continued Indigenous partnerships through long-term maintenance strategies
- Ongoing community inclusion



"While Indigenous communities are diverse, we all have an underlying connection to Country which is core to our beliefs: if we take care of Country, Country will take care of us"

(Yuin woman, Kaylie Salvatori, Arcadia's first Indigenous Strategist)

A Co-Design Approach

To Reach an Authentic and Deeply Embedded Common Ground for All

The "co" in design stands for COMMUNITY or CONVERSATION. By definition, co-design is about bringing people and professionals together make joint decisions, informed by each other's expertise. It's not a community only activity or a professional only activity.

Our co-design response for LSH Croydon starts from the very beginning. Matt Fellingham from Fellingham Consultancy and Design (FCAD), Arcadia and Architectus will work together to form an authentic design narrative from the ground, up. This design narrative embeds stories and conversations with local elders and knowledge holders of Wangal land, into tangible symbols and elements within the built form and public domain.

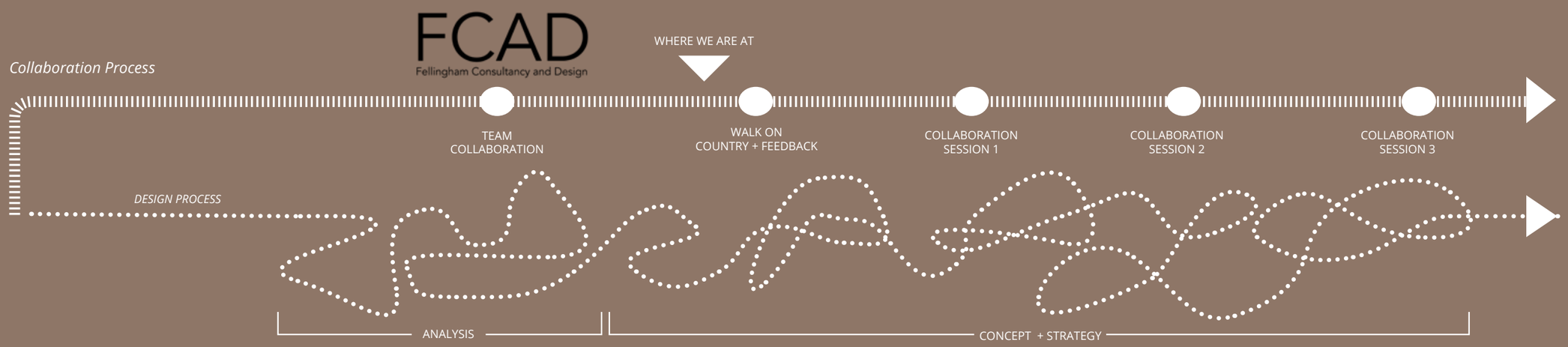
This conversation will only been strengthened with the engagement of the wider design and technical team.

Our design team have had the pleasure to walk Country and listen to stories passed on from conversations with FCAD. This process of listening and storytelling has not only allowed for an authentic, heartfelt engagement process with our knowledge holders, but it means that our design response is met at every turn, with a commitment to create a place that is culturally safe, inclusive and inviting for all walks of life.

We have committed to create a landscape and public domain that is inclusive of community, Indigenous engagement focused and at the forefront of our minds. We don't want the sharing of stories and knowledge to be a "tick the box" activity. These stories will be celebrated in the language of the ground plane and through the built form.

Our co-design efforts extend from identifying the site's history, reading and designing with Country, and also discussing long-term strategies of Indigenous engagement; through employment of First Nations businesses like, IndigiGrow for vegetation selection or Muru Mittigar, for landscape construction, management and stewardship of the public domain.

Our landscape and public domain response is driven by these new relationships formed between Arcadia, FCAD, our Aboriginal elders, Architectus and the wider design team to create a ground plane full of boundless curiosity, education and celebration.



Country Principles

Please refer to the five guiding principles detailed in the **Public Art Strategy** prepared by **FCAD** that will ensure the site's historical significance and local identity is celebrated and carried through all elements of the development. Detailed below are other Country principles relevant to LSH Croydon:

Connection to Country

- Celebrating and acknowledging Wangal Country is vital to reconciliation learning and the unlearning of Colonial narratives
- Country can be acknowledged and celebrated through art interpretation, signage, ecotones of the site and textures
- Educational elements for learning
- Investigating stories for interpretation
- Investigate language names for places
- Art and lighting inclusion to support storytelling
- Preserve sacred artefacts

Healing Country

- Habitat preservation and creation
- Local native planting palette and biodiversity planning
- Spatial design to be sympathetic to natural character, landforms and features
- Design to support seasonal planting
- Design advice on local practices, tools and artefacts
- Use of natural, sustainable materials
- Support future opportunities for partnerships for Aboriginal land management

Legacy and Education

- Provide opportunity for residents to engage in learning and cultural practice
- Support environmental learning through seasonal planting, education on cultural uses
- Use of Wangal language throughout for place names
- Use of storytelling throughout public spaces to support place identity
- Spatial design to support connected communities

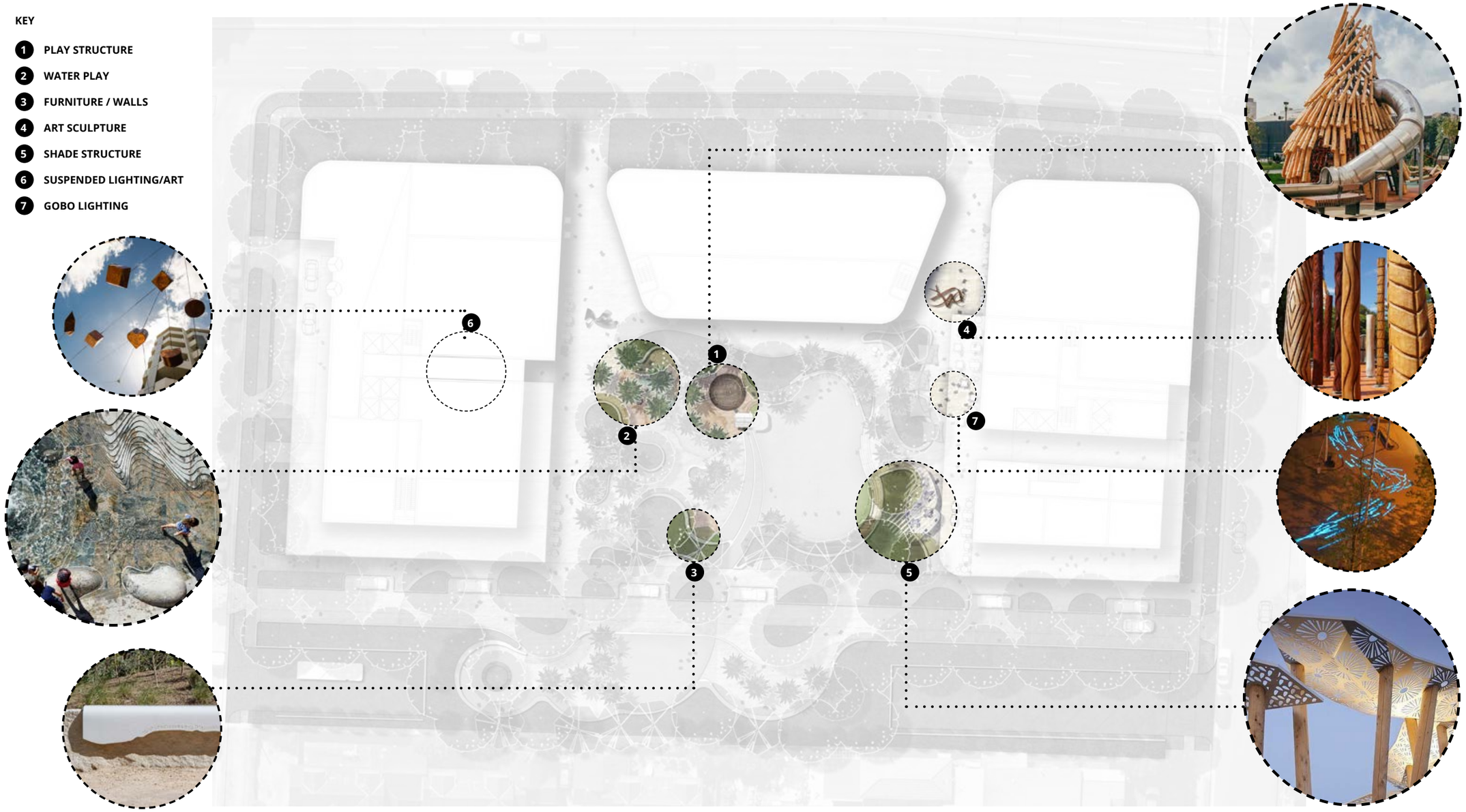
Cares for Country

- Respect First Nations through reconciliatory processes
- Habitat and landscape planting and management to support a balance of biodiversity
- Supports community health and biophillic connections
- Consideration of the projects life-cycle:
  - Sensing / Project Formation
  - Imagining / Project design and concept
  - Shaping / Project delivery
  - Caring / Project maintenance

Public Art Opportunities

KEY

1. PLAY STRUCTURE
2. WATER PLAY
3. FURNITURE / WALLS
4. ART SCULPTURE
5. SHADE STRUCTURE
6. SUSPENDED LIGHTING/ART
7. GOBO LIGHTING



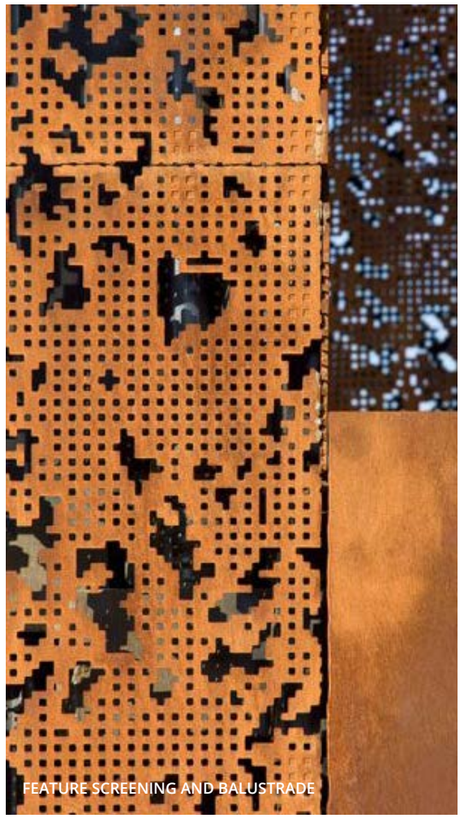
Public Art Opportunities

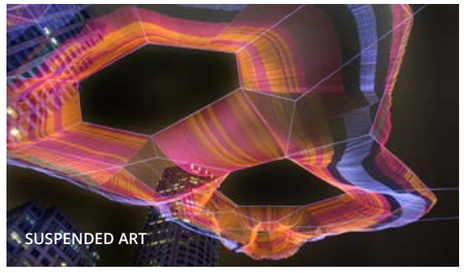
GOBO LIGHTING

COMMUNITY GARDEN SIGNAGE

PERGOLA STRUCTURE

INTERACTIVE WATER PLAY


FEATURE SCREENING AND BALUSTRADE


SUSPENDED ART

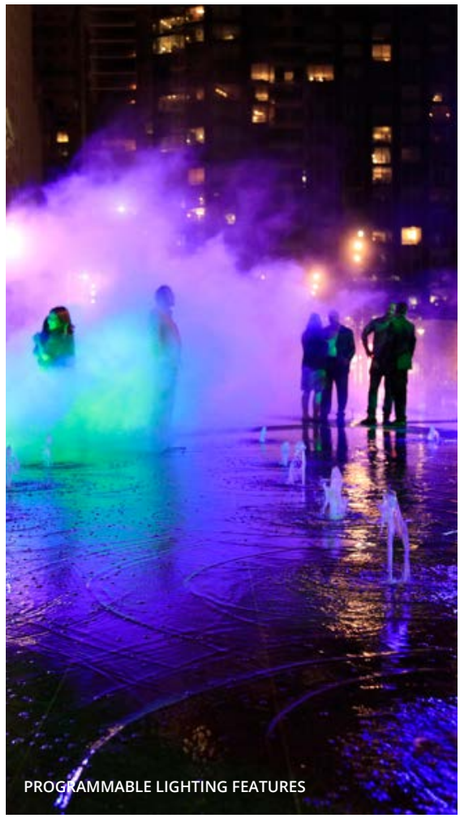
INTERACTIVE WATER PLAY

Materials

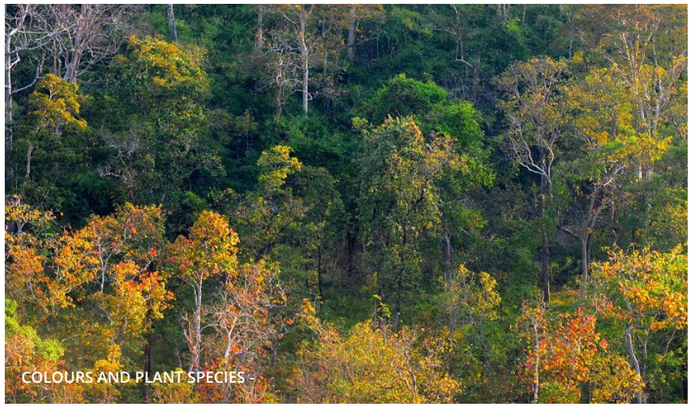
BUSH TUCKER PLANTING

PAVING AND WATER

CATENARY LIGHTING


PROGRAMMABLE LIGHTING FEATURES

TIMBER / NATURAL MATERIALS


COLOURS AND PLANT SPECIES

SANDSTONE TO CONNECT TO LOCAL GEOLOGY

3.0

VISION

Landscape Vision

A vibrant and green mixed-use precinct which draws upon and celebrates the environs and diverse history of the local area

A landscape that enriches the cultural fabric and emerging future character of Croydon.

A landscape that is immersive and engaging of its natural surroundings. Connecting people to place and encouraging community wellness; rest, play, exchange, lifestyle and work.

Design Principles

Design with Country

We pay respect to the traditional custodians of the land - the Wangal Clan of the Eora Nation.

Investigate designing with Country strategies to celebrate Indigenous culture and heritage. Investigate methods to support and showcase Country's ecological systems and strengthen community ties, understanding and stewardship with Country.

Creating a Signature Destination

Employ global best practice approaches to urban design and placemaking in order to create an iconic, world leading mixed-use precinct.

Steeped in place and informed by local histories, customs and landmarks, the materiality, public art, vegetation and spatial design will work together to create an iconic landmark stitched into the fabric of Croydon.

Complement Architectural Form

Creating a synergistic design language between the landscape and architectural form will tie the ground plane into the buildings and treat the site design in a holistic way.

Enrich the Urban Fabric

Tap into existing fabric of the surroundings and embody the ethos of the Parramatta Rd Urban Transformation Strategy to deliver a green urban precinct that enriches the human experience of Croydon.

Capitalise on opportunities to expand the public domain and create places for people to occupy.

Urban Comfort and ESD

Ameliorate climatic factors through providing a comfortable microclimate. Strengthen visual surveillance and comfort via open sight lines and CPTED strategies.

Make ESD moves visible throughout landscape design, demonstrating global best practices and commitment to sustainability.

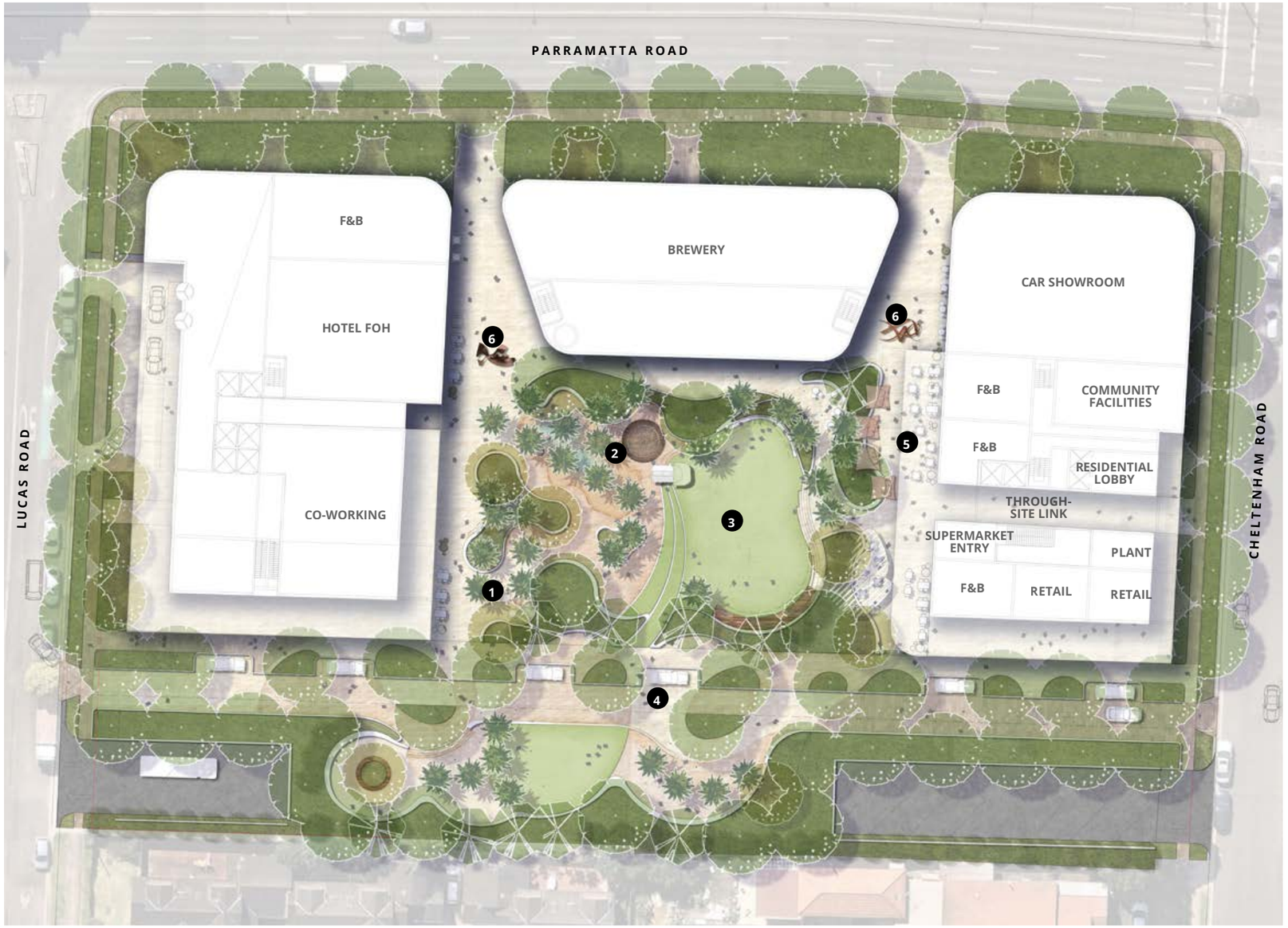
Create a green and healthy precinct that reflects the Parramatta Rd Urban Transformation Strategy to improve the living environment of the neighbourhood.

LANDSCAPE MASTERPLAN

Landscape Masterplan

KEY

1. COMMUNITY FORECOURT
2. WATER PLAY AND SOCIAL TERRACE
3. VILLAGE LAWN
4. SHAREWAY
5. EAT STREET
6. PUBLIC ART OPPORTUNITIES



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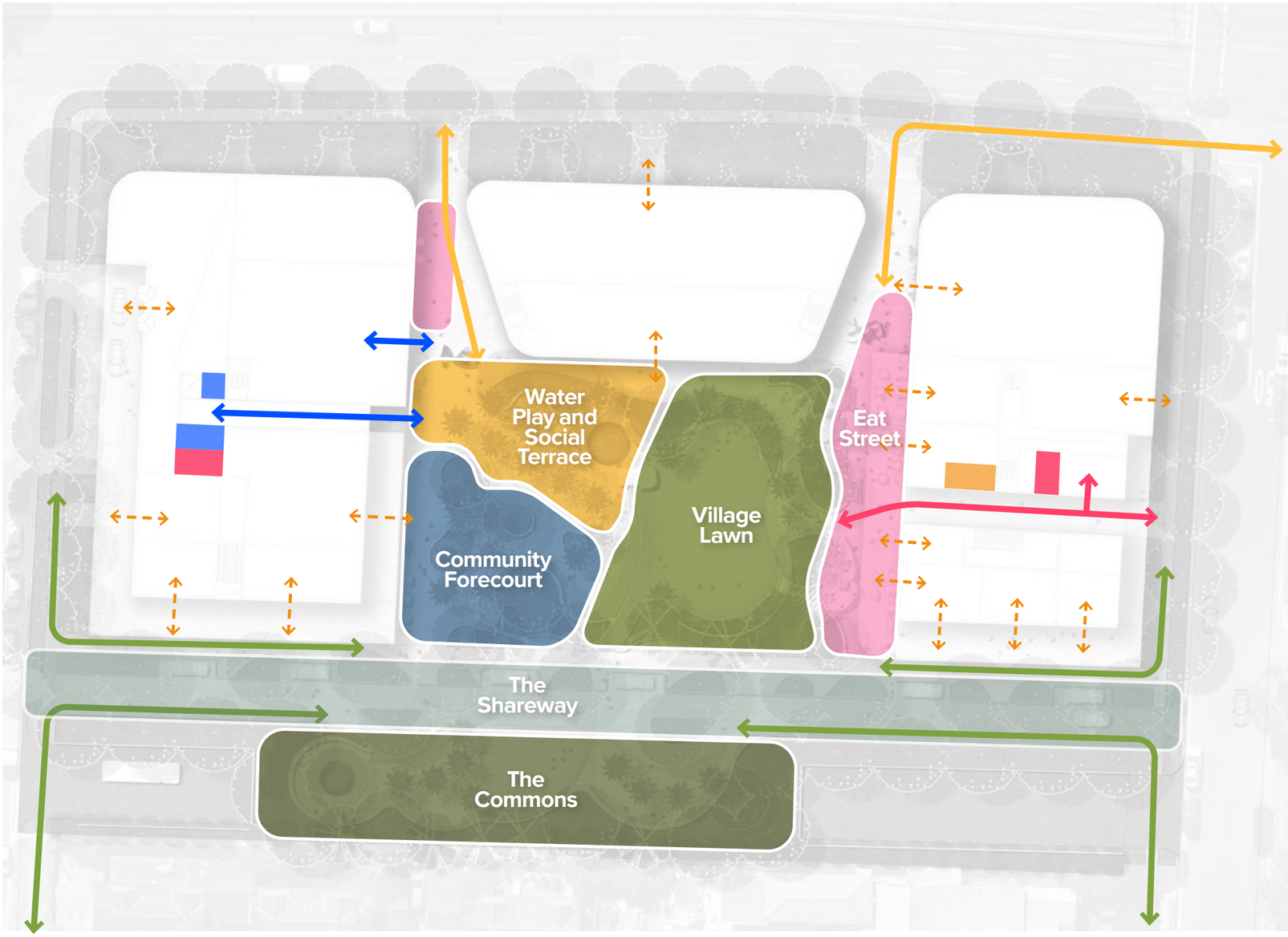
ARCADIA

Masterplan Analysis

Landscape Typologies

KEY

- BUILDING ACCESS
- HOTEL LIFT
- PUBLIC RETAIL LIFT
- RESIDENTIAL LIFT
- HOTEL USERS MOVEMENT
- PUBLIC TRANSPORT USERS MOVEMENT
- LOCAL PEDESTRIANS MOVEMENT
- RESIDENTS MOVEMENT



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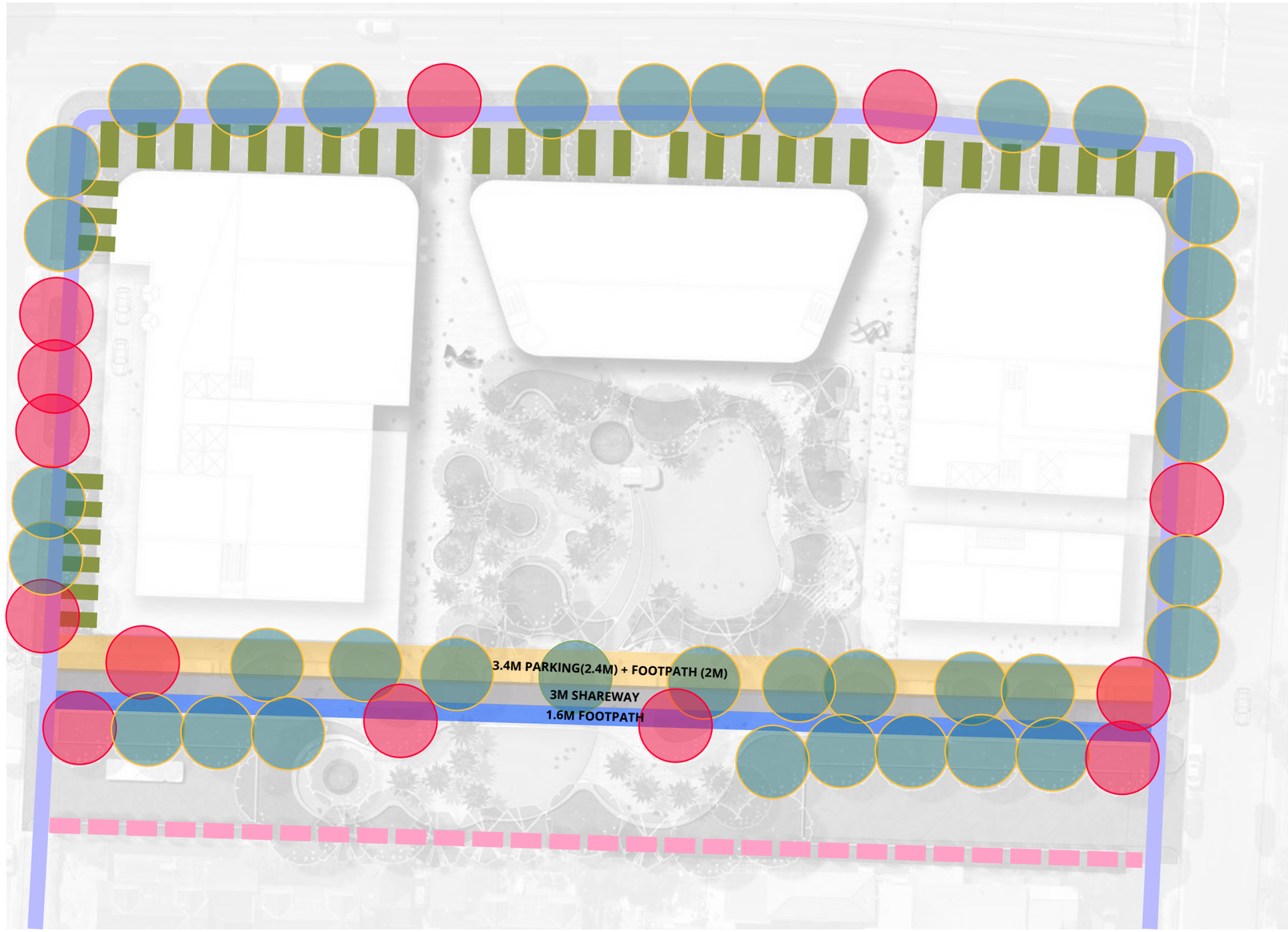
ARCADIA

Masterplan Analysis

Public Domain Strategy

KEY

- LANDSCAPE BUFFER
- FEATURE PLANTING
- PRIVACY PLANTING
- STREET TREES
- 2M WIDE FOOTPATH



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ARCADIA

Detail Plan

Community Forecourt

The plaza is a space of flexible use for restaurant alfresco, events and other congregations. This provides potential to bring people into the site through creating a landmark point. The circulation strategy prioritises fluid pedestrian movement, with the community plaza operating as central nodal point for the ground floor pedestrian connections.

KEY

1. WATER PLAY
2. PUBLIC ART OPPORTUNITY
3. BUFFER PLANTING
4. HOTEL ENTRY
5. TREE PIT
6. SEATING WALL
7. CONNECTION TO PARRAMATTA ROAD
8. BREWERY ENTRY

1:200 @ A3

0 1 2 4 6 8m

ARCADIA

Community Forecourt

Sectional Elevation

KEY

1. FOOTPATH
2. WATER PLAY
3. RAISED PLANTER BED
4. FEATURE PALM TREES
5. OUTDOOR FURNITURE

1:200 @ A3 0 1 2 4 6 8m

ARCADIA

Detail Plan

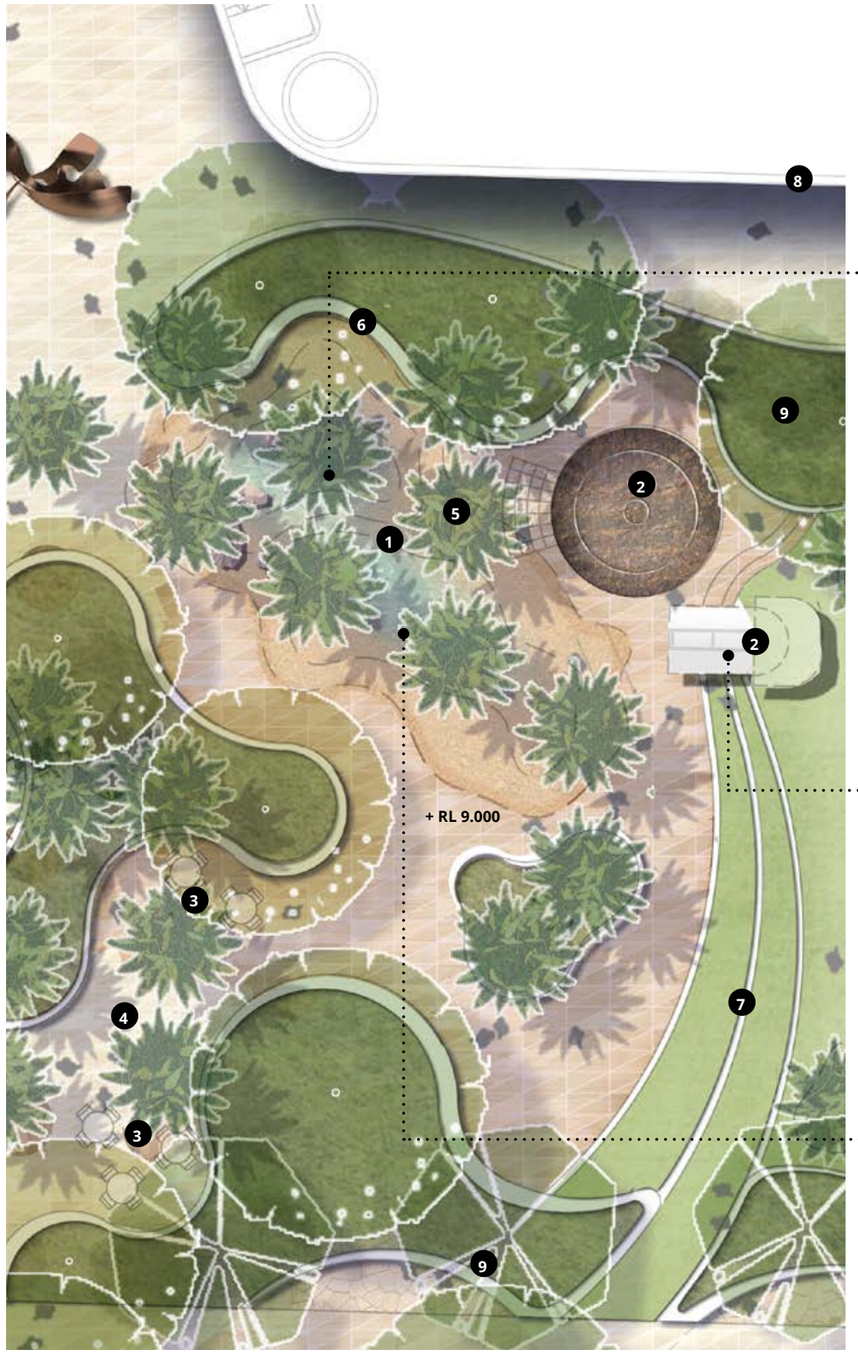
Water Play and Social Terrace

Beyond a playground itself, there is the intention to establish a public space for meeting and communication among the users. Additionally younger generations can rejoice at the variety of play opportunities integrated through the site.

Paying attention to details and the overall scale, it has to be comfortable for the smaller children. As for the landscape solutions, preference to natural materials and natural relief with higher play value should be at the forefront.

KEY

1. **WATER PLAY**
2. **CHILDREN PLAY**
3. **OUTDOOR FURNITURE**
4. **COMMUNITY PLAZA**
5. **TREE PIT**
6. **SEATING WALL**
7. **TERRACE TO LAWN**
8. **BREWERY ENTRY**
9. **BUFFER PLANTING**



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ARCADIA

Water Play and Social Terrace

Sectional Elevation

KEY

1. FOOTPATH
2. WATER PLAY
3. RAISED PLANTER BED
4. FEATURE PALM TREES
5. PLAY EQUIPMENT

1:200 @ A3 0 1 2 4 6 8m

ARCADIA

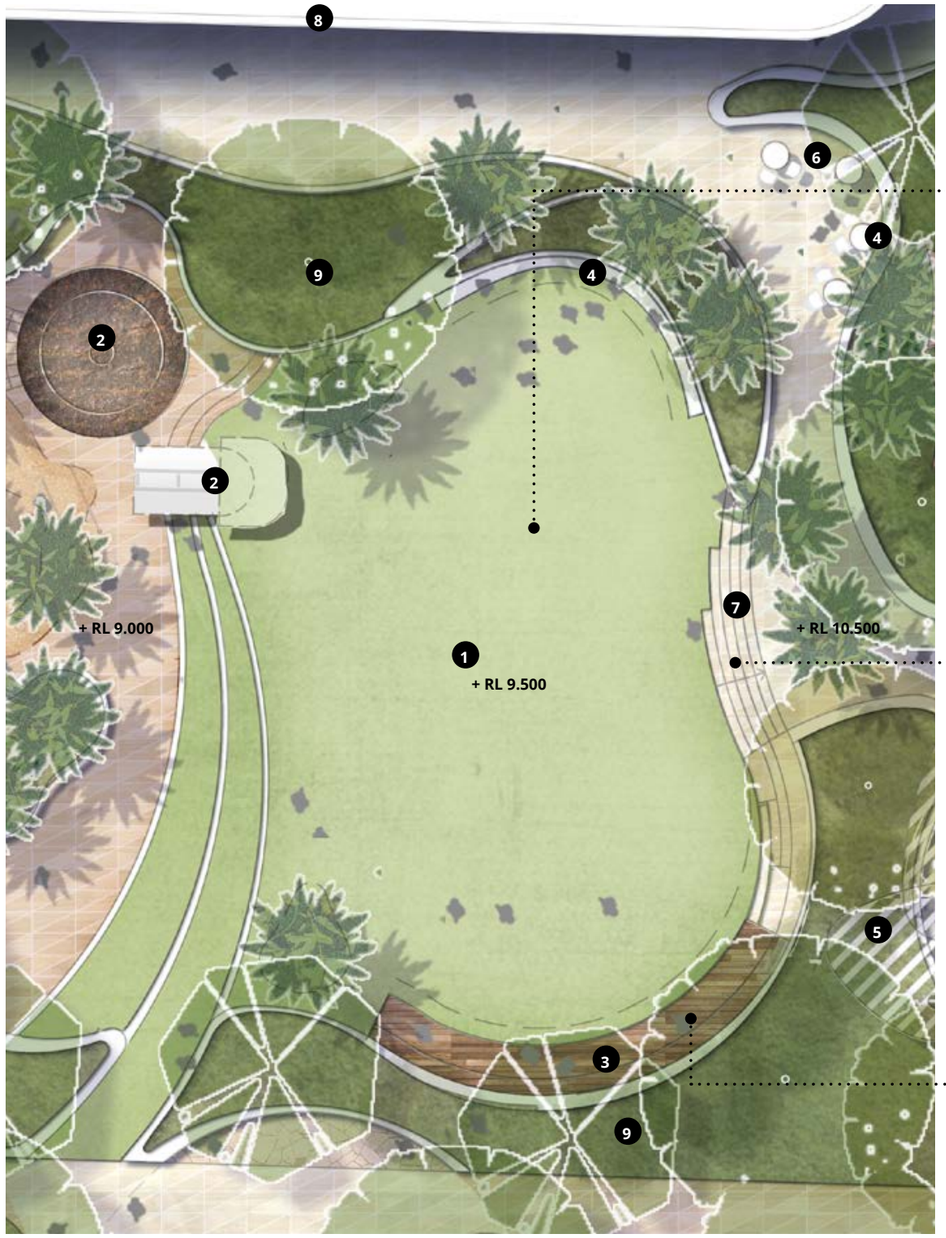
Detail Plan

Village Lawn

The village lawn is a central hub of the open space. Its flexibility and openness allow a variety of social activities and events. It provides opportunities for outdoor cinema, markets as well as daily congregation for the families, workers, dog walkers and other general users.

KEY

1. LAWN
2. CHILDREN'S PLAY
3. DAY BED
4. PLANTING BED WITH SEATING EDGE
5. SHADE STRUCTURE
6. SEATING
7. TERRACE TO EAT STREET
8. BREWERY ENTRY
9. BUFFER PLANTING



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ARCADIA

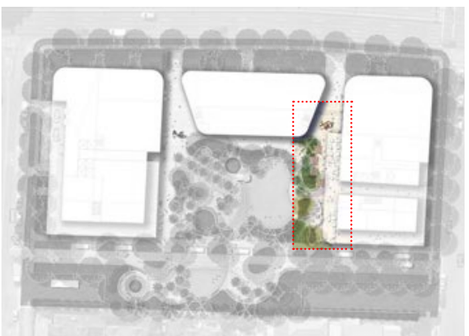
Detail Plan

Eat Street

Retail frontages and Alfresco dining within the site will attract a diverse group of users and bring revenue to the precinct. Elements of public art, lighting and way finding will facilitate a cosy, comfortable character - with similarities to other iconic Sydney laneways such as Steam Mill Lane and Kensington Street.

KEY

1. PUBLIC ART OPPORTUNITY
2. CONNECTION TO PARRAMATTA ROAD
3. UMBRELLAS
4. OUTDOOR DINING
5. SHADE STRUCTURE
6. PLANTER WITH SEATING EDGE
7. TERRACE TO LAWN TERRACE
8. POT PLANTING



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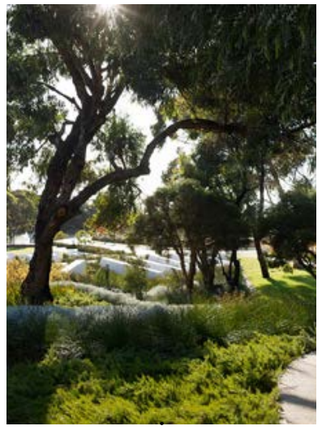
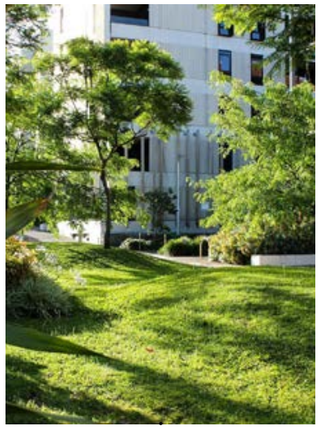
ARCADIA

Detail Plan
The Commons

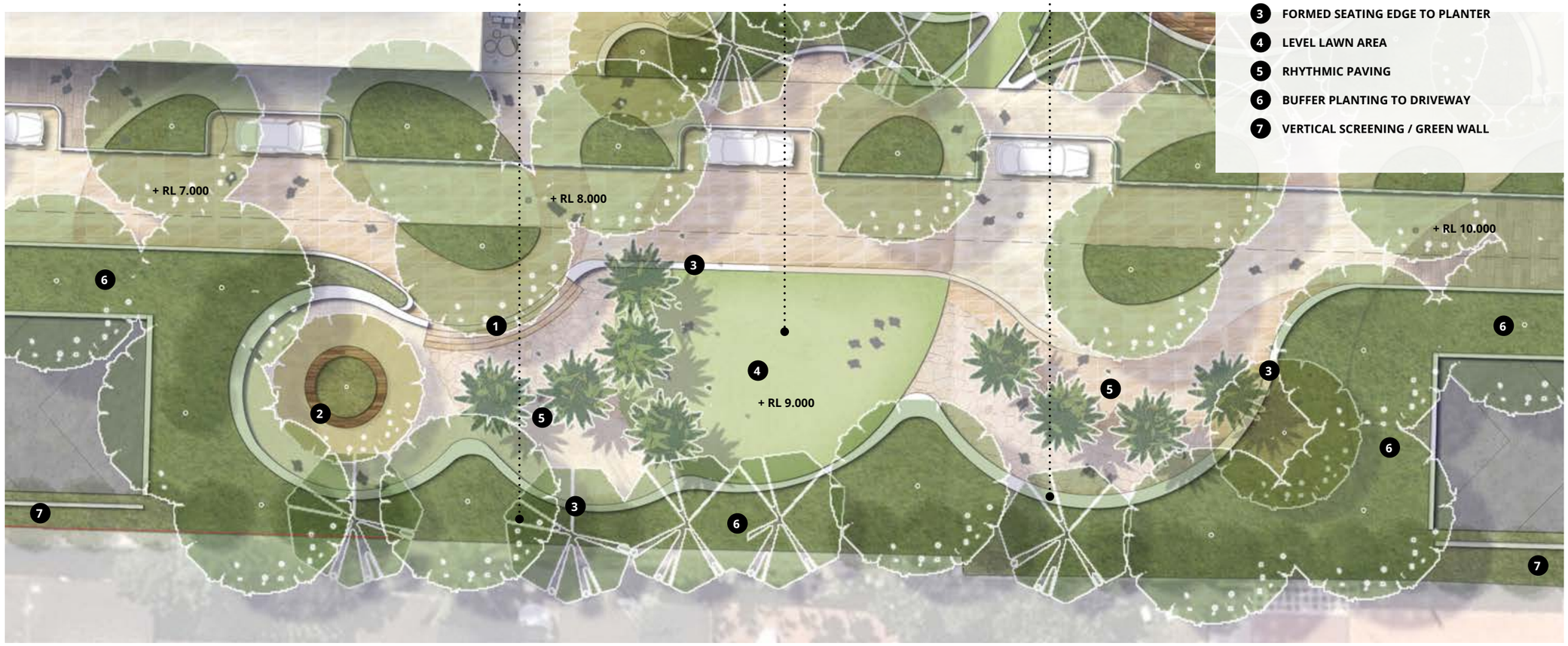
The Commons is an extension of the central green space. Complementary to the expansive landscaped zones of the Village Green and the Social Terrace, the Commons offers a mix of smaller, intimate spaces for residents and visitors to dwell in. Set in close proximity to F&B offerings, perch on the seated edge with a coffee and watch people passing by. A series of turfed and paved areas gently terraces to follow the natural level change across the site, however reamins accessible to everyone; offering a multitude of places for people to come to and stay.





KEY

1. STEPS UP TO THE COMMONS
2. FEATURE TREE AND SEATING
3. FORMED SEATING EDGE TO PLANTER
4. LEVEL LAWN AREA
5. RHYTHMIC PAVING
6. BUFFER PLANTING TO DRIVEWAY
7. VERTICAL SCREENING / GREEN WALL



1:200 @ A3 0 1 2 4 6 8m

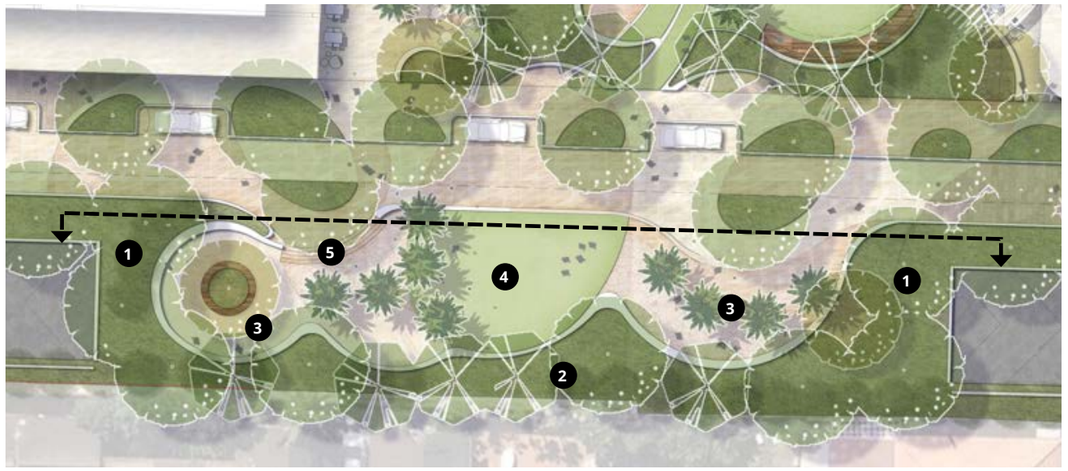
ARCADIA

The Commons

Sectional Elevation

KEY

1. BUFFER PLANTING TO DRIVEWAY
2. BUFFER PLANTING TO EXISTING NEIGHBOURING PROPERTIES
3. PAVED AREA WITH SEATING EDGE. FLEXIBLE GROUND PLANE.
4. LEVEL KICKABOUT LAWN COMPLEMENTARY TO VILLAGE LAWN
5. STEPS TO SHARED LANE



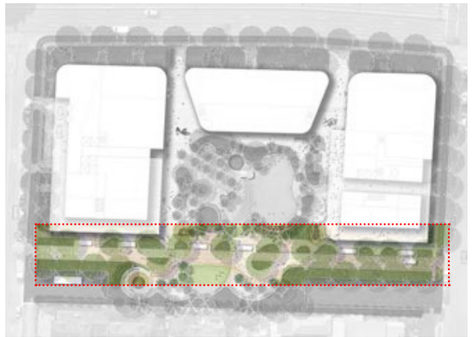
1:400 @ A3 0 0.5 1 2 3 4m

ARCADIA

Detail Plan

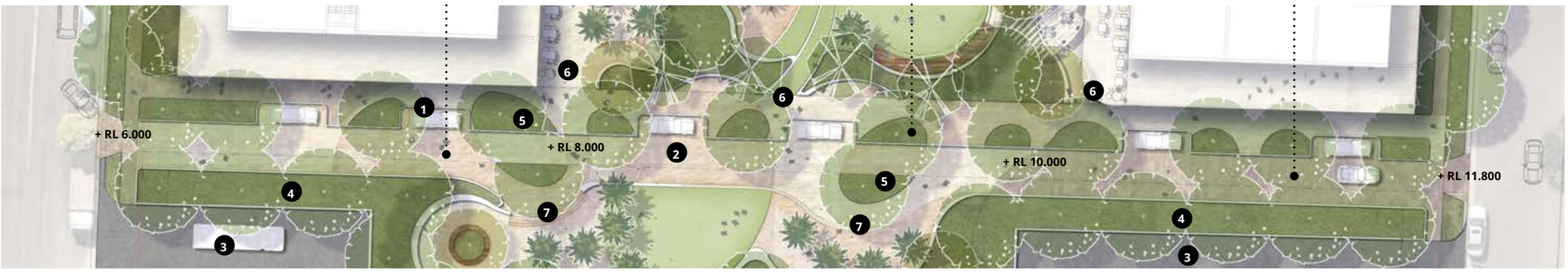
The Shareway

Adjacent to plaza space will be a shared street prioritising the movement of people with infiltration points into the laneways of the site. A vegetated setback with integrated seating will facilitate areas of rest. Landscaping and special threshold paving changes along the shareway, creating vital friction along road necessary to slow motorists down.



KEY

1. PARKING BAYS
2. ONE WAY SHAREWAY
3. DRIVEWAY INTO BASEMENT
4. BUFFER PLANTING
5. STREET TREE PLANTERS
6. CONNECTION TO CENTRAL SPACE
7. CONNECTION TO THE COMMONS



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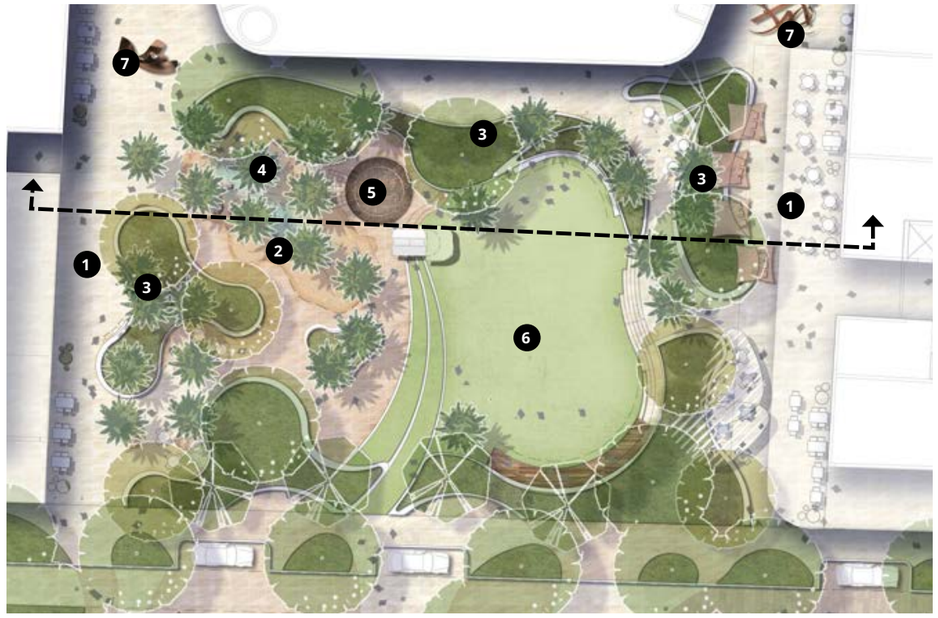
ARCADIA

Sitewide

Sectional Elevation



KEY

1. ALFRESCO
2. WATER PLAY
3. RAISED PLANTER BED
4. FEATURE PALM TREES
5. PLAY EQUIPMENT
6. CENTRAL LAWN
7. PUBLIC ART OPPORTUNITIES

1:400 @ A3 0 0.5 1 2 3 4m

ARCADIA

Planting Palette

Trees

Street Trees

Canopy Trees

Planting Palette

Shrubs and Understorey

Shrubs

Understorey

LHS - Croydon Public Art

We acknowledge the traditional owners of the lands and the surrounds, the Wangal.

We acknowledge and honour the Ancestors and Elders of the Past, We honour the Elders that are Present and Those emerging Elders of the Future.

We acknowledge the stories and their traditions, and we create with a blessing over the lands, Water, Sky and winds that surround with heart to ensure to create beautiful outcomes for generations to come.

Contents

01 Introduction 4
02 Vision 8
03 Guiding principles 10
04 The site 11
05 Thematic framework 15
06 Selection criteria 17
07 Potential Art Locations 18
08 Public Art Categories
09 Procurement & Implementation 19
10 Budget & Maintenance 21
11 Artist Brief 21
12 Conclusion 23

Attachment 4 - Public Art Plan

01 Introduction

As part of the LHS - Croydon project an integrated Public Art Strategy has been developed that outlines the strategic approach to delivering interpretative public art.

This strategy outlines the context and principles that underpin the delivery of interpretative public art, and offers a framework to ensure it authentically contributes to reflecting and celebrating the rich stories of the site, the surrounding area and its people.

This document sets out a detailed and action-oriented approach for planning, implementing and delivering high-quality interpretative public art throughout the site.

Collaboration is central to the development of the Public Art Strategy. This includes collaboration between the heritage consultant, public domain designers, artists, local communities and stakeholders. This will include working with artists to think broadly about location, context and opportunities for integration with heritage interpretation.

‘It’s a hard conversation, there’s going to be every type of emotion, anger, hurt and intergenerational trauma, even tears.

But it is a process, when you’re designing to ensure the healing voice comes through.’

Matt Fellingham
Artist -FCAD

DRAFT

Wangal Nura

Wangal - Nura / Nura meaning country

Wangal country is mostly located in the area known today as the "Inner West" of Sydney, centred around the council areas of the Municipality of Strathfield, Municipality of Burwood, City of Canada Bay and former Ashfield Council (now part of Inner West Council.

What is interpretive public art?

Interpretive public art contributes to the storytelling of a site, reflecting the meanings and relationships that arouse a deep connection between people and place.

Rather than simply stand alone without context, or designed as an element of beauty, interpretive public art authentically responds to the cultural heritage of the site.

It reflects the diversity of voices within the community and engages these diverse audiences through layered and relevant artwork that contributes significantly to the urban landscape.

The Croydon site development has been thoughtfully designed through co-design with heritage overlays. This contributes to the overall layering of Cultural Heritage Story-telling that will help create an inclusive, cultural and social precinct.

02 Vision

Our vision is to engage the community and tell relevant local stories through art and beautiful interpretative overlays, that evoke dialogue and create a sense of place and cultural legacy for years to come.

Objectives

To realise this vision, our objective is to develop an integrated approach to interpretive public art by;

01
Connecting with Indigenous concepts of place, being and knowing with reflection to the traditional owners of place, the Wangal

02
Challenging perceptions and enabling people to better understand the core character of the area they live/work and study in

03
Activating the site throughout the day and night

04
Providing a reflection of Croydon's unique history, natural environment and culturally diverse communities

05
Creating a memorable public space with moments of surprise and delight throughout

06
Delivering public art and interpretation that compliments the landscape, architecture and public domain

07
Attracting audiences with landmark public art that becomes the heart of Croydon a meeting place, a destination

03 Guiding principles

The five guiding principles below will ensure there is a balance between the site, it's historical significance, and the local identity. This approach ensures that experiences of varying engagement levels are offered to a wide ranging audience.

Authentic

Using and acknowledging traditional language for placemaking that honours Traditional owners, custodians and stewardship of Croydon the Wangal. Materiality throughout the site for built and natural forms, being centric to place to maximise narrative. Colour selection to reflect Ochres used by the Wangal in artwork and ceremonies honouring Culture and Customs. Place naming to be local and centric to the area / Totems in the landscaping

Honouring the importance of the Parramatta River

Inclusive

Ongoing engagement and facilitation throughout the design process to ensure an authentic approach for the built and natural forms. Creating with acknowledgement to elements .Collaborating with Aboriginal designers and collaborators to ensure empowerment of the local voice working with Local Land Council, Stakeholders, Traditional Owners and Knowledge Holders, with specific and centric knowledge to the area Ensuring that the knowledge shared is a privilege, and that the expertise of stake holders and knowledge holders will be held with respect, and will only be used for this site, as they're centric to the project, all being site specific.

Excellence

Creating excitement throughout the journey, ensuring that the built and natural form will be done in which curiosity and a shared learning experience can happen. The sharing of Aboriginal culture to entice visitors and residents from the surrounds to use the facilities, pathways, walkways and open gathering spaces created

Honour stories, narratives, artwork, song lines of the Traditional Owners, Stories tellers and Knowledge Holders .Integrate traditional site lines and song lines throughout the landscape that are in harmony with natural elements which are endemic to Wangal and cohesive to the surrounding areas

Resiliance

Connect to Country - leaving country better than we found her, healing through healing, achieved by using medicinal plants in landscape

Creating sustainable outcomes with environmental management and stewardship. Integrating water features and notions of the land pre colonisation, for healing and sustaining life .Culturally safe spaces within the site and landscape which are inclusive for all people regardless of age or capacity

Optimisation

Enhancing duality throughout the site – optimising shared knowledge and learning experience for all visitors.Welcoming a site that is safe for natural Fauna

- Emphasise the integrated relationship between the built and natural environment

- Recognition of the endemic species of flora centric to the site, and their healing properties, and their ability to sustain life for 80,000 years

04 The site

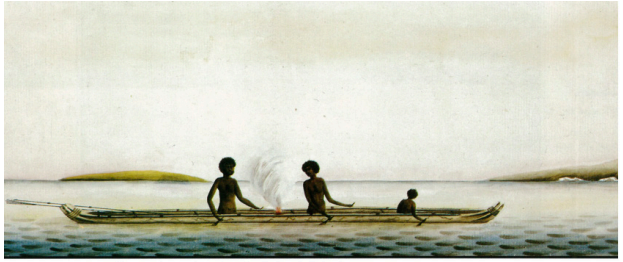
To ensure the interpretive public art responds to the site, it is important to understand the various factors that have shaped its development and surrounding area.

The Wangal were a clan of the Darug (sometimes spelt Dharug) tribe or language group. They called themselves the Eora, meaning 'the people'. The Wangal clan's territory is thought to have originally extended from Darling Harbour, around the Balmain Peninsula (including Goat Island (called Me-mel or Memill) almost to Parramatta in the west, the Parramatta River formed the northern boundary although it is uncertain how far south their land extended. The Wangal are believed to have occupied the area for over 20,000 years.
First contact was made with local Aboriginals of the Wangal Clan by Captain John Hunter who led an exploration of the Parramatta River. On 5 February 1788 while having breakfast he was met by Wangal at the location now referred to as Breakfast Point. The Wangal called the area Booridiow-ogule.
During the summer months, the Wangal gathered muchof their food from along the Parramatta River. The food consisted mainly of fish and shell fish and the remains of these meals, known as shell middens, may still be seen at Rodd Park (Rodd Point)

Traditional Owners, including the Wangal Peoples maintain a significant history with the Australian Continent and the Greater Sydney Area. Examples of such habituation include rock art circa 16,000 years old and radiocarbon and other dating methods that have been used to establish that Aboriginal Peoples have been present on the Australian continent for more than 60,000 years.

Early contact between the British and Wangal Peoples was recorded as early as 1788, when boats were tasked with surveying and charting present day Sydney Harbour and Parramatta River estuaries. Bennelong has rightly become the most recognised Aboriginal identity that was a member of the Wangal Peoples. Bennelong became the only member of the Wangal Peoples to travel overseas to England for a period of three years. Bennelong died in 1813 and was buried on private property on Wallumedegal Country in what is today known as Ryde. Bennelong Point was named in honour of Bennelong as does the Bennelong electorate.

The Wangal Peoples Country is believed to have originally extended from the present-day suburbs of Balmain, Birchgrove, and Leichardt in the East, to Silverwater, Homebush Bay, and Auburn in the West. Wangal Country was located West of the Gadigal to the East (Sydney CBD) and East of the Wategora to the West. On the Southern side of Wangal Country was Bediagal Country and on the Northern side of the Parramatta River were the Wallumedegal Peoples who inhabited the Northern side of the harbour.



A family and fire in a canoe.

05 Thematic Framework

Within a thematic framework, information can be organised so that the audience can easily understand what is being communicated. This guides artists and interpretive designers on the creation of artwork, providing direction on the potential social and historical context to work within. For an inclusive and holistic approach, artists may address any number of the below themes in the one artwork.

Geography

Croydon has a diverse landscape and unique biodiversity surrounding the river and life on it

First Peoples

Since time immemorial, this land has been loved and cared for by Aboriginal people. Croydon and the surrounding areas continues to be loved and cared for by Indigenous people from all across the 29 clan groups of Sydney.

Dreaming Stories

Stories that reflect, connect and talk to the local stories of the Wallumedegal and other clan groups with stories of places, space and context.

Natural Environment

Healing Country, and connecting with endemic fauna and flora, through language and art.

Diverse cultures

Whether a family has lived here for 3 years, 30 years, or for 65,000 years, all are part of the rich tapestry of Croydon's community and diversity.

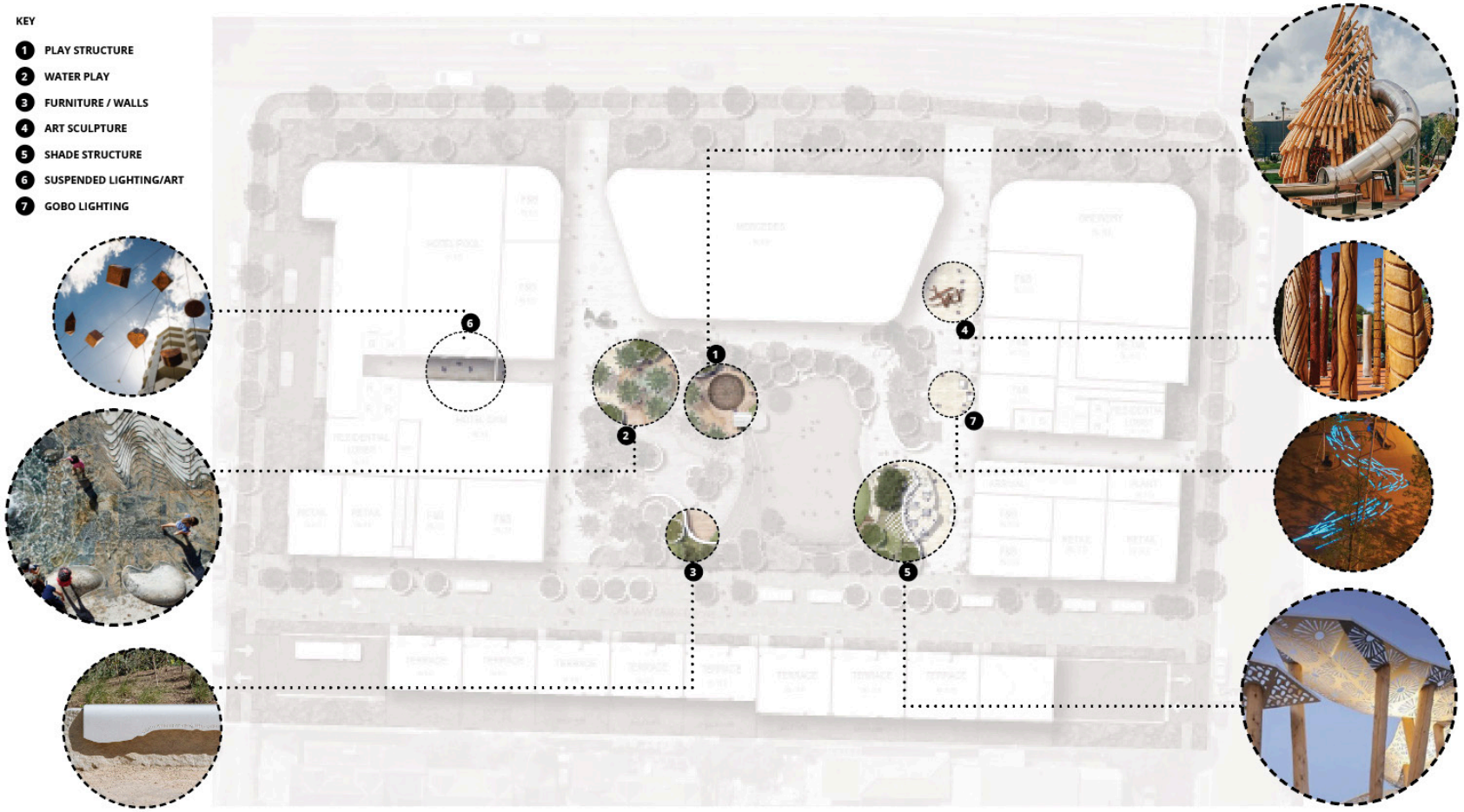
06 Selection Criteria

Evaluation and approval of all artworks will be based on the following criteria:

- Ability to compliment and enhance the existing proposed Aboriginal and non-Aboriginal interpretation within the landscape, as well as the proposed architectural design
- Relevance and appropriateness of the work to the context of its site
- Demonstrates through the artwork a grounded understanding of the site's significant cultural heritage layering over time
- Standards of excellence and innovation
- Integrity of the work
- The way in which people will experience, interpret and interact with the proposed artwork
- Consistency with current planning, heritage and environmental policies and Plans of Management
- Consideration of public safety and the public's access to and use of the public domain
- Consideration of maintenance and durability requirements

The commission, selection and acquisition of artworks will consider objective and desired outcome, budget, project scope, site limitations, technical requirements, consultation requirements, commissioning and project management process.

07 Potential Public Art Locations



08 Public Art Categories

Play

Artwork that excites, entices and activates the mind encouraging people through sensory play.

Art Sculpture

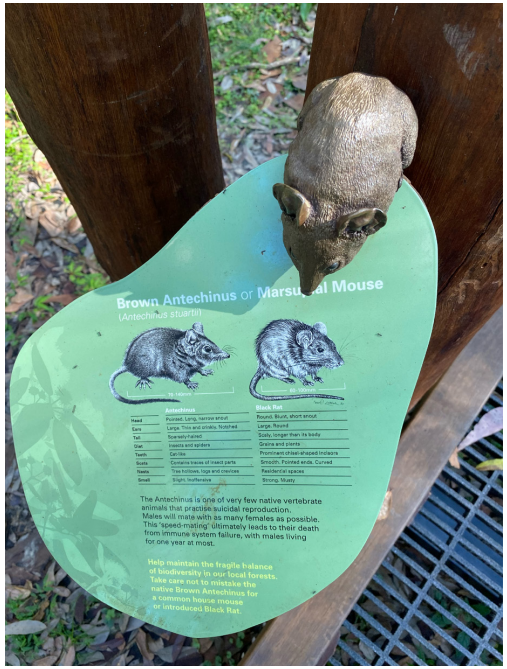
A site specific physical response to the context of site which enhances or provokes the visitor to understand its aspect through artist expression.

Lighting

Lighting can be used to illuminate and express different dimensions of a place that may not be visible during the day.

Educational

Educational art can be used as a medium to enrich understanding of a site by engaging visitors on a emotional and visual level without relying on spoken or written word.



Gobo / Digital

Digital media can be used to add another dimension through the use of projection, VR/AR and other digital overlays, allowing artwork to be dynamic and changeable.

Furnature and Walls

Art can be applied to functional objects which deepen the visitor engagement of the work through utility.

Water Play

09 Procurement & Implementation

To aid the selection of artist/s and artworks to be commissioned, FCAD will be a part of the team to design and implement the artwork

Once selected the artist/s will work with the Design team to undertake detailed design and the delivery of the work.

A selection criteria will be developed during the detailed design phase, but ideally should meet the below criteria:

- based locally where possible;
- representative of a mix of generations: emerging, mid-career and senior artists;
- representative of equity, diversity and inclusion;
- comfortable with the vision and principles of the project.

Artworks depicting Aboriginal story, motifs and/or themes are to be developed in collaboration with local Aboriginal knowledge holders.

Implementation

The design development of permanent public art work will take into consideration sustainability principles in their design, construction and ongoing maintenance. While the work will have a high visual impact in the public domain, it should be constructed to ensure that it requires minimal protection and maintenance.

10 Budget & Maintenance

Budget

The budget for the public art work in the proposed public LHS - Croydon is 0.5% of total construction cost. FCAD and LHS will continue to collaborate throughout construction stage.

Maintenance

Ongoing management of interpretive public art on the site will the responsibility of LHS -

Each artwork will be warranted to 10 years of use and foot traffic.

11 Artist Brief

The artist's brief will contain the following items:

- the site brief
- a thematic framework to respond to specific themes and subjects
- a maximum budget per artwork
- preferred materials, fabrication and installation requirements if this is relevant
- artist selection criteria
- moral rights
- project management information
- timeframes
- lifespan of artwork and maintenance

12 Conclusion

Together with the architecture and landscape, Aboriginal Co-Design and Heritage Interpretation, the Public Art will ensure the importance of the LHS - Croydon's site context and provide an exciting opportunity to connect with the existing cultural landscape of Croydon.

Interpretive public art is essential to tell the stories of people and place. It will provide an interesting, stimulating, accessible and holistic approach to storytelling, contributing to the overall visitor experience.

Interpretive public art will enhance the built form of Croydon and provide a sense of place that will provide a destination for visitors and residents to the site.

Interpretive public art throughout the LHS Croydon Site will provide;

- opportunity for Aboriginal artists to tell their stories and the importance and connection to the land
- locals and visitors with relevant art that will generate pride, ownership and a sense of belonging
- new audiences with a multi-layered and accessible approach to storytelling that engages people of all ages and backgrounds
- unique and engaging stories of people and place that evoke discussion
- attractive, safe and enjoyable spaces that are uniquely Wangal

FCAD

Fellingham Consultancy and Design

Social and Economic Impact Assessment and Community Needs Study

166-204 Parramatta Road, Croydon

Submitted to Burwood Council

Ethos Urban

Prepared by Ethos Urban
Submitted for LSH Property

22 May 2023 | 2200165

'Gura Bulga'
Liz Belanjee Cameron

'Gura Bulga' – translates to Warm Green Country. Representing New South Wales.

By using the green and blue colours to represent NSW, this painting unites the contrasting landscapes. The use of green symbolises tranquillity and health. The colour cyan, a greenish-blue, sparks feelings of calmness and reminds us of the importance of nature, while various shades of blue hues denote emotions of new beginnings and growth. The use of emerald green in this image speaks of place as a fluid moving topography of rhythmical connection, echoed by densely layered patterning and symbolic shapes which project the hypnotic vibrations of the earth, waterways and skies.

Ethos Urban acknowledges the Traditional Custodians of Country throughout Australia and recognises their continuing connection to land, waters and culture.

We acknowledge the Gadigal people, of the Eora Nation, the Traditional Custodians of the land where this document was prepared, and all peoples and nations from lands affected.

We pay our respects to their Elders past, present and emerging.

This report has been updated to reflect the latest design scheme and yields as of May 2023. All other figures and data remain as per the previous November 2022 version.

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This document has been prepared by:		**This document has been reviewed by:**	
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3.0 (FINAL – Update)	22/05/2023	SS/CB	LC/LC

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Contents

1.0 Introduction 9
1.1 Purpose of this report 9
1.2 Overview of this report 9

2.0 Site context and proposed development 10
2.1 Site location and context 10
2.2 Site description 10
2.3 Regional context 11
2.4 Proposed development 13

3.0 Strategic policy context 15
3.1 Key policy themes and drivers 15

4.0 Local social and economic context 18
4.1 Study Area definition 18
4.2 Resident profile 20
4.3 Population and age projections 21
4.4 Employment Projections 23
4.5 Tourism and accommodation trends 24
4.6 Local social infrastructure context 26
4.7 Public transport and access 26
4.8 Local social issues and trends 30
4.9 Community and stakeholder perspectives 34
4.10 Outcomes of LGA-wide consultation and research by Burwood Council 35

5.0 Community Needs Assessment 37
5.1 What is community infrastructure? 37
5.2 Supply 46
5.3 Demand 47
5.4 Gap analysis 47
5.5 Recommendations for community infrastructure on the site 51

6.0 Social Impact Assessment 52
6.1 Introduction 52
6.2 Assessment approach 52
6.3 Social assessment across key factors 53

7.0 Economic Impact Assessment 58

7.1 Introduction 58
7.2 Demand for the development 58
7.3 Economic Impacts 60
7.4 Economic benefits 62

8.0 Social and economic strategy and directions 66
8.1 Catalysing renewal and activation of the Parramatta Road Corridor to benefit current and future communities 66
8.2 Improving community infrastructure for local residents 67
8.3 Supporting local socio-economic development 67

Appendices

Appendix A Community Profile Summary 69

Table of figures

Figure 1 Site locational context 10
Figure 2 Existing development on site, looking east 11
Figure 3 Development to the west (Lucas Road) 11
Figure 4 Development to the north (Parramatta Road) 11
Figure 5 Site frontage, looking south (Parramatta Road) 11
Figure 6 Parramatta Road Corridor 12
Figure 7 Sydney Metro West 13
Figure 8 East-West Section of the Proposal 14
Figure 9 North-South Section of the Proposal 14
Figure 10 Study Area Map 19
Figure 11 Overnight visits – 3km catchment 25
Figure 12 Overnight visits spend in commercial accommodation – 3km catchment 25
Figure 14 Social infrastructure map (3km) 29
Figure 15 Artists' impression of a 'residential precinct' (TOGA) 32
Figure 16 Artists' impression of new Arts and Cultural Centre 47
Figure 17 Provision of open space 50
Figure 19 Proposed structure plan, displaying interfaces with surrounding areas 66
Figure 20 Artist's impression of the proposal's 'green heart' 67
Figure 21 Example of community makerspace 68

Table of tables

Table 1 Strategic policy drivers 15
Table 2 Top 5 countries of birth and languages spoken at home (other than English) 21
Table 3 Population Projections 22
Table 4 Age Projections – SSA 2022-2036 23
Table 5 Employment Forecasts (2022-2036) - SSA 24
Table 6 Local infrastructure 26
Table 7 District/regional infrastructure 26

Table 8 Local community infrastructure benchmarks 40
Table 9 Local infrastructure benchmarking table 48
Table 10 District/regional infrastructure benchmarking table 49
Table 11 Open space benchmarking matrix 49
Table 12 Summary of social impacts 53
Table 13 Construction Phase Economic Benefits ($2020/21) 63
Table 14 Ongoing Phase Economic Benefits ($2020/21) 63
Table 15 Estimated resident retail expenditure at full occupancy 64

Executive summary

Purpose and scope of this report

This report has been prepared for LSH Property Australia (LSH) and assesses the social and economic impacts and articulates the benefits and strategic directions for the Planning Proposal at 166-204 Parramatta Road, Croydon. The proposal relates to the redevelopment of the existing site into a mixed-use precinct supporting a mix of experiential uses that will establish a true live/work/play community. The initial concept refers to the inclusion of residential apartments, hotel, retail spaces (including food and dining), commercial offices spaces, services, health and wellness, and a Mercedes Benz experience centre.

The project vision is for the development of a vibrant, mixed-use precinct which will assist in the regeneration of the Parramatta Road corridor, stimulate the local economy, and contribute to the area's current social infrastructure, retail, and hospitality offering. The development would deliver this, along with residential apartments, a high-quality hotel, and commercial floorspace, in a highly accessible location, strategically positioned on a large site, fronting Parramatta Road and in proximity to the planned Burwood North Metro Station.

Site location and context

The site is located within a strategic position in the broader Sydney context, located between the Sydney CBD and Parramatta CBD, and close to the Burwood town centre. Importantly, the site is situated close to the future Sydney Metro West Burwood North Station, around 600m west of the site. Set to open in 2030, Sydney Metro West will transform this precinct and support new development within proximity to each station, including at Burwood.

The site is located at 166-204 Parramatta Road, Croydon, and within the Burwood LGA. Over recent years, Parramatta Road has experienced increased vehicular congestion, a degrading public realm, economic decline, a lack of coherent delivery to a strategy, and the undervaluing of placemaking.

The Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) has prescribed a number of new actions and considerations to regenerate Parramatta Road, establishing several precincts to transform the Corridor into an active community precinct. The proposal will contribute positively to the renewal of the Parramatta Road Corridor, acting as a catalyst for regeneration in the Kings Bay and Burwood-Croydon Precinct of this important Corridor.

Social and economic context – growth and change

Within 3km of the site, there is estimated to be 131,270 residents as of 2022. This resident population is forecast to increase to 155,770 by 2036, equating to +24,500 residents over the next 14 years. This represents a significant increase in demand, particularly for retail and community uses as well as new dwelling requirements.

Resident characteristics of the surrounding local areas including a predominately family orientated and more ethnically diverse population than the typical Greater Sydney average, with a higher Asian born population that speak languages other than English at home. Households are typically occupied by families, with or without children that predominately rent, with a smaller share of households owned outright. While the age profile is similar to the Greater Sydney benchmark, there is a significantly higher share of young adults aged between 18-34 years. This would indicate this population that would associate strongly with food and dining options and would seek out community facilities and vibrant destinations.

There is a wide range of social infrastructure located within the study areas, including open spaces, community facilities, sport and recreational facilities, childcare, healthcare, and educational institutions. However, there are limited spaces for cultural and creative activities.

Community needs for social and cultural infrastructure

Taking into account the community profile, forecast population, the current and planned supply of infrastructure and its' spatial distribution, the following infrastructure provision is recommended:

- **Multipurpose community space**, which can support the following uses:
  - General community use (i.e., meetings, programs, community bookings)
  - Creative and cultural use (i.e., makerspace, exhibition/event space)
  - Community health service delivery by the Local Health District.
- **Co-working space**, leasing available retail/commercial space to a co-working operator in order to account for the lack of equivalent space in the locality.

Social Impacts and benefits of the scheme

The key social benefits of the proposal include:

- Improved way of life for new residents, workers, and visitors, of the site, as well as the existing community, associated with a new mixed-use development providing community facilities, daily living needs, employment opportunities, and open space in close proximity to planned public transport infrastructure
- Enhanced surroundings associated with the delivery of public domain improvements and provision of amenity on Parramatta Road. It is noted that this has been a long-term state government priority
- Increased accessibility to new local open space. It is an aspiration of the local community to see increased green open spaces and recreational opportunities in Burwood LGA.

Potential negative social impacts of the proposal include:

- Significant changes to way of life, specifically for the low-density residential area immediately to the south. This may include moderate significant levels of increased traffic, noise, and minor overshadowing. It is noted that the proposed development complies with relevant development controls for overshadowing, and that sufficient mitigation measures will be employed to prevent adverse traffic impacts.

Economic Impacts and benefits of the scheme

The key economic impacts and benefits of the proposal include:

- Based on direct construction costs of approximately $284 million, the construction phase is expected to directly support employment 410 jobs years, and deliver a direct value add to the economy of $61.5 million. When the multipliers are taken into account, total state-wide value add to the economy over the construction period are to be; employment of 1,690 job-years and a direct value add to the economy of around $231.4 million.
- On completion, the proposal will support ongoing jobs estimated at 290 FTE direct jobs, contributing direct value added to the economy of $27.5 million per annum. Taking into account the multiplier effect, total ongoing economy-wide effects are estimated at; FTE employment of 440 jobs supported, and total direct value added to the economy of $47.4 million per annum.
- Taking into account the proposed mix of residential dwellings at the site, there is a potential for the site to accommodate some 500 residents once complete and fully occupied. These residents will support additional retail expenditure in the local economy of around +$7.9 million each year, directly benefitting local retail business and services.
- The site will act as catalyst for growth and renewal in this part of the Parramatta Road corridor and will contribute towards ongoing investment in the local area. The proposal will support government investment in the area by delivering much needed housing, visitor accommodation and retail facilities within close proximity to transport and respond positively to the needs of the local area.
- The economic impact assessment concluded that the proposal overall would result in a net benefit to the community, and will not impact on the viability or continued operation of any existing or proposed facility within the region.

Social and Economic Strategy and Directions

The development is strategically positioned to capitalise on the construction of Burwood North Metro Station. Development in proximity to public transport infrastructure supports policy direction for co-location and the "30-minute" city.

The proposed development seeks to catalyse the site in transforming the urban realm into an accessible live, work and play destination setting an exemplar for future development along Parramatta Road. The composition of the development has been sensitively considered in relation to the immediate suburban context in benefitting the community.

Key strategic directions for optimising social and economic benefits through the project include:

- **Catalysing renewal and activation of the Parramatta Road Corridor to benefit current and future communities** – the development will breathe new life into Parramatta Road, attracting further investment, and pedestrian activity.
- **Improving community infrastructure for local residents** – the development will meet local demand for additional facilities while contributing diverse new community offerings not currently available within the dilapidated Parramatta Road area of Croydon.
- **Supporting local socio-economic development** – the development will deliver new local job opportunities for current and future residents of the study areas while enhancing local vibrancy and the economy.

1.0 Introduction

1.1 Purpose of this report

This Social and Economic Impact Assessment and Community Needs Study has been prepared to support the Planning Proposal by LSH Property for the development of a new mixed-use community at 166-204 Parramatta Road, Croydon.

This report sets out the key drivers for this development from a social and economic perspective, aligned with relevant local, regional, and state-level strategic policy drivers. The report assesses the potential social and economic impacts and benefits associated with the project.

The proposal has the potential to be transformative and act as a catalyst for the renewal of the Parramatta Road Corridor, and to deliver significant social and economic value to the local and regional community.

1.2 Overview of this report

This report is structured as follows:

Section 1: Introduction

Section 2: Describes the site context and surrounding development

Section 3: Sets out the strategic policy context and state and local government guidance for desired land use outcomes

Section 4: Describe the social and economic context for the proposed development, including current and forecast population profile, employment estimates, tourism and accommodation trends, local social infrastructure context, and social and economic uses and trends of relevance to the proposal

Section 5: Provides a community needs assessment for the project

Section 6: Provides a social impact assessment of the operational phase of the proposed development, including in relation to the delivery of government and community priorities for the precinct

Section 7: Provides an economic impact assessment of the development, including market demand and economic impacts

Section 8: Sets out a social and economic strategy for the development to optimise social and economic benefits.

A note on COVID-19: *COVID-19 is an unprecedented global health crisis and economic event that is rapidly evolving. At the current time, the research and analysis of economic and population data – such as forecasts of population or employment growth and so on – reflects a return to "business as usual" scenario, while also noting the potential impacts that may be associated with the COVID-19 virus, travel and border restrictions impacting on migration numbers, and the anticipated return to growth in economic or population indicators.*

2.0 Site context and proposed development

2.1 Site location and context

The site is located at 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon, within the Burwood Local Government Area. The site has an extensive frontage to Parramatta Road, and is bound by Lucas Road and Cheltenham Rd (see **Figure 1**). The site is located approximately 1km from Burwood Station and Town Centre and 150m east of Concord Oval. Importantly, the site is approximately 600m east of the future Burwood North Metro Station and is located within the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) investigation area, specifically within the Kings Bay Precinct.

Figure 1 Site locational context

Source: Google maps, Ethos Urban

2.2 Site description

The site contains four separate strata allotments, and existing development on the site consists largely of vacant, unused land.

On 15 April 2018, development approval DA 89/2017 was granted by Burwood Council for the construction of a 4-storey car sales showroom, storage, and service facility at the site. The facility was to be operated by Mercedes-Benz. Accordingly, the majority of the site is currently vacant and excavated to basement level, with the exception of 1-1A Cheltenham Road which currently contains a single storey brick dwelling, as well as a warehouse that was previously operated by the Salvation Army.

To the south is residential development in the form of two storey townhouses with single detached dwellings beyond that; to the west across Lucas Road is a building equipment hire facility and to the north across Parramatta Road are car dealerships.

Images of the site and surrounding context are shown in **Figures 2 to 5**.

Figure 2 Existing development on site, looking east

Source: Client

Figure 3 Development to the west (Lucas Road)

Source: Ethos Urban

Figure 4 Development to the north (Parramatta Road)

Source: Ethos Urban

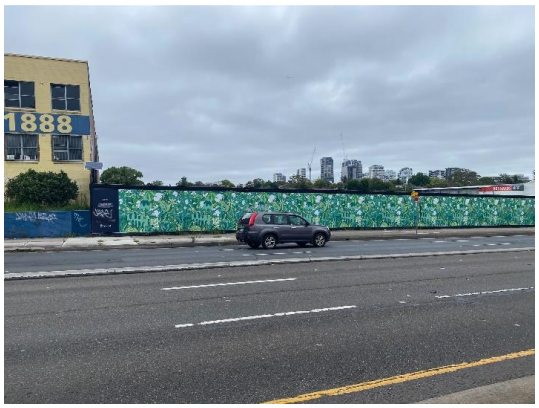


Figure 5 Site frontage, looking south (Parramatta Road)

Source: Ethos Urban

2.3 Regional context

A regional level, the site is strategically positioned around 12km east of Parramatta CBD, and 10km west of Sydney CBD; two major employment and activity centres that act as key social and economic centres regionally, and nationally. Other key surrounding centres of relevance to the site include Sydney Olympic Park and Strathfield to the west, and Burwood strategic centre to the south. Future rail infrastructure including Burwood North Metro Station as part of the Sydney Metro West project will enhance connectivity of the site to these centres.

Importantly, the site is situated within the PRCUTS investigation area; a 20km corridor extending from Granville to Camperdown. Parramatta Road is largely in a state of urban decay, characterised by severe traffic congestion, loud noise and low-quality dated business premises. Accordingly, any development at the site will positively contribute to the overall renewal of the corridor, and act as a catalyst for redevelopment.

2.3.1 Parramatta Road Corridor Urban Transformation Strategy

The site is situated within the Kings Bay Precinct, as defined by the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS). The PRCUTS was released in November 2016 and seeks to coordinate the renewal of land and neighbourhoods along Parramatta Road in the context of reduced congestion associated with the implementation of

the WestConnex transport project, which is expected to remove significant traffic volume, in particular heavy vehicles, from the corridor.

PRCUTS forecasts that Kings Bay Precinct will support some +5,200 new residents, including +2,500 new homes and +2,900 new jobs by 2050. The Strategy identifies the following vision for Kings Bay Precinct:

Kings Bay is envisaged as a new residential urban village with a Parramatta Road address. It will have a dense network of streets and an identity built on its proximity to Sydney Harbour

Of relevance to the site, PRCUTS notes that there are significant urban renewal opportunities for land immediately fronting Parramatta Road, and identifies the site as 'mixed use' in its vision. The plan also recognises that there is an opportunity in Kings Bay Precinct to capitalise on rapid transit, and that the amalgamation of sites in appropriate locations should be encouraged to promote opportunities for redevelopment.

A map of the Parramatta Road Corridor and associated precincts is shown in **Figure 6**.

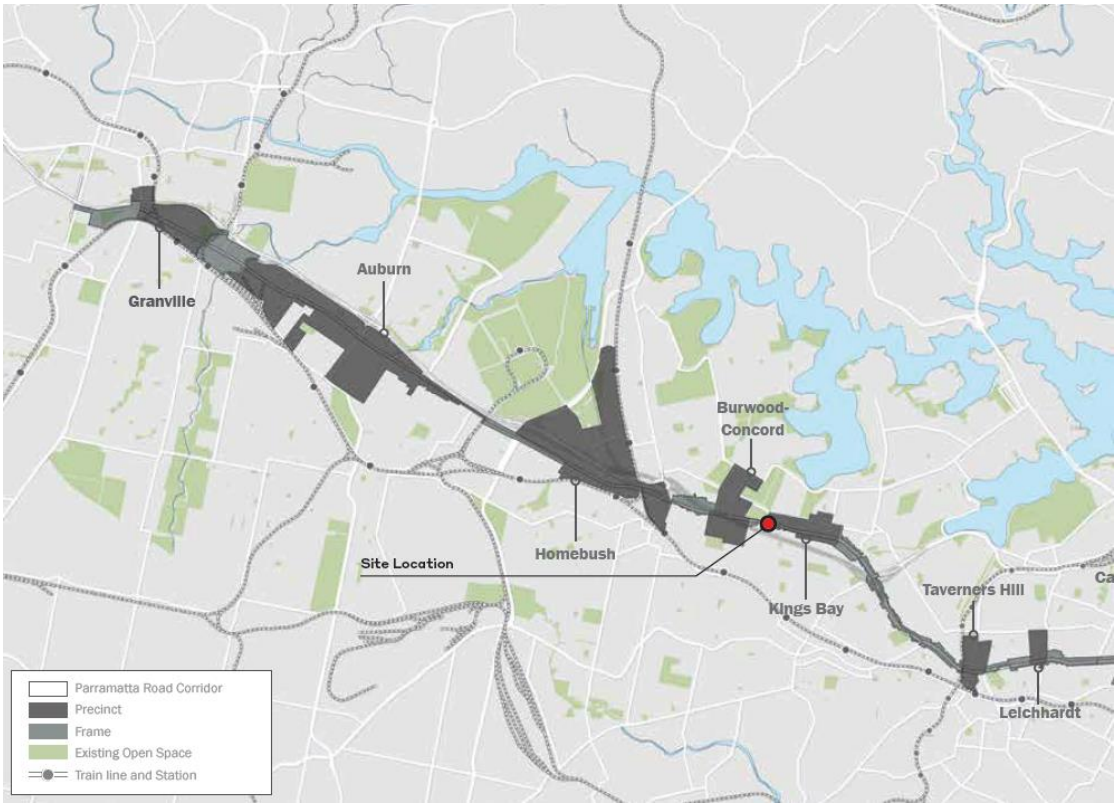


Figure 6 Parramatta Road Corridor

Source: PRCUTS, Ethos Urban

2.3.2 Sydney Metro West

The Sydney Metro West is a rapid transit railway connection being constructed between Sydney CBD and Westmead, with a station planned at Burwood North on the corner of Parramatta and Burwood Roads[1]. When completed, the route "will move more than 40,000 people an hour in each direction between Westmead and the Sydney CBD", cut road congestion on Parramatta and Victoria Roads, create over 80,000 direct and indirect jobs, and enable faster travel for commuters[2].

[1] https://www.sydneymetro.info/station/burwood-north-station
[2] https://www.sydneymetro.info/article/sydney-metro-west-first-environmental-impact-statement-released

Set to be opened in 2030, the Sydney Metro West will dramatically transform the precincts in which each station is situated. This is likely to drive further investment in these areas, as public transport connectivity allows for greater liveability for existing and prospective residents, and greater economic viability for businesses.

Figure 7 Sydney Metro West

Source: Sydney Metro/Ethos Urban

2.4 Proposed development

The Planning Proposal for the 166-204 Parramatta Road site relates to the proposed scheme prepared by Architectus for a visionary mixed use precinct featuring a large activated central space. Specifically, the proposal seeks a total GFA of 35,557m² and FSR of 3.4:1, and includes the following:

- 17,365m² of residential GFA, supporting 193 residential dwellings
- A mid to high end hotel at 12,841m² of GFA and 160 hotel keys, as well as a hotel restaurant and function facilities
- 3,362m² GFA of diverse retail uses including a supermarket, micro-brewery, and speciality retail including a strong focus on food and dining
- 1,197m² of flexible commercial GFA, including co-working spaces
- A Mercedes Benz Experience centre fronting Parramatta Road, at 719m² of GFA
- Designated flexible community and makers spaces at 97m² of GFA
- A large and activated central plaza and open space
- Through site connections to the southern part of the site.

Section drawings of the proposal are shown in **Figures 8 and 9**.

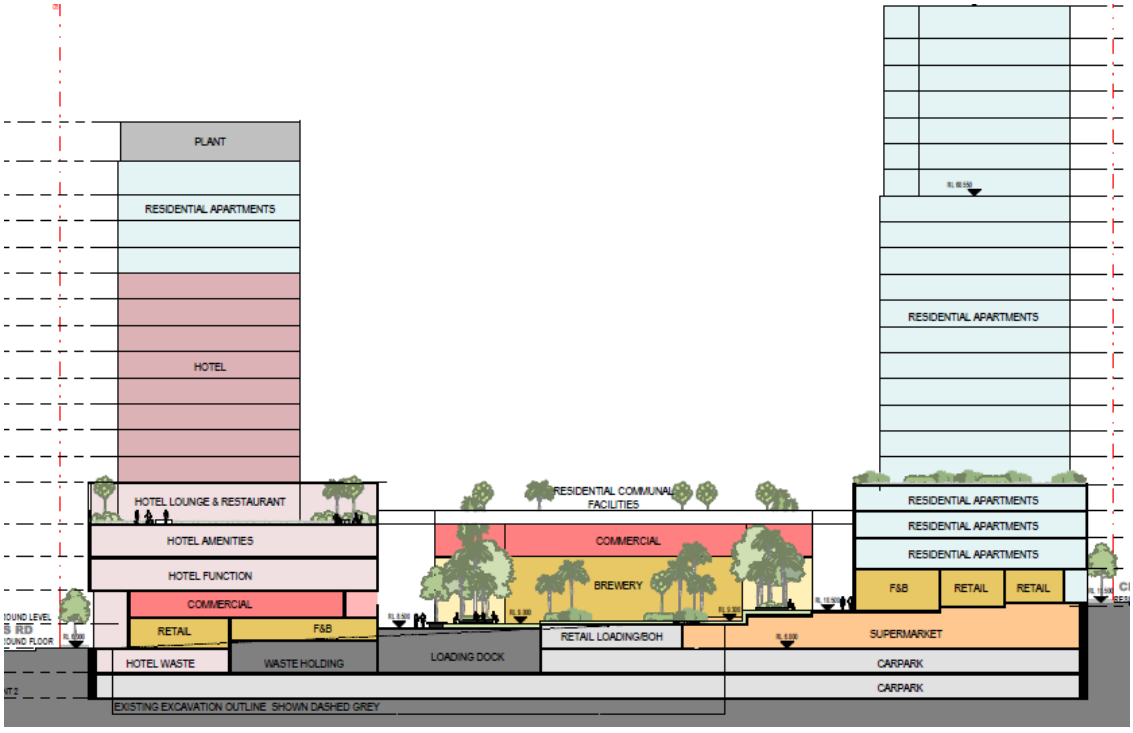


Figure 8 East-West Section of the Proposal

Source: Architectus

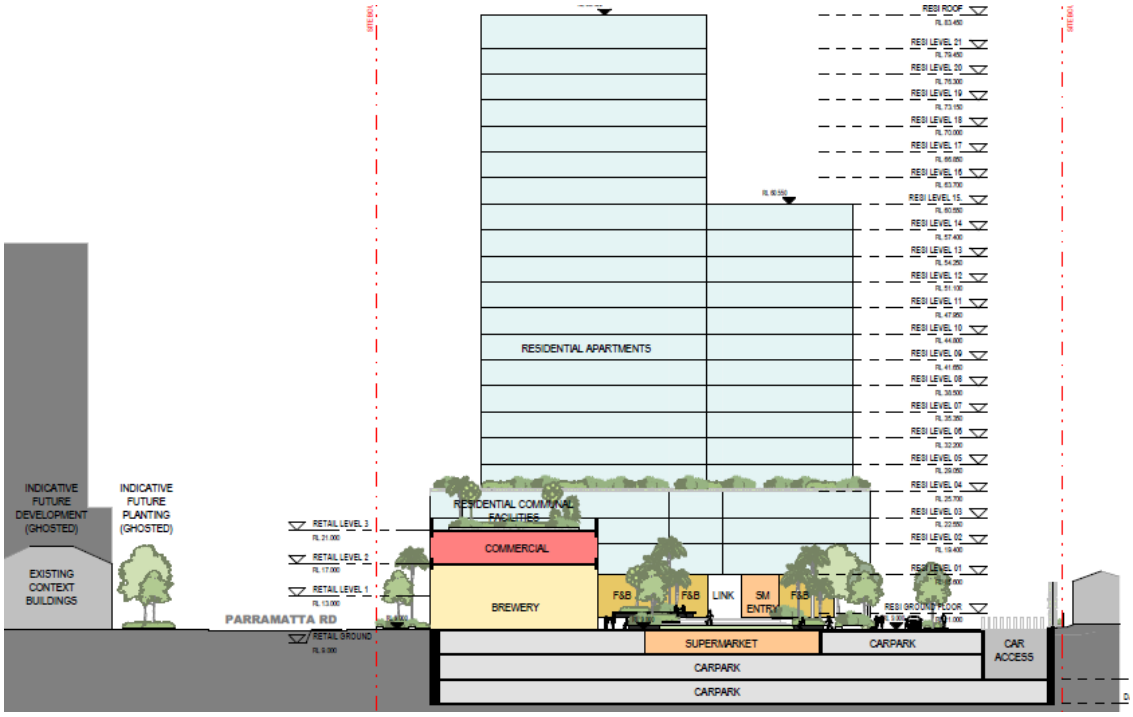


Figure 9 North-South Section of the Proposal

Source: Architectus

3.0 Strategic policy context

3.1 Key policy themes and drivers

The following section identifies the key social drivers for the site and project, based on a review of the key state and local government policies and strategies.

The following documents have been reviewed:

- *Premier's Priorities* (NSW Government, 2022)
- *State Environmental Planning Policy (SEPP) (Housing) 2021* (NSW Government, 2021)
- *NSW Housing Strategy* (NSW DPIE, 2021)
- *Greener Places* (NSW Government Architect, 2020)
- *The Greater Sydney Region Plan – A Metropolis of Three Cities* (Greater Sydney Commission, 2018)
- *Sydney 24-hour Economy Strategy* (Global NSW, 2020)
- *NSW Visitor Economy Strategy 2030* (Destination NSW, 2020)
- *The Eastern City District Plan* (Greater Sydney Commission, 2018)
- *Burwood Local Strategic Planning Statement* (Burwood Council, 2020)
- *Burwood Community Facilities and Open Space Strategy* (Cred for Burwood Council, 2019)
- *Burwood2036 Community Strategic Plan* (Burwood Council, 2022)
- *Burwood Cultural Plan* (Burwood Council, 2015)
- *Parramatta Road Corridor Urban Transformation Strategy* (NSW Government, 2016)
- *Parramatta Road Corridor Urban Transformation Urban Amenity Improvement Plan* (NSW Government, 2016)
- *Reclaiming Parramatta Road* (Committee for Sydney, 2020).

A summary of the key themes of this review is provided in **Table 1**.

Table 1 Strategic policy drivers

Local population growth and diversity/ Need for greater housing choice	• The population of Burwood LGA is expected to grow exponentially to reach 73,500 in 2036. "This means that over 32,000 more people will require housing, transport, schools, healthcare, services, leisure opportunities and green and open spaces" (Community Strategic Plan, pg. 10). • Burwood has a median age of 33 – a relatively young population compared to the rest of Greater Sydney. This can be contributed to a growth in high density dwellings, the young workforce (25-34) and tertiary students (18-24) population. It is expected that couples with children will become the primary household type in Burwood by 2036. • Burwood LGA contains a highly diverse population, with approximately 57% of residents born overseas. This statistic is even higher within Burwood town centre, where 80% of residents were born overseas. • The NSW Housing SEPP has established several principles for the planning and delivery of future housing: "enabling the development of diverse housing types, including purpose-built rental housing… ensuring new housing development provides residents with a reasonable level of amenity, promoting the planning and delivery of housing in locations where it will make good use of existing and planned infrastructure and services, minimising adverse climate and environmental impacts of new housing development, reinforcing the importance of designing housing in a way that reflects and enhances its locality…" (pg. 7). • It is a state priority to ensure access to housing diversity for all, regardless of where they live, which is well-connected to social	• *Burwood Local Strategic Planning Statement* (Burwood Council, 2020) • *Burwood 2036 Community Strategic Plan* (Burwood Council, 2022) • *State Environmental Planning Policy (SEPP) (Housing) 2021* (NSW Government, 2021) • *NSW Housing Strategy* (NSW DPIE, 2021)

	infrastructure, employment opportunities, public transport, essential services, and other daily living needs. Housing should be "designed to support human wellbeing and respond to the environment, maximise technology and support local character and place" (NSW Housing Strategy, pg. 8).	
Supporting the local economy and growth of tourism	• The objective of Global NSW's 24-hour Economy Strategy is to "create a 24-hour city that is renowned for its vibrancy, diversity, safety, and access to amenity right throughout the day and night" (pg. 5). This will involve the facilitation of dynamic night-time offerings, including hospitality venues, theatre, live music, nightclubs, food markets, performances, shopping, and sport events. It is a state priority to diversify night-time activities across Greater Sydney, and to support the growth of 24-hour hubs. • It is a state priority to establish NSW as the "premier visitor economy of the Asia Pacific" (NSW Visitor Economy Strategy, pg. 9) by 2030. This will involve investment in visitor economy infrastructure by the private sector, and the delivery of new sports, arts, cultural and event infrastructure. • The Parramatta Road is recognised as a key trade route and a valuable source of employment lands. It is necessary that growth areas within the Parramatta Road Corridor maintain a supply and diversity of employment land which attracts new businesses and investors, and which creates jobs to support a growing resident population.	• *Sydney 24-hour Economy Strategy* (Global NSW, 2020) • *NSW Visitor Economy Strategy 2030* (Destination NSW, 2020) • *Parramatta Road Corridor Urban Transformation Strategy* (NSW Government, 2016)
Higher density living generated demand for open and green space	• Burwood contains a high proportion of apartments (representing 33% of total dwellings) compared to Greater Sydney (23.7%) and is the LGA's primary dwelling type. In light of the LGA's increasing density, it is a local priority to ensure an adequate supply of open space and recreational facilities in proximity to residential development. "In high density neighbourhoods, public open space is used like a shared backyard, providing a green communal living space" (LSPS, pg. 51). • The Greater Sydney Commission recognises that high rise living "necessitates a reliance on public places to meet a range of activities…" (Eastern City District Plan, pg. 59). According to the Eastern City District Plan, "high density development should be located within 200 metres of open space… Open space in high density neighbourhoods needs to be durable, multi-purpose, and accessible to a variety of users" (pg. 112). • It is a Premier's Priority to "increase the proportion of homes in urban areas within 10 minutes' walk of quality green, open and public space by 10% by 2023". The NSW Government recognises the importance of access to these spaces for "health and wellbeing, environmental resilience and thriving local economies". • NSW Government Architect recognises the importance of green and open space for enhancing the quality of urban environments, stating that "green infrastructure is an essential asset which contributes to creating well-designed built environments which are healthy, responsive, integrated, equitable, and resilient" (Greener Places, pg. 14).	• *Burwood Local Strategic Planning Statement* (Burwood Council, 2020) • *Eastern City District Plan* (Greater Sydney Commission, 2018) • *Premier's Priorities* (NSW Government, 2022) • *Greener Places* (NSW Government Architect, 2020)
Local and regional priorities for social infrastructure	• It is a priority of Burwood Council to align the delivery of social infrastructure with projected population growth in order to deliver positive community outcomes. Council has identified demand for primary education facilities, health facilities (with an emphasis on CALD services), community facilities, and open space. • Burwood's Community Strategic Plan has identified community need for high quality social infrastructure which caters for the LGA's diverse population, including expanded library services and active and passive recreation opportunities. • It is an objective of the Burwood Cultural Plan to "increase the provision of cultural arts activities, programmes and opportunities for public art works and public art displays for the Burwood community". As such, Council will investigate opportunities to provide space for community artwork, enable community participation in creative and cultural output, and facilitate public cultural festivals.	• *Burwood Local Strategic Planning Statement* (Burwood Council, 2020) • *Burwood2036 Community Strategic Plan* (Burwood Council, 2022) • *Burwood Cultural Plan* (Burwood Council, 2015) • *Eastern City District Plan*

	• The Greater Sydney Commission encourages co-location of social infrastructure in order to optimise community usage, enhance accessibility, and promote active transport. • It is a regional priority to strengthen Burwood's sense of place by improving the quality of its public spaces. The diversification of night-time economy offerings is also prioritised in regional strategy, particularly within the Parramatta Road Corridor. • Burwood Council's Community Facilities and Open Space Strategy has highlighted a lack of arts and cultural facilities in Burwood LGA. There is also demand for additional general community floorspace, library floorspace, indoor recreation space, outdoor multipurpose courts, outdoor fitness stations, and local parks.	(Greater Sydney Commission, 2018) • *Burwood Community Facilities and Open Space Strategy* (Cred for Burwood Council, 2019)
Transformation of Parramatta Road Corridor	• It is a state priority to transform the Paramatta Road Corridor into "a high-quality multi-use corridor with improved transport choices, better amenity and balanced growth of housing and jobs... At present the Corridor is synonymous with urban decay, partly attributed to the high traffic volumes along Parramatta Road but also to the lack of a coherent corridor planning and delivery strategy" (Urban Amenity Improvement Plan, pg. 5-6). • The site is located within the Kings Bay Precinct, as identified by the Parramatta Road Corridor Urban Transformation Strategy, with a target of 5,200 new residents, 2,500 new homes, and 2,900 new jobs by 2050. The strategy establishes a need to facilitate a mix of uses on both sides of the Parramatta Road, provide new open space, and create additional pedestrian connections. • The Committee for Sydney's report on Parramatta Road has established several recommendations for the renewal of the corridor. The report recommends increased tree canopy and street furniture, creation of pedestrian plazas, and enhanced placemaking. There is also a need to activate building frontages on Parramatta Road to encourage pedestrian traffic.	• *Parramatta Road Corridor Urban Transformation Urban Amenity Improvement Plan* (NSW Government, 2016) • *Parramatta Road Corridor Urban Transformation Strategy* (NSW Government, 2016) • *Reclaiming Parramatta Road* (Committee for Sydney, 2020)
Facilitating a '30-minute city'	• It is a regional priority to facilitate a '30-minute city' in which residents can access employment, education, healthcare, open space, and other places of interest within 30 minutes of their homes. • Over 80% of Burwood's residents travel outside of the LGA for work. Burwood Council is in the process of developing a local employment and investment strategy. As such, it is a local priority to increase the availability of employment floorspace within commercial centres. • The planned delivery of the Burwood North Metro Station at the corner of Burwood and Parramatta Roads will provide fast and reliable transport links across the Sydney region for Burwood's community. As such, it is a local priority to develop active transport routes to and from key transport hubs and commercial centres.	• *The Greater Sydney Region Plan – A Metropolis of Three Cities* (Greater Sydney Commission, 2018) • *Burwood Local Strategic Planning Statement* (Burwood Council, 2020)

Source: Ethos Urban

4.0 Local social and economic context

This section provides an overview of the site and its current and forecast social and economic context. It analyses the social and economic characteristics of the local and regional community within the identified study areas to better understand the need and potential impacts of the project.

4.1 Study Area definition

For the purposes of this social and economic assessment, multiple study areas have been chosen in order to analyse the resident and worker populations of both the surrounding local and regional area. The chosen study areas have been defined using ABS Statistical Area One (SA1) boundaries that best align with a 1km and 3km radius from the site at 166-204 Parramatta Road, Croydon.

A Primary Study Area (PSA) has been defined to represent resident living within 1km of the site, while a Secondary Study Area (SSA) reflects those living and working within 3km of the site. These areas are considered of most relevance in assessing potential impacts of the project both during construction and the operational phases of the development.

The Study Areas have been defined having regard for the location of competing centres (existing and planned), community facilities as well as the surrounding road and pedestrian network, which influences accessibility to the site. The identified Study Area boundaries that reflect 1km and 3km catchments are illustrated in **Figure 10** below.

Through much of the analysis, demographic data is compared to the Greater Sydney region. Demographic data has been primarily sourced from the ABS Census of Population and Housing 2021, while population and employment estimates have been sourced with reference to projections prepared by Transport for NSW, and the NSW DPE.

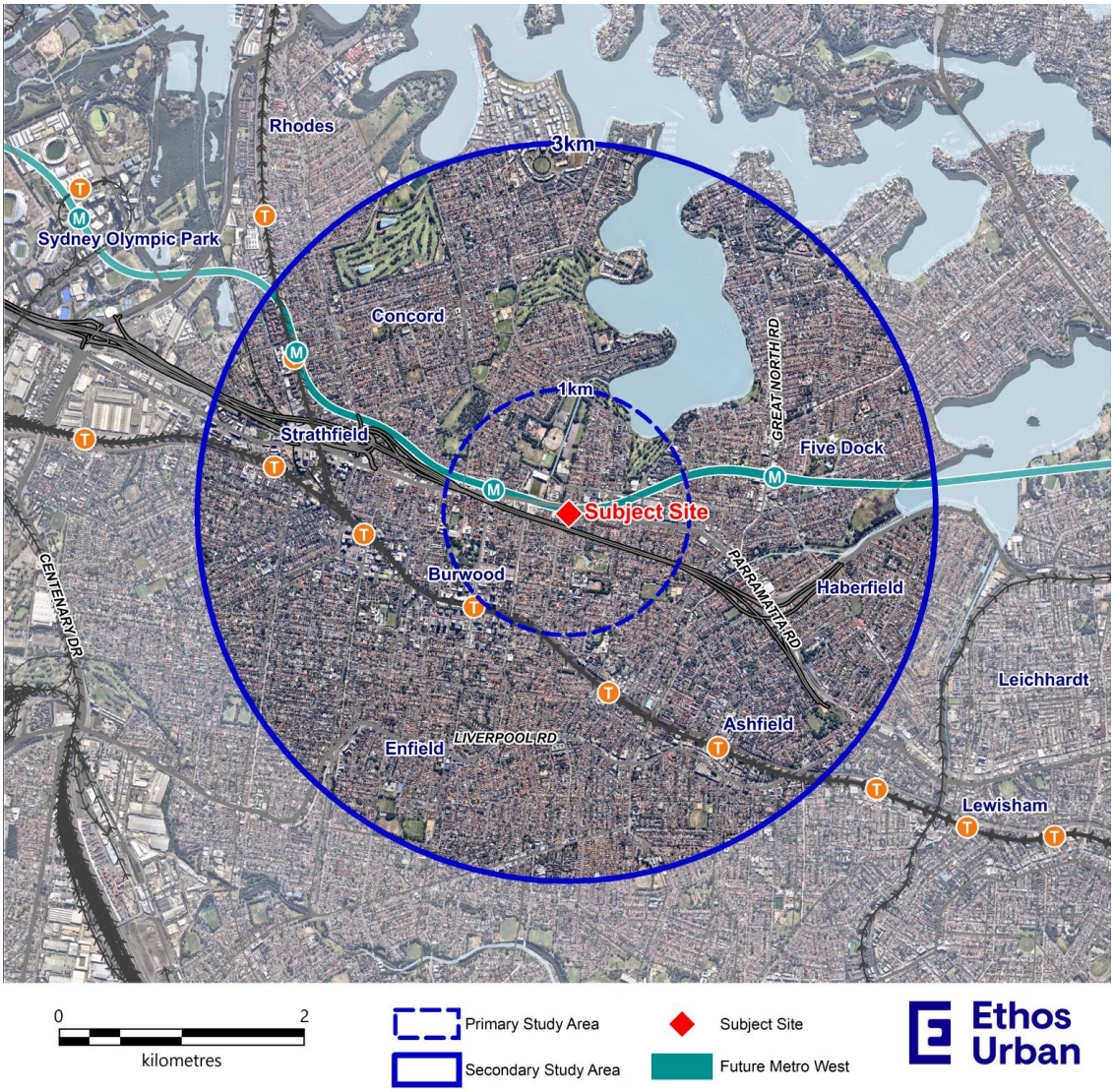


Figure 10 Study Area Map

Source: Nearmap, Mapinfo, Ethos Urban

4.2 Resident profile

This section provides a detailed summary of the resident population characteristics of the identified Study Areas. Demographic data has been drawn from the ABS Census of Population and Housing 2021 results. The data analysis provides a general overview of the demographic characteristics of residents within the Study Areas and is compared to the Greater Sydney benchmark.

Key demographic characteristics of the PSA and SSA include:

- **Age structure**: The median age of the PSA is 36.9 years, marginally lower than Greater Sydney at 37.3. In the PSA the resident population includes a higher proportion of residents aged 18-24 years, at around 31%, compared to 24.4% in Greater Sydney. The share of children aged below 18 years accounts for 15.3% of the resident population in the PSA, and 16.2% in the SSA, lower than Greater Sydney at 21.9%.
- **Country of birth and languages spoken at home**: The study areas are culturally and linguistically diverse, with some 55.9% of PSA and 49.4% of SSA residents overseas born, compared to Greater Sydney at 31.8%. Accordingly, a high proportion of residents speak languages other than English at home, as high as 61% in the PSA, compared to 39% in Greater Sydney overall. This includes around 28.8% of PSA residents speaking Chinese languages (Mandarin or Cantonese) at home, as well as a high proportion of residents speaking Nepali (5.8%) and Italian (5.0%).
- **First Nations residents**: Some 0.5% of SSA residents identify as being of Aboriginal or Torres Strait Islander descent. This is lower than the share of First Nations residents in Greater Sydney at 1.8% of the population.
- **Income**: PSA residents earn an annual median household income of $99,730, whilst SSA residents earn an annual median household income of $109,620. This is, -8.3% lower and +0.8% higher than the annual median household income of Greater Sydney at $108,750.
- **Household Composition**: Dwellings within the PSA are largely occupied family households (66.3%) and likewise in the SSA (67.9%). This is lower compared to the Greater Sydney benchmark of 72.6%. Of family households in the PSA and SSA, around 40% are occupied by couple or single parent families with children, which is lower than the Greater Sydney benchmark of 47.0%. Other household compositions in the PSA including lone persons (25.0%) and group households (8.7%) are prominent compared to Greater Sydney where 23.3% of households are occupied by lone persons, and 4.1% are group households.
- **Dwelling Structure**: Some 49.2% of PSA dwellings are flats, units or apartments, 35.9% are separate houses, and 14.7% are semi-detached or terrace houses. The share of flats, units or apartments in the PSA is comparatively higher to Greater Sydney at 30.7% of dwellings. Overall, the is a more diverse housing mix in both the PSA and SSA compared to Greater Sydney.
- **Tenure type**: Within the PSA 49.7% of dwellings are either owned outright or with a mortgage, while 48.5% are rented. These results are similar in the SSA where 55.5% of dwellings are owned outright or with a mortgage, and 42.9% are rented. Comparatively, the Study Areas each have a higher proportion of rented dwellings compared to Greater Sydney at 36.1%.
- **Housing costs**: Housing costs are generally higher within the PSA and SSA when compared to that of Greater Sydney. PSA median monthly mortgage repayments are $2,778, which is +10.7% higher than Greater Sydney median repayments. The SSA's median monthly mortgage repayments are $2,759, which is +9.9% higher than Greater Sydney median repayments.
- **Education**: Some 27.7% of PSA residents, and 26.8% of SSA residents attend an educational institution. This compares to the share of residents in Greater Sydney attending education at 25.8%. Of those attending education in each study area, around 31% attend a university or other tertiary institution.

A review of key changes in the Study Area demographic profile can be undertaken by investigating trends which have occurred between the 2016 and 2021 Census. Key findings include:

- **Household incomes have increased:** Between 2016 and 2021, annual household income within the study area increased by +$14,690. However, lower than the overall growth in Greater Sydney at +$16,550
- **Less couples with children, more lone person households**. The PSA has seen a decline of -3.7% in couples with children since 2016, while the share of lone person households has increased by +3.0%, By comparison that share of lone persons in Greater Sydney increased by +1.6%.
- **More apartments**: The share of flats, units or apartments in the PSA has increased by +9.7%, while the share of separate houses has declined by -5.4%. By comparison, the share of apartments has increased by only +2.5% in Greater Sydney within the same time frame.

- **More dwellings are being rented**. The share of rented dwellings in the PSA has increased by +6.1%, compared to the overall increase of rented dwellings in Greater Sydney of +1.1%.
- **More residents require assistance with everyday living**: The share of PSA residents needing assistance increased by +4.0%, from 2.2% of the resident population in 2016, to 6.2% in 2021.

The above demographic data shows that the resident population of the Study Areas are predominately family orientated and more ethnically diverse than the typical Greater Sydney average, with a higher Asian born population that speak languages other than English at home. Households are typically occupied by families, with or without children that predominately rent, with a smaller share of households owned outright. While the age profile is similar to the Greater Sydney benchmark, there is a significantly higher share of young adults aged between 18-34 years. This would indicate this population that would associate strongly with food and dining options and would seek out community facilities and vibrant destinations.

It is our view that interpretation of small area data from the 2021 ABS Census – that is any geography smaller than a State - should have due consideration for potential outcomes arising from the COVID-19 pandemic. For example, at a small area level trend analysis relative to 2011 and 2016 Censuses should be treated with some degree of caution, as potential changes in demographics/behaviour may reflect temporary rather than structural changes as a result of COVID-19.

Table 2 Top 5 countries of birth and languages spoken at home (other than English)

Top 5 Countries of Birth	PSA	SSA	Greater Sydney
1	Australia (44.1%)	Australia (50.6%)	Australia (61.1%)
2	China (19.0%)	China (11.9%)	China (4.9%)
3	Nepal (6.1%)	Nepal (6.1%)	India (3.8%)
4	Italy (3.5%)	India (4.2%)	England (3.1%)
5	Vietnam (2.9%)	Italy (3.6%)	Vietnam (1.9%)
Top 5 Languages Spoken at home (other than English)	**PSA**	**SSA**	**Greater Sydney**
1	Mandarin (20.8%)	Mandarin (12.7%)	Mandarin (5.3%)
2	Cantonese (8.0%)	Cantonese (5.9%)	Arabic (4.4%)
3	Nepali (5.8%)	Nepali (5.8%)	Cantonese (2.9%)
4	Italian (5.0%)	Italian (5.3%)	Vietnamese (2.3%)
5	Arabic (3.2%)	Korean (3.1%)	Hindi (1.5%)

Source: ABS Census of Population and Housing 2021

4.3 Population and age projections

4.3.1 Resident population forecasts

Resident population projections have been prepared using the latest official projections from the NSW DPE and rebased to account for the latest ABS population estimates. An examination of historic trends, recent building approvals data and future developments have also been considered. These projections also factor in the likely impact on population growth over the short term as a result of the COVID-19 pandemic and border closures in recent years.

For the purposes of this analysis, the population forecasts reflect ongoing and proposed development activity within proximity to the site, including major project of significance such as:

- Burwood North Precinct: A 26 hectare site earmarked to support a maximum of 3,500 dwellings.
- Kings Bay Precinct: A significant renewal site on the north side of Parramatta Road, which proposed up to 2,800 new dwellings.

Due to the uncertainty around timing and the scale of these major projects, it is assumed that by 2036 they are collectively two thirds complete. The projections also factor in population uplift the proposed development.

A detailed summary of population projections are presented in **Table 3**, and the key findings include:

- In 2022, the 1km catchment had an estimated resident population of 12,900 and is forecast to increase to 25,450 by 2036, reflecting an additional +12,550 residents over the next 14 years. This growth equates to an average annual increase of +896, at an average rate of 5.0% per annum.
- The 3km catchment has an ERP of 131,270 residents as of 2022. The resident population is forecast to increase to some 155,770 persons by 2036, increasing at an average annual rate of 1.2% or +1,750 persons each year.
- Over the 2022-2036 period, all study areas forecast an average annual growth rate higher than the Greater Sydney forecast of +1.1% per annum. This highlights relatively strong population growth in this part of Sydney.

Population growth within the local and regional area will further enhance the need for a range of retail services, community infrastructure, and residential housing to support the needs of a growing population.

Table 3 Population Projections

Population	2016	2022	2026	2031	2036	Change (2022 to 2036)
1km catchment	12,700	12,900	13,500	17,400	25,450	+12,550
3km catchment	132,130	131,270	133,770	140,470	155,770	+24,500
Greater Sydney	5,024,920	5,249,190	5,434,090	5,763,150	6,097,400	+848,210
Annual Growth (no.)		**2016-22**	**2022-26**	**2026-31**	**2031-36**	**2022-2036**
1km catchment		33	150	780	1,610	+896
3km catchment		-143	625	1,340	3,060	+1,750
Greater Sydney		37,378	46,224	65,812	+66,850	+60,586
Annual Growth Rate (%)		**2016-22**	**2022-26**	**2026-31**	**2031-36**	**2022-2036**
1km catchment		0.3%	1.1%	5.2%	7.9%	5.0%
3km catchment		-0.1%	0.5%	1.0%	2.1%	1.2%
Greater Sydney		0.7%	0.9%	1.2%	1.1%	1.1%

Source: NSW DPE, ABS 2022

4.3.2 Resident age forecasts

Age projections have been prepared with reference to NSW DPE Population Projections, and rebased to reflect the latest ABS Census of Population and Housing 2021 age breakdown. A breakdown of population by age is provided in **Table 4**.

The projections show that the study areas are largely characterised by a young population, including young adults and families with or without children. However, the needs of these residents must be balanced with an ageing population, with the number of elderly residents also expected to increase over the projected period. Key findings from the age projections for the SSA include the following:

- In 2022, the largest age cohort in the SSA included persons aged 35-49 years, accounting for some 26,290 residents or 20.0% of the total resident population. This age cohort is forecast to increase by some +4,560 residents by 2036. The growth of this cohort is often associated with an increase in young families with or without children moving into the area.

- Younger adult aged cohorts such as 25-34 years also represent a significant portion of the resident population, where in 2022 this aged group accounted for 19.5% of the resident population at 25,590 residents. This age cohort is forecast to increase by estimated +1,550 by 2036
- Children and adolescents aged 18 years and below together account for some 16.2% of the current 2022 population at 21,320 people. The number of residents in this age group is forecast to increase to 22,610 by 2036, with a slight decrease of the population share to 14.5%.
- Residents aged 70 years and over represent a smaller component of the SSA population, at just 11.6%, equating to some 15,160 residents. This age group is forecast to increasing significantly by 2036, to some 24,820 residents, representing a population increase of around 64% over the period.

Table 4 Age Projections – SSA 2022-2036

	2022		2026		2036		Change 2022-2306
	No.	%	No.	%	No.	%	
0-04	5,790	4.4%	5,740	4.3%	5,950	3.8%	+160
5-11	8,380	6.4%	8,170	6.1%	8,670	5.6%	+290
12-17	7,150	5.4%	7,450	5.6%	7,990	5.1%	+840
18-24 years	15,180	11.6%	14,800	11.1%	17,610	11.3%	+2,430
25-34 years	25,590	19.5%	24,050	18.0%	27,140	17.4%	+1,550
35-49 years	26,290	20.0%	27,690	20.7%	30,850	19.8%	+4,560
50-59 years	15,600	11.9%	15,370	11.5%	17,570	11.3%	+1,970
60-69 years	12,130	9.2%	13,260	9.9%	15,170	9.7%	+3,040
70-84 years	11,500	8.8%	13,300	9.9%	18,470	11.9%	+6,970
85 years and over	3,660	2.8%	3,950	3.0%	6,350	4.1%	+2,690

Source: NSW DPE, ABS Census 2021, Ethos Urban

4.4 Employment Projections

4.4.1 Broad Industry Classifications

The ABS groups employment into industries using the Australian and New Zealand Standards Industrial Classification (ANZSIC) framework. This framework classifies industries according to their productive activities.

For the purposes of estimating employment projections, these ANZSIC industries are grouped into Broad Industry Categories, as these Broad Industry Categories have similar economic drivers. For instance, many industries provide population services, such as household services, and construction services. As population growth increases so too does the demand for employment within these industries – all else being equal.

For other industry groupings, such as, 'industrial', technological trends are changing the way these businesses operate by utilising more equipment and machinery and less labour, these businesses are reducing their overall demand for labour as a proportion of output, and as such, jobs growth is expected to be proportionately lower going forward (see **Table 5** below).

The key drivers and an overview of each category is defined below:

- **Population serving**: Industries within this category tend to provide services to households and individuals. As population grows, so does employment to respond to increased demand for population services.
- **Knowledge workers**: For industries within this category a key factor is the ability to attract and retain high skilled workers. As such, locational and regional factors play a key role as well as the areas access to a highly skilled labour market.
- **Traditional officer workers**: Industries within this location tend to be driven by availability of commercial space and demand from both residents and local businesses.

- **Industrial:** Broad industrial trends, such as economic growth, technology, automation and land use capacity are the main economic drivers for this category.
- **Health, Education, and Other**: Often reliant on population growth to drive demand; however, employment in these industries can also be 'lumpy' and is influenced by major projects (e.g. universities and hospitals). For the purposes of this analysis, the growth outlook is tied to population growth.

A growth outlook and growth projection is applied to each of the Broad Industry Categories and is summarised in **Table 5**.

This section provides a high level overview of employment projections and estimates for the PSA and SSA from 2021 to 2036. Worker projections have been prepared using the official projections from Transport for NSW (2020), and the latest place of work results from the ABS 2021 Census.

Based on current estimates and projections, key points to note regarding the profile of workers within the SSA including the following:

- The SSA is a significant source of jobs for workers in 2022 with some 37,710 jobs. Many of these jobs would likely be concentrated in major precincts within the SSA such as Burwood Town Centre, Concord, Five Dock and Ashfield, which are all active centres that support local and regional employment.
- Of the existing 37,710 workers in the SSA, jobs are predominately concentrated within population serving industries and health and education. There are an estimated 13.390 population serving workers in the SSA, accounting for 35.5% of jobs, while the 10,580 health and education workers represent 28.1% of jobs.
- Population serving activities typically include residents employed in construction, retail trade, accommodation and food services, and arts and recreation services.
- There is also a number of knowledge based workers and traditional office workers, each accounting for 13.3% and 13.9% of jobs in the SSA. Knowledge based workers typically include skilled jobs associated the financial and insurance services, professional, scientific and technical services, and information, media and telecommunications. Meanwhile, traditional office jobs include public administration and safety, administrative and support services and rental, hiring and real estate services.
- Employment projections to 2036 show that jobs growth in the SSA is largely concentrated in population health and education (+4,290 workers) and population serving industries (+1,650). Office based workers including knowledge workers and traditional office will together increase by +1,280 workers between 2022 and 2036.

Employment projections for both the PSA and SSA are presented in **Table 5** below.

Table 5 Employment Forecasts (2022-2036) - SSA

	2022		2036		
Broad Industry Category	**2022**		**2036**		**Change (2022-2036)**
Industrial	3,480	9.2%	3,610	8.0%	130
Population Serving	10,580	28.1%	12,230	27.1%	1,650
Knowledge workers	5,020	13.3%	5,670	12.6%	650
Traditional office workers	5,240	13.9%	5,870	13.0%	630
Health and Education	13,390	35.5%	17,680	39.2%	4,290
Total	*37,710*	100.0%	*45,060*	100.0%	*7,350*

Source: ABS 2021, Transport for NSW, Ethos Urban

4.5 Tourism and accommodation trends

A review of tourism activity within 3km of the subject site shows that the number of visitor nights in the local area has increased significantly, from 1.2 million visitor nights in 2005/06 to 4.7 million visitor nights in 2018/19. Key trends of these visits include:

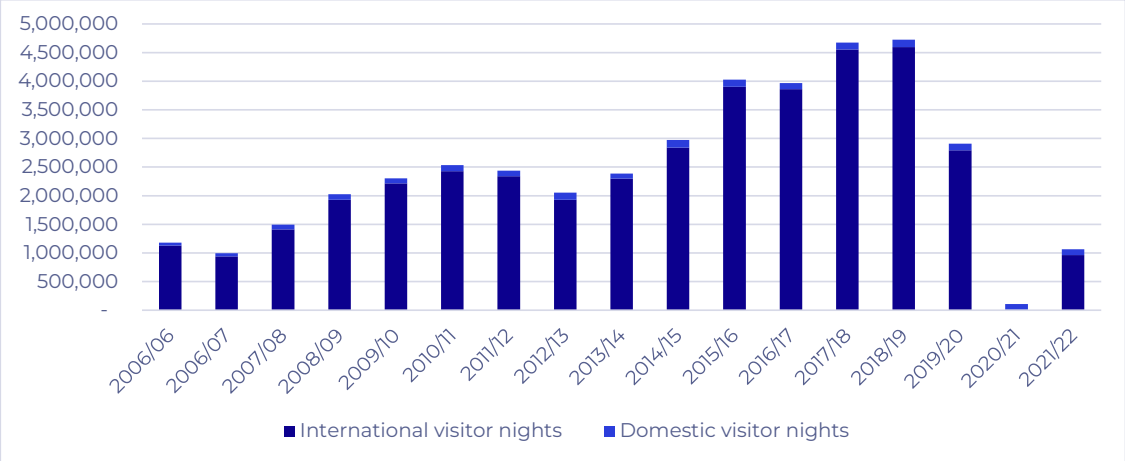
- Some 97.2% were international visitor nights, while just 2.8% were domestic visitor nights.
- There has been an increase in the share of international tourism since 2005, highlighting that increasing visitor nights in the local area has largely been driven by an increase in international visitation. This was a consistent trend

across the Greater Sydney area prior to COVID-19, where the number of international visitor nights increased by around +2.2 million between 2010/11 and 2018/19.

- There has been a considerable increase in the quantity of overnight visits within the catchment area, with a total of 1.06 million international visitor nights in 2021/22, 25% of the pre Covid-19 numbers.
- Some 70.8% of visitor nights in 2018/19 were spent in commercial accommodation (such as a hotel), this equates to around 2.3 million visitor nights spent in commercial accommodation.
- The significant fall in tourism from 2019/20 through to 2020/21 reflects impacts of COVID-19 border closures on the tourism industry. This trend is likely to be a short-term impact, with the tourism industry expected to recover over the coming years as international border restrictions begin to ease, and will be a key driver of economic activity both locally and regionally. The large number of visitors highlight the opportunity to strengthen Burwood and Croydon as a key accommodation precinct. This type of accommodation use would complement retail uses and specifically food and dining options that may co-locate at the site.

The tourism and accommodation trends data presented above has been sourced from Tourism Research Australia.

Figure 11 Overnight visits – 3km catchment



Source: Tourism Research Australia

Figure 12 Overnight visits spend in commercial accommodation – 3km catchment

Source: Tourism Research Australia

4.6 Local social infrastructure context

A review of existing social infrastructure within the primary (PSA) and secondary catchments (SSA) of the site has been undertaken to inform this social assessment, through establishing a baseline of infrastructure networks.

The audit of local infrastructure is focused on local social infrastructure networks within 1km, equivalent to approximately 20 minutes' walk of the subject site. This is given the focus of the Planning Proposal on the creation of a local neighbourhood centre, proving retail amenities and social infrastructure designed to serve a localised population.

The audit of district/regional infrastructure is focused on district and regional infrastructure networks within 3km, and is based on the subject site's capacity to provide district and/or regional level infrastructure for the study area.

The following tables demonstrate the level of social infrastructure which can be found within the 1km and 3km catchments. This is also illustrated by **Figures 13-14**.

Table 6 Local infrastructure

Typology	
Local community facilities	Three (3) local community facilities located within the PSA – George Street Community Centre, Burwood Park Community Centre, and Concord Community Centre.
Childcare	Twelve (12) childcare centres located within the PSA. They offer a total of 869 places.
Medical centres	Seven (7) medical centres located within the PSA. They offer a total of 48 General Practitioners (GPs).
Play spaces	Eight (8) play spaces located within the PSA, with the closest to the site located at Prowse Reserve.
Indoor courts	Three (3) indoor court facilities located within the PSA – Five Dock Indoor Cricket, ATC Badminton Centre, and Dodgeball Sydney.
Government primary schools	Two (2) government primary schools located within the PSA – Concord Public School, Croydon Public School, and Burwood Public School.

Table 7 District/regional infrastructure

Typology	
Aquatic centres	Two (2) aquatic centres located within the SSA – Enfield Aquatic Centre, and Ashfield Aquatic Centre.
Indoor recreation centres	One (1) indoor recreation centre located within the SSA – Five Dock Leisure Centre.
Creative space – presentation	Two (2) creative presentation spaces located within the SSA – Adelaide Perry Gallery, and The Little Gallery Sydney.
Community health centres	One (1) community health centre located within the SSA – Croydon Health Centre.
Government secondary schools	Four (4) government secondary schools located within the SSA – Concord High School, Burwood Girls High School, Ashfield Boys High School, and Strathfield Girls High School.

4.7 Public transport and access

The future development will be highly accessible by public transport. Proposed station locations for Metro West have been identified and are currently being assessed as part of the Sydney Metro West State Significant Infrastructure application (SSSI) submitted by the Sydney Metro Authority. The proposed new station at Burwood North, near the intersection of Burwood Road with Parramatta Road. This location is approximately 400m from the site (approx. 7-minute walking time), which would be considered to be within the station's catchment area. Once operational, the station will be serviced by Sydney Metro City & Western lines and will provide a 20-minute service from Parramatta to the CBD, while significantly reducing travel times to other destinations.

The site is currently serviced by buses toward the Sydney CBD with a stop located opposite the site along Parramatta Road. This stop is serviced by a number of local and regional bus routes, including:

- 415 Campsie to Chiswick
- 461N Burwood to City Hyde Park (Night Service)
- 461X Burwood to City Domain (Express Service)
- 530 Burwood to Chatswood.

Figure 13 Social infrastructure map (1km)

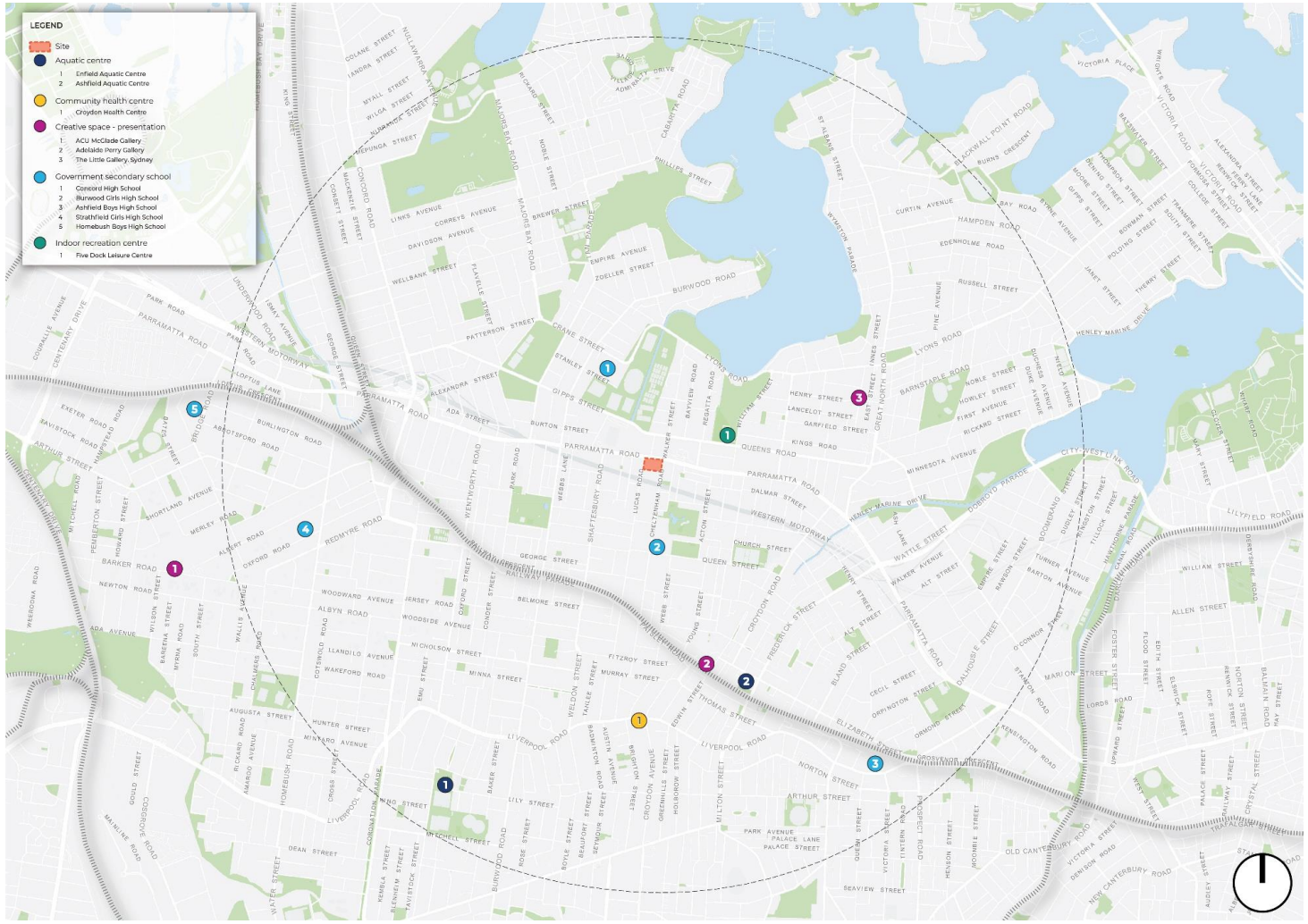


Figure 13 Social infrastructure map (3km)

4.8 Local social issues and trends

The following section highlights key social issues and trends of relevance to the site.

4.8.1 Parramatta Road Corridor Urban Transformation Strategy

Since 2016, it has been a key priority of NSW DPIE to transform Parramatta Road from Camperdown to Granville through the creation of several precincts – Granville, Auburn, Homebush, Burwood-Concord, Five Dock, Taverners Hill, Leichhardt and Camperdown. As of 2021, DPIE's Parramatta Road Implementation Update indicates that precinct-wide traffic studies are required to consider future land use and densities along the corridor, along with necessary future upgrades to transport infrastructure. The implementation update has also prescribed a number of new actions and considerations to align with new policy direction and infrastructure planning which has occurred since the inception of the transformation project, particularly surrounding transport and road improvements[3].

Other state planning initiatives occurring within the corridor includes the Parramatta Road Urban Amenity Improvement Program (PRUAIP) – "a $198 million initiative by the NSW Government to improve open space and active transport links along the Parramatta Road corridor. The program brings State agencies and local councils together to collaborate on projects that will improve public amenity in the corridor"[4].

The Committee for Sydney's 'Reclaiming Parramatta Road' publication details the ongoing issues associated with Parramatta Road, including congested east-west transport, barriers to north-south transport, degraded public realm, economic decline, lack of coherent delivery to a strategy, and the undervaluing of placemaking:

> *"Parramatta Road is one of the ten most congested roads in Australia. The corridor is renowned by motorists as slow and congested, with vehicles rarely travelling the full length… Pedestrian barriers, a lack of median strips, and sparsely located signalised pedestrian crossings mean long detours for pedestrians or cyclists hoping to cross the corridor… In some areas building setbacks from kerb to façade are exceptionally narrow. Footpaths of up to three metres exist but the nature of a busy roadside means the street is an unpleasant place to be. There is also a lack of adequate landscaping, particularly in the eastern sections. Pedestrians will not spend time in a place without shelter from rain or sun… Older buildings, built when the road was a flourishing high street, once held lively local stores, milk bars and cafés. These have fallen into disrepair and dilapidation, with the street becoming unviable for businesses and unremarkable as a place of interest… In many respects, as we have seen historically, the lack of a cohesive governance group or structure has meant that many of the good intentions for the redevelopment of Parramatta Road have failed to materialise…[5]"*

Recent commentary surrounding the transformation of Parramatta Road has highlighted the need for consistent and reliable planning guidance from NSW Government in order to stimulate private sector investment in the corridor. While detailed plans have outlined investment for new open spaces, plazas, and public art, it is clear that the real initiators of change for Parramatta Road will be private investors[6].

Transit oriented development and higher density living

Greater Sydney is currently experiencing a rail infrastructure 'boom' with significant investment activity in new metro lines and light rail services. Of relevance to this proposal, this includes the development of the Sydney Metro West line from the Sydney CBD to Westmead, with the Burwood North Station some 600m west of the site. Significant transport investment can support a shift towards high density residential living in close proximity to these major transport nodes, with this encouraged as an appropriate way to support residential growth by leveraging public transportation services.

Delivery of high density developments has mostly taken the form of transit oriented developments (TOD) which seek to provide residential and other supporting uses in proximity to existing transport nodes or stations. This form of high density development is a strategic way to deliver housing within highly accessible locations that are walkable, supported by amenities and well connected to services and jobs.

The shift towards TOD and higher density living is evident in Greater Sydney when reviewing building approvals data. Over the last decade, medium and high density building approvals have been concentrated in urban renewal and

[3] NSW DPIE 2021, Parramatta Road Corridor Urban Transformation Strategy Implementation Update, https://www.planning.nsw.gov.au/-/media/Files/DPE/Other/PRCUTS_Implementation_Update_2021.PDF
[4] https://www.planning.nsw.gov.au/Plans-for-your-area/Infrastructure-funding/Parramatta-Road-Urban-Amenity-Improvement-Program
[5] https://sydney.org.au/wp-content/uploads/2021/11/2020-11-CfS-Reclaiming-Parramatta-Road-Web_compressed-1.pdf
[6] https://www.urbantaskforce.com.au/wordpress/wp-content/uploads/2021/01/210118-Parramatta-Rd-get-on-with-it.pdf

established areas of the city that have good access to public infrastructure, employment nodes, retail facilities and other services – examples being in key station precincts such as Macquarie Park, Sydney Olympic Park, Liverpool, and Sydney CBD.

The Committee for Sydney estimates that TOD projects could have the capacity to deliver up to 45% of total projected dwellings required in Sydney over the next two decades (Committee for Sydney, 2022, Rethinking Station Precincts). Key benefits of TOD include:

- Enhancing access to community and retail amenities, with train stations functioning as focal points for the community
- More efficiently moving a large number of people around the city, with rail infrastructure more effectively able to move larger number of residents than other modes of travel such as buses and private vehicles
- Reducing reliance on private vehicles and incentivising active and public transport modes of travel. In turn this will reduce the impact on traffic of additional residents in Greater Sydney
- Better integrating train stations within the broader precinct
- Improving liveability by creating vibrant and active places.

4.8.2 Benefits of walkable, mixed-use neighbourhoods

Co-locating housing, employment, social infrastructure, retail, public transport, and daily living needs within dense, mixed-use precincts supports urban activation and amenity. Clustering destinations, such as housing, shops, schools, libraries, cafes, medical centres and so on, makes it more convenient for residents to access a variety of needs within one location. Mixed-use precincts encourage walking and active transport, supports the viability of local retail and social infrastructure, as well as increased activity on the street and improved perceptions of safety.

The co-location of housing, social infrastructure, and essential services has the potential to significantly decrease car dependency and encourage walkability. Walkability can have substantial effects on the health and wellbeing of populations. It is noted that:

> *"People who live in a pedestrian-friendly designed environment participate much more in social life and have greater confidence in their environment. That proved a significant gain in 'social capital' and thus a better quality of life... Against this backdrop walkability is understood as a comprehensive approach for a liveable sustainable city and does not only mean walk-friendliness".*[7]

4.8.3 Benefits of communal private spaces and "third spaces" in contemporary residential developments

'Third places' is a term coined by sociologist Ray Oldenburg and refers to places where people spend time between home ('first' place) and work ('second' place). They are locations where we exchange ideas, have a good time, and build relationships. The most effective third places for building real community connections are the physical places where people can easily and routinely connect with each other: including parks, recreation centres, hairdressers, gyms, and even fast-food restaurants. Third places have a number of important community-building attributes. Depending on their location, social classes and backgrounds can be "levelled-out" and people may feel they are being treated as social equals. Informal conversation is the main activity and most important linking function.[8]

Research suggests that medium and high-density residential developments often lack suitable spaces for socialisation – as events and gatherings are not scheduled between neighbours, and developments are not designed to enable "affordance for lingering". This means that social interactions in larger residential developments are often no more than incidental. This finding suggests that high-density developments require more spaces for social connection to facilitate a cohesive community.[9]

[7] Tran, M. 2021, 'Healthy cities – walkability as a component of health-promoting urban planning and design', *Journal of Sustainable Urbanization Planning and Process*, vol. 1, no. 1.

[8] Butler, Dias (Brookings, 2016) "Third places" as community builders

[9] Thompson, S 2019, "Supporting encounters and casual social ties in large apartment complexes and their surroundings: The role of people, planning, design and management," Thesis prepared for UNSW
http://unsworks.unsw.edu.au/fapi/datastream/unsworks:61597/SOURCE02?view=true

Australian Housing and Urban Research Institute (AHURI) research into apartment residents and neighbourhoods in Sydney and Melbourne highlights the central importance of public infrastructure for lower-income residents—especially open space, libraries, and community centres. Support for 'soft' infrastructure, like community engagement programs and community-led activities, was also important. In the high-density areas studied, infrastructure outcomes were uneven, creating an equity issue where lower-income residents have lower quality of life, even within the same local government area. A focus on providing access to free or low-cost options, both in buildings and in the neighbourhood, is essential to support lower-income residents. [10]

4.8.4 Macro-trends in urban living – the mixed-use precinct

Contemporary urban planning trends in metropolitan Sydney are reflective of a broader global shift toward mixed-use zoning and the creation of highly activated precincts. The impetus of this thinking has largely been attributed to Jane Jacobs and her renowned work – *The Death and Life of Great American Cities*. Among other topics, Jacobs argued that blocks and precincts should serve more than one primary function to catalyse social and economic development. She rebutted the idea that single-use zoning creates visual order and avoids congestion, instead endorsing the idea that diversity encourages walking, thus decreasing congestion and contributing to the convenience and liveliness of cities.

More recent academic research finds benefit in mixed-use zoning across a wealth of areas, including but not limited to: pedestrian safety (Sung et al. 2022),[11] carbon emissions (Zagow 2020).[12] and travel times for non-work activities (Choi, Kang & Yoon 2021).[13] The US-based Brookings Institution focuses largely on the social and economic benefits of walkability (which is largely catalysed by mixed-use zoning), demonstrating that educational attainment and GDP per capita is higher in metro areas with greater walkability. Walkability has also been linked to greater social equity, 'as measured by housing and transportation costs and rental/for-sale housing mix'.[14]

Figure 14 Artists' impression of a 'residential precinct' (TOGA)

Considering regional priorities for a '30-minute city', the project site has a high potential to align with both regional strategic planning directives and global-scale trends in the context of urban living. The Planning Proposal will involve

[10] AHURI (2020). Improving outcomes for apartment residents and neighbourhoods

[11] Sung, H. Lee, S. Cheon, S. Yoon, J. 2022. Pedestrian Safety in Compact and Mixed-Use Urban Environments: Evaluation of 5D Measures on Pedestrian Crashes. *Sustainability*.

[12] Zagow, M. 2020. Does Mixed-use development in the metropolis lead to less carbon emissions. *Urban Climate*.

[13] Choi, D. Kang, M. Yoon, J. 2021. Utility of mixed-use development by reducing aggregated travel time for multiple non-work activities: A case of Seoul, Korea. *Cities*.

[14] The economic power of walkability in metro areas (brookings.edu)

the delivery of a broad spectrum of land uses which will ultimately lead to a more human-centric design, which values the principles of social connection, walkability, and activation.

4.8.5 COVID-19 impacts on local communities

In recent years, COVID-19 has resulted in significant changes and impacts on local communities and the way people live. While the long-term implications of COVID-19 remain uncertain, the pandemic has reinforced the following trends on how and where people live:

- Working from home: flexible working arrangements established because of COVID-19 lockdowns had a large influence on migration patterns, allowing for people to work remotely from more affordable or higher amenity locations. Several major employers have also indicated that flexible working arrangements are likely to remain long-term.
- Economic uncertainty and market conditions: In times of socioeconomic instability, people are more likely to move to locations where there are secure jobs, and where the lifestyle is more affordable. During COVID-19, this may have been where lockdowns and restrictions were less prevalent, such as in regional areas.
- Restrictions on international borders: The restriction of movement internationally is likely to have influenced the increase in domestic migration. Fewer international migrants settling in capital cities can also influence the labour and housing market conditions of those cities, stimulating further movement of people.
- The impact on young adults: Disruption of major life events because of COVID-19, such as university or career pathways, is likely to result in more young adults remaining in their parents' home. The effect of COVID-19 on employment security may have also resulted in more young adults returning to their parents' home.[15]

Despite the above, the long-term implications of COVID-19 remain unclear. However, the importance and benefits of co-locating communities with retail and other services and facilities to improve convenience and trips beyond resident's immediate region was emphasised. A focus on health, wellness and sustainably initiatives has also been reinforced through the public health measures and stay-at-home orders that were implemented during the pandemic. Several of these, such as a focus on safe, sustainable communities will remain a priority for the public and residents in the long term.

4.8.6 Changing consumer retail requirements

Today's fast paced lifestyle and flexible work and life arrangements means that modern consumers have more diverse preferences when it comes to retail uses. Consumers increasing prefer retail facilities that enable or promote:

- **24/7 shopping** - Consumers want the ability to be able to shop at times that are suitable and convenient for them. Working conditions and lifestyles have changed - consumers want to be able to shop early morning, during the day and late at night.
- **Walkability and accessibility -** Consumers, particularly those living in dense communities, prefer to shop locally at facilities that are easily accessible walking or by private car or public transport.
- **Range of products** - Consumers seek a broad range of products, at various levels of price and quality from a range of sources that can cater to a variety of tastes, cultural and ethnic preferences.
- **Shopping as an experience** - Retailers are increasingly responding to consumer demand for a greater retail experience through an increased range of products, foreign brands, and high-quality foods. Retailers are also looking to differentiate themselves by providing better experiences and offers that can attract consumers in competitive retail markets.
- **Shopping online** - Consumers have continued to embrace online shopping for both supermarket and retail goods. Online retailing is now one critical component of a holistic retail network and experience.

The retail sector continues to evolve to the changing economic environment, as well as respond to rapidly changing customer tastes. The COVID-19 pandemic has only increased the need for change in the retail sector and across a range of retail formats.

Some of the changes to so-called 'bricks and mortar' retailing includes increased demand for after hours and weekend trade. Leveraging technology including digital and self-service check-outs, as well as ecommerce fulfilment (i.e., click and collect and home delivery) is also anticipated.

[15] PowerPoint Presentation (population.gov.au)

For all retailers, the focus on health and safety through hygiene practices and social-distancing measures has had a big impact, along with the need to quickly invest in online and omni-channel service models and supply chain requirements to adapt to customer expectations.

Further, the importance of local high-streets and convenience-based retail facilities that are embedded within a community has been highlighted in 2020 and 2021. A focus on supporting local businesses and the local community has returned and is likely to remain relevant in the future.

4.9 Community and stakeholder perspectives

4.9.1 Purpose and approach

Ethos Urban was engaged to support LSH with community and stakeholder consultation throughout October and November 2022. The purpose of engagement on the proposal was to:

- Seek feedback from immediate neighbours and the wider community to better understand local views and potential concerns.
- Provide clear, timely and accessible information and opportunities for neighbours to provide feedback during the initial planning phases of the project.
- Explain how the proposed design concept and site planning approach addresses key community issues and long terms NSW Government strategic planning priorities.
- Create effective lines of communication between the local community and the project team.

This early engagement process provided opportunities for open conversations and feedback from:

- Immediate neighbours to the site
- Community located within a 200m+ radius of the site
- Several key government agencies and service providers.

A high-level summary of the engagement activities undertaken:

Letterbox drop

- Letterbox notification to approximately 36 immediate neighbours and approximately 219 wider community members on 5 November 2022

Stakeholder correspondence

- Several formal and informal project briefings with Burwood City Council planning team.
- Consultation with Transport for NSW, Sydney Water and Ausgrid.

Community drop-in sessions (in-person)

- Five registrants and four attendees at an immediate neighbour session held on the 17 November 2022.
- 22 registrants and 15 attendees at a wider community session held on 21 November 2022.

Community webinar (online)

- 20 registrants and 15 attendees at an online community webinar held on 22 November 2022.

Project email and phone

- Five enquiries received through community engagement channels during the consultation period.

4.9.2 Engagement outcomes

Feedback raised during pre-lodgement consultation related to:

- **LSH as a developer.** Understanding LSH Property's long-term ownership and management of the proposed precinct.
- **Site use and precinct design**. Interest in the rationale behind the proposed building mix and projected population/visitation. There was an acknowledgement that higher density development was inevitable for the area, however, many were concerned with how this could be achieved in a way that is appropriate and sensitive to the surrounding context and local character. There was also concern around the intended quality built of the built form and construction outcomes, as other developments in the area were considered poor quality and 'unattractive'.
- **Building heights and density**. Concern was shown regarding how the proposed height and building massing would impact the amenity of surrounding neighbours. There is a desire for more certainty regarding final building heights and density figures.
- **Community open space, amenities and services**. There was strong support for the proposed public open space and the activation and greening along Parramatta Road. There was strong interest in the proposed retail / commercial mix and various suggestions were put forward on potential community services, amenities, and facilities that reflected local needs and expectations.
- **Traffic management and parking**. There were concerns regarding the proposed location of the entry / exit points of the proposal and parking provisions, given the increased activity and projected population growth. Considerable impacts to surrounding streets were raised, with particular reference to ongoing traffic congestion, narrowness and limited street parking on Cheltenham Road and a need to consider and address pedestrian safety concerns.
- **Planning pathway and consultation**. Interest in indicative timelines for approvals and construction. Overwhelmingly, the community want transparent and holistic engagement where possible in anticipation of other surrounding developments that will create cumulative impacts.
- **Development impacts.** Issues relating to view loss, solar access, overshadowing, noise, privacy, services and utilities were raised. Many residents also expressed the need for LSH to consider how the development would change and impact the quality of life for surrounding residents and properties who have lived in the area for many years and already endured construction impacts from surrounding development such as WestConnex.

4.10 Outcomes of LGA-wide consultation and research by Burwood Council

This assessment draws on community perspectives expressed through a range of community engagements activities by the Burwood Council in recent years.

Burwood 2036 Community Strategic Plan

Burwood Council undertook community consultation between July and September 2021 to inform their Community Strategic Plan (2022). The objective of the consultation was to receive feedback from local residents on Council priorities and visions for Burwood LGA and utilised a wide range of engagement methods. The following key messages were received:

What you love about Burwood:

- Transport and accessibility
- Parks and open spaces
- Shopping centres
- Cultural diversity of the community
- Convenience

What you would like to see changed:

- Traffic and transport
- More green spaces and parks
- Better development

- Improved town centres
- More community events and arts activities

Priorities you would like to see Burwood achieve by 2036 (in order of priority):

- Increasing green spaces
- A welcoming and inclusive community where everyone belongs and feels connected
- Providing high quality community and recreational facilities
- Access to high quality and welcoming public spaces and places
- Managing traffic, parking and supporting alternate modes of transport
- Maintaining clean and safe streets and neighbourhoods
- Ensuring development is high quality, sustainable and well-designed
- Access to a diverse range of community services for all ages and abilities
- Supporting vulnerable people and those in need
- Living sustainably and responding to pressures of climate change
- Providing infrastructure that will support population growth
- An open, transparent and responsible Council.

5.0 Community Needs Assessment

5.1 What is community infrastructure?

Community or social infrastructure includes open space, recreation and community facilities provide places and spaces for people to meet, be active, connect, create and learn. They also represent an important touchpoint for service providers to connect with the community through the delivery of services and amenities.

Infrastructure Australia defines social infrastructure as follows:

> *"Social infrastructure is comprised of the facilities, spaces, services and networks that support the quality of life and wellbeing of our communities. It helps us to be happy, safe and healthy, to learn, and to enjoy life. The network of social infrastructure contributes to social identity, inclusion and cohesion and is used by all Australians at some point in their lives, often on a daily basis. Access to high-quality, affordable social services has a direct impact on the social and economic wellbeing of all Australians."*[16]

Social infrastructure is a combination of hard and soft infrastructure. Hard social infrastructure includes the facilities, buildings and spaces, and soft infrastructure includes the programs, services and networks that occur in these spaces. Built assets, such as libraries and recreation centres, facilitate the delivery of social services by governments and other service providers.

In contemporary social planning, community infrastructure includes spaces for local community participation in cultural and creative making and performing. These spaces are often subsidised and affordable, offering opportunities to provide for affordable future workspace for creative industries, including performance and rehearsal spaces, cultural uses, [spaces for] start-ups and researchers, maker and producer spaces.

Cultural infrastructure is defined in Create NSW's *Cultural Infrastructure Plan 2025+* to include buildings and spaces that accommodate or support culture. It is more than just traditional museums, galleries, and theatres; including all places where the cultural sector and broader community to come together to create, share, learn and store products or experiences.[17]

The following typology adapts – for social infrastructure in the built environment – the typology used in the *Cultural Infrastructure Plan 2025+* and the City of Sydney commissioned Western Sydney University report *Mapping Culture: Venues and infrastructure in the City of Sydney* (2016). The typology is as follows:

- Practice: cultural infrastructure for professional creative practice and art form development, such as rehearsal rooms, artist studios, workshop spaces, and makers spaces
- Presentation: Cultural venues and infrastructure for audiences or spectatorship
- Community and participation: Cultural infrastructure for active participation that is centred on local communities. This includes any spaces which provide the forum for generating culture specific to the local community, and may include such venues as community centres, Aboriginal Cultural Centres, local libraries, and local history museums.
- Commercial and enterprise spaces: including creative retail and co-working services.

It is noted that there is some cross-over between cultural and general local community infrastructure under this typology, namely:

- Libraries are common venues for the local community to participate in culture
- Local community facilities are often relevant for both generating local participation in culture and in its presentation
- Open space has been extensively noted in the source typologies as relevant in the public presentation of culture, including through outdoor event spaces and public art.

While some forms of cultural infrastructure can be audited quantitatively, it is important for these spaces to be understood as dynamic processes. Here, the typology should be applied as a guide only, considering the peculiarities of cultural generation in a locality.

[16] Infrastructure Australia, *Australian Infrastructure Audit 2019*, https://www.infrastructureaustralia.gov.au/sites/default/files/2019-08/Australian%20Infrastructure%20Audit%202019%20-%206.%20Social%20Infrastructure.pdf
[17] *Cultural Infrastructure Plan 2025+ (Create NSW, 11)*.

Effective community infrastructure planning applies qualitative and qualitative analysis

The approach taken to this study is based on established practice in community infrastructure planning, which involves two core stages of analysis.

The approach taken to this study is based on established practice in community infrastructure planning, which involves two core stages of analysis:

- Quantitative analysis of current and planned supply of a selected community infrastructure typology against established benchmarks for provision (number/ size) considered adequate to meet the needs of a particular population size/ geographic catchment.
- Qualitative analysis of:
  - the geographic distribution of supply from a population equity and accessibility/ walkability perspective;
  - the quality of supply (whether infrastructure is fit for purpose/ in need of maintenance etc), and
  - capacity/ utilisation of current supply based on information provided, where available, from the relevant Council (infrastructure that is poorly utilised may mean it is surplus to community needs, for example, or rather not effectively meeting community needs through its design or functionality).

The analysis is also informed by detailed demographic data on population size, characteristics and forecast growth and change. Information on population age groups is essential for planning early years and education facilities and services, for example. While information on the cultural make-up of the community and household types (e.g., couples, or families with children), for example, can help inform decisions on the operation and programming of infrastructure, as well as types of infrastructure.

5.1.1 Study area definition

The geographic catchments applied to the needs analysis are a 1km and 3km radius surrounding the site.

Current and forecast populations of residents and workers within the designated catchment have been analysed to understand demand in 2022, 2026, 2031, and 2036.

5.1.2 Quantitative analysis: assessing quantum through benchmarks

This section introduces the community infrastructure planning benchmarks that have been applied in this analysis of the adequacy of current and planned infrastructure provision in the study area.

Benchmarks guide planning for provision to meet community needs

Benchmarks provide guidance on an adequate level of community infrastructure provision (number/ floorspace/ site area) for a designated population size (residents and workers), within a designated geographic catchment or study area. The full suite of benchmarks is set out below.

The quantitative benchmarking or 'gap analysis' that informs this plan has been undertaken at a local (1km), district and regional level (3km).

Benchmarks are a tool for providing guidance on the quantum, size, and location of facilities in relation to a specific population size and geographic catchment. They are not intended to provide clear cut answers, as social planning is by nature not black and white. Rather they provide guidance on best practice facilities provision, to be used as part of a broader analysis that takes account of a rich range of qualitative and quantitative information.

It is also important to recognise that benchmarks are not a one-size-fits all tool; they ultimately represent only one aspect of government's broader decision-making process when planning community infrastructure.

5.1.3 Community infrastructure benchmarks

The following infrastructure typology has been selected to be applied in through the quantitative assessment that forms the core of this study. This represents a range of infrastructure considered most appropriate in the context of the subject site and surrounds.

The following best practice provision benchmarks are applied in this analysis. These benchmarks are evidenced to be appropriate for locations such as the Burwood LGA.

Table 8 Local community infrastructure benchmarks

Category	Infrastructure type	Definition	Hierarchy	Benchmark	Floorspace	Source
General community spaces	**Integrated multipurpose community centre**	A large multipurpose community facility that is a focal point for the local community. It is delivered through a single building/site or a cluster of proximate buildings/sites and is typically integrated or co-located with other facility types within the network (e.g., library, indoor recreation facility).	Local	1:20,000 residents/ 1:20,000 workers (30% demand)	Large multipurpose community facilities, minimum 2,000 square metres aiming for 2,500 square metres internal area.	• City of Sydney Development Contributions Plan 2015 – Community Facilities Planning Benchmarks • Peer Review of Community Facilities Planning Benchmarks, Elton Consulting for City of Sydney, 2015
	Library	Libraries may be standalone facilities, although they may be integrated as part of larger integrated multipurpose facilities, where they typically form the anchor facility. Generally refers to libraries that function as local community branch libraries.	Local	1:20,000 residents/ 1:20,000 workers (30% demand)	Minimum 1,500 square metres internal area.	• City of Sydney Development Contributions Plan 2015 – Community Facilities Planning Benchmarks • Peer Review of Community Facilities Planning Benchmarks, Elton Consulting for City of Sydney, 2015; • State Library of NSW
	Local community centre	Smaller hubs to include multipurpose rooms with potential for some service provision and specialised spaces.	Local	3:20,000 residents	Minimum 400sqm.	• City of Sydney Development Contributions Plan 2015 – Community Facilities Planning Benchmarks • Peer Review of Community Facilities Planning Benchmarks, Elton Consulting for City of Sydney, 2015
Health facilities	**General Practitioner (GP)**	General practitioner, either in sole practice or operating out of a medical centre.	Local	1:4,000 residents	N/A	• SGS Economics and Planning, 2014
	Community health centre	Centre delivering primary and community health services, run by a local health district. Services can include maternal and child health, sexual health, and mental health.	District	1:50,000	N/A	• NSW Health

Category	Infrastructure type	Definition	Hierarchy	Benchmark	Floorspace	Source
Educational and children's facilities	**Early education and care (preschool and long day care)**	Childcare facilities are purpose-built or fitted out for the provision of early childhood education and care. Preschools provide education to 3- and 4-year-old children. Currently, it is funded for 4-year-olds (15 hours per week) and this will be extended to 3-year-olds from 2029. Facilities can be standalone but are more likely to be part of Long Day Care services or schools.	Local	1 place:3.8 children aged 0-4/ 1 place:75 workers	Minimum 400 square metres internal area per facility and include, but not limited to, required thoroughfares, outdoor play areas, panic rooms, toilet and hygiene facilities, storage areas and administrative areas as per NSW Government legislative and regulatory requirements.	• NSW Productivity Commission 2019 • City of Sydney Childcare Strategy 2014 • Burwood Community Facilities and Open Space Strategy, Cred for Burwood Council, 2019
	Government primary school	School for children from kindergarten to year six.	Local	1:500 children aged 5-11	N/A	• Based on % of all students enrolled 2020 in NSW (Australian Curriculum, Assessment, and Reporting Authority)
	Government secondary school	School for children from year 7 to year 12.	District	1:1,200 children aged 12-17	N/A	• Based on % of all students enrolled 2020 in NSW (Australian Curriculum, Assessment, and Reporting Authority)
	Play space	Play equipment for children, usually located within parks or co-located with other social infrastructure.	Local	1:500 children aged 0-4 and 1:500 children aged 5-11	N/A	• Former Growth Centres Commission (GCC) • Burwood Community Facilities and Open Space Strategy, Cred for Burwood Council, 2019
Sports and recreation facilities	**Indoor court**	Indoor courts for sport and recreational activity. Can be utilised for multiple sporting codes.	Local	1:20,000 residents	N/A	• Parks and Leisure Australia • Burwood Community Facilities and Open Space Strategy, Cred for Burwood Council, 2019

Category	Infrastructure type	Definition	Hierarchy	Benchmark	Floorspace	Source
	Indoor recreation centre	"Indoor recreation centres provide an all-weather venue for recreation, as well as being essential for some sports (e.g., gymnastics, squash, badminton and table tennis) and ideal for others (e.g. high level basketball and netball competitions)."[18]	District/regional	1:50,000-100,000 residents	N/A	• Burwood Community Facilities and Open Space Strategy, Cred for Burwood Council, 2019
	Aquatic facility	Public facility used for community swimming and exercise programs, including learn-to-swim classes.	District/regional	1:50,000-100,000 residents	Indoor Swimming Pool Facility: incorporating a 25-50 metre pool and learn-to-swim/children's swimming spaces: minimum 6,000 square metres.	• Parks and Leisure Australia • Burwood Community Facilities and Open Space Strategy, Cred for Burwood Council, 2019
Cultural facilities and economic development	**Creative space – practice**	Cultural infrastructure for professional creative practice and art form development, such as rehearsal rooms, artist studios, workshop spaces, and makers spaces.	Local	1:8,000 residents	N/A	• Planning for Community Infrastructure in Growth Areas, ASR Research, 2008 • Ethos Urban
	Creative space – presentation	Spaces for performance and exhibition spaces, usually involving an audience (e.g., theatres, cinemas, exhibition space, live music venues, and Aboriginal Keeping Places).	Regional	1:40,000 residents	N/A	• Planning for Community Infrastructure in Growth Areas, ASR Research, 2008 • Ethos Urban
	Cultural infrastructure – community and participation	Cultural infrastructure for active participation that is centred on local communities. This includes any spaces which provide the forum for generating culture specific to the local community. Includes cultural centres and spaces for preserving and celebrating local heritage.	Local	N/A – assessed qualitatively	N/A	N/A

[18] Burwood Community Facilities and Open Space Strategy, Cred for Burwood Council, 2019

Category	Infrastructure type	Definition	Hierarchy	Benchmark	Floorspace	Source
		Often incorporated with local community facilities as spaces for expression of community character.				
	Local co-working infrastructure – enterprise spaces (including for creative enterprises)	Spaces for the community to co-locate employment services and provide affordable coworking space. Co-working spaces are quickly becoming an essential ingredient to a city's economic development. By design and operation they are set up to incubate new businesses, create new technologies and foster innovation and knowledge transfer. They also provide an easy platform for entrepreneurs to enter the market and test their ideas.	Local	N/A – assessed qualitatively	N/A	N/A

5.1.4 Qualitative analysis: assessing infrastructure quality and distribution

Qualitative community infrastructure analysis parameters

Qualitative analysis of existing community infrastructure has also informed this study. This has considered the following parameters:

- Coverage and function – current geographic extent and/or level of provision and function (local, district, regional);
- Capacity and demand – current capacity of infrastructure, including capacity constraints, and its ability to cope with expected demand, including consideration of demographic of current and future users;
- Performance – infrastructure's performance against current demand;
- Management – responsibility for maintenance and management of infrastructure, including source of funding for ongoing operation and maintenance, and
- Future planning – responsibility for short, medium and long-term planning for the infrastructure, including any indicated plans or need for renewal, upgrade and/or additional requirements.

It is important to note that qualitative information can be difficult to obtain, as information sources are often unreliable or incomplete. The qualitative analysis can give broad insight into the quality of infrastructure, but inconsistencies in the assessment may occur due to the data sources and difficulty of obtaining accurate information.

Open space analysis parameters: assessing quality and walkability

Urban environments that include open space improve the quality of life and wellbeing for workers and residents interacting with these spaces. Both state and local governments have recognised the importance of green open spaces for social sustainability and wellbeing, especially as density and populations grow.

Urban environments that include open space improve the quality of life and wellbeing for workers and residents interacting with these spaces. Both state and local governments have recognised the importance of green open spaces for social sustainability and wellbeing, especially as density and populations grow.

The benefits of greening are recognised by the World Health Organisation, which links green urban areas with better health and wellbeing outcomes, through helping combat air pollution, noise, chronic stress, and insufficient physical activity.[19] The Government Architect's Greener Places framework, supported by the GSC Sydney Green Grid Strategy, aims to create a network of upgraded urban spaces and civic amenities that support social cohesion and gathering, while increasing Sydney's green canopy.

An important distinction is noted between open space and civic domain. While open space pertains to such spaces as parks, plazas, promenades, and other passive and active recreation facilities; civic domain relates to more transient movement zones, such as shared streets, publicly accessible through-site links, pedestrian and cycle corridors and some linear plazas.

This study measures site's access to open space against the 'greener places' distance and size metrics in the Greener Places Guide.[20]

Greener Places – an urban green infrastructure design framework

Key principles:

- Integration: this principle proposes to combine green space with urban development and grey infrastructure. It aims to maximise opportunities to deliver green infrastructure along transport routes and enable use of publicly owned assets such as creeks and stormwater channels.
- Connectivity: this principle promotes the creation of a network of high-quality open spaces that connect with town centres, public transport hubs, rivers, creeks, and employment and residential areas.

[19] World Health Organization, *Urban green spaces and health; a review of evidence* (2016) Page 40
[20] https://www.governmentarchitect.nsw.gov.au/policies/greener-places

- Multifunctionality: this principle represents the ability of green infrastructure to delivery multiple uses simultaneously, designing spaces that foster interaction and stewardship, community identity, sense of connectedness and community capacity.
- Participation: this principle relates to a planning process that is open to all and involves stakeholders in the development and implementation of green infrastructure plans and actions. It involves ensuring equitable access, creating accessible spaces for all members of the community, and encourages the use of currently underutilised open space corridors for community use.

Guidance on walkability to open space:

Increased access to open space is a key outcome of the Greener Places Framework. Walkability is one aspect of accessibility. Key principles related to walkability include:

- The quantity, quality, distribution and accessibility of green space enables the delivery of multifunctional open spaces that promote healthy lifestyles
- Improvements to the public domain that promote exercise and alternative modes of transport such as walking, cycling, and jogging
- Protection of green corridors that create a network of walking trails, cycle paths, and open spaces along river and creek corridors
- Enhanced connections to the Green Grid, particularly in and around high-density precincts.

Walkability metrics:

The draft Greener Places Design Guide[21] expands on these principles. Key metrics are as follows:

- Local access for high-density areas > 60 dwellings/ha (0.15-0.5 ha public open space)
  - Residents: 2-3 minutes' walk/200m walking distance to a local park (barrier free)
  - Workers: 5 minutes' walk/400m walking distance to a local park (barrier free)
  - Schools: 5 minutes' walk/400m walking distance to a local park (barrier free)
- Local access for medium to low-density areas < 60 dwellings/ha (0.3 – 2 ha public open space): 5 minutes' walk/ 400m walking distance to a local park (barrier free)
- District access (2-5 ha public open space): 25 minutes' walk/2km proximity to a district park
- Regional access (>5 ha public open space): up to 30 minutes travel time on public transport or by vehicle to regional open space/5 – 10 km from most houses.
- Trail and path networks: 1000 people per km within 800m.

[21] https://www.governmentarchitect.nsw.gov.au/guidance/greener-places-guide

5.2 Supply

5.2.1 Introduction

This section provides an analysis of the community infrastructure context in Burwood LGA, to inform delivery of social benefit on this site. Current supply audits existing provision through a survey of the catchment area. Planned supply examines concrete 'pipeline' supply as well as aspirations for social infrastructure.

5.2.2 Current supply

Refer to **Section 4.6** for an overview of the current supply of local, district and regional community infrastructure within the PSA and SSA.

5.2.3 Spatial distribution of current supply – qualitative analysis

The subject site is well (*spatially*) serviced across the local catchment in terms of social infrastructure, including childcare, local community centres, medical centres, play spaces, primary schools, and recreational facilities. Social infrastructure located within 1km of the site are largely clustered along Burwood Road, at the southwestern edge of the catchment. Local recreational facilities and open space are far more evenly distributed across the catchment. There are currently no local creative/cultural facilities or co-working spaces located within the catchment. Delivering this type of infrastructure on site would assist in meeting local demand by adding to the existing network. Future residents of the subject site would benefit from local social infrastructure which is within walkable distance (less than 800m away, but preferably closer), and co-located with other uses. Future residents of the site would also benefit from enhanced public domain, through site connections, and other pedestrian infrastructure which would increase their accessibility to other facilities within the local network.

The site is also well serviced across the district/regional catchment by recreation and aquatic centres, and education facilities. There are minimal district-level creative presentation spaces in the catchment, all functioning as art galleries. There is only one integrated multipurpose facility located within 3km of the site and can be found to the southwest, near Burwood Station. Future residents of the site would benefit from a greater variety of infrastructure delivered on, or within close proximity to, the site.

5.2.4 Planned supply

The following section provides an overview of planned social infrastructure in relation to the chosen study areas.

Planned works by Burwood Council include:

- Burwood Urban Park/Arts and Cultural Centre – Burwood Council is currently exhibiting a DA to develop the existing carpark next to Burwood Library and Community Hub into a park and Arts and Cultural Centre. The centre will include dedicated performance and rehearsal spaces, studio space, a community lounge, flexible multipurpose spaces, and a café.
- Burwood Park Nature Play, Sensory Garden and Pond Upgrade – Burwood Council have commenced work on an upgrade to Burwood Park which will provide a new nature play area, sensory garden, and pond upgrade. It is expected to be completed in June 2023.

The Parramatta Road Corridor Urban Transformation Strategy Infrastructure Schedule (2016) establishes the following infrastructure projects within the Burwood-Concord and Kings Bay Precincts (located within or adjacent to the PSA) to be delivered between 2024-2054:

Burwood-Concord

- 400 childcare places
- 54 before school care places, 183 after school care places, and 131 vacation care places
- Provision of a cultural feature of facility within an existing community centre (e.g., art space, exhibition area)
- Redevelopment of the Concord Community Centre to include an additional meeting space of 60sqm
- 320sqm of library floor space
- Relocation/expansion of Concord Library into the Concord and Community Recreation Precinct.

Kings Bay

- 122sqm of library floorspace
- Provision of cultural space within an existing or potential new facility
- 181 childcare places
- 24 before school places, 83 after school places, and 59 vacation care places.

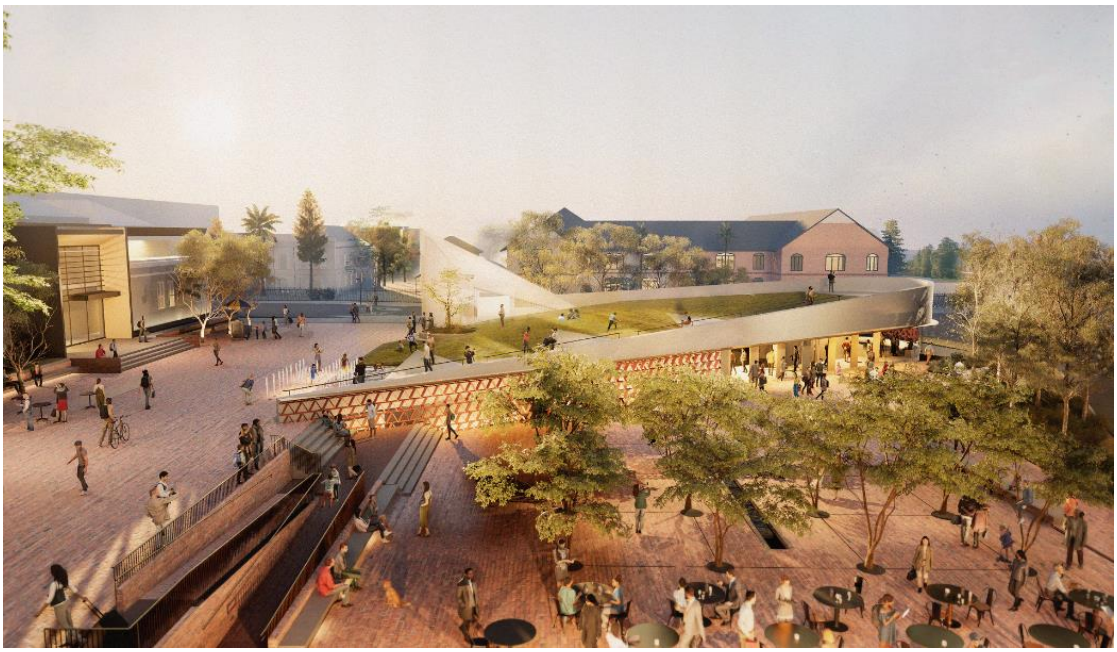


Figure 15 Artists' impression of new Arts and Cultural Centre

Source: Burwood Council

5.3 Demand

Demand for this Community Needs Analysis is calculated based on residential and worker populations within the PSA and SSA. An overview of current and forecast demand has been set out at **Sections 4.0**.

5.4 Gap analysis

5.4.1 Introduction

The social infrastructure needs analysis synthesises the findings of the following sections to identify social infrastructure needs in the study areas:

- Analysis of the local social context of the site, including the demographic profile and character of the area
- Analysis of existing supply of local social infrastructure within 1km of the site as well as district and regional infrastructure types within 3km of the sites
- Analysis of current demand and demand generated by forecast population growth and change, both within the precinct and within the surrounding locality.

The benchmark-based quantitative analysis for this precinct is set out over page.

These gaps identify community infrastructure needs for the study area generally and are not anticipated to be addressed by this site alone.

5.4.2 Infrastructure gap analysis

Table 9 Local infrastructure benchmarking table

Infrastructure type	Current supply	Demand in 2022	Gap	Demand in 2026	Gap	Demand in 2031	Gap	Demand in 2036	Gap	Total gap (resident + worker demand)
Integrated multipurpose facility	0.0	0.6	0.6	0.7	0.7	0.9	0.9	1.3	**1.3**	**1.5**
Worker demand	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	**0.2**	
Library	0.0	0.6	0.6	0.7	0.7	0.9	0.9	1.3	**1.3**	**1.5**
Worker demand	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	**0.2**	
Local community facility	3.0	1.9	-1.1	2.0	-1.0	2.6	-0.4	3.8	**0.8**	-
Childcare places	869.0	137.5	-731.5	135.0	-734.0	160.0	-709.0	222.5	-646.5	-499.3
Worker demand	869.0	125.7	-743.7	130.7	-738.3	139.1	-729.9	147.2	-721.8	
Government primary school	2.0	1.5	-0.5	1.5	-0.5	1.8	-0.2	2.4	-0.4	-
General Practitioner (GP)	48.0	3.2	-44.8	3.4	-44.6	4.4	-43.7	6.4	-41.6	-
Creative space – practice	0.0	1.6	1.6	1.7	1.7	2.2	2.2	3.2	**3.2**	-
Indoor court	3.0	0.6	-2.4	0.7	-2.3	0.9	-2.1	1.3	-1.7	-
Play space	8.0	1.3	-6.7	1.3	-6.7	1.5	-6.5	2.1	-5.9	-

Table 10 District/regional infrastructure benchmarking table

Infrastructure type	Current supply	Demand in 2022	Gap	Demand in 2026	Gap	Demand in 2031	Gap	Demand in 2036	Gap
Government high school	4.0	0.6	-3.4	0.6	-3.4	0.8	-3.2	1.1	-3.0
Indoor recreation centre	1.0	1.8	-0.8	1.8	-0.8	1.9	0.9	2.1	**1.1**
Aquatic facility	2.0	1.8	-0.2	1.8	-0.2	1.9	-0.1	2.1	**0.1**
Community health centre	1.0	2.6	1.6	2.7	1.7	2.8	1.8	3.1	**2.1**
Creative space – presentation	2.0	3.3	1.3	3.3	1.3	3.5	1.5	3.9	**1.9**

5.4.3 Open space analysis

With reference to Government Architect NSW's *Greener Places*, the site and its surroundings are well supplied with open space. High-density dwellings delivered within by development will be appropriately distanced from local open space, district open space (see **Figure 16**), and regional open space. Delivering 0.19ha of open space on site will further contribute to local open space access, while ensuring that the site's residential uplift will not present additional pressure on equivalent open spaces in the area.

Table 11 and **Figure 16** demonstrate the site's alignment with the Greener Places framework. **Figure 16** differentiates between passive and active open space, acknowledging that active open space may not be accessible in the same way as passive open space, mostly due to sport and recreation activity schedules.

Table 11 Open space benchmarking matrix

Distance metric	Size metric	Evaluation
Residents within 200m walking distance of local open space?		Yes
	0.15 – 0.3ha?	Yes
	> 0.3ha?	Yes
Workers within 400m walking distance of local open space?		Yes
	0.15 – 0.3ha?	Yes
	> 0.3ha?	Yes

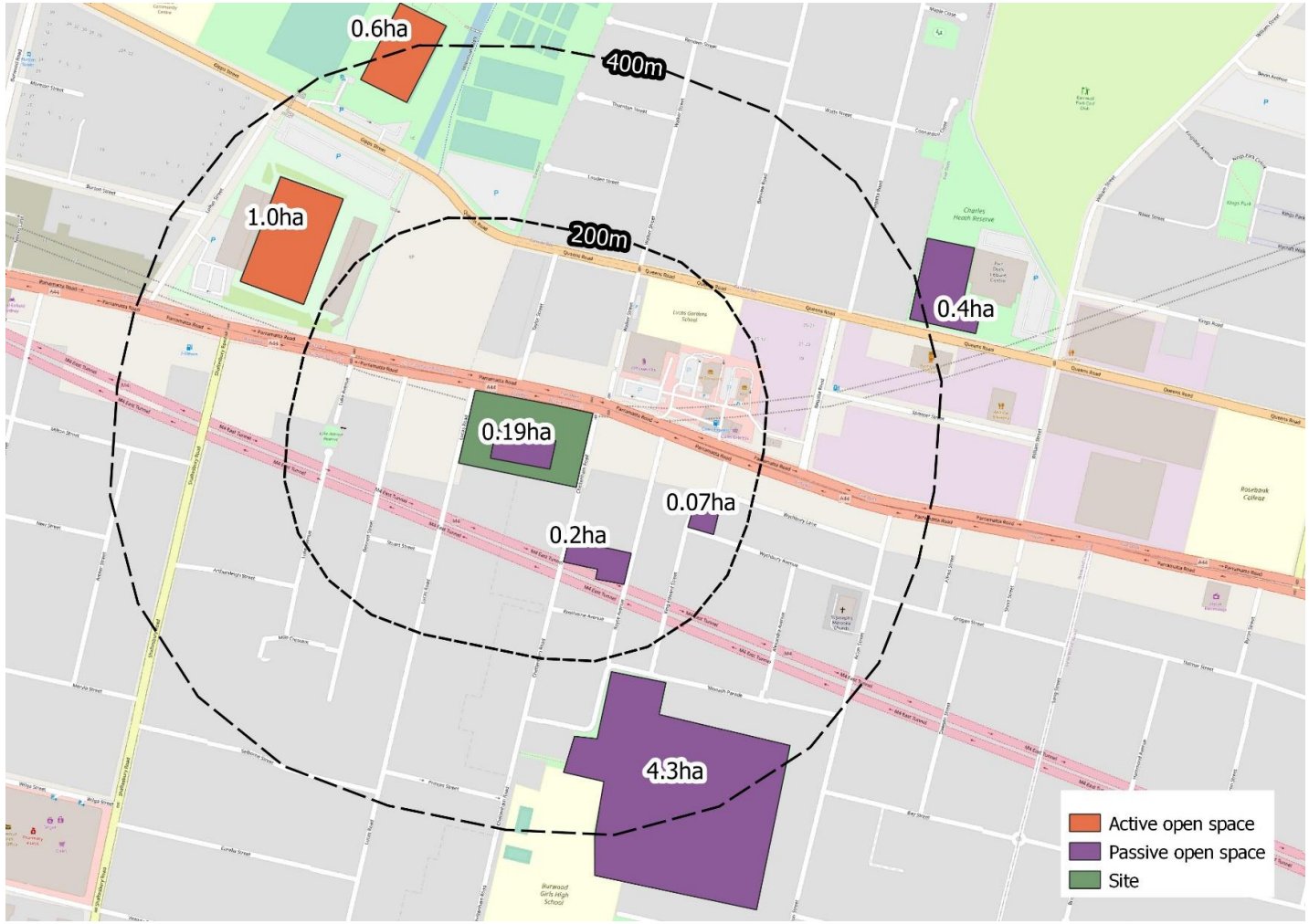


Figure 16 Provision of open space
Source: Ethos Urban

5.5 Recommendations for community infrastructure on the site

Considering the findings outlined above, including both quantitative gap analysis and qualitative and strategic considerations, the following infrastructure is recommended for delivery on-site:

- **Multipurpose community space** – consider provision of multipurpose community space which can support the following uses:
  - General community use (i.e., meetings, programs, community bookings)
  - Creative and cultural use (i.e., makerspace, exhibition/event space)
  - Community health service delivery by the Local Health District.

  Ideally, this space could be arranged flexibly through the inclusion of moveable walls in order to accommodate multiple uses at once if necessary.
- **Co-working space** – consider leasing available retail/commercial space to a co-working operator in order to account for the lack of equivalent space in the locality.

Where the scheme is unable to accommodate any recommended uses or infrastructure gaps identified within **Section 5.4.2**, infrastructure contributions could be explored in order to deliver on the targets outlined within the Parramatta Road Corridor Urban Transformation Strategy Infrastructure Schedule (**Section 5.2.4**).

6.0 Social Impact Assessment

6.1 Introduction

The purpose of this social assessment is to consider the potential social impacts of the development that would be enabled by the Planning Proposal, both positive and negative, for the community and key stakeholders.

This constitutes a preliminary assessment of the likely operational impacts of the development, as is appropriate to the Planning Proposal stage. A more through assessment would be undertaken (through a formal Social Impact Assessment) at the DA stage, when information will be available that will enable a comprehensive assessment of operational as well as constriction impacts.

6.2 Assessment approach

The assessment of social impacts in this section is based on the social factors identified in the *Social Impact Assessment Guideline for State Significant Projects* (SIA Guideline) released by the NSW Department of Planning, Industry and Environment in July 2021.

The SIA Guideline is considered by NSW Government to represent best practice in social impact assessment processes and provides a consistent framework and approach.

As outlined in the SIA Guideline, social impacts vary in their nature and can be positive or negative, tangible or intangible, physically observable, or psychological (fears and aspirations). Social impacts can be quantifiable, partly quantifiable or qualitative. They can also be experienced or perceived differently by different people and groups within a community, or over time.

The SIA Guideline classifies social impacts in the following way, which forms the core basis of this assessment:

- ***Way of life:*** *how people live, get around, work, play and interact with one another each day*
- ***Community:*** *its composition, cohesion, character, how it functions, resilience, and people's sense of place*
- ***Accessibility:*** *how people access and use infrastructure, services and facilities (private, public, or not-for-profit)*
- ***Culture:*** *both Aboriginal and non-Aboriginal - people's shared beliefs, customs, practices, obligations, values and stories, and connections to Country, land, waterways, places and buildings*
- ***Health and wellbeing:*** *people's physical, mental, social and spiritual wellbeing – especially for people vulnerable to social exclusion or substantial change, psychological stress (from financial or other pressures), access to open space and effects on public health*
- ***Surroundings:*** *access to and use of natural and built environment, including ecosystem services (shade, pollution control, erosion control), public safety and security, as well as aesthetic value and amenity*
- ***Livelihoods:*** *including people's capacity to sustain themselves through employment or business*
- ***Decision-making systems:*** *the extent to which people can have a say in decisions that affect their lives, and have access to complaint, remedy and grievance mechanisms.*[22]

Key affected communities

Key affected communities include:

- The current local residents in the study area/s
- Adjacent workers and businesses
- Users of Parramatta, Cheltenham, and Lucas Roads.

[22] The proposals impact on decision-making systems have been identified as negligible, and have not been further assessed in this report.

Assumptions applied

Assumptions applied to complete this assessment include:

- The key findings of the background studies and technical reports are accurate.
- Socio-economic data for each study area accurately reflects the community demographic profile.
- Outcomes of the community consultation and engagement undertaken to date accurately reflect community views.
- All potential social impacts to the local community and special interest groups that can reasonable be identified have been included in this report.

6.3 Social assessment across key factors

This section will provide an assessment of the social context relevant to the Planning Proposal and accompanying indicative reference scheme, including matters such as increased availability of retail, employment, housing diversity, access to social infrastructure and civic domain improvements. Likely social impacts and benefits associated with delivery of the proposal include:

Table 12 Summary of social impacts

Assessment factors	Summary of positive impacts	Summary of negative impacts
Way of life	Increased convenience and amenity for future residents of the site and members of the surrounding community associated with new housing, open space, social infrastructure, employment and retail. New residents will enjoy walkable access to daily living needs.	Potential for disruption to daily living routines for existing residents and workers surrounding the site due to influx of new residents and workers.
Accessibility	Improved accessibility to social infrastructure, job opportunities, open space, and other daily living needs. Proximity to planned public transport and new pedestrian connections will enable greater accessibility for residents of the broader region.	Potential for disruption to regular travel routes, parking availability, and travel times for existing residents and workers surrounding the site due to influx of new residents and workers.
Health & wellbeing	Enhanced walkability surrounding the site and mixed-use design will encourage active healthy lifestyles. New open space will increase opportunities for outdoor relaxation and recreation in an LGA of increasing density.	Potential noise impacts on surrounding residential areas, which may impact on sleep or other daily routines.
Community	Communal amenities, social infrastructure, and public areas delivered through the proposal will lead to greater opportunities for social interaction and community cohesion.	Significant changes to the size and composition of the local community, as well of sense of/connection to place.
Culture	New opportunities for cultural and creative expression associated with the provision of maker space. The design of the proposal considers a diverse community and is inclusive of age, gender, language, and cultural background.	Significant changes to community connection to place due to change in land use.
Surroundings	Significant improvements to amenity on Parramatta Road due to high quality design and landscaping. The proposal	Potential overshadowing and reduction of solar access for surrounding residential area due to

Assessment factors	Summary of positive impacts	Summary of negative impacts
	will increase the aesthetic value of the surrounding area.	bulk and scale of proposed development.
Livelihoods	Delivery of new local employment opportunities for residents living across the region through the provision of retail and commercial floorspace. Retail and commercial activity will serve to strengthen and stimulate the local economy.	N/A.

6.3.1 Way of life: how people live, get around, work, play and interact with one another each day

- Increased convenience for residents, workers and visitors in the Study Area/s associated with delivery of a hotel, retail and hospitality offerings, commercial floorspace, and community facilities in close proximity to a planned key transport artery – Burwood North Metro Station. Importantly, the proposal would improve way of life for future site residents and existing nearby residents with the delivery daily living needs, co-located with housing and employment. The development will increase opportunities for residents to access daily living needs in a location close to their home and workplace. It is noted that post-COVID there may be increased demand for services and amenities within local neighbourhoods with an enhanced role for local centres to support the social and economic needs of communities.
- Positive way of life benefits associated with the delivery of new open space and a public plaza. This would enable future residents to live in close proximity to high-quality, public open space, and also increase overall access for residents, workers, and visitors of the study area/s. Community engagement has revealed local support for new open space and activation on Parramatta Road.
- Positive way of life benefits associated with delivery of housing co-located within a mixed-use centre, close to public transport, employment opportunities, community facilities and open space. Specifically, the proposed development would result in the delivery of 193 new apartments.

  Residents of these dwellings would benefit from access to daily living needs and public transport, which would reduce travel times and enhance convenience. This will contribute towards delivery of a “30-minute city” where people can access housing, employment, education, and other services, including retail, within a short distance of their home.
- Positive way of life impacts associated with the development of a mixed-use precinct on Parramatta Road, featuring landscape setbacks. This design feature will likely enhance walkability around the perimeter of the site, as existing sidewalks on Parramatta Road have been noted as unattractive to pedestrians.

6.3.2 Access to and use of infrastructure, services, and facilities

- Positive social benefits are associated with the delivery of social infrastructure within walking distance to planned public transport and other daily living needs. The location of the site will enable local residents to access community facilities and public open space, within walking distance from their homes. In particular, the provision of social infrastructure at this site, may benefit local residents that do not have, or prefer not to use a car.
- There are also likely benefits associated with delivery of housing in a location well-connected to retail, employment opportunities, schools, planned public transport and open space. The accessibility of these facilities for residents of this site will support residents’ wellbeing and quality of life.
- Delivery of a mixed-use centre to cater for a walkable catchment will help achieve the Greater Sydney Commission’s goal of a 30-minute city – reducing travel times and increasing opportunities for people to spend time with their family and friends.
- Delivery of a mixed-use centre closer to homes and planned public transport may in fact reduce the need for car travel to existing centres further away. It is noted that the intention of the development is to firsthand serve a local catchment, catering for the resident community and visitors who would be able to access the premises on foot. There is hence potential to mitigate traffic congestion impacts by ensuring easy access and linkages with existing active transport networks and public transport stops.

- Potential moderate negative impacts to accessibility associated with an increased number of vehicles and traffic in the locality. It is noted that the Transport Assessment (JMT Consulting, 2023) indicates that the road network will operate 'near capacity' at peak times during operation of the proposed development. No traffic infrastructure upgrades are considered necessary to accommodate the expected traffic generation. It is noted that engagement participants have noted the narrowness and limited street parking that current affects Cheltenham Road, and that there is a desire to ensure the development does not worsen this.

6.3.3 Community: composition, cohesion, character, how it functions, resilience, people's sense of place

- Population growth is associated with the delivery of the proposed development, with impacts to community composition. These impacts may be cumulative due to rapid population growth and development, which Burwood LGA is characterised by. The proposed development would result in the delivery of 193 new dwellings.
- The site would also support around 410 direct FTE construction jobs and 290 direct FTE operational jobs. This may affect the size and composition of the local community, which may be positive or negative.
- Local streets and shops are important places for people to socialise, among others. A concentration of employment, and training opportunities and daily living needs in an area encourages people to be more socially active and enhances the liveability of the place. Delivery of the proposed retail and hospitality offerings, and a high-quality public square would create a local neighbourhood centre that will encourage residents, workers, and visitors in the area to come together and socialise.
- Potential improvements to sense of place are likely to be associated with provision of this high-quality and architecturally designed development at this site as it will deliver on the community aspiration for better development, increased green spaces, and improved town centres. The proposed development will provide new homes, open space, community facilities, workplaces, and enhance the amenity of the area. This may catalyse a new connection to place for residents, workers, and visitors to the area. Community engagement has highlighted the need to ensure community facilities reflect local needs and expectations – this will influence the degree to which the facility will provide community benefit.
- Many positive benefits are associated with delivering a mix of uses at the site. As identified in the review of social issues and trends, public spaces can double as social meeting spaces for communities, and well-designed spaces can attract a higher volume of visitors and support community cohesion. The co-location of multiple uses, including community facilities, public open space, and retail offerings, will provide a space for the users of the site to meet each other can provide a successful mix that enhances the liveability for the local community.
- Communal open spaces for residents, workers, and visitors of the site at ground level will help to encourage social interaction and build social cohesion amongst the residents. Such communal and public spaces acting as "third spaces" where community members can relax and socialise outside of their homes and workplaces help meet the increased need driven by growth of high-density living in Burwood LGA.

6.3.4 Culture: shared beliefs, customs, values and stories, and connections to land, places, buildings

- People living in Burwood LGA area want vibrant, accessible, and safe local area, that is welcoming of all people regardless of age, gender, and/or cultural background. Delivery of social infrastructure on the site which accommodates for Burwood's diverse population will hence cater to community values.
- Positive impacts to connection to place may occur associated with the built form and design of the proposed buildings and delivery of publicly accessible open space and new community facilities on partially vacant land. The new development will provide improved place narratives and opportunities for the local community to create new connections.
- Positive impacts to culture associated with the delivery of landscape elements and public art which reflect local Aboriginal culture and histories, to be developed in collaboration with local Aboriginal knowledge holders (Landscape and Public Domain Concept Plan, Arcadia, 2023) (Public Art Strategy, FCAD, 2022).
- Positive impacts to culture associated with the delivery of community makerspace. This will provide new opportunities for local cultural expression and creation.
- While the site is not currently offering significant amenity, delivery of the proposed development may impact negatively on the surrounding community due to the removal of the existing Salvos store. This may trigger loss of connection to place for residents who frequently utilise the existing site for this purpose. It is noted that provision of this high-quality and architecturally and sustainably designed development on the site will deliver on community aspirations.

6.3.5 Health and wellbeing – including physical, mental, social and spiritual, and especially for vulnerable people; access to open space and effects on public health

- Potentially improved wellbeing for the new residents at a highly walkable site supported by infrastructure, close to the planned public transport and various recreational areas, which may encourage physical activity. The proposal includes high-quality open space, activated ground plain and street frontages, and a through-site link to improve amenity and encourage walkability of the site.
- The proposal supports community aspirations and associated health and wellbeing benefits by improving access to green spaces in high density environments. The proposed development will deliver 1,900sqm of green space, providing respite from the urban environment for residents, workers, and visitors on the site, as well as a place for mental restoration and social connection away from Parramatta Road.
- Networks and social capital can be built through the creation of public spaces and places that allow individuals, particularly those from a lone person household, to connect to others in their neighbourhood. Publicly accessible spaces and retail hubs can function as "third spaces" where community members can relax and socialise outside of their homes. A built environment that supports connectivity and builds relationships can have positive contributions to overall health and wellbeing outcomes. Some of the spaces that the proposal will deliver that can support these outcomes include:
  - Provision of high-quality green, open space and public plaza,
  - Provision of and hospitality offerings.
- Wellbeing benefits are also associated with improved activation and enhanced amenity of the site, which may increase perceptions of safety and opportunities to connect with other members of the community.
- There may be potential traffic impacts on pedestrian safety associated with increased number of people accessing the site by car. However, the intention of the development is to firsthand serve a local walkable catchment, and there is a potential to mitigate this impact by ensuring easy access and linkages with existing active transport networks and public transport stops and pedestrian safety principles.

  It is also noted that the Transport Assessment (JMT Consulting, 2023) indicates that the road network will operate 'near capacity' at peak times during operation of the proposed development. No traffic infrastructure upgrades are considered necessary to accommodate the expected traffic generation.
- Potential noise impacts on the residents, workers and visitors to the site are associated with the delivery of new dwellings, a hotel, retail and hospitality offerings, community facilities, and a public square at this site, next to a busy street. The impacts can be negative, or mitigated, depending on the design elements of the building and landscape mitigating the potential nose.

6.3.6 Surroundings: access to and use of natural and built environment, including ecosystem services, public safety, and security, as well as aesthetic value and amenity

- The proposed development may enhance the local neighbourhood with the proposed attractive, high-quality architecturally designed mixed-use buildings and public spaces at the site, improving amenity and opportunities for enjoyment of this site. Landscaping throughout the site and active frontages will enliven and improve the streetscape along Parramatta Road, Cheltenham Road, and Lucas Road and also assisting to slow existing traffic down. Noting that Parramatta Road is currently prohibitive to pedestrians due to high traffic volumes, unaccommodating paths, and noise, design elements which improve upon existing streetscapes will improve amenity and safety for pedestrians.
- The redevelopment of the site is also likely to improve perceptions of safety associated with increased amenity and activation. The presence of new workers, residents, and visitors will contribute towards increased activation while high quality design of spaces and provision of new services and facilities will offer higher amenity.
- There is potential for increased traffic movements associated with the operation of a mixed-use centre at this site. This may increase local congestion; however, it is noted that the intention of the development is to firsthand serve a local walkable catchment and is located in close proximity to planned public transport. On the other hand, delivery of a mixed-use centre closer to homes may reduce the need for car travel to currently existing centres further away.
- The activation of Parramatta Road on this site during evening hours (due to residents, workers, and visitors to public spaces) provides a positive social benefit in the support of the local night-time economy. It is noted that this supports state and local policy directions for the area.
- Potential improved perceptions of safety are associated with increased activation of the site due to increased number of residents, workers, and visitors on the site, or accessing the retail and other services in the area. This would increase the amount of pedestrian movement and activate the area, most likely during the day and early

hours of the evening. Improved perceptions of safety may be valuable to any residents that need to access and move around the site during late night hours.

- Potential overshadowing impacts to nearby open spaces and low-density residential areas due to the delivery of a new development of greater bulk and scale. This may impact upon solar access for surrounding residents. It is noted that the proposed development complies with the 2016 PRCUTS controls for future development and will result in minimal overshadowing to adjacent residential properties (Urban Design Report, Architectus, 2023). It is noted that community concern related to building heights and how this would affect the amenity and privacy of surrounding residents was raised during engagement activities.

6.3.7 Livelihoods: people's capacity to sustain themselves, whether they experience personal breach or disadvantage, and the distributive equity of impacts and benefits

- Potential positive impacts associated with increased employment opportunities, close to planned public transport infrastructure and in walking distance from homes, associated with the community, retail, and commercial uses proposed to be delivered on this site. The development will create around 410 direct FTE construction jobs and 290 direct FTE operational jobs.
- Potential positive impacts associated with the provision of makerspace and community space which can facilitate learning and training opportunities. This may increase the employability of local residents and lead to new businesses and job opportunities.
- Potential positive impacts associated with the provision of co-working space within the development. There is a noted lack of co-working spaces within the Study Areas, as highlighted in the Community Infrastructure Needs Analysis. Provision of co-working space may enable local economic stimulation, creation of new businesses and employment opportunities.
- The project can further amplify benefits associated with job creation by applying social procurement and employment practices through its construction and operational phases.
- The proposed development will support increased patronage for local businesses, including at night, based on the increased activation (additional residents, workers, and visitors) in the area.
- Permanent changes to the streetscape, improved access to daily needs, and provision of amenity on this site may have positive impacts on the value of property surrounding the site.

7.0 Economic Impact Assessment

7.1 Introduction

This section provides an assessment of the economic impacts (including benefits) likely to occur because of the project. Impacts are considered at the local and regional level, and through the construction and operational phases of the project. An estimate of the jobs likely to be created during the construction and operational phase of the proposed development are provided.

7.1.1 Methodology

To address the potential economic impacts likely to result from the project, this economic impact assessment considers:

- Demand for the development, including targeted uses such as:
  - Residential;
  - Visitor accommodation (hotel);
  - Retail, including a supermarket;
  - Commercial, including co-working facilities; and
  - Community spaces.
- Economic Impacts (including benefits) from the proposed development including:
  - Overall construction investment associated with the project;
  - Construction and ongoing employment generation (direct and multiplier);
  - Increase in Value Added output;
  - Additional expenditure generated by the project; and
  - Improved benefits to the surrounding community.

7.2 Demand for the development

7.2.1 Residential

The proposed development is planned to accommodate 17,365m^2 of residential GFA, equating to a total of 193 dwellings. The dwelling mix includes 1,2 and 3 bedroom residential units.

Strong population growth in the study area is likely to drive increased demand for residential investment in the local and regional area. For example, population growth within 3km of the site (SSA) is projected to increase by +24,500 residents by 2036. This growth includes a mix of young families and children, as well as elderly persons aged 60 years and over.

Assuming the average household size of 2.6 (ABS 2021) remains constant, this would imply a housing need for an additional +9,420 dwellings. In this context, the proposed development would help support a relatively small proportion of future population and dwelling growth. Moreover, it is a strategic objective of PRCUTS to deliver approximately 27,000 new dwellings in the Corridor by 2050. As such, any additional residential dwellings planned at the site within a strategic position along the corridor and close to future transport, would be considered appropriate.

The proposed mix of dwelling typologies including 1, 2 and 3-bedroom units will provide dwelling sizes for a range of occupiers. This dwelling mix would support a range of households in the local area, including families with children, lone persons, downsizers and young singles or professionals. Overall, the proposal can support greater housing choice and sizes for a range of households in this part of Sydney.

In 2021, the median apartment price in Burwood was $880,000 (Pricefinder). Additional residential stock will assist in ensuring housing stock is available across a range of price points and support housing diversity and affordability in Burwood, and the broader Parramatta Road Corridor. Housing affordability is a strategic objective of PRCUT, specifically to deliver more moderately priced housing that is affordable to purchase to for households earning up to $150,000 annually.

Overall, the site represents an ideal location to support higher density residential development due to a range of attributes that includes:

- Walkability and access to public transport.
- Adjacent to retail facilities.
- Accessible to strategic employment centres (Sydney CBD and Parramatta).
- Adjacent to amenities such as community services.
- Alignment to the PRCUTS objectives to facilitate renewal and activity along the Parramatta Road Corridor.

The provision of residential development at the site will ensure a vibrant and active precinct at all hours and on weekends. This is in line with PRCUTS which aims to *deliver a high quality, multi-use corridor with improved transport choices, better amenity, and balanced growth of housing and job within high quality spaces that are valued by the community".* The delivery of residential housing in a mixed use development is important in establishing a neighbourhood setting that enhances activity after hours.

7.2.2 Visitor Accommodation

The proposal for the 166-204 Parramatta Road site includes a 12,841m^2 hotel, supporting 160 rooms. It is understood that the proposal is targeting a mid-high end hotel, and that the site has already attracted the interest of an experienced hotel operator.

A review of existing visitor accommodation supply shows that there is currently 11 hotel and serviced apartment providers within 3km of the site, accommodating a total of 340 rooms. These accommodation facilities are largely operated by independent operators, and typically offer low-mid scale visitor accommodation facilities and services. The exception is the Crowne Plaza Burwood, located just 1km from the site which is considered a higher-end accommodation offering in this part of Sydney. The hotel features 90 rooms, a fitness and wellness centre (including rooftop pool), a modern restaurant, café, rooftop bar, as well as meeting and events spaces.

The remaining accommodation facilities are mostly small accommodation providers in Strathfield and Ashfield, located close to the town centres. These facilities are typically dated, do not offer high levels of amenity and experiences for contemporary visitors wanting to stay for more than one or two nights. There is one proposed 5 star hotel in Ashfield at 92 beds that is in the early planning stages.

Beyond the SSA, Sydney Olympic Park supports a number of hotels including IBIS, Quest, Pullman, and Novotel. Sydney Olympic Park attracts a significant number of visitors to the area, including for sport and recreation events, entertainment and business activities, generating demand for hotel accommodation in the local surrounding region.

The subject site represents a logical location for a mid-range hotel, with tourism data presented in **Section 4.5** showing that in the latest financial year (2021/2022), the SSA received in the order of 1 million visitor nights. Pre COVID-19, there was significant growth in visitor nights overall, peaking in 2018/19 at 4.7 million. Around 70% of visitors to the Study Area stayed in commercial accommodation such as a hotel , highlighting demand for visitor accommodation facilities in this part of Sydney.

This demand and provision of limited bed numbers and low-quality supply highlights a significant gap in the visitor accommodation market for the local area, particularly for mid-high end accommodation.

7.2.3 Retail

The proposed development includes 3,362m^2 of retail floorspace, of which 2,009m^2 is dedicated to a supermarket. The balance of retail floorspace will accommodate a range of retail uses including food and dining, a micro-brewery, and other retail specialities that will activate the street level and public domain within the site itself, but also along Parramatta Road.

As the population of the local area increases, so too will demand for additional retail floorspace. Retail uses are critical in serving the needs of local residents, workers and visitors to the site, as well as the local surrounding area. A successful retail offer helps to support the activation and amenity required to establish a vibrant and attractive destination.

A review of the retail floorspace demand assessment prepared by GapAdvisory (October 2022) shows that there is some 127,000m^2 of traditional retail floorspace (excluding Large Format Retail) across the defined primary sector in the retail assessment. Much of this retail floorspace is attributed to Westfield Burwood; a regional shopping centre with 65,000m^2 of retail GFA. In addition to the 127,000m^2 traditional retail floorspace, there is 14,200m^2 of supermarket floorspace

across key centres such as Westfield Burwood (Coles, Woolworths), 4,100m^2 at Woolworths Burwood Plaza, 3,100m^2 at Coles Five Dock and 2,500m^2 at Coles Monica Centre.

The retail floorspace demand assessment (GapAdvisory 2022) notes that there is a significant supermarket gap of around 18,750m^2 in the Main Trade Area (MTA). Importantly, the GapAdvisory report notes that overall, this part of Sydney is significantly undersupplied for supermarket floorspace, with a minimal provision of full-line stores. This is further supported by the PRCUTS Economic Analysis report which notes that major tenants such as supermarkets are identified as supportable in the Kings Bay precinct.

Overall, the retail demand assessment (GapAdvisory 2022) recommends that the proposed quantum of floorspace at the site is appropriate and will sufficiently support future growth in the area, with the GapAdvisory report estimating total retail floorspace demand (excluding LFR) in the MTA will increase by +23,886m^2 between 2021 and 2036. The proposed retail floorspace at the site will support a range of customer segments, including local residents and workers, as well as visitors to the site. Other customer segments such as passing traffic or commuters to and from the future Burwood North Metro Station will likely support a smaller proportion of demand for these facilities.

Ancillary to the proposed retail uses, the proposal also includes 97m^2 of flexible community space and a 719m^2 Mercedes Benz experience centre. Together, these community and retail uses at the site are expected to create a destination for visitors and residents, and deliver a new experience to this part of Sydney. The proposed retail uses include speciality stores, supermarket, a micro-brewery, and other retail experiences such as the Mercedes Benz Centre are critical in unlocking the subject site as a true mixed use precinct.

7.2.4 Commercial

The proposed development includes some 1,197m^2 of commercial office GFA, including co-working facilities. Co-working is an alternative and flexible workspace model that provides an open plan and collaborative office setting where people and businesses can come together and work within an integrated setting. The spaces are highly flexible and enable people to rent a desk or meeting room, while benefiting from high quality office amenities within a shared space.

A review of existing commercial office supply shows that there is a relatively limited provision of office stock in the local area, with most of the existing office floorspace concentrated in the Burwood Town Centre, which supports some 68,576m^2 of floorspace. The nearest major co-working space to the Subject Site is WOTSO at North Strathfield, incorporating some 6,230m^2 of co-working space, and is located in the Bakehouse Quarter complex.

Co-working spaces have become increasingly sought after as a result of flexible working, exacerbated by the COVID-19 pandemic. This is reflected by increased turnovers for operators such as WOTSO, which saw an 30% increase in operating revenue to the year FY2021, with many established sites recording occupancies in excess of 90%.

The PRCUTS Economic Analysis highlights that the few commercial buildings in and around the Kings Bay Precinct benefit from strong leasing activity, highlighting demand for employment uses within this part of Sydney. A review of employment projections in the SSA shows forecast employment of some +1,278 office-based workers by 2036 (including traditional office and knowledge workers). Taking into account the typical workspace ratio of 16.2m^2 for every 1 office-based worker (City of Sydney Floorspace and Employment Survey 2017), there is an implied demand for over +20,000m^2 of additional office floorspace by 2036, within 3km of the site.

The proposed 1,197m^2 of commercial office floorspace is overall a minor component of the proposed development and is a highly complementary offer that will support existing and forecast demand for office-based facilities.

7.3 Economic Impacts

7.3.1 Residential

The proposed development includes 17,365m^2 of residential floorspace, supporting some 193 dwellings. Adopting the average household size of 2.6 persons per dwelling for the SSA (ABS 2021), the development of the site may accommodate approximately 500 residents at full occupancy.

This level of residential population would account for approximately 2.0% of projected residential growth in the defined SSA (of +24,500) over the period to 2036. As such, the proposed provision of residential floorspace would represent a

relatively small proportion of future residential requirements and therefore, the project would not impact on the ongoing viability or continued operation of other residential developments.

The proposed residential component would help deliver more diverse housing options and provide additional supply in a highly strategic and accessible location that is targeted for renewal. The proposal will also ensure there is an availability of different price points across the local area.

Residential uses at the subject site will facilitate a true live/work/play environment and facilitate a transit-oriented precinct that can cater to a diverse range of age groups, including young professionals, young families and older so-called 'downsizers'.

7.3.2 Visitor accommodation

The proposed development seeks to provide a hotel of 160 beds across 12,841m^2 of visitor accommodation GFA. The hotel will also support a function/conference centre, and a hotel restaurant.

Visitor accommodation is critical in growing a strategic centre and supporting a successful tourist and visitor economy in this part of Sydney, and more broadly within the Parramatta Road Corridor. The availability of modern hotel accommodation space is a key consideration for many customer segments, including businesses and visitors in the future. Furthermore, visitor accommodation is critical to growing the night-time economy and supporting activities in the local area.

This is consistent with the Burwood LSPS, which outlines a key planning priority to Grow Burwood's night-time entertainment, dining and other recreational opportunities. As part of achieving this action, the LSPS states the need to diversify the current offerings in Burwood (including hotels). The provision of 160 rooms within a high amenity hotel at the site will support the growth of Burwood's night time economy and visitor numbers by enhancing the quality of visitor accommodation and providing a place for visitors to stay and experience activities in the local area. This will enhance the local economy and recovery of jobs and growth post COVID-19, particularly in the hospitality and tourism sectors that have experienced significant impacts as a result of the pandemic.

As identified in **Section 7.2.2,** the majority of existing visitor accommodation stock is dated, and there is a market gap for high-quality accommodation facilities in the local and regional area. Furthermore, there remain a range of operators not currently represented in the region who may consider locating at the site. This is reflected by early operator interest. Ensuring consumers and visitors are provided with a range of choice, quality and price points is an important consideration in the provision of a competitive market. The proposed hotel at the site will assist in ensuring this is the case.

The proposed development is not expected to impact on the ongoing viability or continued operation of any existing or proposed visitor accommodation use. Rather, the proposed development would provide a new offer in the local area, and one, that will support the renewal and evolution of the Parramatta Road Corridor with a contemporary hotel use that will support growth across a range of uses and enhance activity in the longer term.

7.3.3 Retail and other community uses

The retail impact assessment prepared by GapAdvisory (October 2022) outlines the overall impacts of the proposed 3,362m^2 of retail GFA to be negligible. Specifically, the GapAdvisory report estimates that the proposed retail mix at the site could generate sales of $34 million, assuming a first full year of trading in 2024/25. This includes $25 million of supermarket sales, and the remainder allocated to speciality retail.

The GapAdvisory report estimates that the greatest retail impact will fall on Five Dock, Concord and Strathfield centres, with each estimated to experience an impact on sales -5.0%, which is considered a low impact. All other centres within the GapAdvisory defined Main Trade Area will have retail impacts of less than 5%, which is considered negligible. Overall, the impact test notes that the additional 3,362m^2 of retail floorspace at the site will add to the market while preserving the existing centres hierarchy.

Furthermore, the scale of other non-retail uses in the proposed development including the Mercedes Benz Centre, and other community spaces form a minor component of the overall development at 0.9% of total GFA. The GapAdvisory report estimates that any impacts of these facilities would be minor and would be widely dispersed across a range of operators in the MTA. In fact, the non-retail uses would be well supported by population growth of +24,500 residents in the SSA by 2036.

Having regard for these factors, the proposed retail and community uses within the development are not expected to adversely impact on the ongoing operation of any existing or proposed retail facility

7.3.4 Commercial and co-working

Plans for the site indicate some 1,197m^2 of commercial floorspace is planned to be provided, inclusive of co-working spaces. At this level of GFA, the proposed commercial floorspace will represent a minor component of the overall project GFA, (just 3.4%). As such, the proposed commercial floorspace of the project is considered ancillary in nature, and complementary to the proposed uses.

As the proposed commercial floorspace will form a small proportion of overall GFA, any impact of these facilities on surrounding businesses or development will be minimal and will not impact on the ongoing operation or viability of any existing or proposed facility. The proposed office floorspace will contribute to an uplift in on-site employment, provide additional co-working spaces for local residents, and establish the site as a true live/work/play community.

7.4 Economic benefits

7.4.1 Input-output modelling

Economic impacts associated with the proposed development have been prepared with input-output modelling undertaken with reference and compliance to best-practice guidelines.

Input-output tables are a 'map' of the economy that track the flow of products, services, and payments through the many industries, households, government organisations and foreign transactions that make up the Australian economy.

Every industry requires inputs from many other industries, plus the inputs of workers and machinery and equipment to produce output. Input-output modelling uses averages derived from the ABS Input Output Tables to estimate the impact on all industries when one industry expands its production. The modelling used in this report is based on the 2018/19 ABS National Accounts release.

As with all economic models, input-output models include a number of limitations, which include the following inherent assumptions: unlimited supplies of all resources including labour and capital, prices remaining constant, technology is fixed in all industries, and import shares are fixed.

Having regard for these limitations, the modelling used for the purposes of this assessment applies the **Simple Multiplier effect measure**. The Simple Multiplier effect measures estimates the expansion of other industries required to support the initial (direct) increase in the original industry; and does not include the additional impacts of extra wages and employment income being spent across the economy (spill-over effects).

Use of the **Simple Multiplier effect measure** is in-line with best practice industry standards and reflects a conservative position. Results from the modelling should be interpreted as indicative of the potential impact the project will have on the Australian economy. The modelling provides estimates of the following economic benefits as a result of the project:

- **Construction Employment** - direct construction job-years supported by construction of the development and indirect job-years supported across all other industries over the construction period.
  'Job-years' is defined as the number of full-time equivalent (FTE) jobs supported over the construction period. i.e. if construction is over 10 years, 100 job-years is equivalent to 10 FTE jobs per year. Job years only applies to construction employment.
- **Ongoing Employment** - direct and indirect FTE jobs supported by the ongoing operation of the project annually.
- **Value Added** - direct and indirect value added generated during the construction and operational phase of the project. Value Added is defined as the wages, salaries and supplements plus gross operating surplus (income earned by businesses) required in producing the extra output (construction investment and operating output/turnover). This represents the standard measure of economic contribution, that is, the increase in economic activity as measured by gross domestic product (GDP).

7.4.2 Construction phase

It is estimated that the direct capital investment required to realise the proposed development will be in the order of approximately $284 million. This is based on the preliminary cost report prepared by mbm.

Based on construction costs of $284 million, the construction phase of the project is estimated to directly support employment of 410 job years, and deliver a direct value-add to the economy of $61.5 million.

When the multipliers are taken into account, total state wide economy effects over the construction program are forecast to be: employment of 1,690 job-years and a total value-add to the economy of $231.4 million.

Table 13 Construction Phase Economic Benefits ($2020/21)

	Construction Phase (spread over construction period)		
	Direct	Indirect	Total
Output ($M)	$284.0	$418.0	$702.0
Employment (job-years)	410	1,280	1,690
Value Added ($M)	$61.5	$169.9	$231.4

Source: Ethos Urban analysis utilising data from ABS, National Accounts 2018/19; ABS, Consumer Price Index
Note:*Job-years: Number of FTE jobs supported over the construction period. i.e. if construction is over 10 years, 100 job-years is equivalent to 10 FTE jobs per year.

7.4.3 Ongoing phase

Economic impacts associated with the operation phase of the proposed development at completion and fully occupied, have been based on supportable employment estimates for the various uses incorporated within the proposed scheme. These estimates have been prepared with reference to relevant industry benchmarks, and include the following:

- **Retail:** 1 worker for every 30.2m^2 of retail floorspace, based on results from the City of Sydney Floor Space and Employment Survey, 2017.
- **Commercial:** 1 worker for every 16.2m^2 of commercial floorspace, based on results from the City of Sydney Floor Space and Employment Survey, 2017.
- **Hotel:** 1 worker for every 100m^2 of accommodation floorspace, based on the NSW Common Planning Assumptions workspace ratios.
- **Other community uses:** 1 worker for every 74.9m^2 of floorspace, based on results from the City of Sydney Floor Space and Employment Survey, 2017. For the purposes of this assessment, this includes the proposed Mercedes Benz experience centre and community spaces.

Based on the above, on completion of the proposed development, the operational phase is expected to deliver the following (direct) benefits: FTE employment of 290 ongoing jobs and direct value-add to the economy of $27.5 million per annum.

When the multipliers are taken into account, total ongoing economy-wide effects are estimated at: FTE employment of 440 jobs supported and a total direct value-add to the economy of $47.4 million per annum.

Table 14 Ongoing Phase Economic Benefits ($2020/21)

	Operational Phase (annual)		
	Direct	Indirect	Total
Output ($M)	$52.3	$42.3	$94.6
Employment (FTE)	290	150	440
Value Added ($M)	$27.5	$20.0	$47.4

Source: ABS, National Accounts 2019/20; Ethos Urban Research

7.4.4 Increased resident expenditure

Once complete and fully occupied, the proposed development will accommodate an additional residential population on site. This resident population would support an increase in retail expenditure that will be directed to local businesses.

Based on the proposed plan the proposed 193 dwellings could support around 500 residents, taking into consideration the SSA average household size of 2.6 (ABS 2021).

A review of retail expenditure per capita by residents in the SSA is in the order of $15,770 each year on average (2021 dollars). Accordingly, the 500 new residents at the site could support a total of $7.9 million in additional retail expenditure generated each year (see **Table 15**). This would include spending on food, liquor and groceries, food catering, non-food items and services. This additional retail expenditure will support existing and proposed retail facilities both at the site, and the surrounding local and regional area.

Table 15 Estimated resident retail expenditure at full occupancy

Measure	Value
Estimated number of new residents	500
Per capita retail expenditure on local retail per annum by residents ($)	$15,770
Increase in expenditure on local retail per annum by residents ($)	$7,913,000

Source: Marketinfo 2016, Ethos Urban
Note: Figures rounded

7.4.5 Other economic benefits

The planning proposal for 166-204 Parramatta Road, will deliver a range of economic benefits to the local community and the state. In particular, the proposal will deliver a modern and high amenity mixed use precinct that responds to community needs of residents, workers and visitors to the local area, and surrounding localities. Other benefits associated with the proposal include:

- Catalysing growth and renewal of the Parramatta Road Corridor by activating a large and amalgamated site in the Kings Bay Precinct, acting as a catalyst for growth, and regenerating the Corridor with a visionary project that will make this part of Parramatta Road a destination for residents, workers and visitors.
- Delivering a contemporary, integrated mixed use development that will transform an underutilised site into a high-quality mixed-use precinct that will be well suited to meet the needs of modern residents, tenants and visitor requirements, and embellish a true live/work/play community.
- Supporting ongoing investment and uplift close to planned major transport infrastructure and precincts along this part of the Parramatta Road Corridor, including the Burwood North Metro Station, Burwood North Precinct, and Kings Bay Village.
- Increasing housing diversity and choice that will cater for a range of future occupiers, including young couple families, with or without children, as well as young singles and downsizers. This will create a space for a range of occupants, and support housing affordability in a central and accessible location in Sydney.
- Provide visitor accommodation for a growing part of Sydney that is experiencing increasing visitation numbers and that does not currently provide a significant offer and range of high amenity hotels.
- Provide support for Burwood LGAs, entertainment and night-time economy by providing accommodation for visitors and patrons.
- Enhance the provision of retail facilities within the local area, supporting on site residents, as well as residents and workers within the surrounding area.
- Benefit local retailers and business through additional retail expenditure in the local area as a result of resident uplift at the site.
- Supporting state and local planning policies, including the PRCUTS through the following:
  - Unlocking residential and employment opportunities with an accessible location, contributing to the need for more housing choice and affordability, as well as contributing towards a diverse and resilient economy.
  - Contribute to establishing an accessible and connected corridor that encourages that use of public transport investments through the delivery of a transit-oriented development close to the future Burwood North Metro station.
  - Create a vibrant community place by establishing a mix of uses including community facilities, retail shops and co-working spaces that will enhance activity along the Parramatta Road Corridor and support walkability.

- Contribute to growing the night time economy by providing high quality visitor accommodation, attracting visitors to the local area.
- Supporting the 30-minute city vision through the provision of a true live/work/play environment close to transport infrastructure.
- Catalysing the renewal of the Parramatta Road Corridor, and specifically Kings Bay Precinct.

As a result of the above, any adverse impacts likely to result from the planning proposal will be limited and will be far outweighed by the benefits expected to be generated as a result of the proposed development. As such, the planning proposal at 166-204 Parramatta Road is likely to result in an overall net gain to the community.

8.0 Social and economic strategy and directions

8.1 Catalysing renewal and activation of the Parramatta Road Corridor to benefit current and future communities

The current state of the Parramatta Road Corridor has long been a point of issue for local and state governments. Its lack of amenity and high traffic volumes have been prohibitive to new development, meaning that the corridor has largely remained stagnant. Currently, poor built form, excessive noise, and a lack of pedestrian access is adversely affecting liveability in the surrounding areas.

The proposed development seeks to transform the urban realm into an accessible live, work and play destination, setting an exemplar for future development along Parramatta Road. The high-quality architectural design, which emphasises urban greening, will enhance views on Parramatta Road and raise the bar for design outcomes in the locality. The composition of the development scheme has been sensitively considered in relation to the immediate suburban context, in order to provide some benefit to the wider community.

Placemaking objectives for the development will revitalise Parramatta Road assisting to slow vehicular traffic in delivering an attractive neighbourhood feel. The design features generous landscaped setbacks which will revitalise the streetscape and improve amenity for pedestrians traversing the corridor. Additionally, the development will provide through-site links and laneways which prioritise pedestrian movement in order to increase local walkability.

With the future Burwood North Metro Station located within walking distance, the development will contribute to the 30-minute city priority of the Greater Sydney Commission. Future residents and workers of the site will be able to access daily living needs, social infrastructure, and other places of interest quickly and conveniently. Locating a mix of uses close to high-frequency public transport will also increase access to such infrastructure for the broader community residing across the study areas.

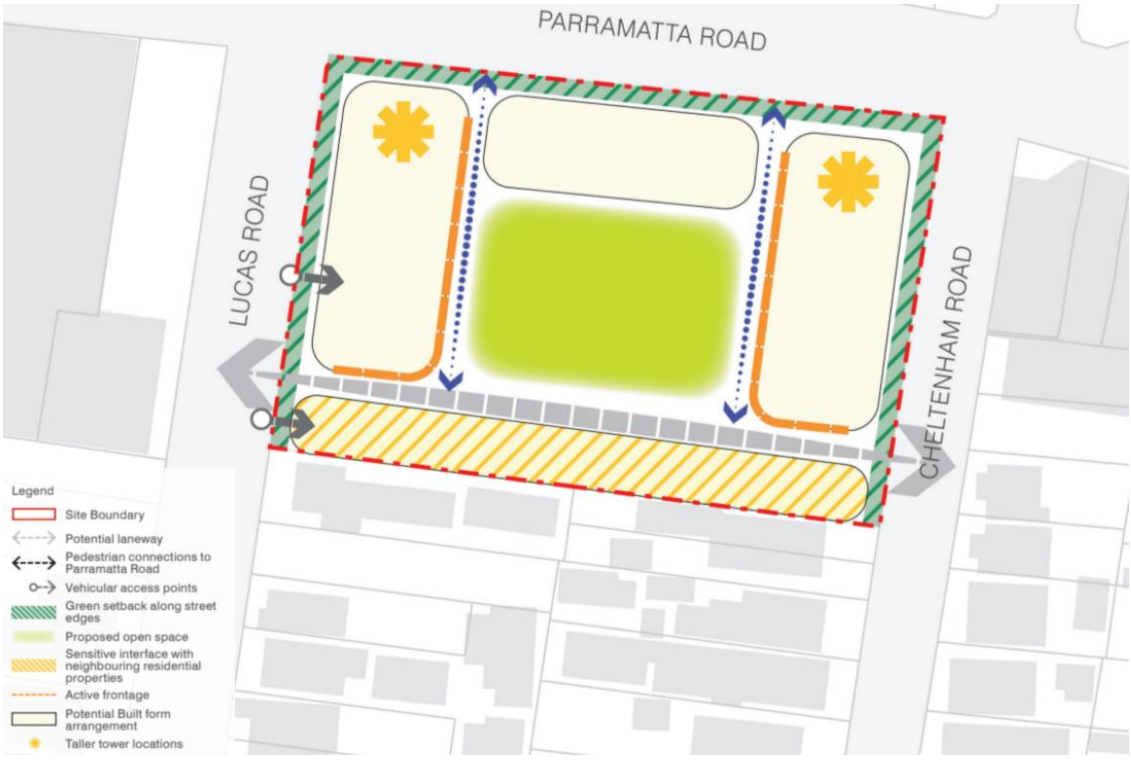


Figure 17 Proposed structure plan, displaying interfaces with surrounding areas

Source: Architectus

8.2 Improving community infrastructure for local residents

The proposed development seeks to contribute to the local network of social infrastructure by providing facilities in a walkable location, co-located with housing, employment floorspace, retail, and public transport infrastructure. This will assist Burwood Council by taking pressure off the existing network, while also accommodating for the site's forecasted residential uplift.

The development scheme includes up to 97m^2 of community floorspace. This dedicated space will be multipurpose, serving a range of functions in order to meet the diverse needs and aspirations of the local community. The Community Needs Analysis undertaken for the site indicates demand for an integrated multipurpose facility, local community facility, as well as creative practice spaces or 'maker spaces'. The delivery of a multipurpose community space within the development will assist in alleviating demand by facilitating a range of community activities.

Some 1,900m^2 of green open space and public plaza for relaxation and recreation will also be delivered by the proposed development. This will enable opportunities for outdoor entertainment, quiet reflection, along with spaces for children's play. The space will make a significant contribution to local open space available to local residents in the surrounding neighborhood.

The proposed range of community infrastructure has been carefully developed with regard to Burwood Council's latest strategic policy drivers, along with an examination of the community's aspirations captured through engagement activities. The local community desires infrastructure which keeps pace with population growth, is high-quality, and caters for a range of activities and programs. The community has also expressed a want for increased greenery and open space. Council supports these aspirations within their policy, and has set objectives for new community facilities and open space.

Figure 18 Artist's impression of the proposal's 'green heart'

Source: Architectus

8.3 Supporting local socio-economic development

Many older retail shops along Parramatta Road are empty and have fallen into disrepair, making the street unviable for businesses and unremarkable as a place of interest. Shop front retail is almost extinct along the road and estimates suggest two in every three shops were closed/vacant, even before the COVID-19 pandemic[23].

[23] Reclaiming Parramatta Road, report by Committee for Sydney, 2020

As a mixed-use centre, the proposed development brings the potential to make a significant contribution to local socio-economic development. Primarily, the proposal will create a number of jobs through its construction and ongoing operation, including the provision of service-based jobs that create local employment opportunities. It is estimated the site will support around 290 direct FTE operational jobs, associated with the delivery of the retail, visitor accommodation and commercial uses on the site. The development will also deliver co-working spaces, which has the potential to enable local economic stimulation, create new businesses and employment opportunities.

The co-location of retail and commercial uses with housing and community infrastructure is also likely to increase the viability of the businesses which will occupy these spaces. Approximately 500 new residents will live within walking distance to these businesses and are likely to utilise them to support their daily living needs where necessary.

Through its provision of community infrastructure, including makerspace and teaching/learning space, the development has the potential to make a broader contribution to local social and economic development. The delivery of affordable space for artists will increase accessibility for local talent, therefore supporting the creative economy. This may catalyse new job opportunities or businesses for local artists. Further, the provision of teaching/learning space will provide new opportunities for education and training, which is likely to strengthen the employable skills of local residents.

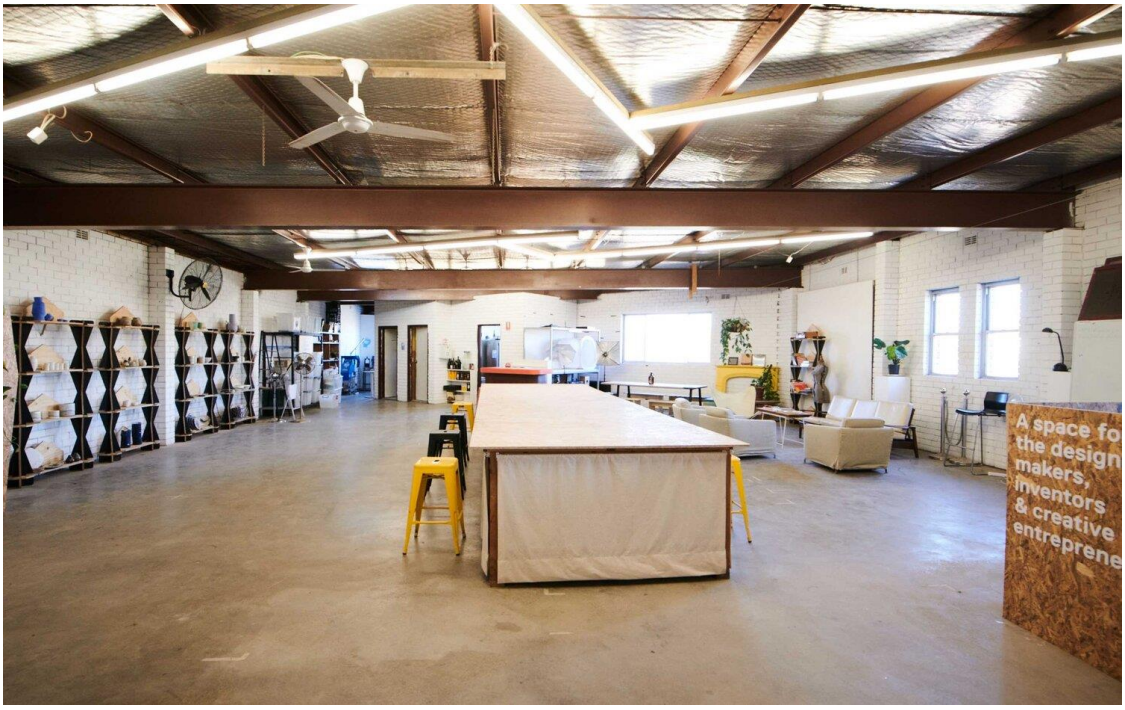


Figure 19 Example of community makerspace

Source: Makerspace & Co Sydney

Appendix A Community Profile Summary

Category	PSA	SSA	Greater Sydney
Income			
Median individual income (annual)	$39,290	$45,440	$45,930
Variation from Greater Sydney median	*-14.5%*	*-1.1%*	*n.a.*
Median household income (annual)	$99,730	$109,620	$108,750
Variation from Greater Sydney median	*-8.3%*	*+0.8%*	*n.a.*
Age Structure			
0 years	0.9%	0.9%	1.2%
1-2 years	1.7%	1.8%	2.4%
3-4 years	1.7%	1.7%	2.4%
5-6 years	1.6%	1.8%	2.5%
7-11 years	4.2%	4.6%	6.3%
12-17 years	5.2%	5.4%	7.1%
18-24 years	12.8%	11.6%	8.8%
25-34 years	18.8%	19.5%	15.6%
35-49 years	20.1%	20.0%	21.7%
50-59 years	11.9%	11.9%	12.0%
60-69 years	9.0%	9.2%	9.7%
70-84 years	8.8%	8.8%	8.4%
85 years and over	3.2%	2.8%	1.9%
Median Age (years)	36.9	37.0	37.3
Country of Birth			
Australia	44.1%	50.6%	61.1%
Aboriginal and Torres Strait Islanders	*0.4%*	*0.5%*	*1.8%*
Other Major English Speaking Countries	4.1%	4.2%	7.1%
Other Overseas Born	51.8%	45.2%	31.8%
% speak English only at home	*39.0%*	*47.2%*	*61.0%*
Household Composition			
Couple family with no children	23.6%	26.1%	24.5%
Couple family with children	29.9%	30.6%	36.1%
Couple family - Total	53.6%	56.6%	60.5%
One parent family	10.2%	9.3%	11.0%
Other families	2.5%	2.0%	1.1%
Family Households - Total	66.3%	67.9%	72.6%
Lone person household	25.0%	24.3%	23.3%
Group Household	8.7%	7.7%	4.1%
Dwelling Structure (Occupied Private Dwellings)			
Separate house	35.8%	38.2%	56.1%
Semi-detached, row or terrace house, townhouse etc.	14.7%	10.5%	12.8%
Flat, unit or apartment	49.2%	50.2%	30.7%
Other dwelling	0.3%	1.0%	0.4%
Occupancy rate	*90.8%*	*91.1%*	*91.8%*
Average household size	2.6	2.6	2.7
Tenure Type (Occupied Private Dwellings)			
Owned outright	26.1%	29.5%	28.3%
Owned with a mortgage	23.5%	26.0%	34.0%
Rented	48.5%	42.9%	36.1%
Other tenure type	1.8%	1.6%	1.6%
Attending Education (% of those attending)			
Pre-school	5.5%	5.7%	8.0%
Infants/Primary Total	20.8%	22.2%	31.4%
Secondary Total	20.4%	20.2%	24.9%
Technical or Further Educational Institution	13.4%	12.5%	10.2%
University or other Tertiary Institution	31.3%	31.6%	21.4%
Other type of educational institution	8.6%	7.8%	4.2%
% of total population attending education	*27.7%*	*26.8%*	*25.8%*
Need for Assistance			
With Need for Assistance	6.2%	5.5%	5.5%
No Need for Assistance	93.8%	94.5%	94.5%

Source: ABS Census of Population and Housing 2021

Note: interpretation of small area data from the 2021 ABS Census should consider potential outcomes from the COVID-19 pandemic.

166 – 204 Parramatta Road, Croydon

Transport Assessment

Prepared for: **LSH Australia**

19 May 2023

PROJECT INFORMATION

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Table of Contents

1 Introduction **1**

2 Site Conditions **2**

2.1 Existing travel behaviour *2*

2.2 Road network *3*

2.3 Public transport *4*

2.4 Traffic volumes *5*

2.5 Public transport accessibility *6*

2.6 Historical traffic flows *7*

2.7 Pedestrian and cyclist facilities *8*

3 Transport Assessment **9**

3.1 Alignment with current transport policy *9*

3.2 Vehicle site access *10*

3.3 Car parking *11*

3.4 Loading and servicing *13*

3.5 Travel demand analysis *14*

3.6 Pedestrian and cycling provision *15*

3.7 Green travel plan *15*

4 Road Network Assessment **18**

4.1 Forecast traffic generation *18*

4.2 Potential traffic generation – current planning controls *21*

4.3 External traffic growth *22*

4.4 Traffic distribution *22*

4.5 Traffic modelling outputs *24*

4.6 Traffic modelling findings *27*

5 Summary **28**

Appendix A: Traffic Modelling Outputs **29**

Figures

Figure 1 Site location 1
Figure 2 Existing road network surrounding the site 3
Figure 3 Public transport services 4
Figure 4 Traffic survey locations 5
Figure 5 30 minute public transport catchment 6
Figure 6 Traffic flows on Parramatta Road – 2019 vs 2021 7
Figure 7 Existing pedestrian and cycling infrastructure 8
Figure 8 15-minute neighbourhood concept 9
Figure 9 Proposed vehicle access strategy 10
Figure 10 On-site loading / servicing area 13
Figure 11 Forecast traffic generation – current controls vs Planning Proposal 21
Figure 12 Increase in traffic movements by intersection (AM peak hour) 23
Figure 13 Increase in traffic movements by intersection (PM peak hour) 23
Figure 14 Forecast intersection performance – Sydney Metro West project 26
Figure 15 Order of road user space considerations 27

Tables

Table 1 Existing travel behaviours 2
Table 2 Indicative parking numbers 12
Table 3 Development trip generation 14
Table 4 Trip generation by mode 14
Table 5 List of potential GTP measures 16
Table 6 Net traffic generation 20
Table 7 Level of service grades / description 24
Table 8 Road network performance – AM Peak Hour (8am – 9am) 25
Table 9 Intersection performance – PM Peak Hour (5pm – 6pm) 25

1 Introduction

JMT Consulting has prepared this transport assessment to support a Planning Proposal for the site at 166-204 Parramatta Road, Croydon. The western part of the site is currently fenced off due to ongoing construction works, with the eastern part of the site previously operating as a Salvation Army store and warehouse. The Planning Proposal seeks to provide for a mixed-use development on the site including residential, retail, commercial and hotel uses. The location of the site is presented in Figure 1 below.

Figure 1 Site location

This transport assessment has considered the following items:

- Existing transport conditions around the site
- Site access arrangements
- Forecast travel demand
- Forecast traffic volumes
- Traffic modelling and road network impacts
- Loading and servicing
- Potential car parking provision

2 Site Conditions

2.1 Existing travel behaviour

Travel behaviours for residents and employees within the area surrounding the site[1] been analysed using 2016[2] Journey to Work Census data. The data demonstrates a strong proportion of people travelling from Croydon to work use public transport, accounting for over half of all trips in the case of residents travelling to work. This reflects the strong availability and accessibility of public transport in this area. Private vehicle is the dominant mode of transport for people travelling to Croydon for work, which is likely representative of the good availability of parking in the area. These existing travel behaviours are summarised in Table 1 below.

Table 1 Existing travel behaviours

Mode of travel*	Proportion of trips	
	Residents travelling to work from Croydon	*Employees travelling into Croydon for work*
Car driver	31%	56%
Car passenger	1%	5%
Bus	4%	4%
Train	53%	28%
Walk	11%	7%
Total	**100%**	**100%**

** Excludes people working from home or not going to work on the date of the Census*

[1] Croydon SA2
[2] 2021 Census data not available at time of writing. Additionally 2021 Journey to Work data would be heavily impacted by the stay at home orders in place at the time of the Census and would not accurately represent the travel behaviours of residents and workers in the area

2.2 Road network

To manage the extensive network of roads for which councils are responsible under the Roads Act 1993, Transport for NSW (TfNSW) in partnership with local government established an administrative framework of *State, Regional,* and *Local Road* categories. State Roads are managed and financed by TfNSW and Regional and Local Roads are managed and financed by councils.

Regional Roads perform an intermediate function between the main arterial network of State Roads and council controlled Local Roads. Due to their network significance TfNSW provides financial assistance to councils for the management of their Regional Roads. Key State and Regional roads which provide access to the site are illustrated in Figure 2 below, which demonstrates the site is very well connected to the surrounding road network.

The site is primarily serviced by Parramatta Road which is a classified as a State Road. The M4 East Motorway runs parallel to Parramatta Road (below ground) close to the subject site, with Queens Road to the north also providing a key east-west corridor. Regional Roads in the vicinity of the site include Railway Parade and Burwood Road. The site is also serviced by local roads managed by Council including direct frontage to Cheltenham Road and Lucas Road.

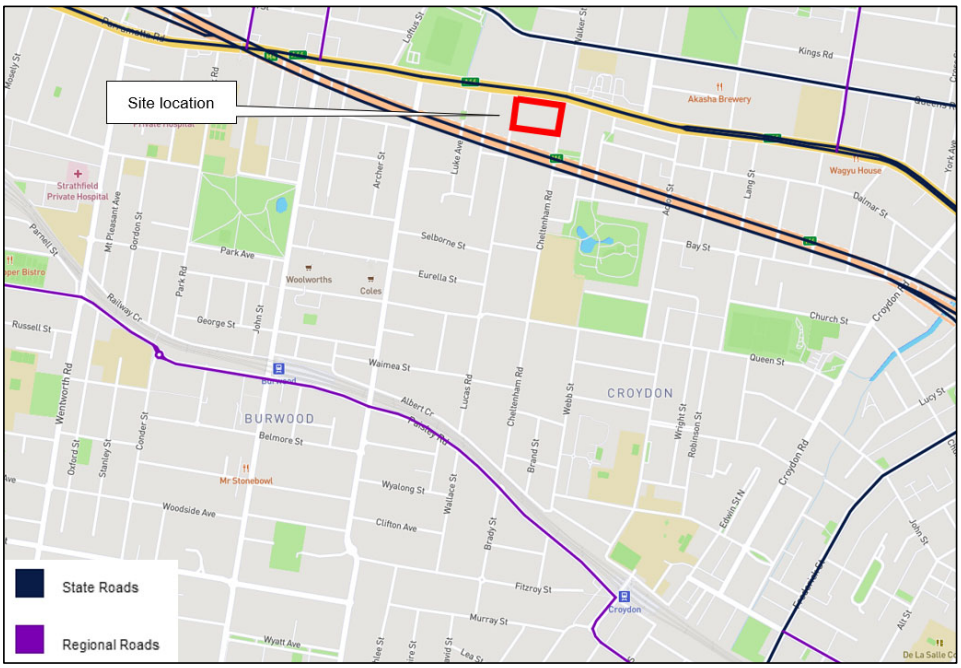

Figure 2 Existing road network surrounding the site

2.3 Public transport

The site has strong connections to nearby public transport, including:

- Bus stops along Parramatta Road servicing multiple bus routes between the Sydney CBD, Burwood, Chatswood and other key centres, with bus routes including:
  - Route 415 (Campsie to Chiswick)
  - Route 461X (Burwood to Sydney CBD)
  - Route 530 (Burwood to Chatswood)
- Croydon train station located approximately 1.5km walking distance from the site.
- Future Burwood North metro station to be delivered as part of the Sydney Metro West project located within an 800m walk of the site. This future metro station will support significantly improved public transport accessibility in the precinct, with fast high frequency services to key employment centres such as Westmead, Parramatta, Pyrmont and the Sydney CBD.

The public transport environment in the vicinity of the site is shown in Figure 6.

Figure 3 Public transport services

2.4 Traffic volumes

Traffic counts were undertaken on Thursday 10 February 2022 to understand the existing level of traffic movements on the road network surrounding the site. It is important to note the traffic survey dates were undertaken outside of any 'stay at home' orders or other COVID-19 pandemic restrictions in place in the Sydney Metropolitan Area. The survey locations are summarised below and shown in Figure 4.

- Parramatta Road / Shaftesbury Road (traffic lights)
- Parramatta Road / Luke Avenue (traffic lights)
- Parramatta Road / Lucas Road (left in – left out)
- Parramatta Road / Cheltenham Road (traffic lights)

Figure 4 Traffic survey locations

The traffic surveys have been used as the basis for the traffic modelling carried out to understand the implications of the Planning Proposal on the surrounding road network.

2.5 Public transport accessibility

An indicator of the level of public transport accessibility a site contains is the number of locations accessible within a 30 minute public transport catchment. A key objective of the Greater Sydney Commission's Greater Sydney Region Plan is to deliver a 30-minute city where jobs, services and quality public transport spaces are in easy reach of residences.

As illustrated in Figure 5 a number of key employment centres across Sydney can be reached within 30 minutes public transport travel time of the site, including Epping, Parramatta, Sydney Olympic Park, Central Station and the Sydney CBD. The highly accessible nature of the site will support access via public transport and reduce the impacts of vehicle based travel.

Figure 5 30 minute public transport catchment

Source: https://www.mapnificent.net/sydney

2.6 Historical traffic flows

Traffic data on Parramatta Road immediately fronting the site is publicly available via the Transport for NSW 'traffic volume viewer' website. To understand the change in traffic movements on Parramatta Road since the opening of the M4 East (Westconnex) in July 2020, weekday traffic data from March to May in 2019 has been compared with weekday data in the equivalent period in 2021 (outside of COVID lockdown periods).

As can be seen in Figure 6 below daily traffic flows on Parramatta Road in the eastbound direction have dropped significantly by over 12,000 vehicles per day or nearly 30% since the same period 2019. This indicates the new road infrastructure that has been completed by the NSW Government has unlocked traffic capacity along the Parramatta Road corridor to facilitate urban renewal projects such as that envisaged under the proposed Planning Proposal.

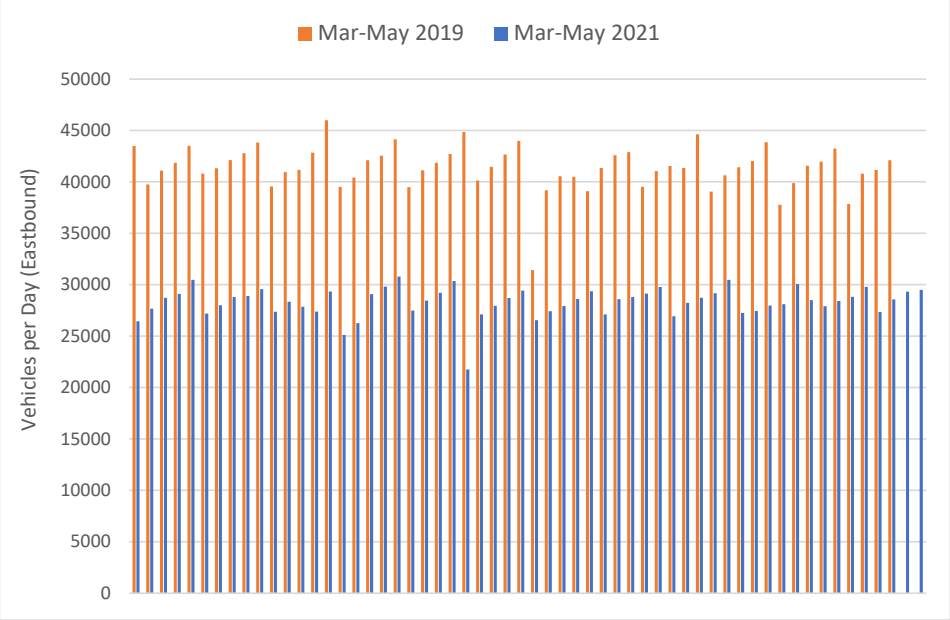

Figure 6 Traffic flows on Parramatta Road – 2019 vs 2021

2.7 Pedestrian and cyclist facilities

The site is surrounded by a well developed network of pedestrian and bicycle paths as illustrated in Figure 7 below. This infrastructure includes:

- Designated cycling routes along Queen Street / Gipps Street as well as Lucas Road fronting the site
- Signalised pedestrian crossings at the Parramatta Road / Cheltenham Road intersection adjacent to the site
- Additional crossing points of Parramatta Road at Shaftesbury Road and Burwood Road adjacent to the future Burwood North metro station.
- Network of formal footpaths adjacent to the site and on surrounding streets.

Figure 7 Existing pedestrian and cycling infrastructure

3 Transport Assessment

3.1 Alignment with current transport policy

The availability of various services within the proposal site, including retail, employment, food/beverage and residential, all within close walking distance of the future Burwood North metro station, aligns with the '15-minute neighbourhoods' concept outlined in the recently released TfNSW Future Transport Strategy. The 15-minute neighbourhood concept aims to support local communities and healthy lifestyles by prioritising place making, walking, cycling, micromobility and last mile freight, to support 15-minute access to connected, local transport networks, precincts and local destinations. The Planning Proposal will facilitate excellent access to transport, services and open space – allowing for the majority of trips to be made on foot with reduced reliance on private vehicle.

Figure 8 15-minute neighbourhood concept

Source: Future Transport Strategy (Transport for NSW, 2022)

3.2 Vehicle site access

The proposed vehicle access strategy for the site redevelopment, as envisaged under the reference scheme, is illustrated in Figure 9 below. The access strategy has been developed so as to minimise impacts to Parramatta Road by locating the car park access points on the site's southern boundary, as well as by providing multiple access points so as to distribute traffic movements across the site. The access strategy can be summarised as follows:

- General vehicle access to the basement car park via access points on the southern frontage of the site on both Lucas Road and Cheltenham Road.
- Separate hotel porte-cochere access via Lucas Road for the purpose of taxi pick up and drop off.
- One-way shared zone to provide for improved site permeability and support access to the smaller retailers at the southern end of the site. Should the shared zone become dedicated as a public road the speed limit will need to be approved by TfNSW through a separate application. It is the current intent however that this road remains a private road.

Given Parramatta Road is a State Classified road, in accordance with Clause 2.118 of SEPP (Transport and Infrastructure) 2021 no direct access is proposed from Parramatta Road - with all vehicle access to be via the local road network. Driveways to the site would be located so as to minimise any impacts to neighbouring properties on Lucas Road and Cheltenham Road, in accordance with the requirements of Australian Standards AS2890.1 (considered during the detailed DA phase).

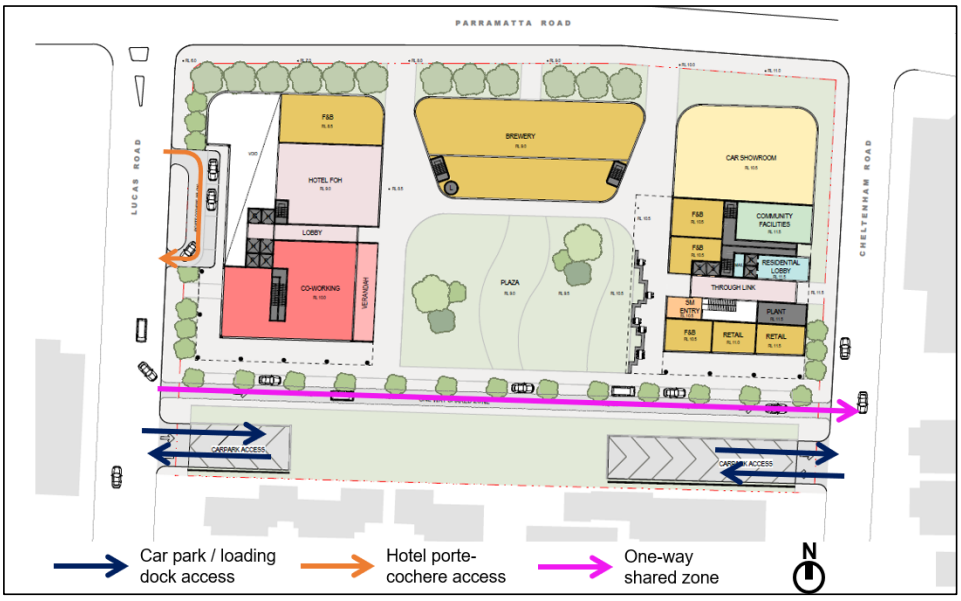

Figure 9 Proposed vehicle access strategy

3.3 Driveway design principles

To emphasise pedestrian priority along the Lucas Road footpath, the porte-cochere driveway entrance/exit is to be fully integrated with the adjoining footpath, at one continuous level. The treatment will therefore be an area which is designed for pedestrians, across which vehicles can pass slowly. Drivers of vehicles will be guided and encouraged to give way to pedestrians on the footpath as required by law. The crossings would also be designed with consistent pavement material.

Other than promoting drivers to give way to pedestrians, the driveway will be designed to balance ease of vehicles in utilising the driveway with minimisation of pedestrian crossing distances, including minimising the crossover distance to promote reduced vehicle speeds and minimise points of conflict for pedestrians.

The photographs below illustrates the Westin Hotel porte-cochere in Pitt Street south of Martin Place. This provides a good example of a driveway crossover located on a street with high pedestrian activity that works well in busy periods.

Figure 10 Example of porte-cochere integrated with adjoining footpath

3.4 Car parking

The current reference scheme provides car parking at rates that are generally consistent with that noted in the Burwood DCP. As per recent advice from TfNSW, the proposed parking rates are maximum rates (rather than minimum rates as noted in the DCP) to encourage a mode shift towards sustainable forms of transport.

One variation to the Burwood DCP parking rate is associated with the hotel use, with the proposed parking rate of 0.3 spaces / room lower than the 1 / room noted in the DCP. The adopted parking rate is considered to provide a more appropriate car parking provision based on the hotel operator requirements and type of guests expected to stay at the hotel. It is also reflective of the improved public transport accessibility to be provided following the introduction of the Burwood North metro to be delivered as part of the Sydney Metro West project.

Table 2 Indicative parking numbers

Use	GFA/ Number	Unit	Minimum DCP Car Parking Rate	Maximum Proposed Car Parking Rate	Maximum No. of Parking Spaces
Retail	3,362	m^2 GFA	1 space / 40m^2 GFA	1 space / 40m^2 GFA	84
Hotel	160	Rooms	1 / room	0.3 / room	48
Commercial	1,197	m^2 GFA	1 space / 50m^2	1 space / 50m^2 GFA	24
Residential apartments	205	Dwellings	0.5 / studio 1 / 1&2 bedroom 1.5 / 3 bedroom	0.5 / studio 1 / 1&2 bedroom 1.5 / 3 bedroom	226
Mercedes centre	719	m^2	1 space / 50m^2	1 space / 50m^2	14
Total					**396**

The current reference scheme proposes approximately 400 parking spaces over two basement levels which is generally compliant with Council's controls. While there is the ability to achieve the minimum parking numbers required under Council's DCP, the proposed maximum parking rates provide for flexibility to reduce car parking (if warranted) to minimise the traffic impacts of the development and reflect the site's accessibility to public transport nodes. This approach to car parking is consistent with TfNSW advice.

It should also be noted that the reference scheme is conceptual in nature and further investigations will need to be undertaken at subsequent stages to confirm the final parking numbers and layout.

3.5 Loading and servicing

The reference design includes an on-site loading and servicing area as indicatively shown in Figure 11 below. This loading dock will be able to accommodate a range of vehicle types and sizes including 3.8m high delivery and waste collection vehicles. Access to the loading dock for service vehicles can be obtained from either Cheltenham Road or Lucas Road as previously indicated in Section 3 of this document. The loading dock location is generally consistent with that documented in the existing development approval for the site at 1A Cheltenham Road.

The final loading dock design and layout will be confirmed during the Development Application phase of the project. The loading dock would be designed in accordance with the relevant Australian Standard (AS2890.2) and allow for vehicles to enter and exit the site in a forwards direction.

Based on the TfNSW Urban Freight Forecasting model and the yields envisaged under the Planning Proposal, a future detailed Development Application for the site would need to make provision for the following service vehicle provision:

- 6 small vehicle parking spaces (B99 / vans / utes)
- 2 medium size vehicle parking spaces (SRV / small trucks)
- 1 large size vehicle parking size (MRV / HRV)

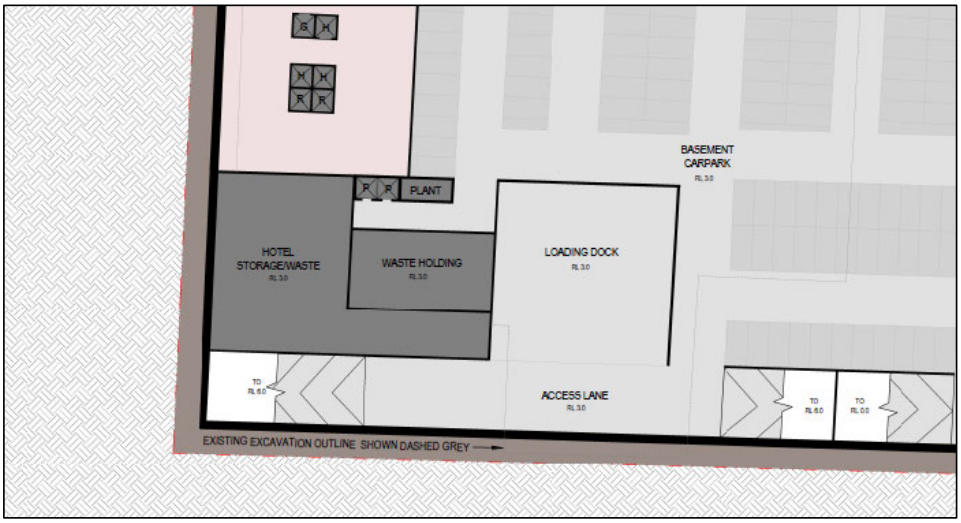

Figure 11 On-site loading / servicing area

3.6 Travel demand analysis

Recent surveys undertaken by the TfNSW of high density residential and mixed use developments indicates a person trip generation rate of approximately 0.60 trips / dwelling. The equivalent trip generation rate for commercial/retail uses was found to be 2.26 trips per 100m^2 GFA in the AM peak hour and 1.73 trips per 100m^2 GFA in the PM peak hour. Applying these rates to the yields possible under the planning proposal results in the following total development trips:

Table 3 Development trip generation

Use	Yield	Quantum	Trip rate (per unit / 100m^2)		Number of trips	
			AM peak hour	PM peak hour	AM peak hour	PM peak hour
Residential	205	units	0.60	0.60	123	123
Retail/Commercial	5,278	m^2 GFA	2.26	1.73	119	91
Total trips					***242***	***214***

Based on the existing travel behaviours of residents and employees of Croydon, existing and future public transport services (particularly the Burwood North metro station), as well as the proposed parking rates for the different uses forecast mode shares have been developed. These mode shares, along with the forecast trip generation noted in Table 3, have been used to estimate the number of trips by mode to and from the site. This is summarised in the table below.

Table 4 Trip generation by mode

Travel mode	*Residential trips*			*Retail/Commercial trips*			*Total*	
	Mode share	AM peak hour	PM peak hour	Mode share	AM peak hour	PM peak hour	AM peak hour	PM peak hour
Car driver	20%	25	25	45%	54	41	78	66
Car passenger	1%	1	1	5%	6	5	7	6
Bus	6%	7	7	6%	7	5	15	13
Train	60%	74	74	35%	42	32	115	106
Walk	13%	16	16	9%	11	8	27	24
Total	**100%**	**123**	**123**	**100%**	**119**	**91**	**242**	**214**

3.7 Pedestrian and cycling provision

The Planning Proposal will include a range of measures to support pedestrian and cycling movement in and around the site, including:

- Setbacks along Parramatta Road to facilitate a 6m green edge which will support improved pedestrian connectivity towards the future Burwood North metro station.
- Bicycle parking within the site for residents, staff and visitors, with end of trip facilities provided for staff. The number of bicycle parking spaces and end of trip facilities will be confirmed during the Development Application stage of the project and will, at a minimum, be provided at rates consistent with Council's controls for the area.
- Provision of a high quality footpath treatment on Cheltenham Road and removal of existing continuous driveway crossover fronting the site.
- Shared zone for pedestrians and cyclists which will provide improved permeability and access for these users
- Through site links that will provide connections between Parramatta Road, Lucas Road and Cheltenham Road.

3.8 Green travel plan

This report includes a preliminary Green Travel Plan (GTP) identifying some key items that could be included in a more detailed plan to be completed in the DA stage of planning.

3.8.1 Background

A Green Travel Plan (GTP) is a package of measures put in place by the development occupants to try and encourage more sustainable travel. It is a means for a development to demonstrate a commitment and take a pro-active step towards improving the environmental sustainability of its activities.

More generally, the principles of a GTP are applied to all people travelling to and from a site. Government authorities are placing increasing emphasis on the need to reduce the number and lengths of motorised journeys and in doing so encourage greater use of alternative means of travel with less negative environmental impacts than the car.

3.8.2 Objectives

The main objectives of the GTP are to reduce the need to travel and promotion of sustainable means of transport. The more specific objectives include:

- High mode share for public transport, cycling and walking to work journeys;
- Ensuring adequate facilities are provided at the site to enable the tenants and visitors of the development to commute by sustainable transport modes;

- Reduce the number of car journeys associated with business travel;
- Facilitate the sustainable and safe travel of occupants; and
- Raise awareness of sustainable transport amongst residents of the development.

3.8.3 Potential measures

A suite of potential measures is described in Table 5 to be implemented as part of the GTP, which can be developed further as the proposal progresses towards a Development Application.

Table 5 List of potential GTP measures

Action	Responsibility
Cycling	
Provide sufficient cycle parking to meet needs, which is easily accessible and secure	Developer
Provide adequate cycle parking facilities for visitors	Developer
Ensure cycle parking is clearly visible or provide signage to direct people to cycle bays	Building manager
Produce a map showing cycle routes and bike stands in the area	Building manager
Walking	
Produce a map showing safe walking routes to and from the site with times, distances to local facilities, such as shops and bus stops	Building manager
Public Transport	
Develop a map showing public transport routes in the area	Building manager
Put up a noticeboard with leaflets and maps showing the main public transport routes to and from the site	Building manager
Carshare / Carpooling	
Put a poster on the noticeboard where residents would register their interest in carpooling by indicating their work location	Building manager
Develop a map showing car-share spots in the area	Building manager
General actions	
Promotion including: • An events calendar. Best in conjunction with statewide events such as National Bike Week and Bike2Work Day, National Walk to Work Day. • Display boards in prominent locations to show public transport maps and timetables.	Building manager

3.8.4 Monitoring and review

In order for the GTP to be effective, it must be reviewed on a regular basis. It is important to ensure that the GTP is meeting its objectives and having the intended impact on car use and transport choices. The GTP should be reviewed periodically by undertaking resident and other users of the building travel surveys. It is recommended that the mode shares are first reviewed at least 18 months after occupation, to allow activity levels to settle at the site.

4 Road Network Assessment

4.1 Forecast traffic generation

4.1.1 Residential traffic generation

The forecast traffic generation for the residential apartments has been determined based on the Sydney wide average traffic generation rates for high density residential uses as published by TfNSW which are as follows:

- AM peak hour: 0.15 vehicle trips per unit
- PM peak hour: 0.19 vehicle trips per unit

The above rates are considered a conservative estimate given the future metro station within close walking distance of the site as well as the mix of uses to be provided which will containment of trips within the site.

4.1.2 Commercial traffic generation

Transport for NSW published a Technical Direction that described vehicular trip rates for commercial developments which are as follows:

- AM peak hour: 1.6 vehicle trips per 100m^2 GFA
- PM peak hour: 1.2 vehicle trips per 100m^2 GFA

These standard traffic generation rates have been adopted as part of the analysis.

4.1.3 Hotel traffic generation

TfNSW has no published traffic generation rates for hotel developments. Surveys of the Mecure Hotel in Wolli Creek were previously undertaken by JMT Consulting in March 2017 to understand the likely traffic generation of this use. The Mecure Hotel contains 271 hotel rooms and serves a similar purpose to the proposed hotel within the subject site. The survey observed a total of 21 vehicles over the PM peak hour (5pm – 6pm), comprised of 11 taxis, 5 car drop offs and 5 vehicles parking. This is equivalent to a peak hour traffic generation rate of 0.14 / vehicles room.

As a conservative approach a traffic generation rate of 0.20 vehicles / room has been adopted for both the AM and PM peak hour. The traffic generated by the hotel will largely comprise of taxis and ride-share vehicles which will already be travelling on the road network.

4.1.4 Retail traffic generation

Traffic generation for retail uses across Sydney varies greatly dependent on a number of variables including the nature and quality of the retail tenancies provided, competition from nearby retail centres, car parking availability and access from the broader road network. For the purposes of this assessment traffic generation rates of 2.5 and 5.0 trips per 100m^2 GFA have been adopted for the AM and PM peak hours respectively. These rates align with those recently surveyed at the East Village Shopping Centre and utilised in major urban renewal precincts such as Melrose Park, following endorsement by TfNSW. The adopted traffic generation rates for retail uses are commensurate with the site's location within an urban centre, surrounded by high density mixed use developments and close to public transport services.

In considering the retail traffic generation it is important to recognise that the nature of retail provided on the site will be local, walk up retail uses rather than 'destination' retail. In this context. The retail component is expected to serve the local walk-up catchment and passing trade to/from the nearby metro station and adjacent mixed use developments - especially during the peak hours.

The RMS "Guide to Traffic Generating Developments" suggests that some 25 per cent of visits are likely to be passing trade, i.e. customers who would have driven past the development regardless of their visit to the development. This is particularly the case given the presence of key road corridors in the vicinity of the site such as Parramatta Road and Burwood Road.

4.1.5 Net traffic generation

Considering the various uses envisaged within the Planning Proposal the overall increase in traffic generation is summarised in Table 6 on the following page.

Table 6 Net traffic generation

Land Use	Quantum	Units	Generation Rate		Containment / Passing Trade		Directionality				Forecast Peak Hour Traffic Generation					
							AM		PM		AM			PM		
			AM	PM	AM	PM	*IN*	*OUT*	*IN*	*OUT*	*IN*	*OUT*	*TOTAL*	*IN*	*OUT*	*TOTAL*
Residential apartments	178	Dwellings	0.19	0.15	0	0	0.20	0.80	0.8	0.2	8	31	39	25	6	31
Commercial	1,916	m^2 GFA	1.60	1.20	0.00	0.00	0.80	0.20	0.20	0.80	25	6	31	5	18	23
Retail	3,362	m^2 GFA	2.50	5.00	0.25	0.25	0.60	0.40	0.5	0.5	38	25	63	63	63	126
Hotel	160	rooms	0.20	0.20	0	0	0.30	0.70	0.7	0.3	10	22	32	22	10	32
Total											**81**	**84**	**165**	**115**	**97**	**212**

4.2 Potential traffic generation – current planning controls

It is important to recognise that the site is currently zoned B6 (enterprise corridor) with an FSR of 1.75:1. Based on a site area of 10,458m^2 up to 18,300m^2 of commercial floor space could be delivered on the site under current planning controls. Based on the same traffic generation rates adopted for the Planning Proposal and as described in Section 4.1.2 of this document, development permissible under current controls for the site would generate nearly 300 traffic movements in the AM peak hour and approximately 220 movements in the PM peak hour. In comparison the Planning Proposal is forecast to generate 165 and 212 vehicle movements in the AM and PM peak hours respectively.

As shown in Figure 12 the volume of traffic generated by development permissible under current development controls is greater in the AM peak hour and similar in the PM peak hour when compared to the reference scheme under the Planning Proposal. This reflects the mix of uses provided on the site as well as the provision of residential and hotel uses which generate traffic at significantly reduced levels when compared with employment uses.

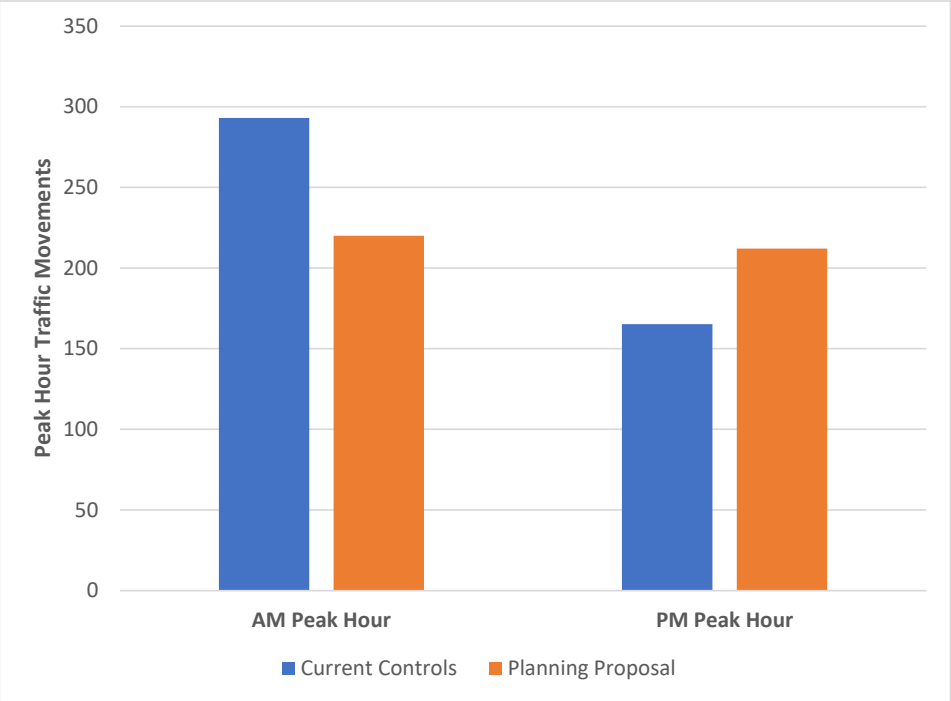

Figure 12 Forecast traffic generation – current controls vs Planning Proposal

It is likely that the potential traffic generation from the site (under it's current controls) would already be accounted for in the precinct wide traffic modelling undertaken for the Parramatta Road corridor. It is also important to recognise that the traffic analysis for the precinct would have also taken into consideration the site's potential as a future B4 zoned mixed use development as identified in the PRCUTS. The current proposal, including the commitment for hotel which is a low traffic generating use, is not a significant increase/impact on what has been considered/planned for in the broad scale strategic planning for the corridor.

4.3 External traffic growth

To assess the cumulative traffic impacts of the proposal with consideration of traffic growth from development in the surrounding area reference is made to the Parramatta Road Corridor Traffic and Transport Strategy completed by Bitzios Consulting on behalf of Strathfield, Burwood and Canada Bay Councils. Based on strategic modelling outputs provided by TfNSW for the study area and the anticipated level of development within the corridor the traffic modelling considered the following levels of traffic growth:

- 2.0% per annum during the AM peak hour
- 2.2% per annum during the PM peak hour

This level of traffic growth has been applied in the modelling undertaken for this study.

4.4 Traffic distribution

The forecast direction of travel to the site utilised in the traffic modelling is as follows:

- From the east via Parramatta Road: 50% of trips
- From the west via Parramatta Road and Shaftesbury Road: 40% of trips
- From the south via Lucas Road or Cheltenham Road: 10% of trips

The resulting increase in traffic movements at each intersection based on the forecast traffic generation and distribution is shown in the figures below. Through this it can be seen that, as a result of the relatively low net traffic increase and multiple routes available, that the increase in vehicles travelling through intersections around the site is generally modest.

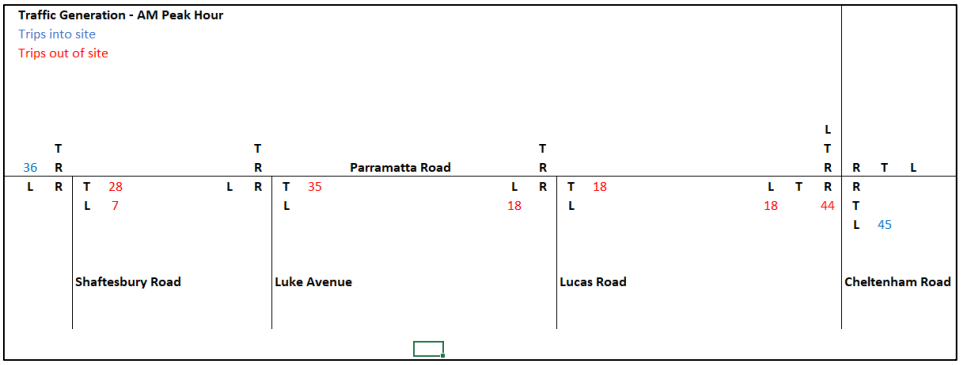

Figure 13 Increase in traffic movements by intersection (AM peak hour)

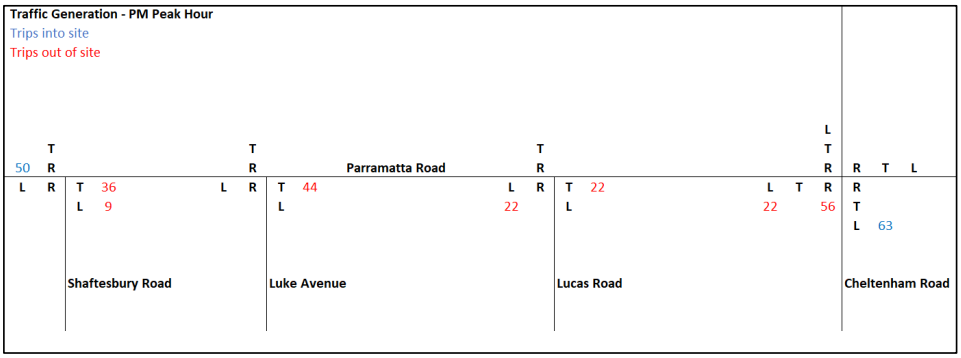

Figure 14 Increase in traffic movements by intersection (PM peak hour)

4.5 Traffic modelling outputs

Traffic modelling has been undertaken using the TfNSW approved SIDRA Network software which considers the operation of intersections in a coordinated manner.

The traffic modelling metric used to analyse the performance of the intersections is intersection Level of Service (LOS). Level of Service is a measure that uses the average delay experienced by vehicles to categorically assign each approach and movement with a qualitative ordinal grade (A through F, with A being the best and F being the worst). RMS Traffic Modelling Guidelines indicate the average delay relating to each grade, this is outlined in Table 7. In typical urban environments it is typical for intersections to operate at Level of Service D or E and still remain within acceptable performance levels.

Table 7 Level of service grades / description

Level of service grade	Average delay (seconds)	Description
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode
F	Greater than 71	Unsatisfactory with excessive queuing

The traffic modelling has considered the following two scenarios:

(i) 'Future Base 2036'- Traffic flows in the future year 2036 based on the counts undertaken in February 2022 increased by the expected background growth rates as described in Section 0 of this document

(ii) 'Future Base 2036'+ Planning Proposal' – As per scenario (i) as well as traffic flows following the development of the subject site as envisaged in the reference scheme supporting this Planning Proposal.

The results of the traffic modelling are summarised in Table 8 (AM peak hour) and Table 9 (PM peak hour). Detailed traffic modelling outputs are provided in Appendix A of this document.

Table 8 Road network performance – AM Peak Hour (8am – 9am)

Intersection	Intersection performance – 2036 'future base'		Intersection performance – 2036 'future base + development'	
	Delay (s)	Level of Service	Delay (s)	Level of Service
Parramatta Road / Shaftesbury Road	46	D	53	D
Parramatta Road / Luke Avenue	4	A	4	A
Parramatta Road / Lucas Road	1	A	1	A
Parramatta Road / Cheltenham Road	15	B	19	B
Overall road network	n/a	D	n/a	D

Table 9 Intersection performance – PM Peak Hour (5pm – 6pm)

Intersection	Intersection performance – 2036 'future base'		Intersection performance – 2036 'future base + development'	
	Delay (s)	Level of Service	Delay (s)	Level of Service
Parramatta Road / Shaftesbury Road	43	D	50	D
Parramatta Road / Luke Avenue	6	A	12	A
Parramatta Road / Lucas Road	1	A	1	A
Parramatta Road / Cheltenham Road	13	A	17	B
Overall road network	n/a	D	n/a	D

The modelling undertaken indicates that the proposal is not anticipated to result in unacceptable traffic impacts on the surrounding road network. Overall intersection level of service remains at Level of Service D or below for all sites considered. When considering the road network holistically, based on the SIDRA network modelling outputs, the overall road network Level of Service remains at 'D' in both the 'future base' and 'future base + development' scenarios.

The findings of the modelling are also generally consistent with the traffic modelling undertaken to support the Sydney Metro West project, with an extract from the transport assessment supporting the EIS (prepared in 2022) shown in Figure 15. The modelling undertaken by TfNSW indicates intersection performance on Parramatta Road at Shaftesbury Road to be Level of Service C for the future year 2036, which is largely consistent with the findings of the modelling undertaken for this study.

Intersection	AM Peak				PM Peak			
	Without Sydney Metro West		With Sydney Metro West		Without Sydney Metro West		With Sydney Metro West	
	Average delay (s)	LOS	Average delay (s)	LOS	Average delay (s)	LOS	Average delay (s)	LOS
Burton Street/ Burwood Road[1]	14	A	28	B	11	A	21	B
Parramatta Road/ Burwood Road	23	B	30	C	22	B	23	B
Parramatta Road/ Loftus Street[2]	9	A	9	A	8	A	7	A
Burton Street/ Loftus Street	5	A	5	A	5	A	5	A
Parramatta Road/ Shaftesbury Road	30	C	30	C	33	C	33	C

Figure 15 Forecast intersection performance – Sydney Metro West project

Source: Sydney Metro West Operational Transport report (Table 68), TfNSW 2022

4.6 Traffic modelling findings

The traffic modelling has indicated that the Planning Proposal would have only minor impacts on the surrounding road network, with overall intersection level of service remaining at Level of Service D or better in the future year 2036. The proposal itself does not substantially change the operation of the signalised intersections on Parramatta Road.

While potential road network upgrades were considered in the early planning phase of the project as the reference design was being refined, the traffic modelling has demonstrated that no traffic upgrades are necessary to accommodate the yields envisaged under the Planning Proposal. Instead the focus of transport infrastructure upgrades will be targeted around an improved environment for pedestrians and cyclists through wider footpaths and public domain improvements. This prioritisation of pedestrian and cycling infrastructure over private vehicles, given the findings of the traffic modelling, is considered appropriate and aligns with broader NSW Government policy of supporting public and active transport as part of new developments.

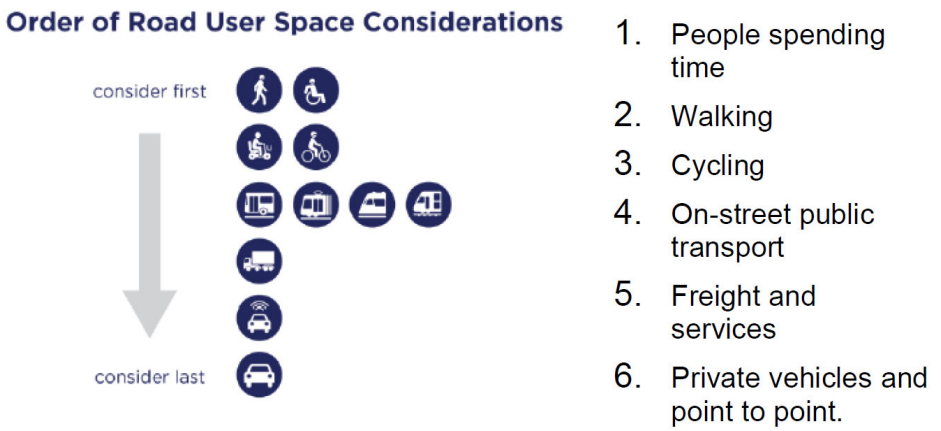

Figure 16 Order of road user space considerations

Source: Road User Space Allocation Procedure - Transport for NSW 2021

5 Summary

This transport assessment has been prepared to support the Planning Proposal for the site at 166-204 Parramatta Road, Croydon. Key findings arising from the assessment are as follows:

- The reference scheme prepared to support the proposal has located vehicle access points well away from Parramatta Road to minimise the impact of the site development on this key road corridor.
- The site will benefit from being within an easy walk from the future Burwood North metro station which will provide direct services to both the Parramatta and Sydney CBDs.
- On-site car parking will generally be provided in accordance with Council's standard DCP parking rates.
- A range of measures will be provided as part of any future site development to support access by walking, cycling and public transport.
- Traffic movements expected to be generated under the Planning Proposal would be lower (in the AM peak hour) and comparable (in the PM peak hour) when compared to a development scenario under current planning controls for the site.
- Traffic modelling, taking into consideration traffic growth along the Parramatta Road corridor, indicates that the proposal would not significantly impact the operation of the adjoining road network, with all intersections forecast to operate at Level of Service D or better. Based on the outcomes of the modelling no traffic infrastructure upgrades are considered necessary to support the yields envisaged under the Planning Proposal.

Therefore, subject to further analysis and design as the project progresses through to a Development Application, the proposal's impact on the adjacent transport network can be managed appropriately.

Appendix A: Traffic Modelling Outputs

MOVEMENT SUMMARY

Site: 104 [Parramatta Road / Shaftesbury Road (Site Folder: AM Future Base + Dev)]

Network: N101 [AM Future Base + Dev (Network Folder: AM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Shaftesbury Road (S)														
1	L2	168	5.0	168	5.0	* 0.961	97.9	LOS F	16.3	118.1	1.00	1.04	1.46	22.8
3	R2	491	3.0	491	3.0	0.961	96.4	LOS F	18.9	136.0	1.00	1.04	1.43	14.6
Approach		659	3.5	659	3.5	0.961	96.8	LOS F	18.9	136.0	1.00	1.04	1.44	17.1
East: Parramatta Road (E)														
4	L2	193	2.7	193	2.7	0.970	78.0	LOS F	19.7	145.0	1.00	1.10	1.28	20.6
5	T1	1884	7.7	1884	7.7	* 0.970	71.8	LOS F	19.7	145.0	1.00	1.12	1.27	21.3
Approach		2077	7.2	2077	7.2	0.970	72.3	LOS F	19.7	145.0	1.00	1.11	1.27	21.2
West: Parramatta Road (W)														
11	T1	2164	9.6	2164	9.6	0.643	11.9	LOS A	18.1	137.5	0.57	0.53	0.57	43.3
12	R2	614	2.1	614	2.1	0.946	88.1	LOS F	15.3	109.3	0.97	1.02	1.39	24.3
Approach		2778	8.0	2778	8.0	0.946	28.7	LOS C	18.1	137.5	0.66	0.63	0.75	33.8
All Vehicles		5514	7.1	5514	7.1	0.970	53.3	LOS D	19.7	145.0	0.83	0.86	1.03	25.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Shaftesbury Road (S)											
P1	Full	8	64.2	LOS F	0.0	0.0	0.96	0.96	228.5	213.6	0.93
West: Parramatta Road (W)											
P4	Full	21	64.2	LOS F	0.1	0.1	0.96	0.96	237.4	225.2	0.95
All Pedestrians		29	64.2	LOS F	0.1	0.1	0.96	0.96	234.9	221.9	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [Parramatta Road / Cheltenham Road (Site Folder: AM Future Base)]

Network: N101 [AM Future Base (Network Folder: AM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cheltenham Road (S)														
1	L2	45	4.7	45	4.7	* 0.781	64.9	LOS E	10.7	77.7	1.00	0.90	1.10	19.4
2	T1	1	0.0	1	0.0	0.781	59.3	LOS E	10.7	77.7	1.00	0.90	1.10	20.7
3	R2	208	4.5	208	4.5	0.781	64.9	LOS E	10.7	77.7	1.00	0.90	1.10	28.7
Approach		255	4.5	255	4.5	0.781	64.9	LOS E	10.7	77.7	1.00	0.90	1.10	27.4
East: Parramatta Road (E)														
4	L2	92	1.1	92	1.1	0.569	20.9	LOS B	15.8	114.6	0.62	0.60	0.62	46.4
5	T1	1965	5.0	1965	5.0	0.569	15.0	LOS B	15.9	116.4	0.61	0.57	0.61	40.1
Approach		2057	4.8	2057	4.8	0.569	15.2	LOS B	15.9	116.4	0.61	0.57	0.61	40.6
North: Walker Street (N)														
7	L2	19	0.0	19	0.0	0.077	46.7	LOS D	1.0	7.2	0.80	0.70	0.80	24.8
8	T1	3	0.0	3	0.0	0.077	42.8	LOS D	1.0	7.2	0.80	0.70	0.80	25.4
9	R2	11	0.0	11	0.0	0.077	46.7	LOS D	1.0	7.2	0.80	0.70	0.80	4.7
Approach		33	0.0	33	0.0	0.077	46.4	LOS D	1.0	7.2	0.80	0.70	0.80	20.3
West: Parramatta Road (W)														
10	L2	17	0.0	17	0.0	0.787	10.2	LOS A	10.5	78.0	0.30	0.29	0.30	14.8
11	T1	2757	6.9	2757	6.9	* 0.787	9.9	LOS A	18.9	140.0	0.49	0.46	0.49	47.9
Approach		2774	6.8	2774	6.8	0.787	9.9	LOS A	18.9	140.0	0.49	0.46	0.49	47.7
All Vehicles		5118	5.9	5118	5.9	0.787	15.0	LOS B	18.9	140.0	0.56	0.53	0.57	42.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Cheltenham Road (S)											
P1	Full	23	64.2	LOS F	0.1	0.1	0.96	0.96	226.6	211.1	0.93
North: Walker Street (N)											
P3	Full	19	64.2	LOS F	0.1	0.1	0.96	0.96	224.6	208.6	0.93
West: Parramatta Road (W)											
P4	Full	42	64.2	LOS F	0.2	0.2	0.96	0.96	233.8	220.4	0.94
All Pedestrians		84	64.2	LOS F	0.2	0.2	0.96	0.96	229.7	215.2	0.94

MOVEMENT SUMMARY

Site: 102 [Parramatta Road / Lucas Road (Site Folder: AM Future Base)]

Network: N101 [AM Future Base (Network Folder: AM Peak Hour)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lucas Road (S)														
1	L2	95	7.8	95	7.8	0.160	10.3	LOS A	0.2	1.8	0.59	0.82	0.59	45.1
Approach		95	7.8	95	7.8	0.160	10.3	LOS A	0.2	1.8	0.59	0.82	0.59	45.1
East: Parramatta Road (E)														
4	L2	73	5.8	73	5.8	0.406	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	56.1
5	T1	1939	5.4	1939	5.4	0.406	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	58.5
Approach		2012	5.4	2012	5.4	0.406	0.3	NA	0.0	0.0	0.00	0.02	0.00	58.1
West: Parramatta Road (W)														
11	T1	2667	7.1	2667	7.1	0.544	0.1	LOS A	4.9	36.5	0.00	0.00	0.00	59.4
Approach		2667	7.1	2667	7.1	0.544	0.1	NA	4.9	36.5	0.00	0.00	0.00	59.4
All Vehicles		4774	6.4	4774	6.4	0.544	0.4	NA	4.9	36.5	0.01	0.03	0.01	57.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 103 [Parramatta Road / Luke Avenue (Site Folder: AM Future Base)]

Network: N101 [AM Future Base (Network Folder: AM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Luke Avenue (S)														
1	L2	8	37.5	8	37.5	0.278	85.4	LOS F	0.4	3.9	1.00	0.69	1.00	16.0
3	R2	1	0.0	1	0.0	* 0.278	84.9	LOS F	0.4	3.9	1.00	0.69	1.00	16.0
Approach		9	33.3	9	33.3	0.278	85.3	LOS F	0.4	3.9	1.00	0.69	1.00	16.0
East: Parramatta Road (E)														
4	L2	13	0.0	13	0.0	0.828	11.7	LOS A	11.0	81.0	0.30	0.31	0.32	49.8
5	T1	2019	6.5	2019	6.5	* 0.828	6.2	LOS A	12.9	95.6	0.29	0.30	0.32	35.0
Approach		2032	6.5	2032	6.5	0.828	6.2	LOS A	12.9	95.6	0.29	0.30	0.32	35.2
West: Parramatta Road (W)														
11	T1	2662	7.8	2662	7.8	0.549	1.5	LOS A	8.9	66.5	0.18	0.16	0.18	51.7
Approach		2662	7.8	2662	7.8	0.549	1.5	LOS A	8.9	66.5	0.18	0.16	0.18	51.7
All Vehicles		4703	7.3	4703	7.3	0.828	3.7	LOS A	12.9	95.6	0.23	0.22	0.24	42.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Luke Avenue (S)											
P1	Full	11	64.2	LOS F	0.0	0.0	0.96	0.96	224.6	208.6	0.93
All Pedestrians		11	64.2	LOS F	0.0	0.0	0.96	0.96	224.6	208.6	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 104 [Parramatta Road / Shaftesbury Road (Site Folder: AM Future Base)]

Network: N101 [AM Future Base (Network Folder: AM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Shaftesbury Road (S)														
1	L2	168	5.0	168	5.0	* 0.927	86.3	LOS F	15.2	110.4	1.00	1.00	1.35	24.5
3	R2	491	3.0	491	3.0	0.927	84.7	LOS F	17.6	126.1	1.00	1.00	1.33	16.1
Approach		659	3.5	659	3.5	0.927	85.1	LOS F	17.6	126.1	1.00	1.00	1.33	18.7
East: Parramatta Road (E)														
4	L2	185	2.8	185	2.8	0.936	65.3	LOS E	19.6	145.0	1.00	1.03	1.19	23.1
5	T1	1855	7.8	1855	7.8	* 0.936	58.1	LOS E	19.6	145.0	1.00	1.04	1.18	24.2
Approach		2040	7.3	2040	7.3	0.936	58.7	LOS E	19.6	145.0	1.00	1.04	1.18	24.1
West: Parramatta Road (W)														
11	T1	2164	9.6	2164	9.6	0.646	12.4	LOS A	18.4	139.3	0.58	0.54	0.58	42.8
12	R2	576	2.2	576	2.2	0.909	78.3	LOS F	13.4	95.8	0.98	0.97	1.30	25.9
Approach		2740	8.1	2740	8.1	0.909	26.3	LOS B	18.4	139.3	0.67	0.63	0.73	35.0
All Vehicles		5439	7.2	5439	7.2	0.936	45.6	LOS D	19.6	145.0	0.83	0.83	0.97	27.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Shaftesbury Road (S)											
P1	Full	8	64.2	LOS F	0.0	0.0	0.96	0.96	228.5	213.6	0.93
West: Parramatta Road (W)											
P4	Full	21	64.2	LOS F	0.1	0.1	0.96	0.96	237.4	225.2	0.95
All Pedestrians		29	64.2	LOS F	0.1	0.1	0.96	0.96	234.9	221.9	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 102 [Parramatta Road / Lucas Road (Site Folder: AM Future Base + Dev)]

Network: N101 [AM Future Base + Dev (Network Folder: AM Peak Hour)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lucas Road (S)														
1	L2	103	7.1	103	7.1	0.253	11.0	LOS A	0.3	2.2	0.61	0.85	0.65	44.4
Approach		103	7.1	103	7.1	0.253	11.0	LOS A	0.3	2.2	0.61	0.85	0.65	44.4
East: Parramatta Road (E)														
4	L2	73	5.8	73	5.8	0.585	5.7	LOS A	0.0	0.0	0.00	0.05	0.00	55.8
5	T1	1958	5.4	1958	5.4	0.585	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	57.9
Approach		2031	5.4	2031	5.4	0.585	0.3	NA	0.0	0.0	0.00	0.02	0.00	57.6
West: Parramatta Road (W)														
11	T1	2667	7.1	2667	7.1	0.569	0.1	LOS A	8.3	61.5	0.00	0.00	0.00	59.3
Approach		2667	7.1	2667	7.1	0.569	0.1	NA	8.3	61.5	0.00	0.00	0.00	59.3
All Vehicles		4801	6.4	4801	6.4	0.585	0.4	NA	8.3	61.5	0.01	0.03	0.01	57.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 101 [Parramatta Road / Cheltenham Road (Site Folder: AM Future Base + Dev)]

Network: N101 [AM Future Base + Dev (Network Folder: AM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cheltenham Road (S)														
1	L2	64	3.3	64	3.3	* 0.830	65.3	LOS E	13.9	100.0	1.00	0.93	1.14	19.3
2	T1	1	0.0	1	0.0	0.830	59.7	LOS E	13.9	100.0	1.00	0.93	1.14	20.6
3	R2	255	3.7	255	3.7	0.830	65.4	LOS E	13.9	100.0	1.00	0.93	1.14	28.6
Approach		320	3.6	320	3.6	0.830	65.3	LOS E	13.9	100.0	1.00	0.93	1.14	27.1
East: Parramatta Road (E)														
4	L2	139	0.8	139	0.8	0.627	25.6	LOS B	18.4	133.2	0.71	0.68	0.71	43.6
5	T1	1965	5.0	1965	5.0	0.627	19.2	LOS B	18.7	136.3	0.70	0.65	0.70	36.7
Approach		2104	4.7	2104	4.7	0.627	19.7	LOS B	18.7	136.3	0.70	0.65	0.70	37.4
North: Walker Street (N)														
7	L2	19	0.0	19	0.0	0.067	41.8	LOS C	1.0	6.8	0.75	0.69	0.75	26.4
8	T1	3	0.0	3	0.0	0.067	37.9	LOS C	1.0	6.8	0.75	0.69	0.75	27.0
9	R2	11	0.0	11	0.0	0.067	41.8	LOS C	1.0	6.8	0.75	0.69	0.75	5.2
Approach		33	0.0	33	0.0	0.067	41.5	LOS C	1.0	6.8	0.75	0.69	0.75	21.8
West: Parramatta Road (W)														
10	L2	17	0.0	17	0.0	0.843	14.5	LOS B	18.6	137.7	0.53	0.50	0.53	13.6
11	T1	2757	6.9	2757	6.9	* 0.843	13.5	LOS A	18.9	140.0	0.64	0.60	0.64	44.6
Approach		2774	6.8	2774	6.8	0.843	13.5	LOS A	18.9	140.0	0.64	0.60	0.64	44.4
All Vehicles		5231	5.7	5231	5.7	0.843	19.3	LOS B	18.9	140.0	0.69	0.64	0.70	39.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Cheltenham Road (S)											
P1	Full	23	64.2	LOS F	0.1	0.1	0.96	0.96	226.6	211.1	0.93
North: Walker Street (N)											
P3	Full	19	64.2	LOS F	0.1	0.1	0.96	0.96	224.6	208.6	0.93
West: Parramatta Road (W)											
P4	Full	42	64.2	LOS F	0.2	0.2	0.96	0.96	233.8	220.4	0.94
All Pedestrians		84	64.2	LOS F	0.2	0.2	0.96	0.96	229.7	215.2	0.94

MOVEMENT SUMMARY

Site: 103 [Parramatta Road / Luke Avenue (Site Folder: AM Future Base + Dev)]

Network: N101 [AM Future Base + Dev (Network Folder: AM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Luke Avenue (S)														
1	L2	8	37.5	8	37.5	0.278	85.4	LOS F	0.4	3.9	1.00	0.69	1.00	16.0
3	R2	1	0.0	1	0.0	* 0.278	84.9	LOS F	0.4	3.9	1.00	0.69	1.00	16.0
Approach		9	33.3	9	33.3	0.278	85.3	LOS F	0.4	3.9	1.00	0.69	1.00	16.0
East: Parramatta Road (E)														
4	L2	13	0.0	13	0.0	0.843	13.3	LOS A	14.8	109.4	0.22	0.25	0.26	48.1
5	T1	2056	6.4	2056	6.4	* 0.843	7.4	LOS A	17.3	128.0	0.16	0.19	0.20	32.4
Approach		2068	6.4	2068	6.4	0.843	7.4	LOS A	17.3	128.0	0.16	0.19	0.20	32.6
West: Parramatta Road (W)														
11	T1	2662	7.8	2662	7.8	0.549	1.5	LOS A	8.9	66.5	0.18	0.17	0.18	51.6
Approach		2662	7.8	2662	7.8	0.549	1.5	LOS A	8.9	66.5	0.18	0.17	0.18	51.6
All Vehicles		4740	7.2	4740	7.2	0.843	4.3	LOS A	17.3	128.0	0.17	0.18	0.19	40.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Luke Avenue (S)											
P1	Full	11	64.2	LOS F	0.0	0.0	0.96	0.96	224.6	208.6	0.93
All Pedestrians		11	64.2	LOS F	0.0	0.0	0.96	0.96	224.6	208.6	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 104 [Parramatta Road / Shaftesbury Road (Site Folder: PM Future Base + Dev)]

Network: N101 [PM Future Base + Dev (Network Folder: PM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Shaftesbury Road (S)														
1	L2	273	1.5	273	1.5	* 0.978	89.4	LOS F	16.3	116.0	1.00	1.10	1.60	24.0
3	R2	428	2.9	428	2.9	0.978	89.2	LOS F	16.3	116.0	1.00	1.10	1.60	15.5
Approach		701	2.4	701	2.4	0.978	89.3	LOS F	16.3	116.0	1.00	1.10	1.60	19.3
East: Parramatta Road (E)														
4	L2	295	3.6	295	3.6	0.956	69.2	LOS E	19.9	145.0	1.00	1.12	1.35	22.1
5	T1	1745	5.4	1745	5.4	* 0.956	63.9	LOS E	19.9	145.0	1.00	1.14	1.31	22.9
Approach		2040	5.1	2040	5.1	0.956	64.6	LOS E	19.9	145.0	1.00	1.13	1.32	22.7
West: Parramatta Road (W)														
11	T1	1817	4.0	1817	4.0	0.556	9.6	LOS A	11.4	82.6	0.55	0.49	0.55	45.7
12	R2	614	2.1	614	2.1	0.955	80.0	LOS F	13.1	93.3	1.00	1.07	1.55	25.6
Approach		2431	3.5	2431	3.5	0.955	27.4	LOS B	13.1	93.3	0.66	0.64	0.80	34.8
All Vehicles		5172	4.0	5172	4.0	0.978	50.5	LOS D	19.9	145.0	0.84	0.90	1.11	26.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Shaftesbury Road (S)											
P1	Full	13	49.2	LOS E	0.0	0.0	0.95	0.95	213.5	213.6	1.00
West: Parramatta Road (W)											
P4	Full	5	49.2	LOS E	0.0	0.0	0.95	0.95	222.4	225.2	1.01
All Pedestrians		18	49.2	LOS E	0.0	0.0	0.95	0.95	216.1	217.0	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [Parramatta Road / Cheltenham Road (Site Folder: PM Future Base)]

Network: N101 [PM Future Base (Network Folder: PM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cheltenham Road (S)														
1	L2	14	0.0	14	0.0	* 0.631	60.2	LOS E	7.6	53.5	0.96	0.83	0.96	20.5
2	T1	5	0.0	5	0.0	0.631	54.7	LOS D	7.6	53.5	0.96	0.83	0.96	21.7
3	R2	178	0.6	178	0.6	0.631	60.2	LOS E	7.6	53.5	0.96	0.83	0.96	29.9
Approach		197	0.5	197	0.5	0.631	60.1	LOS E	7.6	53.5	0.96	0.83	0.96	29.2
East: Parramatta Road (E)														
4	L2	64	0.0	64	0.0	0.602	18.9	LOS B	17.1	123.7	0.60	0.57	0.60	47.8
5	T1	2231	4.1	2231	4.1	0.602	13.3	LOS A	17.3	125.6	0.60	0.56	0.60	41.7
Approach		2295	4.0	2295	4.0	0.602	13.5	LOS A	17.3	125.6	0.60	0.56	0.60	42.0
North: Walker Street (N)														
7	L2	20	0.0	20	0.0	0.092	49.5	LOS D	1.1	8.0	0.82	0.71	0.82	24.0
8	T1	3	0.0	3	0.0	0.092	45.6	LOS D	1.1	8.0	0.82	0.71	0.82	24.5
9	R2	12	0.0	12	0.0	0.092	49.5	LOS D	1.1	8.0	0.82	0.71	0.82	4.5
Approach		35	0.0	35	0.0	0.092	49.1	LOS D	1.1	8.0	0.82	0.71	0.82	19.4
West: Parramatta Road (W)														
10	L2	13	0.0	13	0.0	0.633	8.0	LOS A	4.2	30.2	0.14	0.14	0.14	15.5
11	T1	2371	3.4	2371	3.4	* 0.633	7.1	LOS A	15.5	112.0	0.33	0.31	0.33	50.8
Approach		2383	3.4	2383	3.4	0.633	7.1	LOS A	15.5	112.0	0.33	0.31	0.33	50.6
All Vehicles		4909	3.5	4909	3.5	0.633	12.5	LOS A	17.3	125.6	0.48	0.45	0.48	44.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Cheltenham Road (S)											
P1	Full	21	64.2	LOS F	0.1	0.1	0.96	0.96	226.6	211.1	0.93
North: Walker Street (N)											
P3	Full	19	64.2	LOS F	0.1	0.1	0.96	0.96	224.6	208.6	0.93
West: Parramatta Road (W)											
P4	Full	29	64.2	LOS F	0.1	0.1	0.96	0.96	233.7	220.4	0.94
All Pedestrians		69	64.2	LOS F	0.1	0.1	0.96	0.96	229.1	214.4	0.94

MOVEMENT SUMMARY

Site: 102 [Parramatta Road / Lucas Road (Site Folder: PM Future Base)]

Network: N101 [PM Future Base (Network Folder: PM Peak Hour)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lucas Road (S)														
1	L2	59	1.8	59	1.8	0.079	8.6	LOS A	0.1	0.9	0.51	0.71	0.51	47.0
Approach		59	1.8	59	1.8	0.079	8.6	LOS A	0.1	0.9	0.51	0.71	0.51	47.0
East: Parramatta Road (E)														
4	L2	185	1.7	185	1.7	0.392	5.6	LOS A	0.0	0.0	0.00	0.15	0.00	55.2
5	T1	2034	4.6	2034	4.6	0.392	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	57.3
Approach		2219	4.4	2219	4.4	0.392	0.5	NA	0.0	0.0	0.00	0.05	0.00	56.7
West: Parramatta Road (W)														
11	T1	2287	3.1	2287	3.1	0.442	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.6
Approach		2287	3.1	2287	3.1	0.442	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.6
All Vehicles		4565	3.7	4565	3.7	0.442	0.4	NA	0.1	0.9	0.01	0.03	0.01	57.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 103 [Parramatta Road / Luke Avenue (Site Folder: PM Future Base)]

Network: N101 [PM Future Base (Network Folder: PM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Luke Avenue (S)														
1	L2	8	0.0	8	0.0	0.306	82.8	LOS F	0.7	4.9	1.00	0.70	1.00	16.3
3	R2	6	16.7	6	16.7	* 0.306	83.0	LOS F	0.7	4.9	1.00	0.70	1.00	16.3
Approach		15	7.1	15	7.1	0.306	82.9	LOS F	0.7	4.9	1.00	0.70	1.00	16.3
East: Parramatta Road (E)														
4	L2	13	0.0	13	0.0	0.846	15.4	LOS B	13.2	95.6	0.40	0.42	0.45	46.1
5	T1	2091	4.3	2091	4.3	* 0.846	9.9	LOS A	13.2	95.6	0.40	0.41	0.44	28.0
Approach		2103	4.3	2103	4.3	0.846	10.0	LOS A	13.2	95.6	0.40	0.41	0.44	28.3
West: Parramatta Road (W)														
11	T1	2308	3.2	2308	3.2	0.462	1.4	LOS A	6.7	48.5	0.16	0.15	0.16	52.3
Approach		2308	3.2	2308	3.2	0.462	1.4	LOS A	6.7	48.5	0.16	0.15	0.16	52.3
All Vehicles		4426	3.7	4426	3.7	0.846	5.7	LOS A	13.2	95.6	0.27	0.28	0.30	36.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Luke Avenue (S)											
P1	Full	11	64.2	LOS F	0.0	0.0	0.96	0.96	224.6	208.6	0.93
All Pedestrians		11	64.2	LOS F	0.0	0.0	0.96	0.96	224.6	208.6	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 104 [Parramatta Road / Shaftesbury Road (Site Folder: PM Future Base)]

Network: N101 [PM Future Base (Network Folder: PM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Shaftesbury Road (S)														
1	L2	273	1.5	273	1.5	* 0.910	79.6	LOS F	17.0	121.2	1.00	0.98	1.28	25.7
3	R2	428	2.9	428	2.9	0.910	79.9	LOS F	17.0	121.2	1.00	0.98	1.28	16.8
Approach		701	2.4	701	2.4	0.910	79.8	LOS F	17.0	121.2	1.00	0.98	1.28	20.8
East: Parramatta Road (E)														
4	L2	285	3.7	285	3.7	* 0.894	55.6	LOS D	19.9	145.0	0.98	0.96	1.09	25.3
5	T1	1705	5.5	1705	5.5	0.894	48.6	LOS D	19.9	145.0	0.98	0.96	1.07	26.8
Approach		1991	5.2	1991	5.2	0.894	49.6	LOS D	19.9	145.0	0.98	0.96	1.08	26.6
West: Parramatta Road (W)														
11	T1	1817	4.0	1817	4.0	0.492	10.8	LOS A	12.2	88.0	0.51	0.46	0.51	44.5
12	R2	561	2.3	561	2.3	0.902	77.2	LOS F	12.9	92.4	0.98	0.97	1.29	26.1
Approach		2378	3.6	2378	3.6	0.902	26.5	LOS B	12.9	92.4	0.62	0.58	0.69	35.1
All Vehicles		5069	4.1	5069	4.1	0.910	42.9	LOS D	19.9	145.0	0.81	0.78	0.92	28.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Shaftesbury Road (S)											
P1	Full	13	64.2	LOS F	0.0	0.0	0.96	0.96	228.5	213.6	0.93
West: Parramatta Road (W)											
P4	Full	5	64.1	LOS F	0.0	0.0	0.96	0.96	237.4	225.2	0.95
All Pedestrians		18	64.2	LOS F	0.0	0.0	0.96	0.96	231.1	217.0	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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MOVEMENT SUMMARY

Site: 101 [Parramatta Road / Cheltenham Road (Site Folder: PM Future Base + Dev)]

Network: N101 [PM Future Base + Dev (Network Folder: PM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Cheltenham Road (S)														
1	L2	37	0.0	37	0.0	* 0.719	47.3	LOS D	8.7	61.2	0.97	0.87	1.02	23.8
2	T1	5	0.0	5	0.0	0.719	41.8	LOS C	8.7	61.2	0.97	0.87	1.02	25.1
3	R2	237	0.4	237	0.4	0.719	47.4	LOS D	8.7	61.2	0.97	0.87	1.02	33.4
Approach		279	0.4	279	0.4	0.719	47.3	LOS D	8.7	61.2	0.97	0.87	1.02	32.3
East: Parramatta Road (E)														
4	L2	64	0.0	64	0.0	0.696	22.7	LOS B	17.3	124.8	0.76	0.71	0.76	45.5
5	T1	2231	4.1	2231	4.1	0.696	17.2	LOS B	17.6	127.3	0.76	0.70	0.76	38.4
Approach		2295	4.0	2295	4.0	0.696	17.3	LOS B	17.6	127.3	0.76	0.70	0.76	38.7
North: Walker Street (N)														
7	L2	20	0.0	20	0.0	0.072	34.2	LOS C	0.8	5.8	0.75	0.69	0.75	29.3
8	T1	3	0.0	3	0.0	0.072	30.3	LOS C	0.8	5.8	0.75	0.69	0.75	30.1
9	R2	12	0.0	12	0.0	0.072	34.1	LOS C	0.8	5.8	0.75	0.69	0.75	6.3
Approach		35	0.0	35	0.0	0.072	33.8	LOS C	0.8	5.8	0.75	0.69	0.75	24.5
West: Parramatta Road (W)														
10	L2	13	0.0	13	0.0	0.731	12.4	LOS A	9.8	70.4	0.41	0.38	0.41	14.2
11	T1	2371	3.4	2371	3.4	* 0.731	12.4	LOS A	18.8	135.4	0.60	0.55	0.60	45.6
Approach		2383	3.4	2383	3.4	0.731	12.4	LOS A	18.8	135.4	0.60	0.55	0.60	45.4
All Vehicles		4992	3.5	4992	3.5	0.731	16.7	LOS B	18.8	135.4	0.70	0.64	0.70	41.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Cheltenham Road (S)											
P1	Full	21	49.2	LOS E	0.1	0.1	0.95	0.95	211.6	211.1	1.00
North: Walker Street (N)											
P3	Full	19	49.2	LOS E	0.1	0.1	0.95	0.95	209.7	208.6	0.99
West: Parramatta Road (W)											
P4	Full	29	49.2	LOS E	0.1	0.1	0.95	0.95	218.8	220.4	1.01
All Pedestrians		69	49.2	LOS E	0.1	0.1	0.95	0.95	214.1	214.4	1.00

MOVEMENT SUMMARY

Site: 102 [Parramatta Road / Lucas Road (Site Folder: PM Future Base + Dev)]

Network: N101 [PM Future Base + Dev (Network Folder: PM Peak Hour)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Lucas Road (S)														
1	L2	82	1.3	82	1.3	0.115	9.1	LOS A	0.2	1.3	0.55	0.75	0.55	46.3
Approach		82	1.3	82	1.3	0.115	9.1	LOS A	0.2	1.3	0.55	0.75	0.55	46.3
East: Parramatta Road (E)														
4	L2	185	1.7	185	1.7	0.423	5.6	LOS A	0.0	0.0	0.00	0.14	0.00	55.4
5	T1	2057	4.6	2057	4.6	0.423	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	57.2
Approach		2242	4.3	2242	4.3	0.423	0.5	NA	0.0	0.0	0.00	0.05	0.00	56.7
West: Parramatta Road (W)														
11	T1	2287	3.1	2287	3.1	0.517	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.4
Approach		2287	3.1	2287	3.1	0.517	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.4
All Vehicles		4612	3.7	4612	3.7	0.517	0.4	NA	0.2	1.3	0.01	0.04	0.01	57.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

Site: 103 [Parramatta Road / Luke Avenue (Site Folder: PM Future Base + Dev)]

Network: N101 [PM Future Base + Dev (Network Folder: PM Peak Hour)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Luke Avenue (S)														
1	L2	8	0.0	8	0.0	0.240	64.8	LOS E	0.5	3.8	0.99	0.70	0.99	19.4
3	R2	6	16.7	6	16.7	* 0.240	65.0	LOS E	0.5	3.8	0.99	0.70	0.99	19.4
Approach		15	7.1	15	7.1	0.240	64.9	LOS E	0.5	3.8	0.99	0.70	0.99	19.4
East: Parramatta Road (E)														
4	L2	13	0.0	13	0.0	0.900	25.9	LOS B	13.9	101.1	0.36	0.47	0.52	38.1
5	T1	2137	4.2	2137	4.2	* 0.900	19.6	LOS B	13.9	101.1	0.24	0.36	0.40	18.4
Approach		2149	4.2	2149	4.2	0.900	19.6	LOS B	13.9	101.1	0.24	0.36	0.40	18.7
West: Parramatta Road (W)														
11	T1	2308	3.2	2308	3.2	0.482	4.6	LOS A	13.5	97.3	0.50	0.46	0.50	40.1
Approach		2308	3.2	2308	3.2	0.482	4.6	LOS A	13.5	97.3	0.50	0.46	0.50	40.1
All Vehicles		4473	3.7	4473	3.7	0.900	12.0	LOS A	13.9	101.1	0.38	0.42	0.46	25.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Luke Avenue (S)											
P1	Full	11	49.2	LOS E	0.0	0.0	0.95	0.95	209.6	208.6	1.00
All Pedestrians		11	49.2	LOS E	0.0	0.0	0.95	0.95	209.6	208.6	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Consultation Outcomes Report

Planning Proposal

166-204 Parramatta Road & 1-1A Cheltenham Road, Croydon

Prepared on behalf of LSH Property Australia

Ethos Urban

Prepared by Ethos Urban
Submitted for
LSH Property Australia

November 2022 | 2210896

'Gura Bulga'
Liz Belanjee Cameron

'Gura Bulga' – translates to Warm Green Country. Representing New South Wales.

By using the green and blue colours to represent NSW, this painting unites the contrasting landscapes. The use of green symbolises tranquillity and health. The colour cyan, a greenish-blue, sparks feelings of calmness and reminds us of the importance of nature, while various shades of blue hues denote emotions of new beginnings and growth. The use of emerald green in this image speaks of place as a fluid moving topography of rhythmical connection, echoed by densely layered patterning and symbolic shapes which project the hypnotic vibrations of the earth, waterways and skies.

Ethos Urban acknowledges the Traditional Custodians of Country throughout Australia and recognises their continuing connection to land, waters and culture.

We acknowledge the Gadigal people, of the Eora Nation, the Traditional Custodians of the land where this document was prepared, and all peoples and nations from lands affected.

We pay our respects to their Elders past, present and emerging.

Contact	Nathan Williams Associate Director	nwilliams@ethosurban.com 0414 569 380

This document has been prepared by:		**This document has been reviewed by:**	
Vy Hoang and Anna Paton	24/11/2022	Anna Paton	24/11/2022

Version No.	**Date of issue**	**Prepared By**	**Approved by**
1.0 (DRAFT)	24/11/2022	AP + VH	AP
2.0 (DRAFT)	25/11/2022	AP	AP
3.0 (FINAL)	25/11/2022	AP	AP

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Table of Contents

1.0 Executive Summary 5
1.1 Purpose of this report 5
1.2 Consultation Overview 5
1.3 Key Feedback 6
1.4 Next Steps 6

2.0 Introduction 7
2.1 Site Location and Context 7
2.2 Site Description 7
2.3 Planning and Strategic Context 8
2.4 Proposed Development 9

3.0 Engagement Approach and Objectives 9
3.1 Engagement Approach 10
3.2 Engagement Assessment Requirements 10

4.0 Engagement Activities and Communications Tool Summary 11

5.0 Engagement Delivery and Feedback 12
5.1 Project Email and 1800 Number 12
5.2 Project Introduction Letter and Invitation 12
5.3 Community and Immediate Neighbour Information Sessions 13
5.4 Community Webinar 18
5.1 Burwood Council 20
5.2 Government Agency and Authority Briefings 21
5.1 First Nations Engagement 23

6.0 Conclusion and Next Steps 24

Appendices

Appendix A 25
- Immediate neighbour letter 25
- Immediate neighbour letterbox drop distribution zone 27
- Wider community letter 28
- Wider community letterbox distribution zone 30

Appendix B 31
- Display boards 31
- FAQ brochure 39

Appendix C 43
- Webinar presentation 43

Table of Figures

Figure 1 Site locational context 7
Figure 2 Parramatta Road Urban Transformation Strategy 8
Figure 3 Sydney Metro West 9
Figure 4. Community drop-in session 17 November 2022 14

Table of Tables

Table 1. Council's Scoping response requirements for engagement 10
Table 2. PRCUTS 'Out of Sequence Checklist' – Criteria 3. Stakeholder Engagement. 10
Table 3. Engagement collateral and activities 11
Table 4. Community drop-in session participation summary 13
Table 5. Community drop-in feedback summary 14
Table 6. Community webinar participation 18
Table 7. Community webinar Q&A and feedback 18
Table 8. Informal feedback from TfNSW. 21

1.0 Executive Summary

1.1 Purpose of this report

Ethos Urban has prepared this Consultation Outcomes Report on behalf of LSH Property Australia (LSH) to outline the key issues raised by immediate neighbours, the local community and several government agencies during the preparation of the Planning Proposal (the proposal) for the rezoning of the site located at 166-204 Parramatta Road, Croydon and 1-1A Cheltenham Road (the site). It details the approach to engagement, the various communication tools utilised, engagement activities undertaken, the valuable feedback received to date, and recommendations for further consideration as the project progresses.

Full consideration has been given to Burwood Council's scoping report response requirements for engagement as well as the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) 'Out of Sequence' checklist criteria for Stakeholder Engagement (Criteria 3).

1.2 Consultation Overview

Ethos Urban was engaged to support LSH with community and stakeholder consultation throughout October and November 2022. The purpose of engagement on the proposal was to:

- Seek feedback from immediate neighbours and the wider community to better understand local views and potential concerns.
- Provide clear, timely and accessible information and opportunities for neighbours to provide feedback during the initial planning phases of the project.
- Explain how the proposed design concept and site planning approach addresses key community issues and long term NSW Government strategic planning priorities.
- Create effective lines of communication between the local community and the project team.

This early engagement process provided opportunities for open conversations and feedback from:

- immediate neighbours to the site,
- community located within a 200m+ radius of the site; and
- several key government agencies and service providers.

A high level summary of the engagement activities undertaken:

Letterbox drop

- Letterbox notification to approximately 36 immediate neighbours and approximately 219 wider community members on 5 November 2022

Stakeholder correspondence

- Several formal and informal project briefings with Burwood City Council planning team.
- Consultation with Transport for NSW, Sydney Water and Ausgrid.

Community drop-in sessions (in-person)

- Five registrants and four attendees at an immediate neighbour session held on the 17 November 2022.
- 22 registrants and approximately 15 attendees at a wider community session held on 21 November 2022.

Community webinar (online)

- 20 registrants and approximately 15 attendees at an online community webinar held on 22 November 2022.

Project email and phone

- Seven enquiries received through community engagement channels during the consultation period.

1.3 Key Feedback

Feedback raised during pre-lodgement consultation related to:

- **LSH as a developer.** Understanding LSH Property's long-term ownership and management of the proposed precinct.

- **Site use and precinct design**. Interest in the rationale behind the proposed building mix and projected population/visitation. There was an acknowledgement that higher density development was inevitable for the area, however, many were concerned with how this could be achieved in a way that is appropriate and sensitive to the surrounding context and local character. There was also concern around the intended quality of the built form and construction outcomes, as other developments in the area were considered poor quality and 'unattractive'.

- **Building heights and density**. Concern was shown regarding how the proposed height and building massing would impact the amenity of surrounding neighbours. There is a desire for more certainty regarding final building heights and density figures.

- **Community open space, amenities and services**. Many residents showed strong support for the proposed public open space, activation and greening along Parramatta Road. There was strong interest and support in the proposed retail / commercial mix and various suggestions were put forward on potential community services, amenities, and facilities that reflected local needs and expectations.

- **Traffic management and parking**. There were concerns regarding the proposed location of the entry / exit points of the proposal and parking provisions, given the increased activity and projected population growth. Considerable impacts to surrounding streets were raised, with particular reference to ongoing traffic congestion, narrowness and limited street parking on Cheltenham Road and a need to consider and address pedestrian safety concerns.

- **Planning pathway and consultation**. Interest in indicative timelines for approvals and construction. Overwhelmingly, the community want transparent and holistic engagement where possible in anticipation of other surrounding developments that will create cumulative impacts.

- **Development impacts.** Issues relating to view loss, solar access, overshadowing, noise, privacy, services and utilities were raised. Many residents also expressed the need for LSH to consider how the development would change and impact the quality of life for surrounding residents and properties who have lived in the area for many years and already endured construction impacts from surrounding development such as WestConnex.

1.4 Next Steps

LSH Property Australia recognises the importance of enabling community feedback and input into any future plans for the site.

Feedback received during the pre-planning proposal consultation provided the project team with a better understanding of the local context and concerns from neighbouring residents. The community will have another opportunity to provide formal feedback via the public exhibition process, to be managed by Burwood Council.

Should the Planning Proposal receive a positive Gateway determination from the Department of Planning and Environment, LSH recognises the importance of continued engagement with near neighbours, businesses and the wider Croydon community and will continue to consult during any future Development Application stages they may be involved in.

2.0 Introduction

2.1 Site Location and Context

The site is located at 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon, within the Burwood Local Government Area. The site has an extensive frontage to Parramatta Road and is bound by Lucas Road and Cheltenham Rd (see **Figure 1**). The site is located approximately 1km from Burwood Station and Town Centre and 150m east of Concord Oval. Importantly, the site is approximately 600m east of the future Burwood North Metro Station and is located within the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) investigation area, specifically within the Kings Bay Precinct.

Figure 1 Site locational context

Source: Google maps, Ethos Urban

2.2 Site Description

The site contains four separate strata allotments, and existing development on the site consists largely of vacant, unused land.

On 15 April 2018, development approval DA 89/2017 was granted by Burwood Council for the construction of a 4-storey car sales showroom, storage, and service facility at the site. The facility was to be operated by Mercedes-Benz. Accordingly, the majority of the site is currently vacant and excavated to basement level, with the exception of 1-1A Cheltenham Road which currently contains a single storey brick dwelling, as well as a warehouse that was previously operated by the Salvation Army.

To the south is residential development in the form of two storey townhouses with single detached dwellings beyond that; to the west across Lucas Road is a building equipment hire facility and to the north across Parramatta Road are car dealerships.

2.3 Planning and Strategic Context

2.3.1 Parramatta Road Corridor Urban Transformation Strategy

The site is situated within the Kings Bay Precinct, as defined by the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS). The PRCUTS was released in November 2016 and seeks to coordinate the renewal of land and neighbourhoods along Parramatta Road.

Of relevance to the site, PRCUTS notes that there are significant urban renewal opportunities for land immediately fronting Parramatta Road, and identifies the site as 'mixed use' in its vision. The plan also recognises that there is an opportunity in Kings Bay Precinct to capitalise on rapid transit, and that the amalgamation of sites in appropriate locations should be encouraged to promote opportunities for redevelopment.

A map of the Parramatta Road Corridor and associated precincts is shown in **Figure 2.**

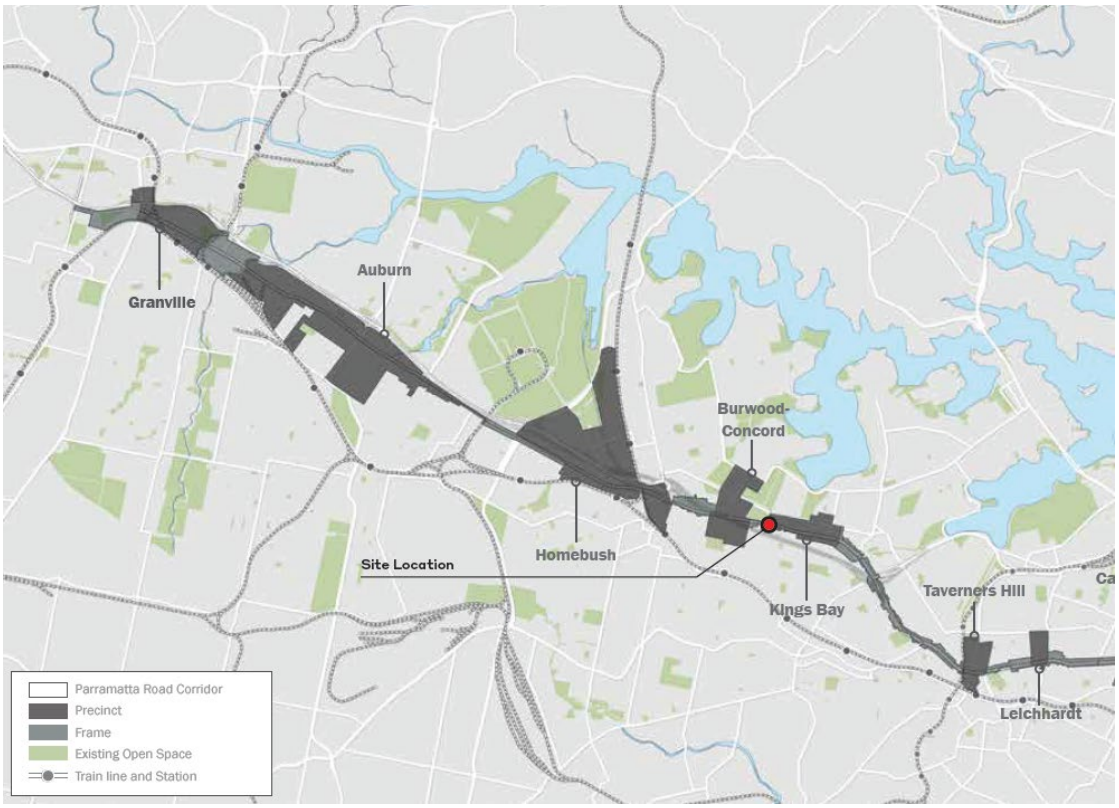

Figure 2 Parramatta Road Urban Transformation Strategy

Source: PRCUTS, Ethos Urban

2.3.2 Sydney Metro West

Set to be opened in 2030, the Sydney Metro West will dramatically transform the precincts in which each station is situated. This is likely to drive further investment in these areas, as public transport connectivity allows for greater liveability for existing and prospective residents and economic viability for businesses.

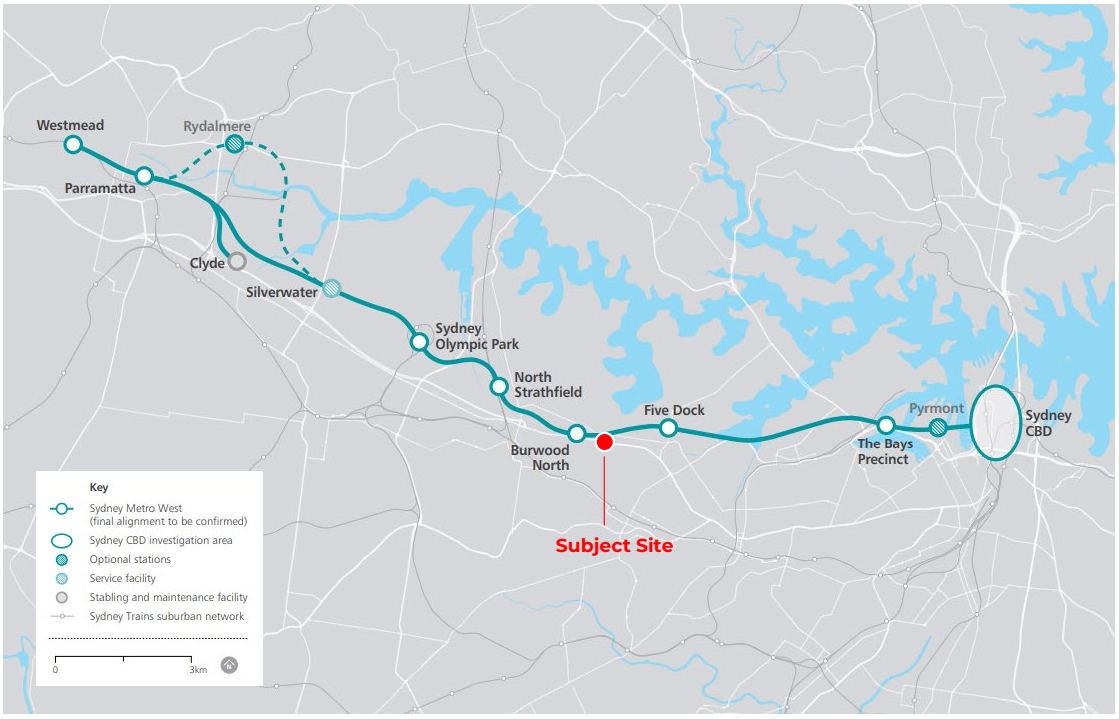

Figure 3 Sydney Metro West

Source: Sydney Metro/Ethos Urban

2.4 Proposed Development

The Planning Proposal (the proposal) for the 166-204 Parramatta Road and 1-1A Cheltenham Road site relates to the proposed scheme prepared by Architectus for a visionary mixed-use precinct featuring a large activated central space. Specifically, the proposal seeks to enable the following changes to the Burwood Local Environmental Plan (BLEP):

- 17,306m^2 of residential GFA, supporting 185 residential dwellings
- A mid to high end hotel at 12,558m^2 of GFA and 160 hotel keys, as well as a hotel restaurant and function facilities
- Diverse retail uses including a supermarket, micro-brewery, and speciality retail including a strong focus on food and dining
- 1,464m^2 of flexible commercial GFA, including co-working spaces
- A Mercedes Benz Experience centre fronting Parramatta Road, at 687m^2 of GFA
- Designated flexible community and makers spaces at 97m^2 of GFA
- A large and activated central plaza and open space
- Through site connections to the southern part of the site.

3.0 Engagement Approach and Objectives

This section of the report outlines the engagement approach and activities undertaken throughout the latter part of 2022.

3.1 Engagement Approach

LSH's approach to community engagement was to develop and deliver a consultation program that constructively engaged with site neighbours, government agencies and service providers to ensure the project team:

- understood local issues; and
- record feedback for consideration during the ongoing refinement of the proposal.

The purpose of engagement was to:

- Seek feedback from immediate neighbours and the wider community to better understand local views and potential concerns.
- Provide clear, timely and accessible information, as well as opportunities for close neighbours to provide feedback during the early planning phases.
- Explain how the proposed design concept and site planning approach addresses key community issues and long terms strategic planning priorities
- Create effective lines of communication between the local community, stakeholders, and the project team.

3.2 Engagement Assessment Requirements

Burwood Council identified a number of areas/issues that required further refinement to allow efficient assessment of the proposal once submitted. These issues were summarised in council's scoping response to the Scoping Proposal submitted by LSH on 1 June 2022. The issue most relevant to this consultation report is detailed in **Table 1** below.

Table 1. Council's Scoping response requirements for engagement

Issue	Requirement	Project Response
Engagement	Details of any engagement undertaken, including feedback from agencies and public authorities, and how issues have been considered.	Details on the various communications tools and engagement activities utilised to share project information, including channels and opportunities for providing feedback is included in **Section 4.0** Details of consultation with Government agencies, service providers, and neighbouring residents as well as how issues raised have been addressed are detailed in **Section 5.0**

The Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) provides an 'Out of Sequence' checklist criteria for Stakeholder Engagement – Criteria 3. **Table 2** below summarises how the proposal responds to these engagement requirements.

Table 2. PRCUTS 'Out of Sequence Checklist' – Criteria 3. Stakeholder Engagement.

No.	Criteria – Stakeholder Engagement	Project Response
1.	Consultation and engagement with relevant stakeholders (council, government agencies, business, community, adjoining properties and user or interest groups, where relevant) have been undertaken, including any relevant pre-planning proposal engagement processes required by local council.	LSH has undertaken preliminary stakeholder consultation as a part of the Planning Proposal process. This is in line with Burwood Council's pre-planning proposal response to the scoping report to the applicant dated 22 August 2022.
2.	An appropriate level of support or agreement is documented.	**Burwood Council:** Refer to Council's response to the pre-planning proposal scoping report dated 2 August 2022. Key concerns have been addressed within the Planning Proposal Report accompanying this application. **TfNSW:** Refer to TfNSW's response to the pre-planning proposal scoping report dated 8 August 2022. Key concerns have been addressed within the Planning Proposal Report accompanying this application.

No.	Criteria – Stakeholder Engagement	Project Response
3.	Provision of documentary evidence outlining the level of planning or project readiness in terms of the extent of planning or business case development for key infrastructure projects.	Refer to the Planning Proposal Report which accompanies this application for more details.

4.0 Engagement Activities and Communications Tool Summary

The table below details the various communications tools and engagement activities utilised, their purpose, target audience and level of anticipated engagement.

Table 3. Engagement collateral and activities

Activity/Tool	Description	How engagement informs the project	Target Audience	Level of Engagement
Collateral				
Immediate neighbour & Community Invite Letters	Letters were emailed and distributed via letterbox drop to inform neighbours about the proposal and invite them to an in-person community drop-in session and an online webinar.	Ensured local residents were aware of the project and provided the opportunity to attend an event that suits them to provide feedback	Local residents	Inform
Frequently Asked Questions (FAQs)	FAQs were printed and distributed at the drop-in sessions to provide explanation of key aspects of the proposal, the planning, design and consultation process where required.	Anticipated and explained some complex planning issues to the community in a simple, easily accessible way	Local residents	Inform
Information display boards	A series of project information boards were displayed at in-person engagement events, detailing project objectives, vision and deliverables with images, architectural plans and easy to understand explanations of the planning and design process	Provided visual aids to engagement event attendees to help explain complex planning issues and details around the project	In-person community drop-in attendees	Inform
Presentation slides	Presentation slides were prepared and used in the community webinar to detail the objectives, vision and key deliverables of the site.	Provided visual aids to stakeholders and the community during online engagement events	Online engagement session attendees	Inform
Project phone number and email address	A dedicated 1800 number and email address were made available to receive and manage project enquiries	Provided an outlet for the community to ask questions and communicate any concerns with the project team.	All	Consult
Activities				
Immediate neighbour meetings and	In-person appointments held within a neighbour drop-in session held near the site	Provided the project team with a much more detailed understanding of the nuanced	Immediate neighbours to the site	Involve

Activity/Tool	Description	How engagement informs the project	Target Audience	Level of Engagement
drop-in sessions	whereby immediately impacted residents could review the information boards and talk to relevant project team members about specific concerns they might have. Residents were encouraged to submit questions ahead of the event so the appropriate technical specialist could address their concerns during the sessions.	issues relating to the project and how the design could be improved to better suit neighbours expectations. It also provided an opportunity to directly convey mitigation strategies to residents by the project team.		
Community drop-in sessions	In-person drop-in sessions held near the site for community members to attend at their leisure, meet the project team, provide feedback on key topics and ask questions	Provided a forum for community members to be able to find out more about the project, provide feedback and ask questions.	Local residents	Involve
Online community Webinar	An online information session for community members to view a presentation, meet the project team, provide feedback on key topics and ask questions.	Provided a flexible and accessible forum for community members to be able to find out more about the proposal, ask questions and provide feedback	Local residents	Involve
Consultation Outcomes Report	A detailed summary of the activities undertaken, stakeholder and community reached, and the feedback provided.	Identify key themes of interest by stakeholders and the community to help inform future planning and design decisions.	All	Inform

5.0 Engagement Delivery and Feedback

The following section of the report provides a detailed summary of the communications and engagement activities undertaken to support the proposal in the lead-up to lodgement, the feedback received, and how the project team has responded.

5.1 Project Email and 1800 Number

A project email address and telephone number were set up and communicated through printed collateral and email outreach to provide residents with a platform to ask questions and provide feedback throughout the engagement period.

5.2 Project Introduction Letter and Invitation

On 5 November 2022, a community notification was distributed* to:

- Approximately 36 immediate neighbours surrounding the site to provide further information about the planning proposal and the invitation to book a one-on-one meeting with the project team to discuss the proposal in more detail.
- Approximately 219 wider community members within 200m+ radius of the site to provide further information about the planning proposal, including further opportunities for engagement and feedback through the community drop-in sessions.

A copy of the letters and distribution zones can be found in **Appendix A.**

** It should be noted that the while the letterbox drop method is a useful channel for mass communication, there are limitations to achieving the desired accuracy and efficiencies including distributors' Code of Conduct when delivering to 'no junk mail' mailboxes as well as difficulty in locating or accessing mailboxes.*

Approximately seven enquiries were received during November 2022 to the dedicated project 1800 number and email address in response to the letter, relating to:

- Registration for upcoming information sessions.
- Early feedback on the planning proposal, including issues relating to the proposed entrance and exit to the site, traffic and parking implications, heritage considerations, impacts to existing infrastructure throughout construction and following completion of the development, and suggestions for community amenities and services.

5.3 Community and Immediate Neighbour Information Sessions

Community drop-in information sessions were held on the 17 November and 21 November 2022 to introduce the project to the community and seek feedback on the proposal. The first session on 17 November targeted immediate neighbours, while the second focused on the wider community. Both sessions provided an opportunity for the project team to listen and receive valuable feedback about nuanced issues relating site neighbours and how the proposal could be more aligned with local character and community expectations.

Project information boards were displayed around the venue at both sessions and project FAQ brochures were distributed to assist participants better understand the proposal. These materials were designed to prompt conversations, collect feedback and provide an ongoing channel for further feedback and questions.

A summary of community interest and attendance is available in **Table 4** and feedback raised across both drop-in sessions is included in **Table 5** below. A copy of the display boards and FAQ brochure can be found at **Appendix B.**

Table 4. Community drop-in session participation summary

Session	Date	Registrants	Attendees (approximate)
Immediate Neighbours	Thursday 17 November 5:30 – 7:30pm Concord Oval	5	4
Wider Community	Monday 21 November 5:30 – 7:30pm Concord Oval	22	15
		Total	**19**

Figure 4. Community drop-in session 17 November 2022.

Table 5. Community drop-in feedback summary

Theme	Feedback Detail	Project Team Response
LSH as a developer	• Interest in LSH as a company and brand • Interest in history of Salvation Army site acquisition. • Interest in whether LSH would hold onto site long-term.	• LSH is proposing a mixed-use site with the intention to hold onto majority of the site, including long-term ownership of hotel, retail and commercial, car park, landscape and central open space for quality control and maintenance. The residential component is currently proposed to be sold however the team is currently investigating build-to-rent options.
Site use, precinct design and building mix	• Many residents expressed strong support for concept design and public open space. Several residents had theexpectation that it would have been a gated precinct. • Acknowledgement that development is inevitable in the area. Expressed the desire for the precinct to set a high quality benchmark for future developments in the area. • Strong support for proposed terraces to the southern boundary of the site and an appreciation that the development 'steps down' to the lower scale housing. • One resident suggested that the area where the terraces are proposed could be considered for community garden uses. • Several residents showed support for the proposed commercial showroom / experience centre so long as it does not bring additional traffic.	• Setting a precedent for the Parramatta Road corridor, the project will provide a residential offering and boutique hotel opportunity in close proximity to transport infrastructure. • The proposed hotel component on the site will leverage the number of visitors to the area and will offer 160+ rooms, conference and event facilities, bars potential for top floor restaurant. This offering will make the most of the site's proximity to Western Sydney Airport and the 10-minute Metro commute to both the Sydney and Parramatta CBDs from Burwood North. • The hotel will positively contribute and complement the local economy through increased employment and spending due to tourism visitation and encouraging community participation -

Theme	Feedback Detail	Project Team Response
	• Several residents showed interest and support for the proposed hotel use and rationale, with some concern relating to increased transient nature of the area and the risk this may detract from the local community feel. • Interest in whether affordable housing, social housing and / or key working housing would be included. • Reference to retirement living villages in Canberra as potential use.	making the F&B offerings and social spaces open to everyone, not just hotel guests. • Details on affordable housing considerations within this proposal are provided within the Planning Proposal Report which accompanies this application.
Building heights and density	• Both interest and concern in proposed heights and density, with preference for reduced height for the two proposed towers. • Concern the proposal is in fact 'high-density' despite community collateral references to medium density. Residential density was anticipated to be as high as 400 apartments. • Interest in intended quality of development, with concerns raised about building quality and structural integrity amidst fears of new development building defects and compromised building practices.	• The scale of the development will be compatible with its physical context, noting the future character of the area and broader NSW Government planning priorities for the site. It is anticipated that the proposal would result in acceptable impacts on the surrounding context. • The location of taller building heights at the corners of the site along Parramatta Rd and the lower scaled building between them maximises solar amenity to the new central open space and the neighbouring residential properties to the south Ensuring an appropriate building height transition and use (residential terraces) along the southern boundary enables a more sensitive interface with the existing neighbouring residential properties. • As mentioned above LSH Property Australia intends to hold and develop the site long term. LSH is committed to supporting quality construction lead by top tier contactors in order to deliver a high-quality built outcome for the site.
Community amenities and services	• Support for more activation and open space along Parramatta Road, appropriate to local context. Residents wish to avoid potential spaces which encourage crime. • Interest in improved local services and offerings such as local supermarket, pharmacy and newsagency. Suggestions included post office, communal gardens, community makerspace, meeting rooms, children's waterplay and play spaces. • Interest in general retail / food and beverage mix, with desire for mix to cater to local tastes and differentiation from current Burwood Chinatown. Suggestions included juice bar, jazz bar, dog-friendly cafes. • Concerns about potential brewery concept could generate noise, anti-social behaviour and undesirable impacts on neighbours. • Comparison to Central Park as an example	• LSH will carefully consider the suggestions provided by the community during the recent engagement. • The proposal provides a strategic response to a detailed community needs and opportunities study will provide formal and informal community spaces to promote local business, community health and social life. • The site will become a focal point of the local neighbourhood by providing a variety of services and amenities separate from its retail offer. These will create a sense of vitality within the site as well as add a sense of attractiveness and welcoming to visitors and residents alike.

Theme	Feedback Detail	Project Team Response
	of a precinct done well.	• The non-residential floor space offers the potential for co-working spaces, a dedicated senior's space, allied health offerings, local open space and play spaces integrated with the landscape.
Open space and greenery	• Strong support for proposed central open public space and green setbacks along Parramatta Rd, Lucas Rd and Cheltenham Rd. • One participant expressed concern the space provided was not large enough. • Suggestions for shaded areas and dog-friendly areas to promote neighbourhood character and encourage community interaction.	• The proposed public open space is approximately 2,425m2+, similar in size to nearby Prowse Reserve. • The activation of the ground plane within this public domain will contribute to the creation of a better Parramatta Road by providing what Croydon currently lacks – public open space, greenery, public art installations, seating and shading.
Traffic management, access and pedestrian safety	• Concerns about impacts to Parramatta Road and congestion. • Desire for entrance / exit via Parramatta Road, despite Transport for NSW regulations. • Desire to address pedestrian and school children safety particularly when crossing proposed vehicle entry / exit points and east of Cheltenham Road crossing Parramatta Road. • Concerns about potential for increased congestion on Cheltenham Road with reference to current traffic volume issues particularly at school time and suggestion for two lanes / additional right-turn lane onto Parramatta Road. • Suggestion for traffic lights on Lucas Road • Support for shared laneway, although concern that the direction of travel would generate more activity on Cheltenham Road. Some preference for the direction to be changed towards Lucas Road • Support for reduced crossovers on Cheltenham Road and general desire for crossovers to be well signposted • Acknowledgement that traffic parking on the old Salvation Army site was dangerous with cars reversing over footpath constantly.	• LSH conducted a preliminary traffic assessment to identify potential traffic impacts, access arrangements, car parking requirements, and other traffic and pedestrian considerations. • This report has taken into consideration various requests and concerns raised by Transport for NSW including the necessity to not locate the proposal entries and exits of Parramatta Rd. • A shared entry and exit has been located off both Lucas Rd and Cheltenham Rd in order split the number of vehicle movements instead of concentrating them on one street only. • Traffic surveys were undertaken over several months, to ensure road volumes were measured to account for peak and off peak times. • Development located within an easy walk from the future Burwood North metro, provide direct services to both the Parramatta and Sydney CBDs. • A range of measures are introduced to support access by walking, cycling and public transport.
Parking	• Support for proposed off street and basement parking, with the suggestion for timed free-parking provisions • Concerns about proposed parking is inadequate for anticipated future population and current residents • Concerns about impacts to street parking, which is already limited	• On-site car parking is provided in • accordance with Council's standard Development Control Plan (DCP) parking rates. • Electric Vehicle (EV) charging points are being considered for the development and will be provided in accordance with the Burwood

Theme	Feedback Detail	Project Team Response
	• Interest in potential electric vehicle (EV) charging ports	Development Control Plan (DCP)
Planning pathway and consultation	• Interest in the broader planning process and indicative timeline for construction and development completion • Interest in construction timeline and impacts • Acknowledgement that letterbox drop notification may have not reached relevant landlords given high rental rates in area. • One resident was interested in purchasing an apartment immediately.	• LSH recognises the importance of enabling community feedback and input into any future development plans for the site. • LSH is committed to engaging with stakeholders in the future and will continue to keep stakeholders and the community informed during the phases of the project, including the statutory public exhibition process. • Detailed plans and studies will be made available through the statutory Public Exhibition process. At the time of the community workshops, no formal proposal had been submitted to council. • Several landlords and landowners of neighbouring residential properties were in attendance at the drop-in sessions.
Construction and development impacts	• Interest and concern in view and privacy impacts to immediate neighbours to the south of the site. • Interest in impacts to services and utilities, with reference to current water / sewerage issues • Mixed feedback on heritage impacts, with reference to limitation of development potential. • Need to consider impacts to quality of life of surrounding residents, including noise mitigation measures • Interest in proposed waste management and sustainability initiatives	• LSH has noted the concerns expressed by the residents, and have considered the need for set-backs, greenery and privacy for those within the development as well as neighbours. • Current planning controls will ensure there is adequate setback between the ground plane and upper floor balconies of apartments and the hotel to protect views, privacy and mitigate noise pollution. • Design considerations will ensure balcony design is activated so there is no impact to lines of sight / privacy. Suitable screening will also be incorporated in future detailed design. • An Ecologically Sustainable Design (ESD) strategy report has been prepared for this proposal and outlines the sustainable design initiatives being explored for the development including waste management, energy generation and it demonstrates a commitment to satisfy national and state environmental sustainability legislation in addition to local planning controls.
Local character	• Interest in day to night transition of the precinct. • Strong support for activated and 'lively' retail uses within the central public open space to avoid reduce and prevent crime / anti-social behaviour caused by proposed commercial / retail activity in the area.	The Urban Design Report which accompanies this submission outlines the desired future character for site, which consists of five key elements as follows: • A green heart - A focus for community and an oasis in the inner west • A green address - Generous new landscaped setbacks will transform Parramatta Road • Local dining & retail - An active 18-hour community • Responsive scale - Built form appropriate to the evolving character of the inner west • Community spaces and jobs - New

Theme	Feedback Detail	Project Team Response
		opportunities for the precinct To reduce opportunities for crime and antisocial behaviour a number of initiatives will be considered including: • Appropriate lighting of public areas • Designing out dark, one way or narrow spaces without active passive surveillance • Areas and uses specially for art and community use (i.e. graffiti wall) • Crime prevention through environmental design

5.4 Community Webinar

An online community webinar was held on 22 November 2022 as an alternative to in-person engagement events and as an additional opportunity to attend a more structured presentation of the proposal. The webinar provided an opportunity to meet the team, ask questions, and provide feedback.

The presentation ran for 1.5hrs and included:

- Welcome, Acknowledgement of Country and team introductions
- Project vision and objectives
- Overview of the planning proposal
- Planning process
- Q&A
- Next steps

Participants were encouraged to submit questions in advance and the webinar 'chat' function was enabled to facilitate the discussion. A summary of webinar participation is outlined in **Table 6** and the Q&A discussion held during the webinar is detailed in **Table 7** below. A copy of the presentation is available at **Appendix C.**

Table 6. Community webinar participation

Session	Date	Registrants	Attendees
Webinar	Tuesday 22 November 5:30 – 7:00pm Online via Zoom	20	15

Table 7. Community webinar Q&A and feedback

Question	Project Team Response
Given LSH's earlier comments on holding onto its sites, will the residential and commercial parts of the development be sold or rented?	LSH is proposing a mixed-use site with the intention to hold onto majority of the site, including long-term ownership of hotel, retail and commercial, car park, landscape and central open space for quality control and maintenance. The residential component is currently proposed to be sold however the team is currently investigating build-to-rent options.
How is the height of the buildings going to affect residential solar power generation? How is that affected by the other towers you have projected in grey on the solar slide?	There are requirements to ensure blanket shadows are not generated from the proposed development. Comprehensive shadowing studies, including modelling on 21 June, the 'worst day of the year - when the sun is at it's lowest' demonstrate the design and separation of the two towers will not generate shadows that remain over surrounding roofs long enough to have an impact of the solar power generation.

Question	Project Team Response
	We will consider this feedback in future discussions with the project environmental sustainability team to ensure minimal impacts to surrounding neighbours.
Why only 400 parking spaces? Apart from the residents and commercial occupants, people will park there and walk to the Burwood metro. Parking in Cheltenham Rd now is at maximum.	As noted in the traffic report and as per the advice from TfNSW, the proposed parking rates are maximum rates to encourage a mode shift towards sustainable forms of transport. Configurations for parking will be determined and managed based on the approved site use and building mix.
Is it your intention that your planning proposal incorporates the building massing indicated in your Masterplan?	Yes, the intention is not to create blanket height across site. The approach is to create a masterplan that gets enshrined in the planning controls and is delivered as so if approved.
What is the projected population of this development? How many of those spaces are intended to be transient?	The hotel will comprise approximately 160 rooms, the residential component, which is proposed to be private will comprise approximately 185 apartments, with the remaining 10-15% for commercial and retail.
You're talking to people who've endured WestConnex construction. Our houses are cracked, we had construction noise in the early morning. Appreciate the greenery proposed, however there is a need to consider impacts to the local area. It's an oasis within a busy area. My fear is this will bring noise and detract from quaintness. We have federation houses. Struggle to understand integration with local context and history	LSH appreciates the ongoing development impacts and we want to work with the local community to achieve the best outcomes. Our proposal seeks to complement and balance development as best as we can in terms of commercial viability and wider local and state government strategic planning objectives. We appreciate this would be a significant change and impact for the local area and surrounding residents and we want to minimise these impacts, particularly on traffic and parking, wherever possible.
Is the pool only for residents or for the public as well? Will the roof have toilet facilities near the pool?	The proposed ground plane is public open space whilst the rooftop is designed as private open space for residents. We are currently investigating other public amenity options, including potential gym operators for the precinct.
Will right turns into the parking space across the opposite flow of traffic be permitted? Because trying to do that in Cheltenham is going to affect flow off Parramatta Road. Similarly, the large flux of traffic coming from the schools further up Cheltenham already clogs the street in mornings and afternoon	Question taken on notice during the session, to be closed out via email with input from the traffic consultant. Response provided on the 24 November 2022: *Right turn movements into the basement car park from Cheltenham Road would be permitted under the current proposal. The reference design has carefully considered current and future traffic movements in the context of the surrounding road network and for this reason located the driveway on Cheltenham Road well away from the Parramatta Road intersection to minimise the instances of impacts to the Parramatta Road / Cheltenham Road traffic lights. As the project progresses further traffic studies will be undertaken which consider additional measures to ameliorate traffic impacts – this will include the potential for the introduction of 'Keep Clear' line-marking outside of the basement access point so that vehicles turning right into the basement do not impact the flow of traffic from Parramatta Road.*
I'm in a remote area this week and the connection keeps dropping out which is very frustrating, so I'll have to leave the meeting. At the moment even the audio has taken a	Comment, noted. This participant re-joined the meeting when able.

Question	Project Team Response
holiday. But thanks for all the info.	
Noting the time of information sessions is limiting for genuine engagement and discussion. What are plans for future engagement prior to lodgement with Burwood? The session was 5.30, which is when people are leaving work.	Comment noted. The project team acknowledges and appreciates it is challenging to find an appropriate time for engagement that works for everyone. Two in-person sessions were hosted between 5:30-7:30pm within a five minute walk to the site. The events were casual, and people could drop-in anytime within this period. A webinar was also available between 5:30-7:30pm for those unable to attend an in-person session. The intended lodgement is before Christmas and Burwood Council will run a formal exhibition period, which provides an opportunity for community, agencies to review and provide formal feedback. Given this is a planning proposal and is early in the process, there will also be further opportunities for engagement as the project progresses, pending relevant approvals.
Why is this development and consultation been conducted separately and not holistically with other developments?	The development of the site has always been intended to be delivered by a Council or a private proponent per the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) released by NSW state government in 2016. We acknowledge the context has changed with approval of Burwood North Metro, however the process for realising the site remains. We recommend you contact and provide this feedback to relevant council regarding other land holdings and it is worth noting Burwood Council is working on Burwood North precinct and Canada Bay Council is working on Kings Bay Precinct.
Given your intention to retain ownership of significant parts of the site, is it intended that the open space is to be dedicated under a planning agreement for offset or retained as open space with public access but in private ownership? Are you intending a planning agreement?	Yes, the intention is to secure this via a planning agreement to ensure ongoing public access and long term maintenance.
What are your plans if permission isn't granted for a 22-storey building?	We will work with Burwood Council to determine what is permissible.
Appreciate time taken to present the information	Comment, noted.

5.1 Burwood Council

Response to pre-planning proposal scoping report

Burwood Council identified areas/issues that require further refinement or information to allow efficient assessment of the proposal within their response to the Scoping proposal issued to LSH on the 2 August 2022. This response is required to be considered as the minimum requirements, noting that council may not have received comments from public authorities and agencies, and which may inform other issues. Key issues raised within the report are provided below:

- Connection Country
- PRCUTSVision
- Affordable housing
- Transport and access
- Active Transport
- Parking

- Sustainability and Resilience
- Design Quality
- Urban Design
- Massing analysis
- Visual Impact
- Public Spaces and landscaping
- Public Art
- Flood risk and drainage
- Contamination
- Tunnel Infrastructure
- Housing that meets community needs
- Public benefit
- Engagement
- Staging Plan
- Draft Development Control Plan

Project Response:

- A detailed summary of how the project has responded to these issues raised by council is provided within the Planning Proposal Report accompanying this application.

5.2 Government Agency and Authority Briefings

LSH has consulted with several key authorities and government agencies in order to identify planning issues to confirm the strategic and site-specific merit of their proposal before lodgement. A summary of this consultation, key feedback and the project response is provided below.

5.2.1 Transport for New South Wales

Response to pre-planning proposal scoping report

Burwood Council referred the scoping report to Transport for New South Wales (TfNSW) for initial review and comment. A formal response was provided by TfNSW to LSH on 8 August 2022. Key issues raised for further refinement and consideration prior to lodgement included the following:

- Integrating land use and future transport (Burwood North metro station)
- Proposed non-residential uses
- Proposed Access Arrangement
- Freight and Servicing
- Proposed Shared Zone
- Car Parking
- Active Transport
- Transport Impact Assessment
- Proposed Green Edge Setback
- Funding and Implementation

Informal discussion on project

An informal meeting was held with TfNSW and the project traffic engineer on the 15 August 2022 to discuss a number of issues relating to scoping report as mentioned above. The table below provides a summary of the key topics of this discussion and the outcomes/impacts to the proposal.

Table 8. Informal feedback from TfNSW.

Topic	Summary of discussion and key actions
Bus lanes – Parramatta Road	• The Parramatta Road bus corridor remains under development and the extent of land acquisition required is not finalised at this point. • In the Kings Bay Precinct it is understood that land will be acquired on both sides of Parramatta Road to accommodate the kerbside bus lanes. • There may be scope for discussions to take place with Council and TfNSW to allow for the utilisation of part of the 6m wide Green Edge setback to accommodate necessary footpath widths and public transport infrastructure (e.g. bus shelters) as the proposal progresses.
Vehicle access arrangements	• TfNSW noted that no vehicle access should be provided via Parramatta Road. • Reference design responds to feedback by locating driveways well away from the Parramatta Road corridor.
Freight and servicing	• TfNSW recommends that the *Last Mile Toolkit* is used to inform the design of the loading dock.

Topic	Summary of discussion and key actions
	• Transport assessment prepared for the proposal utilises the *Last Mile Toolkit* to determine potential loading dock numbers – to be developed further as the design progresses.

Project Response:
- LSH and the project team will continue to work closely with TfNSW as the project progresses.
- Issues listed above have been addressed within the *Planning Proposal Report* and the *Transport Assessment* prepared by JMT Consulting which accompanies this application.

5.2.2 Sydney Water

LSH emailed Sydney Water on the 27 October 2022 to facilitate pre-lodgement consultation. Information provided to Sydney Water included:
- High-level project proposal overview.
- An invitation to meet with the project team to discuss the project.
- Scoping document.
- Architectural Plans (current as of the date of the email).
- Site survey providing as well as an invitation to meet with project team.

Sydney Water acknowledged receipt of the information on 27 October 2022, but have not provided any further correspondence as of the date of this report.

Project Response:
- Sydney Water will be formally notified via the gateway process.
- LSH and the project team will continue working with Sydney Water as the project continues through further planning and design stages.

5.2.3 Ausgrid

LSH emailed Ausgrid on the 27 October 2022 to facilitate pre-lodgement consultation. Information provided to Ausgrid included:
- High-level project proposal overview.
- An invitation to meet with the project team to discuss the project.
- Scoping document.
- Architectural Plans (current as of the date of the email).
- Site survey providing as well as and an invitation to meet with project team.

Ausgrid acknowledged the initial outreach on 28 October 2022, and enquired further into what information was needed. Ausgrid advised that if the enquiry was regarding electrical supply to the proposed development, this would need to go through the contestable process which would require a formal application.

Project Response:
- LSH confirmed that the initial reach out was aimed to begin the pre-lodgement consultation process and check if there were any issues the project team should be aware of at this early planning stage.
- Ausgrid will be formally notified via the gateway process.
- LSH will continue working with Ausgrid as the project continues through further planning and design stages.

5.1 First Nations Engagement

The Wangal People of the Eora Nation are the traditional custodians of the Burwood municipality including Croydon where the project site is located. LSH intends to consult with First Nations peoples through a connecting with County process that incorporates landscape , public domain design, and a public art strategy for the site.

Public Domain and Landscape
LSH have engaged landscape architects Arcadia to undertake the early concept design of the public domain that will become the common ground for all people to come to, learn and reflect. Arcadia is committed to creating a landscape and public domain inclusive of community and is Country-led. Arcadia have begun the initial collaboration process with First Nations Knowledge holders to form an authentic design narrative.

Consultation is based on recent industry and institutional moves to advance Aboriginal design signals in the built environment practice. These include:

- AILA Reflect Reconciliation Action Plan (2019)
- GANSW Draft Connecting with Country (2020)
- GANSW Designing with Country (2020)

Broadly, the connection to Country approach and process for the proposal will be as follows:
Initiation to Concept Design (up to DA submission)

- Cultural research
- Identifying Indigenous underlays
- Cultural observations, recommendations and design references

Design Development (post-DA)

- Walking Country
- Yarning
- Deep listening
- Cultural design response
- Inclusive implementation

Design Delivery

- Indigenous overlay and conscious construction
- Regenerative materiality
- Indigenous interpretations

Post-Delivery

- Continued Indigenous partnerships through long-term maintenance strategies
- Ongoing community inclusion

Public Art Strategy

Together with the architecture and landscape, Aboriginal co-design and heritage interpretation, the public art strategy lead by FCAD will ensure the importance of the site context and provide an exciting opportunity to connect Country and First Nations Knowledge holders.

Interpretive public art at this site will allow aboriginal artists to tell their stories and express the importance of connection to the land.

Project Response:

- The project team intendsto work with First Nations Knowledge holders during the detailed design process, construction, and ongoing operations of the building should the proposal be approved.
- Further details on the connection to Country approach and intended CO-design process is provided within Arcadia's Landscape Design Report that accompanies this submission.
- Details on the Public Art strategy and inclusion of First Nations engagement is provided within the public art strategy prepared by FCAD which accompanies this submission.

6.0 Conclusion and Next Steps

LSH Property Australia recognises the importance of enabling community feedback and stakeholder input into any future plans for the site at 166-204 Parramatta Road & 1-1A Cheltenham Road, Croydon.

As outlined in this report, the feedback received during the pre-planning proposal consultation provided the project team with a better understanding of the local context and the concerns from neighbouring residents. Government agencies and service providers. As such, this early consultation will allow the project team to respond to this feedback and refine the proposal as the project continues.

The community and stakeholder engagement carried out was the first opportunity to present the site's concept design to the public. As such, several community members were taken by surprise by the scale of the development. This is understandable given the current scale of surrounding residential areas.

Should the proposal receive a positive Gateway determination from the Department of Planning and Environment, LSH recognises the importance of continued engagement with near neighbours, businesses and the wider Croydon community and will continue to consult during any future Development Application stages.

Appendix A

- Immediate neighbour letter

5 November 2022

Dear Neighbour,

As Burwood grows and evolves, careful consideration is being given to the future of surrounding areas. Planning for the future rejuvenation of the site at 166-204 Parramatta Road, Croydon has commenced and we are seeking early input from local residents.

Our vision for the site is to be Croydon's Urban Village – a mixed-use precinct that places greenery at its heart and combines all the elements that make a great Sydney neighbourhood and set a benchmark in quality and amenity for the future.

LSH Property Australia is planning to lodge a planning proposal with Burwood Council that is seeking planning changes to enable a considered mix of neighbourhood retail offerings, community amenity, generous open green space and much-needed medium-density housing in the area.

Opportunities for consultation

As an immediate neighbour to the site, we would like to invite you to a dedicated drop-in information session on Thursday 17 November from 5:30 – 7:30pm. You are welcome to drop in at any time during this window, or alternatively you can pre-book a one-on-one 20-minute briefing with the project team to ensure you can provide feedback and raise any questions specific to you.

Please confirm your interest in a one-on-one briefing via return email to **consultation@ethosurban.com** or by calling **1800 870 549** by Tuesday 15 November. Alternatively, if you would prefer to attend in a casual drop-in capacity, please register your interest by scanning the QR code below.

Immediate neighbour drop-in session, including one-on-one meetings (in-person):

Date: Thursday 17 November 2022
Time: 5:30 – 7:30pm for casual drop-ins. If you would like to book a dedicated 20-minute briefing during this time, please get in touch by emailing consultation@ethosurban.com or calling 1800 870 549.
Location: Local venue, event details to be provided upon registration.
Light catering will be provided.

In addition to the immediate neighbour session, we will be hosting a wider community drop-in session and information webinar, which you are welcome to attend if this is more convenient. Please register your interest by scanning the QR codes below.

Community drop-in session (in-person):

Date: Monday 21 November 2022
Time: 5:30 – 7:30pm
Location: Local venue, event details will be provided upon registration. *Light catering will be provided.*

Community webinar (online):

Date: Tuesday 22 November 2022
Time: 5:30 – 7:00pm
Location: Online via Zoom.

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The proposal and next steps

The proposal aims to revitalise Parramatta Road, responding to the needs of current and future residents, with a mixed-use precinct that will bring a range of residential, retail and community uses to the site.

This consultation will inform the refinement of the concept design which will be part of the planning proposal that is submitted to Council. The community will have other opportunities to provide feedback on the proposal through the formal exhibition process.

Site location

Source: Ethos Urban

How do I find out more?

If you have any issues registering or would like to ask any questions, please contact our community engagement team via email on **consultation@ethosurban.com** or by calling **1800 870 549**. If you cannot attend this meeting but would like to register for further updates, please get in touch.

We hope you can join us and look forward to meeting you soon.

Sincerely,

Anna Paton
On behalf of the project community relations team
Principal, Engagement – Ethos Urban

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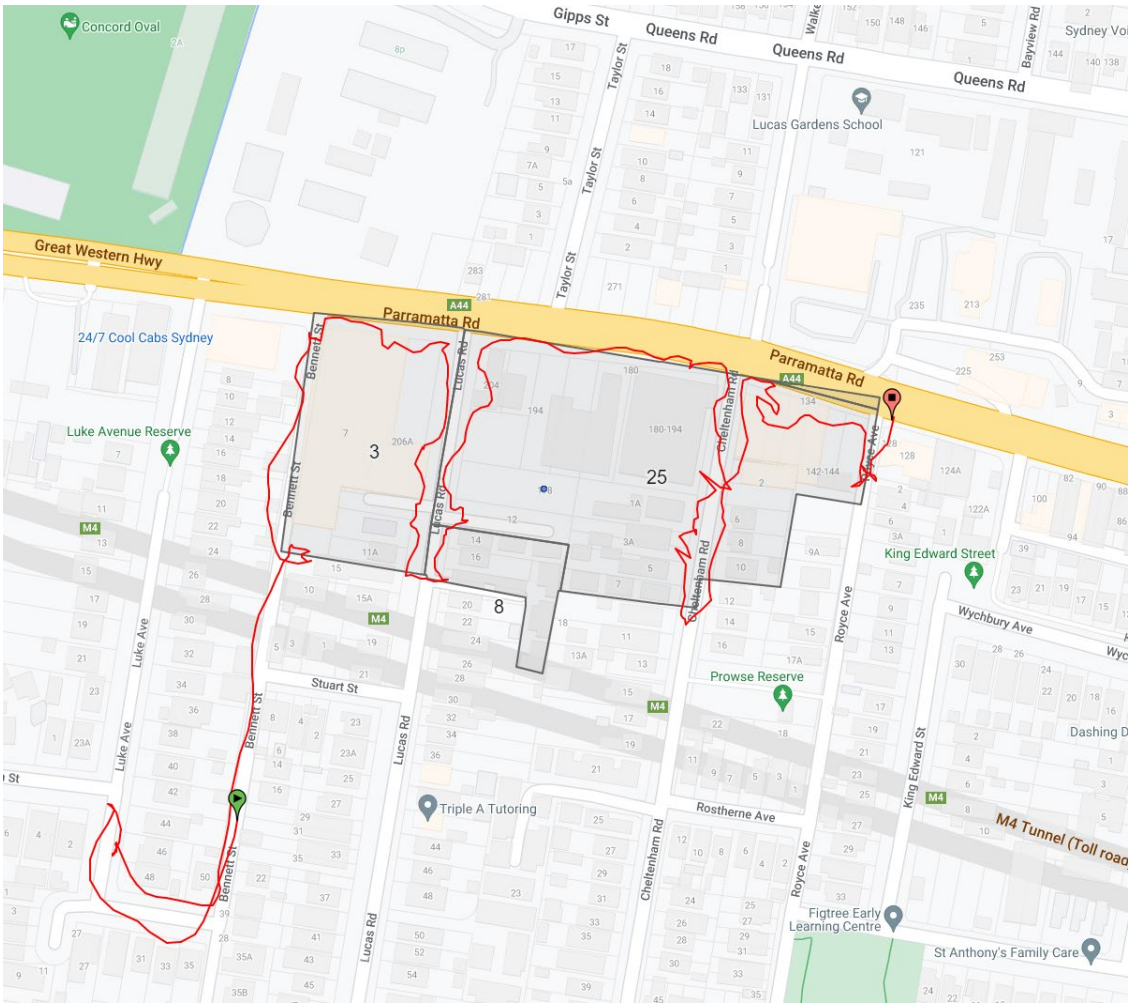
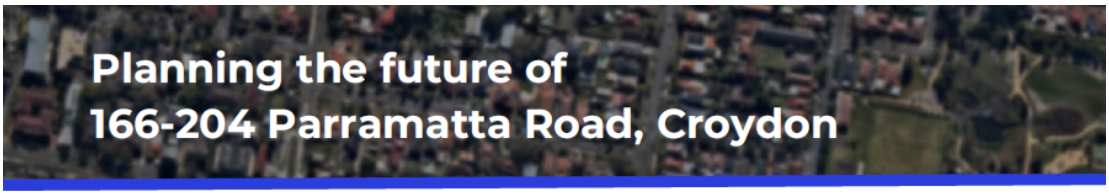
- ### Immediate neighbour letterbox drop distribution zone



Wider community letter



5 November 2022

Dear Resident,

As Burwood grows and evolves, careful consideration is being given to the future of surrounding areas. Planning for the future rejuvenation of the site at 166-204 Parramatta Road, Croydon has commenced and we are seeking early input from local residents.

Our vision for the site is to be Croydon's Urban Village – a mixed-use precinct that places greenery at its heart and combines all the elements that make a great Sydney neighbourhood and set a benchmark in quality and amenity for the future.

LSH Property Australia is planning to lodge a planning proposal with Burwood Council that is seeking planning changes to enable a considered mix of neighbourhood retail offerings, community amenity, generous open green space and much-needed medium-density housing in the area.

Opportunity for consultation

As a local resident, we would like to invite you to attend an upcoming community information session. This is an opportunity to learn more about the proposal, meet the team, raise any questions, and provide feedback on key topics ahead of lodgement in late 2022.

Please register your interest by scanning the QR code below. You also are welcome to submit any questions in advance of the session through the registration links. Alternatively, please email **consultation@ethosurban.com** or call **1800 870 549** for assistance. Meeting location details for the in-person community drop-in session will be shared to registered attendees once confirmed.

We hope you can join us and look forward to seeing you soon.

Community drop-in session (in-person):

Date: Monday 21 November 2022
Time: 5:30 – 7:30pm
Location: Local venue, please scan the QR code to register and event details will be provided upon registration. *Light catering will be provided.*

Community webinar (online):

Date: Tuesday 22 November 2022
Time: 5:30 – 7:30pm
Location: Online via Zoom. Please scan the QR code to register.

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The proposal and next steps

The proposal aims to revitalise Parramatta Road, responding to the needs of current and future residents, with a mixed-use precinct that will bring a range of residential, retail and community uses to the site.

This consultation will inform the refinement of the concept design which will be part of the planning proposal that is submitted to Council. The community will have other opportunities to provide feedback on the proposal through the formal exhibition process.

Site location

Source: Ethos Urban

How do I find out more?

If you have any issues registering or would like to ask any questions, please contact our community engagement team via email on **consultation@ethosurban.com** or by calling **1800 870 549**. If you cannot attend this meeting but would like to register for further updates, please get in touch.

We hope you can join us and look forward to meeting you soon.

Sincerely,

Anna Paton
On behalf of the project community relations team
Principal, Engagement – Ethos Urban

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- **Wider community letterbox distribution zone**

Appendix B

- Display boards

PLANNING FOR THE FUTURE

166-204 Parramatta Road and 1a Cheltenham Rd, Croydon

Our vision

166-204 Parramatta Road will be a mixed-use precinct that places greenery at its heart. Responding to the needs of current and future residents, 166–204 Parramatta Road will provide a considered mix of neighbourhood retail, great public spaces and much-needed medium-density housing for the area.

PROJECT OVERVIEW

What are we proposing?

LSH Property Australia is preparing a planning proposal that is seeking planning changes that will enable a new precinct which includes neighbourhood retail, community amenity, generous open green space and much-needed medium-density housing for the area.

As Croydon and surrounding areas are expected to grow at record rates over the next 15 years, the need for housing, retail, employment, and social infrastructure close to transport hubs is critical as identified by the government.

Our proposal aims to:

Provide a green, safe & generous public realm
A large green community open space at the heart of the site will provide opportunities for the community to dwell in and play, whilst also providing protection from the noise and congestion of Parramatta Rd.

Help meet demand for local housing diversity
The project will provide a mix of apartments and terraces in varied sizes, close to a major public transport hub as well as a boutique hotel.

Support local employment opportunities
The development is estimated to support roughly 400 jobs during construction and around 300 jobs during ongoing operations.

Create opportunities for neighbourhood retail
The proposal offers opportunities for a neighbourhood mix of cafes and restaurants, a small-scale grocery store and local services, designed to service current and emerging residents.

Provide community infrastructure
The proposal aims to provide a variety of services and amenities focussed on the community. There is potential for co-working spaces, a dedicated senior's space, allied health offerings, local open space and play spaces integrated with the landscape.

These boards have been solely prepared for the purpose of a neighbour briefing. The information is subject to change without notice as part of the design, application, assessment and determination process. These boards are not a complete assessment or description of the proposed development and we make no warranties or representations about the material contained in this presentation.

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Planning objectives

Parramatta Road Urban Transformation Strategy (PRCUTS)

The Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) sets out the NSW Government's 30 year plan for the renewal of the Parramatta Road Corridor. The PRCUTS includes indicative controls for possible future development in the corridor in which our site is located.

Our proposal will deliver on the Strategy's seven land use and transport planning principles:

Housing choice and affordability

New and diverse housing to support a growing population with diverse needs.

Diverse and resilient economy

The revitalisation of Parramatta Road will attract new businesses and support existing businesses that create a diversity of jobs closer to home.

Accessible & connected

The Strategy will better serve customers with better connected places and movement networks.

Vibrant communities and places

Promote quality places and built form outcomes to transform the corridor over time.

Green spaces and links

Enhanced and new open spaces and green setbacks will support a healthy lifestyle and provide places for people to gather and relax.

Sustainability and resilience

Liveable local Precincts along the Corridor that are sustainable, resilient and make Sydney a better place.

Delivery

A high quality multi-use corridor with improved transport choices, better amenity and balanced growth of housing and jobs.

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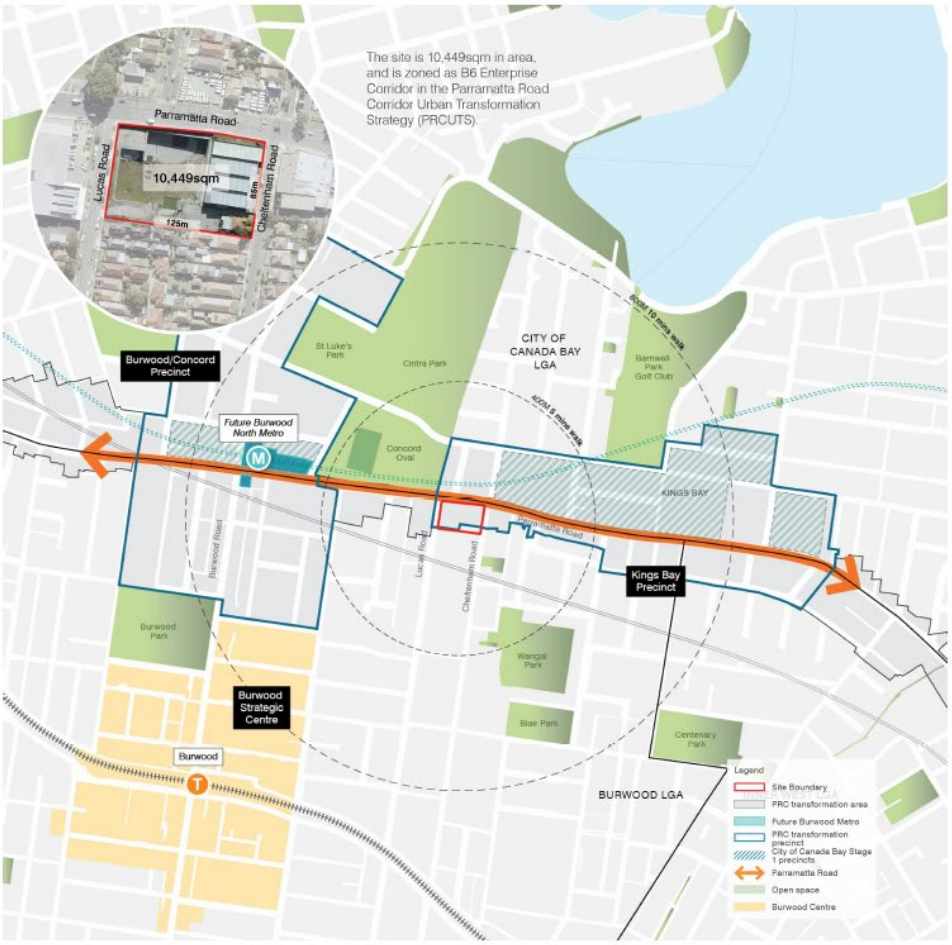
The site



Current view to site across Parramatta Rd, looking south-east.

Current view to site across Parramatta Rd, looking south-west.

Current view to site from Cheltenham Rd.

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Planning process

What is a planning proposal?

Council's Local Environmental Plan (LEP) is NSW Government planning legislation that sets out rules on what can be built and where, including things like the use of the building, it's height, and number of storeys. Over time LEPs need to be updated to better align with the communities' changing needs and wider NSW Government planning objectives.

A planning proposal is the first step (of many) in making an amendment to Council's LEP.

Early concept scheme - central open space. Source: Architectus

The planning proposal process in detail

There are six main stages in the planning proposal process.

STAGE 1: Pre-lodgement
This is an early analysis of the development potential of the relevant land including key environmental or site constraints and a review of the strategic planning framework. It includes obtaining advice and consultation with authorities and government agencies to identify what studies are required.

WE ARE HERE

STAGE 2: Preparation of planning proposal
Council reviews and assesses the proposal. Council will also decide whether to support and submit it to the Department of Planning and Environment (the department) for a Gateway determination.

Burwood Council's newly formed Design Review Panel will review the proposal and provide feedback.

STAGE 3: Gateway determination
Once the planning proposal has been submitted, the Department reviews it through the "Gateway process". The Gateway determination is a checkpoint to review the strategic and site-specific merit of the proposed changes and includes deciding on whether the planning proposal should go forward to public exhibition.

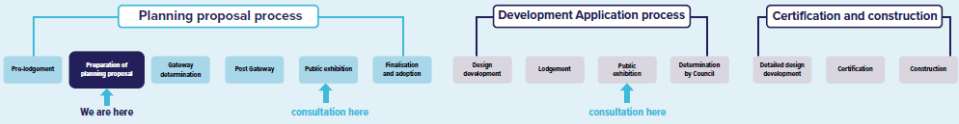
STAGE 4: Post Gateway
This stage involves council actioning the Gateway conditions. This may include undertaking further studies to justify the proposed changes and consulting with specific State agencies or the community.

STAGE 5: Public exhibition and assessment
During this stage council will consult with the community, key authorities and government agencies as required by the Gateway determination. Council will also review the planning proposal to address the conditions of Gateway determination and submissions.

Once publicly exhibited, the planning proposal is ultimately assessed by the local plan-making authority and determined.

STAGE 6: Finalisation and adoption
If the planning proposal is supported, the changes to the LEP is then made and notified.

Project lifecycle at a glance



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Design Principles

Site considerations

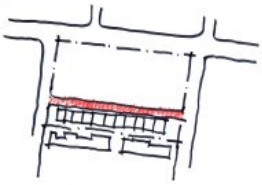
Central open space

A new destination for Croydon, of a size and quality that can only be offered with a site of this size and depth.

Greening the streets

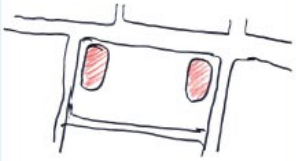
New green setbacks will be transformational not only for the Parramatta Road corridor but to the quality of the surrounding streets as well. They will be a catalyst for the entire neighbourhood.

Traffic and site access



A shared lane-way will provide a fourth street frontage, unlocking through site connections and providing a transition to the residential context to the south.

Minimise overshadowing



There is an opportunity to locate height in a way that aligns scale with the future corridor character and minimises impacts to the south.

Protect the open space

Low-scale built form provides a buffer from the harsh Parramatta environment, and interfaces with the activity of the open space.

Ground plane activation

A bespoke indoor-outdoor offer that does not compete with Westfield and provides a premium activated destination.

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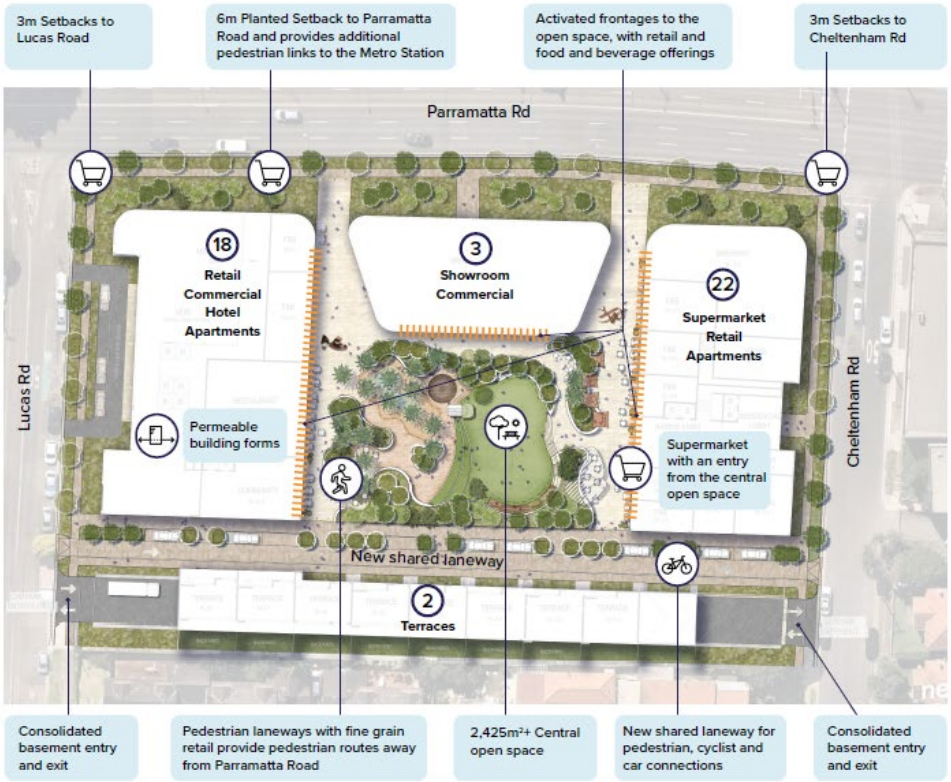
Concept Design

Site plan



Concept massing

We appreciate your input

- What do you think about the central public open space?
- What kinds of neighbourhood retail would you like to see more of in your area?
- What do think a proposal like this could mean for your community?

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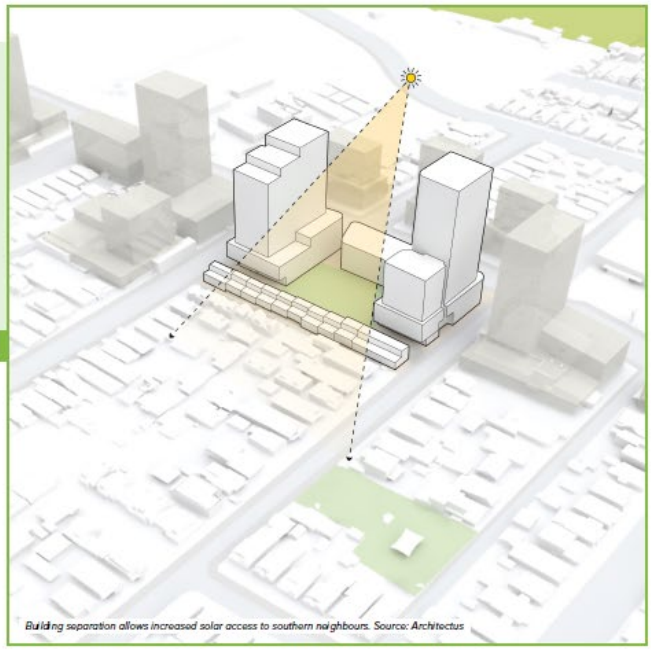
Key Considerations

Solar Access

- No additional overshadowing impact to Prowse Reserve from 9am – 3pm
- The proposal provides more solar amenity for Prowse Reserve than PRCUTS complying scheme
- Tall slender towers ensure fast moving shadows and a shorter period of impact for shading.



Building separation allows increased solar access to southern neighbours. Source: Architectus

Traffic and site access

Traffic survey locations. Source: JMT Consulting

Key measures to reduce impacts to neighbours are:

- Vehicle access points located well away from Parramatta Rd
- Development located within an easy walk from the future Burwood North metro, provide direct services to both the Parramatta and Sydney CBDs.
- On-site car parking is provided in accordance with Council's standard DCP parking rates.
- A range of measures are introduced to support access by walking, cycling and public transport.
- Traffic movements expected to be generated under the Planning Proposal would be lower (in the AM peak hour) and comparable (in the PM peak hour) when compared to a development scenario under current planning controls for the site.
- Traffic modelling indicates that the proposal would not significantly impact the operation of the adjoining road network.

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Project Team

Developer

LSH PROPERTY AUSTRALIA

LSH Property Australia (LSH) is a wholly owned subsidiary of Lei Shing Hong Limited, a major international conglomerate with a 100% local Australian team.

LSH is a majority owned family company involved in sustainable property development and asset management business, with experience delivering world class commercial and mix-use developments.

Breakfast Creek Lifestyle Precinct, QLD.

Mercedes-Benz Sydney, NSW.

Architect

architectus™

Architectus is an award-winning Australian architecture and design studio specialising in commercial, education, interiors, public, residential, transport, urban design and planning.

Architectus provides an insightful and human-centric design approach combined with a collaborative ethos to create unique places that are exemplars of elegance, function and sustainability.

NATURA Macquarie Park, Sydney.

The Langston, Epping, Sydney.

Next steps

We are currently undertaking consultation with neighbours to the site and other nearby residents to share the key planning principles being developed by our design team and listen to their views.

This consultation will inform the refinement of the concept design which will be part of the planning proposal that is submitted to Council.

Once the planning proposal has been lodged, the community will have another opportunity to provide formal feedback via the public exhibition process, to be managed by Burwood Council.

Early Concept scheme - central open space. Source: Architectus

Providing your feedback

Your feedback will impact the proposal in a number of ways:

- Feedback will be recorded and provided to the project team as they continue to refine the project
- Feedback will be included in a *Consultation Outcomes Report* that will be submitted along with the proposal when lodged.
- Comments and concerns will be noted and provided to the Burwood Design Review Panel as part of the project review process for consideration.

Keep in touch

Contact the project team by email
consultation@ethosurban.com

Call the project team with any questions
1800 870 549 (business hours)

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- FAQ brochure

About this project

LSH Property Australia – who we are?

LSH Property Australia (LSH) is a wholly owned subsidiary of Lei Shing Hong Limited, a major international conglomerate with a 100% local Australian team.

LSH is a majority owned family company involved in sustainable property development and asset management business, with experience delivering world class commercial and mix-use developments.

What is LSH Property Australia seeking to do?

LSH Property Australia is preparing a planning proposal that is seeking planning changes that will enable a considered mix of neighbourhood retail, community amenity, generous open green space and much-needed medium-density housing for the area.

Developing 166–204 Parramatta Road will help revitalise the local community for both the current and future residents, with a very high quality development along one of Sydney's most critical transport corridors.

Why now?

As Croydon and surrounding areas are expected to grow at record rates over the next 15 years, the need for high quality housing, retail, employment, and social infrastructure close to transport hubs is critical as identified by the NSW Government.

The site is located along the NSW Government's Parramatta Road Corridor Urban Transformation Strategy area, and is 400m (approx. 7mins walk) from the new Burwood North metro station which is currently under construction.

What is the Parramatta Road Urban Transformation Strategy and what does it mean for this area?

The Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) sets out the NSW Government's 30 year plan for the renewal of Parramatta Road.

The strategy provides an integrated land use and transport framework to guide future land use changes and development along Parramatta Road.

Planning changes will be staged over time and will be coordinated with infrastructure delivery and funding, bringing new life to Parramatta Road and adjacent communities through investments in homes, jobs, transport, open spaces and public amenity.

The PRCUTS includes indicative controls for possible future development in the corridor in which our site is located. The key priorities of the PRCUTS that our proposal will support are:

- Housing choice and affordability
- Diverse and resilient economy
- Accessible and connected
- Vibrant communities and places
- Green spaces and links
- Sustainability and resilience

The indicative controls were prepared prior to the future Burwood North Metro station location being announced and will therefore most likely be subject to further government review.

What does the project aim to do?

1. **Support the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) and help facilitate a '30 minute city'**

   - Located along the Parramatta Road Corridor Urban Transformation Strategy (PRCUTS), the site will be a 7 min walk from the new Burwood North metro station, close to Westconnex, and near the entrance to the future extension to the M4 and M5, as well as the Rozelle Interchange (due to open in 2023). This will provide faster access to Sydney International Airport, the Sydney CBD and the Greater Sydney area.

2. **Meet the demand for local housing diversity and employment**

   - The development is estimated to support roughly 400 jobs during construction and around 300 jobs during ongoing operations.
   - The project will provide a mixture of apartments and terraces in varied sizes, meeting the needs of a range of household types – from singles and couples, to growing families.

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3. **Create opportunities for neighbourhood retail**

- The proposal offers opportunities for a mix of cafes, restaurants, local services and a small-scale quality grocery store designed to service current and emerging residents without competing against other retail spaces in the local area.
- A proposed high quality international branded hotel on the site will strengthen Croydon as a key accommodation precinct and contribute to the area's visitor economy.

What are the specific changes to existing planning legislation being proposed?

The proposal is seeking changes to the Burwood Local Environmental Plan (LEP) in order to:

- adjust the zoning of the site to allow for mixed use development;
- increase the floor space ratio (FSR);
- increase building height;
- identify the site as a 'Key Site' and allow requirements for Design Excellence to be included in the LEP; and
- develop a site-specific Development Control Plan (DCP).

Where is the site?

The site is located at 166-204 Parramatta Road and 1A Cheltenham Road, Croydon.

What is currently on the site?

In April 2018, development approval was granted for the construction of a 4-storey car sales showroom, storage and service facility at the site. The facility was to be an automotive showroom and service facility. Due to various external factors the development did not proceed.

Most of the site is now vacant and is excavated to basement level, with the exception of 1-1a Cheltenham Road which currently houses the old Salvos store (no longer in operation).

About the planning process

What is a planning proposal?

Council's Local Environmental Plan (LEP) is planning legislation that sets out rules on what can be built and where, including things like the use of the building, its height, and number of storeys. Over time LEPs need to be updated to better align with the communities' changing needs and wider NSW Government planning objectives.

A planning proposal is the first step (of many) in amending a Council's LEP.

When submitting a planning proposal to Council for review, the proponent prepares a 'concept scheme' which provides an idea of what the proposed changes could look like. This concept scheme tests how the changed rules could apply to site, and is the start of a formal and iterative process before anything is considered for approval.

What stage is the project at and what role will Burwood Council play?

There are six main stages in the planning proposal process. Local Councils and the NSW Government have different roles at different stages. This project is currently at ***Stage 2.***

Stage 1: Pre-lodgement
This is an early analysis of the development potential of the relevant land including key environmental or site constraints and a review of the strategic planning framework. It includes obtaining advice and consultation with authorities and government agencies to identify what studies are required.

Stage 2: Preparation of planning proposal
Council reviews and assesses the proposal. Council will also decide whether to support and submit it to the Department of Planning and Environment (the Department) for a Gateway determination.

During this stage Burwood Council's newly formed Design Review Panel will review the proposal and provide feedback. Details on this process are provided further below.

Council will then decide whether to endorse the proposal. Prior to this point, Council will have considered the proposal at a Council meeting.

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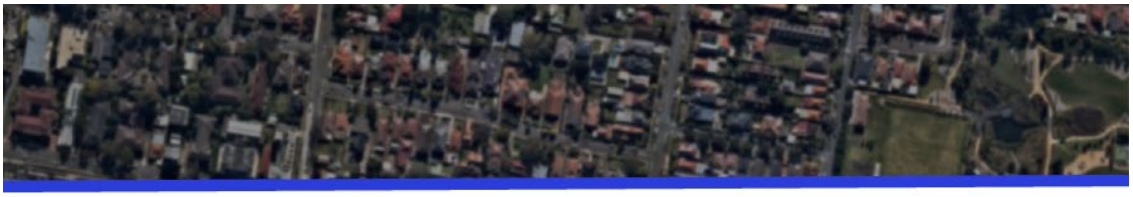


Stage 3: Gateway determination
Once the planning proposal has been submitted, the Department reviews it through the 'Gateway determination' process. The Gateway determination is a checkpoint to review the strategic and site-specific merit of the proposed changes and includes a decision on whether the planning proposal should go forward to public exhibition.

If supported at this stage, the Department will issue a Gateway determination. Typically this includes issuing conditions that must be complied with, such as public exhibition, consultation with other government agencies and the community, or the undertaking of further studies. The Gateway ensures effort is invested at appropriate stages of the process and that consultation is informed and effective. Importantly, the Gateway determination does not guarantee that the proposed changes to the LEP will be made.

Stage 4: Post-Gateway
This stage involves Council actioning the Gateway conditions. This may include undertaking further studies to justify the proposed changes and consulting with specific state agencies or the community.

Stage 5: Public exhibition and assessment
During this stage Council will consult with the community, key authorities and government agencies as required by the Gateway determination. Council will also review the planning proposal to address the conditions of Gateway determination and submissions.

Once publicly exhibited, the planning proposal is ultimately assessed by the local plan-making authority and determined (this may be the Minister or delegate or Council, depending on the type of LEP amendment).

Stage 6: Finalisation and adoption
If the planning proposal is supported, the changes to the LEP are then made and surrounding neighbours are notified. The Minister typically has a role in finalising the LEP (unless this power has been delegated to the local Council).

What is the Burwood Design Review Panel (BDRP) process and when will this happen for this project?

Burwood Council recently established the BDRP to examine, evaluate and comment on the design aspects of development applications. This review process aims to ensure that an independent review is completed and that high quality design outcomes would be achieved by new development within Burwood local Government Area (LGA)

While the panel has no delegated authority to determine the outcomes of a development application, the panel's recommendations and feedback will be used to inform the assessment process.

For this proposal, the BDRP meeting will likely occur shortly after lodgement. After this review process, the design will be updated based on their feedback.

How will the feedback I provide now impact the proposal?

Your feedback will impact the proposal in several ways:

- Feedback will be recorded and provided to the project team to inform the proposal before lodgement.
- Feedback will be included in a *Consultation Outcomes Report* that will be submitted along with the proposal when lodged.
- Comments and concerns will be noted and provided to the Burwood Design Review Panel as part of the project review process for consideration.

When will I get the chance to review the proposal in detail, and will I be notified?

Council will make the documentation available to the public as part of the formal public exhibition process soon after the planning proposal is lodged.

This will provide an opportunity for the community to review all submitted documentation and prepare formal submissions to Council.

It is generally up to Council to decide how and whom to notify as part of the formal public exhibition process.

Who is being consulted on this project?

We are currently undertaking consultation with neighbours to the site and other nearby residents to share the key planning principles being developed by our design team and listen to their views.

During this process, Burwood Council, Transport for NSW, and several other government agencies have also been consulted.

When will we likely see any construction?

This project is still in the early planning stages, which focus on changes to the site's capacity for development. Should this planning proposal be approved, a series of development applications would then also need to be prepared and approved by Council before any construction could begin. This could take a matter of years.

We will endeavour to keep you updated on the timeframes and planning determination processes as the project moves forward.

Consideration of potential impacts to neighbours

What are the key design principles that will minimise impacts to neighbours?

The design process will include feedback from the community, Burwood Council and the Burwood Design Review Panel. We know there are a number of issues important to the local community and we are working hard to ensure impacts are minimised by:

- Preserving solar access and minimising overshadowing to neighbours and open spaces.
- Creating a height transition down to our southern neighbours on Cheltenham and Lucas Roads.
- Prioritising the importance of well-connected open spaces.
- Protecting views through the site from surrounding buildings.
- Mitigating traffic impacts and congestion.

Providing your feedback

How can I have my say and provide my views on the proposed development?

Once the planning proposal has been lodged, the community will have another opportunity to provide formal feedback via the public exhibition process, to be managed by Burwood Council.

Keep in touch

Contact the project team by email
consultation@ethosurban.com

Call the project team with any questions
1800 870 549 (business hours)

LSH PROPERTY AUSTRALIA | 4

Appendix C

- Webinar presentation

Agenda

- Team introductions
- Project vision and objectives
- Overview of planning proposal
- Planning process
- Q&A
- Next steps

Early concept scheme. Source: Architectus

Video conferencing tips

Please ensure your **microphone is on mute** unless you are speaking

Please **raise your hand** if you would like to speak or ask a question. There will be a **Q&A** session at the end of the presentation for questions.

We encourage you **to leave your cameras on,** especially during the **Q&A**

Use the **Chat function** to ask a question or provide feedback throughout the session

Team introductions

Introduction from our speakers this evening

Andrew Cutter
General Manager Property Development and Operations
LSH Property Australia

Farhad Haidari
Principal | Architecture
Architectus

Stephen Gouge
Associate Director | Planning
Ethos Urban

Anna Paton
Principal | Engagement
Ethos Urban

Project vision and objectives

LSH PROPERTY AUSTRALIA

LSH is a majority family owned company and innovative property developer and asset management business. Through building, investing, managing and owning world class lifestyle properties, LSH deliver lasting value focused on improving the lives for their customers and community.

Breakfast Creek Lifestyle Precinct, QLD

Mercedes-Benz Sydney, NSW

Our vision

166-204 Parramatta Road has the opportunity to be transformed into a very special mixed use precinct that places greenery at its heart.

Responding to the needs of current and future residents, 166–204 Parramatta Road will provide a considered mix of neighbourhood retail, great public spaces and much-needed medium-density housing for the area.

Early concept scheme. Source: Architectus

The site

Current view to site across Parramatta Rd, looking south-east

Current view to site across Parramatta Rd, looking south-west.

Current view to site from Cheltenham Rd.

The proposal aims to...

- Provide a green, safe & generous public realm
- Help meet demand for local housing diversity
- Support local employment opportunities
- Quality built development
- Create opportunities for neighbourhood retail
- Provide community infrastructure

Overview of the planning proposal

The site

Current view to site across Parramatta Rd, looking south-east

Current view to site across Parramatta Rd, looking south-west.

Current view to site from Lucas Rd.

Why now? – The Planning Context

The Parramatta Road Corridor Urban Transformation Strategy (PRCUTS)

- Croydon and surrounding areas are expected to grow at record rates over the next 15 years
- The need for high quality housing, retail, employment, and social infrastructure close to transport hubs is critical as identified by the NSW Government.
- The Parramatta Road Corridor Urban Transformation Strategy (PRCUTS) sets out the NSW Government's 30 year plan for the renewal of the Parramatta Road Corridor.

Why now? – The Planning Context

Our proposal aims to deliver on the Strategy's land use and transport planning principles:

Housing choice and affordability

Diverse and resilient economy

Accessible & connected

Vibrant communities and places

Green spaces and links

Sustainability and resilience

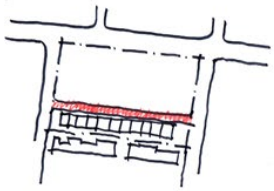
Delivery

Design principles

Central open space

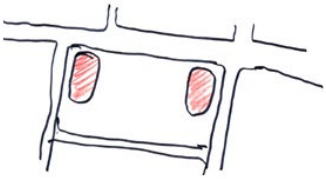
Greening the streets

Traffic and site access



Design principles

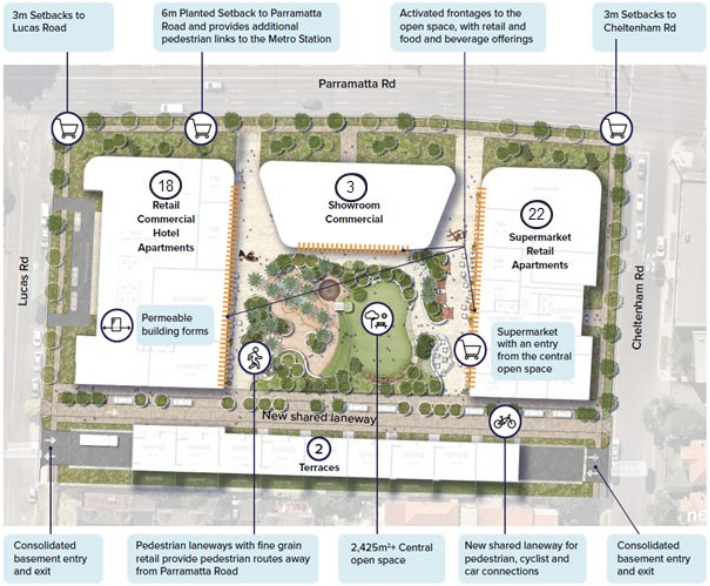
Minimise overshadowing



Protect the open space

Ground plane activation

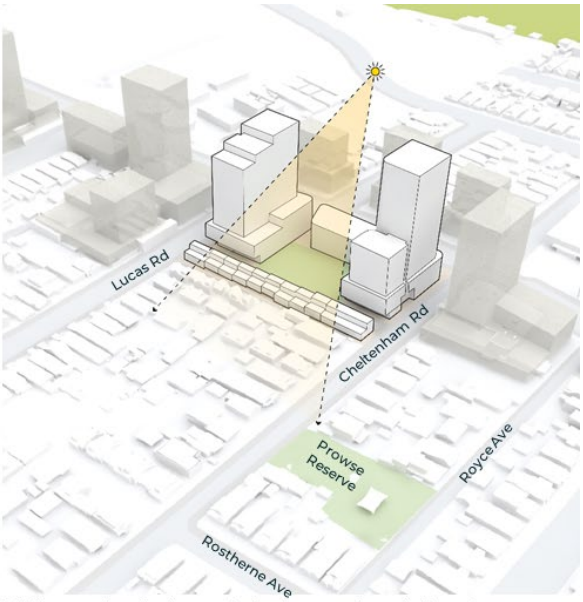
Concept site plan and massing



Key considerations

Solar access

- Comprehensive studies have been undertaken to minimise solar impacts to surrounding neighbours
  - No additional overshadowing impact to Prowse Reserve from 9am – 3pm
  - Tall slender towers ensure fast moving shadows and a shorter period of impact for shading.



Building separation allows increased solar access to southern neighbours. Source: Architectus

Key considerations (TBC)

Traffic, parking and site access

- Key measures to reduce impacts on neighbours include:
  - Comprehensive traffic modelling
  - TfNSW does not permit access/exit from Parramatta Rd
  - Walking distance to future Burwood North metro – expanded tree lined footpaths
  - Onsite parking
  - Less reliance on private vehicles and healthier modes of transport

Traffic survey locations. Source: JMT Consulting

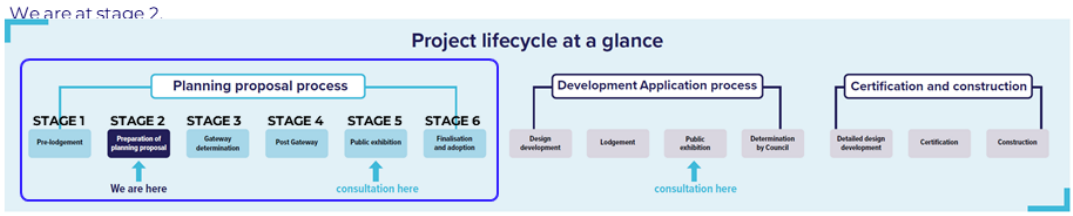
Planning process

What is a planning proposal?

- Council's Local Environmental Plan (LEP) is NSW Government planning legislation that sets out rules on what can be built and where, including things like the use of the building, it's height, and number of storeys.
- Over time LEPs need to be updated to better align with the communities' changing needs and wider NSW Government planning objectives.
- A planning proposal is the first step (of many) in making an amendment to Council's LEP.

There are six main stages in the planning proposal process.

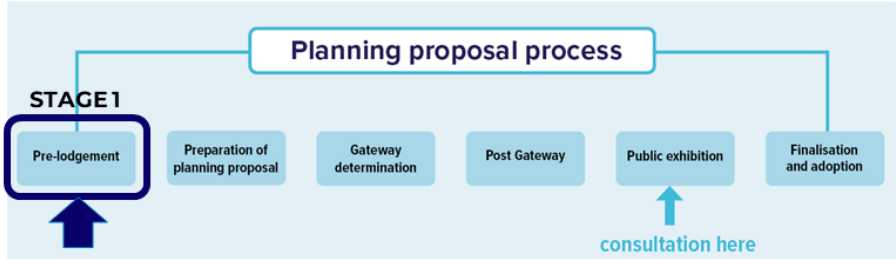
We are at stage 2.



Planning process in detail

Stage 1: Pre-lodgement

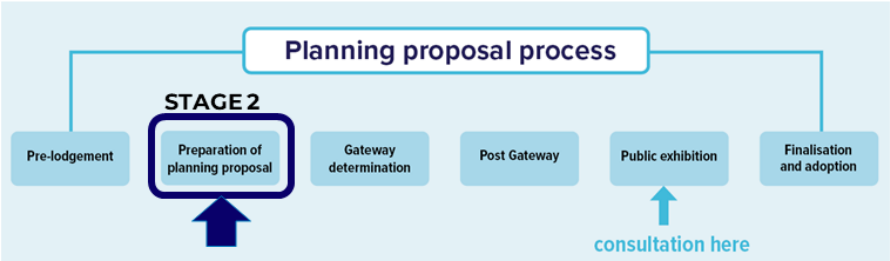
This is an early analysis of the development potential of the relevant land including key environmental or site constraints and a review of the strategic planning framework. It includes obtaining advice and consultation with authorities and government agencies to identify what studies are required.



Planning process in detail

Stage 2: Preparation of planning proposal

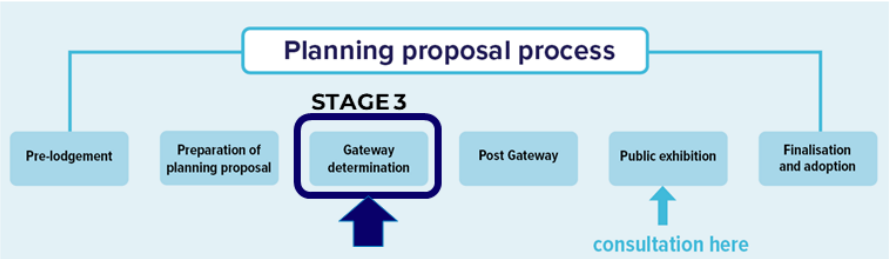
Council reviews and assesses the proposal. Council will also decide whether to support and submit it to the Department of Planning and Environment (the department) for a Gateway determination.



Planning process in detail

Stage 3: Gateway determination

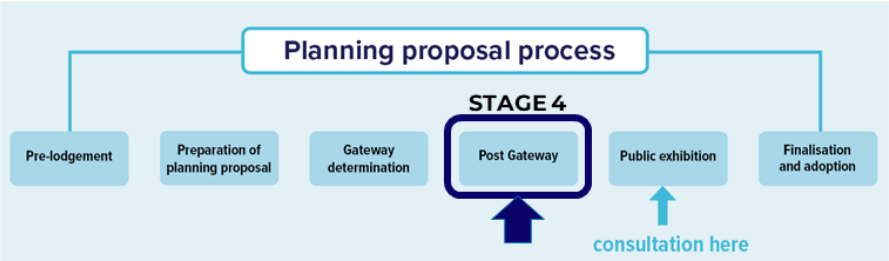
Once the planning proposal has been submitted, the Department reviews it through the "Gateway process". The Gateway determination is a checkpoint to review the strategic and site-specific merit of the proposed changes and includes deciding on whether the planning proposal should go forward to public exhibition.



Planning process in detail

Stage 4: Post Gateway

This stage involves council actioning the Gateway conditions. This may include undertaking further studies to justify the proposed changes and consulting with specific State agencies or the community.



Planning process in detail

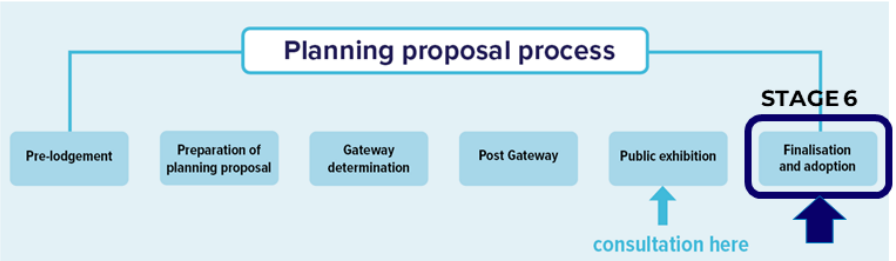
Stage 5: Public exhibition and assessment

During this stage council will consult with the community, key authorities and government agencies as required by the Gateway determination. Council will also review the planning proposal to address the conditions of Gateway determination and submissions.

Planning process in detail

Stage 6: Finalisation and adoption

If the planning proposal is supported, the changes to the LEP is then made and notified.



Project Team

Ethos Urban
Planning
Engagement
Social Strategy
Economics

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Architecture
Urban Design

ARCADIA
Landscape
Public domain

Aspire Sustainability Consulting
Ecologically
Sustainable
Design (ESD)
strategy

JMT Consulting
Traffic

Douglas Partners Geotechnics | Environment | Groundwater
Geotechnical studies

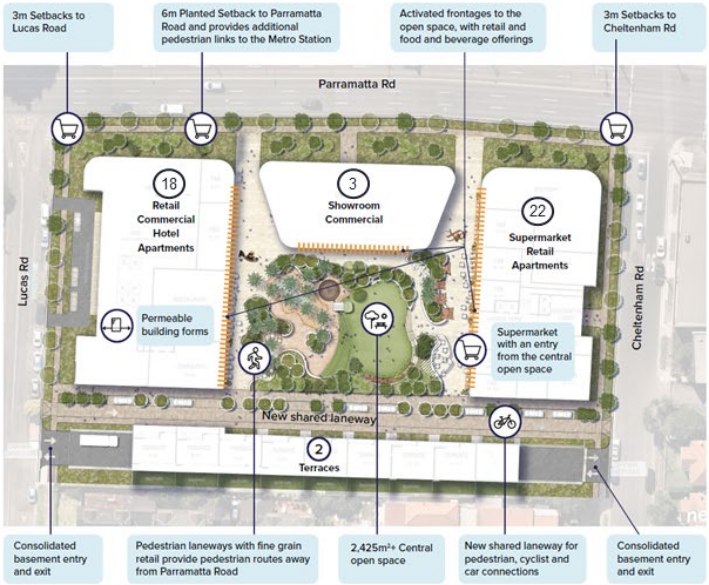
FCAD Fellingham Consultancy and Design
Public Art

scp engineers and development consultants
Flood Risk & Drainage

Your feedback is important

- What do you think about the central public open space?
- What kinds of neighbourhood retail would you like to see more of in your area?
- What do think a proposal like this could mean for your community?

Q&A


3m Setbacks to Lucas Road
6m Planted Setback to Parramatta Road and provides additional pedestrian links to the Metro Station
Activated frontages to the open space, with retail and food and beverage offerings
3m Setbacks to Cheltenham Rd
Parramatta Rd
18
Retail
Commercial
Hotel
Apartments
3
Showroom
Commercial
22
Supermarket
Retail
Apartments
Lucas Rd
Cheltenham Rd
Permeable building forms
Supermarket with an entry from the central open space
New shared laneway
2
Terraces
Consolidated basement entry and exit
Pedestrian laneways with fine grain retail provide pedestrian routes away from Parramatta Road
2,425m²+ Central open space
New shared laneway for pedestrian, cyclist and car connections
Consolidated basement entry and exit

What's next?

- The planning proposal will be submitted to Burwood Council before the end of 2022.
- Council will decide whether to support and submit it to the Department of Planning and Environment (the department) for a Gateway determination.
- Your feedback will be included in a *Consultation Outcomes Report* that will be submitted with the submission.
- Comments and concerns will also be provided to the Burwood Design Review Panel as part of the project review process for consideration.
- There will be a formal public exhibition process run by Council, where you will have the opportunity to review all the reports in detail and provide formal feedback to Council.

Contact the team

consultation@ethosurban.com

1800 870 549

Early concept scheme – central open space. Source: Architectus

Thank you

ESD Strategy Report

LSH Croydon

Neoscape

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ABN: 62636142017

Contents

1 Introduction 3
1.1. Sustainable Design Frameworks & Planning Controls 3
1.1.1. NCC 2022 Volume 1 Section J (Energy Efficiency) 3
1.1.2. Building Sustainability Index (BASIX) 3
1.1.3. City of Sydney & Burwood DCP's: 3
1.1.4. NABERS 3
1.1.5. Hotel Sustainability Policy 6
2 Project Description 7
2.1. Information Sources 7
2.2. Aim of Report 7
3 Ecologically Sustainable Design 8
3.1. Energy 8
3.2. Occupant Engagement 9
3.3. Transport 9
3.4. Materials 9
3.5. Water 9
3.7. Construction 10
3.8. Land Use & Ecology 10
3.9. Emissions & Waste 10
3.10. Climate Change Adaptation 10
4 Conclusion 11

Revision History

Revision	Reference	Description	Author	Checked	Date
1.0	4705.01	ESD Strategy Report	Luke Williams	Luke Williams	26th October 2022

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1 Introduction

Aspire Sustainability Consulting has been engaged to prepare an Ecologically Sustainable Design (ESD) strategy report to accompany the Concept Design Application regarding the proposed LSH Croydon development at 166-204 Parramatta Road, Croydon. This report outlines the sustainable design initiatives being explored for the development, demonstrating a commitment to satisfy national & state legislation in addition to local planning controls.

1.1. Sustainable Design Frameworks & Planning Controls

The development shall be designed in line with the following sustainable design frameworks, ensuring key ESD principles are implemented across all aspects of the project:

- NCC 2022 Section J (Classes 2-9);
- BASIX (Class 2);
- NABERS (Classes 3-9);
- City of Sydney DCP, Section 3.6 (Classes 2-9);
- Burwood DCP, Section 6.7 (Classes 2-9);
- Hotel Sustainability Standards (Class 3).

1.1.1. NCC 2022 Volume 1 Section J (Energy Efficiency)

Provisions within Section J of the NCC relate to energy efficiency and the reduction of Greenhouse Gas Emissions for Class 2 to 9 developments. Aspects of design required to be addressed in Section J include the façade, building envelope, lighting, HVAC, energy metering, building sealing and ventilation. All portions of the development will comply with NCC Section J; however the Class 2 portions of the development will be required to comply with BASIX, the sustainability rating tool for Class 2 buildings in NSW.

1.1.2. Building Sustainability Index (BASIX)

BASIX is the primary framework applied to Class 2 portions of developments in addition to their associated common areas. Minimum performance requirements regarding the building fabric, appliances (energy and water efficiency) and central building systems must be achieved.

1.1.3. NABERS

NABERS is a national rating system that measures the environmental performance of Australian buildings and tenancies. NABERS measures the energy efficiency, water usage, waste management and indoor environment quality of a building or tenancy and its impact on the environment.

Burwood DCP requires NABERS Energy ratings as a minimum environmental performance requirement for new non-residential developments.

1.1.4. City of Sydney & Burwood DCP's:

The following tables contain a recommended design response to sustainable building design objectives within City of Sydney DCP, Section 3.6 (ESD) & Burwood DCP, Section 6.7 (Energy Efficiency & Sustainability). These DCP's were selected due to reference within LSH Scoping Report in addition to containing the most comprehensive ESD requirements when compared to DCP's of adjacent LGA's.

Table 1: City of Sydney DCP – Recommended Design Response

City of Sydney Section 3.6: Objectives	Recommended Design Response
(a) Apply principles and processes that contribute to ecologically sustainable development (ESD).	▪ Energy & Water Efficiency addressed through achieving NABERS ratings, Section J & BASIX compliance. Additional sustainable building design considerations outlined below.
(b) Reduce the impacts from development on the environment.	▪ In addition to energy & water efficiency, explore potential to adopt environmentally friendly materials, ensure a reduced impact from construction and improve local levels of biodiversity.
(c) Reduce the use of resources in development and by development over its effective life.	▪ Consider electrified building to minimise fossil fuels used on site. Materials with low embodied energy/EPD's to be explored. Minimise construction and operational waste.
(d) Reduce the cause and impacts of the urban heat island effect.	▪ Light external colour scheme (also improving daylight levels), well shaded communal spaces and incorporation of landscaping. Consider Green roofs & walls.
(e) Increase the resilience of development to the effects of climate change.	▪ Items outlined in (d) above. Critical services located above basement/flood prone areas, provide PV, consider battery storage.
(f) Ensure that greenhouse gas emissions will be reduced.	▪ NABERS Energy ratings are required for applicable portions of development in accordance with Burwood DCP.
(g) Increase the use of cogeneration and tri-generation systems	▪ Not applicable – outdated.
(h) Replace intensive carbon power sources with low carbon and renewable energy.	▪ Reducing heating and cooling loads through sensible façade design/thermal mass, provide PV and consider heat pumps/electrified development.
(i) Reduce the use of potable water.	▪ NABERS Water rating targeted for development to demonstrate water efficiency of non-Class 2 areas.
(j) Ensure that development can adapt to climate change.	▪ Addressed in (d & e). Consider design for disassembly, provide increased MSSB capacity.
(k) Ensure that waste will be reduced.	▪ Subject to OWMP requirements, however as a minimum, design should allow for separation of multiple waste streams. Construction to divert ≥90% of waste from landfill.
(l) Increase the use of products from recycled sources.	▪ Architect to explore. Consideration of % sustainable concrete.
(m) Improve indoor environmental quality.	▪ Use of low VOC paints, low formaldehyde materials. Sufficient outdoor air and filtration.
(n) Reduce the environmental impact from building materials through reduction, re-use and recycling of materials, resources and building components.	▪ Addressed in (b).
(o) Improve the biodiversity.	▪ Consideration of green roofs/walls to be considered in landscape design.

Table 2: Burwood DCP – Recommended Design Response

Burwood DCP Section 6.7: Objectives	Recommended Design Response
P1: Where applicable, development is to demonstrate compliance with the design principles embodied in the Building Sustainability Index (BASIX). All commitments listed on a BASIX certificate must be marked on all relevant plans and specifications.	▪ Residential components of development and associated common areas to achieve compliance with BASIX provisions.
P2: The principles and properties of thermal mass, glazing, insulation and solar energy are to be recognised and incorporated into the design of residential development not subject to BASIX.	▪ Consideration of thermal mass, embodied energy and renewable technology to be explored during early stages of design.
P3: The non-residential component of any development must aim to achieve at least a minimum of a 4.5 star rating under the National Australian Built Environment Rating (NABERS) system	▪ Non-residential portions of building to target 4.5 Star NABERS Energy ratings with commitment agreements.
P4: Improve the control of mechanical space heating and cooling by designing heating/cooling systems to target only those spaces which require heating or cooling, not the whole building.	▪ Thermal envelope to be determined with maximum space efficiency in mind. Natural ventilation to be considered where possible, without impacting comfort.
P5: Improve the efficiency of hot water systems by: ▪ Encouraging the use of solar powered hot water systems. Solar and heat pump systems must be eligible for at least 24 Renewable Energy Certificates (RECs) and domestic type. ▪ Gas systems must have a minimum 3.5 star energy efficiency rating. ▪ Insulating hot water systems. ▪ Installing water saving devices, such as flow regulators, 3 stars Water Efficiency Labelling and Standards Scheme (WELS Scheme) rated shower heads, dual flush toilets and tap aerators.	▪ Solar/Heat Pump hot water to be explored in place of gas. Should gas be provided, spatial provision for future heat pump installation to be integrated in design; ▪ Rainwater tanks and water efficient fixtures/appliances to be adopted.
P6: Reduce reliance on artificial lighting and design lighting systems to target only those spaces which require lighting at any particular 'off-peak' time, not the whole building. Incorporate a timing system to automatically control the use of lighting throughout the building.	▪ Energy efficient lighting and control systems to be adopted allowing targeted NABERS ratings to be achieved.
P7: All non-residential development Class 5-9 will need to comply with the Building Code of Australia energy efficiency provisions.	▪ NCC provisions to be adopted in design.
P8: An Energy Efficiency Report from a suitably qualified consultant that demonstrates a commitment to achieve no less than 4 stars under the Australian Building Greenhouse Rating Scheme or equivalent must be provided for all commercial and industrial development with a construction cost of over $5 million.	▪ Energy Efficiency report providing design recommendations to be developed for DA.

1.1.5. Hotel Sustainability Policy

Table 3: Hotel Sustainability Requirements for New Developments

Hotel Sustainability Policy	
Destinations: Prioritize the resilience of hotels' communities by respecting the local natural resources and cultural heritage; helping to protect biodiversity and animal welfare; minimizing pollution; and advancing climate change adaptation.	▪ Green Star Buildings certification likely required. If not owned by Hotel, NABERS Energy and Water Ratings could suffice for hotel; ▪ Surrounding areas to be considered from an environmental perspective; ▪ Construction practices should be put in place to reduce impacts on air pollution, pollution runoff and construction debris; ▪ Consider rainwater tanks and efficient water fixtures in accordance with the hotels specified flow rates.
Climate change and water conservation: Accelerate climate and water action by elevating efficiency measures, prioritizing water conservation in drought-prone areas, and increasing the use of renewable energy and grey water.	▪ Green Roofs and light external colour schemes to be explored; ▪ Passive design elements to be adopted into design strategy; ▪ 10% reduction on code (via JV3) & Energy efficient building services; ▪ Selection of refrigerants should consider ODP & GWP as part of specification; ▪ Native or drought resistant plant species to be adopted. Irrigation with moisture sensor override required where landscape requires irrigation. ▪ Double glazing with thermally broken frames required; ▪ Consider small windows in non-visible areas of the building to reduce energy costs; ▪ Water efficient laundry and kitchen equipment to be considered. ▪ Adequate hanging space, towel bars, or hooks shall be available for guests to hang towels for reuse; ▪ Evaluate renewable or low carbon energy options & consider electrification; ▪ Provide BMS with sensors capable of measuring environmental conditions; ▪ NCC 2022 electric vehicle infrastructure provisions to be adopted for project.
Waste and Circularity: Reduce waste generated at properties—including prevention of food waste and single-use items—and increase recycling and composting.	▪ Sufficient provisions for separation of waste and recycling sources to be provided; ▪ Recycle, donate or liquidate materials whenever possible during construction and operation; ▪ Provide filtered water stations to avoid use of single use bottles; ▪ Provide high speed air dryers to avoid paper use in bathrooms.
Responsible Sourcing: Advance responsible practices across the supply chain in order to address key impact areas.	▪ Wood Flooring and furniture to be FSC certified; ▪ Paints, adhesives, wall coverings, carpets and furniture to be low VOC/Formaldehyde OR have Third party environmental declarations; ▪ Tile carpets to back of house areas to enable modular replacement over time; ▪ Cement with % fly ash/blast furnace slag to be evaluated.

It is recommended Hotel ''Sustainability – Global' policy is read in full by the entire project team in order to understand specific requirements relating to various aspects of design.

2 Project Description

The development is located at 166-204 Parramatta Road, Croydon NSW 2132.

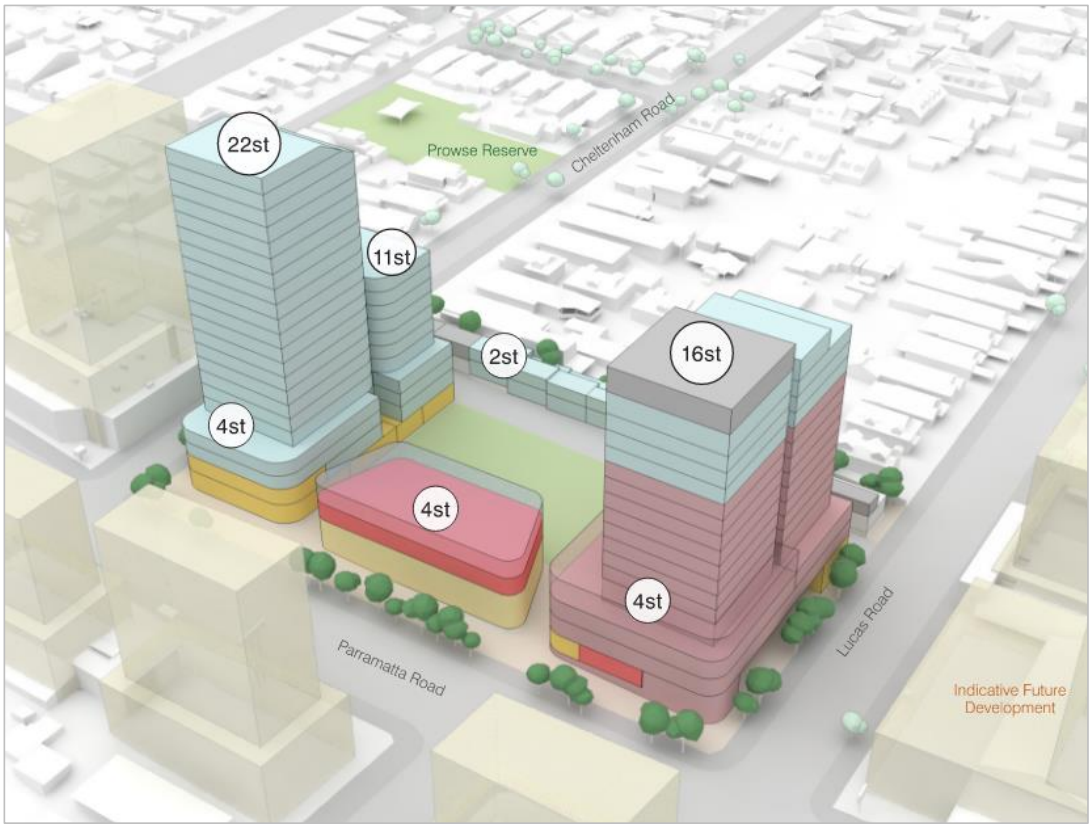

Figure 1: Site Isometric View

2.1. Information Sources

- NCC 2019 Volume 1;
- City of Sydney DCP 2012, Section 3.6;
- Burwood DCP Section 6.7;
- Hotel Global Sustainability Policy;
- LSH0015 Croydon Brochure Digital FA4 (3) V02;
- Scoping Report_FINAL (May 10th 2022);
- LSH Croydon - Planning Proposal Drawings_141022;
- 220920_LSH Croydon Council Response Scheme.

2.2. Aim of Report

The following sections outline design initiatives being considered that reduce the environmental impact of the design, construction, and operation of the development, highlighting alignment with applicable targets and planning controls.

3 Ecologically Sustainable Design

The following Sections contain sustainable design initiatives currently being explored by the design team in line with the ecologically sustainable design categories outlined below:

- Energy;
- Transport;
- Occupant Engagement;
- Materials;
- Water;
- Construction;
- Land Use & Ecology;
- Emissions & Waste; &
- Climate Change Adaptation.

During design development, feedback from the design team will drive discussions with the aim of finalising the approach regarding sustainable design for the LSH Croydon development.

3.1. Energy

The LSH Croydon project team will consider the following initiatives throughout design development:

- Metering in line with minimum performance standards to track and monitor energy consumption;
- BMS allowing monitoring of energy and water use to set and track consumption over time;
- Efficient HVAC systems, considering heat recovery for spaces with high outdoor air requirements;
- High Efficiency gas or heat pump systems for hot water heating;
- Energy efficient white goods;
- Compliance with NCC 2022 Energy Efficiency Requirements (Section J);
- Electrical vehicle infrastructure (NCC 2022 requirement);
- Solar PV system to provide a portion of the sites power, whilst reducing peak power demands;
- Energy efficient LED lighting throughout with appropriate motion & daylight controls;
- Consideration of an all-electric building, or provisions for becoming fossil fuel free in the future.

Passive design strategies currently under review are outlined below:

- A light external colour scheme that reduces the sites contribution to the urban heat island effect, also lowering internal temperatures by minimising the heat being absorbed through the roof and walls;
- The addition of vegetation throughout the site to provide shade and reduce impacts associated with the urban heat island effect;
- Maximising natural ventilation, with cross ventilation to a large portion of residential apartments;
- Walls comprising high thermal mass, providing a cooler, more comfortable internal environment during warmer days whilst reducing energy consumption;
- Window shading that avoids peak daytime solar loads, with vertical shading considered to the East & West, horizontal to the North.

3.2. Occupant Engagement

Initiatives to increase environmental awareness such as the following should be considered for adoption:

- Signage and education (water consumption, being active, avoiding use of lifts);
- Screen displaying environmental information.

3.3. Transport

The development is located on Parramatta Road, well connected to a variety of sustainable modes of transport such as bicycle tracks, trains, and bus stops. The site is within walking distance of the planned Metro West line with will provide access to major employment and education centres such as Parramatta, Sydney Olympic Park, Westmead and Sydney CBD, in addition to having excellent access to WestConnex.

Provisions to facilitate active transport modes will be implemented in design, including an end of trip facility comprising showers and lockers in addition to bicycle parking facilities.

3.4. Materials

The environmental footprint of the development can be reduced through the procurement of sustainable products. This can include products produced with lower than typical energy consumption during manufacture, made with reused content, or locally sourced.

The sustainable materials strategy for the development will explore the following items:

- Environmental Performance Declarations (EPD's) for major material components;
- Recycled content in products where appropriate;
- FSC timber;
- Concrete with reduced Portland cement quantities;
- Products specified to contain low VOC & formaldehyde, improving internal air quality.

3.5. Water

The development will reduce water consumption by incorporating the following water saving measures into design:

- Installing fixtures and fittings in line with best practice requirements;
- Ensuring native plant species are incorporated throughout;
- Use of water efficient drip irrigation methods with moisture sensor control where possible;
- Rainwater tank to reduce the potable water consumption of the development and reduce the strain on central water infrastructure.

Table 4: Recommended Water Efficiency of Fixtures & Appliances

Fixture/Equipment Type	WELS Rating
Taps	5 stars
Urinals	5 stars
Toilet	4 stars
Showers	3 stars (> 6 but <= 7.5)
Clothes Washing Machines	Not Provided
Dishwashers	5 Stars

3.7. Construction

Sustainable construction practices that will be considered for implementation throughout construction include:

- Contractor construction waste management plan to investigate >90% of construction waste by weight being diverted from landfill;
- Responsible management systems such as an Environmental Management Plan & implementing an Environmental Management System in line with ISO 14001;
- Incorporating information to site inductions relating to sustainable design, mental health and well-being to site inductions and ensuring resources are made available to support site workers if needed throughout the construction of the site;
- Concrete with a portion of Portland cement replaced with recycled aggregate;
- Reuse of existing building elements where possible.

3.8. Land Use & Ecology

The development aims to reduce potential negative impacts resulting from urban development and enhance local ecology by implementing the following design features:

- Plant beds & trees at multiple locations which allow for deep planting and significant canopy cover, providing shade, improving air quality as well as enhancing local levels of biodiversity;
- Utilising stormwater and WSUD features, decreasing the strain on central water infrastructure systems, and providing safe havens for local biodiversity;
- Light colour schemes to external surfaces and areas of deep soil vegetation that reduce the urban heat island effect.

3.9. Emissions & Waste

ESD initiatives associated with emissions and waste currently considered in design include:

- Stormwater & WSUD features, reducing the sites impact from stormwater runoff and pollution;
- Specifying air cooled HVAC systems, eliminating the risk associated with legionella disease when cooling towers are installed on site;
- Adopting an Operational Waste Management Plan (OWMP) for the development, and ensuring facilities are provided allow the separation of various waste streams when the site is in operation;
- Carrying out a hazardous materials survey to identify and safely dispose of any contaminated waste.

The potential to use air conditioning systems with R14a refrigerants that have a low Global Warming Potential compared to R32 will also be explored, subject to no detrimental impacts on air conditioning system efficiency.

3.10. Climate Change Adaptation

To ensure the long-term durability of the site and its ability to adapt to a changing climate, the following measures will be considered in design:

- Rainwater tank to reduce the potable water consumption of the development and reduce the strain on central water infrastructure;
- Light colour schemes that keep the external surfaces of the building cool, reducing impacts of the urban heat island effect & keeping naturally ventilated spaces cool;

- Increasing capacity of mechanical and electrical distribution boards to accommodate an increase in building electrical loads associated with a warming climate;
- Ensuring the development is constructed in accordance with recognised standards regarding wind tolerance and impacts from hail;
- Offering a place of respite during extreme weather events.

4 Conclusion

LSH regard sustainability as an important long-term approach to investment, creating liveable spaces constructed with a reduced environmental footprint, able to operate efficiently and adapt to future climates.

The proposed development provides great opportunity to showcase sustainable design and provide a space that meets the needs of the present, whilst protecting the future.

This report demonstrates the development is on track to achieving sustainability requirements contained within national, state, and local planning controls. The initiatives considered in this report will help to reduce Greenhouse Gas Emissions, improve occupant well-being, and provide a space resilient to future climate challenges.

Throughout design development detailed investigations will be carried out to further refine the ESD strategy for the development, providing an exceptional example of sustainable design to the Croydon LGA and beyond.

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Contamination Investigation

Proposed Croydon Vertical Village
166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon

Prepared for
LSH Property (Alexandria) Pty Ltd

Project 207969.02
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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

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Table of Contents

Page

1. Introduction 1
2. Proposed Development 2
3. Scope of Work 2
4. Site Information 2
5. Environmental Setting 4
6. Previous Reports and Site History 5
   6.1 EIS (2017) 5
   6.2 DP (2017a) 6
   6.3 DP (2017b) 7
   6.4 ADE (2018) 8
   6.5 Greencap (2021) 9
7. Site Walkover 9
8. Preliminary Conceptual Site Model 11
9. Data Quality Objectives 13
10. Site Assessment Criteria 13
11. Results 13
   11.1 Field Work Results 13
   11.2 Laboratory Analytical Results 15
12. Discussion 16
   12.1 Soils 16
      12.1.1 Site Suitability 16
      12.1.2 Preliminary Waste Classification 16
   12.2 Groundwater 16
   12.3 Data Quality Assurance and Quality Control 17
13. Conclusions and Recommendations 17
14. References 18
15. Limitations 18

Appendices

Appendix A:	Drawing
Appendix B:	About this Report
Appendix C:	Site Photographs
Appendix D:	Data Quality Objectives
Appendix E:	Previous Investigation Logs (DP, 2017a) and Explanatory Notes
Appendix F:	Site Assessment Criteria
Appendix G:	Summary Results Tables
	G1: Summary of Laboratory Results for Soil Analysis
	G2: Summary of Laboratory Results for Water Analysis
Appendix H:	Laboratory Certificates of Analysis, Chain of Custody Documentation and Sample Receipt Advice

Report on Contamination Investigation
Proposed Croydon Vertical Village
166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon

1. Introduction

Douglas Partners Pty Ltd (DP) has been engaged by LSH Property (Alexandria) Pty Ltd (LSH) to complete this Contamination Investigation (CI) for the proposed Croydon Vertical Village at 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon (the site). The site is shown on Drawing 1, Appendix A.

The investigation was undertaken in accordance with DP's proposal 207969.02.P.001.Rev1 dated 28 February 2022.

DP understands that the western portion of the site (Area 1) was previously bulk excavated for construction of a two-level basement associated with a proposed car showroom development that was never completed and is currently a construction site. Area 1 and an off-site neighbouring residential block (Area 2) was the subject of a preliminary site investigation (PSI) (EIS, 2017) in 2017 by Environmental Investigation Services Pty Ltd (EIS). DP then completed a detailed site investigation (DSI) (DP, 2017a) following recommendations made in the EIS (2017) report and then a contamination action report (CAP) (DP, 2017b). ADE (2018) then provided verification analysis for the disposal of general solid waste (GSW) and retained virgin excavated natural material (VENM) at Area 1.

DP also understands that Areas 1 and 2 along with an adjacent lot occupied by a warehouse building previously used by the Salvation Army (Area 3) have been acquired by LSH and incorporated into the site boundary for this investigation. LSH has provided DP with a phase 1 environmental due diligence desktop investigation completed by Greencap in 2021 (Greencap, 2021) for Area 3.

The objective of the CI is to assess the suitability of the site for the proposed development and whether further investigation and/or management is required based on review of available data from the previous investigations undertaken at different areas of the site and incorporating the relevant fieldwork results of the original DSI (DP, 2017a). It is understood that the report will be used to support a Development Application for the proposed development.

This report must be read in conjunction with all appendices including the notes provided in Appendix B.

The following key guidelines were consulted in the preparation of this report:

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013); and
- NSW EPA *Guidelines for Consultants Reporting on Contaminated Land* (NSW EPA, 2020).

2. Proposed Development

The proposed development will include the demolition of all buildings on the site and construction of:

- Two high-rise, mixed-use buildings;
- A medium-rise, mixed-use building;
- A row of low-rise, attached houses; and
- A two-to-three level extension of the existing basement into the eastern portion of the site.

3. Scope of Work

The scope of works for the CI comprised the following:

- Review of previous reports provided to DP;
- Review of the following site history information / records, obtained by DP:
  - Registered groundwater bores;
  - Historical and current aerial photographs; and
  - NSW EPA databases held under the CLM and POEO Acts for the site and adjoining properties.
- A walkover of the site to observe and record current land uses, signs of historical uses, hydrogeological features (i.e., streams, dams, water wells, catchments and drainage), presence of fill, waste disposal practices, etc compared to the results of previous investigations;
- Based on the above information, identify areas of environmental concern and contaminants of potential concern (CoPC);
- Preparation of a conceptual site model (CSM); and
- Provision of this CI report describing the methodology and results of the previous investigations. The report includes the conclusions with respect to the contamination status of the site, and recommendations for further work as deemed necessary.

4. Site Information

Site Address	166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon
Legal Description	Lot 1, Deposited Plan 86926; Lots A, B and C, Deposited Plan 84812; Lots 100 and 101, Deposited Plan 850953; Lot 1, Deposited Plan 86033; and Lot 1, Deposited Plan 206411.
Area	9,240 m^2
Zoning	Zone B6 Enterprise Corridor

Local Council Area	Burwood Council
Current Use	Construction site and commercial and industrial warehouse
Surrounding Uses	North - Parramatta Road then commercial and residential East - Cheltenham Road then commercial and residential South - Residential West - Lucas Road then commercial and residential

The site boundary is shown on Figure 1.

Figure 1: Site Location

5. Environmental Setting

Regional Topography	The regional topography falls generally to the west, and it is in this direction that any local groundwater would be anticipated to flow and ultimately towards Parramatta River.
Site Topography	The previous site topography generally sloped east to west, similar to the regional topography. However, reference to ADE (2018) indicates that a large volume of soil has been excavated from the western portion of site as a result of bulk excavations for the proposed basement and therefore, the current levels at the western portion of the site are expected to be lower and currently unknown at the time of this report.
Soil Landscape	Reference to the Sydney 1:100 000 Soils Landscape Sheet indicates that the site is underlain by the residual Blacktown soil landscape comprising gently undulating rises on Wianamatta Group shales and Hawkesbury shale, local relief to 30 m, slopes are usually <5%. Broad rounded crests and ridges with gently inclined slopes.
Geology	Reference to the Sydney 1:100 000 Geological Series Sheet 9130 indicates that the site is underlain by Ashfield Shale of the Wianamatta Group (see Figure 1 below). Ashfield Shale typically comprises black to dark grey shale and laminite (interlaminated siltstones and sandstones).
Acid Sulfate Soils	Reference to the 1:25 000 Acid Sulfate Soils (ASS) Risk map indicates that the site is classified as Class 5 Acid Sulfate Soils area. ASS are not typically found in Class 5 areas. Works in a class 5 area that are likely to lower the water table below 1 m AHD on adjacent class 1, 2, 3 or 4 land will trigger the requirement for assessment and may require management.
Surface Water	Surface water is expected to collect within the excavated portion of the site or sheet into nearby stormwater channels present in the vicinity of the low lying St Lukes Park and Concord Oval located approximately 160-250 m to the north-west. These drains flow into Parramatta River and hence would be the likely source of any site run-off via the local stormwater network.
Groundwater	A review of available Water NSW records indicate there are 26 groundwater bores within 2 km of the site. Three bores are present within 500 m of the site, however no data on standing water level or intended use was available. DP (2017a) installed six groundwater wells across the western portion of the site. Groundwater levels at the time of the previous investigation ranged between -5.51 m Australian Height Datum (AHD) to 6.93 m AHD.

6. Previous Reports and Site History

The following previous reports are relevant to the current investigation:

- EIS (2017). *Stage 1 Desktop Environmental Site Assessment, Due Diligence, 178-204 Parramatta Road & 1-1A Cheltenham Road, Croydon*. Report: E300046KFrpt, dated 13 January 2017.
- DP (2017a). *Report on Detailed Site (Contamination) Investigation, Mercedes Benz Croydon Showroom, 180 Parramatta Road, Croydon.* Report: 85862.01.R.001.Rev1, dated 10 August 2017.
- DP (2017b). *Report on Contamination Action Plan*, *Mercedes Benz Croydon Showroom, 180 Parramatta Road, Croydon.* Report: 85862.01.R.002.Rev0, dated 1 September 2017.
- ADE (2018). *Verification of remaining in situ soil as VENM, Chalouhi worksite, in situ soil material, 194-204 Parramatta Road, Croydon NSW*. Report CHL-58-13905 / LTR2 / v2 final, dated 21 June 2018.
- Greencap (2021). *Phase 1 Enviro Due Diligence Investigation, 166-176 Parramatta Road, Croydon.* Report: C125987:J174256, dated 31 August 2021.

6.1 EIS (2017)

EIS (2017) comprised a desktop review of the western portion of the site for pre-purchase due diligence purposes. The report in summary noted the following:

- Prior to 1955, the site was used for residential purposes and has subsequently been used for commercial and industrial activities, primarily involving car related industries. It was noted that a grocer and carpenter businesses were registered at the site in the 1950s and an electrical supplies retailer registered in 1970;
- Council records since the 1960s indicated applications for site operations including panel beating, car painting, sale of car tyres and car servicing;
- Review of the site Section 149 Planning Certificates and the NSW EPA database did not indicate that the site has been identified as contaminated;
- Search of the SafeWork NSW records did not identify any licences to store dangerous goods at the site (including underground fuel storage tanks or above ground storage tanks);
- Local groundwater was expected to flow to the west, with the potential for viable groundwater abstraction and use to be low; and
- Potential asbestos containing material was present within the site structures and the fibre cement sheeting in the landscape strip along the southern boundary.

The sources of potential contamination concern were identified as site filling, use of the site for car related activities (car dealership, service centre), historical commercial use of the site and hazardous building materials associated with previous and existing structures.

Contaminants of potential concern were identified as heavy metals, TRH, BTEX, VOC (including chlorinated solvents), PAH, OCP, OPP, PCB and asbestos.

6.2 DP (2017a)

DP (2017a) comprised a review of EIS (2017), soil sampling from six test bores primary drilled for geotechnical purposes, groundwater sampling from two groundwater wells and associated laboratory analysis. This was subsequently followed by soil sampling for environmental purposes from an additional 15 test bores, sampling from four of the installed groundwater wells, associated laboratory analysis and reporting. Sample locations are shown on Drawing 1, Appendix A.

Fill on the site was generally encountered to depths between 0.2 m and 1.0 m below ground level (bgl) and comprised brown and grey silty clay, sandy clay and clay with minor portions of gravel. Crushed sandstone and gravelly sand layers of fill were also present in some test bores. Inclusions of brick fragments, glass fragments, pipe, ash and charcoal were also observed in the fill.

Natural soils typically comprised grey, brown, red and orange clays, silty clays and shaly clays and were present underlying the fill at all locations. Ironstone gravel was also evident within these soils. Natural soils were identified to be present to depth of between 1.2 m and 2.5 m bgl. These soils were underlain by bedrock primarily comprising grey, red and brown shale, with sandstone, laminate and siltstone also present.

Most notably from a contamination perspective, hydrocarbon odours were observed within the soil profile at varying locations and depths. These odours were observed in the fill at BH5 (0.17-0.6 m bgl) and BH19 (0.3-0.5 m bgl) and within the natural soils at BH5 (1.7-2.3 m bgl), BH10 (0.4-2.0 m bgl) and BH21 (0.6-1.2 m bgl). It is noted that odours across the whole site were not observed, although it was considered likely that odorous materials were present between sample locations and at varying depths and that these will be encountered during bulk excavations.

For the five bores where hydrocarbon odours were observed, the laboratory results recorded the presence of total recoverable hydrocarbon (TRH) in the strata consistent with the field observations, however, samples taken from the underlying strata where no odours were observed, recorded results below the laboratory reporting limit (LRL). Sample BH10/0.9-1.0 taken from the odorous soils in BH10 recorded a low ethylbenzene concentration of 3 mg/kg. This suggests that the contaminants are generally confined to where the odours were being observed and are not significantly mobile. In total, TRH was detected above the LRL in eight samples, although these concentrations were all well below the adopted SAC for the proposed showroom land use.

With respect to other contaminants in soils, these were generally low with all results within the health and ecological assessment criteria. In this regard it is noted that there were no detections for benzene, toluene, xylene, organochlorine pesticide (OCP), organophosphate pesticide (OPP) and polychlorinated biphenyl (PCB) above the LRL. Some low concentrations of PAH were detected, primarily in the fill which was thought to be in-part due to the presence of charcoal and ash. With respect to heavy metals, lead and zinc concentrations were generally associated with the fill but were below adopted SAC. This is consistent with the site's past activities associated with car sales, servicing and repairs, but may also be associated with charcoal and ash in the fill materials.

Based on the total concentration and leaching (TCLP) results, the fill at the site was considered to have a preliminary waste classification of General Solid Waste (non-putrescible). With respect to the classification of the natural soils, given the presence of detected TRH in the natural soils where odours were present, these odorous materials are unable to be classified as virgin excavated natural material (VENM) and hence are given a preliminary waste classification of General Solid Waste (non-putrescible). Those natural soils and rock that do not display signs of contamination (i.e., odours, staining) were given a preliminary classification as VENM.

As noted in Section 5, the groundwater encountered in the monitoring wells at varying depths within the bedrock profile across the site indicated the likely presence of temporary 'perched' or localised groundwater tables, rather than a regional groundwater table. No free product or sheen was detected or observed in the monitoring wells.

The groundwater laboratory results indicated low levels of contamination with all results below the respective SAC for a generic commercial / industrial land use (groundwater investigation level - GIL) with the exception of certain metals, namely arsenic, copper nickel and zinc. All benzene, TRH (C_{10}-C_{40}), PAH, cadmium, chromium, lead and mercury concentrations were below LRL in all primary samples. With respect to nickel and zinc concentrations, these were higher in the up-gradient Well 6 located off-site then in any of the wells located on the site suggesting an off-site source. The detection of arsenic in Well 17A was not replicated in the other site wells, including Well 4 located on the down-gradient corner of the site, indicating that any such contamination is most likely to be localised and not wide spread.

DP recommended the following be undertaken prior to demolition or construction:

- Confirmation of the requirements for groundwater disposal from Council (or other relevant authorities) is sought to inform the project planning and construction methodology;
- A HAZMAT survey of existing buildings is completed prior to demolition;
- Construction site management plan and protocols, including a management process to minimise the potential for exposure to odours by site workers and at adjacent sites;
- Waste classification of the soils (including testing) to confirm classification prior to off-site disposal of materials in accordance with the NSW EPA *Waste Classification Guidelines 2014;* and
- An unexpected finds protocol is prepared and implemented during site works (e.g., to address any odorous soil identified during works, asbestos etc.).

Based on the field and analytical results and subject to implementation of the report's recommendations, it was considered the site could be made suitable for the previously proposed car showroom development.

6.3 DP (2017b)

DP (2017b) comprised a review of EIS (2017) and DP (2017a), outlining the areas of concern identified to date in the western portion of the site and a sequence of remedial works carried out during the early works stage of the previous proposed development alongside the demolition, piling and bulk excavation of the site.

In summary the early works, from a contamination perspective, was anticipated to involve the following:

- Hazardous materials survey on structures since demolished;
- Removal of hazardous materials from the site by a suitably experienced and licensed contractor with appropriate site management practices implemented during the removal works;
- Disposal of the hazardous materials to an appropriately licensed waste facility;
- Demolition of the previous structures and disposal of materials to appropriately licensed receiving sites;
- Clearance of the site post completion of the demolition works by a suitably qualified occupational hygienist;
- Appropriate WHS procedures implemented by the contractor to address the potential for encountering odorous materials which had the potential to release soil vapours into the work area. Implementation of an unexpected finds protocol (UFP) should other materials of concern be encountered;
- Where odorous materials were encountered, implementation of odour management practices and monitoring. This could have included use of odour suppressant measures (e.g., odour misting, direct application to surface of odour suppressant) to minimise exposure to offensive odours during stockpiling of pile returns and excavation;
- Implementation of procedures to monitor odours on site boundaries during excavation and/or stockpiling of odorous soils;
- Management of pile returns and disposal of resultant soils off-site to an appropriate receiving facility / site;
- Disposal off site of excavated materials from bulk excavations to an appropriately licenced landfill or receiving site involving segregation of the fill and odorous natural materials from the VENM; and
- Final inspection of site by an Environmental Consultant and Occupation Hygienist on completion of the bulk excavation.

6.4 ADE (2018)

ADE (2018) comprised a summary review regarding the stages of excavation of all fill and other material not meeting the criteria for VENM had been satisfactorily removed from the site. ADE summarised the validation of three stages of the site; the eastern and western portions of the site and the excavation of a deep sewer line previously running east to west through the site. ADE concluded that:

- Soil materials within the site that were classified as general solid waste (GSW) (non-putrescible) had been removed from the site;
- Soil materials within the site that were classified as GSW - special waste (non-putrescible) had been removed from the site;
- Fill materials and hydrocarbon impacted natural soils identified within the site had been removed from the site; and
- Based on the previous ADE investigations and the visual inspection of the surface soils within the site on 1 June 2018, ADE considered remaining *in situ* materials within the subject area to meet the criteria for classification as VENM.

6.5 Greencap (2021)

Greencap (2021) comprised a desktop review of the eastern portion of the site. The report in summary noted the following:

- Prior to 1955, the site was used for residential purposes and has subsequently been used for commercial and industrial activities, primarily involving car related industries. It was noted that a grocer and carpenter businesses were registered at the site in the 1950s and an electrical supplies retailer registered in 1970;
- A review of site history indicated the site was a vacant until several small individual buildings were constructed between 1930 to 1943, owned by the Sydney County Council. The small structures were demolished between 1955 and 1963 and redeveloped into the commercial land use as seen in the 2021 aerial photograph in the Greencap (2021) report;
- Review of the site Section 149 Planning Certificates and the NSW EPA database did not indicate that the site had been identified as contaminated; and
- Search of the SafeWork NSW records did not identify any licences to store dangerous goods at the site (including underground fuel storage tanks or above ground storage tanks).

The sources of potential contamination concern were identified as unverified site filling, legacy demolition activities at the site and the off-site Coles Express Five Dock.

Contaminants of potential concern were identified as heavy metals, TRH, BTEX, PAH, OCP, OPP, PCB and asbestos.

It is noted that a site inspection was not undertaken due to Covid-19 restrictions at the time of the report.

7. Site Walkover

A site walkover was undertaken by an environmental scientist, Wen-Fei Yuan accompanied by Senior Project Manager, Reece Mackie and Project Coordinator, Victoria Ghafari of Neoscape Pty Ltd on 9 May 2022. The general site topography was observed to be consistent with that described in Section 5. The following key site features pertinent to the updated DSI (DP, 2017a) were observed (refer to photographs in Appendix C).

The site is divided into the following three main areas:

- Area 1 (Lot 1, DP 86926; Lots A-C, DP 84812; Lots 100-101, DP 850953; Lot 1, DP 86033): an excavation pit with concrete walls around the boundaries of the pit and construction materials;
- Area 2 (Lot 1, DP 817488): a vacant residential house with a concrete paved storage area for construction materials. The residential house was used as a site office during basement construction in Area 1; and
- Area 3 (Lot 1, DP 206411): a vacant warehouse (former Salvation Army store).

Area 1:

- Two to three basement levels were excavated as part of the original proposed development. Area 1 is now a large, irregular-shaped excavation pit with concrete walls around the boundaries of the pit. The base of the pit is directly on rock (shale / sandstone). An architectural drawing, Drawing no. A.21011, indicates the depth of excavation to be greater than 6 m - 9.3 m below the surround ground surface. (Photograph 1);
- Temporary, hoarding boards were constructed around the perimeter of Area 1. This has somewhat limited the viewing of Area 1 (Photograph 2);
- Minor construction materials were stored in Area 1 (Photograph 3); and
- Several small ponds were observed in Area 1. It is understood that regular pumping of rainwater from the pit is carried out on a monthly basis to prevent the accumulation of rainwater in the pit (Photograph 1).

Area 2:

- The residential premises was not accessible at the time of the updated site walkover. The rear of Area 2 was observed from the boundary of Area 3. It is understood that the rendered brick house was used as a site office during basement construction of Area 1. The rear of Area 2 was entirely concrete paved and formerly used to store construction materials and for staff car parking (Photograph 5); and
- Historical aerial photographs indicate the residential house in Area 2 was constructed prior to the 1930s.

Area 3:

- Area 3 is predominately occupied by a brick warehouse. It is understood the warehouse was used as a Salvation Army store. Advertisement for a tile store was observed on the northern wall of the warehouse, fronting Parramatta Road (Photograph 3);
- The interior of the warehouse was vacant with a small office space, a kitchen, amenities and old plant rooms comprising possibly a ventilation/cooling system, a water heater, damaged electrical switchboard and miscellaneous waste (including building rubble) found on the floor (Photographs 7-10); and
- An underground pit (possibly underground services) cover was observed near an old plant room (Photograph 8).

[1] prepared by Architectus Sydney Pty Ltd; supplied by Neoscape

8. Preliminary Conceptual Site Model

A Conceptual Site Model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors. The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e., it enables an assessment of the potential source - pathway - receptor linkages (complete pathways).

Potential Sources

Based on the site walkover and previous investigations, the following potential sources of contamination and associated contaminants of potential concern (COPC) have been identified.

- S1: Fill: Associated with levelling on the eastern portion of the site.
  - COPC include metals, TRH, BTEX, PAH, PCB, OCP, phenols and asbestos.
- S2: Off-site land uses: Associated with the neighbouring Coles Express and former Burwood STA Depot.
  - COPC include lead, TRH, BTEX, PAH, and VOC.
- S3: Former and current buildings.
  - COPC include asbestos, synthetic mineral fibres (SMF), lead (in paint) and PCB.

Potential Receptors

The following potential human receptors have been identified:

- R1: Current users [construction and maintenance workers, employees and visitors];
- R2: End users [residents, employees and visitors]; and
- R3: Adjacent site users [residential and commercial].

The following potential environmental receptors have been identified:

- R4: Surface water [Parramatta River (marine)]; and
- R5: Groundwater.

Given the limited landscaping areas, the commercial use of the site and the proposed bulk excavation for the new development, ecological receptors were not considered relevant for this assessment.

Potential Pathways

The following potential pathways have been identified:

- P1: Ingestion and dermal contact;
- P2: Inhalation of dust and / or vapours;
- P3: Surface water run-off;
- P4: Leaching of contaminants and vertical migration into groundwater;
- P5: Lateral migration of groundwater providing base flow to water bodies; and

- P6: Inhalation, ingestion and absorption.

Summary of Potentially Complete Exposure Pathways

A 'source–pathway–receptor' approach has been used to assess the potential risks of harm being caused to human or environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways (potential complete pathways). The possible pathways between the above sources (S1 to S3) and receptors (R1 to R5) are provided in below Table 1.

Table 1: Summary of Potentially Complete Exposure Pathways

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S1: Fill, Metals, TRH, BTEX, PAH, phenols, OCP, OPP and asbestos	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current users [construction and maintenance workers, employees and visitors] R2: End users [residents, employees and visitors]	An intrusive investigation is recommended to assess possible contamination including testing of the soils and groundwater.
	P2: Inhalation of dust and/or vapours	R3: Adjacent site users [current and future]	
	P3: Surface water run-off P4: Leaching of contaminants and vertical migration into groundwater	R4: Surface water	
	P5: Lateral migration of groundwater providing base flow to water bodies	R5: Groundwater	
S3: Off site and upgradient service station, lead, TRH, BTEX, PAH, and VOC	P2: Inhalation of dust and/or vapours P3: Leaching of contaminants and vertical migration into groundwater	R1: Current users [maintenance workers/commercial tenants/visitors] R2: Construction and maintenance workers R3: End users [maintenance workers/commercial tenants/visitors] R5: Groundwater	

Source and COPC	Transport Pathway	Receptor	Risk Management Action
S3: Former and current buildings, asbestos, SMF, lead (in paint) and PCB	P1: Ingestion and dermal contact P2: Inhalation of dust and/or vapours	R1: Current users [insert land use] R2: Construction and maintenance workers R3: End users [insert land use]	A hazardous buildings material survey should be conducted prior to demolition with a clearance certificate provided for the ground surface post demolition.

9. Data Quality Objectives

The CI was devised from DP (2017a) with reference to the seven-step data quality objective process which is provided in Appendix B Schedule B2, NEPC (2013). The data quality objective process is outlined in Appendix D. No additional sampling was undertaken as part of the current CI.

10. Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in the current investigation are informed by the CSM (Section 8) which identified human receptors to potential contamination on the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The investigation and screening levels relevant to the interpretation of previous results as part of this CI comprise levels adopted for a generic commercial land use scenario. The derivation of the SAC is included in Appendix F and the adopted SAC are listed on the summary analytical results tables in Appendix G.

11. Results

11.1 Field Work Results

The borehole logs for the previous DSI investigation (DP, 2017a) are included in Appendix E. The logs recorded the following general sub-surface profile:

Concrete Hardstand: Concrete slab was encountered at all test locations between 0.1 and 0.3 m below ground level (bgl).

Fill:	Brown and grey silty clay, sandy clay and clay with minor portions of gravel. Crushed sandstone layers of fill were present in BH13 and BH14 with a gravelly sand identified in BH21. Inclusions of brick fragments (BH8-11), glass fragments (BH13 and BH14), pipe (BH4), ash (BH13) and charcoal (BH8, BH10-12, BH14 and BH18) were also observed in the fill. Fill was encountered to depths between 0.2 m bgl (BH9) and 1.0 m bgl (BH13). Seven of the 21 test bores recorded the presence of fill below 0.5 m bgl whilst fill was not present at BH1 and BH2.
Clay / Silty Clay / Shaley Clay:	Natural soils typically comprised grey, brown, red and orange clays, silty clays and shaly clays and were present underlying the fill at all locations (with the exception of BH20 due to refusal on concrete). Ironstone gravel was also evident with these soils. Natural soils were identified to be present to depths of between 1.2 m bgl (BH2) and 2.5 m bgl (BH3).
Bedrock:	Underlying the natural soils was bedrock primarily comprising grey, red and brown shale, with sandstone, laminite (BH2) and siltstone (BH5) also present.

While it is noted in the ADE VENM report (ADE, 2018) that all GSW from Area 1 has been removed, sub-surface conditions from previous locations BH6, BH15 and BH18 from Area 2 are still relevant and all previous logs can be inferred as a possible indication on potential sub-surface conditions at Area 3.

Groundwater levels recorded on 2 June 2017, prior to sampling are shown in Table 2 along with stabilised parameters recorded prior to sampling. Due to limited recharge, field parameters were not able to be taken at BH2 and BH11. In this regard, BH2 was dry during the initial investigation sampling on 10 March 2017 and BH11 had very limited sample which was highly turbid due to collection near the base of the well.

Table 2: Summary of Groundwater Level Measurements on 2 June 2017

Well ID	Ground Level * m (AHD)	SWL m (bgl)	SWL m (AHD)
BH2	9.3	8.05	1.25
BH4	6.5	10.48	-3.98
BH6	11.7	2.84	8.86
BH8	8.0	7.3	0.7
BH11	7.7	13.21	-5.51
BH17A	8.3	9.23	-0.93

Notes:
*Surveyed by dGPS
AHD - Australian Height Datum
SWL - standing water level
bgl - below ground level

Based on the groundwater level measurements, groundwater was interpreted to be flowing to the west, towards the Parramatta River. This was expected given the topography and the location of the down-gradient discharge point (the Parramatta River).

Physical parameters were measured whilst sampling (where possible) and summarised in Table 3.

Table 3: Summary of Field Parameters (Groundwater)

Well / Sample ID	Temp. (ºC)	DO (ppm)	EC* (µS/cm)	pH	Redox (mV)
BH2	25.1	0.18	400	5.84	110
BH4	Insufficient groundwater in well to obtain parameters				
BH6	22.6	0.12	575	5.02	83
BH8	21.2	0.85	3640	6.55	-104
BH11	Insufficient groundwater in well to obtain parameters				
BH17A	20.1	2.04	4840	6.93	-12

Notes:
*Calculated from TDS result

The dissolved oxygen levels indicated generally anaerobic conditions. The pH was slightly acidic. The electrical conductivity values are typical of brackish water as would be expected of a Wianamatta Shale. Redox potential (Eh) indicates slightly reducing conditions.

No light non-aqueous phase liquid LNAPL was observed whilst sampling.

11.2 Laboratory Analytical Results

The results of laboratory analysis are summarised in the following tables in Appendix G:

- Table G1: Summary of Previous Laboratory Results of Soil Analysis; and
- Table G2: Summary of Previous Laboratory Results of Water Analysis.

The laboratory certificates of analysis together with the chain of custody and sample receipt information are provided in Appendix I.

12. Discussion

12.1 Soils

12.1.1 Site Suitability

The analytical results for OCP, OPP and PCB in all samples from the previous DSI investigation (DP, 2017a) for Area 1 and 2 were below the Laboratory Practical Quantitation Limit (PQL) and SAC. BTEX and PAH were detected in select samples, primarily in the fill (since removed) and below the SAC. VOC was detected in select samples, in natural material, and below the SAC. Metals were detected in all samples and below the SAC.

All previous results for asbestos were below the screening PQL of 0.1 g/kg. Material sample (A01) collected from the southern fence of Area 1 did not record the presence of asbestos through laboratory analysis. It is noted that the presence of building rubble (glass, brick, and pipe) was observed in the fill can be an indicator for the potential presence of asbestos.

It is noted in the VENM letter (ADE, 2018) that all previous fill within the Area 1 of site has been removed from site down to the underlying VENM. The analytical table from the previous DSI (DP, 2017a) has been included in Table G1, Appendix G as the previous results can be an indication of sub surface conditions at Areas C which currently has no chemical data as per Greencap (2021).

12.1.2 Preliminary Waste Classification

Regarding the previous waste classification for Areas 1 and 2, there were exceedances for the General Solid Waste (GSW) criteria without TCLP (CT1 criteria) including lead (12 samples) and B(a)P (9 samples). It is noted that these exceedances were located within fill material. TCLP analysis was undertaken on selected samples to address the different materials and highest concentrations for lead and B(a)P. The results confirmed the low leachability of these contaminants and all results recorded concentrations within the GSW criteria with TCLP (SCC1 and TCLP1 criteria). The DSI (DP, 2017a) then considered the fill at the site to have a preliminary waste classification of General Solid Waste (non-putrescible), including natural soils with observed odours and TRH detections. All remaining natural soil at the site were preliminary classified as VENM.

It is noted in the VENM letter (ADE, 2018) that all previous fill within the Area 1 of the site had been removed from site down to the underlying VENM. Again, the analytical table from the previous DSI (DP, 2017a) has been included in Table G1, Appendix G as the previous results can be an indication of sub surface conditions at Areas C and potential waste classifications detailed in ADE (2018) which currently has no chemical data as per Greencap (2021).

12.2 Groundwater

At the time of this investigation, the SAC from the previous DSI (DP, 2017a) have been amended to reflect current guideline criteria. As such, the default guideline values have been updated to be sourced from the *Water Quality Australia, Australian and New Zealand guidelines for fresh and marine water quality* (ANZG, 2018) as shown in Table G2.

The analytical results for phenol, OCP, OPP, PCB in all samples were below the PQL and SAC. BTEX, TRH, PAH and VOC were detected in select samples and are also below the SAC. Dissolved heavy metals were detected in all samples and are below the SAC.

Based on our experience in the area and on previous investigation findings, the concentrations of metals in groundwater are considered likely to be attributed to the background concentrations consistent with regional groundwater quality. The detection of chloroform in select samples was reported in DP 2017a as likely to be associated with potable water and hence were not considered to be of significant concern.

12.3 Data Quality Assurance and Quality Control

The field and laboratory data quality assurance and quality control for the previous DSI (DP, 2017a) samples have been reviewed and based on the results of the field QA and field and laboratory QC, and evaluation against the data quality indicators (DQI) it is concluded that the field and laboratory test data obtained are reliable and useable for this investigation.

13. Conclusions and Recommendations

As the current investigation was limited to a review of previous investigations for the site and incorporation of relevant chemical data from the previous DSI (DP, 2017a) for Areas 1 and 2 of the site, data gaps are present within the Area 3 portion of the site and beneath the residential house within Area 2. Therefore, comments on the actual contamination status of the site as a whole cannot be provided unless intrusive investigations are undertaken to obtain quantitative data on the contamination status of the soil.

Based on the above, it is concluded that the site can be made suitable, from a contamination perspective, for the proposed development, subject to the following:

- A hazardous building materials survey of the existing buildings to be demolished must be undertaken prior to disturbance. The results should identify potential contaminants (e.g., asbestos and lead) that may be present as improper demolition could spread the contamination to surface soils;
- Clearance of the building disturbance following the removal of identified hazardous materials, and upon demolition of the building (where proposed to be demolished) should be undertaken by a qualified occupational hygienist / licensed asbestos assessor; and
- Upon demolition of existing buildings, a supplementary investigation should be undertaken targeting the sub soils beneath Area 3 and demolished structures and hardstand in Area 2. It is anticipated that this supplementary investigation will satisfy the data gaps of this DSI. Given that the site is currently occupied by existing structures / buildings, it is considered that the recommended for intrusive investigation should ideally be undertaken following demolition of the site structures.

14. References

CRC CARE. (2017). *Risk-based Management and Remediation Guidance for Benzo(a)pyrene.* Technical Report no. 39: Cooperative Research Centre for Contamination Assessment and Remediation of the Environment.

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

NSW EPA. (1995). *Contaminated Sites, Sampling Design Guidelines.* NSW Environment Protection Authority.

NSW EPA. (2020). *Guidelines for Consultants Reporting on Contaminated Land.* Contaminated Land Guidelines: NSW Environment Protection Authority.

15. Limitations

Douglas Partners (DP) has prepared this report for LSH Property (Alexandria) Pty Ltd for the project at 194 Parramatta Road, Croydon in accordance with DP's proposal 207969.02.P.001.Rev1 dated 28 February 2022. The work was carried out under DP Standard terms of Engagement. This report is provided for the exclusive use of LSH Property (Alexandria) Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the environmental components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

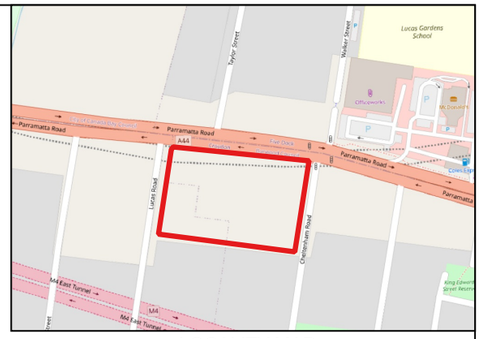
Asbestos was not been detected by observation or by laboratory analysis, either on the surface of the site, or in filling materials at the test locations sampled and analysed. Building demolition materials, such as concrete, glass, brick, and pipe, was, however, located in previous below-ground fill, and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

Although the sampling plan adopted for this investigation was considered appropriate to achieve the stated project objectives, there are necessarily parts of the site that have not been sampled and analysed. This is either due to undetected variations in ground conditions or to budget constraints (as discussed above), or to parts of the site being inaccessible and not available for inspection/sampling, or to vegetation preventing visual inspection and reasonable access. It is therefore considered possible that HBM, including asbestos, may be present in unobserved or untested parts of the site, between and beyond sampling locations, and hence no warranty can be given that asbestos is not present.

Douglas Partners Pty Ltd

Appendix A

Drawing



LOCALITY MAP

Notes:
1. Basemap from metromap.com
2. Site boundary inferred from NSW spatial services lot boundary

Legend

- Current Site Boundary
- Area 1 (EIS, 2017) and (DP, 2017a, 2017b)
- Area 2
- Area 3 (Greencap, 2021)

Previous Investigation (DP, 2017a)

- Borehole
- Groundwater Well

0 10 20 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	LSH Property (Alexandria) Pty Ltd	TITLE:	**Site Locality and Previous Test Locations**
OFFICE:	Sydney	DRAWN BY:	JH
SCALE:	1:500 @ A3	DATE:	02.06.2022

Proposed Croydon Vertical Village
166-204 Parramatta Road and 1-1A Cheltenham Road Croydon

N

PROJECT No:	207969.02
DRAWING No:	1
REVISION:	0

Appendix B

About this Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix C

Site Photographs

Photograph 1 – The existing excavation pit

Photograph 2 – Rear of the residential house

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	207969.02
	166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon	PLATE No:	1
	Proposed Croydon Vertical Village	REV:	0
	CLIENT: LSH Developments	DATE:	26-05-22

Photograph 3 – Northern wall of the existing brick warehouse (currently vacant)

Photograph 4 – The interior of the warehouse

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	207969.02
	166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon	PLATE No:	2
	Proposed Croydon Vertical Village	REV:	0
	CLIENT: LSH Developments	DATE:	26-05-22

Photograph 5 – Possibly a ventilation/cooling system observed in the plant with miscellaneous waste (building rubble) observed on the ground.

Photograph 6 – A water heater

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	207969.02
	166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon	PLATE No:	3
	Proposed Croydon Vertical Village	REV:	0
	CLIENT: LSH Developments	DATE:	26-05-22

Photograph 7 – Damaged electrical switchboard

Photograph 8 – An underground pit (possibly service pit) observed in the warehouse.

Douglas Partners Geotechnics / Environment / Groundwater	**Site Photographs**	PROJECT:	207969.02
	166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon	PLATE No:	4
	Proposed Croydon Vertical Village	REV:	0
	CLIENT: LSH Developments	DATE:	June 2022

Appendix D

Data Quality Objectives

Appendix D

Data Quality Objectives

166-204 Parramatta Road and 1-1A Cheltenham Road Croydon

D1.0 Data Quality Objectives

The DSI has been devised broadly in accordance with the seven-step data quality objective (DQO) process which is provided in Appendix B, Schedule B2 of NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).

Step	Summary
1: State the problem	The objective of the investigation is to confirm the contamination status of the site with respect to the proposed land use. The report is being undertaken as the land is to be redeveloped. A preliminary conceptual site model (CSM) has been prepared (Section 8) for the proposed development. The project team consisted of experienced environmental engineers and scientists working in the roles of Project Principal, Project Reviewer, Project Manager, field staff.
2: Identify the decisions / goal of the study	The site history has identified possible contaminating previous uses which are identified in the CSM (Section 8). The CSM identifies the associated contaminants of potential concern (COPC) and the likely impacted media. The site assessment criteria (SAC) for each of the COPC are detailed in Appendix F. The decision is to establish whether or not the results fall below the SAC. On this basis, an assessment of the site's suitability from a contamination perspective and whether (or not) further assessment and / or remediation will be derived.
3: Identify the information inputs	Inputs to the investigation will be the results of analysis of samples to measure the concentrations of COPC identified in the CSM (Section 8) at the site using NATA accredited laboratories and methods, where possible. The SAC for each of the COPC are detailed in Appendix F. A photoionization detector (PID) was used on-site to screen soils for VOC. PID readings will be used to inform sample selection for laboratory analysis.
4: Define the study boundaries	The lateral boundaries of the investigation area are shown on Drawing 1, Appendix A. The vertical boundaries are to the extent of contamination impact as determined from the site history assessment and site observations. The assessment is limited to the timeframe over which the field investigation was undertaken. Constraints to the assessment are identified and discussed in the conclusions of the report, Section 13.
5: Develop the analytical approach (or decision rule)	The decision rule is to compare all analytical results with SAC (Appendix H, based on NEPC (2013)). Where guideline values are absent, other sources of guideline values accepted by NEPC (2013) shall be adopted where possible. Where a sample result exceeds the adopted criterion, a further site-specific assessment will be made as to the risk posed by the presence of that contaminant(s).

Step	Summary
	Initial comparisons will be with individual results then, where required, summary statistics (including mean, standard deviation and 95% upper confidence limit (UCL) of the arithmetic mean (95% UCL)) to assess potential risks posed by the site contamination. Quality control results are to be assessed according to their relative percent difference (RPD) values. For field duplicates, triplicates and laboratory results, RPDs should generally be below 30%; for field blanks and rinsates, results should be at or less than the limits of reporting (NEPC, 2013). Refer to DP, 2017a for the field and laboratory quality assurance assessment of the previous DSI.
6: Specify the performance or acceptance criteria	Baseline condition: Contaminants at the site exceed human health and environmental SAC and pose a potentially unacceptable risk to receptors (null hypothesis). Alternative condition: Contaminants at the comply with human health and environmental SAC and as such, do not pose a potentially unacceptable risk to receptors (alternative hypothesis). Unless conclusive information from the collected data is sufficient to reject the null hypothesis, it is assumed that the baseline condition is true.
7: Optimise the design for obtaining data	As the purpose of the sampling program was to assess for potential contamination across the site, the sampling program was reliant on professional judgement to identify and sample the potentially affected areas. Further details regarding the proposed sampling plan are presented in the previous DSI (DP, 2017a)

D2.0 References

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM].* Australian Government Publishing Services Canberra: National Environment Protection Council.

Douglas Partners Pty Ltd

Appendix E

Previous Investigation Logs (DP, 2017a) and Explanatory Notes

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 7.1 AHD
EASTING: 325371
NORTHING: 6250669
DIP/AZIMUTH: 90°/--

BORE No: BH1
PROJECT No: 85862.00
DATE: 27/2/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.12	CONCRETE - grey concrete with angular to sub-angular igneous gravel							A			
	0.4	CLAY - apparently firm, grey, high plasticity clay, trace of silt, wet							E, A, E			2 subsamples BD1
	1	CLAY - very stiff, grey mottled red clay, with some silt and ironstone gravel, moist							A/E			
									S			3,7,12 N = 19
	2							Unless otherwise noted, defects comprise B, 0-10°, pl, sm, co, cly/fe	A			2 subsamples
	2.2	SHALE - extremely low to very low strength, moderately to highly weathered, fragmented, grey mottled red shale, with some ironstone bands						2.33 - 3.89m: 5 x Cs, 30 - 130mm	C	100	0	
	3.2	SHALE - very low strength, highly weathered, fragmented to highly fractured, grey and light grey shale, with some low to medium strength bands						3.05m: CORE LOSS: 150mm 3.45 - 3.80m: 3 x J, 45°, st, ro, cln 4.08 - 4.69m: 2 x J, 80°, ir, ro, cln	C	91	0	PL(A) = 0.27
	5							5.26 - 5.74m: 2 x J, 30°, ir, ro, cln	C	100	13	PL(A) = 0.36 PL(A) = 0.39
	6.2	SANDSTONE - medium then high strength, moderately weathered then fresh, slightly fractured and unbroken, light grey-brown, fine sandstone, with some medium strength siltstone bands						6m: Cs, 110mm 6.13 - 6.58m: 6 x B, 0°, pl, he Below 6.5m depth: Unless otherwise noted, defects are B, 0-10°, pl, ro, stn, cbs 7.35 - 7.41m: 2 x J, 0-30°, cu, he	C	100	73	PL(A) = 1.23 PL(A) = 2.27 PL(A) = 0.77
	9.0							8.94m: CORE LOSS: 60mm	C	98	96	PL(A) = 2.18

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP/SI **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.12m; solid flight auger to 2.5m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 7.1 AHD
EASTING: 325371
NORTHING: 6250669
DIP/AZIMUTH: 90°/--

BORE No: BH1
PROJECT No: 85862.00
DATE: 27/2/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
	10.1	SANDSTONE - high strength, fresh, unbroken, medium to coarse, light grey sandstone, with some carbonaceous laminations										
-4	11								C	98	96	PL(A) = 2.16 PL(A) = 1.47
	12.0	Bore discontinued at 12.0m - limit of investigation										
-5	12											
-6	13											
-7	14											
-8	15											
-9	16											
-10	17											
-11	18											
-12	19											

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP/SI **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.12m; solid flight auger to 2.5m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 9.3 AHD
EASTING: 325424
NORTHING: 6250665
DIP/AZIMUTH: 90°/--

BORE No: BH2
PROJECT No: 85862.00
DATE: 27 - 28/2/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.1	CONCRETE - grey concrete, subangular to angular, igneous gravel					
		SILTY CLAY - apparently firm to stiff, grey-brown, high plasticity, silty clay, trace of ironstone gravel, moist		A E			2 subsamples
	0.7			A E			2 subsamples
	1.18	CLAY - apparently very stiff to hard, light grey clay with some, with some silt and shaly gravel	Unless otherwise noted, defects are B, 0-10°, pl, sm, co, cly	S			18, 19/30 Ref
	2.0	LAMINITE - low strength, highly weathered, fragmented, dark grey laminite, with some extremely low strength bands	1.56m: Cs, 10mm 1.66m: Cs, 30mm 1.79m: Cs, 40mm	C	100	54	PL(A) = 0.94 PL(A) = 0.43
		LAMINITE - medium strength, moderately weathered, fractured, grey-brown laminite, with approximately 25% sandstone laminations	2.69m: Cs, 20mm 2.81m: Cs, 10mm 3m: J, 60°, pl, sm, cln 3.21 - 4.24m: 8 x J, 0-30°, cu, sm, cln or he				PL(A) = 0.61
			4.38m: J, 75°, pl, sm, cln 5.08m: J, 60-90°, ir, sm, cln 5.81 - 7.14m: 4 x J, 70°, pl, sm, cln	C	100	28	PL(A) = 0.51 PL(A) = 0.73
	5.18	SHALE - medium strength, fresh, slightly fractured, dark grey shale	7.82m: J, 85°, pl, sm, cln	C	100	95	PL(A) = 0.94 PL(A) = 0.84 PL(A) = 1.08
				C	100	96	PL(A) = 0.71

Degree of Weathering: EW, HW, MW, SW, FS, FR
Graphic Log
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Water: 10-03-17
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 1.35m

TYPE OF BORING: Diatube coring to 0.10m; solid flight auger to 1.35m; NMLC diamond coring to 12.07m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 3.0m depth, screen from 3.0m to 12.0m depth, gravel pack from 2.6m to 12.0m depth, bentonite from 2.1m to 2.6m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 9.3 AHD
EASTING: 325424
NORTHING: 6250665
DIP/AZIMUTH: 90°/--

BORE No: BH2
PROJECT No: 85862.00
DATE: 27 - 28/2/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Water	Fracture Spacing (m)	Discontinuities	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
	10.1	SANDSTONE - very high strength, fresh, slightly fractured, grey, fine sandstone										PL(A) = 5.12
	11.05	LAMINITE - very high strength, fresh, unbroken, light grey and grey laminite with approximately 20% fine sandstone laminations							C	100	96	PL(A) = 3.84
	12.07	Bore discontinued at 12.07m- limit of investigation										

Degree of Weathering: EW, HW, MW, SW, FS, FR
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00
Discontinuities: B - Bedding, J - Joint, S - Shear, F - Fault

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 1.35m

TYPE OF BORING: Diatube coring to 0.10m; solid flight auger to 1.35m; NMLC diamond coring to 12.07m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 3.0m depth, screen from 3.0m to 12.0m depth, gravel pack from 2.6m to 12.0m depth, bentonite from 2.1m to 2.6m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.2 AHD
EASTING: 325381
NORTHING: 6250641
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 85862.00
DATE: 28/2/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.12	CONCRETE - grey concrete, subangular igneous gravel, 8mm steel reinforcement		A/E			2 subsamples
	0.5	FILLING - apparently poorly compacted, dark grey silty clay filling, with some crushed ironstone gravel, moist		B			
				A/E			2 subsamples
	1	CLAY - firm to stiff, brown, high plasticity clay, with some silt, moist		S			3,3,5 N = 8
	1.5	SILTY CLAY - very stiff to hard, grey-brown, silty clay, with some ironstone gravel, moist					
	2			A/E			2 subsamples
			Unless otherwise noted, defects are B, 0-10°, pl, sm, co, cly or fe	A			2 subsamples
				S			17,15/50 Ref
	2.5	SHALE - extremely low to very low strength, extremely to highly weathered, fragmented, grey shale, with some ironstone bands		C	100	0	
	3		2.9m: Cs, 30mm 3m: CORE LOSS: 560mm				
	3.56		3.56m: Cs, 170mm				
	4		3.81 - 4.00m: 3 x Cs, 20 - 60mm 4.12m: J, 85-90°, ir, he 4.19m: Cs, 230mm				
	4.5	SHALE - very low strength, highly to moderately weathered, fragmented to fractured, grey-brown shale	4.52m: Cs, 40mm 4.64 - 4.87m: 8 x J, 0-30°, cu, he 4.75m: Cs, 80mm 5.05m: Cs, 10mm 5.12m: Cs, 20mm	C	81	0	PL(A) = 0.83 PL(A) = 0.13
	6		6.02m: J, 30°, pl, sm, cln				
	6.3	SHALE - low then medium strength, slightly weathered then fresh, fractured and slightly fractured, dark grey shale	6.13 - 6.44m: 3 x J, 70-90°, cu, sm, stn, fe 6.45 - 6.86m: 7 x J, 45-90°, cu, sm, cln 6.8m: J, 80°, pl, he				PL(A) = 0.36
	7		7.21m: J, 85°, pl, sm, cln 7.62 - 7.89m: 4 x J, 30-45°, pl, sm, cln	C	100	60	PL(A) = 1.15
	8.07	SANDSTONE - high and very high strength, fresh, unbroken, light grey-dark grey, fine sandstone with some carbonaceous laminations					PL(A) = 4.34
	9			C	100	100	PL(A) = 2.63

Degree of Weathering: EW, HW, MW, SW, FS, FR
Graphic Log
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Water
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.12m; solid flight auger to 2.7m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.2 AHD
EASTING: 325381
NORTHING: 6250641
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 85862.00
DATE: 28/2/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
-2		SANDSTONE - high and very high strength, fresh, unbroken, light grey-dark grey, fine sandstone with some carbonaceous laminations *(continued)*										PL(A) = 4.8
-3	11								C	100	100	PL(A) = 3.03
	12 12.0	Bore discontinued at 12.0m- limit of investigation										
-4												
-5	13											
-6	14											
-7	15											
-8	16											
-9	17											
-10	18											
-11	19											

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.12m; solid flight auger to 2.7m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 6.5 AHD
EASTING: 325348
NORTHING: 6250596
DIP/AZIMUTH: 90°/--

BORE No: BH4
PROJECT No: 85862.00
DATE: 2/3/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.1	CONCRETE - dark grey concrete, subangular igneous gravel, N8 steel reinforcement					
		FILLING - apparently poorly compacted, dark grey, high plasticity, clay filling, with some silt, trace of clay pipe and organics, moist		A/E			3 subsamples
	0.8			A/E			2 subsamples
	1.3	SILTY CLAY - stiff silty clay, with some sand, moist		S			3,4,14 N = 18
		SHALY CLAY - very stiff to hard, mottled grey and red, shaly clay, with some ironstone gravel, silt and sand	Unless otherwise noted, all defects are B, 0-5°, pl, sm, cln/co cly	A/E			2 subsamples
	2.2	SHALE - very low strength, highly weathered, fragmented, grey mottled red shale, with some low strength bands		A			
	2.6		2.5m: CORE LOSS: 100mm 2.83 - 3.93m: 6 x Cs, 20 - 150mm	C	80	0	
			3.57m: J, 60°, pl, sm, co, cly	C	100	0	
			4.1m: Cs, 80mm 4.28m: Cs, 100mm 4.49 - 4.72m: 3 x J, 30°, pl, sm, cln 4.95m: Cs, 50mm 5.43m: J, 80°, cu, ro, cln	C	100	0	
	5.59	SANDSTONE - medium strength, slightly weathered, fractured, grey, fine sandstone		C	100	98	PL(A) = 0.93
	6.5	SANDSTONE - high strength, fresh, slightly fractured and unbroken, light grey, fine to medium sandstone with some carbonaceous laminations and beds					PL(A) = 2.5
			7.48m: Cs, 10mm 7.91m: Cs, 10mm	C	100	96	PL(A) = 2.31 PL(A) = 2.87
				C	100	100	PL(A) = 1.87
	9.9						

Degree of Weathering: EW, HW, MW, SW, FS, FR
Graphic Log
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Water
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m

TYPE OF BORING: Diatube coring to 0.10m; solid flight auger to 2.5m; NMLC diamond coring to 12.0m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 2.6m depth, screen from 2.6m to 11.6m depth, gravel pack from 2.4m to 11.6m depth, bentonite from 1.4m to 2.4m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 6.5 AHD
EASTING: 325348
NORTHING: 6250596
DIP/AZIMUTH: 90°/--

BORE No: BH4
PROJECT No: 85862.00
DATE: 2/3/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
-4		SANDSTONE - high strength, fresh, unbroken, light grey, medium to coarse sandstone, trace of thin siltstone laminations *(continued)*										PL(A) = 1.61
	11					10-03-17			C	100	100	
-5												PL(A) = 1.9
	11.83	Bore discontinued at 11.83m- limit of investigation										
-6	12											
-7	13											
-8	14											
-9	15											
-10	16											
-11	17											
-12	18											
-13	19											

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m

TYPE OF BORING: Diatube coring to 0.10m; solid flight auger to 2.5m; NMLC diamond coring to 12.0m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 2.6m depth, screen from 2.6m to 11.6m depth, gravel pack from 2.4m to 11.6m depth, bentonite from 1.4m to 2.4m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.9 AHD
EASTING: 325401
NORTHING: 6250591
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 85862.00
DATE: 1 - 2/3/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.17	CONCRETE - dark grey concrete, subangular to angular igneous gravel, 12mm steel reinforcement		A/E			2 subsamples
	0.6	FILLING - poorly compacted, dark grey, silty clay filling, with some gravel, faint hydrocarbon odour		B			
	1	CLAY - very stiff, mottled grey-brown clay, with some silt and ironstone gravel, moist		A/E			2 subsamples
				S			7,8,14 N = 22
	1.7	CLAYEY SILT - very stiff to hard, grey clayey silt, trace of shaley gravel, moist, strong hydrocarbon odour		E			
	2.3	SILTSTONE - extremely low strength, highly to moderately weathered, fragmented, grey siltstone, trace of ironstone bands	Unless otherwise noted, defects are B, 0-5°, pl, sm, cln/co, cly	A			
			2.67 - 3.62m: 6 x Cs, 20 - 60mm	C	100	0	
	3.55	SHALE - very low to low strength, highly to moderately weathered, fractured, grey-brown shale		C	100	0	PL(A) = 0.53
			4.95 - 5.38m: 3 x J, 45°, pl, sm, cln; 5.05 - 5.21m: 2 x Cs, 30 - 40mm; 5.31m: Cs, 40mm				
	5.65	SHALE - low strength, slightly weathered, fragmented to fractured, dark grey shale		C	100	56	PL(A) = 0.2
	6.5	SHALE - medium strength, fresh, slightly fractured and unbroken, dark grey shale	7.57m: J, 60°, pl, sm, cln				PL(A) = 0.94; PL(A) = 0.88
				C	100	100	PL(A) = 0.78
	9.33	SANDSTONE - high to very high strength, fresh, unbroken, grey, fine sandstone	9.1m: J, 80°, pl, sm, cln	C	100	100	PL(A) = 5.15

Degree of Weathering: EW, HW, MW, SW, FS, FR
Graphic Log
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Water
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.17m; solid flight auger to 2.3m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.9 AHD
EASTING: 325401
NORTHING: 6250591
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 85862.00
DATE: 1 - 2/3/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
		SANDSTONE - high to very high strength, fresh, unbroken, grey, fine sandstone *(continued)*										PL(A) = 2.78
	10.65	SANDSTONE - high strength, fresh, unbroken, grey, medium to coarse sandstone, trace of siltstone bands							C	100	100	PL(A) = 2.27
	12.0	Bore discontinued at 12.0m- limit of investigation										

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.17m; solid flight auger to 2.3m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 11.7 AHD
EASTING: 325454
NORTHING: 6250598
DIP/AZIMUTH: 90°/--

BORE No: BH6
PROJECT No: 85862.00
DATE: 1/3/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.18	CONCRETE - dark grey concrete, subangular igneous gravel, 12mm steel reinforcement		A			2 subsamples
				A/E			2 subsamples; BD2
	0.7	FILLING - apparently poorly compacted, dark grey, silty clay filling, trace of ironstone gravel		E			
	1	SILTY CLAY - very stiff, mottled grey-brown, silty clay, with some ironstone gravel		A			2 subsamples
				S			4,6,11 N = 17
	2		Unless otherwise noted, defects are B, 0-5°, pl, sm, cln/co, cly	A			2 subsamples
	2.2	SHALE - very low strength, highly weathered, fragmented to highly fractured, dark grey shale		A			
				S			25/120, Ref
	3		2.56 - 3.00m: 4 x Cs, 30 - 50mm	C	100	0	
	3.6	LAMINITE - medium strength, moderately weathered, fractured and slightly fractured, grey-brown laminite, with approximately 40% fine sandstone laminations					PL(A) = 1.04
	4		3.84 - 4.32m: 4 x J, 80°, cu, sm, cln 4.09m: Cs, 10mm				
			4.42m: Cs, 10mm 4.44 - 5.59m: 10 x J, 0-70°, cu, he 4.85m: Cs, 10mm	C	100	0	PL(A) = 0.8
	5						PL(A) = 0.65
			5.45m: J, 70°, pl, sm, cln				
	5.83	LAMINITE - high and very high strength, fresh, slightly fractured, dark grey laminite, with approximately 20% fine sandstone laminations	5.81m: J, 60°, pl, sm, cln				
	6		6.31m: J, 60°, pl, sm, cln				PL(A) = 1.92
	7			C	100	81	PL(A) = 3.06
	8.0	SHALE - high strength, fresh, slightly fractured and unbroken, dark grey shale, trace of fine sandstone laminations					PL(A) = 1.86
	9			C	100	100	PL(A) = 1.43

Degree of Weathering: EW, HW, MW, SW, FS, FR
Graphic Log
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Water: 10-03-17
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m

TYPE OF BORING: Diatube coring to 0.18m; solid flight auger to 2.7m; NMLC diamond coring to 12.0m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 3.0m depth, screen from 3.0m to 12.0m depth, gravel pack from 2.4m to 12.0m depth, bentonite from 1.4m to 2.4m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 11.7 AHD
EASTING: 325454
NORTHING: 6250598
DIP/AZIMUTH: 90°/--

BORE No: BH6
PROJECT No: 85862.00
DATE: 1/3/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
		SHALE - high strength, fresh, slightly fractured and unbroken, dark grey shale, trace of fine sandstone laminations *(continued)*										
												PL(A) = 1.83
	11								C	100	100	
								11.35m: J, 60°, pl, sm, cln				PL(A) = 1.47
	12 12.0	Bore discontinued at 12.0m- limit of investigation										
	13											
	14											
	15											
	16											
	17											
	18											
	19											

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m

TYPE OF BORING: Diatube coring to 0.18m; solid flight auger to 2.7m; NMLC diamond coring to 12.0m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 3.0m depth, screen from 3.0m to 12.0m depth, gravel pack from 2.4m to 12.0m depth, bentonite from 1.4m to 2.4m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.5 AHD
EASTING: 325401.4
NORTHING: 6250661.8
DIP/AZIMUTH: 90°/--

BORE No: BH7
PROJECT No: 85862.01
DATE: 24/5/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	CONCRETE		U	0.1 0.2		PID<5		
	0.35	FILLING - brown and grey sandy clay filling with some fine to medium igneous gravel		U	0.4 0.5		PID<5		
	0.7	CLAY - red and light grey clay							
	1	SHALY CLAY - light grey shaly clay		U	0.9 1.0		PID<5		
	1.4	SHALE - extremely low strength, grey shale		U	1.5 1.6		PID<5		
	1.7	Bore discontinued at 1.7m - refusal on shale							
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB **CASING:** Uncased
TYPE OF BORING: Diatube coring to 0.1m; Pushtube 0.1m to 1.7m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.2 AHD
EASTING: 325386
NORTHING: 6250654.7
DIP/AZIMUTH: 90°/--

BORE No: BH8
PROJECT No: 85862.01
DATE: 24/5/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.12	CONCRETE		U	0.12		PID<5		Gatic cover Concrete plug 0.0-0.2m
	0.4	FILLING - brown sandy clay filling with some fine to medium igneous gravel, trace of charcoal and brick fragments		U	0.3 0.4 0.5		PID<5		
		CLAY - orange-red clay with a trace of ironstone gravel		U	0.9 1.0		PID<5		Gravel 0.2-2.0m
	1.2	SHALY CLAY - light grey-red shaly clay							50mm diameter Class 18 PVC casing 0.0-3.0m
	2.0	SHALE - extremely low strength, light grey shale		U	1.9 2.0		PID<5		Bentonite plug 2.0-2.5m
	3.0	SHALE - extremely low then extremely low to very low strength, extremely to highly weathered, light grey-brown shale with some ironstone bands		U C	2.9 3.0 4.6		PID<5		
	5.15	SHALE - very low then low strength, highly then slightly weathered, fractured, grey-brown shale		C					
	6.4	SHALE - medium strength, fresh, slightly fractured, grey shale			7.4				Gravel 2.5-15.0m
	8.4	SANDSTONE - high strength, fresh, slightly fractured and unbroken, light grey and grey, fine to medium grained sandstone with some siltstone laminations and bands		C					50mm diameter Class 18 Machine-slotted PVC screen 3.0-15.0m

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB/SI **CASING:** Uncased

TYPE OF BORING: Diatube coring to 0.12m; Pushtube to 3.0m; Solid flight auger 0.12m to 3.0m; NMLC-Diamond coring 3.0m to 15.0m

WATER OBSERVATIONS: No free groundwater observed whilst pushtubing and augering

REMARKS: Logging for contamination purposes

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.2 AHD
EASTING: 325386
NORTHING: 6250654.7
DIP/AZIMUTH: 90°/--

BORE No: BH8
PROJECT No: 85862.01
DATE: 24/5/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - high strength, fresh, slightly fractured and unbroken, light grey and grey, fine to medium grained sandstone with some siltstone laminations and bands *(continued)*		C	10.5				
	11								11
	12			C					12
	13				13.7				13
	14			C					14
					14.9		PID<5		End cap
	15 15.0	Bore discontinued at 15.0m - target depth reached			14.95 15.0				15
	16								16
	17								17
	18								18
	19								19

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB/SI **CASING:** Uncased
TYPE OF BORING: Diatube coring to 0.12m; Pushtube to 3.0m; Solid flight auger 0.12m to 3.0m; NMLC-Diamond coring 3.0m to 15.0m
WATER OBSERVATIONS: No free groundwater observed whilst pushtubing and augering
REMARKS: Logging for contamination purposes

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.5 AHD
EASTING: 325396.1
NORTHING: 6250648.7
DIP/AZIMUTH: 90°/--

BORE No: BH9
PROJECT No: 85862.01
DATE: 24/5/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.12	CONCRETE		U	0.12		PID<5		
	0.2	FILLING - dark brown sandy clay filling with some fine to medium igneous gravel and trace brick fragments		U*	0.2 / 0.4		PID<5		
		CLAY - red-orange clay with some shale gravel			0.5				
	1.0	SHALY CLAY - light grey and red shaly clay		U	0.9 / 1.0		PID<5		
	2.0	Bore discontinued at 2.0m - refusal on shale		U	1.9 / 2.0		PID<5		

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB **CASING:** Uncased

TYPE OF BORING: Diatube coring to 0.12m; Pushtube 0.12m to 2.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *BD2/240517 taken at 0.4m to 0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 7.0 AHD
EASTING: 325356.1
NORTHING: 6250631.5
DIP/AZIMUTH: 90°/--

BORE No: BH10
PROJECT No: 85862.01
DATE: 24/5/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.2	CONCRETE							
	0.4	FILLING - brown sandy clay filling with some fine to medium igneous gravel - concrete and brick fragments from 0.2m to 0.4m		U*	0.2 0.3		PID=8		
				U	0.4 0.5		PID=33		
6	1	CLAY - orange, light grey and red clay, strong hydrocarbon odour - shale and ironstone fragments from 0.6m		U	0.9 1.0		PID=76		1
	1.4	SHALY CLAY - red-grey shaly clay with strong hydrocarbon odour							
5	2 2.0	SHALE - extremely low strength, red-brown shale - grey from 2.3m		U	1.9 2.0		PID=57		2
				U	2.6 2.7		PID=17		
	2.8	Bore discontinued at 2.8m - refusal on shale							
4	3								3
3	4								4
2	5								5
1	6								6
0	7								7
-1	8								8
-2	9								9

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB **CASING:** Uncased
TYPE OF BORING: Diatube coring to 0.1m; Pushtube 0.1m to 2.8m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *BD1/240517 taken at 0.2m to 0.3m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 7.8 AHD
EASTING: 325377.6
NORTHING: 6250618.4
DIP/AZIMUTH: 90°/--

BORE No: BH11
PROJECT No: 85862.01
DATE: 25/5/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.1	CONCRETE		U	0.1 0.2		PID<5		Gatic cover Concrete plug 0.0-0.2m
	0.55	FILLING - dark and light brown sandy clay filling with some fine to medium igneous gravel, trace of brick fragments and charcoal		U	0.4 0.5		PID<5		
	1	CLAY - orange and red clay - light grey and orange from 0.7m		U	0.9 1.0		PID<5		Gravel 0.2-2.0m 50mm diameter Class 18 PVC casing 0.0-3.0m
	1.8 2.0	SHALY CLAY - light grey mottled orange and red shaly clay		U	1.9 2.0		PID<5		
		SHALE - extremely low strength, light grey shale		U	2.7 2.8		PID<5		Bentonite plug 2.0-2.5m
	3.1	SHALE - extremely low strength, extremely weathered, light grey shale		C	3.1				
	4.1 4.55	SHALE - very low strength, highly weathered, fragmented to fractured, light grey-brown shale with some low strength bands			4.32				
	5.05	SHALE - low strength, moderately weathered, fragmented to highly fractured, grey brown shale		C					
	6.2	SHALE - medium strength, fresh, fractured and slightly fractured, grey shale							
	7.2				7.0				Gravel 2.5-15.0m
	8.2	LAMINITE - high strength, fresh, unbroken, light grey laminite		C					50mm diameter Class 18 Machine-slotted PVC screen 3.0-15.0m
	10.0				10.0				

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB/SI **CASING:** Uncased

TYPE OF BORING: Diatube coring to 0.1m; Pushtube 0.1m to 2.0m; Solid flight auger 2.0m to 3.0m; NMLC-Diamond coring 3.0m to 15.0m

WATER OBSERVATIONS: No free groundwater observed whilst pushtubing and augering

REMARKS: *BD1/250517 taken at 0.1m to 0.2m. Coreloss 4.32-4.55m down BH, coreloss 7.0-7.2m dropped due to poor condition when transferring to core box; Logging for contamination purposes

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 7.8 AHD
EASTING: 325377.6
NORTHING: 6250618.4
DIP/AZIMUTH: 90°/--

BORE No: BH11
PROJECT No: 85862.01
DATE: 25/5/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - high strength, fresh, unbroken, light grey, fine to medium grained sandstone			10.0				
-3	11			C					11
-4	12								12
-5	13				13.0				13
-6	14			C					14
-7	15 15.0				15.0				15 End cap
		Bore discontinued at 15.0m - target depth reached							
-8	16								16
-9	17								17
-10	18								18
-11	19								19
-12									

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB/SI **CASING:** Uncased

TYPE OF BORING: Diatube coring to 0.1m; Pushtube 0.1m to 2.0m; Solid flight auger 2.0m to 3.0m; NMLC-Diamond coring 3.0m to 15.0m

WATER OBSERVATIONS: No free groundwater observed whilst pushtubing and augering

REMARKS: *BD1/250517 taken at 0.1m to 0.2m. Coreloss 4.32-4.55m down BH, coreloss 7.0-7.2m dropped due to poor condition when transferring to core box; Logging for contamination purposes

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 7.2 AHD
EASTING: 325359.3
NORTHING: 6250617.9
DIP/AZIMUTH: 90°/--

BORE No: BH12
PROJECT No: 85862.01
DATE: 23/5/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CONCRETE							
	0.3								
	0.4	FILLING - dark brown sandy clay filling with some fine to medium igneous gravel and trace to some charcoal		U U	0.3 0.4 0.5		PID<5 PID<5		
	0.8	CLAY - light grey and red clay							
	1	SHALY CLAY - light grey and red shaly clay		U	0.9 1.0		PID<5		1
	2			U	1.9 2.0		PID<5		2
	2.1								
	2.2	SHALE - extremely low strength, brown shale							
		Bore discontinued at 2.2m - refusal on shale							
	3								3
	4								4
	5								5
	6								6
	7								7
	8								8
	9								9

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB **CASING:** Uncased
TYPE OF BORING: Diatube coring to 0.3m; Pushtube 0.3m to 2.2m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: BH13
PROJECT No: 85862.01
DATE: 3/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.15	CONCRETE							
	0.25	FILLING - orange crushed sandstone filling with trace to some grey slag		U	0.15		PID<5		
				U	0.25		PID<5		
	0.5	FILLING - brown and grey clay filling with some fine to medium igneous and sandstone gravel and trace to some ash and glass fragments		U	0.3		PID=7		
					0.4				
					0.5				
1	1.0	FILLING - orange-brown clay filling with some fine to coarse igneous and sandstone gravel		U	0.9		PID<5		1
					1.0				
		CLAY - orange-grey clay with some sandstone gravel		U	1.4		PID<5		
	1.7	SHALY CLAY - light grey red yellow mottled shaly clay			1.5				
2				U	1.9		PID<5		2
	2.1	SHALE - grey, red and yellow weathered shale			2.0				
				U	2.1		PID<5		
	2.5	Bore discontinued at 2.5m - refusal on shale			2.3				
3									3
4									4
5									5
6									6
7									7
8									8
9									9

RIG: Bobcat **DRILLER:** GM **LOGGED:** CB **CASING:** Uncased
TYPE OF BORING: Diatube to 0.15m; Pushtube 0.15m to 2.5m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Bore located inside service building

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 9.0 AHD
EASTING: 325397.5
NORTHING: 6250602.5
DIP/AZIMUTH: 90°/--

BORE No: BH14
PROJECT No: 85862.01
DATE: 3/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.15	CONCRETE SLAB		U	0.15 / 0.25		PID<5		
	0.3	FILLING - orange and yellow crushed sandstone filling		U*	0.4 / 0.5		PID<5		
	0.7	FILLING - dark grey-brown clay filling with some fine to medium igneous gravel, trace of sand and glass fragments		U	0.9 / 1.0		PID<5		
	1.1	CLAY - orange-red clay							
		SHALY CLAY - light grey, red and light brown shaly clay		U	1.4 / 1.5		PID<5		
	1.7	SHALE - light grey-red weathered shale		U	1.9 / 2.0		PID<5		
	2.0	Bore discontinued at 2.0m - refusal on shale							

RIG: Bobcat **DRILLER:** GM **LOGGED:** CB **CASING:** Uncased

TYPE OF BORING: Diatube coring to 0.15m; Pushtube 0.15m to 2.0m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: *BD1/030617 taken at 0.4m to 0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 9.7 AHD
EASTING: 325421.7
NORTHING: 6250598.9
DIP/AZIMUTH: 90°/--

BORE No: BH15
PROJECT No: 85862.01
DATE: 23/5/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CONCRETE							
	0.3			U	0.3		PID<5		
	0.4	FILLING - brown sandy clay filling with some fine to medium igneous gravel		U**	0.4 0.5		PID<5		
	0.8	CLAY - light grey and orange clay with some shale gravel							
	1	SHALY CLAY - orange, red and light grey shaly clay		U	0.9 1.0		PID<5		1
	1.6	SHALE - extremely low strength, brown, orange, and light grey shale		U	1.9 2.0		PID<5		2
	2								
	2.1	Bore discontinued at 2.1m - target depth reached							
	3								3
	4								4
	5								5
	6								6
	7								7
	8								8
	9								9

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB **CASING:** Uncased
TYPE OF BORING: Diatube coring to 0.3m; Pushtube 0.3m to 2.1m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: **BD2/230517 taken at 0.4m to 0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 7.7 AHD
EASTING: 325375.8
NORTHING: 6250598.3
DIP/AZIMUTH: 90°/--

BORE No: BH16
PROJECT No: 85862.01
DATE: 23/5/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.25	CONCRETE							
	0.4	FILLING - brown sandy clay filling with some fine to medium igneous gravel and trace to some charcoal		U U	0.25 0.4 0.5		PID<5 PID<5		
		CLAY - orange and red clay		U	0.9 1.0		PID<5		
		- red and light grey with some shale and ironstone gravel from 1.6m		U	1.9 2.0		PID<5		
	2.2	SHALE - extremely low strength, light grey and light brown shale		U	2.9 3.0		PID<5		
	3.2	Bore discontinued at 3.2m - target depth reached							

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB **CASING:** Uncased
TYPE OF BORING: Diatube coring to 0.25m; Pushtube 0.25m to 3.2m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 9.0 AHD
EASTING: 325404.58
NORTHING: 6250590.9
DIP/AZIMUTH: 90°/--

BORE No: BH17
PROJECT No: 85862.01
DATE: 23/5/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		CONCRETE							
	0.25	FILLING - brown sandy clay filling with some fine to medium igneous gravel		U	0.25		PID<5		
	0.3			U	0.3 0.4 0.5		PID<5		
	0.8	CLAY - orange and brown clay							
	1	SHALY CLAY - red and light grey shaly clay		U	0.9 1.0		PID<5		
	1.8	SHALE - extremely low strength, light grey shale		U	1.9 2.0		PID<5		
	2								
	2.2	Bore discontinued at 2.2m - target depth reached							
	3								
	4								
	5								
	6								
	7								
	8								
	9								

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB **CASING:** Uncased
TYPE OF BORING: Diatube coring to 0.25m; Pushtube 0.25m to 2.2m
WATER OBSERVATIONS: No free groundwater observed
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 9.0 AHD
EASTING: 325404.6
NORTHING: 6250590.9
DIP/AZIMUTH: 90°/--

BORE No: BH17A
PROJECT No: 85862.01
DATE: 26/5/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.25	CONCRETE							Gatic cover Concrete plug 0.0-0.2m
	0.3	FILLING - brown sandy clay filling with some fine to medium igneous gravel							
	0.8	CLAY - orange-brown clay							
8	1	SHALY CLAY - red and light grey shaly clay							1 Gravel 0.2-2.0m 50mm diameter Class 18 PVC casing 0.0-3.0m
	1.8	SHALE - extremely low strength, light grey shale							
7	2								2 Bentonite plug 2.0-2.5m
6	3								3
5	4								4
	4.5	SHALE - extremely low to very low strength, extremely to highly weathered, fragmented to fractured, light grey-brown shale		C	4.5				
4	5								5
	5.45	SHALE - low strength, highly then moderately weathered, fragmented, grey-brown shale			5.55				
	5.75								
3	5.95 6	SHALE - medium strength fresh, slightly fractured, grey shale			6.0 6.1		PID<5		6
2	7			C					7 Gravel 2.5-15.0m
1	8								8
	8.45				8.35				
0	9 9.0			C					9 50mm diameter Class 18 Machine-slotted PVC screen 3.0-15.0m
	9.65	SANDSTONE - high strength, fresh, unbroken, light grey, fine grained sandstone							

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB/SI **CASING:** Uncased

TYPE OF BORING: Diatube coring to 0.25m; Solid flight auger 0.25 to 2.5m; NMLC-Diamond coring 2.6m to 15.0m

WATER OBSERVATIONS: No free groundwater observed whilst augering

REMARKS: Logging for contamination purposes

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 9.0 AHD
EASTING: 325404.6
NORTHING: 6250590.9
DIP/AZIMUTH: 90°/--

BORE No: BH17A
PROJECT No: 85862.01
DATE: 26/5/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
		SANDSTONE - description next page SANDSTONE - high strength, fresh, unbroken, light grey, fine grained sandstone *(continued)*		C					
-2	11				11.4				11
-3	12			C					12
-4	13								13
	13.87				13.82				
-5	14			C					14
									End cap
-6	15 15.0	Bore discontinued at 15.0m - target depth reached			15.0				15
-7	16								16
-8	17								17
-9	18								18
-10	19								19

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB/SI **CASING:** Uncased
TYPE OF BORING: Diatube coring to 0.25m; Solid flight auger 0.25 to 2.5m; NMLC-Diamond coring 2.6m to 15.0m
WATER OBSERVATIONS: No free groundwater observed whilst augering
REMARKS: Logging for contamination purposes

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 10.4 AHD
EASTING: 325431.4
NORTHING: 6250592.9
DIP/AZIMUTH: 90°/--

BORE No: BH18
PROJECT No: 85862.01
DATE: 23/5/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.17	CONCRETE SLAB		U	0.17		PID<5		
	0.3	FILLING - dark brown sandy clay filling with some medium igneous gravel and trace of charcoal			0.25				
				U*	0.4		PID<5		
		CLAY - grey, red and orange clay with some sand			0.5				
	1			U	0.9		PID<5		1
					1.0				
	1.8	SHALE - extremely low strength, light grey and orange shale		U	1.9		PID<5		2
	2				2.0				
	2.2	Bore discontinued at 2.2m - target depth reached							
	3								3
	4								4
	5								5
	6								6
	7								7
	8								8
	9								9

RIG: Geoprobe **DRILLER:** Terratest **LOGGED:** CB **CASING:** Uncased
TYPE OF BORING: Diatube coring to 0.17m; Pushtube 0.17m to 2.2m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: *BD1/230517 taken at 0.4m to 0.5m

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: BH19
PROJECT No: 85862.01
DATE: 3/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.15	CONCRETE		U	0.15		PID=21		
	0.3	FILLING - orange clay filling with some fine to medium igneous gravel and some crushed sandstone cobbles and gravel		U	0.25		PID=45		
	0.5				0.4				
					0.5				
	0.9	FILLING - light grey-brown clay filling with some fine to medium igneous gravel and strong hydrocarbon odour		U	0.7		PID=16		
					0.8				
1	1.1	FILLING - dark brown sandy clay filling with some fine to medium igneous ravel		U	0.9		PID<5		1
					1.0				
		CLAY - orange red clay		U	1.4		PID<5		
					1.5				
		SHALY CLAY - orange shaly clay							
	1.9				1.9				
2	2.0	SHALE - light grey-red weathered shale		U	2.0		PID<5		2
		Bore discontinued at 2.0m - refusal on shale							
3									3
4									4
5									5
6									6
7									7
8									8
9									9

RIG: Bobcat **DRILLER:** GM **LOGGED:** CB **CASING:** Uncased
TYPE OF BORING: Diatube coring to 0.15m; Pushtube 0.15m to 2.0m
WATER OBSERVATIONS: No free groundwater observed
REMARKS: Bore located inside service building

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: BH20
PROJECT No: 85862.01
DATE: 3/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.2	CONCRETE							
	0.35	FILLING - grey gravelly sandy clay filling		A	0.2 0.3		PID<5		
		Bore discontinued at 0.35m - refusal on concrete							

RIG: Bobcat **DRILLER:** GM **LOGGED:** CB **CASING:** Uncased

TYPE OF BORING: Diatube coring to 0.2m; Solid flight auger 0.2m to 0.35m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Bore located inside service building. Roof height precluded pushtubing

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: --
EASTING:
NORTHING:
DIP/AZIMUTH: 90°/--

BORE No: BH21
PROJECT No: 85862.01
DATE: 3/6/2017
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Well Construction Details
	0.18	CONCRETE		A	0.18		PID<5		
	0.3	FILLING - brown gravelly sandy filling (roadbase)		A	0.25		PID=-9		
	0.6	FILLING brown gravelly sandy clay filling with some crushed sandstone cobbles and gravel			0.4 / 0.5				
	1	CLAY - orange-red clay with moderate hydrocarbon odour		A	0.9 / 1.0		PID=-38		1
	1.2	SHALY CLAY - light grey and red mottled light brown shaly clay		A	1.4 / 1.5		PID=-12		
	1.7	SHALE - light grey-red weathered shale		A	1.9 / 2.0		PID<5		2
	2								
	2.1	Bore discontinued at 2.1m - refusal on shale							
	3								3
	4								4
	5								5
	6								6
	7								7
	8								8
	9								9

RIG: Bobcat **DRILLER:** GM **LOGGED:** CB **CASING:** Uncased

TYPE OF BORING: Diatube t0 0.18m; Solid flight auger 0.18m to 2.1m

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Bore located inside service building. Roof height precluded pushtubing

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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Sampling Methods

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Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

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Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- 'Moist, dry of plastic limit' or 'w <PL' (i.e. hard and friable or powdery).
- 'Moist, near plastic limit' or 'w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- 'Moist, wet of plastic limit' or 'w >PL' (i.e. soils usually weakened and free water forms on the hands when handling).
- 'Wet' or 'w ≈LL' (i.e. near the liquid limit).
- 'Wet' or 'w >LL' (i.e. wet of the liquid limit).

Rock Descriptions

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Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $Is_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
Highly weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately weathered	MW	The whole of the rock material is discoloured , usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	No signs of decomposition or staining.
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Douglas Partners

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

May 2017

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General

- Asphalt
- Road base
- Concrete
- Filling

Soils

- Topsoil
- Peat
- Clay
- Silty clay
- Sandy clay
- Gravelly clay
- Shaly clay
- Silt
- Clayey silt
- Sandy silt
- Sand
- Clayey sand
- Silty sand
- Gravel
- Sandy gravel
- Cobbles, boulders
- Talus

Sedimentary Rocks

- Boulder conglomerate
- Conglomerate
- Conglomeratic sandstone
- Sandstone
- Siltstone
- Laminite
- Mudstone, claystone, shale
- Coal
- Limestone

Metamorphic Rocks

- Slate, phyllite, schist
- Gneiss
- Quartzite

Igneous Rocks

- Granite
- Dolerite, basalt, andesite
- Dacite, epidote
- Tuff, breccia
- Porphyry

May 2017

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Calibration and Service Report – PID

Company:	Douglas Partners Pty Ltd (Sydn	**Manufacturer:**	RAE	**Serial #:**	595-002219
Contact:	Wen-Fei Yuan	**Instrument:**	MINIRAE LITE SN: 595-002219	**Asset #:**	
Address:	PO Box 472 WEST RYDE NSW 2114	**Model:**	MiniRAE Lite	**Part #:**	059-A126-000
		Configuration:	VOC	**Sold:**	01.03.2017
		Wireless:	-	**Last Cal:**	
Phone:	02 9809 0666	**Network ID:**	-	**Job #:**	30314
Fax:	02 9809 4095	**Unit ID:**	-	**Cal Spec:**	
Email:	WenFei.Yuan@douglaspartners	**Details:**		**Order #:**	130031

Item	Test	Pass/Fail	Comments	Serial Number
Battery	NiCd, NiMH, Dry cell, LiIon	P		
Charger	Power Supply	P		
	Cradle, Travel Charger	P		
Pump	Flow	P	>500 mL/min	
Filter	Filter, fitting, etc	P		
Alarms	Audible, visual, vibration	P		
Display	Operation	P		
Switches	Operation	P		
PCB	Operation	P		
Connectors	Condition	P		
Firmware	Version	P	2.14	
Datalogger	Operation	P		
Monitor Housing	Condition	P		
Case	Condition / Type	P		
Sensors				
PID	Lamp	P		
PID	Sensor	P		
THP	Sensor	P		

Engineer's Report

Initial Setup and Calibration

Melbourne	**Head Office**	2 Merchant Avenue	THOMASTOWN VIC 3074	T: +(613) 9464 2300	F:+ (613) 9464 3421
Sydney	S14 Lvl 2	6-8 Holden Street	ASHFIELD NSW 2131	T: +(612) 9716 5966	F:+ (612) 9716 5988
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sales@aesolutions.com.au

ISO Certified 9001:2008

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Calibration Certificate

Sensor	Type	Serial No.	Span Gas	Concentration	Traceability Lot #	CF	Reading	
							Zero	Span
PID	10.6eV	1062R115578	Isobutylene	100 PPM	S110317-1		0	100.4

Calibrated/Repaired by: DARREN FRANCALANZA Date: 07.03.2017 Next Due: 07.09.2017

Melbourne	**Head Office**	2 Merchant Avenue	THOMASTOWN VIC 3074	T: +(613) 9464 2300	F:+ (613) 9464 3421
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Appendix F

Site Assessment Criteria

Appendix F

Site Assessment Criteria

166-204 Parramatta Road and 1-1A Cheltenham Road Croydon

F1.0 Introduction

F1.1 Guidelines

The following key guidelines were consulted for deriving the site assessment criteria (SAC):

- NEPC *National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) [NEPM]* (NEPC, 2013).
- EPA, US. (2016). Regional Screening Level Summary Table, Industrial Soil, May 2016. United States Environmental Protection Agency.
- CRC CARE *Health screening levels for petroleum hydrocarbons in soil and groundwater* (CRC CARE, 2011).
- ANZG *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018).
- NHMRC, NRMMC *Australian Drinking Water Guidelines 6 2011, Version 3.2* (NHMRC, NRMMC, 2016).

F1.2 General

The SAC applied in the current investigation are informed by the CSM which identified human and environmental receptors to potential contamination at the site. Analytical results are assessed (as a Tier 1 assessment) against the SAC comprising primarily the investigation and screening levels of Schedule B1 of NEPC (2013).

The following inputs are relevant to the selection and/or derivation of the SAC:

- Land use: commercial / industrial.
  - Corresponding to land use category 'D', commercial / industrial such as shops, offices, factories and industrial sites.
- Soil type: sand (sand encountered in some of the filling, however predominately the site soil type is clay).

F2.0 Soils

F2.1 Health Investigation and Screening Levels

The generic health investigation levels (HIL) and health screening levels (HSL) are considered to be appropriate for the assessment of human health risk via all relevant pathways of exposure associated with contamination at the site. The adopted soil HIL and HSL for the contaminants of concern are in Table 1 and Table 2.

Table 1: Health Investigation Levels (mg/kg)

Contaminant	HIL-D
Metals	
Arsenic	3000
Cadmium	900
Chromium (VI)	3600
Copper	240 000
Lead	1500
Mercury (inorganic)	730
Nickel	6000
Zinc	400 000
PAH	
B(a)P TEQ	40
Total PAH	4000
Phenols	
Phenol	240 000
Pentachlorophenol	660
OCP	
DDT+DDE+DDD	3600
Aldrin and dieldrin	45
Chlordane	530
Endosulfan	2000
Endrin	100
Heptachlor	50
HCB	80
Methoxychlor	2500

Contaminant	HIL-D
OPP	
Chlorpyrifos	2000
PCB	
PCB	7
VOC (various analytes)	240 [a]

Notes: a - 1,2,4-trimethyl benzene used as a conservative screen

Table 2: Health Screening Levels (mg/kg)

Contaminant	HSL-D	HSL-D	HSL-D	HSL-D
SAND	**0 m to <1 m**	**1 m to <2 m**	**2 m to <4 m**	**4 m+**
Benzene	3	3	3	3
Toluene	NL	NL	NL	NL
Ethylbenzene	NL	NL	NL	NL
Xylenes	230	NL	NL	NL
Naphthalene	NL	NL	NL	NL
TRH F1	260	370	630	NL
TRH F2	NL	NL	NL	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The soil saturation concentration (Csat) is defined as the soil concentration at which the porewater phase cannot dissolve any more of an individual chemical. The soil vapour that is in equilibrium with the porewater will be at its maximum. If the derived soil HSL exceeds Csat, a soil vapour source concentration for a petroleum mixture could not exceed a level that would results in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'

The HSL for direct contact derived from CRC CARE (2011) are in Table 3.

Table 3: Health Screening Levels for Direct Contact (mg/kg)

Contaminant	DC HSL-D	DC HSL-IMW
Benzene	430	1100
Toluene	99 000	120 000
Ethylbenzene	27 000	85 000
Xylenes	81 000	130 000
Naphthalene	11 000	29 000
TRH F1	26 000	82 000
TRH F2	20 000	62 000
TRH F3	27 000	85 000
TRH F4	38 000	120 000

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} minus naphthalene
IMW intrusive maintenance worker

F2.2 Asbestos in Soil

Based on the CSM and / or current site access limitations, a detailed asbestos assessment was not considered to be warranted at this stage. However, due to the history of widespread use of ACM products across Australia, ACM can be encountered unexpectedly and sporadically at a site. Therefore, the presence or absence of asbestos at a limit of reporting of 0.1 g/kg (AS:4964) has been adopted for this investigation / assessment as an initial screen.

F2.3 Ecological Investigation Levels

Ecological investigation levels (EIL) and added contaminant limits (ACL), where appropriate, have been derived in NEPC (2013) for arsenic, copper, chromium (III), nickel, lead, zinc, DDT and naphthalene. The adopted EIL, derived using the interactive (excel) calculation spreadsheet on the NEPM toolbox website are shown in Table 5, with inputs into their derivation shown in Table 4.

Table 4: Inputs to the Derivation of the Ecological Investigation Levels

Variable	Input	Rationale
Age of contaminants	“Aged” (>2 years)	
pH	5.98	Measured average (DP, 2017a)
CEC	35.35 meq/100g	Measured average (DP, 2017a)
Clay content	1%	Assumed conservative clay composition
Traffic volumes	High	Site adjacent to Parramatta Road
State / Territory	NSW	

Table 5: Ecological Investigation Levels (mg/kg)

Contaminant	EIL-D
Metals	
Arsenic	160
Copper	300
Nickel	670
Chromium III	320
Lead	1800
Zinc	690
PAH	
Naphthalene	370
OCP	
DDT	640

F2.4 Ecological Screening Levels

Ecological screening levels (ESL) are used to assess the risk of selected petroleum hydrocarbon compounds, BTEX and benzo(a)pyrene to terrestrial ecosystems. The adopted ESL are shown in Table 6.

Table 6: Ecological Screening Levels (mg/kg)

Contaminant	Soil Type	EIL-D
Benzene	Coarse	75
Toluene	Coarse	135
Ethylbenzene	Coarse	165
Xylenes	Coarse	180
TRH F1	Coarse/ Fine	215*
TRH F2	Coarse/ Fine	170*
TRH F3	Coarse	1700
TRH F4	Coarse	3300
B(a)P	Coarse	1.4

Notes: ESL are of low reliability except where indicated by * which indicates that the ESL is of moderate reliability
TRH F1 is TRH C_6-C_{10} minus BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

F2.5 Management Limits

In addition to appropriate consideration and application of the HSL and ESL, there are additional considerations which reflect the nature and properties of petroleum hydrocarbons, including:

- Formation of observable light non-aqueous phase liquids (LNAPL);
- Fire and explosion hazards; and
- Effects on buried infrastructure e.g., penetration of, or damage to, in-ground services.

The adopted management limits are in Table 7.

Table 7: Management Limits (mg/kg)

Contaminant	Soil Type	ML-D
TRH F1	Coarse	700
TRH F2	Coarse	1000
TRH F3	Coarse	3500
TRH F4	Coarse	10 000

Notes: TRH F1 is TRH C_6-C_{10} including BTEX
TRH F2 is TRH >C_{10}-C_{16} including naphthalene

F3.0 Groundwater

F3.1 Introduction

The groundwater investigation levels (GIL) used for interpretation of the groundwater data (as a Tier 1 assessment) have been selected based on the potential risks posed from contamination sourced from the site to receptors at or down-gradient of the site, as identified by the conceptual site model (CSM). The receptors, exposure points and pathways are summarised in Table 8.

Table 8: Summary of Potential Receptors and Potential Risks

Receptor	Location	Exposure Point	Exposure Pathway
Surface water aquatic ecosystem	Down-gradient from site.	Receiving surface water body at the groundwater discharge point.	Exposure to contaminants.
Occupants of buildings	On site and down-gradient from site.	Enclosed buildings (existing and proposed).	Inhalation of VOC (including TRH and BTEX) overlying VOC impacted groundwater via the vapour intrusion pathway.
Human consumption	On site and down-gradient from site.	receiving surface water body at the groundwater discharge point.	Ingestion of contaminants in water used for drinking water supply.

The rationale for the selection of GIL is in Table 9.

Table 9: Groundwater Investigation Level Rationale

Receptor / Beneficial Use	GIL	Source	Comments / Rationale
Aquatic ecosystem	DGV	ANZG (2018)	95% LOP for non-bioaccumulative contaminants
Building occupants (vapour intrusion)	HSL	NEPC (2013)	2 m to <4 m
Drinking water	GV	NHMRC (2016)	Health and aesthetic-based GV

Notes: DGV default guideline value
% LOP percentage level of protection of species
HSL health screening level
GV guideline value

F3.2 Groundwater Investigation Levels for Aquatic Ecosystems

The DGV for the protection of aquatic ecosystems derived from ANZG (2018) are in Table 10.

Table 10: Groundwater Investigation Levels for Protection of Aquatic Ecosystems (µg/L)

Contaminant	Marine Water
Metals	
Arsenic	13 [1]
Cadmium	8.2 [6 7]
Chromium (VI)	260.6 [6]
Copper	1.3
Lead	147.3 [6]
Mercury (inorganic)	0.4
Nickel	73.4 [6 7]
Zinc	83.9 [6]
BTEX	
Benzene	700
Toluene	180
Ethylbenzene	80
M-xylenes	75

Contaminant	Marine Water
PAH	
B(a)P TEQ	0.1 [2]
Naphthalene	70
Phenols	
Phenol	400
Pentachlorophenol	11 [3]
OCP	
DDT+DDE+DDD	0.0004 [2]
Aldrin and dieldrin	0.003 [2 4]
Chlordane	0.001 [2]
Endosulfan	0.01
Endrin	0.008
Heptachlor	0.0004 [2]
Methoxychlor	0.004 [2]
OPP	
Chlorpyrifos	0.009
PCB	
PCB	0.01 [3 5]
VOC	
Chloroform	370 [3]

Notes:

1. ANZG DGV for fresh water adopted in absence of marine water DGV
2. Where the contaminant does not have a % LOP, the 'unknown' LOP has been adopted
3. To account for the bioaccumulating nature of this toxicant, it is recommended that the 99% species protection level DGV is used for slightly to moderately
4. ANZG for aldrin has been adopted in the absence of dieldrin criteria.
5. ANZG for aroclor.
6. Calculated from average hardness value (476.2 mg/kg CaCO3)
7. To account for the bioaccumulating nature of this toxicant, it is recommended that the (99)% species protection level DGV is used for slightly to moderately disturbed systems

F3.3 Health Screening Levels for Vapour Intrusion

The HSL to evaluate potential vapour intrusion risks derived from NEPC (2013) are in Table 11.

Table 11: Groundwater Health Screening Levels for Vapour Intrusion (µg/L)

Contaminant	HSL-D
SAND	**2 m to <4 m**
Benzene	5000
Toluene	NL
Ethylbenzene	NL
Xylenes	NL
Naphthalene	NL
TRH F1	6000
TRH F2	NL

Notes: TRH F1 is TRH C_6-C_{10} minus BTEX

TRH F2 is TRH >C_{10}-C_{16} minus naphthalene

The solubility limit is defined as the groundwater concentration at which the water cannot dissolve any more of an individual chemical based on a petroleum mixture. The soil vapour that is in equilibrium with the groundwater will be at its maximum. If the derived groundwater HSL exceeds the water solubility limit, a soil vapour source concentration for a petroleum mixture could not exceed a level that would result in the maximum allowable vapour risk for the given scenario. For these scenarios, no HSL is presented for these chemicals and the HSL is shown as 'not limiting' or 'NL'.

F3.4 Groundwater Investigation Levels for Drinking Water

The GV for the drinking water derived from NHMRC, NRMMC (2016) are in Table 12.

Table 12: Groundwater Investigation Levels for Drinking Water (µg/L)

Contaminant	Guideline Value
Arsenic	10
Cadmium	2
Chromium (VI)	50
Copper	2000
Lead	10
Mercury (inorganic)	1
Nickel	20
BTEX	
Benzene	1
Toluene	800
Ethylbenzene	300
Total xylenes	600

Contaminant	Guideline Value
PAH	
B(a)P TEQ	0.01
OCP	
DDT+DDE+DDD	9 [a]
Aldrin and dieldrin	0.3
Chlordane	2
Endosulfan	20
Heptachlor	0.3

F4.0 References

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Appendix G

Summary Results Tables

G1: Summary of Laboratory Results for Soil Analysis

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Table G1: Summary of Previous Soil Laboratory Results (DP, 2017a)

				BTEX							VOC (detected)							Metals									Organochlorine Pesticides																					
				Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	Xylene Total	C6-C10 less BTEX (F1)	1,3,5-trimethyl benzene	1,2,4-trimethyl benzene	4-isopropyl toluene	n-butyl benzene	VOCs (Sum of +ve Dectections)	pH (aqueous extract)	Cation Exchange Capacity	Lead	Lead- TCLP	Arsenic	Cadmium	Chromium (VI)	Copper	Mercury	Nickel	Zinc	4,4-DDE	a-BHC	Aldrin	Aldrin + Dieldrin	b-BHC	Chlordane (cis)	Chlordane (trans)	d-BHC	DDD	DDT	DDT+DDE+DDD	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulphate	Endrin	Endrin aldehyde	g-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	pH Units	meq/100g	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Laboratory Reporting Limit (LRL)				0.2	1	0.5	2	1	1	25						0.1	0.1	1	0.03	4	0.4	1	1	0.1	1	1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NEPM 2013 HILs/HSLs D- Commercial/Industrial				430	27,000	99,000			81,000	26,000								1500		3000	900	3600	240,000	730	6000	400,000				45						3600					100			50		2500
NEPM 2013 Commercial/Industrial D Soil HSL for Vapour Intrusion, Sand 0-1m				3	NL	NL			230	260																																						
US EPA *Regional Screening Level Summary Table* , Industrial Soil, May 2016											12,000	240		58,000																																	
NEPM 2013 EILs/ESLs for Commercial/Industrial, Coarse/Sand 0-2m				75	165	135			180	215								1800		160		320	300		670	690									640													
NEPM 2013 Management Limits in Commercial/Industrial, Coarse Soil																																																
NSW 2014 General Solid Waste (CT1)				10	600	288			1000									100		100	20	100		4	40																								
NSW 2014 General Solid Waste (SCC1 and TCLP1)																		1500	5			1900		50	1050																								
ANZECC (1992) - For Natural Material				0.05-1		0.1-1												<2-200		0.2-30	0.04-2	0.5-110	1-190	0.001-0.1	2-400	2-180																							
Location	**Sample Depth**	**Sample Date**	**Srtata**																																													
BH1	0.25-0.3	27/02/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	28	-	7	<0.4	21	11	<0.1	2	7	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH2	0.5-0.6	27/02/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	18	-	12	<0.4	12	15	<0.1	2	15	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH3	0.2-0.4	28/02/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	7.7	19	130	0.05	10	<0.4	30	28	0.4	11	120	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH3	0.8-0.9	28/02/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	22	-	7	<0.4	22	11	<0.1	2	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	0.4-0.5	2/03/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	59	-	7	<0.4	19	6	<0.1	3	330	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH4	0.8-1.0	2/03/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	6.3	25	26	-	10	<0.4	18	9	<0.1	1	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH4	1.8-2.0	2/03/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	17	-	5	<0.4	9	22	<0.1	<1	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD2/020317 (intra)	1.8-2.0	2/03/2017	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	-	<4	<0.4	5	20	<0.1	<1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	0.3-0.4	1/03/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	10.5	91	59	-	<4	<0.4	11	36	<0.1	9	52	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH5	1.5-1.7	1/03/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	5.4	-	15	-	<4	<0.4	6	12	<0.1	<1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	2.2-2.3	1/03/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	16	-	<4	<0.4	7	120	<0.1	2	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH6	0.4-0.6	1/03/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	55	-	9	<0.4	20	17	<0.1	4	32	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BD2/010317 (intra)	0.4-0.6	1/03/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	170	0.07	9	<0.4	18	32	0.1	7	93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH7	0.1-0.2	24/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	44	-	7	<0.4	19	18	<0.1	5	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH8	0.12-0.3	24/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	900	0.73	6	<0.4	24	69	0.3	17	520	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH8	2.9-3.0	24/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	12	-	<4	<0.4	2	12	<0.1	<1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH8	14.9-14.95	24/05/2017	Natural (rock core)	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	15	-	4	<0.4	8	16	<0.1	10	54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH9	0.12-0.2	24/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	150	0.03	7	<0.4	21	21	0.2	5	210	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH9	0.4-0.5	24/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	24	-	7	<0.4	18	12	<0.1	2	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD2/240517 (intra)	0.4-0.5	24/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	21	-	6	<0.4	12	11	<0.1	2	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD2/240517 (inter)	0.4-0.5	24/05/2017	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	-	9	<1	16	11	<0.1	<2	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10	0.2-0.3	24/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	78	-	25	<0.4	32	14	<0.1	7	140	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH10	0.9-1.0	24/05/2017	Natural	<0.2	3	<0.5	<2	<1	<1	140	3	5	1	2	14	-	-	23	-	17	<0.4	11	14	<0.1	<1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10	1.9-2.0	24/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	140	3	6	1	2	12	7.4	6.4	14	-	<4	<0.4	5	19	<0.1	<1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10	2.6-2.7	24/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	6	-	<4	<0.4	2	8	<0.1	<1	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11	0.1-0.2	25/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	460	0.2	11	1	25	42	0.2	10	530	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BD1/250517 (intra)	0.1-0.2	25/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	390	-	18	1	29	53	0.1	11	360	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH11	1.9-2.0	25/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	16	-	16	<0.4	6	11	<0.1	<1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12	0.3-0.4	23/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	100	<0.03	11	<0.4	27	240	0.2	9	220	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12	0.9-1.0	23/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	17	-	8	<0.4	13	9	<0.1	<1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13	0.15-0.25	3/06/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	150	0.1	8	<0.4	18	22	<0.1	16	150	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH13	0.25-0.3	3/06/2017	Filling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13	0.4-0.5	3/06/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	37	-	11	<0.4	16	28	<0.1	4	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13	1.4-1.5	3/06/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	22	-	10	<0.4	29	16	<0.1	3	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14	0.4-0.5	3/06/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	480	0.07	54	1	27	62	0.2	16	590	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BD1/030617 (intra)	0.4-0.5	3/06/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	320	-	14	2	12	45	<0.1	13	330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14	1.4-1.5	3/06/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	20	-	<4	<0.4	11	9	<0.1	<1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15	0.3-0.4	23/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	120	0.04	4	<0.4	14	64	<0.1	14	84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15	0.4-0.5	23/05/2017	Natrual	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-			23	-	6	<0.4	11	9	<0.1	<1	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD2/230517 (intra)	0.4-0.5	23/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-			22	-	15	<0.4	14	12	<0.1	<1	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD2/230517 (inter)	0.4-0.5	23/05/2017	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	-	7	<1	12	12	<0.1	<2	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15	1.9-2.0	23/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	16	-	5	<0.4	5	26	<0.1	2	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH16	0.25-0.4	23/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	750	2	7	<0.4	20	16	<0.1	4	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17	0.25-0.3	23/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	22	-	9	<0.4	23	13	<0.1	4	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17	1.9-2.0	23/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-			16	-	4	<0.4	4	23	<0.1	5	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17A	6.0-6.1	26/05/2017	Natural (rock core)	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	21	-	5	<0.4	7	35	<0.1	23	95	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18	0.17-0.25	23/05/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	44	-	6	<0.4	19	11	<0.1	4	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18	0.4-0.5	23/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	18	-	9	<0.4	21	6	<0.1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD1/230517 (intra)	0.4-0.5	23/05/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	20	-	11	<0.4	20	11	<0.1	2	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BD1/230517 (inter)	0.4-0.5	23/05/2017	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	-	13	<1	22	8	<0.1	<2	<5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19	0.4-0.5	3/06/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	73	-	12	<0.4	31	17	<0.1	13	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19	0.7-0.8	3/06/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	150	0.07	9	<0.4	27	24	0.2	7	110	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH20	0.2-0.3	3/06/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	80	-	<4	<0.4	15	59	<0.1	11	69	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
BH21	0.18-0.25	3/06/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	110	<0.03	5	<0.4	33	66	<0.1	24	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21	0.4-0.5	3/06/2017	Filling	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	49	-	9	<0.4	21	11	0.1	4	87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21	0.9-1.0	3/06/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	20	-	9	<0.4	24	27	<0.1	3	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH21	1.4-1.5	3/06/2017	Natural	<0.2	<1	<0.5	<2	<1	<1	<25	-	-	-	-	-	-	-	17	-	6	<0.4	8	13	<0.1	<1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A01	Surface/Sth Fence	2/06/2017	Material	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	-	23/05/2017	Soil	101%	102%	96%	100%	106%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Blank	-	23/05/2017	Soil	<0.2	<1	<0.5	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: TRH PQL adopted as initial screening criteria for natural soils/rock.

Douglas Partners

Table G1: Summary of Previous Soil Laboratory Results (DP, 2017a)

				Organophosphorous Pesticides								PAH																				Phenolics	Polychlorinated Biphenyls							TRH									Asbestos	
				Bromophos-ethyl	Chlorpyrifos	Chlorpyrifos-methyl	Diazinon	Dimethoate	Ethion	Malathion	Ronnel	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a) pyrene	Benzo(a) pyrene TEQ	Benzo(a) pyrene - TCLP	Benzo(b,j&k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Naphthalene	PAHs (Sum of +'ve Dectections)	PAHs TCLP (Sum of +'ve Dectections)	Phenanthrene	Pyrene	Phenolics Total	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	C10-C16	C16-C34	C34-C40	F2-NAPHTHALENE	C6 - C9	C10 - C14	C15 - C28	C29-C36	>C10 - C40 (Sum of total)	C6-C10	Asbestos ID- Material	Asbestos Screening
				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	-	g/kg
Laboratory Reporting Limit (LRL)				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	0.5	0.001	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05	-	0.1	0.1	5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	50	100	100	50	25	50	100	100	250	25	-	0.1
NEPM 2013 HILs/HSLs D- Commercial/Industrial					2000												40									11,000	4000												27,000	38,000	20,000							AD	0.1
NEPM 2013 Commercial/Industrial D Soil HSL for Vapour Intrusion, Sand 0-1m																										NL															NL									
US EPA *Regional Screening Level Summary Table* , Industrial Soil, May 2016				5800		8200	5700	160	410	16,000	58,000																																							
NEPM 2013 ELs/ESLs for Commercial/Industrial, Coarse/Sand 0-2m																1.4										370													1700	3300	170									
NEPM 2013 Management Limits in Commercial/Industrial, Coarse Soil																																						1000	3500	10,000						700			
NSW 2014 General Solid Waste (CT1)					4											0.8																										650				10,000				
NSW 2014 General Solid Waste (SCC1 and TCLP1)																10		0.04																																
ANZECC (1992) - For Natural Material																											0.95-5				0.03-0.5								LRL	LRL	LRL	LRL	LRL	LRL	LRL	LRL	LRL	LRL			
Location	**Sample Depth**	**Sample Date**	**Srtata**																																															
BH1	0.25-0.3	27/02/2017	Natural	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH2	0.5-0.6	27/02/2017	Natural	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH3	0.2-0.4	28/02/2017	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.2	<0.5	-	0.4	0.2	0.3	<0.1	0.5	<0.1	0.2	<0.1	2.9	-	0.2	0.5	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH3	0.8-0.9	28/02/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH4	0.4-0.5	2/03/2017	Natural	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH4	0.8-1.0	2/03/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH4	1.8-2.0	2/03/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BD2/020317 (intra)	1.8-2.0	2/03/2017	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH5	0.3-0.4	1/03/2017	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.7	0.77	1	-	1	0.5	0.6	<0.1	1.4	<0.1	0.5	<0.1	7.8	-	0.4	1.5	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH5	1.5-1.7	1/03/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH5	2.2-2.3	1/03/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH6	0.4-0.6	1/03/2017	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BD2/010317 (intra)	0.4-0.6	1/03/2017	Filling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH7	0.1-0.2	24/05/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH8	0.12-0.3	24/05/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	0.1	1.4	2.9	4	<0.001	4.4	1.5	1.3	0.3	1.9	<0.1	1.6	<0.1	18	0	0.6	2	-	-	-	-	-	-	-	-	<50	130	<100	<50	<25	<50	<100	110	<50	<25	-	<0.1
BH8	2.9-3.0	24/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH8	14.9-14.95	24/05/2017	Natural (rock core)	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	0.06	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.54	-	0.5	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH9	0.12-0.2	24/05/2017	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.8	1.2	1.6	<0.001	2	0.7	0.8	<0.1	1.87	<0.1	0.8	<0.1	11	0	1.3	1.6	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH9	0.4-0.5	24/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BD2/240517 (intra)	0.4-0.5	24/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BD2/240517 (inter)	0.4-0.5	24/05/2017	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10	0.2-0.3	24/05/2017	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.6	0.9	-	1	0.5	0.4	0.1	0.4	<0.1	0.5	<0.1	4.6	-	0.2	0.4	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH10	0.9-1.0	24/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	96	<100	<100	94	34	110	<100	<100	100	150	-	-
BH10	1.9-2.0	24/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	290	<100	<100	290	<25	<50	<100	<100	290	140	-	-
BH10	2.6-2.7	24/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH11	0.1-0.2	25/05/2017	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.6	0.8	-	1	0.4	0.4	<0.1	0.8	<0.1	0.4	<0.1	5.2	-	0.5	0.8	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BD1/250517 (intra)	0.1-0.2	25/05/2017	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.64	0.8	-	1	0.3	0.4	<0.1	0.8	<0.1	0.4	<0.1	5.3	-	0.4	0.8	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH11	1.9-2.0	25/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH12	0.3-0.4	23/05/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.2	0.3	<0.5	-	0.5	0.2	0.2	<0.1	0.4	<0.1	0.2	<0.1	2.8	-	0.3	0.4	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH12	0.9-1.0	23/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH13	0.15-0.25	3/06/2017	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.06	<0.5	-	<0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.3	-	<0.1	0.1	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH13	0.25-0.3	3/06/2017	Filling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.1
BH13	0.4-0.5	3/06/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	0.2	0.9	0.82	1.2	<0.001	1	0.5	1	0.1	1.7	<0.1	0.4	<0.1	9.2	0	0.4	1.8	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH13	1.4-1.5	3/06/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH14	0.4-0.5	3/06/2017	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.6	1.3	1.1	1.6	<0.001	2	0.6	1.3	0.1	3.5	<0.1	0.5	<0.1	17	0	2.2	3.2	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BD1/030617 (intra)	0.4-0.5	3/06/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.2	0.2	<0.5	-	0.3	<0.1	0.2	<0.1	0.4	<0.1	<0.1	<0.1	<0.05	-	0.3	0.4	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH14	1.4-1.5	3/06/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH15	0.3-0.4	23/05/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	0.2	0.6	0.8	1	<0.001	1	0.4	0.5	<0.1	1.1	<0.1	0.4	<0.1	7.2	0	0.7	1.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH15	0.4-0.5	23/05/2017	Natrual	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BD2/230517 (intra)	0.4-0.5	23/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25		-
BD2/230517 (inter)	0.4-0.5	23/05/2017	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15	1.9-2.0	23/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH16	0.25-0.4	23/05/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	0.1	<0.5	-	0.2	<0.1	0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.95	-	0.1	0.2	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH17	0.25-0.3	23/05/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH17	1.9-2.0	23/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH17A	6.0-6.1	26/05/2017	Natural (rock core)	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	0.1	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	-	<0.1	<0.1	-	-	-	-	-	-	-	-	84	<100	<100	84	<25	62	120	<100	80	<25	-	-
BH18	0.17-0.25	23/05/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH18	0.4-0.5	23/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BD1/230517 (intra)	0.4-0.5	23/05/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BD1/230517 (inter)	0.4-0.5	23/05/2017	Natural	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH19	0.4-0.5	3/06/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	-	0.2	<0.1	-	-	-	-	-	-	-	-	<50	260	<100	480	<25	250	490	<100	750	<25	-	<0.1
BH19	0.7-0.8	3/06/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	0.2	0.2	<0.5	-	0.5	0.2	0.3	<0.1	0.5	<0.1	0.2	<0.1	3	-	0.3	0.5	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	-
BH20	0.2-0.3	3/06/2017	Filling	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.6	1.6	1.5	2.2	<0.001	2.4	1	1.6	0.2	3.8	0.1	0.7	<0.1	20	0	2.2	3.7	<5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<50	130	<100	<50	<25	<50	100	100	130	<25	-	<0.1
BH21	0.18-0.25	3/06/2017	Filling	-	-	-	-	-	-	-	-	<0.1	0.2	0.2	0.6	0.78	1.2	-	1	0.6	0.7	0.1	1.3	<0.1	0.5	<0.1	7.9	-	0.5	1.3	-	-	-	-	-	-	-	-	<50	110	<100	<50	<25	<50	<100	100	110	<25	-	<0.1
BH21	0.4-0.5	3/06/2017	Filling	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	0.1	<0.5	-	<0.2	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	0.4	-	<0.1	0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
BH21	0.9-1.0	3/06/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	1700	560	<50	<25	<50	780	1200	2200	<25	-	-
BH21	1.4-1.5	3/06/2017	Natural	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	<0.05	<0.5	-	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	-	<0.1	<0.1	-	-	-	-	-	-	-	-	<50	<100	<100	<50	<25	<50	<100	<100	<50	<25	-	<0.1
A01	Surface/5th Fence	2/06/2017	Material	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NAD	-
Trip Spike	-	23/05/2017	Soil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Blank	-	23/05/2017	Soil	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: TRH PQL adopted as initial screening criteria for natural soils/rock.

G2: Summary of Laboratory Results for Water Analysis

Douglas Partners

Table G2: Summary of Previous Groundwater Laboratory Results (DP, 2017a)

			BTEX						VOC		Metals										PAH							TRH								
			Benzene	Ethylbenzene	Toluene	Xylene (m & p)	Xylene (o)	C6-C10 less BTEX (F1)	Chloroform	VOCs (Sum of total +ve)	Lead	Arsenic	Cadmium	Chromium (III+VI)	Copper	Mercury	Nickel	Zinc	All OCPs	All OPPs	Benzo(a) pyrene	Benzo(a) pyrene - TEQ	Naphthalene	PAHs (Sum of total +ve)	Total Phenolics	Total PCBs	C10-C16	C16-C34	C34-C40	F2-NAPHTHALENE	C6 - C9	C10 - C14	C15 - C28	C29-C36	Hardness
			µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mgCaCo3/L
PQL			1	1	1	2	1	10	1	-	1	1	0.1	1	1	0.05	1	1	0.001	0.01	0.01	0.05	0.02	-	0.05	0.01	0.05	0.1	0.1	0.05	10	50	100	100	3
NEPM 2013 Commercial HSL D GW for Vapour Intrusion, Sand 2-<4m			5000	NL	NL	-	-	6000	9	-	-	-	-	-	-	-	-	-	-	-	-	-	NL	-	-	-	-	-	-	1	-	-	-	-	-
ANZG DGV, 95% LOP Marine Waters			700	80	180	75 / 200 [h]	-	-	370	-	147.3 [b]	13 [c]	8.2 [b]	260.6 [b]	1.3	0.4	73.4 [b]	83.9 [b]	0.0004 [d]	0.009 [e]	-	-	50	-	11 [f]	0.01 [i]	-	-	-	-	-	-	-	-	-
ADWG 2022			1	300	800	600		-	-	-	10	10	2	50	2000	1	20	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Location	**Sample Depth**	**Sample Date**																																		
BH2	Mid column	13/03/2017	<1	<1	<1	<2	<1	<10	<1	0	<1	**1**	<0.1	<1	**3**	<0.05	**14**	**14**	-	-	<1	<5	<1	0	-	-	<50	<100	<100	<50	<10	<50	<100	<100	**180**
BH4	Mid column	2/06/2017	<1	<1	<1	<2	<1	<10	**2**	**2**	<1	**8**	<0.1	<1	**3**	<0.05	**35**	**8**	-	-	<0.1	<0.5	<0.2	0	<0.05	-	<50	<100	<100	<50	<10	<50	<100	<100	**1200**
BH6	Mid column	10/03/2017	<1	<1	<1	<2	<1	<10	<1	0	<1	**2**	<0.1	**1**	**25**	<0.05	**4**	**79**	<0.001	<0.004	<0.01	<0.05	<0.02	0	<0.05	<0.01	<50	<100	<100	<50	<10	<50	<100	<100	**11**
BH8	Mid column	2/06/2017	<1	<1	<1	<2	<1	<10	**2**	**2**	<1	**4**	<0.1	<1	**1**	<0.05	**6**	**10**	-	-	<0.1	<0.5	<0.2	0	<0.05	-	<50	<100	<100	<50	<10	<50	<100	<100	**400**
BD1/020617 [a]	Mid column	2/06/2017	<1	<1	<1	2	<1	<10	-	-	<1	**4**	<0.1	<1	<1	<0.05	**6**	**8**	-	-	<0.1	<0.5	<0.2	**0.26**	<0.05	-	<50	<100	<100	<50	<10	<50	<100	<100	-
BH11	Mid column	2/06/2017	<1	**4**	**3**	**23**	**23**	**180**	-	-	<1	**2**	<0.1	<1	**<1**	<0.05	**1**	**12**	-	-	-	-	-	-	-	-	-	-	-	-	**86**	-	-	-	-
BH17A	Mid column	2/06/2017	<1	<1	<1	<2	<1	<10	**9**	**9**	<1	**19**	<0.1	<1	**3**	<0.05	**39**	**25**	-	-	<0.1	<0.5	<0.2	0	<0.05	-	<50	<100	<100	<50	<10	<50	<100	<100	**590**
Trip Blank	-	10/03/2017	<1	<1	<1	<2	<1	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	-	10/03/2017	125%	125%	121%	130%	130%	<10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Blank	-	2/06/2017	<1	<1	<1	<2	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trip Spike	-	2/06/2017	90%	110%	98%	110%	115%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

PAH analysis for BH2 at higher detection due to limited sample volume; Sample analysis limited for BH11 due to limited sample volume

a	Laboratory replicate sample of sample listed directly above
b	Hardness Adjusted DGV (µg/L)
e	As(V) ANZG DGV for fesh water adopted in absence of marine water DGV
d	Threshold for aldrin as a conservative screen
e	Threshold for chlorpyrifos adopted as an initial screen
f	Threshold for pentachlorophenol as a conservative screen
g	ANZG DGV for fesh water adopted in absence of marine water DGV
h	m-xylene threshold of 75ug/L, p-xylene threshold of 200ug/L
i	99% LOP adopted due to the potential for bioaccumulation
j	Threshold for Aroclor 1242 as a conservative screen
-	No criteria or not tested
Italics	ANZG DGV of unknown reliability

Abbreviations

ADZG	Australian and New Zealand Guidelines for Freshwater and Marine Water Quality
BTEX	Benzene, toluene, ethyl benzene, total xylenes
DGV	Default guideline value
HSL	Health screening level
OCP	Organochlorine pesticides
OPP	Organophosphate pesticides
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PQL	Practical quantitation limit of laboratory reporting
TRH	Total recoverable hydrocarbons, including total petroleum hydrocarbons (TPH)
VOC	Volatile organic compounds

Appendix H

Laboratory Certificates of Analysis, Chain of Custody

and Sample Receipt Advice

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **162987**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden

Sample log in details:

Your Reference:	**85862, Croydon Contamination Testing**		
No. of samples:	12 soils		
Date samples received / completed instructions received	06/03/17	/	06/03/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	13/03/17	/	13/03/17
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Client Reference: 85862, Croydon Contamination Testing

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	162987-1	162987-2	162987-3	162987-4	162987-5
Your Reference	---------- -	BH1	BH2	BH3	BH3	BH4
Depth	----------	0.25-0.3	0.5-0.6	0.2-0.4	0.8-0.9	0.4-0.5
Date Sampled		27/02/2017	27/02/2017	28/02/2017	28/02/2017	2/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	08/03/2017	08/03/2017	08/03/2017	08/03/2017	08/03/2017
TRHC_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRHC_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	97	111	97	97	109

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	162987-6	162987-7	162987-8	162987-9	162987-10
Your Reference	---------- -	BH4	BH4	BH5	BH5	BH5
Depth	----------	1.8-2.0	0.8-1.0	0.3-0.4	1.5-1.7	2.2-2.3
Date Sampled		2/03/2017	2/03/2017	1/03/2017	1/03/2017	1/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	08/03/2017	08/03/2017	08/03/2017	08/03/2017	08/03/2017
TRHC_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRHC_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	111	100	101	97	106

Client Reference: 85862, Croydon Contamination Testing

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	162987-11	162987-12
Your Reference	---------- -	BH6	BH2/010317
Depth	----------	0.4-0.6	-
Date Sampled		1/03/2017	1/03/2017
Type of sample		Soil	Soil
Date extracted	-	07/03/2017	07/03/2017
Date analysed	-	08/03/2017	08/03/2017
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	94	94

Client Reference: 85862, Croydon Contamination Testing

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	162987-1	162987-2	162987-3	162987-4	162987-5
Your Reference	---------- -	BH1	BH2	BH3	BH3	BH4
Depth	----------	0.25-0.3	0.5-0.6	0.2-0.4	0.8-0.9	0.4-0.5
Date Sampled		27/02/2017	27/02/2017	28/02/2017	28/02/2017	2/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH>C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH>C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C_{16}-C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH>C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	97	93	92	92	92

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	162987-6	162987-7	162987-8	162987-9	162987-10
Your Reference	---------- -	BH4	BH4	BH5	BH5	BH5
Depth	----------	1.8-2.0	0.8-1.0	0.3-0.4	1.5-1.7	2.2-2.3
Date Sampled		2/03/2017	2/03/2017	1/03/2017	1/03/2017	1/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
TRH C_{10} - C_{14}	mg/kg	<50	<50	<50	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100	<100	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100	<100	<100	<100
TRH>C_{10}-C_{16}	mg/kg	<50	<50	<50	<50	<50
TRH>C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C_{16}-C_{34}	mg/kg	<100	<100	<100	<100	<100
TRH>C_{34}-C_{40}	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	92	91	90	91	89

Client Reference: 85862, Croydon Contamination Testing

svTRH (C10-C40) in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	 162987-11 BH6 0.4-0.6 1/03/2017 Soil	 162987-12 BH2/010317 - 1/03/2017 Soil
Date extracted	-	07/03/2017	07/03/2017
Date analysed	-	07/03/2017	07/03/2017
TRH C_{10} - C_{14}	mg/kg	<50	<50
TRH C_{15} - C_{28}	mg/kg	<100	<100
TRH C_{29} - C_{36}	mg/kg	<100	<100
TRH>C_{10}-C_{16}	mg/kg	<50	<50
TRH>C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50	<50
TRH>C_{16}-C_{34}	mg/kg	<100	<100
TRH>C_{34}-C_{40}	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	90	90

Client Reference: 85862, Croydon Contamination Testing

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	162987-1 BH1 0.25-0.3 27/02/2017 Soil	162987-2 BH2 0.5-0.6 27/02/2017 Soil	162987-3 BH3 0.2-0.4 28/02/2017 Soil	162987-4 BH3 0.8-0.9 28/02/2017 Soil	162987-5 BH4 0.4-0.5 2/03/2017 Soil
Date extracted	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	0.5	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	0.5	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.3	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	0.4	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.2	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.2	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	2.9	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	109	107	103	108	113

Client Reference: 85862, Croydon Contamination Testing

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	162987-6 BH4 1.8-2.0 2/03/2017 Soil	162987-7 BH4 0.8-1.0 2/03/2017 Soil	162987-8 BH5 0.3-0.4 1/03/2017 Soil	162987-9 BH5 1.5-1.7 1/03/2017 Soil	162987-10 BH5 2.2-2.3 1/03/2017 Soil
Date extracted	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	1.4	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	1.5	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.7	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.6	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	1	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	0.77	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.5	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.5	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	1.0	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	1.0	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	1.0	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	7.8	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	105	111	96	104	104

Client Reference: 85862, Croydon Contamination Testing

PAHs in Soil		
Our Reference:	UNITS	162987-11
Your Reference	----------	BH6
	-	
Depth	----------	0.4-0.6
Date Sampled		1/03/2017
Type of sample		Soil
Date extracted	-	07/03/2017
Date analysed	-	07/03/2017
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo(a)anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2
Benzo(a)pyrene	mg/kg	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total +ve PAH's	mg/kg	<0.05
Surrogate p-Terphenyl-d14	%	101

Client Reference: 85862, Croydon Contamination Testing

Organochlorine Pesticides in soil						
Our Reference:	UNITS	162987-1	162987-2	162987-3	162987-5	162987-8
Your Reference	----------	BH1	BH2	BH3	BH4	BH5
	-					
Depth	----------	0.25-0.3	0.5-0.6	0.2-0.4	0.4-0.5	0.3-0.4
Date Sampled		27/02/2017	27/02/2017	28/02/2017	2/03/2017	1/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	96	96	97	95

Client Reference: 85862, Croydon Contamination Testing

Organochlorine Pesticides in soil		
Our Reference:	UNITS	162987-11
Your Reference	----------	BH6
	-	
Depth	----------	0.4-0.6
Date Sampled		1/03/2017
Type of sample		Soil
Date extracted	-	07/03/2017
Date analysed	-	07/03/2017
HCB	mg/kg	<0.1
alpha-BHC	mg/kg	<0.1
gamma-BHC	mg/kg	<0.1
beta-BHC	mg/kg	<0.1
Heptachlor	mg/kg	<0.1
delta-BHC	mg/kg	<0.1
Aldrin	mg/kg	<0.1
Heptachlor Epoxide	mg/kg	<0.1
gamma-Chlordane	mg/kg	<0.1
alpha-chlordane	mg/kg	<0.1
Endosulfan I	mg/kg	<0.1
pp-DDE	mg/kg	<0.1
Dieldrin	mg/kg	<0.1
Endrin	mg/kg	<0.1
pp-DDD	mg/kg	<0.1
Endosulfan II	mg/kg	<0.1
pp-DDT	mg/kg	<0.1
Endrin Aldehyde	mg/kg	<0.1
Endosulfan Sulphate	mg/kg	<0.1
Methoxychlor	mg/kg	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1
Surrogate TCMX	%	126

Client Reference: 85862, Croydon Contamination Testing

Organophosphorus Pesticides						
Our Reference:	UNITS	162987-1	162987-2	162987-3	162987-5	162987-8
Your Reference	---------- -	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.25-0.3	0.5-0.6	0.2-0.4	0.4-0.5	0.3-0.4
Date Sampled		27/02/2017	27/02/2017	28/02/2017	2/03/2017	1/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	96	96	97	95

Organophosphorus Pesticides		
Our Reference:	UNITS	162987-11
Your Reference	---------- -	BH6
Depth	----------	0.4-0.6
Date Sampled		1/03/2017
Type of sample		Soil
Date extracted	-	07/03/2017
Date analysed	-	07/03/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1
Bromophos-ethyl	mg/kg	<0.1
Chlorpyriphos	mg/kg	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1
Diazinon	mg/kg	<0.1
Dichlorvos	mg/kg	<0.1
Dimethoate	mg/kg	<0.1
Ethion	mg/kg	<0.1
Fenitrothion	mg/kg	<0.1
Malathion	mg/kg	<0.1
Parathion	mg/kg	<0.1
Ronnel	mg/kg	<0.1
Surrogate TCMX	%	126

Client Reference: 85862, Croydon Contamination Testing

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	162987-1 BH1 0.25-0.3 27/02/2017 Soil	162987-2 BH2 0.5-0.6 27/02/2017 Soil	162987-3 BH3 0.2-0.4 28/02/2017 Soil	162987-5 BH4 0.4-0.5 2/03/2017 Soil	162987-8 BH5 0.3-0.4 1/03/2017 Soil
Date extracted	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	96	96	96	97	95

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	162987-11 BH6 0.4-0.6 1/03/2017 Soil
Date extracted	-	07/03/2017
Date analysed	-	07/03/2017
Aroclor 1016	mg/kg	<0.1
Aroclor 1221	mg/kg	<0.1
Aroclor 1232	mg/kg	<0.1
Aroclor 1242	mg/kg	<0.1
Aroclor 1248	mg/kg	<0.1
Aroclor 1254	mg/kg	<0.1
Aroclor 1260	mg/kg	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1
Surrogate TCLMX	%	126

Client Reference: 85862, Croydon Contamination Testing

Acid Extractable metals in soil						
Our Reference:	UNITS	162987-1	162987-2	162987-3	162987-4	162987-5
Your Reference	---------- -	BH1	BH2	BH3	BH3	BH4
Depth	----------	0.25-0.3	0.5-0.6	0.2-0.4	0.8-0.9	0.4-0.5
Date Sampled		27/02/2017	27/02/2017	28/02/2017	28/02/2017	2/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	08/03/2017	08/03/2017	08/03/2017	08/03/2017	08/03/2017
Arsenic	mg/kg	7	12	10	7	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	21	12	30	22	19
Copper	mg/kg	11	15	28	11	6
Lead	mg/kg	28	18	130	22	59
Mercury	mg/kg	<0.1	<0.1	0.4	<0.1	<0.1
Nickel	mg/kg	2	2	11	2	3
Zinc	mg/kg	7	15	120	16	330

Acid Extractable metals in soil						
Our Reference:	UNITS	162987-6	162987-7	162987-8	162987-9	162987-10
Your Reference	---------- -	BH4	BH4	BH5	BH5	BH5
Depth	----------	1.8-2.0	0.8-1.0	0.3-0.4	1.5-1.7	2.2-2.3
Date Sampled		2/03/2017	2/03/2017	1/03/2017	1/03/2017	1/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	08/03/2017	08/03/2017	08/03/2017	08/03/2017	08/03/2017
Arsenic	mg/kg	5	10	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	9	18	11	6	7
Copper	mg/kg	22	9	36	12	120
Lead	mg/kg	17	26	59	15	16
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	1	9	<1	2
Zinc	mg/kg	24	10	52	6	62

Client Reference: 85862, Croydon Contamination Testing

Acid Extractable metals in soil			
Our Reference:	UNITS	162987-11	162987-12
Your Reference	---------- -	BH6	BH2/010317
Depth	----------	0.4-0.6	-
Date Sampled		1/03/2017	1/03/2017
Type of sample		Soil	Soil
Date prepared	-	07/03/2017	07/03/2017
Date analysed	-	08/03/2017	08/03/2017
Arsenic	mg/kg	9	9
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	20	18
Copper	mg/kg	17	32
Lead	mg/kg	55	170
Mercury	mg/kg	<0.1	0.1
Nickel	mg/kg	4	7
Zinc	mg/kg	32	93

Client Reference: 85862, Croydon Contamination Testing

Misc Soil - Inorg						
Our Reference:	UNITS	162987-1	162987-2	162987-3	162987-5	162987-8
Your Reference	---------- -	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.25-0.3	0.5-0.6	0.2-0.4	0.4-0.5	0.3-0.4
Date Sampled		27/02/2017	27/02/2017	28/02/2017	2/03/2017	1/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Misc Soil - Inorg		
Our Reference:	UNITS	162987-11
Your Reference	---------- -	BH6
Depth	----------	0.4-0.6
Date Sampled		1/03/2017
Type of sample		Soil
Date prepared	-	07/03/2017
Date analysed	-	07/03/2017
Total Phenolics (as Phenol)	mg/kg	<5

Client Reference: 85862, Croydon Contamination Testing

Misc Inorg - Soil				
Our Reference:	UNITS	162987-3	162987-7	162987-8
Your Reference	---------- -	BH3	BH4	BH5
Depth	----------	0.2-0.4	0.8-1.0	0.3-0.4
Date Sampled		28/02/2017	2/03/2017	1/03/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	09/03/2017	09/03/2017	09/03/2017
Date analysed	-	09/03/2017	09/03/2017	09/03/2017
pH 1:5 soil:water	pH Units	7.7	6.3	10.5
Electrical Conductivity 1:5 soil:water	µS/cm	130	330	300
Chloride, Cl 1:5 soil:water	mg/kg	87	250	22
Sulphate, SO4 1:5 soil:water	mg/kg	76	160	280

Client Reference: 85862, Croydon Contamination Testing

Moisture						
Our Reference:	UNITS	162987-1	162987-2	162987-3	162987-4	162987-5
Your Reference	---------- -	BH1	BH2	BH3	BH3	BH4
Depth	----------	0.25-0.3	0.5-0.6	0.2-0.4	0.8-0.9	0.4-0.5
Date Sampled		27/02/2017	27/02/2017	28/02/2017	28/02/2017	2/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	08/03/2017	08/03/2017	08/03/2017	08/03/2017	08/03/2017
Moisture	%	26	16	19	22	20

Moisture						
Our Reference:	UNITS	162987-6	162987-7	162987-8	162987-9	162987-10
Your Reference	---------- -	BH4	BH4	BH5	BH5	BH5
Depth	----------	1.8-2.0	0.8-1.0	0.3-0.4	1.5-1.7	2.2-2.3
Date Sampled		2/03/2017	2/03/2017	1/03/2017	1/03/2017	1/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	07/03/2017	07/03/2017	07/03/2017	07/03/2017	07/03/2017
Date analysed	-	08/03/2017	08/03/2017	08/03/2017	08/03/2017	08/03/2017
Moisture	%	13	23	21	15	12

Moisture			
Our Reference:	UNITS	162987-11	162987-12
Your Reference	---------- -	BH6	BH2/010317
Depth	----------	0.4-0.6	-
Date Sampled		1/03/2017	1/03/2017
Type of sample		Soil	Soil
Date prepared	-	07/03/2017	07/03/2017
Date analysed	-	08/03/2017	08/03/2017
Moisture	%	19	21

Client Reference: 85862, Croydon Contamination Testing

Asbestos ID - soils						
Our Reference:	UNITS	162987-1	162987-2	162987-3	162987-5	162987-8
Your Reference	---------- -	BH1	BH2	BH3	BH4	BH5
Depth	----------	0.25-0.3	0.5-0.6	0.2-0.4	0.4-0.5	0.3-0.4
Date Sampled		27/02/2017	27/02/2017	28/02/2017	2/03/2017	1/03/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	9/03/2017	9/03/2017	9/03/2017	9/03/2017	9/03/2017
Sample mass tested	g	Approx. 35g	Approx. 25g	Approx. 40g	Approx. 30g	Approx. 35g
Sample Description	-	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Brown fine-grained soil & rocks	Grey fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils		
Our Reference:	UNITS	162987-11
Your Reference	---------- -	BH6
Depth	----------	0.4-0.6
Date Sampled		1/03/2017
Type of sample		Soil
Date analysed	-	9/03/2017
Sample mass tested	g	Approx. 40g
Sample Description	-	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected
Trace Analysis	-	No asbestos detected

Client Reference: 85862, Croydon Contamination Testing

CEC Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	162987-3 BH3 0.2-0.4 28/02/2017 Soil	162987-7 BH4 0.8-1.0 2/03/2017 Soil	162987-8 BH5 0.3-0.4 1/03/2017 Soil
Date prepared	-	13/03/2017	13/03/2017	13/03/2017
Date analysed	-	13/03/2017	13/03/2017	13/03/2017
Exchangeable Ca	meq/100g	17	4.9	89
Exchangeable K	meq/100g	0.5	0.2	1.1
Exchangeable Mg	meq/100g	1.7	17	0.59
Exchangeable Na	meq/100g	<0.1	2.9	0.39
Cation Exchange Capacity	meq/100g	19	25	91

Client Reference: 85862, Croydon Contamination Testing

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.

Client Reference: 85862, Croydon Contamination Testing

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Alternatively determined by colourimetry/turbidity using Discrete Analyer.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.

Client Reference: 85862, Croydon Contamination Testing

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Date analysed	-			08/03/2017	162987-1	08/03/2017 || 08/03/2017	LCS-1	08/03/2017
TRHC_6 - C_9	mg/kg	25	Org-016	<25	162987-1	<25 || <25	LCS-1	109%
TRHC_6 - C_{10}	mg/kg	25	Org-016	<25	162987-1	<25 || <25	LCS-1	109%
Benzene	mg/kg	0.2	Org-016	<0.2	162987-1	<0.2 || <0.2	LCS-1	80%
Toluene	mg/kg	0.5	Org-016	<0.5	162987-1	<0.5 || <0.5	LCS-1	108%
Ethylbenzene	mg/kg	1	Org-016	<1	162987-1	<1 || <1	LCS-1	118%
m+p-xylene	mg/kg	2	Org-016	<2	162987-1	<2 || <2	LCS-1	120%
o-Xylene	mg/kg	1	Org-016	<1	162987-1	<1 || <1	LCS-1	124%
naphthalene	mg/kg	1	Org-014	<1	162987-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	103	162987-1	97 || 106 || RPD: 9	LCS-1	99%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Date analysed	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
TRHC_{10} - C_{14}	mg/kg	50	Org-003	<50	162987-1	<50 || <50	LCS-1	126%
TRHC_{15} - C_{28}	mg/kg	100	Org-003	<100	162987-1	<100 || <100	LCS-1	119%
TRHC_{29} - C_{36}	mg/kg	100	Org-003	<100	162987-1	<100 || <100	LCS-1	91%
TRH>C_{10}-C_{16}	mg/kg	50	Org-003	<50	162987-1	<50 || <50	LCS-1	126%
TRH>C_{16}-C_{34}	mg/kg	100	Org-003	<100	162987-1	<100 || <100	LCS-1	119%
TRH>C_{34}-C_{40}	mg/kg	100	Org-003	<100	162987-1	<100 || <100	LCS-1	91%
Surrogate o-Terphenyl	%		Org-003	96	162987-1	97 || 96 || RPD: 1	LCS-1	95%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Date analysed	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	LCS-1	94%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	LCS-1	98%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	LCS-1	109%
Anthracene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	LCS-1	105%
Pyrene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	LCS-1	105%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	LCS-1	96%
Benzo(b,j +k)fluoranthene	mg/kg	0.2	Org-012	<0.2	162987-1	<0.2 || <0.2	[NR]	[NR]

Client Reference: 85862, Croydon Contamination Testing

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	162987-1	<0.05 || <0.05	LCS-1	105%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	110	162987-1	109 || 107 || RPD: 2	LCS-1	99%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Date analysed	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
HCB	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	LCS-1	88%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	LCS-1	88%
Heptachlor	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	LCS-1	79%
delta-BHC	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	LCS-1	85%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	LCS-1	84%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	LCS-1	90%
Dieldrin	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	LCS-1	100%
Endrin	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	LCS-1	82%
pp-DDD	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	LCS-1	89%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	LCS-1	70%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	96	162987-1	96 || 95 || RPD: 1	LCS-1	97%

Client Reference: 85862, Croydon Contamination Testing

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Date analysed	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	LCS-1	77%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	LCS-1	87%
Dimethoate	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	LCS-1	77%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	LCS-1	87%
Malathion	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	LCS-1	71%
Parathion	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	LCS-1	94%
Ronnel	mg/kg	0.1	Org-008	<0.1	162987-1	<0.1 || <0.1	LCS-1	70%
Surrogate TCMX	%		Org-008	96	162987-1	96 || 95 || RPD: 1	LCS-1	95%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Date analysed	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	162987-1	<0.1 || <0.1	LCS-1	102%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	162987-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	96	162987-1	96 || 95 || RPD: 1	LCS-1	95%

Client Reference: 85862, Croydon Contamination Testing

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Date analysed	-			08/03/2017	162987-1	08/03/2017 || 08/03/2017	LCS-1	08/03/2017
Arsenic	mg/kg	4	Metals-020	<4	162987-1	7 || 7 || RPD: 0	LCS-1	111%
Cadmium	mg/kg	0.4	Metals-020	<0.4	162987-1	<0.4 || <0.4	LCS-1	102%
Chromium	mg/kg	1	Metals-020	<1	162987-1	21 || 20 || RPD: 5	LCS-1	105%
Copper	mg/kg	1	Metals-020	<1	162987-1	11 || 11 || RPD: 0	LCS-1	104%
Lead	mg/kg	1	Metals-020	<1	162987-1	28 || 28 || RPD: 0	LCS-1	103%
Mercury	mg/kg	0.1	Metals-021	<0.1	162987-1	<0.1 || <0.1	LCS-1	93%
Nickel	mg/kg	1	Metals-020	<1	162987-1	2 || 2 || RPD: 0	LCS-1	96%
Zinc	mg/kg	1	Metals-020	<1	162987-1	7 || 8 || RPD: 13	LCS-1	104%

QUALITY CONTROL Misc Soil - Inorg	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Date analysed	-			07/03/2017	162987-1	07/03/2017 || 07/03/2017	LCS-1	07/03/2017
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	162987-1	<5 || <5	LCS-1	100%

QUALITY CONTROL Misc Inorg - Soil	UNITS	PQL	METHOD	Blank
Date prepared	-			09/03/2017
Date analysed	-			09/03/2017
pH 1:5 soil:water	pH Units		Inorg-001	[NT]
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10

QUALITY CONTROL CEC	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			13/03/2017	[NT]	[NT]	LCS-1	13/03/2017
Date analysed	-			13/03/2017	[NT]	[NT]	LCS-1	13/03/2017
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	101%
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	107%
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	110%
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	106%

Client Reference: 85862, Croydon Contamination Testing

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
Date analysed	-	162987-11	08/03/2017 || 08/03/2017	162987-2	08/03/2017
TRHC$_6$ - C$_9$	mg/kg	162987-11	<25 || <25	162987-2	106%
TRHC$_6$ - C$_{10}$	mg/kg	162987-11	<25 || <25	162987-2	106%
Benzene	mg/kg	162987-11	<0.2 || <0.2	162987-2	79%
Toluene	mg/kg	162987-11	<0.5 || <0.5	162987-2	107%
Ethylbenzene	mg/kg	162987-11	<1 || <1	162987-2	114%
m+p-xylene	mg/kg	162987-11	<2 || <2	162987-2	116%
o-Xylene	mg/kg	162987-11	<1 || <1	162987-2	117%
naphthalene	mg/kg	162987-11	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	162987-11	94 || 110 || RPD: 16	162987-2	95%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
Date analysed	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	162987-11	<50 || <50	162987-2	120%
TRHC$_{15}$ - C$_{28}$	mg/kg	162987-11	<100 || <100	162987-2	110%
TRHC$_{29}$ - C$_{36}$	mg/kg	162987-11	<100 || <100	162987-2	118%
TRH>C$_{10}$-C$_{16}$	mg/kg	162987-11	<50 || <50	162987-2	120%
TRH>C$_{16}$-C$_{34}$	mg/kg	162987-11	<100 || <100	162987-2	110%
TRH>C$_{34}$-C$_{40}$	mg/kg	162987-11	<100 || <100	162987-2	118%
Surrogate o-Terphenyl	%	162987-11	90 || 90 || RPD: 0	162987-2	93%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
Date analysed	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
Naphthalene	mg/kg	162987-11	<0.1 || <0.1	162987-2	82%
Acenaphthylene	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	162987-11	<0.1 || <0.1	162987-2	97%
Phenanthrene	mg/kg	162987-11	<0.1 || <0.1	162987-2	99%
Anthracene	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	162987-11	<0.1 || 0.2	162987-2	99%
Pyrene	mg/kg	162987-11	<0.1 || 0.2	162987-2	102%
Benzo(a)anthracene	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	162987-11	<0.1 || <0.1	162987-2	90%
Benzo(b,j+k)fluoranthene	mg/kg	162987-11	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	162987-11	<0.05 || 0.05	162987-2	104%
Indeno(1,2,3-c,d)pyrene	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]

Client Reference: 85862, Croydon Contamination Testing

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Benzo(g,h,i)perylene	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	162987-11	101 || 102 || RPD: 1	162987-2	99%
QUALITY CONTROL Organochlorine Pesticides in soil	**UNITS**	**Dup. Sm#**	**Duplicate Base + Duplicate + %RPD**	**Spike Sm#**	**Spike % Recovery**
Date extracted	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
Date analysed	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
HCB	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	162987-11	<0.1 || <0.1	162987-2	93%
gamma-BHC	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	162987-11	<0.1 || <0.1	162987-2	91%
Heptachlor	mg/kg	162987-11	<0.1 || <0.1	162987-2	83%
delta-BHC	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	162987-11	<0.1 || <0.1	162987-2	91%
Heptachlor Epoxide	mg/kg	162987-11	<0.1 || <0.1	162987-2	89%
gamma-Chlordane	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	162987-11	<0.1 || <0.1	162987-2	96%
Dieldrin	mg/kg	162987-11	<0.1 || <0.1	162987-2	106%
Endrin	mg/kg	162987-11	<0.1 || <0.1	162987-2	86%
pp-DDD	mg/kg	162987-11	<0.1 || <0.1	162987-2	95%
Endosulfan II	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	162987-11	<0.1 || <0.1	162987-2	74%
Methoxychlor	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%	162987-11	126 || 107 || RPD: 16	162987-2	100%

Client Reference: 85862, Croydon Contamination Testing

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
Date analysed	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
Azinphos-methyl (Guthion)	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	162987-11	<0.1 || <0.1	162987-2	74%
Chlorpyriphos-methyl	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	162987-11	<0.1 || <0.1	162987-2	90%
Dimethoate	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	162987-11	<0.1 || <0.1	162987-2	82%
Fenitrothion	mg/kg	162987-11	<0.1 || <0.1	162987-2	92%
Malathion	mg/kg	162987-11	<0.1 || <0.1	162987-2	64%
Parathion	mg/kg	162987-11	<0.1 || <0.1	162987-2	97%
Ronnel	mg/kg	162987-11	<0.1 || <0.1	162987-2	75%
Surrogate TCMX	%	162987-11	126 || 107 || RPD: 16	162987-2	96%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
Date analysed	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
Aroclor 1016	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	162987-11	<0.1 || <0.1	162987-2	105%
Aroclor 1260	mg/kg	162987-11	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%	162987-11	126 || 107 || RPD: 16	162987-2	96%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	162987-11	07/03/2017 || 07/03/2017	162987-2	07/03/2017
Date analysed	-	162987-11	08/03/2017 || 08/03/2017	162987-2	08/03/2017
Arsenic	mg/kg	162987-11	9 || 9 || RPD: 0	162987-2	90%
Cadmium	mg/kg	162987-11	<0.4 || <0.4	162987-2	95%
Chromium	mg/kg	162987-11	20 || 21 || RPD: 5	162987-2	94%
Copper	mg/kg	162987-11	17 || 14 || RPD: 19	162987-2	101%
Lead	mg/kg	162987-11	55 || 44 || RPD: 22	162987-2	90%
Mercury	mg/kg	162987-11	<0.1 || <0.1	162987-2	107%
Nickel	mg/kg	162987-11	4 || 5 || RPD: 22	162987-2	90%
Zinc	mg/kg	162987-11	32 || 33 || RPD: 3	162987-2	88%

Client Reference: 85862, Croydon Contamination Testing

QUALITY CONTROL Misc Soil - Inorg	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	162987-2	07/03/2017
Date analysed	-	[NT]	[NT]	162987-2	07/03/2017
Total Phenolics (as Phenol)	mg/kg	[NT]	[NT]	162987-2	100%

QUALITY CONTROL CEC	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	162987-3	13/03/2017 || 13/03/2017
Date analysed	-	162987-3	13/03/2017 || 13/03/2017
Exchangeable Ca	meq/100 g	162987-3	17 || 16 || RPD: 6
Exchangeable K	meq/100 g	162987-3	0.5 || 0.5 || RPD: 0
Exchangeable Mg	meq/100 g	162987-3	1.7 || 1.6 || RPD: 6
Exchangeable Na	meq/100 g	162987-3	<0.1 || <0.1

Client Reference: **85862, Croydon Contamination Testing**

Report Comments:

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.
Note: Samples requested for asbestos testing were sub-sampled from bags provided by the client.

Asbestos ID was analysed by Approved Identifier:	Paul Ching
Asbestos ID was authorised by Approved Signatory:	Paul Ching

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Client Reference: 85862, Croydon Contamination Testing

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Aileen Hie

From: David Holden <David.Holden@douglaspartners.com.au>
Sent: Wednesday, 8 March 2017 6:56 PM
To: Aileen Hie
Subject: RE: Sample Receipt for 162987 85862, Croydon Contamination Testing
Attachments: 162987-coc.pdf

Hi Aileen,

Could I request that you add pH, EC, sulphate and chloride analysis to sample 9 (BH 5- 1.5-1.7).

Thanks

Dave

Envirolab Ref: 162987A
Date: 15/3/17
Std 7 TA.

David Holden | Associate/Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 8878 0652 | F: 02 9809 4095 | M: 0414 768 997 | E: David.Holden@douglaspartners.com.au

FINANCIAL REVIEW
CLIENT CHO
WINNER

This email is confidential. If you are not the intended recipient, please notify us immediately and be aware that any disclosure, copying, distribution or use of the contents of this information is prohibited. Please note that the company does not make any commitment through emails not confirmed by fax or letter.

From: Aileen Hie [mailto:AHie@envirolab.com.au]
Sent: Monday, 6 March 2017 5:31 PM
To: David Holden
Subject: Sample Receipt for 162987 85862, Croydon Contamination Testing

Please refer to attached for a copy of your COC and our Sample Receipt Advice (SRA).
Please open and read the SRA as it contains important information.
Please let the lab know immediately if there are any issues.

Results will be available by 6.30pm on the date indicated.

PLEASE NOTE COMBO PRICES WILL ONLY APPLY IF COMBOS ARE SELECTED ON COC.

The new 2016-2017 Price List commences 1st November 2015 - please contact us if you don't have a copy.

Please note that subcontracted testing or non routine testing may take significantly longer than just the standard 5 day TAT, contact the lab to get an approximate due date.

Enquiries should be made directly to:

customerservice@envirolab.com.au

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **162987-A**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden

Sample log in details:

Your Reference:	**85862, Croydon Contamination Testing**
No. of samples:	Additional Testing on 1 Soil
Date samples received / completed instructions received	06/03/17 / 08/03/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	15/03/17 / 15/03/17
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Client Reference: 85862, Croydon Contamination Testing

Misc Inorg - Soil		
Our Reference:	UNITS	162987-A-9
Your Reference	---------- -	BH5
Depth	----------	1.5-1.7
Date Sampled		1/03/2017
Type of sample		Soil
Date prepared	-	14/03/2017
Date analysed	-	14/03/2017
pH 1:5 soil:water	pH Units	5.4
Electrical Conductivity 1:5 soil:water	µS/cm	100
Chloride, Cl 1:5 soil:water	mg/kg	60
Sulphate, SO4 1:5 soil:water	mg/kg	46

Client Reference: 85862, Croydon Contamination Testing

Method ID	Methodology Summary
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Inorg-002	Conductivity and Salinity - measured using a conductivity cell at 25°C in accordance with APHA latest edition 2510 and Rayment & Lyons.
Inorg-081	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA latest edition, 4110-B. Alternatively determined by colourimetry/turbidity using Discrete Analyer.

Client Reference: 85862, Croydon Contamination Testing

QUALITY CONTROL Misc Inorg - Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			14/03/2017	[NT]	[NT]	LCS-1	14/03/2017
Date analysed	-			14/03/2017	[NT]	[NT]	LCS-1	14/03/2017
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-1	102%
Electrical Conductivity 1:5 soil:water	µS/cm	1	Inorg-002	<1	[NT]	[NT]	LCS-1	97%
Chloride, Cl 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	LCS-1	83%
Sulphate, SO4 1:5 soil:water	mg/kg	10	Inorg-081	<10	[NT]	[NT]	LCS-1	88%

Client Reference: **85862, Croydon Contamination Testing**

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Client Reference: 85862, Croydon Contamination Testing

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

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LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Aileen Hie

From: David Holden <David.Holden@douglaspartners.com.au>
Sent: Tuesday, 14 March 2017 9:01 AM
To: Aileen Hie
Subject: 162987 85862, Croydon Contamination Testing- TCLP Analysis

Hi Aileen,

Could I please get TCLP analysis for lead in the following samples (ELS job 162987):
- 162987-3 (BH3/0.2-0.4)
- 162987-12 (BH2/010317)

It would be appreciated if I could get these leached today due to holding times. Standard reporting time is fine.

Thanks

Dave

David Holden | Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 8878 0652 | F: 02 9809 4095 | M: 0414 768 997 | E: David.Holden@douglaspartners.com.au

This email is confidential. If you are not the intended recipient, please notify us immediately and be aware that any disclosure, copying, distribution or use of the contents of this information is prohibited. Please note that the company does not make any commitment through emails not confirmed by fax or letter.

Envirolab Ref: 162987 B
Due: 21/3/17
Std TIA.

-----Original Message-----
From: Nancy Zhang [mailto:NZhang@envirolab.com.au]
Sent: Monday, 13 March 2017 5:52 PM
To: David Holden
Subject: Results for Registration 162987 85862, Croydon Contamination Testing

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC
an excel file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
customerservice@envirolab.com.au

Regards

Envirolab Services
12 Ashley St Chatswood NSW 2067

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **162987-B**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden

Sample log in details:

Your Reference:	**85862, Croydon Contamination Testing**
No. of samples:	Additional Testing on 2 Soils
Date samples received / completed instructions received	06/03/17 / 14/03/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	21/03/17 / 15/03/17
Date of Preliminary Report:	Not Issued

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Results Approved By:

David Springer
General Manager

Client Reference: 85862, Croydon Contamination Testing

Metals in TCLP USEPA1311			
Our Reference:	UNITS	162987-B-3	162987-B-12
Your Reference	----------	BH3	BH2/010317
	-		
Depth	----------	0.2-0.4	-
Date Sampled		28/02/2017	1/03/2017
Type of sample		Soil	Soil
Date extracted	-	15/03/2017	15/03/2017
Date analysed	-	15/03/2017	15/03/2017
pH of soil for fluid# determ.	pH units	8.1	6.6
pH of soil TCLP (after HCl)	pH units	1.5	1.5
Extraction fluid used	-	1	1
pH of final Leachate	pH units	5.0	5.0
Lead in TCLP	mg/L	0.05	0.07

Client Reference: 85862, Croydon Contamination Testing

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

Client Reference: 85862, Croydon Contamination Testing

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/03/2017	[NT]	[NT]	LCS-W1	15/03/2017
Date analysed	-			15/03/2017	[NT]	[NT]	LCS-W1	15/03/2017
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	101%

Client Reference: **85862, Croydon Contamination Testing**

Report Comments:

Asbestos ID was analysed by Approved Identifier: Paul Ching
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NR: Test not required
<: Less than
PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than
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NA: Test not required
LCS: Laboratory Control Sample

Client Reference: 85862, Croydon Contamination Testing

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Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

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Measurement Uncertainty estimates are available for most tests upon request.

CHAIN OF CUSTODY

Douglas Partners
Geotechnics / Environment / Groundwater

Client: Douglas Partners	Project Number: 85862	To:	Envirolab Services
Contact Person: DIH	Project Name: Croydon- Contamination Testing	Contact Person:	Aileen Hie
Project Mgr: AK	PO No.:	Address:	12 Ashley Street
Sampler: JAP	lab Quote No. :		Chatswood NSW 2068
Address: 96 Hermitage Road	Date results required: std	Phone:	02 9910 6200
West Ryde NSW 2114		Fax:	02 9910 6201
	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	Email:	ahie@envirolab.com.au
Phone: 9809 0666 Mob:	Report format: esdat / PDF / Excel	Laboratory Report No:	
Email: david.holden @douglaspartners.com.au	Comments	Lab Comments:	
Prior Storage (Fride, Esky, Shelf)			

Sample information						Tests Required											Comments
Lab Sample ID	Field Sample ID	Depth	Date sampled	Container Type	Type of sample	combo 8a	combo 3	metals	TRH/Btex	pH	EC	Sulphate	chloride	CEC		Combo	Provide as much information about the sample as you can
1	BH1	0.25-0.3	27/2	Ziploc bag	Soil	✓											
2	BH2	0.5-0.6	27/2			✓											
3	BH3	0.2-0.4	28/2			✓				✓	✓	✓	✓	✓			
4	BH3	0.8-0.9	28/2				✓										
5	BH4	0.4-0.5	2/3			✓											
6	BH4	1.8-2.0	2/3				✓										
7	BH4	0.8-1.0	2/3				✓			✓	✓	✓	✓	✓			
8	BH5	0.3-0.4	1/3			✓				✓	✓	✓	✓	✓			
9	BH5	1.5-1.7	1/3				✓										
10	BH5	2.2-2.3	1/3				✓										
11	BH6	0.4-0.6	1/3			✓											
12	BD2/0	0317	1/3					✓	✓								

ENVIROLAB SERVICES
Envirolab Services
~~12 Ashley St~~
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 162987

Date Received: 06.03.17
Time Received: 12:30
Received by: N.R
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by: Douglas Partners	Sample Receipt	*Lab use only:*
Hand delivered / Courier (by whom) HUNTER	Received by (Company): ELS	Samples Received: Cool or Ambient (circle one)
Condition of Sample at dispatch Cool or Ambient (circle)	Print Name: Nicholas Roberts	Temperature Received at: (if applicable)
Temperature (if Applicable):	Date & Time: 06.03.17 12:30	Transported by: Hand delivered / courier
Print Name: D. Holden	Signature:	
Date & Time: 1/3/17 4:00		
Signature:		Page_____of _____

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **163474**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden

Sample log in details:

Your Reference:	**85862, Croydon**		
No. of samples:	4 waters		
Date samples received / completed instructions received	14/03/17	/	14/03/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	23/03/17	/	21/03/17
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Client Reference: 85862, Croydon

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	163474-1 BH2 13/03/2017 water	163474-2 BH6 10/03/2017 water
Date extracted	-	15/03/2017	15/03/2017
Date analysed	-	16/03/2017	16/03/2017
Dichlorodifluoromethane	µg/L	<10	<10
Chloromethane	µg/L	<10	<10
Vinyl Chloride	µg/L	<10	<10
Bromomethane	µg/L	<10	<10
Chloroethane	µg/L	<10	<10
Trichlorofluoromethane	µg/L	<10	<10
1,1-Dichloroethene	µg/L	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1
1,1-dichloroethane	µg/L	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1
Bromochloromethane	µg/L	<1	<1
Chloroform	µg/L	<1	<1
2,2-dichloropropane	µg/L	<1	<1
1,2-dichloroethane	µg/L	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1
1,1-dichloropropene	µg/L	<1	<1
Cyclohexane	µg/L	<1	<1
Carbon tetrachloride	µg/L	<1	<1
Benzene	µg/L	<1	<1
Dibromomethane	µg/L	<1	<1
1,2-dichloropropane	µg/L	<1	<1
Trichloroethene	µg/L	<1	<1
Bromodichloromethane	µg/L	<1	<1
trans-1,3-dichloropropene	µg/L	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1
Toluene	µg/L	<1	<1
1,3-dichloropropane	µg/L	<1	<1
Dibromochloromethane	µg/L	<1	<1
1,2-dibromoethane	µg/L	<1	<1
Tetrachloroethene	µg/L	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1
Chlorobenzene	µg/L	<1	<1
Ethylbenzene	µg/L	<1	<1
Bromoform	µg/L	<1	<1
m+p-xylene	µg/L	<2	<2
Styrene	µg/L	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1
o-xylene	µg/L	<1	<1

Client Reference: 85862, Croydon

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	163474-1 BH2 13/03/2017 water	163474-2 BH6 10/03/2017 water
1,2,3-trichloropropane	µg/L	<1	<1
Isopropylbenzene	µg/L	<1	<1
Bromobenzene	µg/L	<1	<1
n-propyl benzene	µg/L	<1	<1
2-chlorotoluene	µg/L	<1	<1
4-chlorotoluene	µg/L	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1
Tert-butyl benzene	µg/L	<1	<1
1,2,4-trimethyl benzene	µg/L	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1
Sec-butyl benzene	µg/L	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1
4-isopropyl toluene	µg/L	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1
n-butyl benzene	µg/L	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1
Hexachlorobutadiene	µg/L	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1
Surrogate Dibromofluoromethane	%	101	101
Surrogate toluene-d8	%	102	101
Surrogate 4-BFB	%	98	99

Client Reference: 85862, Croydon

vTRH(C6-C10)/BTEXN in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ---------- 	163474-1 BH2 13/03/2017 water	163474-2 BH6 10/03/2017 water	163474-3 Trip Spike/100317 10/03/2017 water	163474-4 Trip Blank/ 100317 10/03/2017 water
Date extracted	-	15/03/2017	15/03/2017	16/03/2017	16/03/2017
Date analysed	-	16/03/2017	16/03/2017	17/03/2017	17/03/2017
TRHC$_6$ - C$_9$	µg/L	<10	<10	[NA]	<10
TRHC$_6$ - C$_{10}$	µg/L	<10	<10	[NA]	<10
TRHC$_6$ - C$_{10}$ less BTEX (F1)	µg/L	<10	<10	[NA]	<10
Benzene	µg/L	<1	<1	125%	<1
Toluene	µg/L	<1	<1	121%	<1
Ethylbenzene	µg/L	<1	<1	125%	<1
m+p-xylene	µg/L	<2	<2	130%	<2
o-xylene	µg/L	<1	<1	130%	<1
Naphthalene	µg/L	<1	<1	[NA]	<1
Surrogate Dibromofluoromethane	%	101	101	101	103
Surrogate toluene-d8	%	102	101	99	95
Surrogate 4-BFB	%	98	99	107	98

Client Reference: 85862, Croydon

svTRH (C10-C40) in Water			
Our Reference:	UNITS	163474-1	163474-2
Your Reference	---------- -	BH2	BH6
Date Sampled	----------	13/03/2017	10/03/2017
Type of sample		water	water
Date extracted	-	16/03/2017	17/03/2017
Date analysed	-	17/03/2017	20/03/2017
TRH C_{10} - C_{14}	µg/L	<50	<50
TRH C_{15} - C_{28}	µg/L	<100	<100
TRH C_{29} - C_{36}	µg/L	<100	<100
TRH>C_{10} - C_{16}	µg/L	<50	<50
TRH>C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50
TRH>C_{16} - C_{34}	µg/L	<100	<100
TRH>C_{34} - C_{40}	µg/L	<100	<100
Surrogate o-Terphenyl	%	81	81

Client Reference: 85862, Croydon

PAHs in Water - Low Level		
Our Reference:	UNITS	163474-2
Your Reference	---------- -	BH6
Date Sampled	----------	10/03/2017
Type of sample		water
Date extracted	-	17/03/2017
Date analysed	-	19/03/2017
Naphthalene	µg/L	<0.02
Acenaphthylene	µg/L	<0.01
Acenaphthene	µg/L	<0.01
Fluorene	µg/L	<0.01
Phenanthrene	µg/L	<0.01
Anthracene	µg/L	<0.01
Fluoranthene	µg/L	<0.01
Pyrene	µg/L	<0.01
Benzo(a)anthracene	µg/L	<0.01
Chrysene	µg/L	<0.01
Benzo(b,j+k)fluoranthene	µg/L	<0.02
Benzo(a)pyrene	µg/L	<0.01
Indeno(1,2,3-c,d)pyrene	µg/L	<0.01
Dibenzo(a,h)anthracene	µg/L	<0.01
Benzo(g,h,i)perylene	µg/L	<0.01
Benzo(a)pyrene TEQ	µg/L	<0.05
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	92

Client Reference: 85862, Croydon

PAHs in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	 163474-1 BH2 13/03/2017 water
Date extracted	-	17/03/2017
Date analysed	-	17/03/2017
Naphthalene	µg/L	<1
Acenaphthylene	µg/L	<1
Acenaphthene	µg/L	<1
Fluorene	µg/L	<1
Phenanthrene	µg/L	<1
Anthracene	µg/L	<1
Fluoranthene	µg/L	<1
Pyrene	µg/L	<1
Benzo(a)anthracene	µg/L	<1
Chrysene	µg/L	<1
Benzo(b,j+k)fluoranthene	µg/L	<2
Benzo(a)pyrene	µg/L	<1
Indeno(1,2,3-c,d)pyrene	µg/L	<1
Dibenzo(a,h)anthracene	µg/L	<1
Benzo(g,h,i)perylene	µg/L	<1
Benzo(a)pyrene TEQ	µg/L	<5
Total +ve PAH's	µg/L	NIL (+)VE
Surrogate p-Terphenyl-d14	%	71

Client Reference: 85862, Croydon

OCP in water - Trace level Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	 163474-2 BH6 10/03/2017 water
Date extracted	-	17/03/2017
Date analysed	-	19/03/2017
HCB	µg/L	<0.001
alpha-BHC	µg/L	<0.001
gamma-BHC	µg/L	<0.001
beta-BHC	µg/L	<0.001
Heptachlor	µg/L	<0.001
delta-BHC	µg/L	<0.001
Aldrin	µg/L	<0.001
Heptachlor Epoxide	µg/L	<0.001
gamma-Chlordane	µg/L	<0.001
alpha-Chlordane	µg/L	<0.001
Endosulfan I	µg/L	<0.002
pp-DDE	µg/L	<0.001
Dieldrin	µg/L	<0.001
Endrin	µg/L	<0.001
pp-DDD	µg/L	<0.001
Endosulfan II	µg/L	<0.002
DDT	µg/L	<0.001
Endosulfan Sulphate	µg/L	<0.001
Methoxychlor	µg/L	<0.001
Mirex	µg/L	<0.002
Surrogate p-Terphenyl-d_{14}	%	92

Client Reference: 85862, Croydon

OP in water Trace ANZECCF/ADWG		
Our Reference:	UNITS	163474-2
Your Reference	---------- -	BH6
Date Sampled	----------	10/03/2017
Type of sample		water
Date extracted	-	17/03/2017
Date analysed	-	19/03/2017
Azinphos-methyl (Guthion)	µg/L	<0.01
Bromophos ethyl	µg/L	<0.01
Chlorpyriphos	µg/L	<0.009
Chlorpyriphos-methyl	µg/L	<0.01
Diazinon	µg/L	<0.01
Dichlorovos	µg/L	<0.01
Dimethoate	µg/L	<0.01
Ethion	µg/L	<0.01
Fenitrothion	µg/L	<0.01
Malathion	µg/L	<0.01
Parathion	µg/L	<0.004
Methyl Parathion	µg/L	<0.01
Ronnel	µg/L	<0.01
Surrogate p-Terphenyl-d_{14}	%	92

Client Reference: 85862, Croydon

PCB in water - trace level Aroclors		
Our Reference:	UNITS	163474-2
Your Reference	---------- -	BH6
Date Sampled	----------	10/03/2017
Type of sample		water
Date prepared	-	17/03/2017
Date analysed	-	19/03/2017
Aroclor 1016	µg/L	<0.01
Aroclor 1221	µg/L	<0.01
Aroclor 1232	µg/L	<0.01
Aroclor 1242	µg/L	<0.01
Aroclor 1248	µg/L	<0.01
Aroclor 1254	µg/L	<0.01
Aroclor 1260	µg/L	<0.01
Surrogate p-Terphenyl-d14	%	92

Client Reference: 85862, Croydon

Total Phenolics in Water		
Our Reference:	UNITS	163474-2
Your Reference	---------- -	BH6
Date Sampled	----------	10/03/2017
Type of sample		water
Date extracted	-	15/03/2017
Date analysed	-	15/03/2017
Total Phenolics (as Phenol)	mg/L	<0.05

Client Reference: 85862, Croydon

HM in water - dissolved			
Our Reference:	UNITS	163474-1	163474-2
Your Reference	----------	BH2	BH6
	-		
Date Sampled	----------	13/03/2017	10/03/2017
Type of sample		water	water
Date prepared	-	15/03/2017	15/03/2017
Date analysed	-	15/03/2017	15/03/2017
Arsenic-Dissolved	µg/L	1	2
Cadmium-Dissolved	µg/L	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	1
Copper-Dissolved	µg/L	3	25
Lead-Dissolved	µg/L	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05
Nickel-Dissolved	µg/L	14	4
Zinc-Dissolved	µg/L	14	79

Client Reference: 85862, Croydon

Cations in water Dissolved			
Our Reference:	UNITS	163474-1	163474-2
Your Reference	---------- -	BH2	BH6
Date Sampled	----------	13/03/2017	10/03/2017
Type of sample		water	water
Date digested	-	15/03/2017	15/03/2017
Date analysed	-	15/03/2017	15/03/2017
Calcium - Dissolved	mg/L	27	1.7
Magnesium - Dissolved	mg/L	27	1.6
Hardness	$mgCaCO_{3}/L$	180	11

Client Reference: 85862, Croydon

Method ID	Methodology Summary
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.
Ext-054	Analysed by MPL Envirolab
Org-012/017	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS and/or GC-MS/MS.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-022	Determination of various metals by ICP-MS.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-020	Determination of various metals by ICP-AES.

Client Reference: 85862, Croydon

QUALITY CONTROL VOCs in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/03/2017	163474-1	15/03/2017 || 16/03/2017	LCS-W1	15/03/2017
Date analysed	-			16/03/2017	163474-1	16/03/2017 || 17/03/2017	LCS-W1	16/03/2017
Dichlorodifluoromethane	µg/L	10	Org-013	<10	163474-1	<10 || <10	[NR]	[NR]
Chloromethane	µg/L	10	Org-013	<10	163474-1	<10 || <10	[NR]	[NR]
Vinyl Chloride	µg/L	10	Org-013	<10	163474-1	<10 || <10	[NR]	[NR]
Bromomethane	µg/L	10	Org-013	<10	163474-1	<10 || <10	[NR]	[NR]
Chloroethane	µg/L	10	Org-013	<10	163474-1	<10 || <10	[NR]	[NR]
Trichlorofluoromethane	µg/L	10	Org-013	<10	163474-1	<10 || <10	[NR]	[NR]
1,1-Dichloroethene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,1-dichloroethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	LCS-W1	96%
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Bromochloromethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Chloroform	µg/L	1	Org-013	<1	163474-1	<1 || <1	LCS-W1	97%
2,2-dichloropropane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,2-dichloroethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	LCS-W1	95%
1,1,1-trichloroethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	LCS-W1	95%
1,1-dichloropropene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Cyclohexane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Carbon tetrachloride	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Benzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Dibromomethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,2-dichloropropane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Trichloroethene	µg/L	1	Org-013	<1	163474-1	<1 || <1	LCS-W1	104%
Bromodichloromethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	LCS-W1	95%
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Toluene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,3-dichloropropane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Dibromochloromethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	LCS-W1	97%
1,2-dibromoethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Tetrachloroethene	µg/L	1	Org-013	<1	163474-1	<1 || <1	LCS-W1	99%
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Chlorobenzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Ethylbenzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Bromoform	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
m+p-xylene	µg/L	2	Org-013	<2	163474-1	<2 || <2	[NR]	[NR]
Styrene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
o-xylene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]

Client Reference: 85862, Croydon

QUALITY CONTROL VOCs in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
1,2,3-trichloropropane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Isopropylbenzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Bromobenzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
n-propyl benzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
2-chlorotoluene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
4-chlorotoluene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Tert-butyl benzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Sec-butyl benzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
4-isopropyl toluene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
n-butyl benzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Hexachlorobutadiene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-013	100	163474-1	101 || 100 || RPD: 1	LCS-W1	97%
Surrogate toluene-d8	%		Org-013	102	163474-1	102 || 100 || RPD: 2	LCS-W1	102%
Surrogate 4-BFB	%		Org-013	100	163474-1	98 || 96 || RPD: 2	LCS-W1	107%

Client Reference: 85862, Croydon

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			16/03/2017	163474-1	15/03/2017 || 16/03/2017	LCS-W1	16/03/2017
Date analysed	-			17/03/2017	163474-1	16/03/2017 || 17/03/2017	LCS-W1	17/03/2017
TRHC_6 - C_9	µg/L	10	Org-016	<10	163474-1	<10 || <10	LCS-W1	99%
TRHC_6 - C_{10}	µg/L	10	Org-016	<10	163474-1	<10 || <10	LCS-W1	99%
Benzene	µg/L	1	Org-016	<1	163474-1	<1 || <1	LCS-W1	96%
Toluene	µg/L	1	Org-016	<1	163474-1	<1 || <1	LCS-W1	95%
Ethylbenzene	µg/L	1	Org-016	<1	163474-1	<1 || <1	LCS-W1	100%
m+p-xylene	µg/L	2	Org-016	<2	163474-1	<2 || <2	LCS-W1	102%
o-xylene	µg/L	1	Org-016	<1	163474-1	<1 || <1	LCS-W1	101%
Naphthalene	µg/L	1	Org-013	<1	163474-1	<1 || <1	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	100	163474-1	101 || 100 || RPD: 1	LCS-W1	100%
Surrogate toluene-d8	%		Org-016	94	163474-1	102 || 100 || RPD: 2	LCS-W1	103%
Surrogate 4-BFB	%		Org-016	94	163474-1	98 || 96 || RPD: 2	LCS-W1	103%

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/03/2017	[NT]	[NT]	LCS-W1	17/03/2017
Date analysed	-			17/03/2017	[NT]	[NT]	LCS-W1	17/03/2017
TRHC_{10} - C_{14}	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	73%
TRHC_{15} - C_{28}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	87%
TRHC_{29} - C_{36}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	104%
TRH>C_{10} - C_{16}	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	73%
TRH>C_{16} - C_{34}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	87%
TRH>C_{34} - C_{40}	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	104%
Surrogate o-Terphenyl	%		Org-003	75	[NT]	[NT]	LCS-W1	86%

QUALITY CONTROL PAHs in Water - Low Level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/03/2017	[NT]	[NT]	LCS-W1	17/03/2017
Date analysed	-			17/03/2017	[NT]	[NT]	LCS-W1	17/03/2017
Naphthalene	µg/L	0.02	Org-012	<0.2	[NT]	[NT]	LCS-W1	83%
Acenaphthylene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	LCS-W1	102%
Phenanthrene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	LCS-W1	107%
Anthracene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	LCS-W1	99%
Pyrene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	LCS-W1	100%

Client Reference: 85862, Croydon

QUALITY CONTROL PAHs in Water - Low Level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)anthracene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	LCS-W1	108%
Benzo(b,j+k) fluoranthene	µg/L	0.02	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	LCS-W1	107%
Indeno(1,2,3-c,d)pyrene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	0.01	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	113	[NT]	[NT]	LCS-W1	100%
QUALITY CONTROL PAHs in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/03/2017	[NT]	[NT]	LCS-W1	17/03/2017
Date analysed	-			17/03/2017	[NT]	[NT]	LCS-W1	17/03/2017
Naphthalene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	110%
Acenaphthylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	104%
Phenanthrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	128%
Anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	130%
Pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	130%
Benzo(a)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	114%
Benzo(b,j+k) fluoranthene	µg/L	2	Org-012	<2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	LCS-W1	120%
Indeno(1,2,3-c,d)pyrene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	1	Org-012	<1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	75	[NT]	[NT]	LCS-W1	70%

Client Reference: 85862, Croydon

QUALITY CONTROL OCP in water - Trace level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/03/2017	[NT]	[NT]	LCS-W1	17/03/2017
Date analysed	-			19/03/2017	[NT]	[NT]	LCS-W1	19/03/2017
HCB	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	[NR]	[NR]
alpha-BHC	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	LCS-W1	115%
gamma-BHC	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	[NR]	[NR]
beta-BHC	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	LCS-W1	114%
Heptachlor	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	LCS-W1	108%
delta-BHC	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	[NR]	[NR]
Aldrin	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	LCS-W1	104%
Heptachlor Epoxide	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	LCS-W1	92%
gamma-Chlordane	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	[NR]	[NR]
alpha-Chlordane	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	[NR]	[NR]
Endosulfan I	µg/L	0.002	Org-005	<0.002	[NT]	[NT]	[NR]	[NR]
pp-DDE	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	LCS-W1	108%
Dieldrin	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	LCS-W1	96%
Endrin	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	LCS-W1	107%
pp-DDD	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	LCS-W1	81%
Endosulfan II	µg/L	0.002	Org-005	<0.002	[NT]	[NT]	[NR]	[NR]
DDT	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	LCS-W1	102%
Methoxychlor	µg/L	0.001	Org-005	<0.001	[NT]	[NT]	[NR]	[NR]
Mirex	µg/L	0.002	Org-012	<0.002	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Org-012	[NT]	[NT]	[NT]	LCS-W1	100%

Client Reference: 85862, Croydon

QUALITY CONTROL OP in water Trace ANZECCF/ADWG	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			17/03/2017	[NT]	[NT]	LCS-W1	17/03/2017
Date analysed	-			19/03/2017	[NT]	[NT]	LCS-W1	19/03/2017
Azinphos-methyl (Guthion)	µg/L	0.01	Ext-054	<0.01	[NT]	[NT]	[NR]	[NR]
Bromophos ethyl	µg/L	0.01	Ext-054	<0.01	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	µg/L	0.009	Ext-054	<0.009	[NT]	[NT]	LCS-W1	111%
Chlorpyriphos-methyl	µg/L	0.01	Ext-054	<0.01	[NT]	[NT]	LCS-W1	105%
Diazinon	µg/L	0.01	Ext-054	<0.01	[NT]	[NT]	[NR]	[NR]
Dichlorovos	µg/L	0.01	Ext-054	<0.01	[NT]	[NT]	[NR]	[NR]
Dimethoate	µg/L	0.01	Ext-054	<0.01	[NT]	[NT]	[NR]	[NR]
Ethion	µg/L	0.01	Ext-054	<0.01	[NT]	[NT]	LCS-W1	106%
Fenitrothion	µg/L	0.01	Ext-054	<0.01	[NT]	[NT]	LCS-W1	123%
Malathion	µg/L	0.01	Ext-054	<0.01	[NT]	[NT]	[NR]	[NR]
Parathion	µg/L	0.004	Ext-054	<0.004	[NT]	[NT]	[NR]	[NR]
Methyl Parathion	µg/L	0.01	Ext-054	<0.01	[NT]	[NT]	[NR]	[NR]
Ronnel	µg/L	0.01	Ext-054	<0.2	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d_{14}	%		Ext-054	113	[NT]	[NT]	LCS-W1	100%

QUALITY CONTROL PCB in water - trace level Aroclors	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			17/03/2017	[NT]	[NT]	LCS-W1	17/03/2017
Date analysed	-			19/03/2017	[NT]	[NT]	LCS-W1	19/03/2017
Aroclor 1016	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]	LCS-W1	102%
Aroclor 1260	µg/L	0.01	Org-012/017	<0.01	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Ext-054	113	[NT]	[NT]	LCS-W1	100%

Client Reference: 85862, Croydon

QUALITY CONTROL Total Phenolics in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/03/2017	[NT]	[NT]	LCS-W1	15/03/2017
Date analysed	-			15/03/2017	[NT]	[NT]	LCS-W1	15/03/2017
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	LCS-W1	100%

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			15/03/2017	[NT]	[NT]	LCS-W2	15/03/2017
Date analysed	-			15/03/2017	[NT]	[NT]	LCS-W2	15/03/2017
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	99%
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	LCS-W2	101%
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	98%
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	100%
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	103%
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	LCS-W2	100%
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	95%
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	96%

QUALITY CONTROL Cations in water Dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date digested	-			15/03/2017	[NT]	[NT]	LCS-W1	15/03/2017
Date analysed	-			15/03/2017	[NT]	[NT]	LCS-W1	15/03/2017
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	LCS-W1	106%
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5	[NT]	[NT]	LCS-W1	109%
Hardness	mgCaCO3/L	3		[NT]	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	LCS-2	17/03/2017
Date analysed	-	[NT]	[NT]	LCS-2	20/03/2017
TRH C_{10} - C_{14}	µg/L	[NT]	[NT]	LCS-2	81%
TRH C_{15} - C_{28}	µg/L	[NT]	[NT]	LCS-2	86%
TRH C_{29} - C_{36}	µg/L	[NT]	[NT]	LCS-2	79%
TRH>C_{10} - C_{16}	µg/L	[NT]	[NT]	LCS-2	82%
TRH>C_{16} - C_{34}	µg/L	[NT]	[NT]	LCS-2	86%
TRH>C_{34} - C_{40}	µg/L	[NT]	[NT]	LCS-2	71%
Surrogate o-Terphenyl	%	[NT]	[NT]	LCS-2	79%

Client Reference: **85862, Croydon**

Report Comments:

Dissolved Metals: Sample 163474-1; no preserved sample was received, therefore the unpreserved sample was filtered through 0.45um filter at the lab.
Note: there is a possibility some elements may be underestimated.

OC/OP/PCB/PAH-Low Level/TRH in water analysed by MPL Laboratories. Report No.193435.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Client Reference: 85862, Croydon

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

CHAIN OF CUSTODY

Douglas Partners
Geotechnics / Environment / Groundwater

Client: Douglas Partners	Project Number: 85862	To:	Envirolab Services
Contact Person: DIH	Project Name: Croydon- Contamination Testing	Contact Person:	Aileen Hie
Project Mgr: AK	PO No.:	Address:	12 Ashley Street
Sampler: ZM	lab Quote No. :		Chatswood NSW 2068
Address: 96 Hermitage Road	Date results required: std	Phone:	02 9910 6200
West Ryde NSW 2114		Fax:	02 9910 6201
	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	Email:	ahie@envirolab.com.au
Phone: 9809 0666 Mob:	Report format: esdat / PDF / Excel	Laboratory Report No:	
Email: david.holden @douglaspartners.com.au	Comments	Lab Comments:	
Prior Storage (Fride, Esky, Shelf)			

Sample information						Tests Required											Comments
Lab Sample ID	Field Sample ID	Depth	Date sampled	Container Type	Type of sample	combo 4L	VOC	OCP/OPP/ PCB (trace)	TRH/Btex	hardness	metals					Combo	Provide as much information about the sample as you can
1	BH2		13/3/17	Glass	Water	✓	✓			✓							Due to limited sample in BH2, please analyse for in the following order until no more analysis able to be undertaken: TRH/BTEX, PAH (low), VOC, metals, phenols, hardness
2	BH6		10/3/17	↓	↓	✓	✓	✓		✓							
3	Trip Spike	/100317							✓								
4	Trip Blank	/100317							✓								

ENVIROLAB NSW
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 163474
Date Received: 14.03.17
Time Received: 11.30
Received by: JE
Temp: Cool/Ambient 9.3°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

Relinquished by: Douglas Partners	Sample Receipt	*Lab use only:*
Hand delivered / Courier (by whom)	Received by (Company): ELS	Samples Received: Cool or Ambient (circle one)
Condition of Sample at dispatch Cool or Ambient (circle)	Print Name: JE	Temperature Received at: (if applicable)
Temperature (if Applicable):	Date & Time: 14.03.17 11.30	Transported by: Hand delivered / courier
Print Name: DAVID HOLDEN	Signature:	
Date & Time: 14/3/17 9:45am		
Signature:		Page_____of _____

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **163598**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden

Sample log in details:

Your Reference:	**85862, Croydon**		
No. of samples:	1 soil		
Date samples received / completed instructions received	15/03/17	/	15/03/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	23/03/17	/	20/03/17
Date of Preliminary Report:	Not Issued		

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Client Reference: 85862, Croydon

Acid Extractable metals in soil		
Our Reference:	UNITS	163598-1
Your Reference	----------	BD3/020317
	-	
Date Sampled	----------	2/03/2017
Type of sample		soil
Date prepared	-	17/03/2017
Date analysed	-	17/03/2017
Arsenic	mg/kg	<4
Cadmium	mg/kg	<0.4
Chromium	mg/kg	5
Copper	mg/kg	20
Lead	mg/kg	9
Mercury	mg/kg	<0.1
Nickel	mg/kg	<1
Zinc	mg/kg	5

Client Reference: 85862, Croydon

Moisture		
Our Reference:	UNITS	163598-1
Your Reference	----------	BD3/020317
	-	
Date Sampled	----------	2/03/2017
Type of sample		soil
Date prepared	-	17/03/2017
Date analysed	-	20/03/2017
Moisture	%	12

Client Reference: 85862, Croydon

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.

Client Reference: 85862, Croydon

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			17/03/2017	[NT]	[NT]	LCS-9	17/03/2017
Date analysed	-			17/03/2017	[NT]	[NT]	LCS-9	17/03/2017
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	LCS-9	110%
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	LCS-9	101%
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-9	106%
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-9	107%
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-9	101%
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	LCS-9	94%
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-9	95%
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-9	98%

Client Reference: **85862, Croydon**

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

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NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
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Client Reference: 85862, Croydon

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CHAIN OF CUSTODY

Douglas Partners
Geotechnics / Environment / Groundwater

Client: Douglas Partners	Project Number: 85862	To: Envirolab Services
Contact Person: DIH	Project Name: Croydon- Contamination Testing	Contact Person: Aileen Hie
Project Mgr: AK	PO No.:	Address: 12 Ashley Street
Sampler: JAP	lab Quote No. :	Chatswood NSW 2068
Address: 96 Hermitage Road	Date results required: std	Phone: 02 9910 6200
West Ryde NSW 2114		Fax: 02 9910 6201
	Note: Inform lab in advance if urgent turnaround is required - surcharges apply	Email: ahie@envirolab.com.au
Phone: 9809 0666 Mob:	Report format: esdat / PDF / Excel	Laboratory Report No:
Email: david.holden @douglaspartners.com.au	Comments	Lab Comments:
Prior Storage (Fride, Esky, Shelf)		

Sample information						Tests Required											Comments
Lab Sample ID	Field Sample ID	Depth	Date sampled	Container Type	Type of sample	metals										Combo	Provide as much information about the sample as you can
1	BD3/020317		2/3/17	Glass	Soil	✓											

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: ~~135~~ 163598
Date Received: 15.3.2017
Time Received: 18.40
Received by: PR
Temp: Cool/Ambient
Cooling: Ice/Icepack 14.1
Security: Intact/Broken/None

Relinquished by: Douglas Partners	Sample Receipt	*Lab use only:*
Hand delivered / Courier (by whom)	Received by (Company): EJ	Samples Received: Cool or Ambient (circle one)
Condition of Sample at dispatch Cool or Ambient (circle)	Print Name: P. Ray	Temperature Received at: (if applicable)
Temperature (if Applicable):	Date & Time: 15.3.2017 18.40	Transported by: Hand delivered / courier
Print Name: David Holden	Signature: R	
Date & Time: 15/3/17 2:00pm		
Signature:		Page_____of _____.

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Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **168161**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden, Chris Bagia

Sample log in details:

Your Reference:	**85862.01, Mercedes Benz Showroom**		
No. of samples:	30 soils		
Date samples received / completed instructions received	30/05/17	/	30/05/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	6/06/17	/	6/06/17
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Client Reference: 85862.01, Mercedes Benz Showroom

VOCs in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	 168161-7 BH10 0.9-1.0 24/05/2017 Soil	 168161-8 BH10 1.9-2.0 24/05/2017 Soil
Date extracted	-	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017
Dichlorodifluoromethane	mg/kg	<1	<1
Chloromethane	mg/kg	<1	<1
Vinyl Chloride	mg/kg	<1	<1
Bromomethane	mg/kg	<1	<1
Chloroethane	mg/kg	<1	<1
Trichlorofluoromethane	mg/kg	<1	<1
1,1-Dichloroethene	mg/kg	<1	<1
trans-1,2-dichloroethene	mg/kg	<1	<1
1,1-dichloroethane	mg/kg	<1	<1
cis-1,2-dichloroethene	mg/kg	<1	<1
bromochloromethane	mg/kg	<1	<1
chloroform	mg/kg	<1	<1
2,2-dichloropropane	mg/kg	<1	<1
1,2-dichloroethane	mg/kg	<1	<1
1,1,1-trichloroethane	mg/kg	<1	<1
1,1-dichloropropene	mg/kg	<1	<1
Cyclohexane	mg/kg	<1	<1
carbon tetrachloride	mg/kg	<1	<1
Benzene	mg/kg	<0.2	<0.2
dibromomethane	mg/kg	<1	<1
1,2-dichloropropane	mg/kg	<1	<1
trichloroethene	mg/kg	<1	<1
bromodichloromethane	mg/kg	<1	<1
trans-1,3-dichloropropene	mg/kg	<1	<1
cis-1,3-dichloropropene	mg/kg	<1	<1
1,1,2-trichloroethane	mg/kg	<1	<1
Toluene	mg/kg	<0.5	<0.5
1,3-dichloropropane	mg/kg	<1	<1
dibromochloromethane	mg/kg	<1	<1
1,2-dibromoethane	mg/kg	<1	<1
tetrachloroethene	mg/kg	<1	<1
1,1,1,2-tetrachloroethane	mg/kg	<1	<1
chlorobenzene	mg/kg	<1	<1
Ethylbenzene	mg/kg	3	<1
bromoform	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
styrene	mg/kg	<1	<1
1,1,2,2-tetrachloroethane	mg/kg	<1	<1

Client Reference: 85862.01, Mercedes Benz Showroom

VOCs in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	 168161-7 BH10 0.9-1.0 24/05/2017 Soil	 168161-8 BH10 1.9-2.0 24/05/2017 Soil
o-Xylene	mg/kg	<1	<1
1,2,3-trichloropropane	mg/kg	<1	<1
isopropylbenzene	mg/kg	<1	<1
bromobenzene	mg/kg	<1	<1
n-propyl benzene	mg/kg	<1	<1
2-chlorotoluene	mg/kg	<1	<1
4-chlorotoluene	mg/kg	<1	<1
1,3,5-trimethyl benzene	mg/kg	3	3
tert-butyl benzene	mg/kg	<1	<1
1,2,4-trimethyl benzene	mg/kg	5	6
1,3-dichlorobenzene	mg/kg	<1	<1
sec-butyl benzene	mg/kg	<1	<1
1,4-dichlorobenzene	mg/kg	<1	<1
4-isopropyl toluene	mg/kg	1	1
1,2-dichlorobenzene	mg/kg	<1	<1
n-butyl benzene	mg/kg	2	2
1,2-dibromo-3-chloropropane	mg/kg	<1	<1
1,2,4-trichlorobenzene	mg/kg	<1	<1
hexachlorobutadiene	mg/kg	<1	<1
1,2,3-trichlorobenzene	mg/kg	<1	<1
Surrogate Dibromofluorometha	%	111	108
Surrogate aaa-Trifluorotoluene	%	82	89
Surrogate Toluene-d_8	%	100	99
Surrogate 4-Bromofluorobenzene	%	108	106

Client Reference: 85862.01, Mercedes Benz Showroom

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	168161-1	168161-2	168161-3	168161-4	168161-5
Your Reference	---------- -	BH7	BH8	BH8	BH9	BH9
Depth	----------	0.1-0.2	0.12-0.3	2.9-3.0	0.12-0.2	0.4-0.5
Date Sampled		24/05/2017	24/05/2017	24/05/2017	24/05/2017	24/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	95	96	98	95	84

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	168161-6	168161-7	168161-8	168161-9	168161-10
Your Reference	---------- -	BH10	BH10	BH10	BH10	BH11
Depth	----------	0.2-0.3	0.9-1.0	1.9-2.0	2.6-2.7	0.1-0.2
Date Sampled		24/05/2017	24/05/2017	24/05/2017	24/05/2017	25/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
TRH C_6 - C_9	mg/kg	<25	34	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	150	140	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	140	140	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	3	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	2	3	<1	<1
Surrogate aaa-Trifluorotoluene	%	82	82	89	96	82

Client Reference: 85862.01, Mercedes Benz Showroom

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	168161-11	168161-12	168161-13	168161-14	168161-15
Your Reference	---------- -	BH11	BH12	BH12	BH15	BH15
Depth	----------	1.9-2.0	0.3-0.4	0.9-1.0	0.3-0.4	0.4-0.5
Date Sampled		25/05/2017	23/05/2017	23/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	88	91	85	96	91

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	168161-16	168161-17	168161-18	168161-19	168161-20
Your Reference	---------- -	BH15	BH16	BH17	BH17	BH18
Depth	----------	1.9-2.0	0.25-0.4	0.25-0.3	1.9-2.0	0.17-0.25
Date Sampled		23/05/2017	23/05/2017	23/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	01/06/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	92	88	100	97	99

Client Reference: 85862.01, Mercedes Benz Showroom

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	168161-21	168161-22	168161-23	168161-24	168161-25
Your Reference	---------- -	BH18	BD2/240517	BD1/240517	BD1/250517	BD2/230517
Depth	----------	0.4-0.5	-	-	-	-
Date Sampled		23/05/2017	24/05/2017	24/05/2017	25/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	94	96	105	95	85

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	168161-26	168161-27	168161-28	168161-29	168161-30
Your Reference	---------- -	BD1/230517	BH8	BH17A	TRIPSPIKE	TRIP BLANK
Depth	----------	-	14.9-14.95	6.0-6.1	-	-
Date Sampled		23/05/2017	24/05/2017	26/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Rock	Rock	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	[NA]	[NA]
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	[NA]	[NA]
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	[NA]	[NA]
Benzene	mg/kg	<0.2	<0.2	<0.2	101%	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	96%	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	102%	<1
m+p-xylene	mg/kg	<2	<2	<2	100%	<2
o-Xylene	mg/kg	<1	<1	<1	106%	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	[NA]	[NA]
naphthalene	mg/kg	<1	<1	<1	[NA]	[NA]
Surrogate aaa-Trifluorotoluene	%	79	88	92	96	96

Client Reference: 85862.01, Mercedes Benz Showroom

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	168161-1	168161-2	168161-3	168161-4	168161-5
Your Reference	---------- -	BH7	BH8	BH8	BH9	BH9
Depth	----------	0.1-0.2	0.12-0.3	2.9-3.0	0.12-0.2	0.4-0.5
Date Sampled		24/05/2017	24/05/2017	24/05/2017	24/05/2017	24/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	110	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	130	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	130	<50	<50	<50
Surrogate o-Terphenyl	%	83	82	82	82	83

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	168161-6	168161-7	168161-8	168161-9	168161-10
Your Reference	---------- -	BH10	BH10	BH10	BH10	BH11
Depth	----------	0.2-0.3	0.9-1.0	1.9-2.0	2.6-2.7	0.1-0.2
Date Sampled		24/05/2017	24/05/2017	24/05/2017	24/05/2017	25/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	110	280	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	96	290	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	94	290	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	100	290	<50	<50
Surrogate o-Terphenyl	%	81	82	82	82	82

Client Reference: 85862.01, Mercedes Benz Showroom

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	168161-11	168161-12	168161-13	168161-14	168161-15
Your Reference	---------- -	BH11	BH12	BH12	BH15	BH15
Depth	----------	1.9-2.0	0.3-0.4	0.9-1.0	0.3-0.4	0.4-0.5
Date Sampled		25/05/2017	23/05/2017	23/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	82	82	82	81	82

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	168161-16	168161-17	168161-18	168161-19	168161-20
Your Reference	---------- -	BH15	BH16	BH17	BH17	BH18
Depth	----------	1.9-2.0	0.25-0.4	0.25-0.3	1.9-2.0	0.17-0.25
Date Sampled		23/05/2017	23/05/2017	23/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	82	81	80	81	83

Client Reference: 85862.01, Mercedes Benz Showroom

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	168161-21	168161-22	168161-23	168161-24	168161-25
Your Reference	---------- -	BH18	BD2/240517	BD1/240517	BD1/250517	BD2/230517
Depth	----------	0.4-0.5	-	-	-	-
Date Sampled		23/05/2017	24/05/2017	24/05/2017	25/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	350	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	510	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	740	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	300	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	1,000	<50	<50
Surrogate o-Terphenyl	%	81	82	95	79	80

svTRH (C10-C40) in Soil				
Our Reference:	UNITS	168161-26	168161-27	168161-28
Your Reference	---------- -	BD1/230517	BH8	BH17A
Depth	----------	-	14.9-14.95	6.0-6.1
Date Sampled		23/05/2017	24/05/2017	26/05/2017
Type of sample		Soil	Rock	Rock
Date extracted	-	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	62
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	120
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	84
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	84
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	80
Surrogate o-Terphenyl	%	85	93	89

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	168161-1 BH7 0.1-0.2 24/05/2017 Soil	168161-2 BH8 0.12-0.3 24/05/2017 Soil	168161-3 BH8 2.9-3.0 24/05/2017 Soil	168161-4 BH9 0.12-0.2 24/05/2017 Soil	168161-5 BH9 0.4-0.5 24/05/2017 Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	02/06/2017	02/06/2017	02/06/2017	02/06/2017	02/06/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.6	<0.1	1.3	<0.1
Anthracene	mg/kg	<0.1	0.1	<0.1	0.1	<0.1
Fluoranthene	mg/kg	<0.1	1.9	<0.1	1.7	<0.1
Pyrene	mg/kg	<0.1	2.0	<0.1	1.6	<0.1
Benzo(a)anthracene	mg/kg	<0.1	1.4	<0.1	0.8	<0.1
Chrysene	mg/kg	<0.1	1.3	<0.1	0.8	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	4.4	<0.2	2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	2.9	<0.05	1.2	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	1.6	<0.1	0.8	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.3	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	1.5	<0.1	0.7	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	4.0	<0.5	1.6	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	4.0	<0.5	1.6	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	4.0	<0.5	1.6	<0.5
Total +ve PAH's	mg/kg	<0.05	18	<0.05	11	<0.05
Surrogate p-Terphenyl-d14	%	86	83	90	86	87

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- -	168161-6 BH10 0.2-0.3 24/05/2017 Soil	168161-7 BH10 0.9-1.0 24/05/2017 Soil	168161-8 BH10 1.9-2.0 24/05/2017 Soil	168161-9 BH10 2.6-2.7 24/05/2017 Soil	168161-10 BH11 0.1-0.2 25/05/2017 Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	02/06/2017	02/06/2017	02/06/2017	02/06/2017	02/06/2017
Naphthalene	mg/kg	<0.1	0.3	0.5	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	<0.1	<0.1	<0.1	0.5
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	0.4	<0.1	<0.1	<0.1	0.8
Pyrene	mg/kg	0.4	<0.1	<0.1	<0.1	0.8
Benzo(a)anthracene	mg/kg	0.3	<0.1	<0.1	<0.1	0.4
Chrysene	mg/kg	0.4	<0.1	<0.1	<0.1	0.4
Benzo(b,j+k)fluoranthene	mg/kg	1	<0.2	<0.2	<0.2	1
Benzo(a)pyrene	mg/kg	0.60	<0.05	<0.05	<0.05	0.60
Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.1	<0.1	<0.1	0.4
Dibenzo(a,h)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	0.5	<0.1	<0.1	<0.1	0.4
Benzo(a)pyrene TEQ calc (zero)	mg/kg	0.9	<0.5	<0.5	<0.5	0.8
Benzo(a)pyrene TEQ calc(half)	mg/kg	0.9	<0.5	<0.5	<0.5	0.8
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	0.9	<0.5	<0.5	<0.5	0.8
Total +ve PAH's	mg/kg	4.6	0.3	0.52	<0.05	5.2
Surrogate p-Terphenyl-d14	%	85	80	83	87	87

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- -	168161-11 BH11 1.9-2.0 25/05/2017 Soil	168161-12 BH12 0.3-0.4 23/05/2017 Soil	168161-13 BH12 0.9-1.0 23/05/2017 Soil	168161-14 BH15 0.3-0.4 23/05/2017 Soil	168161-15 BH15 0.4-0.5 23/05/2017 Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	02/06/2017	02/06/2017	02/06/2017	02/06/2017	02/06/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.3	<0.1	0.7	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Fluoranthene	mg/kg	<0.1	0.4	<0.1	1.1	<0.1
Pyrene	mg/kg	<0.1	0.4	<0.1	1.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.2	<0.1	0.6	<0.1
Chrysene	mg/kg	<0.1	0.2	<0.1	0.5	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.5	<0.2	1	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.3	<0.05	0.80	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.2	<0.1	0.4	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	<0.1	0.4	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	1.0	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	1.0	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	1.0	<0.5
Total +ve PAH's	mg/kg	<0.05	2.8	<0.05	7.2	<0.05
Surrogate p-Terphenyl-d14	%	81	86	92	86	91

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	168161-16 BH15 1.9-2.0 23/05/2017 Soil	168161-17 BH16 0.25-0.4 23/05/2017 Soil	168161-18 BH17 0.25-0.3 23/05/2017 Soil	168161-19 BH17 1.9-2.0 23/05/2017 Soil	168161-20 BH18 0.17-0.25 23/05/2017 Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	02/06/2017	02/06/2017	02/06/2017	02/06/2017	02/06/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.1	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	0.95	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	93	86	91	90	78

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	168161-21 BH18 0.4-0.5 23/05/2017 Soil	168161-22 BD2/240517 - 24/05/2017 Soil	168161-23 BD1/240517 - 24/05/2017 Soil	168161-24 BD1/250517 - 25/05/2017 Soil	168161-25 BD2/230517 - 23/05/2017 Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	02/06/2017	02/06/2017	02/06/2017	02/06/2017	02/06/2017
Naphthalene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	0.7	0.4	<0.1
Anthracene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	1.4	0.8	<0.1
Pyrene	mg/kg	<0.1	<0.1	1.4	0.8	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	0.8	0.4	<0.1
Chrysene	mg/kg	<0.1	<0.1	0.7	0.4	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	2	1	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	1.0	0.64	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	0.6	0.4	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	0.6	0.3	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	1.4	0.8	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	1.4	0.8	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	1.4	0.8	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	9.4	5.3	<0.05
Surrogate p-Terphenyl-d14	%	81	81	86	84	87

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- -	168161-26 BD1/230517 - 23/05/2017 Soil	168161-27 BH8 14.9-14.95 24/05/2017 Rock	168161-28 BH17A 6.0-6.1 26/05/2017 Rock
Date extracted	-	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	02/06/2017	02/06/2017	02/06/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	0.5	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.06	0.1
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	0.54	0.1
Surrogate p-Terphenyl-d14	%	75	101	88

Client Reference: 85862.01, Mercedes Benz Showroom

Organochlorine Pesticides in soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	168161-4 BH9 0.12-0.2 24/05/2017 Soil	168161-6 BH10 0.2-0.3 24/05/2017 Soil	168161-10 BH11 0.1-0.2 25/05/2017 Soil	168161-23 BD1/240517 - 24/05/2017 Soil	168161-24 BD1/250517 - 25/05/2017 Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	111	102	106	113	106

Client Reference: 85862.01, Mercedes Benz Showroom

Organophosphorus Pesticides						
Our Reference:	UNITS	168161-4	168161-6	168161-10	168161-23	168161-24
Your Reference	----------	BH9	BH10	BH11	BD1/240517	BD1/250517
Depth	- ----------	0.12-0.2	0.2-0.3	0.1-0.2	-	-
Date Sampled		24/05/2017	24/05/2017	25/05/2017	24/05/2017	25/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	111	102	106	113	106

Client Reference: 85862.01, Mercedes Benz Showroom

PCBs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	168161-4 BH9 0.12-0.2 24/05/2017 Soil	168161-6 BH10 0.2-0.3 24/05/2017 Soil	168161-10 BH11 0.1-0.2 25/05/2017 Soil	168161-23 BD1/240517 - 24/05/2017 Soil	168161-24 BD1/250517 - 25/05/2017 Soil
Date extracted	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	111	102	106	113	106

Client Reference: 85862.01, Mercedes Benz Showroom

Acid Extractable metals in soil						
Our Reference:	UNITS	168161-1	168161-2	168161-3	168161-4	168161-5
Your Reference	---------- -	BH7	BH8	BH8	BH9	BH9
Depth	----------	0.1-0.2	0.12-0.3	2.9-3.0	0.12-0.2	0.4-0.5
Date Sampled		24/05/2017	24/05/2017	24/05/2017	24/05/2017	24/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Arsenic	mg/kg	8	6	<4	7	7
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	23	24	2	21	18
Copper	mg/kg	10	69	12	21	12
Lead	mg/kg	24	900	12	150	24
Mercury	mg/kg	<0.1	0.3	<0.1	0.2	<0.1
Nickel	mg/kg	2	17	<1	5	2
Zinc	mg/kg	21	520	4	210	43

Acid Extractable metals in soil						
Our Reference:	UNITS	168161-6	168161-7	168161-8	168161-9	168161-10
Your Reference	---------- -	BH10	BH10	BH10	BH10	BH11
Depth	----------	0.2-0.3	0.9-1.0	1.9-2.0	2.6-2.7	0.1-0.2
Date Sampled		24/05/2017	24/05/2017	24/05/2017	24/05/2017	25/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Arsenic	mg/kg	25	6	<4	<4	11
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	1
Chromium	mg/kg	32	5	5	2	25
Copper	mg/kg	14	10	19	8	42
Lead	mg/kg	78	17	14	6	460
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	0.2
Nickel	mg/kg	7	<1	<1	<1	10
Zinc	mg/kg	140	<1	3	<1	530

Client Reference: 85862.01, Mercedes Benz Showroom

Acid Extractable metals in soil						
Our Reference:	UNITS	168161-11	168161-12	168161-13	168161-14	168161-15
Your Reference	---------- -	BH11	BH12	BH12	BH15	BH15
Depth	----------	1.9-2.0	0.3-0.4	0.9-1.0	0.3-0.4	0.4-0.5
Date Sampled		25/05/2017	23/05/2017	23/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Arsenic	mg/kg	16	11	8	4	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	27	13	14	11
Copper	mg/kg	11	240	9	64	9
Lead	mg/kg	16	100	17	120	23
Mercury	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Nickel	mg/kg	<1	9	<1	14	<1
Zinc	mg/kg	2	220	1	84	8

Acid Extractable metals in soil						
Our Reference:	UNITS	168161-16	168161-17	168161-18	168161-19	168161-20
Your Reference	---------- -	BH15	BH16	BH17	BH17	BH18
Depth	----------	1.9-2.0	0.25-0.4	0.25-0.3	1.9-2.0	0.17-0.25
Date Sampled		23/05/2017	23/05/2017	23/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Arsenic	mg/kg	5	7	9	4	6
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	5	20	23	4	19
Copper	mg/kg	26	16	13	23	11
Lead	mg/kg	16	750	22	16	44
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	4	4	5	4
Zinc	mg/kg	13	51	14	24	34

Client Reference: 85862.01, Mercedes Benz Showroom

Acid Extractable metals in soil						
Our Reference:	UNITS	168161-21	168161-22	168161-23	168161-24	168161-25
Your Reference	---------- -	BH18	BD2/240517	BD1/240517	BD1/250517	BD2/230517
Depth	----------	0.4-0.5	-	-	-	-
Date Sampled		23/05/2017	24/05/2017	24/05/2017	25/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Arsenic	mg/kg	9	6	20	18	15
Cadmium	mg/kg	<0.4	<0.4	1	1	<0.4
Chromium	mg/kg	21	12	31	29	14
Copper	mg/kg	6	11	54	53	12
Lead	mg/kg	18	21	280	390	22
Mercury	mg/kg	<0.1	<0.1	0.2	0.1	<0.1
Nickel	mg/kg	2	2	23	11	<1
Zinc	mg/kg	3	32	220	360	25

Acid Extractable metals in soil						
Our Reference:	UNITS	168161-26	168161-27	168161-28	168161-31	168161-32
Your Reference	---------- -	BD1/230517	BH8	BH17A	BH7 - [TRIPLICATE]	BH10 - [TRIPLICATE]
Depth	----------	-	14.9-14.95	6.0-6.1	0.1-0.2	0.9-1.0
Date Sampled		23/05/2017	24/05/2017	26/05/2017	24/05/2017	24/05/2017
Type of sample		Soil	Rock	Rock	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Arsenic	mg/kg	11	4	5	7	17
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	20	8	7	19	11
Copper	mg/kg	11	16	35	18	14
Lead	mg/kg	20	15	21	44	23
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	10	23	5	<1
Zinc	mg/kg	10	54	95	50	1

Client Reference: 85862.01, Mercedes Benz Showroom

Acid Extractable metals in soil		
Our Reference:	UNITS	168161-33
Your Reference	---------- -	BD1/240517 - [TRIPLICATE]
Depth	----------	-
Date Sampled		24/05/2017
Type of sample		Soil
Date prepared	-	31/05/2017
Date analysed	-	31/05/2017
Arsenic	mg/kg	67
Cadmium	mg/kg	2
Chromium	mg/kg	29
Copper	mg/kg	69
Lead	mg/kg	760
Mercury	mg/kg	0.2
Nickel	mg/kg	26
Zinc	mg/kg	490

Client Reference: 85862.01, Mercedes Benz Showroom

Moisture						
Our Reference:	UNITS	168161-1	168161-2	168161-3	168161-4	168161-5
Your Reference	---------- -	BH7	BH8	BH8	BH9	BH9
Depth	----------	0.1-0.2	0.12-0.3	2.9-3.0	0.12-0.2	0.4-0.5
Date Sampled		24/05/2017	24/05/2017	24/05/2017	24/05/2017	24/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
Moisture	%	26	15	13	19	21

Moisture						
Our Reference:	UNITS	168161-6	168161-7	168161-8	168161-9	168161-10
Your Reference	---------- -	BH10	BH10	BH10	BH10	BH11
Depth	----------	0.2-0.3	0.9-1.0	1.9-2.0	2.6-2.7	0.1-0.2
Date Sampled		24/05/2017	24/05/2017	24/05/2017	24/05/2017	25/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
Moisture	%	19	19	12	15	20

Moisture						
Our Reference:	UNITS	168161-11	168161-12	168161-13	168161-14	168161-15
Your Reference	---------- -	BH11	BH12	BH12	BH15	BH15
Depth	----------	1.9-2.0	0.3-0.4	0.9-1.0	0.3-0.4	0.4-0.5
Date Sampled		25/05/2017	23/05/2017	23/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
Moisture	%	16	25	24	18	20

Moisture						
Our Reference:	UNITS	168161-16	168161-17	168161-18	168161-19	168161-20
Your Reference	---------- -	BH15	BH16	BH17	BH17	BH18
Depth	----------	1.9-2.0	0.25-0.4	0.25-0.3	1.9-2.0	0.17-0.25
Date Sampled		23/05/2017	23/05/2017	23/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
Moisture	%	9.8	19	16	10	20

Client Reference: 85862.01, Mercedes Benz Showroom

Moisture						
Our Reference:	UNITS	168161-21	168161-22	168161-23	168161-24	168161-25
Your Reference	---------- -	BH18	BD2/240517	BD1/240517	BD1/250517	BD2/230517
Depth	----------	0.4-0.5	-	-	-	-
Date Sampled		23/05/2017	24/05/2017	24/05/2017	25/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017	01/06/2017	01/06/2017
Moisture	%	21	21	16	22	21

Moisture				
Our Reference:	UNITS	168161-26	168161-27	168161-28
Your Reference	---------- -	BD1/230517	BH8	BH17A
Depth	----------	-	14.9-14.95	6.0-6.1
Date Sampled		23/05/2017	24/05/2017	26/05/2017
Type of sample		Soil	Rock	Rock
Date prepared	-	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	01/06/2017	01/06/2017	01/06/2017
Moisture	%	22	1.3	4.2

Client Reference: 85862.01, Mercedes Benz Showroom

Asbestos ID - soils						
Our Reference:	UNITS	168161-1	168161-2	168161-4	168161-6	168161-10
Your Reference	---------- -	BH7	BH8	BH9	BH10	BH11
Depth	----------	0.1-0.2	0.12-0.3	0.12-0.2	0.2-0.3	0.1-0.2
Date Sampled		24/05/2017	24/05/2017	24/05/2017	24/05/2017	25/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	5/06/2017	5/06/2017	5/06/2017	5/06/2017	5/06/2017
Sample mass tested	g	Approx. 30g	Approx. 35g	Approx. 35g	Approx. 35g	Approx. 30g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown fine-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference:	UNITS	168161-12	168161-14	168161-17	168161-18	168161-20
Your Reference	---------- -	BH12	BH15	BH16	BH17	BH18
Depth	----------	0.3-0.4	0.3-0.4	0.25-0.4	0.25-0.3	0.17-0.25
Date Sampled		23/05/2017	23/05/2017	23/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	5/06/2017	5/06/2017	5/06/2017	5/06/2017	5/06/2017
Sample mass tested	g	Approx. 30g	Approx. 35g	Approx. 35g	Approx. 35g	Approx. 30g
Sample Description	-	Brown fine-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown clayey soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibre detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Client Reference: 85862.01, Mercedes Benz Showroom

Misc Soil - Inorg						
Our Reference:	UNITS	168161-4	168161-6	168161-10	168161-23	168161-24
Your Reference	---------- -	BH9	BH10	BH11	BD1/240517	BD1/250517
Depth	----------	0.12-0.2	0.2-0.3	0.1-0.2	-	-
Date Sampled		24/05/2017	24/05/2017	25/05/2017	24/05/2017	25/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Date analysed	-	31/05/2017	31/05/2017	31/05/2017	31/05/2017	31/05/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5	<5	<5

Client Reference: 85862.01, Mercedes Benz Showroom

Misc Inorg - Soil		
Our Reference:	UNITS	168161-8
Your Reference	----------	BH10
	-	
Depth	----------	1.9-2.0
Date Sampled		24/05/2017
Type of sample		Soil
Date prepared	-	01/06/2017
Date analysed	-	01/06/2017
pH 1:5 soil:water	pH Units	7.4

Client Reference: 85862.01, Mercedes Benz Showroom

CEC		
Our Reference:	UNITS	168161-8
Your Reference	----------	BH10
	-	
Depth	----------	1.9-2.0
Date Sampled		24/05/2017
Type of sample		Soil
Date prepared	-	02/06/2017
Date analysed	-	02/06/2017
Exchangeable Ca	meq/100g	0.1
Exchangeable K	meq/100g	0.1
Exchangeable Mg	meq/100g	4.3
Exchangeable Na	meq/100g	1.8
Cation Exchange Capacity	meq/100g	6.4

Client Reference: 85862.01, Mercedes Benz Showroom

Method ID	Methodology Summary
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.

Client Reference: 85862.01, Mercedes Benz Showroom

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-009	Determination of exchangeable cations and cation exchange capacity in soils using 1M Ammonium Chloride exchange and ICP-AES analytical finish.

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/05/2017	168161-7	31/05/2017 || 31/05/2017	LCS-8	31/05/2017
Date analysed	-			31/05/2017	168161-7	31/05/2017 || 31/05/2017	LCS-8	31/05/2017
Dichlorodifluoromethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
Chloromethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
Vinyl Chloride	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
Bromomethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
Chloroethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
Trichlorofluoromethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,1-Dichloroethene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
trans-1,2-dichloroethene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,1-dichloroethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	LCS-8	92%
cis-1,2-dichloroethene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
bromochloromethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
chloroform	mg/kg	1	Org-014	<1	168161-7	<1 || <1	LCS-8	104%
2,2-dichloropropane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,2-dichloroethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	LCS-8	106%
1,1,1-trichloroethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	LCS-8	77%
1,1-dichloropropene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
Cyclohexane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
carbon tetrachloride	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
Benzene	mg/kg	0.2	Org-014	<0.2	168161-7	<0.2 || <0.2	[NR]	[NR]
dibromomethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,2-dichloropropane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
trichloroethene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	LCS-8	83%
bromodichloromethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	LCS-8	121%
trans-1,3-dichloropropene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
Toluene	mg/kg	0.5	Org-014	<0.5	168161-7	<0.5 || <0.5	[NR]	[NR]
1,3-dichloropropane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
dibromochloromethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	LCS-8	120%
1,2-dibromoethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
tetrachloroethene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	LCS-8	105%
1,1,1,2-tetrachloroethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
chlorobenzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
Ethylbenzene	mg/kg	1	Org-014	<1	168161-7	3 || 1 || RPD: 100	[NR]	[NR]
bromoform	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
m+p-xylene	mg/kg	2	Org-014	<2	168161-7	<2 || <2	[NR]	[NR]
styrene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
o-Xylene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,2,3-trichloropropane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL VOCs in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
isopropylbenzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
bromobenzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
n-propyl benzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
2-chlorotoluene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
4-chlorotoluene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	1	Org-014	<1	168161-7	3 || 1 || RPD: 100	[NR]	[NR]
tert-butyl benzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	1	Org-014	<1	168161-7	5 || 2 || RPD: 86	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
sec-butyl benzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
4-isopropyl toluene	mg/kg	1	Org-014	<1	168161-7	1 || <1	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
n-butyl benzene	mg/kg	1	Org-014	<1	168161-7	2 || <1	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,2,4-trichlorobenzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
hexachlorobutadiene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	1	Org-014	<1	168161-7	<1 || <1	[NR]	[NR]
Surrogate Dibromofluorometha	%		Org-014	111	168161-7	111 || 108 || RPD: 3	LCS-8	111%
Surrogate aaa-Trifluorotoluene	%		Org-014	101	168161-7	82 || 89 || RPD: 8	LCS-8	99%
Surrogate Toluene-d_8	%		Org-014	100	168161-7	100 || 98 || RPD: 2	LCS-8	101%
Surrogate 4-Bromofluorobenzene	%		Org-014	91	168161-7	108 || 97 || RPD: 11	LCS-8	94%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			01/06/2017	168161-7	31/05/2017 || 31/05/2017	LCS-8	31/05/2017
Date analysed	-			01/06/2017	168161-7	31/05/2017 || 31/05/2017	LCS-8	31/05/2017
TRHC_6 - C_9	mg/kg	25	Org-016	<25	168161-7	34 || <25	LCS-8	100%
TRHC_6 - C_{10}	mg/kg	25	Org-016	<25	168161-7	150 || 37 || RPD: 121	LCS-8	100%
Benzene	mg/kg	0.2	Org-016	<0.2	168161-7	<0.2 || <0.2	LCS-8	91%
Toluene	mg/kg	0.5	Org-016	<0.5	168161-7	<0.5 || <0.5	LCS-8	104%
Ethylbenzene	mg/kg	1	Org-016	<1	168161-7	3 || 1 || RPD: 100	LCS-8	100%
m+p-xylene	mg/kg	2	Org-016	<2	168161-7	<2 || <2	LCS-8	103%
o-Xylene	mg/kg	1	Org-016	<1	168161-7	<1 || <1	LCS-8	99%
naphthalene	mg/kg	1	Org-014	<1	168161-7	2 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	106	168161-7	82 || 89 || RPD: 8	LCS-8	99%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/05/2017	168161-7	31/05/2017 || 31/05/2017	LCS-8	31/05/2017
Date analysed	-			01/06/2017	168161-7	01/06/2017 || 01/06/2017	LCS-8	01/06/2017
TRHC_{10} - C_{14}	mg/kg	50	Org-003	<50	168161-7	110 || 94 || RPD: 16	LCS-8	115%
TRHC_{15} - C_{28}	mg/kg	100	Org-003	<100	168161-7	<100 || <100	LCS-8	116%
TRHC_{29} - C_{36}	mg/kg	100	Org-003	<100	168161-7	<100 || <100	LCS-8	106%
TRH>C_{10}-C_{16}	mg/kg	50	Org-003	<50	168161-7	96 || 84 || RPD: 13	LCS-8	115%
TRH>C_{16}-C_{34}	mg/kg	100	Org-003	<100	168161-7	<100 || <100	LCS-8	116%
TRH>C_{34}-C_{40}	mg/kg	100	Org-003	<100	168161-7	<100 || <100	LCS-8	106%
Surrogate o-Terphenyl	%		Org-003	84	168161-7	82 || 82 || RPD: 0	LCS-8	99%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/05/2017	168161-7	31/05/2017 || 31/05/2017	LCS-8	31/05/2017
Date analysed	-			02/06/2017	168161-7	02/06/2017 || 02/06/2017	LCS-8	02/06/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	168161-7	0.3 || 0.3 || RPD: 0	LCS-8	113%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	LCS-8	100%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	LCS-8	111%
Anthracene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	LCS-8	102%
Pyrene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	LCS-8	101%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	LCS-8	121%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	168161-7	<0.2 || <0.2	[NR]	[NR]

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	168161-7	<0.05 || <0.05	LCS-8	127%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	168161-7	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	101	168161-7	80 || 81 || RPD: 1	LCS-8	124%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/05/2017	[NT]	[NT]	LCS-8	31/05/2017
Date analysed	-			31/05/2017	[NT]	[NT]	LCS-8	31/05/2017
HCB	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	117%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	111%
Heptachlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	123%
delta-BHC	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	112%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	125%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	131%
Dieldrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	130%
Endrin	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	112%
pp-DDD	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	125%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	LCS-8	91%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%		Org-005	111	[NT]	[NT]	LCS-8	95%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/05/2017	[NT]	[NT]	LCS-8	31/05/2017
Date analysed	-			31/05/2017	[NT]	[NT]	LCS-8	31/05/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-8	91%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-8	84%
Dimethoate	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-8	92%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-8	104%
Malathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-8	71%
Parathion	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-8	113%
Ronnel	mg/kg	0.1	Org-008	<0.1	[NT]	[NT]	LCS-8	101%
Surrogate TCMX	%		Org-008	111	[NT]	[NT]	LCS-8	113%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			31/05/2017	[NT]	[NT]	LCS-8	31/05/2017
Date analysed	-			31/05/2017	[NT]	[NT]	LCS-8	31/05/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	LCS-8	111%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%		Org-006	111	[NT]	[NT]	LCS-8	113%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			31/05/2017	168161-7	31/05/2017 || 31/05/2017	LCS-8	31/05/2017
Date analysed	-			31/05/2017	168161-7	31/05/2017 || 31/05/2017	LCS-8	31/05/2017
Arsenic	mg/kg	4	Metals-020	<4	168161-7	6 || 14 || RPD: 80	LCS-8	117%
Cadmium	mg/kg	0.4	Metals-020	<0.4	168161-7	<0.4 || <0.4	LCS-8	104%
Chromium	mg/kg	1	Metals-020	<1	168161-7	5 || 10 || RPD: 67	LCS-8	107%
Copper	mg/kg	1	Metals-020	<1	168161-7	10 || 13 || RPD: 26	LCS-8	108%
Lead	mg/kg	1	Metals-020	<1	168161-7	17 || 22 || RPD: 26	LCS-8	105%
Mercury	mg/kg	0.1	Metals-021	<0.1	168161-7	<0.1 || <0.1	LCS-8	109%
Nickel	mg/kg	1	Metals-020	<1	168161-7	<1 || <1	LCS-8	102%
Zinc	mg/kg	1	Metals-020	<1	168161-7	<1 || <1	LCS-8	104%
QUALITY CONTROL Misc Soil - Inorg	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			31/05/2017	[NT]	[NT]	LCS-8	31/05/2017
Date analysed	-			31/05/2017	[NT]	[NT]	LCS-8	31/05/2017
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	LCS-8	96%
QUALITY CONTROL Misc Inorg - Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			01/06/2017	[NT]	[NT]	LCS-8	01/06/2017
Date analysed	-			01/06/2017	[NT]	[NT]	LCS-8	01/06/2017
pH 1:5 soil:water	pH Units		Inorg-001	[NT]	[NT]	[NT]	LCS-8	103%
QUALITY CONTROL CEC	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			02/06/2017	[NT]	[NT]	LCS-1	02/06/2017
Date analysed	-			02/06/2017	[NT]	[NT]	LCS-1	02/06/2017
Exchangeable Ca	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	102%
Exchangeable K	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	104%
Exchangeable Mg	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	101%
Exchangeable Na	meq/100g	0.1	Metals-009	<0.1	[NT]	[NT]	LCS-1	110%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	168161-1	31/05/2017 || 31/05/2017	LCS-9	31/05/2017
Date analysed	-	168161-1	31/05/2017 || 31/05/2017	LCS-9	01/06/2017
$TRHC_6$ - C_9	mg/kg	168161-1	<25 || <25	LCS-9	106%
$TRHC_6$ - C_{10}	mg/kg	168161-1	<25 || <25	LCS-9	106%
Benzene	mg/kg	168161-1	<0.2 || <0.2	LCS-9	96%
Toluene	mg/kg	168161-1	<0.5 || <0.5	LCS-9	105%
Ethylbenzene	mg/kg	168161-1	<1 || <1	LCS-9	105%
m+p-xylene	mg/kg	168161-1	<2 || <2	LCS-9	111%
o-Xylene	mg/kg	168161-1	<1 || <1	LCS-9	110%
naphthalene	mg/kg	168161-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	168161-1	95 || 74 || RPD: 25	LCS-9	101%
QUALITY CONTROL svTRH (C10-C40) in Soil	**UNITS**	**Dup. Sm#**	**Duplicate Base + Duplicate + %RPD**	**Spike Sm#**	**Spike % Recovery**
Date extracted	-	168161-1	31/05/2017 || 31/05/2017	LCS-9	31/05/2017
Date analysed	-	168161-1	01/06/2017 || 01/06/2017	LCS-9	01/06/2017
$TRHC_{10}$ - C_{14}	mg/kg	168161-1	<50 || <50	LCS-9	88%
$TRHC_{15}$ - C_{28}	mg/kg	168161-1	<100 || <100	LCS-9	128%
$TRHC_{29}$ - C_{36}	mg/kg	168161-1	<100 || <100	LCS-9	106%
$TRH>C_{10}$-C_{16}	mg/kg	168161-1	<50 || <50	LCS-9	88%
$TRH>C_{16}$-C_{34}	mg/kg	168161-1	<100 || <100	LCS-9	128%
$TRH>C_{34}$-C_{40}	mg/kg	168161-1	<100 || <100	LCS-9	106%
Surrogate o-Terphenyl	%	168161-1	83 || 83 || RPD: 0	LCS-9	111%
QUALITY CONTROL PAHs in Soil	**UNITS**	**Dup. Sm#**	**Duplicate Base + Duplicate + %RPD**	**Spike Sm#**	**Spike % Recovery**
Date extracted	-	168161-1	31/05/2017 || 31/05/2017	LCS-9	31/05/2017
Date analysed	-	168161-1	02/06/2017 || 02/06/2017	LCS-9	02/06/2017
Naphthalene	mg/kg	168161-1	<0.1 || <0.1	LCS-9	113%
Acenaphthylene	mg/kg	168161-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	168161-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	168161-1	<0.1 || <0.1	LCS-9	101%
Phenanthrene	mg/kg	168161-1	<0.1 || <0.1	LCS-9	112%
Anthracene	mg/kg	168161-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	168161-1	<0.1 || <0.1	LCS-9	103%
Pyrene	mg/kg	168161-1	<0.1 || <0.1	LCS-9	104%
Benzo(a)anthracene	mg/kg	168161-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	168161-1	<0.1 || <0.1	LCS-9	123%
Benzo(b,j+k)fluoranthene	mg/kg	168161-1	<0.2 || <0.2	[NR]	[NR]
Benzo(a)pyrene	mg/kg	168161-1	<0.05 || <0.05	LCS-9	124%
Indeno(1,2,3-c,d)pyrene	mg/kg	168161-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	168161-1	<0.1 || <0.1	[NR]	[NR]

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Benzo(g,h,i)perylene	mg/kg	168161-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	168161-1	86 || 80 || RPD: 7	LCS-9	128%
QUALITY CONTROL Acid Extractable metals in soil	**UNITS**	**Dup. Sm#**	**Duplicate Base + Duplicate + %RPD**	**Spike Sm#**	**Spike % Recovery**
Date prepared	-	168161-1	31/05/2017 || 31/05/2017	LCS-9	31/05/2017
Date analysed	-	168161-1	31/05/2017 || 31/05/2017	LCS-9	31/05/2017
Arsenic	mg/kg	168161-1	8 || 7 || RPD: 13	LCS-9	115%
Cadmium	mg/kg	168161-1	<0.4 || 1	LCS-9	102%
Chromium	mg/kg	168161-1	23 || 19 || RPD: 19	LCS-9	105%
Copper	mg/kg	168161-1	10 || 19 || RPD: 62	LCS-9	107%
Lead	mg/kg	168161-1	24 || 51 || RPD: 72	LCS-9	104%
Mercury	mg/kg	168161-1	<0.1 || <0.1	LCS-9	104%
Nickel	mg/kg	168161-1	2 || 8 || RPD: 120	LCS-9	100%
Zinc	mg/kg	168161-1	21 || 89 || RPD: 124	LCS-9	102%
QUALITY CONTROL VOCs in soil	**UNITS**	**Dup. Sm#**	**Duplicate Base + Duplicate + %RPD**	**Spike Sm#**	**Spike % Recovery**
Date extracted	-	[NT]	[NT]	168161-8	31/05/2017
Date analysed	-	[NT]	[NT]	168161-8	31/05/2017
Dichlorodifluoromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Chloromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	mg/kg	[NT]	[NT]	[NR]	[NR]
Bromomethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Chloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	mg/kg	[NT]	[NT]	[NR]	[NR]
trans-1,2-dichloroethene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1-dichloroethane	mg/kg	[NT]	[NT]	168161-8	79%
cis-1,2-dichloroethene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromochloromethane	mg/kg	[NT]	[NT]	[NR]	[NR]
chloroform	mg/kg	[NT]	[NT]	168161-8	87%
2,2-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	mg/kg	[NT]	[NT]	168161-8	89%
1,1,1-trichloroethane	mg/kg	[NT]	[NT]	168161-8	71%
1,1-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
Cyclohexane	mg/kg	[NT]	[NT]	[NR]	[NR]
carbon tetrachloride	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
dibromomethane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
trichloroethene	mg/kg	[NT]	[NT]	168161-8	72%
bromodichloromethane	mg/kg	[NT]	[NT]	168161-8	98%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL VOCs in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
trans-1,3-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
Toluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
dibromochloromethane	mg/kg	[NT]	[NT]	168161-8	121%
1,2-dibromoethane	mg/kg	[NT]	[NT]	[NR]	[NR]
tetrachloroethene	mg/kg	[NT]	[NT]	168161-8	91%
1,1,1,2-tetrachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
chlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromoform	mg/kg	[NT]	[NT]	[NR]	[NR]
m+p-xylene	mg/kg	[NT]	[NT]	[NR]	[NR]
styrene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	mg/kg	[NT]	[NT]	[NR]	[NR]
o-Xylene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,3-trichloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
isopropylbenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
bromobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	mg/kg	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
tert-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
sec-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,4-trichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
hexachlorobutadiene	mg/kg	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluorometha	%	[NT]	[NT]	168161-8	107%
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	168161-8	86%
Surrogate Toluene-d_8	%	[NT]	[NT]	168161-8	101%
Surrogate 4-Bromofluorobenzene	%	[NT]	[NT]	168161-8	104%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	168161-23	31/05/2017 || 31/05/2017	168161-8	31/05/2017
Date analysed	-	168161-23	01/06/2017 || 01/06/2017	168161-8	31/05/2017
$TRHC_6$ - C_9	mg/kg	168161-23	<25 || <25	168161-8	87%
$TRHC_6$ - C_{10}	mg/kg	168161-23	<25 || <25	168161-8	87%
Benzene	mg/kg	168161-23	<0.2 || <0.2	168161-8	75%
Toluene	mg/kg	168161-23	<0.5 || <0.5	168161-8	90%
Ethylbenzene	mg/kg	168161-23	<1 || <1	168161-8	86%
m+p-xylene	mg/kg	168161-23	<2 || <2	168161-8	92%
o-Xylene	mg/kg	168161-23	<1 || <1	168161-8	85%
naphthalene	mg/kg	168161-23	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	168161-23	105 || 114 || RPD: 8	168161-8	86%
QUALITY CONTROL svTRH (C10-C40) in Soil	**UNITS**	**Dup. Sm#**	**Duplicate Base + Duplicate + %RPD**	**Spike Sm#**	**Spike % Recovery**
Date extracted	-	168161-23	31/05/2017 || 31/05/2017	168161-8	31/05/2017
Date analysed	-	168161-23	01/06/2017 || 01/06/2017	168161-8	01/06/2017
$TRHC_{10}$ - C_{14}	mg/kg	168161-23	<50 || <50	168161-8	91%
$TRHC_{15}$ - C_{28}	mg/kg	168161-23	350 || 210 || RPD: 50	168161-8	107%
$TRHC_{29}$ - C_{36}	mg/kg	168161-23	510 || 380 || RPD: 29	168161-8	92%
$TRH>C_{10}$-C_{16}	mg/kg	168161-23	<50 || <50	168161-8	91%
$TRH>C_{16}$-C_{34}	mg/kg	168161-23	740 || 470 || RPD: 45	168161-8	107%
$TRH>C_{34}$-C_{40}	mg/kg	168161-23	300 || 230 || RPD: 26	168161-8	92%
Surrogate o-Terphenyl	%	168161-23	95 || 94 || RPD: 1	168161-8	82%
QUALITY CONTROL PAHs in Soil	**UNITS**	**Dup. Sm#**	**Duplicate Base + Duplicate + %RPD**	**Spike Sm#**	**Spike % Recovery**
Date extracted	-	168161-23	31/05/2017 || 31/05/2017	168161-8	31/05/2017
Date analysed	-	168161-23	02/06/2017 || 02/06/2017	168161-8	02/06/2017
Naphthalene	mg/kg	168161-23	0.1 || <0.1	168161-8	73%
Acenaphthylene	mg/kg	168161-23	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	168161-23	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	168161-23	<0.1 || <0.1	168161-8	71%
Phenanthrene	mg/kg	168161-23	0.7 || 0.8 || RPD: 13	168161-8	75%
Anthracene	mg/kg	168161-23	0.1 || 0.1 || RPD: 0	[NR]	[NR]
Fluoranthene	mg/kg	168161-23	1.4 || 1.1 || RPD: 24	168161-8	66%
Pyrene	mg/kg	168161-23	1.4 || 1.1 || RPD: 24	168161-8	69%
Benzo(a)anthracene	mg/kg	168161-23	0.8 || 0.6 || RPD: 29	[NR]	[NR]
Chrysene	mg/kg	168161-23	0.7 || 0.6 || RPD: 15	168161-8	85%
Benzo(b,j+k)fluoranthene	mg/kg	168161-23	2 || 1 || RPD: 67	[NR]	[NR]
Benzo(a)pyrene	mg/kg	168161-23	1.0 || 0.76 || RPD: 27	168161-8	97%
Indeno(1,2,3-c,d)pyrene	mg/kg	168161-23	0.6 || 0.4 || RPD: 40	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	168161-23	<0.1 || <0.1	[NR]	[NR]

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Benzo(g,h,i)perylene	mg/kg	168161-23	0.6 || 0.4 || RPD: 40	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	168161-23	86 || 84 || RPD: 2	168161-8	107%

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	168161-23	31/05/2017 || 31/05/2017
Date analysed	-	168161-23	01/06/2017 || 01/06/2017
HCB	mg/kg	168161-23	<0.1 || <0.1
alpha-BHC	mg/kg	168161-23	<0.1 || <0.1
gamma-BHC	mg/kg	168161-23	<0.1 || <0.1
beta-BHC	mg/kg	168161-23	<0.1 || <0.1
Heptachlor	mg/kg	168161-23	<0.1 || <0.1
delta-BHC	mg/kg	168161-23	<0.1 || <0.1
Aldrin	mg/kg	168161-23	<0.1 || <0.1
Heptachlor Epoxide	mg/kg	168161-23	<0.1 || <0.1
gamma-Chlordane	mg/kg	168161-23	<0.1 || <0.1
alpha-chlordane	mg/kg	168161-23	<0.1 || <0.1
Endosulfan I	mg/kg	168161-23	<0.1 || <0.1
pp-DDE	mg/kg	168161-23	<0.1 || <0.1
Dieldrin	mg/kg	168161-23	<0.1 || <0.1
Endrin	mg/kg	168161-23	<0.1 || <0.1
pp-DDD	mg/kg	168161-23	<0.1 || <0.1
Endosulfan II	mg/kg	168161-23	<0.1 || <0.1
pp-DDT	mg/kg	168161-23	<0.1 || <0.1
Endrin Aldehyde	mg/kg	168161-23	<0.1 || <0.1
Endosulfan Sulphate	mg/kg	168161-23	<0.1 || <0.1
Methoxychlor	mg/kg	168161-23	<0.1 || <0.1
Surrogate TCMX	%	168161-23	113 || 114 || RPD: 1

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	168161-23	31/05/2017 || 31/05/2017
Date analysed	-	168161-23	01/06/2017 || 01/06/2017
Azinphos-methyl (Guthion)	mg/kg	168161-23	<0.1 || <0.1
Bromophos-ethyl	mg/kg	168161-23	<0.1 || <0.1
Chlorpyriphos	mg/kg	168161-23	<0.1 || <0.1
Chlorpyriphos-methyl	mg/kg	168161-23	<0.1 || <0.1
Diazinon	mg/kg	168161-23	<0.1 || <0.1
Dichlorvos	mg/kg	168161-23	<0.1 || <0.1
Dimethoate	mg/kg	168161-23	<0.1 || <0.1
Ethion	mg/kg	168161-23	<0.1 || <0.1
Fenitrothion	mg/kg	168161-23	<0.1 || <0.1
Malathion	mg/kg	168161-23	<0.1 || <0.1
Parathion	mg/kg	168161-23	<0.1 || <0.1
Ronnel	mg/kg	168161-23	<0.1 || <0.1
Surrogate TCMX	%	168161-23	113 || 114 || RPD: 1

QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	168161-23	31/05/2017 || 31/05/2017
Date analysed	-	168161-23	01/06/2017 || 01/06/2017
Aroclor 1016	mg/kg	168161-23	<0.1 || <0.1
Aroclor 1221	mg/kg	168161-23	<0.1 || <0.1
Aroclor 1232	mg/kg	168161-23	<0.1 || <0.1
Aroclor 1242	mg/kg	168161-23	<0.1 || <0.1
Aroclor 1248	mg/kg	168161-23	<0.1 || <0.1
Aroclor 1254	mg/kg	168161-23	<0.1 || <0.1
Aroclor 1260	mg/kg	168161-23	<0.1 || <0.1
Surrogate TCLMX	%	168161-23	113 || 114 || RPD: 1

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	168161-23	31/05/2017 || 31/05/2017	168161-8	31/05/2017
Date analysed	-	168161-23	31/05/2017 || 31/05/2017	168161-8	31/05/2017
Arsenic	mg/kg	168161-23	20 || 37 || RPD: 60	168161-8	93%
Cadmium	mg/kg	168161-23	1 || 3 || RPD: 100	168161-8	89%
Chromium	mg/kg	168161-23	31 || 33 || RPD: 6	168161-8	93%
Copper	mg/kg	168161-23	54 || 86 || RPD: 46	168161-8	108%
Lead	mg/kg	168161-23	280 || 480 || RPD: 53	168161-8	87%
Mercury	mg/kg	168161-23	0.2 || 0.2 || RPD: 0	168161-8	105%
Nickel	mg/kg	168161-23	23 || 30 || RPD: 26	168161-8	89%
Zinc	mg/kg	168161-23	220 || 330 || RPD: 40	168161-8	91%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	168161-24	91%
Date analysed	-	[NT]	[NT]	168161-24	91%
TRHC_{10} - C_{14}	mg/kg	[NT]	[NT]	168161-24	91%
TRHC_{15} - C_{28}	mg/kg	[NT]	[NT]	168161-24	91%
TRHC_{29} - C_{36}	mg/kg	[NT]	[NT]	168161-24	91%
TRH>C_{10}-C_{16}	mg/kg	[NT]	[NT]	168161-24	91%
TRH>C_{16}-C_{34}	mg/kg	[NT]	[NT]	168161-24	91%
TRH>C_{34}-C_{40}	mg/kg	[NT]	[NT]	168161-24	91%
Surrogate o-Terphenyl	%	[NT]	[NT]	168161-24	91%

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	168161-24	31/05/2017
Date analysed	-	[NT]	[NT]	168161-24	02/06/2017
Naphthalene	mg/kg	[NT]	[NT]	168161-24	80%
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	168161-24	83%
Phenanthrene	mg/kg	[NT]	[NT]	168161-24	110%
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	168161-24	109%
Pyrene	mg/kg	[NT]	[NT]	168161-24	109%
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	168161-24	129%
Benzo(b,j+k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	168161-24	140%
Indeno(1,2,3-c,d)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	[NT]	[NT]	168161-24	109%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	168161-24	31/05/2017
Date analysed	-	[NT]	[NT]	168161-24	01/06/2017
HCB	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-BHC	mg/kg	[NT]	[NT]	168161-24	106%
gamma-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
beta-BHC	mg/kg	[NT]	[NT]	168161-24	97%
Heptachlor	mg/kg	[NT]	[NT]	168161-24	104%
delta-BHC	mg/kg	[NT]	[NT]	[NR]	[NR]
Aldrin	mg/kg	[NT]	[NT]	168161-24	94%
Heptachlor Epoxide	mg/kg	[NT]	[NT]	168161-24	88%
gamma-Chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
alpha-chlordane	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan I	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDE	mg/kg	[NT]	[NT]	168161-24	118%
Dieldrin	mg/kg	[NT]	[NT]	168161-24	109%
Endrin	mg/kg	[NT]	[NT]	168161-24	109%
pp-DDD	mg/kg	[NT]	[NT]	168161-24	115%
Endosulfan II	mg/kg	[NT]	[NT]	[NR]	[NR]
pp-DDT	mg/kg	[NT]	[NT]	[NR]	[NR]
Endrin Aldehyde	mg/kg	[NT]	[NT]	[NR]	[NR]
Endosulfan Sulphate	mg/kg	[NT]	[NT]	168161-24	89%
Methoxychlor	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCMX	%	[NT]	[NT]	168161-24	126%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	168161-24	31/05/2017
Date analysed	-	[NT]	[NT]	168161-24	01/06/2017
Azinphos-methyl (Guthion)	mg/kg	[NT]	[NT]	[NR]	[NR]
Bromophos-ethyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Chlorpyriphos	mg/kg	[NT]	[NT]	168161-24	80%
Chlorpyriphos-methyl	mg/kg	[NT]	[NT]	[NR]	[NR]
Diazinon	mg/kg	[NT]	[NT]	[NR]	[NR]
Dichlorvos	mg/kg	[NT]	[NT]	168161-24	71%
Dimethoate	mg/kg	[NT]	[NT]	[NR]	[NR]
Ethion	mg/kg	[NT]	[NT]	168161-24	99%
Fenitrothion	mg/kg	[NT]	[NT]	168161-24	107%
Malathion	mg/kg	[NT]	[NT]	168161-24	74%
Parathion	mg/kg	[NT]	[NT]	168161-24	107%
Ronnel	mg/kg	[NT]	[NT]	168161-24	86%
Surrogate TCMX	%	[NT]	[NT]	168161-24	96%
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	168161-24	31/05/2017
Date analysed	-	[NT]	[NT]	168161-24	01/06/2017
Aroclor 1016	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1221	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1232	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1242	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1248	mg/kg	[NT]	[NT]	[NR]	[NR]
Aroclor 1254	mg/kg	[NT]	[NT]	168161-24	102%
Aroclor 1260	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate TCLMX	%	[NT]	[NT]	168161-24	96%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	168161-24	31/05/2017
Date analysed	-	[NT]	[NT]	168161-24	31/05/2017
Arsenic	mg/kg	[NT]	[NT]	168161-24	86%
Cadmium	mg/kg	[NT]	[NT]	168161-24	89%
Chromium	mg/kg	[NT]	[NT]	168161-24	88%
Copper	mg/kg	[NT]	[NT]	168161-24	91%
Lead	mg/kg	[NT]	[NT]	168161-24	#
Mercury	mg/kg	[NT]	[NT]	168161-24	104%
Nickel	mg/kg	[NT]	[NT]	168161-24	85%
Zinc	mg/kg	[NT]	[NT]	168161-24	#

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Misc Soil - Inorg	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	168161-4	31/05/2017 || 31/05/2017
Date analysed	-	168161-4	31/05/2017 || 31/05/2017
Total Phenolics (as Phenol)	mg/kg	168161-4	<5 || <5

QUALITY CONTROL Misc Soil - Inorg	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	168161-6	31/05/2017
Date analysed	-	[NT]	[NT]	168161-6	31/05/2017
Total Phenolics (as Phenol)	mg/kg	[NT]	[NT]	168161-6	102%

Client Reference: 85862.01, Mercedes Benz Showroom

Report Comments:

VOC, vTRH & BTEX in soil:
The RPD for duplicate results is accepted due to the non homogenous nature of the sample/s.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 168161-1 for Cu, Pb, Ni and Zn. Therefore a triplicate result has been issued as laboratory sample number 168161-31.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 168161-7 for Cr. Therefore a triplicate result has been issued as laboratory sample number 168161-32.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 168161-23 for As, Cd and Pb. Therefore a triplicate result has been issued as laboratory sample number 168161-33.

Acid Extractable Metals in Soil:
Percent recovery is not possible to report due to the high concentration of the element/s in the sample/s. However an acceptable recovery was obtained for the LCS.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples requested for asbestos testing were sub-sampled from jars provided by the client.

Asbestos ID was analysed by Approved Identifier:	Paul Ching
Asbestos ID was authorised by Approved Signatory:	Paul Ching

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Client Reference: 85862.01, Mercedes Benz Showroom

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Aileen Hie

From: David Holden <David.Holden@douglaspartners.com.au>
Sent: Saturday, 10 June 2017 6:30 PM
To: Aileen Hie
Subject: 168161 85862.01, Mercedes Benz Showroom- Additional TCLp analysis

Hi Aileen,

Could you please undertake TCLP analysis on the following samples for ELS job 168161 (DP:85862.01)

Sample:

-168161-2 (BH8/0.12-0.3)- TCLP- PAH, lead
-168161-4 (BH9/0.12-0.2)- TCLP- PAH, lead,
-168161-10 (BH11/0.1-0.2)- TCLP- lead
-168161-12 (BH12/0.3-0.4)- TCLP- lead
-168161-14 (BH15/0.3-0.4)- TCLP- PAH, lead
-168161-17 (BH16/0.25-0.4)- TCLP- lead

24hr turnaround would be much appreciated.

Thanks

Dave

Envirolab Ref: 168161A
Due: 15/6/17
2 day TAT

David Holden | Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 8878 0652 | F: 02 9809 4095 | M: 0414 768 997 | E: David.Holden@douglaspartners.com.au

FINANCIAL REVIEW
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This email is confidential. If you are not the intended recipient, please notify us immediately and be aware that any disclosure, copying, distribution or use of the contents of this information is prohibited. Please note that the company does not make any commitment through emails not confirmed by fax or letter.

From: Jeremy Faircloth [mailto:JFaircloth@envirolab.com.au]
Sent: Tuesday, 6 June 2017 4:05 PM
To: Christopher Bagia; David Holden
Subject: Results for Registration 168161 85862.01, Mercedes Benz Showroom

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the Invoice
a copy of the COC
an excel file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
customerservice@envirolab.com.au

Aileen Hie

From: David Holden <David.Holden@douglaspartners.com.au>
Sent: Wednesday, 14 June 2017 11:47 AM
To: Aileen Hie
Subject: RE: 168161 85862.01, Mercedes Benz Showroom- Additional TCLP analysis

Thanks Aileen,

If possible, could I add a silica gel clean-up/ TPH analysis for 168161-28 (BH17A- 6.0-6.1)

Cheers

Dave

David Holden | Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 8878 0652 | F: 02 9809 4095 | M: 0414 768 997 | E: David.Holden@douglaspartners.com.au

FINANCIAL REVIEW
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This email is confidential. If you are not the intended recipient, please notify us immediately and be aware that any disclosure, copying, distribution or use of the contents of this information is prohibited. Please note that the company does not make any commitment through emails not confirmed by fax or letter.

From: Aileen Hie [mailto:AHie@envirolab.com.au]
Sent: Wednesday, 14 June 2017 11:29 AM
To: David Holden
Cc: Jacinta Hurst
Subject: RE: 168161 85862.01, Mercedes Benz Showroom- Additional TCLP analysis

Sorry Dave, I think I missed it. I'll get this logged in and reported tomorrow

Regards,

Aileen Hie | Sample Receipt Supervisor | Envirolab Services Pty Ltd

Great Science, Great Service.

12 Ashley Street Chatswood NSW 2067
T 612 9910 6200 **F** 612 9910 6201
E ahie@envirolab.com.au | **W** www.envirolab.com.au

Please note that all samples submitted to the Envirolab Group laboratories will be analysed under the Envirolab Group Terms and Conditions. The Terms and Conditions are accessible by clicking this link

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **168161-A**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden, Chris Bagia

Sample log in details:

Your Reference:	**85862.01, Mercedes Benz Showroom**
No. of samples:	Additional Testing on 7 Soils
Date samples received / completed instructions received	30/05/17 / 10/06/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	15/06/17 / 15/06/17
Date of Preliminary Report:	Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.
Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Client Reference: 85862.01, Mercedes Benz Showroom

sTPH in Soil (C10-C40)-Silica		
Our Reference:	UNITS	168161-A-28
Your Reference	----------	BH17A
	-	
Depth	----------	6.0-6.1
Date Sampled		26/05/2017
Type of sample		Rock
Date extracted	-	14/06/2017
Date analysed	-	15/06/2017
TPH C_{10} - C_{14}	mg/kg	60
TPH C_{15} - C_{28}	mg/kg	120
TPH C_{29} - C_{36}	mg/kg	<100
TPH>C_{10}-C_{16}	mg/kg	66
TPH>C_{16}-C_{34}	mg/kg	110
TPH>C_{34}-C_{40}	mg/kg	<100
Surrogate o-Terphenyl	%	103

Client Reference: 85862.01, Mercedes Benz Showroom

Metals in TCLP USEPA1311						
Our Reference:	UNITS	168161-A-2	168161-A-4	168161-A-10	168161-A-12	168161-A-14
Your Reference	---------- -	BH8	BH9	BH11	BH12	BH15
Depth	----------	0.12-0.3	0.12-0.2	0.1-0.2	0.3-0.4	0.3-0.4
Date Sampled		24/05/2017	24/05/2017	25/05/2017	23/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/06/2017	15/06/2017	15/06/2017	15/06/2017	15/06/2017
Date analysed	-	15/06/2017	15/06/2017	15/06/2017	15/06/2017	15/06/2017
pH of soil for fluid# determ.	pH units	9.3	8.7	8.1	7.9	8.6
pH of soil TCLP (after HCl)	pH units	1.8	1.8	1.8	1.8	1.7
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.8	5.0	5.0	5.0	6.0
Lead in TCLP	mg/L	0.73	0.03	0.2	<0.03	0.04

Metals in TCLP USEPA1311		
Our Reference:	UNITS	168161-A-17
Your Reference	---------- -	BH16
Depth	----------	0.25-0.4
Date Sampled		23/05/2017
Type of sample		Soil
Date extracted	-	15/06/2017
Date analysed	-	15/06/2017
pH of soil for fluid# determ.	pH units	8.8
pH of soil TCLP (after HCl)	pH units	1.8
Extraction fluid used	-	1
pH of final Leachate	pH units	5.0
Lead in TCLP	mg/L	2.0

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in TCLP (USEPA 1311)				
Our Reference:	UNITS	168161-A-2	168161-A-4	168161-A-14
Your Reference	----------	BH8	BH9	BH15
	-			
Depth	----------	0.12-0.3	0.12-0.2	0.3-0.4
Date Sampled		24/05/2017	24/05/2017	23/05/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	15/06/2017	15/06/2017	15/06/2017
Date analysed	-	15/06/2017	15/06/2017	15/06/2017
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	98	97	88

Client Reference: 85862.01, Mercedes Benz Showroom

Method ID	Methodology Summary
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Org-012	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL sTPH in Soil (C10-C40)-Silica	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/06/2017	[NT]	[NT]	LCS-1	14/06/2017
Date analysed	-			14/06/2017	[NT]	[NT]	LCS-1	14/06/2017
TPHC_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-1	104%
TPHC_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-1	98%
TPHC_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-1	106%
TPH>C_{10}-C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-1	104%
TPH>C_{16}-C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-1	98%
TPH>C_{34}-C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-1	106%
Surrogate o-Terphenyl	%		Org-003	102	[NT]	[NT]	LCS-1	83%

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD
Date extracted	-			15/06/2017	168161-A-2	15/06/2017 || 15/06/2017
Date analysed	-			15/06/2017	168161-A-2	15/06/2017 || 15/06/2017
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	168161-A-2	0.73 || 0.73 || RPD: 0

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank
Date extracted	-			15/06/2017
Date analysed	-			15/06/2017
Naphthalene in TCLP	mg/L	0.001	Org-012	<0.001
Acenaphthylene in TCLP	mg/L	0.001	Org-012	<0.001
Acenaphthene in TCLP	mg/L	0.001	Org-012	<0.001
Fluorene in TCLP	mg/L	0.001	Org-012	<0.001
Phenanthrene in TCLP	mg/L	0.001	Org-012	<0.001
Anthracene in TCLP	mg/L	0.001	Org-012	<0.001
Fluoranthene in TCLP	mg/L	0.001	Org-012	<0.001
Pyrene in TCLP	mg/L	0.001	Org-012	<0.001
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012	<0.001
Chrysene in TCLP	mg/L	0.001	Org-012	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012	<0.002
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012	<0.001

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank
Surrogate p-Terphenyl-d14	%		Org-012	120

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	LCS-W1	15/06/2017
Date analysed	-	[NT]	[NT]	LCS-W1	15/06/2017
Lead in TCLP	mg/L	[NT]	[NT]	LCS-W1	94%

QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	LCS-W1	15/06/2017
Date analysed	-	[NT]	[NT]	LCS-W1	15/06/2017
Naphthalene in TCLP	mg/L	[NT]	[NT]	LCS-W1	88%
Acenaphthylene in TCLP	mg/L	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	[NT]	[NT]	LCS-W1	100%
Phenanthrene in TCLP	mg/L	[NT]	[NT]	LCS-W1	117%
Anthracene in TCLP	mg/L	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	[NT]	[NT]	LCS-W1	113%
Pyrene in TCLP	mg/L	[NT]	[NT]	LCS-W1	113%
Benzo(a)anthracene in TCLP	mg/L	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	[NT]	[NT]	LCS-W1	101%
Benzo(bjk)fluoranthene in TCLP	mg/L	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	[NT]	[NT]	LCS-W1	85%
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	[NT]	[NT]	LCS-W1	83%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	168161-A-4	15/06/2017
Date analysed	-	[NT]	[NT]	168161-A-4	15/06/2017
Lead in TCLP	mg/L	[NT]	[NT]	168161-A-4	96%

Client Reference: **85862.01, Mercedes Benz Showroom**

Report Comments:

Asbestos ID was analysed by Approved Identifier: Paul Ching
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
PQL: Practical Quantitation Limit
NT: Not tested
NR: Test not required
RPD: Relative Percent Difference
NA: Test not required
<: Less than
>: Greater than
LCS: Laboratory Control Sample

Client Reference: 85862.01, Mercedes Benz Showroom

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Laboratory Acceptance Criteria

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Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

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Measurement Uncertainty estimates are available for most tests upon request.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	85862.01	**Suburb:**	Croydon	**To:**	ELS
Project Name:	Mercedes Benz Showroom	**Order Number**			
Project Manager:	David Holden	**Sampler:**	Chris Bagia	**Attn:**	Aileen Hie
Emails:	david.holden@douglaspartners.com.au		chris.bagia@douglaspartners.com.au	**Phone:**	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☐ Esky ☒ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Sample Depth	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 3a	Combo 3	Combo 8a	VOC	pH	CEC	Combo 8			Notes/preservation
BH7	0.1 - 0.2	1	24/05/17	S	G	X									
BH8	0.12 - 0.3	2	24/05/17	S	G	X									
BH8	2.9 - 3.0	3	24/05/17	S	G		X								
BH9	0.12 - 0.2	4	24/05/17	S	G			X							
BH9	0.4 - 0.5	5	24/05/17	S	G		X								
BH10	0.2 - 0.3	6	24/05/17	S	G			X							
BH10	0.9 - 1.0	7	24/05/17	S	G		X		X						
BH10	1.9 - 2.0	8	24/05/17	S	G		X		X	X	X				
BH10	2.6 - 2.7	9	24/05/17	S	G		X								
BH11	0.1 - 0.2	10	25/05/17	S	G			X							
BH11	1.9 - 2.0	11	25/05/17	S	G		X								
BH12	0.3 - 0.4	12	23/05/17	S	G	X									
BH12	0.9 - 1.0	13	23/05/17	S	G		X								
BH15	0.3 - 0.4	14	23/05/17	S	G	X									
BH15	0.4 - 0.5	15	23/05/17	S	G		X								
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐	

Envirolab Service
12 Ashley St
Chatswood NSW 2067
Ph: (02) 99 910 6200
Job No: 168161
Date Received: 30/5
Time Received: 13·30
Received by: DW
Temp: Cool/Ambient
Cooling: Ice/Icepack 4·7
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: **Received by:** **Date & Time:** 30/5/17 13·30

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	85862.01	**Suburb:**	Croydon	**To:**	ELS
Project Name:	Mercedes Benz Showroom	**Order Number**			
Project Manager:	David Holden	**Sampler:**	Chris Bagia	**Attn:**	Aileen Hie
Emails:	david.holden@douglaspartners.com.au		chris.bagia@douglaspartners.com.au	**Phone:**	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☐ Esky ☒ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☒ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Sample Depth	Lab ID	Sampling Date	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 3a	Combo 3	Combo 8a	VOC	pH	CEC	Combo 8	Btex		Notes/preservation
BH15	1.9 - 2.0	16	23/05/17	S	G		X								
BH16	0.25 - 0.4	17	23/05/17	S	G	X									
BH17	0.25 - 0.3	18	23/05/17	S	G	X									
BH17	1.9 - 2.0	19	23/05/17	S	G		X								
BH18	0.17 - 0.25	20	23/05/17	S	G	X									
BH18	0.4 - 0.5	21	23/05/17	S	G		X								
BD2/240517	-	22	24/05/17	S	G		X								
BD1/240517	-	23	24/05/17	S	G							X			
BD1/250517	-	24	25/05/17	S	G							X			
BD2/230517	-	25	23/05/17	S	G		X								
BD1/230515	-	26	23/05/17	S	G		X								
BH 8	14.9 - 14.95	27	24/5/17	ROCK	G		X								
BH17A	6.0 - 6.1	28	26/5/17	ROCK	G		X								
TRIP SPIKE		29											X		
TRIP BLANK		30											X		
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐		

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: **Received by:** **Date & Time:**

168161

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **168500**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden, C Bagia

Sample log in details:

Your Reference:	**85862.01, Mercedes Benz Croydon Showroom**
No. of samples:	6 water 1 material
Date samples received / completed instructions received	02/06/17 / 02/06/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	9/06/17 / 9/06/17
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	168500-1 BH8 2/06/2017 Water	168500-2 BH4 2/06/2017 Water	168500-3 BH17A 2/06/2017 Water
Date extracted	-	05/06/2017	05/06/2017	05/06/2017
Date analysed	-	05/06/2017	05/06/2017	05/06/2017
Dichlorodifluoromethane	µg/L	<10	<10	<10
Chloromethane	µg/L	<10	<10	<10
Vinyl Chloride	µg/L	<10	<10	<10
Bromomethane	µg/L	<10	<10	<10
Chloroethane	µg/L	<10	<10	<10
Trichlorofluoromethane	µg/L	<10	<10	<10
1,1-Dichloroethene	µg/L	<1	<1	<1
Trans-1,2-dichloroethene	µg/L	<1	<1	<1
1,1-dichloroethane	µg/L	<1	<1	<1
Cis-1,2-dichloroethene	µg/L	<1	<1	<1
Bromochloromethane	µg/L	<1	<1	<1
Chloroform	µg/L	2	2	9
2,2-dichloropropane	µg/L	<1	<1	<1
1,2-dichloroethane	µg/L	<1	<1	<1
1,1,1-trichloroethane	µg/L	<1	<1	<1
1,1-dichloropropene	µg/L	<1	<1	<1
Cyclohexane	µg/L	<1	<1	<1
Carbon tetrachloride	µg/L	<1	<1	<1
Benzene	µg/L	<1	<1	<1
Dibromomethane	µg/L	<1	<1	<1
1,2-dichloropropane	µg/L	<1	<1	<1
Trichloroethene	µg/L	<1	<1	<1
Bromodichloromethane	µg/L	<1	<1	2
trans-1,3-dichloropropene	µg/L	<1	<1	<1
cis-1,3-dichloropropene	µg/L	<1	<1	<1
1,1,2-trichloroethane	µg/L	<1	<1	<1
Toluene	µg/L	<1	<1	<1
1,3-dichloropropane	µg/L	<1	<1	<1
Dibromochloromethane	µg/L	<1	<1	<1
1,2-dibromoethane	µg/L	<1	<1	<1
Tetrachloroethene	µg/L	<1	<1	<1
1,1,1,2-tetrachloroethane	µg/L	<1	<1	<1
Chlorobenzene	µg/L	<1	<1	<1
Ethylbenzene	µg/L	<1	<1	<1
Bromoform	µg/L	<1	<1	<1
m+p-xylene	µg/L	<2	<2	<2
Styrene	µg/L	<1	<1	<1
1,1,2,2-tetrachloroethane	µg/L	<1	<1	<1
o-xylene	µg/L	1	<1	<1

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

VOCs in water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	168500-1 BH8 2/06/2017 Water	168500-2 BH4 2/06/2017 Water	168500-3 BH17A 2/06/2017 Water
1,2,3-trichloropropane	µg/L	<1	<1	<1
Isopropylbenzene	µg/L	<1	<1	<1
Bromobenzene	µg/L	<1	<1	<1
n-propyl benzene	µg/L	<1	<1	<1
2-chlorotoluene	µg/L	<1	<1	<1
4-chlorotoluene	µg/L	<1	<1	<1
1,3,5-trimethyl benzene	µg/L	<1	<1	<1
Tert-butyl benzene	µg/L	<1	<1	<1
1,2,4-trimethyl benzene	µg/L	1	<1	<1
1,3-dichlorobenzene	µg/L	<1	<1	<1
Sec-butyl benzene	µg/L	<1	<1	<1
1,4-dichlorobenzene	µg/L	<1	<1	<1
4-isopropyl toluene	µg/L	<1	<1	<1
1,2-dichlorobenzene	µg/L	<1	<1	<1
n-butyl benzene	µg/L	<1	<1	<1
1,2-dibromo-3-chloropropane	µg/L	<1	<1	<1
1,2,4-trichlorobenzene	µg/L	<1	<1	<1
Hexachlorobutadiene	µg/L	<1	<1	<1
1,2,3-trichlorobenzene	µg/L	<1	<1	<1
Surrogate Dibromofluoromethane	%	119	119	119
Surrogate toluene-d8	%	99	99	99
Surrogate 4-BFB	%	91	97	90

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

vTRH(C6-C10)/BTEXN in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	168500-1 BH8 2/06/2017 Water	168500-2 BH4 2/06/2017 Water	168500-3 BH17A 2/06/2017 Water	168500-4 BD1 2/06/2017 Water	168500-5 TRIP SPIKE 2/06/2017 Water
Date extracted	-	05/06/2017	05/06/2017	05/06/2017	05/06/2017	05/06/2017
Date analysed	-	05/06/2017	05/06/2017	05/06/2017	05/06/2017	05/06/2017
TRHC$_6$ - C$_9$	µg/L	<10	<10	<10	<10	[NA]
TRHC$_6$ - C$_{10}$	µg/L	<10	<10	<10	<10	[NA]
TRHC$_6$ - C$_{10}$ less BTEX (F1)	µg/L	<10	<10	<10	<10	[NA]
Benzene	µg/L	<1	<1	<1	<1	90%
Toluene	µg/L	<1	<1	<1	<1	98%
Ethylbenzene	µg/L	<1	<1	<1	<1	110%
m+p-xylene	µg/L	<2	<2	<2	2	100%
o-xylene	µg/L	1	<1	<1	1	115%
Naphthalene	µg/L	<1	<1	<1	<1	[NA]
Surrogate Dibromofluoromethane	%	119	119	119	118	125
Surrogate toluene-d8	%	99	99	99	104	103
Surrogate 4-BFB	%	91	97	90	118	130

vTRH(C6-C10)/BTEXN in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	168500-6 TRIP BLANK 2/06/2017 Water
Date extracted	-	05/06/2017
Date analysed	-	05/06/2017
Benzene	µg/L	<1
Toluene	µg/L	<1
Ethylbenzene	µg/L	<1
m+p-xylene	µg/L	<2
o-xylene	µg/L	<1
Surrogate Dibromofluoromethane	%	115
Surrogate toluene-d8	%	99
Surrogate 4-BFB	%	132

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

svTRH (C10-C40) in Water Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	168500-1 BH8 2/06/2017 Water	168500-2 BH4 2/06/2017 Water	168500-3 BH17A 2/06/2017 Water	168500-4 BD1 2/06/2017 Water
Date extracted	-	05/06/2017	05/06/2017	05/06/2017	05/06/2017
Date analysed	-	05/06/2017	05/06/2017	05/06/2017	05/06/2017
TRHC_{10} - C_{14}	µg/L	<50	<50	<50	<50
TRHC_{15} - C_{28}	µg/L	<100	<100	<100	<100
TRHC_{29} - C_{36}	µg/L	<100	<100	<100	<100
TRH>C_{10} - C_{16}	µg/L	<50	<50	<50	<50
TRH>C_{10} - C_{16} less Naphthalene (F2)	µg/L	<50	<50	<50	<50
TRH>C_{16} - C_{34}	µg/L	<100	<100	<100	<100
TRH>C_{34} - C_{40}	µg/L	<100	<100	<100	<100
Surrogate o-Terphenyl	%	83	98	89	73

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

PAHs in Water - Low Level Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ---------- 	168500-1 BH8 2/06/2017 Water	168500-2 BH4 2/06/2017 Water	168500-3 BH17A 2/06/2017 Water	168500-4 BD1 2/06/2017 Water
Date extracted	-	05/06/2017	05/06/2017	05/06/2017	05/06/2017
Date analysed	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Naphthalene	µg/L	<0.2	<0.2	<0.2	<0.2
Acenaphthylene	µg/L	<0.1	<0.1	<0.1	<0.1
Acenaphthene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluorene	µg/L	<0.1	<0.1	<0.1	<0.1
Phenanthrene	µg/L	<0.1	<0.1	<0.1	<0.1
Anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Fluoranthene	µg/L	<0.1	<0.1	<0.1	0.1
Pyrene	µg/L	<0.1	<0.1	<0.1	0.1
Benzo(a)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Chrysene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	µg/L	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Indeno(1,2,3-c,d)pyrene	µg/L	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	µg/L	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ	µg/L	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	µg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE	0.26
Surrogate p-Terphenyl-d14	%	79	90	80	113

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

Total Phenolics in Water					
Our Reference:	UNITS	168500-1	168500-2	168500-3	168500-4
Your Reference	---------- -	BH8	BH4	BH17A	BD1
Date Sampled	----------	2/06/2017	2/06/2017	2/06/2017	2/06/2017
Type of sample		Water	Water	Water	Water
Date extracted	-	05/06/2017	05/06/2017	05/06/2017	05/06/2017
Date analysed	-	05/06/2017	05/06/2017	05/06/2017	05/06/2017
Total Phenolics (as Phenol)	mg/L	<0.05	<0.05	<0.05	<0.05

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

HM in water - dissolved Our Reference: Your Reference Date Sampled Type of sample	UNITS ---------- - ----------	168500-1 BH8 2/06/2017 Water	168500-2 BH4 2/06/2017 Water	168500-3 BH17A 2/06/2017 Water	168500-4 BD1 2/06/2017 Water
Date prepared	-	05/06/2017	05/06/2017	05/06/2017	05/06/2017
Date analysed	-	05/06/2017	05/06/2017	05/06/2017	05/06/2017
Arsenic-Dissolved	µg/L	4	8	19	4
Cadmium-Dissolved	µg/L	<0.1	<0.1	<0.1	<0.1
Chromium-Dissolved	µg/L	<1	<1	<1	<1
Copper-Dissolved	µg/L	1	3	3	<1
Lead-Dissolved	µg/L	<1	<1	<1	<1
Mercury-Dissolved	µg/L	<0.05	<0.05	<0.05	<0.05
Nickel-Dissolved	µg/L	6	35	39	6
Zinc-Dissolved	µg/L	10	8	25	8

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

Cations in water Dissolved				
Our Reference:	UNITS	168500-1	168500-2	168500-3
Your Reference	---------- -	BH8	BH4	BH17A
Date Sampled	----------	2/06/2017	2/06/2017	2/06/2017
Type of sample		Water	Water	Water
Date digested	-	05/06/2017	05/06/2017	05/06/2017
Date analysed	-	05/06/2017	05/06/2017	05/06/2017
Calcium - Dissolved	mg/L	60	160	83
Magnesium - Dissolved	mg/L	61	190	94
Hardness	$mgCaCO_3/L$	400	1,200	590

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

Asbestos ID - materials		
Our Reference:	UNITS	168500-7
Your Reference	---------- -	A01
Date Sampled	----------	2/06/2017
Type of sample		material
Date analysed	-	6/06/2017
Mass / Dimension of Sample	-	175x130x6mm
Sample Description	-	Beige compressed fibre cement material
Asbestos ID in materials	-	No asbestos detected Organic fibre detected

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

Method ID	Methodology Summary
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Metals-022	Determination of various metals by ICP-MS.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Metals-020	Determination of various metals by ICP-AES.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

QUALITY CONTROL VOCs in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			05/06/2017	[NT]	[NT]	LCS-W1	05/06/2017
Date analysed	-			05/06/2017	[NT]	[NT]	LCS-W1	05/06/2017
Dichlorodifluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Chloromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Vinyl Chloride	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Bromomethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Chloroethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
Trichlorofluoromethane	µg/L	10	Org-013	<10	[NT]	[NT]	[NR]	[NR]
1,1-Dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Trans-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	101%
Cis-1,2-dichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Chloroform	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	103%
2,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	99%
1,1,1-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	91%
1,1-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Cyclohexane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Carbon tetrachloride	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Dibromomethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Trichloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	86%
Bromodichloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	102%
trans-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
cis-1,3-dichloropropene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1,2-trichloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3-dichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Dibromochloromethane	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	113%
1,2-dibromoethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Tetrachloroethene	µg/L	1	Org-013	<1	[NT]	[NT]	LCS-W1	98%
1,1,1,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Chlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Ethylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromoform	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
m+p-xylene	µg/L	2	Org-013	<2	[NT]	[NT]	[NR]	[NR]
Styrene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,1,2,2-tetrachloroethane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
o-xylene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

QUALITY CONTROL VOCs in water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
1,2,3-trichloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Isopropylbenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Bromobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
n-propyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
2-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
4-chlorotoluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3,5-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Tert-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,4-trimethyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,3-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Sec-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,4-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
4-isopropyl toluene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
n-butyl benzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2-dibromo-3-chloropropane	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,4-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Hexachlorobutadiene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
1,2,3-trichlorobenzene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-013	113	[NT]	[NT]	LCS-W1	111%
Surrogate toluene-d8	%		Org-013	98	[NT]	[NT]	LCS-W1	99%
Surrogate 4-BFB	%		Org-013	88	[NT]	[NT]	LCS-W1	86%

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			05/06/2017	[NT]	[NT]	LCS-W2	05/06/2017
Date analysed	-			05/06/2017	[NT]	[NT]	LCS-W2	05/06/2017
TRHC$_6$ - C$_9$	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W2	103%
TRHC$_6$ - C$_{10}$	µg/L	10	Org-016	<10	[NT]	[NT]	LCS-W2	103%
Benzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W2	80%
Toluene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W2	119%
Ethylbenzene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W2	103%
m+p-xylene	µg/L	2	Org-016	<2	[NT]	[NT]	LCS-W2	107%
o-xylene	µg/L	1	Org-016	<1	[NT]	[NT]	LCS-W2	129%
Naphthalene	µg/L	1	Org-013	<1	[NT]	[NT]	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	113	[NT]	[NT]	LCS-W2	105%
Surrogate toluene-d8	%		Org-016	98	[NT]	[NT]	LCS-W2	120%
Surrogate 4-BFB	%		Org-016	88	[NT]	[NT]	LCS-W2	129%

QUALITY CONTROL svTRH (C10-C40) in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			05/06/2017	[NT]	[NT]	LCS-W1	05/06/2017
Date analysed	-			05/06/2017	[NT]	[NT]	LCS-W1	05/06/2017
TRHC$_{10}$ - C$_{14}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	86%
TRHC$_{15}$ - C$_{28}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	110%
TRHC$_{29}$ - C$_{36}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	100%
TRH>C$_{10}$ - C$_{16}$	µg/L	50	Org-003	<50	[NT]	[NT]	LCS-W1	86%
TRH>C$_{16}$ - C$_{34}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	110%
TRH>C$_{34}$ - C$_{40}$	µg/L	100	Org-003	<100	[NT]	[NT]	LCS-W1	100%
Surrogate o-Terphenyl	%		Org-003	75	[NT]	[NT]	LCS-W1	83%

QUALITY CONTROL PAHs in Water - Low Level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			05/06/2017	[NT]	[NT]	LCS-W1	05/06/2017
Date analysed	-			06/06/2017	[NT]	[NT]	LCS-W1	06/06/2017
Naphthalene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	LCS-W1	80%
Acenaphthylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	LCS-W1	82%
Phenanthrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	LCS-W1	93%
Anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	LCS-W1	96%
Pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	LCS-W1	91%

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

QUALITY CONTROL PAHs in Water - Low Level	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	LCS-W1	102%
Benzo(b,j +k)fluoranthene	µg/L	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	LCS-W1	98%
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	µg/L	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	100	[NT]	[NT]	LCS-W1	73%
QUALITY CONTROL Total Phenolics in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			05/06/2017	[NT]	[NT]	LCS-W2	05/06/2017
Date analysed	-			05/06/2017	[NT]	[NT]	LCS-W2	05/06/2017
Total Phenolics (as Phenol)	mg/L	0.05	Inorg-031	<0.05	[NT]	[NT]	LCS-W2	104%
QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			05/06/2017	[NT]	[NT]	LCS-W2	05/06/2017
Date analysed	-			05/06/2017	[NT]	[NT]	LCS-W2	05/06/2017
Arsenic-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	99%
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	[NT]	[NT]	LCS-W2	101%
Chromium-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	93%
Copper-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	97%
Lead-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	102%
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	[NT]	[NT]	LCS-W2	84%
Nickel-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	97%
Zinc-Dissolved	µg/L	1	Metals-022	<1	[NT]	[NT]	LCS-W2	101%

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

QUALITY CONTROL Cations in water Dissolved	UNITS	PQL	METHOD	Blank
Date digested	-			05/06/2017
Date analysed	-			05/06/2017
Calcium - Dissolved	mg/L	0.5	Metals-020	<0.5
Magnesium - Dissolved	mg/L	0.5	Metals-020	<0.5
Hardness	mgCaCO3/L	3		[NT]

QUALITY CONTROL Cations in water Dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date digested	-	[NT]	[NT]	LCS-W1	05/06/2017
Date analysed	-	[NT]	[NT]	LCS-W1	05/06/2017
Calcium - Dissolved	mg/L	[NT]	[NT]	LCS-W1	103%
Magnesium - Dissolved	mg/L	[NT]	[NT]	LCS-W1	103%
Hardness	mgCaCO3/L	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL HM in water - dissolved	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	168500-2	05/06/2017
Date analysed	-	[NT]	[NT]	168500-2	05/06/2017
Arsenic-Dissolved	µg/L	[NT]	[NT]	[NR]	[NR]
Cadmium-Dissolved	µg/L	[NT]	[NT]	[NR]	[NR]
Chromium-Dissolved	µg/L	[NT]	[NT]	[NR]	[NR]
Copper-Dissolved	µg/L	[NT]	[NT]	[NR]	[NR]
Lead-Dissolved	µg/L	[NT]	[NT]	[NR]	[NR]
Mercury-Dissolved	µg/L	[NT]	[NT]	168500-2	78%
Nickel-Dissolved	µg/L	[NT]	[NT]	[NR]	[NR]
Zinc-Dissolved	µg/L	[NT]	[NT]	[NR]	[NR]

Client Reference: **85862.01, Mercedes Benz Croydon Showroom**

Report Comments:

Asbestos ID was analysed by Approved Identifier: Paul Ching
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NR: Test not required
<: Less than
PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than
NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Client Reference: 85862.01, Mercedes Benz Croydon Showroom

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	85862.01	**Suburb:**	Croydon	**To:**	ELS
Project Name:	Mercedes Benz Croydon Showroom	**Order Number**			
Project Manager:	David Holden	**Sampler:**	CB	**Attn:**	Aileen Hie
Emails:	david.holden@douglaspartners.com.au		chris.bagia@douglaspartners.com.au	**Phone:**	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☐ Standard ☒			**Email:**	Ahie@envirolab.com.au
Prior Storage:	☒ Esky ☐ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐	No ☒	(If YES, then handle, transport and store in accordance with FPM HAZID)

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, P - plastic)	Analytes: Combo 4L	VOC	Hardness	BTEX	Asbestos (Fragment ID)					Notes/preservation
BH8	1	02/06/17	W	G/P	X	X	X							
BH4	2	02/06/17	W	G/P	X	X	X							
BH17A	3	02/06/17	W	G/P	X	X	X							
BD1	4	02/06/17	W	G/P	X									
Trip Spike	5							X						
Trip Blank	6							X						
A01	7	02/06/17	fragment	-					X					
PQL (S) mg/kg													**ANZECC PQLs req'd for all water analytes** ☐	

ENVIROLAB
~~Envirolab Services~~
~~12 Ashley St~~
~~Chatswood NSW 2067~~
~~Ph: (02) 9910 6200~~
~~Job No:~~ 168500
Date Received: 2/6
Time Received: 17:30
Received by: DW
~~Temp: Cool/Ambient~~
Cooling: Ice/Icepack 15.2
Security: ~~Intact~~/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Metals to Analyse: 8HM unless specified here:

Lab Report/Reference No:

Total number of samples in container: **Relinquished by:** **Transported to laboratory by:**

Send Results to: Douglas Partners Pty Ltd **Address** **Phone:** **Fax:**

Signed: **Received by:** **Date & Time:** 2/6/17 17:30

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **168541**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden

Sample log in details:

Your Reference:	**85862.01, Mercedes Benz Showroom**		
No. of samples:	12 soils		
Date samples received / completed instructions received	05/06/17	/	05/06/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	8/06/17	/	8/06/17
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Client Reference: 85862.01, Mercedes Benz Showroom

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	168541-1	168541-3	168541-4	168541-5	168541-6
Your Reference	---------- -	BH13	BH13	BH13	BH14	BH14
Depth	----------	0.15-0.25	0.4-0.5	1.4-1.5	0.4-0.5	1.4-1.5
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	07/06/2017	07/06/2017	07/06/2017	07/06/2017	07/06/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	111	111	109	107	112

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	168541-7	168541-8	168541-9	168541-10	168541-11
Your Reference	---------- -	BH19	BH19	BH20	BH21	BH21
Depth	----------	0.4-0.5	0.7-0.8	0.2-0.3	0.18-0.25	0.9-1.0
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	07/06/2017	07/06/2017	07/06/2017	07/06/2017	07/06/2017
TRH C_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	110	105	109	107	114

Client Reference: 85862.01, Mercedes Benz Showroom

vTRH(C6-C10)/BTEXN in Soil		
Our Reference:	UNITS	168541-12
Your Reference	---------- -	BD1/030617
Depth	----------	-
Date Sampled		3/06/2017
Type of sample		Soil
Date extracted	-	06/06/2017
Date analysed	-	07/06/2017
TRH C_6 - C_9	mg/kg	<25
TRH C_6 - C_{10}	mg/kg	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25
Benzene	mg/kg	<0.2
Toluene	mg/kg	<0.5
Ethylbenzene	mg/kg	<1
m+p-xylene	mg/kg	<2
o-Xylene	mg/kg	<1
Total +ve Xylenes	mg/kg	<1
naphthalene	mg/kg	<1
Surrogate aaa-Trifluorotoluene	%	105

Client Reference: 85862.01, Mercedes Benz Showroom

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	168541-1	168541-3	168541-4	168541-5	168541-6
Your Reference	---------- -	BH13	BH13	BH13	BH14	BH14
Depth	----------	0.15-0.25	0.4-0.5	1.4-1.5	0.4-0.5	1.4-1.5
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	100	<50	<50	<50
Surrogate o-Terphenyl	%	76	78	78	81	76

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	168541-7	168541-8	168541-9	168541-10	168541-11
Your Reference	---------- -	BH19	BH19	BH20	BH21	BH21
Depth	----------	0.4-0.5	0.7-0.8	0.2-0.3	0.18-0.25	0.9-1.0
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	250	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	490	<100	<100	<100	780
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	100	1,200
TRH>C$_{10}$-C$_{16}$	mg/kg	480	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	480	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	260	<100	130	110	1,700
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	560
Total +ve TRH (>C10-C40)	mg/kg	750	<50	130	110	2,200
Surrogate o-Terphenyl	%	130	77	78	75	80

Client Reference: 85862.01, Mercedes Benz Showroom

svTRH (C10-C40) in Soil		
Our Reference:	UNITS	168541-12
Your Reference	---------- -	BD1/030617
Depth	----------	-
Date Sampled		3/06/2017
Type of sample		Soil
Date extracted	-	06/06/2017
Date analysed	-	07/06/2017
TRH C_{10} - C_{14}	mg/kg	<50
TRH C_{15} - C_{28}	mg/kg	<100
TRH C_{29} - C_{36}	mg/kg	<100
TRH >C_{10}-C_{16}	mg/kg	<50
TRH >C_{10} - C_{16} less Naphthalene (F2)	mg/kg	<50
TRH >C_{16}-C_{34}	mg/kg	<100
TRH >C_{34}-C_{40}	mg/kg	<100
Total +ve TRH (>C10-C40)	mg/kg	<50
Surrogate o-Terphenyl	%	81

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- -	168541-1 BH13 0.15-0.25 3/06/2017 Soil	168541-3 BH13 0.4-0.5 3/06/2017 Soil	168541-4 BH13 1.4-1.5 3/06/2017 Soil	168541-5 BH14 0.4-0.5 3/06/2017 Soil	168541-6 BH14 1.4-1.5 3/06/2017 Soil
Date extracted	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	0.4	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Phenanthrene	mg/kg	<0.1	0.4	<0.1	2.2	<0.1
Anthracene	mg/kg	<0.1	0.2	<0.1	0.6	<0.1
Fluoranthene	mg/kg	0.1	1.7	<0.1	3.5	<0.1
Pyrene	mg/kg	0.1	1.8	<0.1	3.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.9	<0.1	1.3	<0.1
Chrysene	mg/kg	<0.1	1	<0.1	1.3	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	1	<0.2	2	<0.2
Benzo(a)pyrene	mg/kg	0.06	0.82	<0.05	1.1	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.4	<0.1	0.5	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	0.1	<0.1	0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.5	<0.1	0.6	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	1.2	<0.5	1.6	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	1.2	<0.5	1.6	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	1.2	<0.5	1.6	<0.5
Total +ve PAH's	mg/kg	0.3	9.2	<0.05	17	<0.05
Surrogate p-Terphenyl-d14	%	95	84	83	100	93

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- -	168541-7 BH19 0.4-0.5 3/06/2017 Soil	168541-8 BH19 0.7-0.8 3/06/2017 Soil	168541-9 BH20 0.2-0.3 3/06/2017 Soil	168541-10 BH21 0.18-0.25 3/06/2017 Soil	168541-11 BH21 0.9-1.0 3/06/2017 Soil
Date extracted	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	08/06/2017	08/06/2017	08/06/2017	08/06/2017	08/06/2017
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	0.4	0.2	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.2	0.3	2.2	0.5	<0.1
Anthracene	mg/kg	<0.1	<0.1	0.6	0.2	<0.1
Fluoranthene	mg/kg	<0.1	0.5	3.8	1.3	<0.1
Pyrene	mg/kg	<0.1	0.5	3.7	1.3	<0.1
Benzo(a)anthracene	mg/kg	<0.1	0.2	1.6	0.6	<0.1
Chrysene	mg/kg	<0.1	0.3	1.6	0.7	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	0.5	2.4	1	<0.2
Benzo(a)pyrene	mg/kg	<0.05	0.2	1.5	0.78	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	0.2	0.7	0.5	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	0.2	0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	0.2	1.0	0.6	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	2.2	1.2	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	2.2	1.2	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	2.2	1.2	<0.5
Total +ve PAH's	mg/kg	0.2	3.0	20	7.9	<0.05
Surrogate p-Terphenyl-d14	%	101	83	85	87	92

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in Soil		
Our Reference:	UNITS	168541-12
Your Reference	----------	BD1/030617
	-	
Depth	----------	-
Date Sampled		3/06/2017
Type of sample		Soil
Date extracted	-	06/06/2017
Date analysed	-	08/06/2017
Naphthalene	mg/kg	<0.1
Acenaphthylene	mg/kg	<0.1
Acenaphthene	mg/kg	<0.1
Fluorene	mg/kg	<0.1
Phenanthrene	mg/kg	0.3
Anthracene	mg/kg	<0.1
Fluoranthene	mg/kg	0.4
Pyrene	mg/kg	0.4
Benzo(a)anthracene	mg/kg	0.2
Chrysene	mg/kg	0.2
Benzo(b,j+k)fluoranthene	mg/kg	0.3
Benzo(a)pyrene	mg/kg	0.2
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5
Total +ve PAH's	mg/kg	2.0
Surrogate p-Terphenyl-d14	%	89

Client Reference: 85862.01, Mercedes Benz Showroom

Organochlorine Pesticides in soil				
Our Reference:	UNITS	168541-1	168541-7	168541-9
Your Reference	----------	BH13	BH19	BH20
	-			
Depth	----------	0.15-0.25	0.4-0.5	0.2-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	06/06/2017	06/06/2017	06/06/2017
HCB	mg/kg	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	90	94

Client Reference: 85862.01, Mercedes Benz Showroom

Organophosphorus Pesticides				
Our Reference:	UNITS	168541-1	168541-7	168541-9
Your Reference	----------	BH13	BH19	BH20
	-			
Depth	----------	0.15-0.25	0.4-0.5	0.2-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	06/06/2017	06/06/2017	06/06/2017
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1
Surrogate TCMX	%	96	90	94

Client Reference: 85862.01, Mercedes Benz Showroom

PCBs in Soil				
Our Reference:	UNITS	168541-1	168541-7	168541-9
Your Reference	----------	BH13	BH19	BH20
	-			
Depth	----------	0.15-0.25	0.4-0.5	0.2-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	06/06/2017	06/06/2017	06/06/2017
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1
Surrogate TCLMX	%	96	90	94

Client Reference: 85862.01, Mercedes Benz Showroom

Acid Extractable metals in soil						
Our Reference:	UNITS	168541-1	168541-3	168541-4	168541-5	168541-6
Your Reference	----------	BH13	BH13	BH13	BH14	BH14
Depth	----------	0.15-0.25	0.4-0.5	1.4-1.5	0.4-0.5	1.4-1.5
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Arsenic	mg/kg	<4	11	10	54	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	1	<0.4
Chromium	mg/kg	12	16	29	27	11
Copper	mg/kg	13	28	16	62	9
Lead	mg/kg	110	37	22	480	20
Mercury	mg/kg	<0.1	<0.1	<0.1	0.2	<0.1
Nickel	mg/kg	4	4	3	16	<1
Zinc	mg/kg	110	34	7	590	2

Acid Extractable metals in soil						
Our Reference:	UNITS	168541-7	168541-8	168541-9	168541-10	168541-11
Your Reference	----------	BH19	BH19	BH20	BH21	BH21
Depth	----------	0.4-0.5	0.7-0.8	0.2-0.3	0.18-0.25	0.9-1.0
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Arsenic	mg/kg	12	9	<4	5	9
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	31	27	21	33	24
Copper	mg/kg	17	24	33	66	27
Lead	mg/kg	73	150	61	110	20
Mercury	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
Nickel	mg/kg	13	7	13	24	3
Zinc	mg/kg	66	110	57	160	11

Client Reference: 85862.01, Mercedes Benz Showroom

Acid Extractable metals in soil				
Our Reference:	UNITS	168541-12	168541-13	168541-14
Your Reference	----------	BD1/030617	BH13 - [TRIPLICATE]	BH20 - [TRIPLICATE]
Depth	----------	-	0.15-0.25	0.2-0.3
Date Sampled		3/06/2017	03/06/2017	03/06/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	06/06/2017	06/06/2017	06/06/2017
Arsenic	mg/kg	14	8	<4
Cadmium	mg/kg	2	<0.4	<0.4
Chromium	mg/kg	12	18	15
Copper	mg/kg	45	22	59
Lead	mg/kg	320	150	80
Mercury	mg/kg	<0.1	<0.1	<0.1
Nickel	mg/kg	13	16	11
Zinc	mg/kg	330	150	69

Client Reference: 85862.01, Mercedes Benz Showroom

Misc Soil - Inorg				
Our Reference:	UNITS	168541-1	168541-7	168541-9
Your Reference	----------	BH13	BH19	BH20
	-			
Depth	----------	0.15-0.25	0.4-0.5	0.2-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	06/06/2017	06/06/2017	06/06/2017
Total Phenolics (as Phenol)	mg/kg	<5	<5	<5

Client Reference: 85862.01, Mercedes Benz Showroom

Moisture						
Our Reference:	UNITS	168541-1	168541-3	168541-4	168541-5	168541-6
Your Reference	---------- -	BH13	BH13	BH13	BH14	BH14
Depth	----------	0.15-0.25	0.4-0.5	1.4-1.5	0.4-0.5	1.4-1.5
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	07/06/2017	07/06/2017	07/06/2017	07/06/2017	07/06/2017
Moisture	%	12	17	22	24	16

Moisture						
Our Reference:	UNITS	168541-7	168541-8	168541-9	168541-10	168541-11
Your Reference	---------- -	BH19	BH19	BH20	BH21	BH21
Depth	----------	0.4-0.5	0.7-0.8	0.2-0.3	0.18-0.25	0.9-1.0
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	06/06/2017	06/06/2017	06/06/2017	06/06/2017	06/06/2017
Date analysed	-	07/06/2017	07/06/2017	07/06/2017	07/06/2017	07/06/2017
Moisture	%	23	21	14	11	19

Moisture		
Our Reference:	UNITS	168541-12
Your Reference	---------- -	BD1/030617
Depth	----------	-
Date Sampled		3/06/2017
Type of sample		Soil
Date prepared	-	06/06/2017
Date analysed	-	07/06/2017
Moisture	%	23

Client Reference: 85862.01, Mercedes Benz Showroom

Asbestos ID - soils						
Our Reference:	UNITS	168541-1	168541-2	168541-5	168541-7	168541-9
Your Reference	---------- -	BH13	BH13	BH14	BH19	BH20
Depth	----------	0.15-0.25	0.25-0.3	0.4-0.5	0.4-0.5	0.2-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	8/06/2017	8/06/2017	8/06/2017	8/06/2017	8/06/2017
Sample mass tested	g	Approx. 35g	Approx. 30g	Approx. 25g	Approx. 45g	Approx. 45g
Sample Description	-	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils		
Our Reference:	UNITS	168541-10
Your Reference	---------- -	BH21
Depth	----------	0.18-0.25
Date Sampled		3/06/2017
Type of sample		Soil
Date analysed	-	8/06/2017
Sample mass tested	g	Approx. 50g
Sample Description	-	Brown coarse-grained soil & rocks
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected

Client Reference: 85862.01, Mercedes Benz Showroom

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.

Client Reference: 85862.01, Mercedes Benz Showroom

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-031	Total Phenolics by segmented flow analyser (in line distillation with colourimetric finish). Solids are extracted in a caustic media prior to analysis.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
Date analysed	-			07/06/2017	168541-1	07/06/2017 || 07/06/2017	LCS-2	07/06/2017
TRHC_6 - C_9	mg/kg	25	Org-016	<25	168541-1	<25 || <25	LCS-2	111%
TRHC_6 - C_{10}	mg/kg	25	Org-016	<25	168541-1	<25 || <25	LCS-2	111%
Benzene	mg/kg	0.2	Org-016	<0.2	168541-1	<0.2 || <0.2	LCS-2	97%
Toluene	mg/kg	0.5	Org-016	<0.5	168541-1	<0.5 || <0.5	LCS-2	111%
Ethylbenzene	mg/kg	1	Org-016	<1	168541-1	<1 || <1	LCS-2	113%
m+p-xylene	mg/kg	2	Org-016	<2	168541-1	<2 || <2	LCS-2	118%
o-Xylene	mg/kg	1	Org-016	<1	168541-1	<1 || <1	LCS-2	120%
naphthalene	mg/kg	1	Org-014	<1	168541-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	110	168541-1	111 || 114 || RPD: 3	LCS-2	127%
QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
Date analysed	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
TRHC_{10} - C_{14}	mg/kg	50	Org-003	<50	168541-1	<50 || <50	LCS-2	116%
TRHC_{15} - C_{28}	mg/kg	100	Org-003	<100	168541-1	<100 || <100	LCS-2	112%
TRHC_{29} - C_{36}	mg/kg	100	Org-003	<100	168541-1	<100 || <100	LCS-2	106%
TRH>C_{10}-C_{16}	mg/kg	50	Org-003	<50	168541-1	<50 || <50	LCS-2	116%
TRH>C_{16}-C_{34}	mg/kg	100	Org-003	<100	168541-1	<100 || <100	LCS-2	112%
TRH>C_{34}-C_{40}	mg/kg	100	Org-003	<100	168541-1	<100 || <100	LCS-2	106%
Surrogate o-Terphenyl	%		Org-003	95	168541-1	76 || 77 || RPD: 1	LCS-2	125%
QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
Date analysed	-			08/06/2017	168541-1	08/06/2017 || 08/06/2017	LCS-2	08/06/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	LCS-2	104%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	LCS-2	93%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	LCS-2	104%
Anthracene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	168541-1	0.1 || <0.1	LCS-2	104%
Pyrene	mg/kg	0.1	Org-012	<0.1	168541-1	0.1 || <0.1	LCS-2	103%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	LCS-2	114%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	168541-1	<0.2 || <0.2	[NR]	[NR]

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	168541-1	0.06 || <0.05	LCS-2	79%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	100	168541-1	95 || 90 || RPD: 5	LCS-2	119%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
Date analysed	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
HCB	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	LCS-2	101%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	LCS-2	101%
Heptachlor	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	LCS-2	105%
delta-BHC	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	LCS-2	98%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	LCS-2	109%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	LCS-2	110%
Dieldrin	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	LCS-2	113%
Endrin	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	LCS-2	100%
pp-DDD	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	LCS-2	102%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	LCS-2	75%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	96	168541-1	96 || 95 || RPD: 1	LCS-2	116%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
Date analysed	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	LCS-2	75%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	LCS-2	76%
Dimethoate	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	LCS-2	74%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	LCS-2	81%
Malathion	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	LCS-2	80%
Parathion	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	LCS-2	106%
Ronnel	mg/kg	0.1	Org-008	<0.1	168541-1	<0.1 || <0.1	LCS-2	82%
Surrogate TCMX	%		Org-008	96	168541-1	96 || 95 || RPD: 1	LCS-2	97%
QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
Date analysed	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	168541-1	<0.1 || <0.1	LCS-2	103%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	168541-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	96	168541-1	96 || 95 || RPD: 1	LCS-2	97%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
Date analysed	-			06/06/2017	168541-1	06/06/2017 || 06/06/2017	LCS-2	06/06/2017
Arsenic	mg/kg	4	Metals-020	<4	168541-1	<4 || 14	LCS-2	115%
Cadmium	mg/kg	0.4	Metals-020	<0.4	168541-1	<0.4 || <0.4	LCS-2	106%
Chromium	mg/kg	1	Metals-020	<1	168541-1	12 || 27 || RPD: 77	LCS-2	110%
Copper	mg/kg	1	Metals-020	<1	168541-1	13 || 110 || RPD: 158	LCS-2	110%
Lead	mg/kg	1	Metals-020	<1	168541-1	110 || 130 || RPD: 17	LCS-2	103%
Mercury	mg/kg	0.1	Metals-021	<0.1	168541-1	<0.1 || <0.1	LCS-2	107%
Nickel	mg/kg	1	Metals-020	<1	168541-1	4 || 16 || RPD: 120	LCS-2	102%
Zinc	mg/kg	1	Metals-020	<1	168541-1	110 || 120 || RPD: 9	LCS-2	104%

QUALITY CONTROL Misc Soil - Inorg	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			06/06/2017	[NT]	[NT]	LCS-1	06/06/2017
Date analysed	-			06/06/2017	[NT]	[NT]	LCS-1	06/06/2017
Total Phenolics (as Phenol)	mg/kg	5	Inorg-031	<5	[NT]	[NT]	LCS-1	100%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	168541-9	06/06/2017 || 06/06/2017
Date analysed	-	168541-9	07/06/2017 || 07/06/2017
$TRHC_6 - C_9$	mg/kg	168541-9	<25 || <25
$TRHC_6 - C_{10}$	mg/kg	168541-9	<25 || <25
Benzene	mg/kg	168541-9	<0.2 || <0.2
Toluene	mg/kg	168541-9	<0.5 || <0.5
Ethylbenzene	mg/kg	168541-9	<1 || <1
m+p-xylene	mg/kg	168541-9	<2 || <2
o-Xylene	mg/kg	168541-9	<1 || <1
naphthalene	mg/kg	168541-9	<1 || <1
Surrogate aaa-Trifluorotoluene	%	168541-9	109 || 106 || RPD: 3

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	168541-9	06/06/2017 || 06/06/2017
Date analysed	-	168541-9	06/06/2017 || 06/06/2017
TRH C_{10} - C_{14}	mg/kg	168541-9	<50 || <50
TRH C_{15} - C_{28}	mg/kg	168541-9	<100 || <100
TRH C_{29} - C_{36}	mg/kg	168541-9	<100 || <100
TRH >C_{10}-C_{16}	mg/kg	168541-9	<50 || <50
TRH >C_{16}-C_{34}	mg/kg	168541-9	130 || <100
TRH >C_{34}-C_{40}	mg/kg	168541-9	<100 || <100
Surrogate o-Terphenyl	%	168541-9	78 || 74 || RPD: 5

QUALITY CONTROL PAHs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	168541-9	06/06/2017 || 06/06/2017
Date analysed	-	168541-9	08/06/2017 || 08/06/2017
Naphthalene	mg/kg	168541-9	<0.1 || <0.1
Acenaphthylene	mg/kg	168541-9	0.4 || 0.1 || RPD: 120
Acenaphthene	mg/kg	168541-9	<0.1 || <0.1
Fluorene	mg/kg	168541-9	0.1 || <0.1
Phenanthrene	mg/kg	168541-9	2.2 || 0.5 || RPD: 126
Anthracene	mg/kg	168541-9	0.6 || 0.2 || RPD: 100
Fluoranthene	mg/kg	168541-9	3.8 || 1.1 || RPD: 110
Pyrene	mg/kg	168541-9	3.7 || 1.2 || RPD: 102
Benzo(a)anthracene	mg/kg	168541-9	1.6 || 0.5 || RPD: 105
Chrysene	mg/kg	168541-9	1.6 || 0.6 || RPD: 91
Benzo(b,j+k)fluoranthene	mg/kg	168541-9	2.4 || 1 || RPD: 82
Benzo(a)pyrene	mg/kg	168541-9	1.5 || 0.65 || RPD: 79
Indeno(1,2,3-c,d)pyrene	mg/kg	168541-9	0.7 || 0.4 || RPD: 55
Dibenzo(a,h)anthracene	mg/kg	168541-9	0.2 || 0.1 || RPD: 67
Benzo(g,h,i)perylene	mg/kg	168541-9	1.0 || 0.5 || RPD: 67
Surrogate p-Terphenyl-d14	%	168541-9	85 || 79 || RPD: 7

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	168541-9	06/06/2017 || 06/06/2017
Date analysed	-	168541-9	06/06/2017 || 06/06/2017
HCB	mg/kg	168541-9	<0.1 || <0.1
alpha-BHC	mg/kg	168541-9	<0.1 || <0.1
gamma-BHC	mg/kg	168541-9	<0.1 || <0.1
beta-BHC	mg/kg	168541-9	<0.1 || <0.1
Heptachlor	mg/kg	168541-9	<0.1 || <0.1
delta-BHC	mg/kg	168541-9	<0.1 || <0.1
Aldrin	mg/kg	168541-9	<0.1 || <0.1
Heptachlor Epoxide	mg/kg	168541-9	<0.1 || <0.1
gamma-Chlordane	mg/kg	168541-9	<0.1 || <0.1
alpha-chlordane	mg/kg	168541-9	<0.1 || <0.1
Endosulfan I	mg/kg	168541-9	<0.1 || <0.1
pp-DDE	mg/kg	168541-9	<0.1 || <0.1
Dieldrin	mg/kg	168541-9	<0.1 || <0.1
Endrin	mg/kg	168541-9	<0.1 || <0.1
pp-DDD	mg/kg	168541-9	<0.1 || <0.1
Endosulfan II	mg/kg	168541-9	<0.1 || <0.1
pp-DDT	mg/kg	168541-9	<0.1 || <0.1
Endrin Aldehyde	mg/kg	168541-9	<0.1 || <0.1
Endosulfan Sulphate	mg/kg	168541-9	<0.1 || <0.1
Methoxychlor	mg/kg	168541-9	<0.1 || <0.1
Surrogate TCMX	%	168541-9	94 || 95 || RPD: 1

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Organophosphorus Pesticides	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	168541-9	06/06/2017 || 06/06/2017
Date analysed	-	168541-9	06/06/2017 || 06/06/2017
Azinphos-methyl (Guthion)	mg/kg	168541-9	<0.1 || <0.1
Bromophos-ethyl	mg/kg	168541-9	<0.1 || <0.1
Chlorpyriphos	mg/kg	168541-9	<0.1 || <0.1
Chlorpyriphos-methyl	mg/kg	168541-9	<0.1 || <0.1
Diazinon	mg/kg	168541-9	<0.1 || <0.1
Dichlorvos	mg/kg	168541-9	<0.1 || <0.1
Dimethoate	mg/kg	168541-9	<0.1 || <0.1
Ethion	mg/kg	168541-9	<0.1 || <0.1
Fenitrothion	mg/kg	168541-9	<0.1 || <0.1
Malathion	mg/kg	168541-9	<0.1 || <0.1
Parathion	mg/kg	168541-9	<0.1 || <0.1
Ronnel	mg/kg	168541-9	<0.1 || <0.1
Surrogate TCMX	%	168541-9	94 || 95 || RPD: 1
QUALITY CONTROL PCBs in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date extracted	-	168541-9	06/06/2017 || 06/06/2017
Date analysed	-	168541-9	06/06/2017 || 06/06/2017
Aroclor 1016	mg/kg	168541-9	<0.1 || <0.1
Aroclor 1221	mg/kg	168541-9	<0.1 || <0.1
Aroclor 1232	mg/kg	168541-9	<0.1 || <0.1
Aroclor 1242	mg/kg	168541-9	<0.1 || <0.1
Aroclor 1248	mg/kg	168541-9	<0.1 || <0.1
Aroclor 1254	mg/kg	168541-9	<0.1 || <0.1
Aroclor 1260	mg/kg	168541-9	<0.1 || <0.1
Surrogate TCLMX	%	168541-9	94 || 95 || RPD: 1
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	168541-9	06/06/2017 || 06/06/2017
Date analysed	-	168541-9	06/06/2017 || 06/06/2017
Arsenic	mg/kg	168541-9	<4 || <4
Cadmium	mg/kg	168541-9	<0.4 || <0.4
Chromium	mg/kg	168541-9	21 || 11 || RPD: 62
Copper	mg/kg	168541-9	33 || 44 || RPD: 29
Lead	mg/kg	168541-9	61 || 94 || RPD: 43
Mercury	mg/kg	168541-9	<0.1 || <0.1
Nickel	mg/kg	168541-9	13 || 9 || RPD: 36
Zinc	mg/kg	168541-9	57 || 60 || RPD: 5

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	168541-5	06/06/2017 || 06/06/2017
Date analysed	-	168541-5	06/06/2017 || 06/06/2017
Arsenic	mg/kg	168541-5	54 || 47 || RPD: 14
Cadmium	mg/kg	168541-5	1 || 1 || RPD: 0
Chromium	mg/kg	168541-5	27 || 24 || RPD: 12
Copper	mg/kg	168541-5	62 || 63 || RPD: 2
Lead	mg/kg	168541-5	480 || 470 || RPD: 2
Mercury	mg/kg	168541-5	0.2 || 0.2 || RPD: 0
Nickel	mg/kg	168541-5	16 || 14 || RPD: 13
Zinc	mg/kg	168541-5	590 || 530 || RPD: 11
QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Date prepared	-	168541-12	06/06/2017 || 06/06/2017
Date analysed	-	168541-12	06/06/2017 || 06/06/2017
Arsenic	mg/kg	168541-12	14 || 11 || RPD: 24
Cadmium	mg/kg	168541-12	2 || 3 || RPD: 40
Chromium	mg/kg	168541-12	12 || 17 || RPD: 34
Copper	mg/kg	168541-12	45 || 55 || RPD: 20
Lead	mg/kg	168541-12	320 || 360 || RPD: 12
Mercury	mg/kg	168541-12	<0.1 || 0.1
Nickel	mg/kg	168541-12	13 || 15 || RPD: 14
Zinc	mg/kg	168541-12	330 || 360 || RPD: 9

Client Reference: **85862.01, Mercedes Benz Showroom**

Report Comments:

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 168541-1 for Cr, Cu and Ni. Therefore a triplicate result has been issued as laboratory sample number 168541-13.

Asbestos: A portion of the supplied sample was sub-sampled for asbestos analysis according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g of sample in its own container.
Note: Samples 168541-1, 2, 5, 7, 9, 10 were sub-sampled from jars provided by the client.

PAH_S:
The RPD for duplicate results is accepted due to the non homogenous nature of the sample/s.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 168541-9 for Cr. Therefore a triplicate result has been issued as laboratory sample number 168541-14.

Asbestos ID was analysed by Approved Identifier:	Lucy Zhu
Asbestos ID was authorised by Approved Signatory:	Paul Ching

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Client Reference: 85862.01, Mercedes Benz Showroom

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Aileen Hie

From: David Holden <David.Holden@douglaspartners.com.au>
Sent: Saturday, 10 June 2017 6:44 PM
To: Aileen Hie
Subject: 168541 85862.01, Mercedes Benz Showroom- Additional TCLP analysis

Hi Aileen,

Could you please undertake TCLP analysis on the following samples for ELS job 168541 (DP:85862.01)

Sample:

-168541-1 (BH13/0.15-0.25)- TCLP- lead
-168541-3 (BH13/0.4-0.5)- TCLP- PAH
-168541-5 (BH14/0.4-0.5)- TCLP- PAH, lead
-168541-8 (BBH19/0.7-0.8)- TCLP- lead
-168541-9 (BH20/0.2-0.3)- TCLP- PAH
-168451-10 (BH21/0.18-0.25)- TCLP- lead.

Envirolab Ref: 168541A
Due: 15/6/17
2 day T/A.

Need results by midday on Thursday 15th.

Thanks

Dave

David Holden | Environmental Scientist
Douglas Partners Pty Ltd | ABN 75 053 980 117 | www.douglaspartners.com.au
96 Hermitage Road West Ryde NSW 2114 | PO Box 472 West Ryde NSW 1685
P: 02 8878 0652 | F: 02 9809 4095 | M: 0414 768 997 | E: David.Holden@douglaspartners.com.au

FINANCIAL REVIEW
CLIENT CHO
WINNER

This email is confidential. If you are not the intended recipient, please notify us immediately and be aware that any disclosure, copying, distribution or use of the contents of this information is prohibited. Please note that the company does not make any commitment through emails not confirmed by fax or letter.

From: Ken Nguyen [mailto:KNguyen@envirolab.com.au]
Sent: Thursday, 8 June 2017 5:19 PM
To: David Holden
Subject: Results for Registration 168541 85862.01, Mercedes Benz Showroom

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC
an excel file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
customerservice@envirolab.com.au

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **168541-A**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden

Sample log in details:

Your Reference:	**85862.01, Mercedes Benz Showroom**
No. of samples:	Additional Testing on 6 Soils
Date samples received / completed instructions received	05/06/17 / 14/06/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	15/06/17 / 15/06/17
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Client Reference: 85862.01, Mercedes Benz Showroom

Metals in TCLP USEPA1311						
Our Reference:	UNITS	168541-A-1	168541-A-3	168541-A-5	168541-A-8	168541-A-9
Your Reference	---------- -	BH13	BH13	BH14	BH19	BH20
Depth	----------	0.15-0.25	0.4-0.5	0.4-0.5	0.7-0.8	0.2-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	15/06/2017	15/06/2017	15/06/2017	15/06/2017	15/06/2017
Date analysed	-	15/06/2017	[NA]	15/06/2017	15/06/2017	[NA]
pH of soil for fluid# determ.	pH units	7.4	7.2	7.0	6.8	9.4
pH of soil TCLP (after HCl)	pH units	1.6	1.7	1.8	1.8	1.8
Extraction fluid used	-	1	1	1	1	1
pH of final Leachate	pH units	5.0	5.0	5.0	5.0	6.6
Lead in TCLP	mg/L	0.1	[NA]	0.07	0.07	[NA]

Metals in TCLP USEPA1311		
Our Reference:	UNITS	168541-A-10
Your Reference	---------- -	BH21
Depth	----------	0.18-0.25
Date Sampled		3/06/2017
Type of sample		Soil
Date extracted	-	15/06/2017
Date analysed	-	15/06/2017
pH of soil for fluid# determ.	pH units	9.4
pH of soil TCLP (after HCl)	pH units	1.8
Extraction fluid used	-	1
pH of final Leachate	pH units	6.3
Lead in TCLP	mg/L	<0.03

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in TCLP (USEPA 1311)				
Our Reference:	UNITS	168541-A-3	168541-A-5	168541-A-9
Your Reference	----------	BH13	BH14	BH20
	-			
Depth	----------	0.4-0.5	0.4-0.5	0.2-0.3
Date Sampled		3/06/2017	3/06/2017	3/06/2017
Type of sample		Soil	Soil	Soil
Date extracted	-	15/06/2017	15/06/2017	15/06/2017
Date analysed	-	15/06/2017	15/06/2017	15/06/2017
Naphthalene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthylene in TCLP	mg/L	<0.001	<0.001	<0.001
Acenaphthene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluorene in TCLP	mg/L	<0.001	<0.001	<0.001
Phenanthrene in TCLP	mg/L	<0.001	<0.001	<0.001
Anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Fluoranthene in TCLP	mg/L	<0.001	<0.001	<0.001
Pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(a)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Chrysene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(bjk)fluoranthene in TCLP	mg/L	<0.002	<0.002	<0.002
Benzo(a)pyrene in TCLP	mg/L	<0.001	<0.001	<0.001
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	<0.001	<0.001	<0.001
Dibenzo(a,h)anthracene in TCLP	mg/L	<0.001	<0.001	<0.001
Benzo(g,h,i)perylene in TCLP	mg/L	<0.001	<0.001	<0.001
Total +ve PAH's	mg/L	NIL (+)VE	NIL (+)VE	NIL (+)VE
Surrogate p-Terphenyl-d14	%	83	90	104

Client Reference: 85862.01, Mercedes Benz Showroom

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP) using Zero Headspace Extraction (zHE) using AS4439 and USEPA 1311.
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.
Org-012	Leachates are extracted with Dichloromethane and analysed by GC-MS.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013.
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS.

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/06/2017	[NT]	[NT]	LCS-W1	15/06/2017
Date analysed	-			15/06/2017	[NT]	[NT]	LCS-W1	15/06/2017
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	94%
QUALITY CONTROL PAHs in TCLP (USEPA 1311)	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			15/06/2017	[NT]	[NT]	LCS-W1	15/06/2017
Date analysed	-			15/06/2017	[NT]	[NT]	LCS-W1	15/06/2017
Naphthalene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	LCS-W1	88%
Acenaphthylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NR]	[NR]
Acenaphthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NR]	[NR]
Fluorene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	LCS-W1	100%
Phenanthrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	LCS-W1	117%
Anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NR]	[NR]
Fluoranthene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	LCS-W1	113%
Pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	LCS-W1	113%
Benzo(a)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NR]	[NR]
Chrysene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	LCS-W1	101%
Benzo(bjk)fluoranthene in TCLP	mg/L	0.002	Org-012	<0.002	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	LCS-W1	85%
Indeno(1,2,3-c,d)pyrene - TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene in TCLP	mg/L	0.001	Org-012	<0.001	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	120	[NT]	[NT]	LCS-W1	83%

Client Reference: **85862.01, Mercedes Benz Showroom**

Report Comments:

Asbestos ID was analysed by Approved Identifier: Lucy Zhu
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NR: Test not required
<: Less than
PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than
NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Client Reference: 85862.01, Mercedes Benz Showroom

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Douglas Partners
Geotechnics | Environment | Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	85862.01	**Suburb:**	Croydon	**To:**	ELS
Project Name:	Mercedes Benz Showroom	**Order Number**			
Project Manager:	DIH	**Sampler:**	CB	**Attn:**	Aileen Hie
Emails:	david.holden@douglaspartners.com			**Phone:**	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☑ Standard ☐			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☑ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Sample Depth	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, B - bag)	Analytes: Combo 3a	Combo 3	Combo 3b	Asbestos ID						Notes/preservation
BH13	0.15-0.25	1	03/06/17	S	G			✓							
BH13	0.25-0.3	2	03/06/17	S	G				✓						
BH13	0.4-0.5	3	03/06/17	S	G		✓								
BH13	1.4-1.5	4	03/06/17	S	G		✓								
BH14	0.4-0.5	5	03/06/17	S	G	✓									
BH14	1.4-1.5	6	03/06/17	S	G		✓								
BH19	0.4-0.5	7	03/06/17	S	G			✓							
BH19	0.7-0.8	8	03/06/17	S	G		✓								
BH20	0.2-0.3	9	03/06/17	S	G			✓							
BH21	0.18-0.25	10	03/06/17	S	G	✓									
BH21	0.9-1.0	11	03/06/17	S	G		✓								
BD1/030617	-	12	03/06/17	S	G		✓								
PQL (S) mg/kg														**ANZECC PQLs req'd for all water analytes** ☐	

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 168541
Date Received: 5/6
Time Received: 11.30
Received by: DM
Temp: Cool/Ambient
Cooling: Ice/Icepack 5.6
Security: Intact/Broken/None

PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit

Lab Report/Reference No:

Metals to Analyse: 8HM unless specified here:

Total number of samples in container: 12 **Relinquished by:** D.Holden **Transported to laboratory by:** Hur

Send Results to: Douglas Partners Pty Ltd **Address** david.holden@douglaspartners.com.au **Phone:** 88780652 **Fax:**

Signed: **Received by:** **Date & Time:** 5/6/17 @ 11.30

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **168542**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden

Sample log in details:

Your Reference:	**85862.01, Mercedes Benz Showroom**		
No. of samples:	1 water		
Date samples received / completed instructions received	05/06/17	/	05/06/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	8/06/17	/	7/06/17
Date of Preliminary Report:	Not Issued		

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Results Approved By:

David Springer
General Manager

Client Reference: 85862.01, Mercedes Benz Showroom

vTRH(C6-C10)/BTEXN in Water		
Our Reference:	UNITS	168542-1
Your Reference	----------	BH11
	-	
Date Sampled	----------	2/06/2017
Type of sample		Water
Date extracted	-	06/06/2017
Date analysed	-	06/06/2017
$TRHC_6$ - C_9	µg/L	86
$TRHC_6$ - C_{10}	µg/L	240
$TRHC_6$ - C_{10} less BTEX (F1)	µg/L	180
Benzene	µg/L	<1
Toluene	µg/L	3
Ethylbenzene	µg/L	4
m+p-xylene	µg/L	23
o-xylene	µg/L	23
Naphthalene	µg/L	4
Surrogate Dibromofluoromethane	%	90
Surrogate toluene-d8	%	76
Surrogate 4-BFB	%	112

Client Reference: 85862.01, Mercedes Benz Showroom

HM in water - dissolved		
Our Reference:	UNITS	168542-1
Your Reference	----------	BH11
	-	
Date Sampled	----------	2/06/2017
Type of sample		Water
Date prepared	-	06/06/2017
Date analysed	-	06/06/2017
Arsenic-Dissolved	µg/L	2
Cadmium-Dissolved	µg/L	<0.1
Chromium-Dissolved	µg/L	<1
Copper-Dissolved	µg/L	<1
Lead-Dissolved	µg/L	<1
Mercury-Dissolved	µg/L	<0.05
Nickel-Dissolved	µg/L	1
Zinc-Dissolved	µg/L	12

Client Reference: 85862.01, Mercedes Benz Showroom

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-013	Water samples are analysed directly by purge and trap GC-MS.
Metals-022	Determination of various metals by ICP-MS.
Metals-021	Determination of Mercury by Cold Vapour AAS.

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Water	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			06/06/2017	168542-1	06/06/2017 || 06/06/2017	LCS-W1	06/06/2017
Date analysed	-			06/06/2017	168542-1	06/06/2017 || 06/06/2017	LCS-W1	06/06/2017
TRHC_6 - C_9	µg/L	10	Org-016	<10	168542-1	86 || 95 || RPD: 10	LCS-W1	110%
TRHC_6 - C_{10}	µg/L	10	Org-016	<10	168542-1	240 || 220 || RPD: 9	LCS-W1	110%
Benzene	µg/L	1	Org-016	<1	168542-1	<1 || <1	LCS-W1	92%
Toluene	µg/L	1	Org-016	<1	168542-1	3 || 4 || RPD: 29	LCS-W1	120%
Ethylbenzene	µg/L	1	Org-016	<1	168542-1	4 || 4 || RPD: 0	LCS-W1	109%
m+p-xylene	µg/L	2	Org-016	<2	168542-1	23 || 23 || RPD: 0	LCS-W1	114%
o-xylene	µg/L	1	Org-016	<1	168542-1	23 || 21 || RPD: 9	LCS-W1	115%
Naphthalene	µg/L	1	Org-013	<1	168542-1	4 || 3 || RPD: 29	[NR]	[NR]
Surrogate Dibromofluoromethane	%		Org-016	87	168542-1	90 || 100 || RPD: 11	LCS-W1	93%
Surrogate toluene-d8	%		Org-016	93	168542-1	76 || 90 || RPD: 17	LCS-W1	128%
Surrogate 4-BFB	%		Org-016	84	168542-1	112 || 108 || RPD: 4	LCS-W1	106%

QUALITY CONTROL HM in water - dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			06/06/2017	168542-1	06/06/2017 || 06/06/2017	LCS-W1	06/06/2017
Date analysed	-			06/06/2017	168542-1	06/06/2017 || 06/06/2017	LCS-W1	06/06/2017
Arsenic-Dissolved	µg/L	1	Metals-022	<1	168542-1	2 || 2 || RPD: 0	LCS-W1	93%
Cadmium-Dissolved	µg/L	0.1	Metals-022	<0.1	168542-1	<0.1 || <0.1	LCS-W1	97%
Chromium-Dissolved	µg/L	1	Metals-022	<1	168542-1	<1 || <1	LCS-W1	93%
Copper-Dissolved	µg/L	1	Metals-022	<1	168542-1	<1 || <1	LCS-W1	94%
Lead-Dissolved	µg/L	1	Metals-022	<1	168542-1	<1 || <1	LCS-W1	97%
Mercury-Dissolved	µg/L	0.05	Metals-021	<0.05	168542-1	<0.05 || [N/T]	LCS-W1	88%
Nickel-Dissolved	µg/L	1	Metals-022	<1	168542-1	1 || 1 || RPD: 0	LCS-W1	94%
Zinc-Dissolved	µg/L	1	Metals-022	<1	168542-1	12 || 12 || RPD: 0	LCS-W1	94%

Client Reference: **85862.01, Mercedes Benz Showroom**

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Client Reference: 85862.01, Mercedes Benz Showroom

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	85862.01	**Suburb:**	Croydon	**To:**	ELS
Project Name:	Mercedes Benz Showroom	**Order Number**			
Project Manager:	DIH	**Sampler:**	CB	**Attn:**	Aileen Hie
Emails:	david.holden@douglaspartners.com			**Phone:**	
Date Required:	Same day ☐ 24 hours ☐ 48 hours ☐ 72 hours ☑ Standard ☐			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☑ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, B - bag)	TRH/BTEX	Metals								Notes/preservation
BH11	1	02/06/17	W	G	✓	✓								

ENVIROLAB GROUP
Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
Job No: 168542
Date Received: 5/6
Time Received: 11:30
Received by: DW
Temp: Cool/Ambient 5.7
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL (S) mg/kg			**ANZECC PQLs req'd for all water analytes** ☐
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit		**Lab Report/Reference No:**	
Metals to Analyse: 8HM unless specified here:			
Total number of samples in container: 3	**Relinquished by:** D.Holden	**Transported to laboratory by:** Hur	
Send Results to: Douglas Partners Pty Ltd	**Address** david.holden@douglaspartners.com.au	**Phone:** 88780652 **Fax:**	
Signed:	**Received by:**	**Date & Time:** 5/6/17 11:30	

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS **169045**

Client:
Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: David Holden

Sample log in details:

Your Reference:	**85862.01, Mercedes Benz Showroom**		
No. of samples:	3 soils		
Date samples received / completed instructions received	13/06/17	/	13/06/17

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	14/06/17	/	14/06/17
Date of Preliminary Report:	Not Issued		

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

Client Reference: 85862.01, Mercedes Benz Showroom

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	169045-1	169045-2
Your Reference	---------- -	BH21	BH21
Depth	----------	0.4-0.5	1.4-1.5
Date Sampled		3/06/2017	3/06/2017
Type of sample		Soil	Soil
Date extracted	-	13/06/2017	13/06/2017
Date analysed	-	14/06/2017	14/06/2017
TRH C_6 - C_9	mg/kg	<25	<25
TRH C_6 - C_{10}	mg/kg	<25	<25
vTPH C_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	83	83

Client Reference: 85862.01, Mercedes Benz Showroom

svTRH (C10-C40) in Soil			
Our Reference:	UNITS	169045-1	169045-2
Your Reference	---------- -	BH21	BH21
Depth	----------	0.4-0.5	1.4-1.5
Date Sampled		3/06/2017	3/06/2017
Type of sample		Soil	Soil
Date extracted	-	13/06/2017	13/06/2017
Date analysed	-	13/06/2017	13/06/2017
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	81	79

Client Reference: 85862.01, Mercedes Benz Showroom

PAHs in Soil			
Our Reference:	UNITS	169045-1	169045-2
Your Reference	----------	BH21	BH21
	-		
Depth	----------	0.4-0.5	1.4-1.5
Date Sampled		3/06/2017	3/06/2017
Type of sample		Soil	Soil
Date extracted	-	13/06/2017	13/06/2017
Date analysed	-	14/06/2017	14/06/2017
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	0.1	<0.1
Pyrene	mg/kg	0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.1	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Total +ve PAH's	mg/kg	0.4	<0.05
Surrogate p-Terphenyl-d14	%	98	102

Client Reference: 85862.01, Mercedes Benz Showroom

Acid Extractable metals in soil				
Our Reference:	UNITS	169045-1	169045-2	169045-4
Your Reference	---------- -	BH21	BH21	BH21 - [TRIPLICATE]
Depth	----------	0.4-0.5	1.4-1.5	0.4-0.5
Date Sampled		3/06/2017	3/06/2017	03/06/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	13/06/2017	13/06/2017	13/06/2017
Date analysed	-	14/06/2017	14/06/2017	14/06/2017
Arsenic	mg/kg	11	6	9
Cadmium	mg/kg	<0.4	<0.4	<0.4
Chromium	mg/kg	21	8	21
Copper	mg/kg	15	13	11
Lead	mg/kg	76	17	49
Mercury	mg/kg	0.2	<0.1	0.1
Nickel	mg/kg	5	<1	4
Zinc	mg/kg	150	4	87

Client Reference: 85862.01, Mercedes Benz Showroom

Moisture			
Our Reference:	UNITS	169045-1	169045-2
Your Reference	----------	BH21	BH21
	-		
Depth	----------	0.4-0.5	1.4-1.5
Date Sampled		3/06/2017	3/06/2017
Type of sample		Soil	Soil
Date prepared	-	13/06/2017	13/06/2017
Date analysed	-	14/06/2017	14/06/2017
Moisture	%	20	18

Client Reference: 85862.01, Mercedes Benz Showroom

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore "Total +ve PAHs" is simply a sum of the positive individual PAHs.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 °C for a minimum of 12 hours.

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			13/06/2017	169045-1	13/06/2017 || 13/06/2017	LCS-14	13/06/2017
Date analysed	-			14/06/2017	169045-1	14/06/2017 || 14/06/2017	LCS-14	14/06/2017
TRHC_6 - C_9	mg/kg	25	Org-016	<25	169045-1	<25 || <25	LCS-14	97%
TRHC_6 - C_{10}	mg/kg	25	Org-016	<25	169045-1	<25 || <25	LCS-14	97%
Benzene	mg/kg	0.2	Org-016	<0.2	169045-1	<0.2 || <0.2	LCS-14	111%
Toluene	mg/kg	0.5	Org-016	<0.5	169045-1	<0.5 || <0.5	LCS-14	97%
Ethylbenzene	mg/kg	1	Org-016	<1	169045-1	<1 || <1	LCS-14	94%
m+p-xylene	mg/kg	2	Org-016	<2	169045-1	<2 || <2	LCS-14	92%
o-Xylene	mg/kg	1	Org-016	<1	169045-1	<1 || <1	LCS-14	84%
naphthalene	mg/kg	1	Org-014	<1	169045-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	82	169045-1	83 || 90 || RPD: 8	LCS-14	97%
QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			13/06/2017	169045-1	13/06/2017 || 13/06/2017	LCS-14	13/06/2017
Date analysed	-			13/06/2017	169045-1	13/06/2017 || 13/06/2017	LCS-14	13/06/2017
TRHC_{10} - C_{14}	mg/kg	50	Org-003	<50	169045-1	<50 || <50	LCS-14	93%
TRHC_{15} - C_{28}	mg/kg	100	Org-003	<100	169045-1	<100 || <100	LCS-14	96%
TRHC_{29} - C_{36}	mg/kg	100	Org-003	<100	169045-1	<100 || <100	LCS-14	76%
TRH>C_{10}-C_{16}	mg/kg	50	Org-003	<50	169045-1	<50 || <50	LCS-14	93%
TRH>C_{16}-C_{34}	mg/kg	100	Org-003	<100	169045-1	<100 || <100	LCS-14	96%
TRH>C_{34}-C_{40}	mg/kg	100	Org-003	<100	169045-1	<100 || <100	LCS-14	76%
Surrogate o-Terphenyl	%		Org-003	82	169045-1	81 || 80 || RPD: 1	LCS-14	88%
QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			13/06/2017	169045-1	13/06/2017 || 13/06/2017	LCS-14	13/06/2017
Date analysed	-			14/06/2017	169045-1	14/06/2017 || 14/06/2017	LCS-14	14/06/2017
Naphthalene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || <0.1	LCS-14	105%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || <0.1	LCS-14	96%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || 0.3	LCS-14	103%
Anthracene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	169045-1	0.1 || 0.4 || RPD: 120	LCS-14	108%
Pyrene	mg/kg	0.1	Org-012	<0.1	169045-1	0.1 || 0.4 || RPD: 120	LCS-14	110%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || 0.3	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || 0.3	LCS-14	117%
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	169045-1	<0.2 || 0.9	[NR]	[NR]

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	169045-1	0.1 || 0.50 || RPD: 133	LCS-14	92%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || 0.4	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	169045-1	<0.1 || 0.4	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	104	169045-1	98 || 98 || RPD: 0	LCS-14	131%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			13/06/2017	169045-1	13/06/2017 || 13/06/2017	LCS-14	13/06/2017
Date analysed	-			14/06/2017	169045-1	14/06/2017 || 14/06/2017	LCS-14	14/06/2017
Arsenic	mg/kg	4	Metals-020	<4	169045-1	11 || 4 || RPD: 93	LCS-14	114%
Cadmium	mg/kg	0.4	Metals-020	<0.4	169045-1	<0.4 || <0.4	LCS-14	100%
Chromium	mg/kg	1	Metals-020	<1	169045-1	21 || 7 || RPD: 100	LCS-14	108%
Copper	mg/kg	1	Metals-020	<1	169045-1	15 || 14 || RPD: 7	LCS-14	108%
Lead	mg/kg	1	Metals-020	<1	169045-1	76 || 38 || RPD: 67	LCS-14	104%
Mercury	mg/kg	0.1	Metals-021	<0.1	169045-1	0.2 || <0.1	LCS-14	116%
Nickel	mg/kg	1	Metals-020	<1	169045-1	5 || 3 || RPD: 50	LCS-14	100%
Zinc	mg/kg	1	Metals-020	<1	169045-1	150 || 59 || RPD: 87	LCS-14	102%

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	169045-2	13/06/2017
Date analysed	-	[NT]	[NT]	169045-2	14/06/2017
$TRHC_6 - C_9$	mg/kg	[NT]	[NT]	169045-2	89%
$TRHC_6 - C_{10}$	mg/kg	[NT]	[NT]	169045-2	89%
Benzene	mg/kg	[NT]	[NT]	169045-2	92%
Toluene	mg/kg	[NT]	[NT]	169045-2	88%
Ethylbenzene	mg/kg	[NT]	[NT]	169045-2	85%
m+p-xylene	mg/kg	[NT]	[NT]	169045-2	90%
o-Xylene	mg/kg	[NT]	[NT]	169045-2	82%
naphthalene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%	[NT]	[NT]	169045-2	78%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date extracted	-	[NT]	[NT]	169045-2	13/06/2017
Date analysed	-	[NT]	[NT]	169045-2	13/06/2017
TRHC_{10} - C_{14}	mg/kg	[NT]	[NT]	169045-2	89%
TRHC_{15} - C_{28}	mg/kg	[NT]	[NT]	169045-2	97%
TRHC_{29} - C_{36}	mg/kg	[NT]	[NT]	169045-2	82%
TRH>C_{10}-C_{16}	mg/kg	[NT]	[NT]	169045-2	89%
TRH>C_{16}-C_{34}	mg/kg	[NT]	[NT]	169045-2	97%
TRH>C_{34}-C_{40}	mg/kg	[NT]	[NT]	169045-2	82%
Surrogate o-Terphenyl	%	[NT]	[NT]	169045-2	79%
QUALITY CONTROL PAHs in Soil	**UNITS**	**Dup. Sm#**	**Duplicate Base + Duplicate + %RPD**	**Spike Sm#**	**Spike % Recovery**
Date extracted	-	[NT]	[NT]	169045-2	13/06/2017
Date analysed	-	[NT]	[NT]	169045-2	14/06/2017
Naphthalene	mg/kg	[NT]	[NT]	169045-2	107%
Acenaphthylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	[NT]	[NT]	169045-2	101%
Phenanthrene	mg/kg	[NT]	[NT]	169045-2	99%
Anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	[NT]	[NT]	169045-2	93%
Pyrene	mg/kg	[NT]	[NT]	169045-2	100%
Benzo(a)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	[NT]	[NT]	169045-2	117%
Benzo(b,j+k)fluoranthene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(a)pyrene	mg/kg	[NT]	[NT]	169045-2	113%
Indeno(1,2,3-c,d)pyrene	mg/kg	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%	[NT]	[NT]	169045-2	120%

Client Reference: 85862.01, Mercedes Benz Showroom

QUALITY CONTROL Acid Extractable metals in soil	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Spike % Recovery
Date prepared	-	[NT]	[NT]	169045-2	13/06/2017
Date analysed	-	[NT]	[NT]	169045-2	14/06/2017
Arsenic	mg/kg	[NT]	[NT]	169045-2	95%
Cadmium	mg/kg	[NT]	[NT]	169045-2	98%
Chromium	mg/kg	[NT]	[NT]	169045-2	101%
Copper	mg/kg	[NT]	[NT]	169045-2	108%
Lead	mg/kg	[NT]	[NT]	169045-2	98%
Mercury	mg/kg	[NT]	[NT]	169045-2	115%
Nickel	mg/kg	[NT]	[NT]	169045-2	98%
Zinc	mg/kg	[NT]	[NT]	169045-2	100%

Client Reference: **85862.01, Mercedes Benz Showroom**

Report Comments:

PAH_S:
The RPD for duplicate results is accepted due to the non homogenous nature of the sample/s.

Acid Extractable Metals in Soil: The laboratory RPD acceptance criteria has been exceeded for 169045-1 for Cr, Pb and Zn. Therefore a triplicate result has been issued as laboratory sample number 169045-4.

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Client Reference: 85862.01, Mercedes Benz Showroom

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Douglas Partners
Geotechnics / Environment / Groundwater

CHAIN OF CUSTODY DESPATCH SHEET

Project No:	85862.01	**Suburb:**	Croydon	**To:**	ELS
Project Name:	Mercedes Benz Showroom	**Order Number**			
Project Manager:	DIH	**Sampler:**	CB	**Attn:**	Aileen Hie
Emails:	david.holden@douglaspartners.com			**Phone:**	
Date Required:	Same day ☐ 24 hours ☑ 48 hours ☐ 72 hours ☐ Standard ☐			**Email:**	ahie@envirolab.com.au
Prior Storage:	☐ Esky ☑ Fridge ☐ Shelved	Do samples contain 'potential' HBM?	Yes ☐ No ☐ (If YES, then handle, transport and store in accordance with FPM HAZID)		

Sample ID	Sample Depth	Lab ID	Date Sampled	Sample Type (S - soil, W - water)	Container Type (G - glass, B - bag)	Analytes: Combo 3									Notes/preservation
BH21	0.4-0.5	1	03/06/17	S	G	✓									
BH21	1.4-1.5	2	03/06/17	S	G	✓									
BH21	1.9-2.0	3	03/06/17	S	G										Keep on hold

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200
ENVIROLAB GROUP
Job No: 169045
Date Received: 13.06.17
Time Received: 12.50
Received by: JE
Temp: Cool/Ambient 9.3°C
Cooling: Ice/Icepack
Security: Intact/Broken/None

PQL (S) mg/kg			**ANZECC PQLs req'd for all water analytes** ☐
PQL = practical quantitation limit. If none given, default to Laboratory Method Detection Limit		**Lab Report/Reference No:**	
Metals to Analyse: 8HM unless specified here:			
Total number of samples in container: 3	**Relinquished by:** D.Holden	**Transported to laboratory by:** Hunter	
Send Results to: Douglas Partners Pty Ltd	**Address** david.holden@douglaspartners.com.au	**Phone:** 88780652 **Fax:**	
Signed: 0800 13/6/17	**Received by:** JE ELS	**Date & Time:** 13.06.17 12.50	

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1714903**	Page	: 1 of 2
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID HOLDEN	Contact	: Customer Services ES
Address	: PO BOX 472 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 1685	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9809 0666	Telephone	: +61-2-8784 8555
Project	: 85862.01 Croydon	Date Samples Received	: 16-Jun-2017 17:30
Order number	: ----	Date Analysis Commenced	: 19-Jun-2017
C-O-C number	: ----	Issue Date	: 23-Jun-2017 14:39
Sampler	: ----		
Site	: ----		
Quote number	: EN/020/16		
No. of samples received	: 3		
No. of samples analysed	: 3		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW

Page	: 2 of 2
Work Order	: ES1714903
Client	: DOUGLAS PARTNERS PTY LTD
Project	: 85862.01 Croydon

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Client sample ID	BD2/240517	BD2/230517	BD1/230517	----	----
			Client sampling date / time	[24-May-2017]	[23-May-2017]	[23-May-2017]	----	----
Compound	CAS Number	LOR	Unit	ES1714903-001	ES1714903-002	ES1714903-003	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1	%	23.5	21.8	22.4	----	----
EG005T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	9	7	13	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	16	12	22	----	----
Copper	7440-50-8	5	mg/kg	11	12	8	----	----
Lead	7439-92-1	5	mg/kg	20	22	16	----	----
Nickel	7440-02-0	2	mg/kg	<2	<2	<2	----	----
Zinc	7440-66-6	5	mg/kg	40	7	<5	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	----

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES1714903**	Page	: 1 of 3
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID HOLDEN	Contact	: Customer Services ES
Address	: PO BOX 472 96 HERMITAGE ROAD WEST RYDE NSW, AUSTRALIA 1685	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9809 0666	Telephone	: +61-2-8784 8555
Project	: 85862.01 Croydon	Date Samples Received	: 16-Jun-2017
Order number	: ----	Date Analysis Commenced	: 19-Jun-2017
C-O-C number	: ----	Issue Date	: 23-Jun-2017
Sampler	: ----		
Site	: ----		
Quote number	: EN/020/16		
No. of samples received	: 3		
No. of samples analysed	: 3		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW

Page	:	2 of 3
Work Order	:	ES1714903
Client	:	DOUGLAS PARTNERS PTY LTD
Project	:	85862.01 Croydon

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 952737)									
ES1714903-001	BD2/240517	EA055: Moisture Content	----	1	%	23.5	23.7	0.956	0% - 20%
ES1714963-005	Anonymous	EA055: Moisture Content	----	1	%	17.4	17.4	0.00	0% - 50%
EG005T: Total Metals by ICP-AES (QC Lot: 956455)									
ES1714903-001	BD2/240517	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	16	17	0.00	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	<2	<2	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	9	8	14.5	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	11	10	0.00	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	20	20	0.00	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	40	34	17.0	No Limit
ES1715095-016	Anonymous	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.00	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	13	8	46.7	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	7	6	0.00	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.00	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	35	26	30.8	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	42	34	22.3	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	102	94	7.99	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 956456)									
ES1714903-001	BD2/240517	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit
ES1715095-016	Anonymous	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.00	No Limit

Page	: 3 of 3
Work Order	: ES1714903
Client	: DOUGLAS PARTNERS PTY LTD
Project	: 85862.01 Croydon

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 956455)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	21.7 mg/kg	102	86	126
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	4.64 mg/kg	96.1	83	113
EG005T: Chromium	7440-47-3	2	mg/kg	<2	43.9 mg/kg	93.0	76	128
EG005T: Copper	7440-50-8	5	mg/kg	<5	32 mg/kg	94.8	86	120
EG005T: Lead	7439-92-1	5	mg/kg	<5	40 mg/kg	90.2	80	114
EG005T: Nickel	7440-02-0	2	mg/kg	<2	55 mg/kg	97.4	87	123
EG005T: Zinc	7440-66-6	5	mg/kg	<5	60.8 mg/kg	111	80	122
EG035T: Total Recoverable Mercury by FIMS (QCLot: 956456)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	2.57 mg/kg	78.3	70	105

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG005T: Total Metals by ICP-AES (QCLot: 956455)							
ES1714903-001	BD2/240517	EG005T: Arsenic	7440-38-2	50 mg/kg	92.9	70	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	98.8	70	130
		EG005T: Chromium	7440-47-3	50 mg/kg	97.6	70	130
		EG005T: Copper	7440-50-8	250 mg/kg	98.2	70	130
		EG005T: Lead	7439-92-1	250 mg/kg	89.6	70	130
		EG005T: Nickel	7440-02-0	50 mg/kg	94.5	70	130
		EG005T: Zinc	7440-66-6	250 mg/kg	120	70	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 956456)							
ES1714903-001	BD2/240517	EG035T: Mercury	7439-97-6	5 mg/kg	90.1	70	130

Letter

Flood Risk and Drainage

DATE	18/10/2022
TO	Neoscape
ATTN	Reece Mackie
PROJECT	LSH Croydon

Dear Reece,

SCP have been engaged by LSH Property Australia to provide flood risk and drainage advice to support a planning proposal for a development at 166-204 Parramatta Road, Croydon. Figure 1 below presents the upper ground floor concept site layout.

FIGURE 1 – UPPER GROUND FLOOR SITE LAYOUT (ARCHITECTUS)

The purpose of this letter is to identify the existing flood risk that impacts the site and to propose potential management strategies if required based on floodplain risk management requirements.

The site sits within the Burwood Council LGA and is approximately 200m east of an existing stormwater channel adjacent Concord Oval. This channel drains to the north into Exile Bay. Figure 2 presents the locality of the site and its proximity to existing trunk drainage infrastructure

FIGURE 2 – SITE LOCALITY PLAN (GOOGLE EARTH)

Burwood Council Development Control Plan (BDCP) Section 6.4 outlines the flood planning requirements for all sites within the Burwood Council LGA. These controls have been developed from the NSW Floodplain Development Manual (April 2005) and are in place to:

- Minimise flood risk to life and property
- Facilitate development that is compatible with flood function and behaviour including accounting for climate change
- Avoiding adverse and/or cumulative impacts on flood behaviour and the environment
- Enabling safe occupation and efficient evacuation in the event of a flood.

Several flood studies have been engaged by Council to assist in identifying flood affected lots. This information has been combined into a Consolidated Flood Identification (CFI) map identifying the lots which are subject to flood planning requirements. Figure 3 presents the site location overlaid on the CFI.

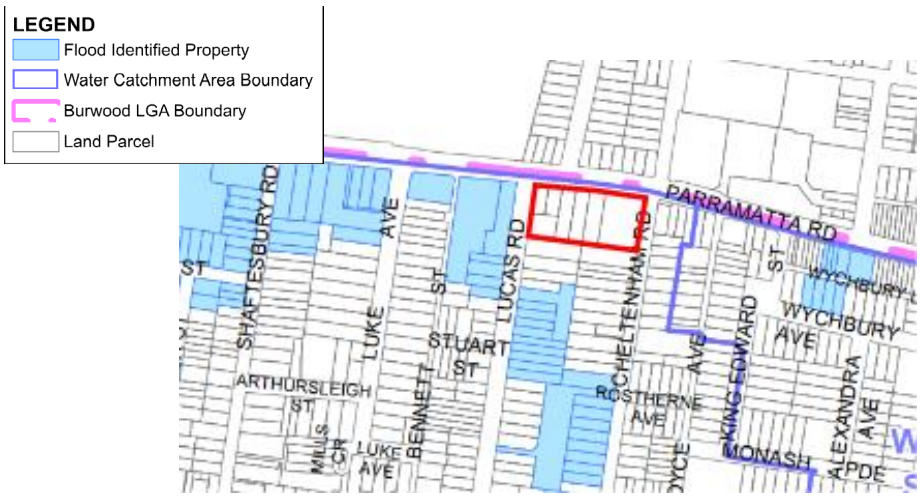


FIGURE 3 – CONSOLIDATED FLOOD IDENTIFICATION MAP (BURWOOD COUNCIL)

From the map above the site is not considered a flood identified lot and as such is not subject to flood planning requirements under the NSW Floodplain Risk Manual.

Regardless of this the site stormwater drainage should be developed as part of the Development Application in accordance with Burwood Council's Stormwater Management Code including stormwater quantity and quality management to ensure the development is compatible with overland flow behaviour and doesn't result in any adverse or cumulative impacts on downstream environments

Yours faithfully
SCP Consulting Pty Ltd

James Clare
Associate Director - Civil

GapMaps
YOU'RE IN THE RIGHT PLACE

166 - 204 Parramatta Road, Croydon

Economic impact assessment

26 October 2022

GapAdvisory

Table of contents

Executive summary	3
Introduction	5
Site context and proposed development	7
Trade area analysis	11
Other customer segments	16
Retail floorspace potential	21
Recommended mix	23
Economic impacts assessment	27

Executive Summary

Executive summary

This assessment of economic need and impacts focusses on the retail and commercial components of the proposed mixed-use development at 166 – 204 Parramatta Road, Croydon. The following key points summarise our key findings:

- We have defined a main trade area (MTA) that could be served by the proposed development, incorporating a primary sector and three secondary sectors. The trade area definition has regard to the surrounding competitive environment, the site's prime frontage to Parramatta Road, the high quality design and the potential unique tenant mix that could occupy the development. The population of the MTA is estimated at around 117,600 (45,200 in the primary sector) and is projected to increase by around 1.2% p.a. over the next 10 years, including growth of around 1.7-1.8% p.a. in the primary sector.
- There is an estimated under-supply of supermarket floorspace of around 1,600 sq.m at present in the primary sector and a gap of around 18,750 sq.m across the MTA noting that even with the potential addition of a new full-line Woolworths at North Strathfield this gap will still be in the order of 20,640 sq.m by 2031 with no further supply. This part of Sydney is significantly under-supplied for supermarket space, with many of the supermarkets smaller than 3,000 sq.m.
- More broadly, traditional retail floorspace demand in the primary sector is expected to increase by around 12,500 sq.m over the next 10 years (an average increase of 1,250 sq.m p.a.), while in the MTA it is expected to increase by around 24,000 sq.m over this timeframe (at 2,400 sq.m p.a.).
- There appears to be sufficient future growth in the trade area, in addition to incumbent demand, to support additional convenience retail facilities of the scale envisaged (i.e. 4,071 sq.m). Indeed, the proposed floorspace is equivalent to around 1 - 2 years of traditional retail floorspace demand growth generated by the MTA population, noting there will also be additional demand generated by surrounding workers, future workers and visitors to the hotel on site.
- With a small-medium sized supermarket/food market anchor proposed, as well as potential hospitality anchor(s), located in a high density and large potential trade area, we recommend the following indicative mix of uses for the site: Supermarket/food market: 2,100 – 2,300 sq.m; Retail specialty: 1,500 – 2,000 sq.m and Ancillary Commercial (i.e. including gym/fitness, medical/health, co-working etc): 1,500 – 2,500 sq.m.
- Based on the assessment of the retail floorspace gap and the impacts analysis in this report, we conclude that the scale of the retail component of the proposed development is appropriate. The development could be added to the market while comfortably preserving the existing centres hierarchy as estimated impacts on surrounding centres/precincts are likely to be negligible.
- The retail component of the proposed development is small scale (4,071 sq.m) compared to the offer at Burwood (>100,000 sq.m) and many of the surrounding retail centres/precincts, like Leichhardt, Concord, Five Dock, Ashfield (which are around 17,500 sq.m or larger).
- Estimated impacts across the surrounding network are generally expected to be 5% or less on any given centre (a negligible), and generally average around 3% across centres within the defined MTA. Of particular note, impacts on nearby Burwood Strategic Centre are expected to be around 1%. This precinct is significant in scale and is a vibrant, attractive destination that serves a broad regional catchment.
- The proposed development will help to meet a current under-supply of supermarket floorspace in the defined MTA and primary sector, as well as help to meet some of the future demand for supermarket and convenience retail generated by these populations.
- The proposed development will provide a range of retail and non-retail amenities to future residents of the Kings Bay and Burwood precincts on Parramatta Road, within an easy walking distance.

Introduction

Introduction

This report presents an assessment of the potential need for, and appropriate scale of, retail and ancillary non-retail uses that should form part of a proposed mixed-use development at 166 - 204 Parramatta Road, Croydon. The report is presented in seven sections as follows:

Section 1: Provides an overview of the subject site and summarises the proposed development.

Section 2: Assesses the potential trade area served by the retail and ancillary non-retail component of the proposed development and the current and future population in this defined trade area, as well as reviewing the socio-demographic profile of this population.

Section 3: Reviews other customer segments of relevance for the retail and ancillary non-retail components of the proposed development.

Section 4: Reviews the surrounding competitive environment within which the proposed development will operate, including proposed/planned retail developments.

Section 5: Builds upon the trade area analysis to provide estimates of current and future retail floorspace demand generated by the trade area population, to understand the need for, and appropriate scale, of additional retail facilities.

Section 6: Having regard to the above, this section provides a recommended mix of retail and ancillary non-retail floorspace that would be appropriate for the proposed development.

Section 7: Assesses the potential sales that could be generated the proposed development and estimates the potential impacts on the surrounding centres hierarchy.

Section 1 – Site context and proposed development

Site context

The 166 - 204 Parramatta Road, Croydon subject site is situated at the western edge of the Kings Bay precinct and less than 1km from the Burwood precinct, which will accommodate a future Metro station. The distance from the new metro station to the subject site is around 400m, i.e. less than 5min walk.

The Kings Bay precinct currently contains light industrial uses and large format retail (LFR) like Fantastic Furniture, Officeworks, Kennards Hire etc, and is planned to accommodate a significant uplift in residential dwellings over the next 10 - 20 years, as well as an increase in retail and other employment floorspace.

The nearby Burwood precinct stretches from just north of Westfield Burwood to Crane Street, about 1 - 3km north of the existing Burwood train station. This precinct is expected to absorb a significant increase in residential density over the next 10 - 20 years, with less retail expected compared with Kings Bay, given the existing offer at Burwood is substantial.

The existing offer at Burwood includes an estimated 90,000 – 100,000 sq.m of retail floorspace, dominated by the 65,000 sq.m Westfield Burwood shopping centre, plus Burwood Plaza as well as a solid strip retail offer along Burwood Road. The strip precinct is very vibrant and contains a broad mix of hospitality, food & beverage, convenience retail, services, medical/health, gym/fitness and administrative/commercial uses

The subject site will be accessible from Cheltenham Road, Parramatta Road and Lucas Road and occupies a prominent location on Parramatta Road.

Figure 1.1 – Local context

Map 1.1 – Site local context

Proposed development

The proposed development at 166 - 204 Parramatta Road consists of around 35,546 sq.m of mixed-use multi-storey residential, hotel, retail and commercial development. The mix of uses is planned to include the following gross floor area (GFA) breakdown:

- 16,257 sq.m of residential multi-storey housing (approx. 177 dwellings) and 1,049 sq.m of terraced housing (8 dwellings)
- 12,558 sq.m of hotel floorspace (i.e. around 160 rooms)
- 1,464 sq.m of commercial floorspace
- 2,058 sq.m supermarket floorspace
- 1,375 sq.m of retail floorspace
- A signature 687 sq.m Mercedes Experience Centre
- 97 sq.m community facilities

This report examines the appropriate scale and mix of retail and commercial floorspace that should be provided as part of the development, to ensure the new local residents are well served by convenient amenities, while also serving the growing population around this part of Sydney.

We note the retail mix is planned to be distributed over multiple levels with the supermarket/food market in the basement level.

Figure 1.1 – Upper ground floor of proposed development

Section 2 - Trade area analysis

Trade area definition

Given the location of the subject site on Parramatta Road, together with the scale and nature of the potential uses that are being considered, as well as the surrounding retail and commercial town centres, we have defined a main trade area (MTA) that includes one primary sector and three secondary sectors. Refer Map 2.1 overleaf.

The trade area definition has regard to the excellent site location with frontage to Parramatta Road; the likely scale and mix of the proposed development – which could potentially be anchored by a food market operator such as Harris Farm Markets (HFM); the potential destinational hospitality tenant(s) that could form part of the mix; the surrounding retail centres hierarchy and the high-quality design expected at the precinct.

In addition to the surrounding residents, there are three other customer segments that could potentially be served by the proposed development at the subject site

- **Nearby workers**: within the hotel, the retail and commercial facilities at the subject site, as well as the surrounding Kings Bay precinct
- **Hotel visitors:** includes tourists, business travellers visiting the hotel for leisure, events, conferences or work.
- **Passing traffic/destinational visitors:** who may stop in to use/visit a given use while driving past the site or have travelled from beyond the MTA, say because of a specific tenant/operator at the subject site.

Other customer segments

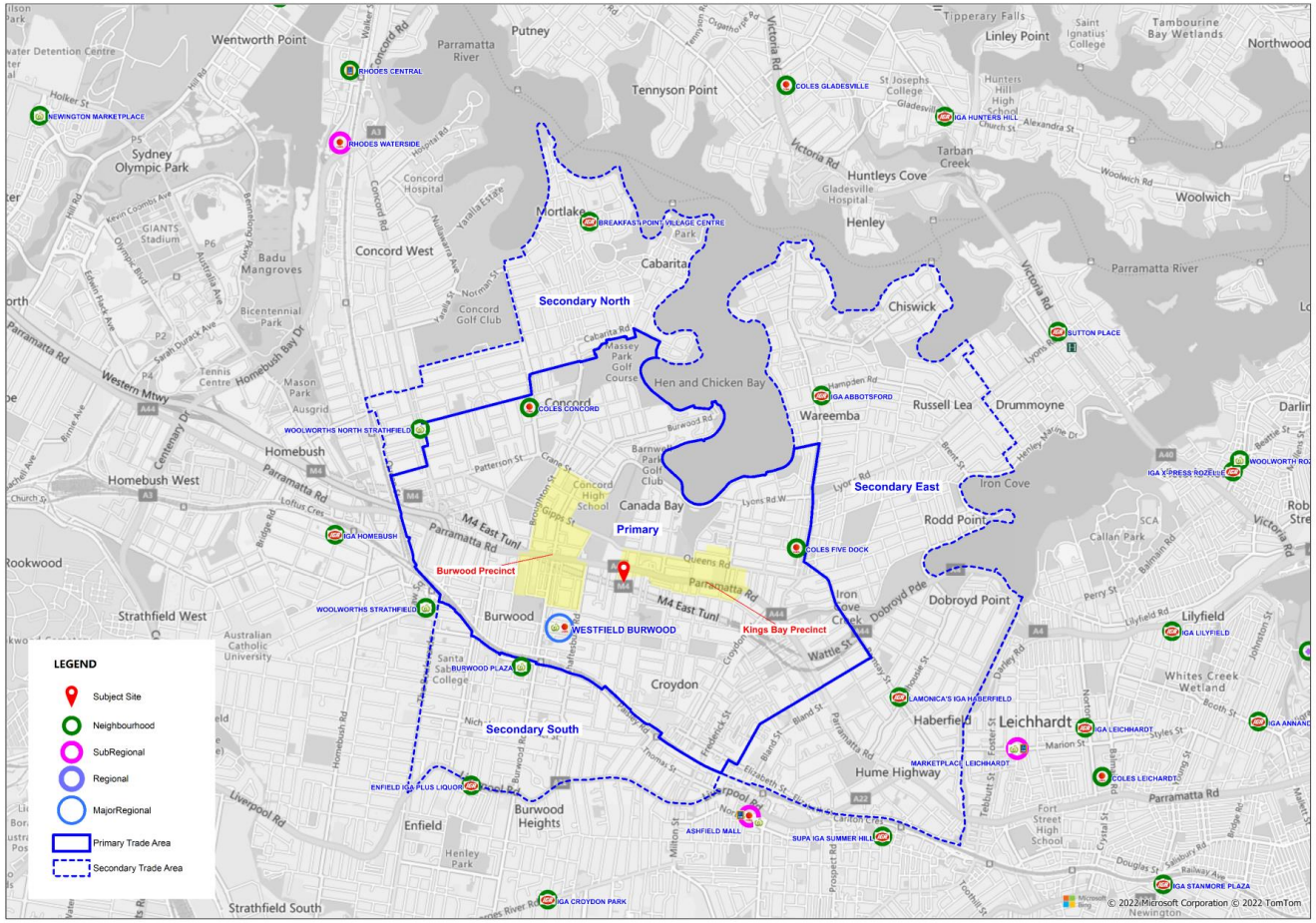
These other customer segments are likely to provide additional turnover to the residential catchment and is captured in an assumption of beyond trade area (BTA) spend later in this report.

The integrated hotel will drive some demand, in particular for food and beverage facilities, but is likely to be a small segment when compared with the permanent residential MTA customer segment.

The surrounding workforce is relatively small compared to comparable mixed-use retail/residential assets in locations that form part of high density business parks or CBDs, e.g. Rhodes (11,000+ workers), Central Park (42,000+ workers) etc.

Parramatta Road is one of the busiest roads in Sydney, with a pre-Covid vehicle per day (VPD) count above 60,000 (two-way count) near the site.

Map 2.1 – Trade area definition



Trade area population growth

Table 2.1 outlines the MTA historical and forecasted population over the period 2016 to 2031. These projections have regard to the latest ABS population estimates, NSW government and local council projections at the small area level and expectations about the future capacity/development within strategic precincts such as Kings Bay and Burwood.

We note the following:

- The subject site could support around 190 dwellings, yielding a population in the order of 380 - 400 persons.
- There are an estimated 5,200 persons within a 10min walking distance from the subject site, a population which could potentially increase by up to 2,500 persons by 2031 (around 48%), driven by redevelopment in the Burwood and Kings Bay precincts.
- The primary sector, which includes the high-density, fast growing walkable catchment, contains around 45,200 persons, and is projected to grow by around 18% by 2031 to reach 53,,300 persons.
- The secondary sectors are estimated to grow at an average of around 1.1% per annum over the next decade from around 72,300 persons to 79,700 by 2031.
- Overall, the defined main trade area (MTA) population is projected to grow from around 117,600 persons to 133,000 persons by 2031, equivalent to growth of around 1.2% per annum.

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Table 2.1 – Trade area population 2016 - 2031

	Actual population		Estimated population			Change
Trade area sector	2016	2020	2021	2026	2031	2021 - 31
Primary sector	42,240	44,944	45,244	48,794	53,294	8,050
Secondary sectors						
• North	14,991	16,116	16,216	17,046	18,046	1,830
• South	14,147	15,211	15,336	16,786	18,536	3,200
• East	39,132	40,616	40,766	41,846	43,096	2,330
Total Secondary	68,270	71,943	72,318	75,678	79,678	7,360
Main trade area	**110,510**	**116,887**	**117,562**	**124,472**	**132,972**	**15,410**
	Average annual growth (no.)					
	2011-16	2016-20	2020-21	2021-26	2026-31	
Primary sector	908	676	300	710	900	
Secondary sectors						
• North	413	281	100	166	200	
• South	215	266	125	290	350	
• East	386	371	150	216	250	
Total Secondary	1,014	918	375	672	800	
Main trade area	**1,923**	**1,594**	**675**	**1,382**	**1,700**	
	Average annual growth (%)					**Change**
	2011-16	2016-20	2020-21	2021-26	2026-31	2021 - 31
Primary sector	2.3%	1.6%	0.7%	1.5%	1.8%	1.7%
Total secondary	1.6%	1.3%	0.5%	0.9%	1.0%	1.0%
Main trade area	**1.8%**	**1.4%**	**0.6%**	**1.1%**	**1.3%**	**1.2%**

**As at June*

Source: ABS, GapMaps, forecast.ID, NSW Dept. Transport

Socio-demographic profile

Table 2.2 summarises the socio-demographic profile of the trade area population, based on data from the 2016 ABS Census of Population and Housing. We note the following:

- The primary sector population has incomes on par with Sydney metro averages, with around 30% of this population born in the period that would classify them as Generation Y. There is an Asian born skew in this population.
- The secondary north population has very high incomes (~30% above Sydney averages), and consists of around 26% baby boomers, with a below average proportion of Generation Y residents. Around 74% of households own or are buying homes and 87% of workers are employed in white collar/services type jobs.
- The secondary south population has average household incomes slightly below the Sydney metro average, there is a very high proportion of Generation Y residents, and a very high proportion of Asian born residents.
- The secondary east sector is the largest secondary sector, and includes a wide breadth of suburbs ranging from Russell Lea to Five Dock, to parts of Haberfield and Ashfield. Average household incomes are around 12% above the Sydney metro average.

Table 2.2 – Trade area socio-demographic profile

Category	10-min walk	Primary	Secondary North	Secondary South	Secondary East	Syd Metro	Australia
Average age (years)	40.1	37.8	41.0	37.4	39.8	37.4	38.4
Households							
No. of Households	1,436	13,084	3,743	4,355	16,170	1,623,737	8,285,829
Average household size	3.0	2.8	2.6	2.9	2.5	2.8	2.6
Income							
Average annual per capita	$39,937	$43,025	$60,547	$38,970	$53,190	$43,336	$39,634
Average annual per household	$119,699	$119,303	$154,562	$113,009	$134,976	$120,119	$103,519
% HH > $130,000							
Generational Cohorts (% of Popn.)							
Pre-Boomers	10.7%	9.4%	10.1%	8.6%	10.6%	8.3%	9.4%
Baby Boomers	22.3%	17.9%	25.9%	18.0%	20.0%	19.9%	21.7%
Gen X	18.7%	19.4%	21.7%	15.8%	22.2%	20.7%	20.1%
Gen Y	24.5%	29.9%	18.9%	36.3%	24.8%	23.7%	21.3%
Gen Z	18.2%	16.4%	15.3%	15.4%	14.5%	18.4%	18.6%
Gen Alpha	5.6%	7.1%	8.2%	5.9%	7.9%	9.1%	8.9%
Country of Birth (% of Population)							
Australia	43.5%	44.2%	60.7%	32.7%	55.8%	57.0%	66.7%
China	17.1%	15.4%	7.1%	22.2%	5.6%	4.6%	2.2%
Asia - balance	13.3%	13.0%	7.9%	15.0%	6.1%	9.9%	5.3%
Europe	9.2%	8.3%	8.3%	4.7%	11.1%	6.6%	6.7%
Elsewhere	14.7%	15.6%	14.6%	19.3%	19.2%	19.2%	17.1%
Housing (% of Households)							
Own/buying home	63.9%	57.5%	74.0%	50.6%	60.1%	64.6%	67.8%
Renting	35.9%	42.3%	25.7%	48.7%	39.4%	34.6%	31.4%
Average monthly mortgage payment	$3,011	$2,862	$3,223	$2,671	$3,058	$2,617	$2,071
Average weekly rental payment	$450	$494	$703	$490	$505	$480	$358
Employment							
% of Workforce White Collar	76.15%	78.5%	86.76%	75.27%	81.99%	74.69%	70.2%
% of Workforce Blue Collar	23.85%	21.5%	13.24%	24.73%	18.01%	25.31%	29.8%
Unemployment rate at Census date	7.65%	6.8%	3.97%	8.05%	4.62%	6.03%	6.8%
Vehicle Ownership							
Average No. of motor vehicles per Household	1.46	1.39	1.80	1.21	1.44	1.66	1.80

Sources : Census of Population & Housing, 2016 (ABS); GapMaps

Section 3 – Other customer segments

Other customer segments

Workers

Pre-Covid there were an estimated 2,500 workers within a 10 minute walking distance of the subject site. This is small when compared with other office and significant industrial precincts across Sydney.

For example, around Rhodes business park there were more than 11,000 workers; Sydney Olympic Park supports more than 14,000 workers; Australia Technology Park supports more than 12,000 workers; and Parramatta CBD supports more than 50,000 workers.

The proposed development at the subject site could potentially support more than 300 workers once developed, as well as a temporary construction workforce.

The future development/gentrification of the Kings Bay precinct and Burwood metro precincts could potentially support more than 2,000 jobs over the next 20 years. We estimate that an additional 1,000 – 1,500 jobs could potentially be supported by 2031, equating to a surrounding permanent workforce of around 3,500 – 4,000 workers within a 10 minute walking distance.

Throughout the ongoing construction and development of these precincts there will be a transitory workforce that will generate demand for retail and services within the precinct.

Hotel visitors

The proposed hotel could support around 160 rooms. At an average occupancy rate of around 70 – 75% or so, this would equate to more than 60,000 visitors per annum.

Over the course of a year, this visitation level would equate a permanent residential population in the order of 150 persons, noting that tourists tend to spend more per day on retail goods and services, in particular food and beverage, than a typical permanent resident.

Section 4 – Competition

Competition

This section of the report reviews the key competition of relevance to the proposed retail offer at the subject site. This competition is outlined on Map 4.1. The following key points are noted:

Existing competition

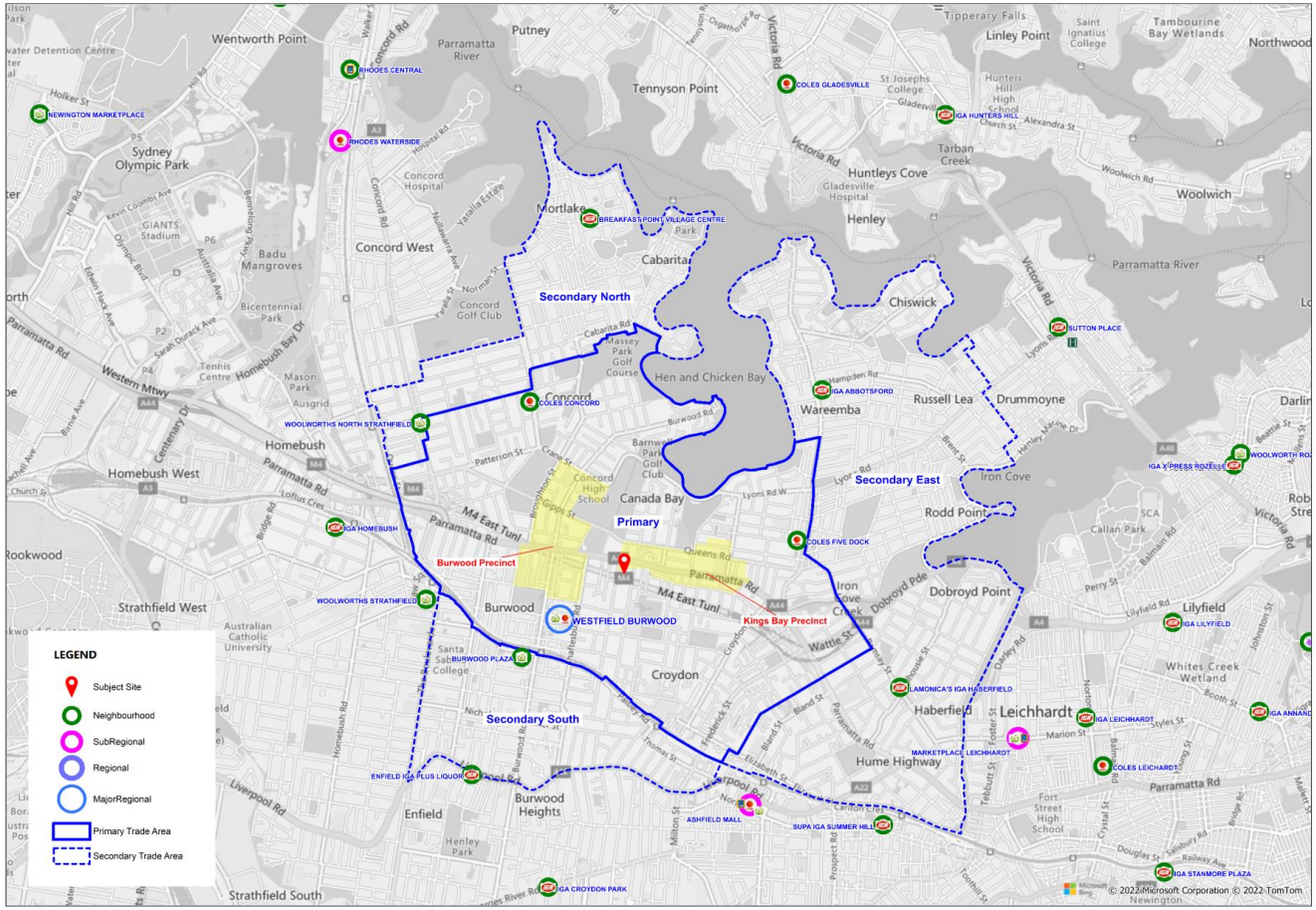
- The closest supermarket facilities are situated at Burwood, which includes Coles and Woolworths supermarkets at Westfield Burwood, as well as a large Woolworths supermarket at Burwood Plaza. There is an estimated 90,000 – 95,000 sq.m of retail floorspace within the existing Burwood strategic centre. This precinct is vibrant and comprehensive, including significant hospitality, food & beverage, convenience retail, retail services, medical/health, fitness/wellness and other non-retail services.
- Also within the defined primary sector there is around 17,500 sq.m of retail floorspace at Concord, including the Coles anchored Monica centre; and a similar amount estimated in the Five Dock town centre, which is another vibrant and extensive retail and services strip also containing a 3,100 sq.m Coles supermarket. This precinct will support a new Metro station.
- To the west along Parramatta Road, the next major retail cluster is North Strathfield, which contains around 11,000 – 12,000 sq.m of retail floorspace, including the predominantly non-retail Bakehouse Quarter asset (incl. Aldi) and a very small Woolworths; and to the south-west, the Strathfield town centre contains an estimated 12,000 sq.m of retail floorspace, of which more than half is comprised of the 6,900 sq.m Strathfield Plaza, anchored by a 2,500 sq.m Woolworths.
- The closest Harris Farm Markets (HFM) are located at Drummoyne and Leichhardt. This particular tenant while competitive with major supermarket players, offers a point of difference on price, quality, customer service, experience and focusses predominantly on the fresh food/packaged food sector. It does not provide many of the non-food items found in traditional supermarkets.
- To the east/south-east, the closest retail clusters are located at Ashfield Mall (a sub-regional centre with all three major supermarkets), Leichhardt Marketplace (anchored by Woolworths and Aldi), and Norton Plaza (with a Coles and HFM).

Future competition

- A development application for a new 3,500 sq.m Woolworths supermarket in North Strathfield town centre is currently being assessed by City of Canada Bay Council. We would expect, should this be approved and developed, that Woolworths may close its small format store on Concord Road, however for the purposes of our analysis we have assumed that both remain open.
- A major redevelopment of Burwood Plaza is planned, called Burwood Place. This project is planned to include several residential apartment towers, a commercial tower, and a redevelopment of the retail offer. Around 25,000 – 26,000 sq.m has been indicated in the application however, not all of this is likely to be pure retail (i.e. supermarket, food, goods, and retail services) as this is a large quantum in the shadow of Westfield Burwood , with some of this space likely to be occupied by gym/fitness, medical/health, and ancillary commercial type uses.
- According to the Parramatta Road Urban Transformation Strategy (PRUTS), the Kings Bay precinct was recommended to support an additional 5,000 sq.m of retail floorspace by 2031, and up to 10,000 sq.m over the longer term. Since that strategy the new metro stations have been announced, including one at the Burwood precinct and Five Dock.
- The Burwood precinct wasn't earmarked for major additional retail floorspace in the PRUTS, however since that study was undertaken the new metro station at Burwood has been confirmed and is now under construction. While there will be high density residential development around this station, because there is already a strong retail offer nearby in Burwood, we expect the mix in this precinct to consider of small scale convenience, some food and beverage and services retail.

Table 4.1 summarises the surrounding competition.

Map 4.1 – Surrounding retail competition



Competition (cont.)

Table 4.1 – Retail competition, incl. proposed

Centre	Est. retail GLA (sq.m)	Est. super. GLA (sq.m)	Major traders (supermarkets)	Centre	Retail GLA (sq.m)	Est. super. GLA (sq.m)	Major traders (supermarkets)
Primary sector				**Beyond trade area (selected)**			
Burwood Strategic Centre				Drummoyne	20,000	2,750	Harris Farm Markets, IGA
Westfield Burwood	57,000	7,000	Woolworths, Coles	Leichhardt			
Burwood Plaza	10,000	4,100	Woolworths	Leichhardt Marketplace	17,600	5,500	Woolworths, Aldi
Burwood Place (p)	>20,000**		Redev.of Burwood Plaza	Norton Plaza	11,900	5,500	Coles, Harris Farm Markets
Other Burwood	25,000			Other	17,500		
Total Burwood*	**92,000**	**11,100**		**Total Leichhardt**	**47,000**	**11,000**	
Five Dock	17,500	3,100	Coles	Ashfield			
Concord				Ashfield Mall	25,000	8,500	Coles, Woolworths, Aldi
Monica Centre	6,000	2,500	Coles	Ashfield other	10,000		
Other Concord	11,500			**Total Ashfield**	**35,000**	**8,500**	
Total Concord	**17,500**						
Sub-total primary sector	**127,000**	**14,200**					
Rest of MTA				**Rest of MTA**			
Breakfast Point	3,500	1,200	Supa IGA	Strathfield			
North Strathfield				Strathfield Plaza	6,900	2,500	Woolworths
Bakehouse Quarter***	5,000	1,750	Aldi	Other	5,000		
Other	6,400	1,400	Woolworths	**Total Strathfield**	**11,900**	**2,500**	
Woolworths (p)	3,500	3,500	Woolworths (p)	Croydon	1,000		n.a.
Total North Strathfield*	**11,400**	**3,150**		Haberfield	2,500	750	IGA
				Wareemba/Abottsford	3,000	600	IGA
				Sub-total rest of MTA	**33,300**	**8,200**	

**Does not include proposed competition*
***Represents a replacement of the existing 10,700 sq.m at Burwood Plaza*
****Traditional retail only (excludes gyms, offices, medical, entertainment etc)*
Source; PCA, PRUTS, various Council studies, GapMaps, Cordell

Section 5 – Retail floorspace potential

Retail floorspace demand

Table 5.1 to the right presents an analysis of the retail floorspace demand generated by the MTA population, to understand the potential need/gap for additional retail uses at the subject site. We have focussed specifically on the need for supermarkets and traditional retail.

The following is noted:

- The nearby Westfield Burwood shopping centre draws from a very large trade area, in excess of 400,000 persons (i.e. well beyond the potential trade area served by the proposed development). This retail offer includes convenience retail, F&B as well as higher order leisure and comparison shopping facilities.
- We have conservatively applied a supermarket floorspace provision ratio of 0.35 sq.m per person, which is around the national average, noting that Sydney is significantly under-supplied for supermarket floorspace, with a provision rate of less than 0.30 sq.m per person. There is an estimated 2.2 sq.m of retail floorspace across Australia, of which around 0.65 sq.m is considered larger format retail (LFR), equating to 1.55 sq.m of traditional retail floorspace (ex-LFR) supply per person. We have used these provision rates to estimate the current and projected demand for retail floorspace generated by the MTA population.
- At 2021, the primary sector population generates demand for an estimated 15,800 sq.m of supermarket floorspace and around 70,100 sq.m of traditional retail floorspace (ex-LFR). This supermarket floorspace demand is projected to grow by around 2,800 sq.m over the next 10 years to 2031, with total retail floorspace demand (ex-LFR) projected to grow by 12,500 sq.m.
- More broadly across the MTA, future population growth will equate to growth in supermarket floorspace demand of around 5,400 sq.m and traditional retail floorspace demand (ex-LFR) of around 23,900 sq.m by 2031.

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Table 5.1 – Retail floorspace demand (sq.m) 2021 - 2031

	Estimated population			
Trade area sector	2021	2026	2031	Chg. 21 - 31
Primary sector	45,244	48,794	53,294	8,050
Total Secondary	72,318	75,678	79,678	7,360
Main trade area	**117,562**	**124,472**	**132,972**	**15,410**

	Retail floorspace demand per capita (sq.m)		
Retail type	2021	2026	2031
Supermarket	0.35	0.35	0.35
Total retail ex-LFR	1.55	1.55	1.55

	Retail floorspace demand (sq.m)			
Retail type	2021	2026	2031	Chg. 21 - 31
Primary				
Supermarket	15,835	17,078	18,653	2,818
Total retail ex-LFR	70,128	75,631	82,606	12,478
MTA				
Supermarket	41,147	43,565	46,540	5,394
Total retail ex-LFR	182,221	192,932	206,107	23,886

**As at June*
***LFR = Large Format Retail*
Source: ABS, GapMaps

Retail floorspace gap

Table 5.2 to the right builds upon the previous table, and compares the demand with the existing and proposed supply of supermarket floorspace and retail floorspace (ex-LFR), over the period 2021 to 2031. We have focussed in particular on the primary sector.

- There is an estimated 14,200 sq.m of supermarket floorspace in the primary sector, including around 7,000 sq.m at Westfield Burwood (Coles, Woolworths); 4,100 sq.m Woolworths at Burwood Plaza; 3,100 sq.m Coles at Five Dock; and 2,500 sq.m Coles at Monica Centre.
- There is around 127,000 sq.m of traditional retail floorspace (ex-LFR) across the primary sector, most of this located in the Burwood Strategic Centre, dominated by the 65,000 sq.m Westfield Burwood, but with a very solid and vibrant retail strip precinct as well. Additional floorspace may be added to this precinct over time.
- Comparing supply with demand shows that there is an estimated under-supply of supermarket floorspace of around 1,600 sq.m at present in the primary sector, but a 56,900 sq.m 'over-supply' of total retail ex-LFR. This is because Westfield Burwood (and the Burwood precinct) serves a regional role and function, drawing its business from a very broad trade area serving more than 475,000 persons, with more than 40% of its visitation drawn from beyond a 10 min drive, including 24% from beyond 15 min (source: GapMaps/Near - mobile device data).
- There is a very significant supermarket gap across the defined MTA, of around 18,750 sq.m, noting that even with the potential addition of a new full-line Woolworths at North Strathfield this gap will still be in the order of 20,640 sq.m by 2031 with no further supply. This part of Sydney is significantly under-supplied for supermarket space, with many of the stores less than 3,000 sq.m.

Having regard to the above, there appears to be sufficient future growth in the trade area, in addition to incumbent demand, to support additional convenience retail facilities of the scale envisaged. We consider the proposed mixed use development, with around 4,071 sq.m of traditional retail floorspace, to be appropriate in scale, and should be comfortably absorbed into the existing centres hierarchy.

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Table 5.2 – Retail floorspace gap (sq.m) 2021 - 2031

	Retail floorspace demand (sq.m)			
Retail type	2021	2026	2031	Chg. 21 - 31
Primary				
Supermarket	15,835	17,078	18,653	2,818
Total retail ex-LFR	70,128	75,631	82,606	12,478
MTA				
Supermarket	41,147	43,565	46,540	5,394
Total retail ex-LFR	182,221	192,932	206,107	23,886
	Retail floorspace supply (sq.m) - est.			
Retail type	2021	2026	2031	Chg. 21 - 31
Primary				
Supermarket**	14,200	14,200	15,950	1,750
Total retail ex-LFR**	127,000	127,000	132,000	5,000
MTA				
Supermarket***	22,400	25,900	25,900	3,500
Total retail ex-LFR***	160,300	163,800	163,800	3,500
	Retail floorspace gap (sq.m)			
Retail type	2021	2026	2031	Chg. 21 - 31
Primary				
Supermarket	-1,635	-2,878	-2,703	-1,068
Total retail ex-LFR	56,872	51,369	49,394	-7,478
MTA				
Supermarket	-18,747	-17,665	-20,640	-1,894
Total retail ex-LFR	-21,921	-29,132	-42,307	-20,386

**As at June*
***Assumes net increase at Burwood Place is added includes an Aldi plus some additional retail*
***Assumes Woolworths North Strathfield is added*
Source: ABS, GapMaps

Section 6 – Recommended mix

Key considerations and recommended mix

The following key factors have been considered in forming our views about the development potential of the retail and ancillary non-retail offer at the subject site.

- The site is about 400 – 500m from the planned Burwood Metro station (i.e. it is not fully integrated with the train station, say like Rhodes Central, Hurstville Central or Chatswood Interchange).
- There are some 5,200 persons within a 10min walking distance of the site, increasing to 7,700 persons by 2031, an increase of 2,500 persons in this area alone.
- More broadly, there around some 47,700 persons within a 5min drive-time of the site (household income - $117,000). This compares with the 5min drive-time around the HFM Lindfield store of 43,000 (HH income - $165,000) and the HFM Cammeray store of 52,300 (HH income - $159,000). Comparisons with Rhodes Central (19,700) indicate a much large 5min DT population, but slightly lower than East Village (65,600) – which are both multi-level retail assets integrated with residential towers.
- The proposed hotel at the subject site could potentially support around 160 rooms, which will support demand for food and beverage services.
- Pre-Covid there were around 2,500 workers within a 10min walking distance of the site, while this workforce will grow potentially by around 1,500 jobs by 2031, as a comparison, pre-Covid, there were an estimated 11,000 workers in the Rhodes business park pre-Covid, around 5,700 workers within a 10min walk around East Village.
- HFM is a differentiating tenant and should help drive significant custom to the retail precinct, and would create a point of difference not provided in the MTA.
- A typical neighbourhood shopping centre anchored by a supermarket typically supports around 2,000 – 2,500 sq.m of additional retail and ancillary non-retail floorspace, including mini-majors of around 500 - 600 sq.m and 1,000 – 1,500 sq.m of specialty retail and 500 – 1,000 sq.m of non-retail uses like gyms, childcare, medical etc.
- Having regard to the above considerations and the analysis contained in the previous sections of this report, we recommend the following potential mix of uses for the site:
  - Supermarket: 2,100 – 2,300 sq.m
  - Retail specialty: 1,500 – 2,000 sq.m
  - Commercial: 1,500 – 2,500 sq.m
    - Gym/fitness: 500 – 1,000 sq.m
    - Medical/health: 500 - 750 sq.m
    - Other commercial inc. co-working: 500 – 1,000 sq.m

Section 7 - Estimated impacts

Estimated impacts methodology

In this section of the report, we estimate the potential trading impacts on the surrounding centres hierarchy that could result from the proposed development. The following methodology has been applied:

- Assess sales potential of the proposed retail component of the development, in the first full year of trade, as outlined in Table 7.1 to the right. This is assumed to be FY2024/25.
- Estimate current (and pre-Covid) sales performance of the surrounding retail hierarchy. These estimates draw from industry averages and Property Council of Australia (PCA) data for enclosed shopping centre assets that report sales.
- Estimate growth in sales performance of the surrounding retail hierarchy to 2024/25.
- Estimate the likely share of turnover generated by the proposed development that would be redirected from each defined precinct/centre.
- Estimate the likely impacts (in dollars and as percentage) for each precinct/centre.

Typically, when assessing economic impacts for retail developments impacts below 5% are considered low/negligible, impacts of 5 – 10% are consider low to moderate, and impacts of 10 – 15% are considered moderate, but acceptable. Impacts of greater than 15% are considered significant.

Generally, the context around an assessment of impacts is to assess whether a centre is likely to suffer adverse impacts to the extent that it would lead to major vacancies and a net reduction of services to the surrounding community, having regard to the addition of the new retail facilities.

Table 7.1 – Est. sales proposed development: 2024/25

Use type	GLA (sq.m)	Est. turnover ($M)	Est. turnover ($/sq.m)
Retail			
Supermarket	2,058	24.7	12,000
Specialty retail	975	7.3	7,500
Hospitality anchor	400	2.2	5,500
Total retail	**3,433**	**34.2**	**9,965**
Non-retail uses			
Gym/fitness	450	n.a.	n.a.
Medical/wellness/health	450	n.a.	n.a.
Other commercial	564	n.a.	n.a.
Mercedes centre	687	n.a.	n.a.
Total non-retail	**2,151**	**n.a.**	**n.a.**
Total retail and non-retail	**5,584**	**n.a.**	**n.a.**

**Est. 2024/25. Constant $2021/22*
***Non-retail includes commercial/services type uses (i.e. excludes residential, hotel)*
Source: GapMaps

We estimate the proposed mix at the subject site could potentially generate sales in the order of $34m in its first year of trade, assumed to be 2024/25, based on supermarket sales of around $25m and specialty/hospitality sales of around $9.5m.

Not all of the 'retail' floorspace outlined in the proposed plans is expected to be allocated to retail uses, with non-retail services like gyms/fitness and medical/health/wellness expected as well as the signature Mercedes concept, which is expected to comprise around 687 sq.m.

Estimated impacts

Table 7.2 presents an assessment of the potential trading impacts associated with the proposed development. We note the following:

- The estimated impact on the Burwood precinct is expected to be negligible, estimated at around $8.6m in 2024/25, equivalent to an impact of around 1%, in the context of an estimated $680m of annual sales within this precinct. There is no risk of any noticeable adverse effects on this centre, noting in particular the relative scale of the proposed offer is less than 5% the size of the Burwood precinct.
- Other precincts in the primary sector, i.e. Five Dock and Concord, are estimated to absorb a combined 35% of the proposed development's sales, equating to impacts of around 5% respectively on their future estimated turnover in 2024/25. Such impacts are considered minor/negligible. This represents an upper limit scenario in our view, with the proportion of redistributed sales potentially lower than this.
- The centres within the secondary sectors are expected to absorb around 20 – 25% of sales, equivalent to around $8m, or an average of about 2%, with Strathfield and North Strathfield expected to absorb the greatest share of impact at a combined share of 20%, with impacts estimated to be 5% or less.
- There are three significant retail precincts located just beyond the periphery of the trade area to the north-east (Drummoyne), south-east (Leichhardt) and south (Ashfield). Ashfield and Leichhardt contain both Aldi, Coles and Woolworths supermarkets, with the latter also supporting a Harris Farm Markets. These precincts are estimated to be impacted negligibly (1% or less), and there will also be a proportion of spend that will be redistributed from other undefined centres.

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Table 7.2 – Est. impacts surrounding centres: FY2024/25

Precinct	Retail GLA (sq.m)	Superm'kt GLA (sq.m)	Est. turnover CY2021 ($M)	Est. turnover FY2025 ($M)	Share impact (%)	Est. impacts ($)	Est. impacts (%)
Proposed development					34.2		
Primary sector							
Burwood strategic centre	92,000	11,100	621	677	25%	8.6	1%
Five Dock	17,500	3,100	114	125	17.5%	6.0	5%
Concord	17,500	2,500	110	120	17.5%	6.0	5%
Sub-total primary sector	**127,000**	**16,700**	**846**	**922**	**60%**	**20.5**	**2%**
Rest of MTA							
Breakfast Point	3,500	1,200	23	26	1.5%	0.5	2%
North Strathfield	11,400	1,400	88	135	7.5%	2.6	2%
Strathfield	11,900	2,500	81	88	12.5%	4.3	5%
Croydon	1,000	0	5	6	0.5%	0.2	3%
Haberfield	2,500	750	15	17	1.0%	0.3	2%
Wareemba/Abottsford	3,000	600	17	19	1.0%	0.3	2%
Sub-total rest of MTA	**33,300**	**8,200**	**212**	**271**	**23%**	**7.9**	**3%**
Sub-total MTA	**160,300**	**24,900**	**1,058**	**1,192**	**83%**	**28.4**	**2%**
Beyond trade area							
Drummoyne	20,000	3,000	127	138	2.5%	0.9	1%
Leichhardt	47,300	11,000	328	358	6.5%	2.2	1%
Ashfield	35,000	10,000	256	279	5.0%	1.7	1%
Other / beyond trade area	n.a.	n.a.	n.a.	n.a.	2.5%	0.9	n.a.
Sub-total BTA	**184,600**	**45,000**	**337**	**367**	**17%**	**5.6**	**2%**
Total					**100%**		

**Est. 2024/25. Constant $2021/22*
Source: GapMaps

Economic impacts (cont.)

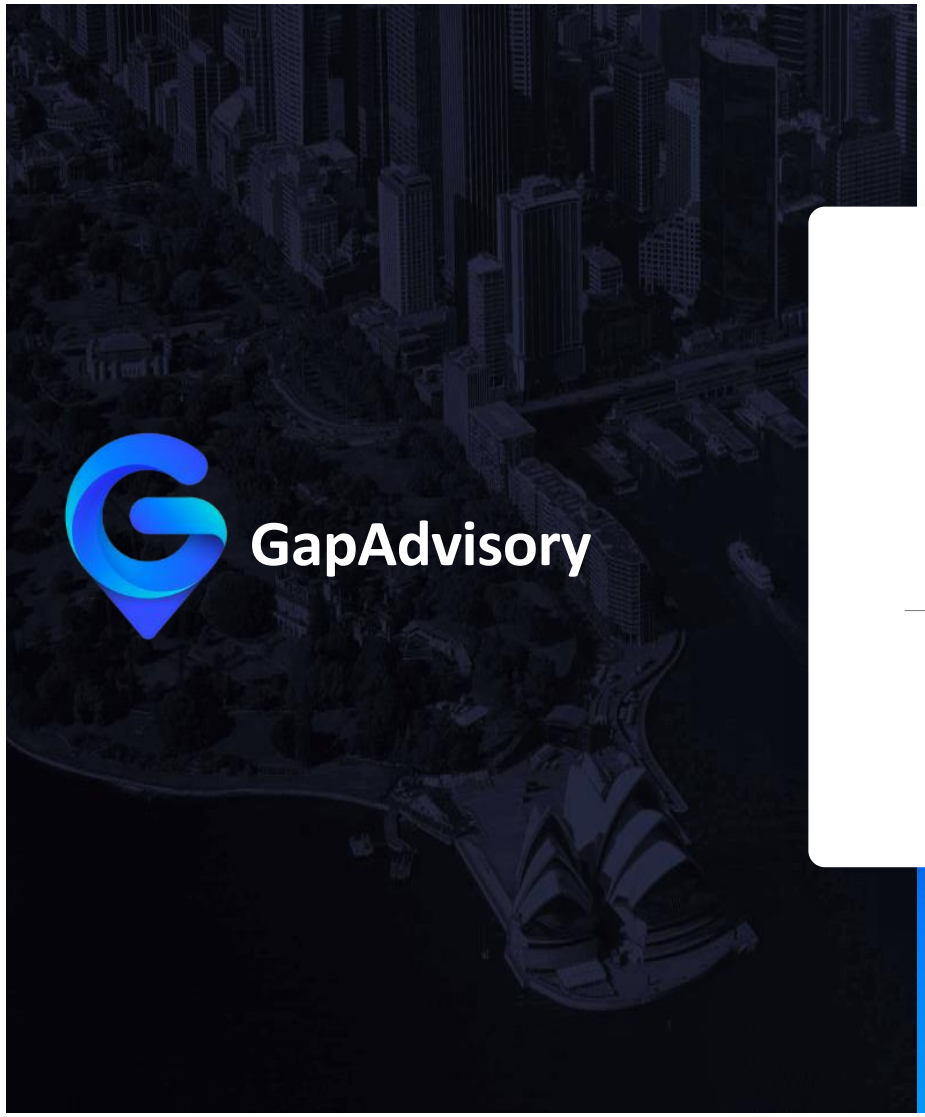
As outlined earlier in this report, the subject site forms part of the Kings Bay precinct, which is intended to support a significant increase in residential density over the next 10 – 20 years, new employment, as well as additional retail and ancillary non-retail facilities – the scale of which the proposed development is consistent with.

Based on the assessment of the retail floorspace gap and the impacts analysis in this report, we conclude that the scale of the retail component of the proposed development to be appropriate. The development could be added to the market while preserving the existing centres hierarchy as estimated impacts on other surrounding centres are likely to be negligible. It will help to reduce some of the current under-supply of supermarket floorspace in the defined MTA and primary sector, as well as help to meet some of the future demand generated by these populations.

The retail component of the proposed development is small scale compared to the offer at Burwood and many of the surrounding retail centres/precincts, like Leichhardt, Concord, Five Dock, Ashfield etc. As such, estimated impacts on the surrounding retail centres hierarchy are expected to be negligible.

In terms of non-retail uses, the scale envisaged is small, with the gym/fitness component likely to consist of 1 – 2 operators and the medical/health/wellness offer likely to consist of several operators, across a range of specific specialties within this broad group (e.g. physiotherapy, dental, preventative health, alternative health, psychology). For context, there are more than 20 gyms/fitness centres across the MTA, more than 40 medical centres, and several hundred registered medical/allied health practitioners across the MTA.

Any impacts from these types of uses would be widely dispersed across a range of operators, noting medical/health and gym/fitness uses tend to be a small component of any of the surrounding centres (i.e. these aren't the key anchors underpinning the vibrancy/vitality of any given centre). Furthermore, the growth in the surrounding trade area population would support additional provision of these types of facilities.



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Report on
Desktop Geotechnical Assessment

Proposed Croydon Vertical Village
166 - 204 Parramatta Rd, Croydon

Prepared for
LSH Property (Alexandria) Pty Ltd

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		25 October 2022
Reviewer		25 October 2022

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Table of Contents

Page

1. Introduction 1
2. Background 2
3. Site Description 4
4. Published Data 5
   4.1 Geology 5
   4.2 Soil Landscape 5
   4.3 Acid Sulfate Soils 5
   4.4 Transport Infrastructure 6
5. Proposed Development 6
6. Geotechnical Model 7
7. Comments 8
   7.1 Site Preparation and Earthworks 8
   7.2 Impact on Adjacent Structures and Transport Infrastructure 9
   7.3 Excavations 9
      7.3.1 Methods 9
      7.3.2 Vibrations 10
      7.3.3 Disposal of Excavated Material 10
      7.3.4 Groundwater 11
      7.3.5 Excavation Slopes 11
   7.4 Excavation Support 12
      7.4.1 General 12
      7.4.2 Ground Anchors 13
      7.4.3 Existing Shoring Walls 14
   7.5 Footings and Foundations 15
   7.6 Seismic Design 16
   7.7 Soil Aggressivity 16
   7.8 Acid Sulfate Soils 16
   7.9 Pavements 16
8. Further Work 17
9. References 17
10. Limitations 17

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Appendix A: About This Report
Appendix B: Drawings
Appendix C: Previous Field Work Results
Appendix D: Previous Laboratory Test Results

Report on Desktop Geotechnical Assessment
Proposed Croydon Vertical Village
166 - 204 Parramatta Rd, Croydon

1. Introduction

This report presents the results of a desktop geotechnical assessment undertaken for the proposed Croydon Vertical Village at 166 - 204 Parramatta Rd, Croydon. The desktop geotechnical assessment was commissioned for the Planning Proposal in an email dated 28 March 2022 by Neoscape Pty Ltd, agents on behalf of LSH Property (Alexandria) Pty Ltd, and was undertaken in accordance with Douglas Partners' proposal 207969.01.P.001.Rev0 dated 7 February 2022.

DP understands that the western portion of the site was previously excavated for the construction of a two-level basement associated with a proposed car showroom development that was never completed. The construction site (including Lot 1 in Deposited Plan 817488) and the adjacent lot occupied by a warehouse building previously used by the Salvation Army (Lot 1 in Deposited Plan 206411) were subsequently acquired by (LSH).

It is understood that the proposed development of the expanded site includes:

- construction of two high-rise, mixed-use buildings;
- construction of a medium-rise, mixed-use building;
- construction of a row of low-rise, attached houses; and
- a two-to-three level extension of the existing basement into the eastern portion of the site.

The purpose of the desktop geotechnical assessment is to assess and advise upon:

- the ground profile in the vicinity of the proposed works;
- site preparation and earthworks;
- excavations;
- groundwater;
- excavation support;
- foundation types, founding levels and allowable bearing pressures;
- site sub-soil class in accordance with AS 1170.4 – 2007;
- pavement design parameters; and
- other relevant geotechnical issues such as slope stability, soil aggressivity to buried structural elements, acid sulfate soils and potential impacts on adjacent structures and infrastructure.

The results of a detailed site investigation (DSI) for contamination will be reported separately.

This report should be read in conjunction with the notes ‘About this Report’ given in Appendix A.

2. Background

DP previously carried out a geotechnical investigation of the western portion of the site for the previous car showroom development (Ref: 85862.00.R.001.Rev1 dated 20 June 2017).

The previous investigation comprised:

- site inspection for mapping of relevant features across the site;
- on-site electronic scanning for buried services at proposed borehole locations;
- drilling of six boreholes (BH1 – BH6) using a track-mounted, limited access drilling rig with solid flight augers through soil to practical refusal on bedrock at depths of between 1.35 m and 2.7 m, then progressing the boreholes into the bedrock to termination depths of between 11.8 m and 12.1 m;
- Standard penetration tests (SPTs) at regular intervals within the soil profile;
- discrete disturbed sampling of soil;
- retrieval of rock core samples from the bedrock profile;
- installation of standpipe monitoring wells in boreholes BH2, BH4 and BH6; and
- standpipe monitoring well development, groundwater level measurement and in situ, rising-head permeability testing.

Boreholes BH1, BH3 and BH5 were backfilled with site spoil upon completion and made safe, with the surface temporarily restored using quickset concrete. The standpipe monitoring wells were installed with 9.0 m of 50 mm diameter screen from their base, backfilled around the screen with a 5 mm gravel pack to between 2.4 m and 2.6 m depth, sealed above the gravel pack with a bentonite layer of between 0.5 m and 1.0 m thickness, then grouted to the surface with a steel gatic cover installed flush with the existing pavement surface. The borehole locations and levels were determined by survey using a differential GPS receiver.

The locations of the boreholes and standpipe monitoring wells are shown on Drawing 1 in Appendix B. The detailed borehole logs are included in Appendix C, together with notes defining classification methods and terms used to describe the soils and rocks.

Based on the results of the previous site investigation, the ground profile for the western portion of the site was summarised as follows:

- **Concrete Pavement Surface –** between 100 mm and 180 mm thick; overlying
- **Filling** – apparently poorly compacted silty clay filling with minor proportions of crushed ironstone gravel to depths of between 0.5 m and 0.8 m in BH3 – BH6 only (i.e., the southern half of the site); overlying
- **Clay** – generally stiff to very stiff in consistency with some silt and gravel of ironstone and extremely weathered shale fragments to depths of between 1.2 m and 2.3 m; overlying
- **Shale** – thickening to the east, the shale is extremely low to low strength, highly to moderately weathered, fragmented to highly fractured to depths of between 2.0 m and 7.4 m, grading to medium strength, moderately weathered to fresh, fractured and slightly fractured below a depth

range of between 3.6 m and 7.4 m at BH2, BH3, BH5 and BH6. The shale grades to high strength, fresh, slightly fractured and unbroken below 5.8 m depth at BH6; overlying

- **Sandstone** – medium then high to very high strength, fresh, slightly fractured to unbroken sandstone, except at BH6, where it was not encountered prior to borehole termination.

Free groundwater was not observed in any borehole during auger drilling. The use of water as a drilling fluid during NMLC diamond coring of the bedrock precluded further observation of the groundwater levels below the bedrock surface during the initial field work. The groundwater levels and in situ permeability measurements obtained from the standpipe monitoring wells installed at boreholes BH2, BH4 and BH6, following their development, are summarised in Table 1.

In situ permeability testing in the standpipe monitoring wells was carried using the rising-head test method, whereby the standing water in each well was first measured then pumped out of the well so as to lower the standing water level in the well, whereupon its depth was again measured to commence the test. The water depth in the well was then measured at regular time intervals as it rose back towards the groundwater level. The equation of Hvorslev was then used to estimate the permeability of the subject strata, in this case, the bedrock.

Table 1: Summary of Groundwater Level and Permeability Measurements

Borehole	Ground Surface Level (m AHD)	Groundwater Depth on 10 March 2017 (m)	Groundwater Level on 10 March 2017 (m AHD)	Permeability (m/s)
BH2	9.3	7.9	1.4	3.8×10^{-8}
BH4	6.5	11.2	-4.7	*
BH6	11.7	3.0	8.7	1.6×10^{-7}

*The standpipe well was pumped dry prior to permeability testing and remained dry for the duration of the test.

Three soil samples were analysed in a NATA-accredited laboratory for measurement of electrical conductivity, pH, chloride and sulfate concentrations in order to assess aggressivity of the site soils to buried concrete, in accordance with AS 2159 – 2009 – Piling: Design and Installation. The laboratory results are included in Appendix D, with the results summarised in Table 2.

Table 2: Chemical Analysis Test Results for Soil Samples

Borehole	Depth (m)	Conductivity (µS/cm)	pH	Cl (mg/kg)	SO_4 (mg/kg)
BH3	0.2 – 0.4	130	7.7	87	76
BH4	0.8 – 1.0	330	6.3	250	160
BH5	0.3 – 0.4	300	10.5	22	280

Notes: Cl = Chloride ion concentration, SO_4 = Sulfate ion concentration

Two bulk soil samples were also analysed in a NATA-accredited laboratory for measurement of California bearing ratio (CBR). The laboratory CBR test results are included in Appendix D, with the results summarised in Table 3.

Table 3: Summary of CBR Test Results

Borehole	Depth (m)	Soil Description	FMC[1] (%)	CBR (%)	Swell (%)	SMDD[2] (t/m^3)	OMC[3] (%)
BH3	0.4 – 0.8	Filling	25.3	2.0[4]	0.5	1.68	20.0
BH5	0.5 – 0.8	Filling	27.1	6.0[5]	0.0	1.63	22.0

[1] Field moisture content
[2] Standard maximum dry density
[3] Optimum moisture content
[4] 5.0 mm penetration reading
[5] 2.5 mm penetration reading

3. Site Description

The site comprises a near-rectangular shaped area of about 1.04 ha, with a fall of between 3.5 m and 5.5 m in the westerly direction. It is bounded by Parramatta Road to the north, Lucas Road to the west, Cheltenham Road to the east, and several low-rise residential properties to the south.

An access-limited site inspection was undertaken on 9 May 2022 by an environmental scientist from DP, Wen-Fei Yuan, accompanied by Senior Project Manager, Reece Mackie and Project Coordinator, Victoria Ghafari of Neoscape Pty Ltd. With reference to Drawing 1 in Appendix B, the site is presently divided into the following three main areas:

- Area 1, comprising Lot 1 DP 86926, Lots A-C DP 84812, Lots 100-101 DP 850953, and Lot 1 DP 86033, forming the western portion of the site;
- Area 2, comprising Lot 1 DP 817488, forming the south-eastern portion of the site; and
- Area 3, comprising Lot 1 DP 206411, forming the north-eastern portion of the site.

It was observed at Area 1 that:

- there is a large, irregular-shaped basement substructure of two to three basement levels;
- the concrete retaining walls of the basement appear generally to have a single row of temporary anchors and a localised area of corner struts with waler beams;
- the exposed anchor heads appear to be covered with rust;
- bedrock is exposed at the bulk excavation level of the basement (shale/sandstone);
- some minor stockpiles of construction materials were present;
- there were several small ponds over the floor of the basement. It is understood that pumping of rainwater from the basement is carried out on a monthly basis to limit the accumulation of surface water runoff and groundwater inflows to the basement; and
- temporary hoardings were constructed around the perimeter.

It was observed at Area 2 that:

- a vacant, detached residential building occupied the eastern part of the site. It is understood that the rendered brick building was used as a site office during basement construction at Area 1; and
- the western part of the property was entirely surfaced by a concrete pavement. It is understood that the concrete pavement was formerly used to store construction materials and for staff car parking during the basement construction at Area 1.

It was observed at Area 3 that:

- it is predominately occupied by a brick warehouse. It is understood the warehouse was used as a Salvation Army store;
- the interior of the warehouse was vacant with a small office space, a kitchen, amenities and old plant rooms comprising possibly a ventilation/cooling system, a water heater, damaged electrical switchboard and miscellaneous waste (including building rubble) on the floor; and
- a pit cover (possibly for underground services) was observed near an old plant room.

4. Published Data

4.1 Geology

The Geological Survey of NSW 1:100,000 Series Sheet 9130 for Sydney indicates that the site is underlain by Ashfield Shale of the Triassic Period. Ashfield Shale typically comprises black to dark grey shale and laminite (interlaminated siltstones and sandstones).

4.2 Soil Landscape

The Soil Conservation Service of NSW 1:100 000 Soil Landscape Series Sheet 9130 (Sydney) indicates that the site is located within the 'Blacktown' residual soil landscape unit. The map notes indicate that the Blacktown residual soil landscape unit is characterised by a topography of gently undulating rises on Wianamatta Group shales and Hawkesbury Sandstone. Broad, rounded crests and ridges with gently inclined slopes are indicated to be typical of this soil landscape, with local relief of up to 30 m and slope grades of usually less than 5%. Moderately deep, residual clay soils are indicated to overlie the bedrock in this area.

4.3 Acid Sulfate Soils

The ASRIS national map of published acid sulfate soil mapping indicates that there is an extremely low probability of occurrence of acid sulfate soils (ASS) at the site.

4.4 Transport Infrastructure

Reference to Google Maps and the NSW Government Schedule of Classified Roads and Unclassified Regional Roads (Ref: SF2012/015672 Version 11 last updated April 2017 by the Planning and Operations Branch of Roads and Maritime Services (RMS)) indicates that Parramatta Road (also known as the Great Western Highway), which is located on-grade adjacent to the northern boundary of the site, is a Classified Road (Ref: Gazetted Road Number 5).

In addition, it is shown on the NSW Government's Sydney Metro West interactive website map (see https://caportal.com.au/tfnsw/sydmetrowest/map#) that the proposed twin tunnels for the Sydney Metro West railway line may be located below Parramatta Road approximately 14 m north-west of the site. The same interactive website map indicates that the twin M4 East road tunnels are located about 65 m south-west of the site.

Local roads border the site on its western and eastern sides.

5. Proposed Development

DP's understanding of the proposed 'Croydon Vertical Village' development is based on the architectural drawings by Architectus provided by the client (and included in Appendix B), specifically Drawing Nos. A.1097 – A.1104, A.1111, A.1112, A.1115 – A.1117, A.2100 and A.2101 Issue A dated 14 October 2022.

Based on the supplied architectural drawings, it is understood that the proposed development comprises:

- a two- to three-level common basement from west to east across the site with a basement floor level of RL 0.0 m AHD, and with setbacks of about 6.0 m, 3.0 m, 3.0 m and 3.0 m to the north, south, east and west, respectively;
- a 19-storey, mixed-use building in the eastern part of the site, consisting of a retail ground floor with residential apartment floors above;
- an 18-storey, mixed-use building in the western part of the site, consisting of both commercial, hotel and residential floors;
- a four-storey, mixed-use building in the central-north part of the site, consisting of a Mercedes Benz experience centre (occupying the equivalent of the lower two floors), a commercial floor above it and residential communal facilities occupying the upper floor;
- a single row of eight, two- to three-storey, attached dwellings (terrace houses) along the southern perimeter of the site with plant rooms attached at each end of the row of buildings, together with access driveways to the basement below at the western and eastern boundaries;
- a shared laneway between the eastern and western site boundaries along the northern side of the attached dwellings; and
- an open space 'plaza' in the central part of the site, covered by a lawn with some trees.

Based on comparison with available 1 m Digital Elevation Model (DEM) data from the Elvis website of the Intergovernmental Committee on Surveying and Mapping (ICSM) and assuming a bulk excavation

level (BEL) of RL -0.5 m AHD (i.e., 500 mm below the basement floor level to accommodate a concrete slab and subfloor drainage layer), the proposed depths of bulk excavation vary from 6.0 m to 11.5 m from west to east across the basement footprint.

It is noted that the BEL of the existing basement excavation in the western portion of the site is about RL -1.5 m AHD, again based on available 1 m DEM data from the Elvis website of the ICSM. The existing basement would therefore be required to be backfilled to a design subgrade level (DSL) of about RL -0.3 m AHD, i.e., up to 1.2 m of fill would need to be placed over the base of the existing basement to achieve the required basement floor level of RL 0.0 m AHD.

Details of foundation loadings for the single medium-rise and two high-rise buildings are not known at this stage. It is anticipated, however, that column working loads for the proposed larger, framed buildings will be in the order of:

- 4000 – 4500 kN for the four-storey building in the central-northern part of the site;
- 14,000 – 15,000 kN for the hotel building in the western part of the site; and
- 15,500 – 16,500 kN for the apartment building in the eastern portion of the site.

6. Geotechnical Model

In general, surficial, poorly compacted silty clay filling less than 1 m deep discontinuously overlies stiff to very stiff, residual clay (i.e., over the southern half of the site), which overlies bedrock at depths of between 1.2 m and 2.3 m.

The bedrock profile is interpreted to be Ashfield Shale overlying Hawkesbury Sandstone.

Classification of the rock encountered in the boreholes is based on the classification system of Pells et al (1998) in the paper entitled “Foundations on Sandstone and Shale in the Sydney Region”, Australian Geomechanics, December 1998. The interpreted depth and reduced levels (RLs) at the upper surface of the various bedrock classes is shown in Table 4.

Table 4: Summary of Geotechnical Model

Borehole	Depth (& Reduced Level) of Top of Various Rock Classes (m (& m AHD))								
	Ground Surface Level	Class V Shale	Class IV Shale	Class III Shale	Class II Shale	Class I Shale	Class III Sandstone	Class II Sandstone	Class I Sandstone
BH1	(7.1)	2.2 (4.9)	3.2 (3.9)	-	-	-	6.2 (0.9)	-	10.1 (-3.0)
BH2	(9.3)	1.2 (8.1)	2.0 (7.3)	-	5.2 (4.1)	11.1 (-1.8)	-	-	10.1 (-0.8)
BH3	(8.2)	2.5 (5.7)	4.5 (3.7)	6.3 (1.9)	-	-	-	-	8.1 (0.1)
BH4	(6.5)	2.2 (4.3)	-	-	-	-	-	5.6 (0.9)	9.9 (-3.4)

Borehole	Depth (& Reduced Level) of Top of Various Rock Classes (m (& m AHD))								
	Ground Surface Level	Class V Shale	Class IV Shale	Class III Shale	Class II Shale	Class I Shale	Class III Sandstone	Class II Sandstone	Class I Sandstone
BH5	(8.9)	2.3 (6.6)	3.6 (5.3)	-	-	6.5 (2.4)	-	-	9.3 (-0.4)
BH6	(11.7)	-	2.2 (9.5)	3.6 (8.1)	5.8 (5.9)	-	-	-	-

The groundwater encountered at varying depths within the bedrock profile across the site suggests the presence of temporary 'perched' groundwater, rather than a regional groundwater table. It should be noted that groundwater levels can fluctuate over time due to seasonal and climatic factors.

Interpreted geological cross-sections through the site, based on the borehole logs, are shown on Drawings 2 – 4 in Appendix B.

7. Comments

7.1 Site Preparation and Earthworks

Site preparation for the purpose of trafficking of the site by piling rig plant and for installation of shoring wall piles should be carried out in accordance with the guidelines contained in AS 3798 – 2007. This includes clearing, to the minimum extent necessary for the works, all materials unsuitable for incorporation into the works, as well as the removal of all debris (such as old footings, buried pipes and the like) to sufficient depth so as to prevent obstruction of subsequent excavation and foundation works. For the proposed works, this will include the demolition of the existing buildings and pavement surfaces and relocation and/or decommissioning and removal of some existing buried services and grease-arrestors.

In general, excavations that result from these activities should be backfilled. Prior to backfilling, the stripped surface should be compacted to a minimum 95% of the maximum dry density for Standard compaction (AS 1289.5.1.1 – 2003). Backfilling should then be carried out using clean, select material, with maximum 75 mm particle size and compacted in horizontal layers to a minimum 95% of the Standard maximum dry density. If site soils are used for backfilling, these will need to be screened for any oversize or otherwise unsuitable materials (such as organic or contaminated soils) and moisture-conditioned to within 2% of the material's optimum moisture content prior to its placement in any backfill.

Within the existing basement footprint, where up to 1.2 m of backfilling would be required to achieve a DSL of RL -0.3 m AHD above the existing BEL for the proposed basement, place fill material in layers not exceeding 300 mm loose thickness, with each layer compacted to a minimum dry density ratio of 98% Standard. It is recommended that the upper 1 m of filling for any fill which is required to support building footings or upper 0.5 m under pavements be compacted to a dry density ratio of at least 100% Standard. Where fill material is clayey, the moisture content within the filling should be maintained within

2% of OMC (where OMC is the optimum moisture content at Standard compaction) during and after compaction.

It is noted that particular care will be required when using compaction and earthworks machinery in close proximity to infrastructure, such as the adjacent footpaths and buried services, so as to reduce the potential for damage due to vibrations.

7.2 Impact on Adjacent Structures and Transport Infrastructure

The proposed works have the potential to adversely impact adjacent buildings and above and below-ground utilities.

With reference to the NSW Government Department of Planning Interim Guideline for Development near Rail Corridors and Busy Roads (December 2008), Transport for NSW (TfNSW) Technical Direction – Geotechnology for excavation adjacent to TfNSW infrastructure (Ref: GTD 2020/001 Version No. 01 – 2 July 2020) and based on DP's experience, the proposed works also have the potential to adversely impact the proposed Sydney Metro West tunnels and the adjacent road reserve of Parramatta Road. It also has the potential to adversely impact the adjacent local roads of Lucas Road and Cheltenham Road.

Specific geotechnical assessment and modelling of the effects of any proposed excavation adjacent to each property boundary will likely be conditioned as part of any proposed development application approval. Assessment and modelling will likely include a review of the effects of excavation sidewall movement, lateral ground movements with respect to nearby services and building footings, and changes in stresses and strains on tunnel linings. In DP's experience, engineering precautions can be undertaken to limit any potential adverse impacts. It is noted that the lowest floor level of the proposed new basement is above the level of the current basement.

7.3 Excavations

7.3.1 Methods

Prior to the commencement of any excavation, reference should be made to the SafeWork NSW Excavation Work Code of Practice – January 2020.

Bulk excavation for the proposed basement will involve cuts of between 6.0 m and 11.5 m from west to east. Within this range of excavation depths, the materials that will be encountered include filling, residual clay, shale of extremely low strength grading to medium strength with depth, and medium to high strength sandstone. Excavation in the filling, residual clay and extremely low strength shale should be readily carried out using conventional earthmoving equipment. Bulk excavations in very low to low strength shale would likely require light to medium ripping using a D6 'dozer or similar plant, or excavators fitted with either ripping tynes or rock hammers. Heavy ripping using D9 'dozers or similar, and/or excavators fitted with rock hammers, would be required for bulk excavations in medium strength shale and medium to high strength sandstone. Excavators fitted with rock hammers and diamond saws would be required for detailed footing and trench excavations.

7.3.2 Vibrations

It is anticipated, based on the range of materials that will be encountered within the proposed depth range of bulk excavations, that vibration will be caused by excavation work on the site, particularly during excavation of medium strength or stronger rock, and precautions will therefore be required when excavating close to neighbouring buildings. The level of acceptable vibration is dependent on various factors, including the type of building structure (e.g., reinforced concrete, brick, etc.), its structural condition, the frequency range of vibrations produced by the construction equipment, the natural frequency of the building and the vibration transmitting medium (ground profile).

The Australian Standard AS 2187.2 – 1993 (Explosives Code) recommends a maximum vector sum peak particle velocity (VSPPV) of 10 mm/s for houses and low-rise residential or commercial buildings. Ground vibration arising from excavation plant is of a continuous, rather than transient, nature, unlike blasting events. Thus, more stringent vibration limits than those given for blasting should generally apply. Buildings supported on shallow foundations are particularly prone to the detrimental effects of settlement and vibration.

It is expected that the neighbouring buildings would likely have footings founded at shallow levels, so it is suggested that the VSPPV be provisionally limited to 5 mm/s at the building line. It is noted that vibration levels at or above 5 mm/s VSPPV may be disturbing to the adjacent property occupants and some complaints from neighbours are possible. Some reassurance, possibly via vibration monitoring, may be necessary.

To respond to potential claims for damages resulting from construction activities, it is suggested that allowance be made for dilapidation surveys to be carried out on the adjoining structures (or other nearby structures that potentially may be susceptible to vibration damage). This activity should be performed prior to the commencement of work on site, in order to provide a baseline for comparison in the event of any claims for damages.

7.3.3 Disposal of Excavated Material

All excavated materials to be removed off-site will need to be disposed of in accordance with current EPA (2014) guidelines. Under the Protection of the Environment Operations Act 1997 (POEO Act) a waste/fill receiving site must be satisfied that materials received meet the environmental criteria for proposed land use. This includes filling and virgin excavated natural materials (VENM), such as may be removed from this site. Accordingly, environmental testing will need to be carried out to classify spoil prior to disposal. The type and extent of testing undertaken will depend on the final use or destination of the spoil, and requirements of the receiving site. Further advice on this will be provided in the contamination report for the site.

7.3.4 Groundwater

Groundwater was encountered at varying depths within the bedrock profile across the site in the standpipe monitoring wells, which suggests the presence of temporary 'perched' groundwater, rather than a regional groundwater table. Based on the depths at which groundwater was measured and the site elevation, it is considered likely that there will be some groundwater seepage into the excavation along the soil/rock interface and through defects in the rock mass. Based on the results of the in situ permeability tests, however, seepage volumes would be expected to be relatively low and should be readily handled using normal 'sump-and-pump' methods for seepage removal.

Groundwater entering excavations and post-construction accumulation of groundwater below the basement floor will need to be disposed of in accordance with the Protection of the Environment Operations Act 1997 (POEO Act). Ultimately, this requires that any water discharged into the natural environment should comply with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZAST, August 2018).

It will be necessary to provide sub-floor drainage to safeguard against uplift pressures if the basement floor and walls are designed for drained conditions. This could comprise a minimum 100 mm thick, durable, open-graded, crushed rock layer with subsurface drains and sumps. It is normally necessary to incorporate provision for regular flushing and cleaning in the design of the sub-floor drainage system.

7.3.5 Excavation Slopes

As the bulk excavation for the proposed basement will exceed a depth of 4 m, temporary batters are not considered feasible for the sides of the bulk excavation, and excavation support will therefore be required. Nevertheless, in the course of carrying out bulk excavations inside a supported basement perimeter, the need for temporary cut batters may arise as the bulk excavation proceeds, such as for temporary earth ramps and the like, for which suggested temporary maximum batter slopes for slopes not higher than 4 m are given in Table 5.

Table 5: Recommended Temporary Maximum Batter Slopes

Material	Batter Slope Ratio (H:V)
Filling and stiff clay	1.5:1
Very stiff to hard, shaly clay	1:1
Extremely low strength shale	1:1[1]
Very low to low strength, fractured shale	0.75:1[1]
Medium strength, slightly fractured Rock	Vertical[2]

[1] Subject to inspection by an experienced geotechnical engineer or engineering geologist

[2] Dependent on jointing and subject to inspection by an experienced geotechnical engineer or engineering geologist

7.4 Excavation Support

7.4.1 General

As excavation depths greater than 4 m are proposed for the basement, the excavation will require both temporary and permanent lateral support.

Potential means of excavation support include anchored shoring walls, with the anchored shoring walls likely to require more than one row of temporary anchors. Cantilevered shoring walls should not be used to support adjacent building foundations. The shoring walls could be constructed utilising a system of anchored soldier piles drilled along the excavation line to at least two pile diameters below the BEL, with reinforced shotcrete infill panels between the soldiers progressively installed in drops of approximately 2 m height.

Retaining walls that are capable of some outward rotation may be designed on the basis of the parameters shown in Table 6 and bulk unit weights of 20 kN/m^3 and 22 kN/m^3 for the retained soil and rock, respectively.

Table 6: Suggested Temporary and Permanent Active Earth Pressure Coefficients

Material	Active Earth Pressure Coefficient, K_a	
	Temporary	Permanent
Filling	0.3	0.4
Residual clay	0.25	0.3
Shale (all classes)	0.2	0.25
Class III, Class II & Class I sandstone	0	0

These values of K_a should generally be increased by 50% to reduce lateral (inward) wall deflections near sensitive, existing structures. Additional allowance should also be made for lateral pressures due to surcharge loads above the walls and also for hydrostatic pressures. Unless positive drainage measures can be incorporated within the shoring system to prevent water pressure build-up behind the walls, the full hydrostatic head should be allowed for in design.

A maximum allowable passive pressure of 2000 kPa can be assumed for the medium to high strength rock below BEL.

The design of excavation support for a multi-anchored wall system (braced face support, i.e., two or more rows of anchors) may be based on a uniform rectangular earth pressure distribution. The following earth pressure magnitudes are considered appropriate, where H is the height to be retained, in metres:

- 6H kPa, where some lateral movement is allowed; and
- 8H kPa, where lateral movements need to be limited (e.g., next to buildings and services).

The design of the temporary shoring system and possibly the long-term basement must also cater for the possibility that a continuous, planar moderately-dipping joint or fault will 'daylight' near the base of the excavation, leading to large wedges of rock becoming unstable during or after bulk excavation.

There have been several reported wedge failures or 'near failures' in the Ashfield Shale formation in Sydney, as described in Andrews & Braybrooke (2001).

The TfNSW Technical Direction GTD 2020/001 (dated 2 July 2020) provides minimum design loading and load combination requirements for shoring walls supporting TfNSW infrastructure, which should be considered by the designer of the shoring walls.

7.4.2 Ground Anchors

Anchoring of soldier piles can be accomplished by post-tensioned anchors inclined below the horizontal. For estimating purposes, it is suggested that the maximum allowable bond stresses given in Table 7 be adopted for the various ground profile materials present within the proposed depths of bulk excavation.

Table 7: Preliminary Maximum Allowable Bond Stresses for Anchors

Material	Allowable Bond Stress (kPa)
Residual Clay	10
Class V shale	20
Class IV shale	100
Class II & Class I shale	400
Class III & Class II sandstone	800

For temporary support of large excavations in Ashfield Shale, sufficient rock bolting and anchoring is required to prevent movement or sliding along these continuous defects. Anchors should be designed to cater for a possible mobilised wedge that would give rise to a total anchor force of $4.2H^2$ kN/m along the length of the wall, where H is the full height of the proposed excavation (in metres). This figure is based on an anchor inclination of 10° below the horizontal and the following assumed material and strength parameters:

- Planar failure on a joint/fault dipping at 45°, striking parallel to and "daylighting" at the toe of the excavation;
- Shear strength at interface: $\Phi' = 25°$, $c' = 0$ kPa; and
- Bulk unit weight (γ_b) of shale wedge = 21 kN/m^3

The calculation of the $4.2H^2$ total anchor force (per metre run of wall) is based on statics, and follows the process set out in Hoek & Bray (1981).

A factor of safety of 1.1 against sliding may be adopted for this design approach given that it assumes an unlikely combination of adverse factors, in particular that the subject defect would run the full length and height of the excavation.

The 10° anchor inclination to the horizontal is considered to be the shallowest angle that will allow relatively easy anchor installation and grouting. Should there be a requirement to increase the inclination of the anchors then, to maintain a similar factor of safety to that designed for, the anchor capacity would need to be increased as shown in Table 8.

Table 8: Increased Capacity Requirement for Steeper Anchors

Anchor Inclination below Horizontal	Required Increase in Anchor Capacity
10°	0%
15°	5%
20°	14%
25°	22%

The anchors should have their bond lengths behind the projected 45° line.

Ultimately, it is the contractor's responsibility to ensure that the correct design values (specific to the anchor system and method of installation) are used and that the anchor holes are carefully cleaned out prior to grouting. After anchors have been installed, it is recommended that they be tested to 125% of nominal working load and then locked off at between 60% and 80% of their working loads. Checks should be carried out, however, to ensure that the load is maintained in the anchors throughout the construction period and is not lost due to creep effects or other causes.

Where temporary anchors may intrude into neighbouring properties, permission should be sought from the owners before their installation. Where ground anchors are proposed to be located within the road reserve and/or easements of a classified road, TfNSW Technical Direction GTD 2020/001 dated 2 July 2020 requires that the ground anchors:

- be temporary;
- be designed and tested in accordance with AS 5100.3;
- have a minimum design life of two years, and if required for more than 18 months, are to be designed as permanent anchors;
- are not stressed to more than 75% of the tendon ultimate tensile strength under either working or test loads;
- be installed not less than 1.5 m below the surface within the road reserve and/or easement; and
- be structurally disconnected from the shoring wall once they are no longer required to carry load.

It is anticipated that the basement floor slabs will be designed to provide permanent lateral support to the shoring walls following their construction, so the installed ground anchors are expected to be temporary. The use of permanent ground anchors, if required, would require careful attention to corrosion protection and further geotechnical advice should be sought in this case.

7.4.3 Existing Shoring Walls

The existing shoring walls with temporary anchors for the now-abandoned development have stood exposed to the elements of weather for the last four or so years and the anchors appear to be deteriorating (i.e., rusting). For worker health and safety and for the safety of the general public outside the site boundaries, it will therefore be necessary for the original shoring wall designer and constructor to undertake an assessment and provide confirmation that the existing shoring walls and temporary

anchors are adequate to resist earth pressures, potential wedge failures and all relevant surcharge loads prior to commencement of detailed design and construction of the proposed development.

Given that the typical design life of temporary anchors is two years, however, it is considered likely that all the existing anchors for the existing sections of the shoring walls to be retained for the proposed development will need to be replaced prior to commencement of construction.

7.5 Footings and Foundations

For structures located wholly within the basement footprint and outside of the existing basement footprint, shallow footings and lift wells below the BEL will likely be founded in either Class III, Class II or Class I sandstone, or Class II or Class I shale. Within the existing basement footprint, however, new footings would need to be taken down to through an above-suggested engineered fill to below the BEL for the existing basement, some 1.2 m below the proposed basement floor level. In both cases, the parameters in Table 9 may be used for foundation design.

Table 9: Foundation Design Parameters for Shallow Footings below BEL

Rock Class	Young's Modulus (MPa)	Ultimate Parameters		Allowable (Serviceability) Parameters	
		Shaft Adhesion[2] (kPa)	End Bearing Pressure (kPa)	Shaft Adhesion[2] (kPa)	End Bearing Pressure (kPa)
Class II Shale	1000	800	70,000	300	6000
Class I Shale	2000	1000	120,000	400	8000[1]
Class III Sandstone	700	1000	30,000	350	3500
Class II Sandstone	1000	2000	90,000	600	6000
Class I Sandstone	2000	3000	120,000	800	8000[1]

[1] Subject to inspection and spoon testing by a geotechnical engineer or engineering geologist
[2] Clean sockets of roughness category R2 or better (Walker and Pells, 1998)

Footings proportioned on the basis of the above allowable shaft adhesion and end bearing pressures would be expected to experience total settlements of less than 1% of the minimum footing dimension under the applied working (i.e., serviceability) load, with differential settlements between adjacent columns expected to be less than half this value.

By way of example, a square pad footing of 1.6 m width founded in either Class II sandstone or Class II shale below the BEL would adequately support a column working load of up to 15,500 kN, with an estimated footing settlement of less than 16 mm.

Serviceability analysis should be undertaken if ultimate parameters are used to design the footings.

All shallow footings should be inspected by a geotechnical engineer or engineering geologist prior to the placement of steel reinforcement and concrete. Spoon testing should also be undertaken for all shallow footings proportioned on the basis of an allowable end bearing pressure greater than 3500 kPa to check that no significant weak seams exist within a depth of 1.5 times the least footing dimension below the foundation level.

7.6 Seismic Design

Based on the sub-surface conditions encountered at the boreholes for the previous investigation, the site has been assessed in accordance with Section 4 of AS 1170.4 – 2007 (Structural Design Actions: Part 4 - Earthquake Actions in Australia) and has been assigned to the site sub-soil Class C_e (shallow soil).

7.7 Soil Aggressivity

The results of electrical conductivity, pH, chloride and sulphate analyses indicate that the concentrations within the soil samples analysed are non-aggressive to both concrete piles (Table 6.4.2(C) of AS 2159 – 2009) and steel piles (Table 6.5.2(C) of AS 2159 – 2009). Reference should be made to Table 6.4.3 of AS 2159 – 2009 to determine minimum concrete cover to steel reinforcement and minimum concrete strength required for piles, based on the exposure classification.

7.8 Acid Sulfate Soils

The Acid Sulfate Soil Risk Map published by the former NSW Department of Land and Water Conservation indicates that there is no known occurrence of acid sulfate soils at the site, although it is located about 80 m south-east of an area mapped as 'disturbed terrain' with an elevation in the range of RL 2 – 4 m AHD, associated with a minor channel draining northward into Canada Bay.

Due to the site's elevation (between RL 6.1 m and RL 10.0 m AHD within the proposed building footprint) and geology (thin, discontinuous, surficial filling overlying residual soil overlying bedrock at shallow depth), the risk that acid sulfate soils are present on the site is considered to be very low.

7.9 Pavements

Laboratory test results have indicated California bearing ratios of 2% and 6%. Assuming the existing filling below the likely subgrade formation level is adequately moisture conditioned and re-compacted, a design CBR of 3% may be adopted for preliminary pavement design purposes. Adequate surface and subsoil drainage will be required to avoid softening of the subgrade.

8. Further Work

Comprehensive geotechnical assessment by a NSW Government – registered geotechnical engineer would be required as part of the planning and design processes of the project, in particular to demonstrably reduce the risk of adverse impacts on the adjacent buildings, utilities and transport infrastructure to levels acceptable to the relevant approval authorities.

Prior to detailed design and construction of the proposed works (i.e., as part of the detailed DA), comprehensive intrusive geotechnical investigation of the site should be undertaken in accordance with the requirements of AS 1726 to a depth at least 5 m below the proposed bulk excavation level, the likely toe level of proposed piles or the invert level of the lowest tunnel, whichever is deepest, and as a minimum should include at least two cored boreholes within the footprint of the proposed basement excavation in the eastern part of the site (i.e., Areas 2 and 3) with recovery of rock core samples for logging, photographing and laboratory testing, as well as the installation of at least one standpipe monitoring well to measure and monitor groundwater levels.

As part of the comprehensive geotechnical assessment, numerical modelling will need to be carried out to predict the impact of the proposed development on the proposed Sydney Metro West railway tunnels, on the adjacent at-grade roads and utilities, and on neighbouring buildings. The proposed works may also trigger a specialist engineering assessment to address the requirements of Sydney Water.

9. References

AS 1170.4. (2007). *Structural Design Actions, Part 4: Earthquake Actions in Australia.* Reconfirmed 2018. Incorporating Amendments 1 & 2: Standards Australia.

AS 2159. (2009). *Piling - Design and Installation.* Standards Australia.

AS 2670.2. (1990). *Evaluation of Human Exposure to whole-body vibration, Part 2: Continuous and shock-induced vibrations in buildings (1 to 80 Hz).* Standards Australia.

AS 2870. (2011). *Residential Slabs and Footings.* Standards Australia.

AS 3798. (2007). *Guidelines on Earthworks for Commercial and Residential Developments.* Standards Australia.

Pells, P. J., Mostyn, G., & Walker, B. F. (1998). Foundations on Sandstone and Shale in the Sydney Region. *Australian Geomechanics, No 33 Part 3*, 17-29.

10. Limitations

Douglas Partners (DP) has prepared this report for this project at 166-204 Parramatta Road, Croydon, in accordance with DP's proposal dated 7 Febraury 2022 and acceptance received from Neoscape Pty Ltd, agents on behalf of LSH Property (Alexandria) Pty Ltd dated 28 March 2022. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of LSH Property (Alexandria) Pty Ltd for this project only and for the purposes as described in the report. It should not

be used by or be relied upon for other projects or purposes on the same or another site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during the previous investigation (Ref: 85865.00.R.001.Rev1 dated 20 June 2017) and a limited recent inspection. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all the attached notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope of work for this report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of fill of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such fill may contain contaminants and hazardous building materials.

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

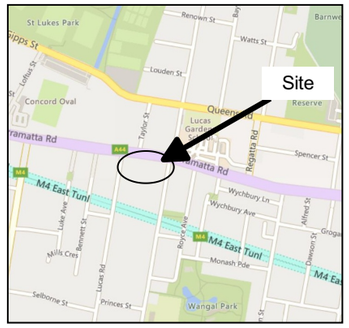
Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Appendix B

Drawings



Site Location

Legend

- Borehole & Well
- Borehole
- Cross-Section
- Area 1
- Area 2
- Area 3
- Proposed Basement Footprint
- Site Boundary

0 10 20 30 40 50 m

Drawing adapted from Metromaps aerial imagery dated 9/02/2022 and Architectus Drawing No.A.1097 Issue 4 dated 7/02/2022

Test locations were surveyed using a differential GPS receiver

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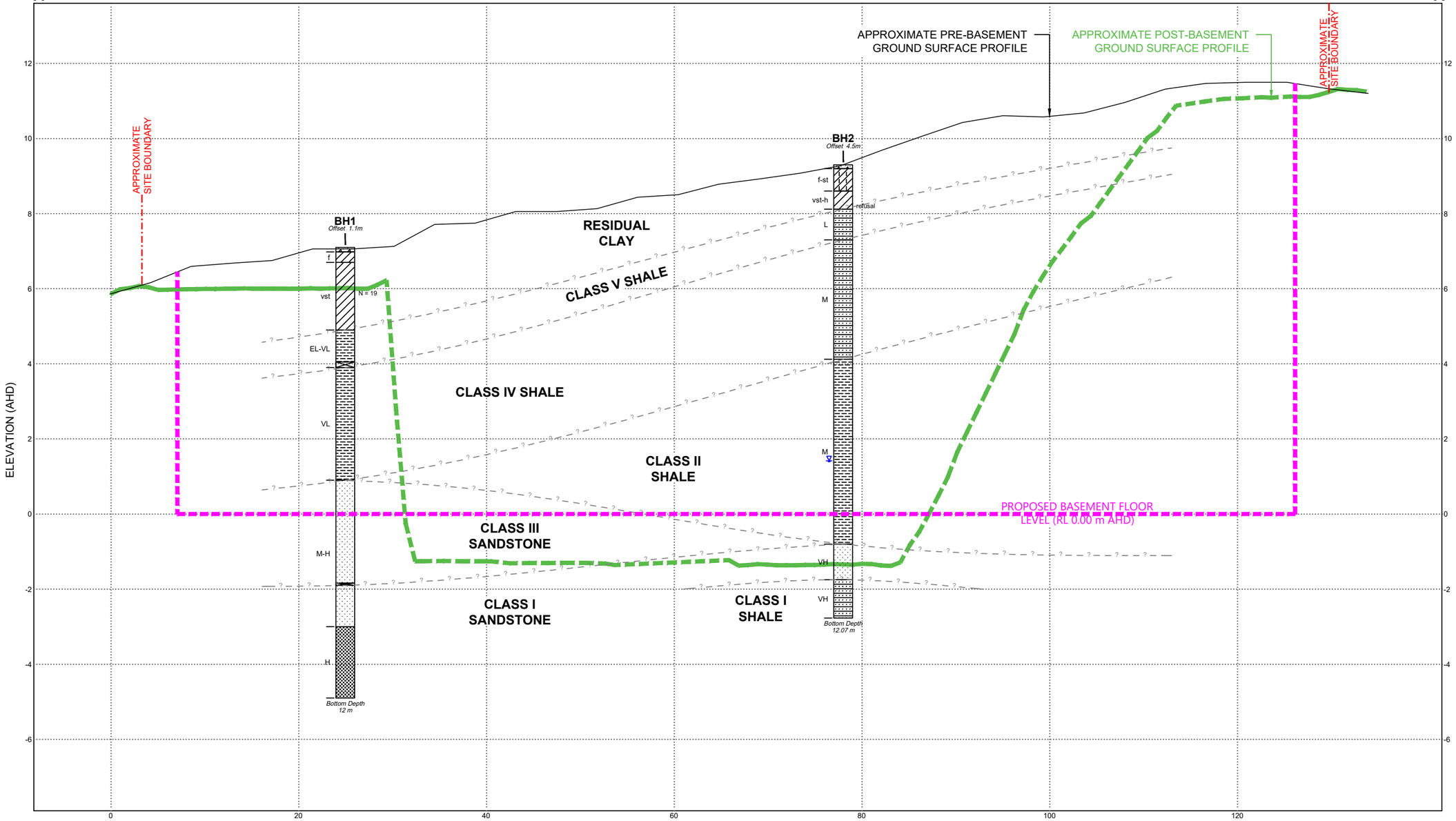
CLIENT: LSH Property (Alexandria) Pty Ltd		TITLE: **Test Location Plan**	Project: 207969.01
OFFICE: Sydney	DRAWN BY: AK	**Proposed Croydon Vertical Village**	DRAWING No: 1
SCALE: 1:500 @ A3	DATE: 03.June.2022	**166-204 Parramatta Road, Croydon**	REVISION: 0

N

DP.QGIS.A3LandScapeDrawingLayout.DftA



LEGEND

- Core Loss
- Clay
- Concrete
- Laminite
- Sandstone coarse grained
- Sandstone fine grained
- Shale
- Silty Clay

NOTES:

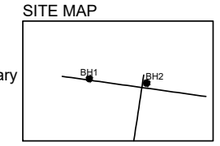
1. Subsurface conditions are accurate at the borehole locations only.
   Variations in subsurface conditions may occur between borehole locations.
   Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

ROCK STRENGTH
EL - Extremely Low
VL - Very Low
L - Low
M - Medium
H - High
VH- Very High

SOIL CONSISTENCY
vs - Very Soft
s - Soft
f - Firm
st - Stiff
vst - Very Stiff
h - Hard

TESTS / OTHER
N - Standard penetration test value
— ? — — - Interpreted geotechnical boundary
▽ - Water level

SITE MAP



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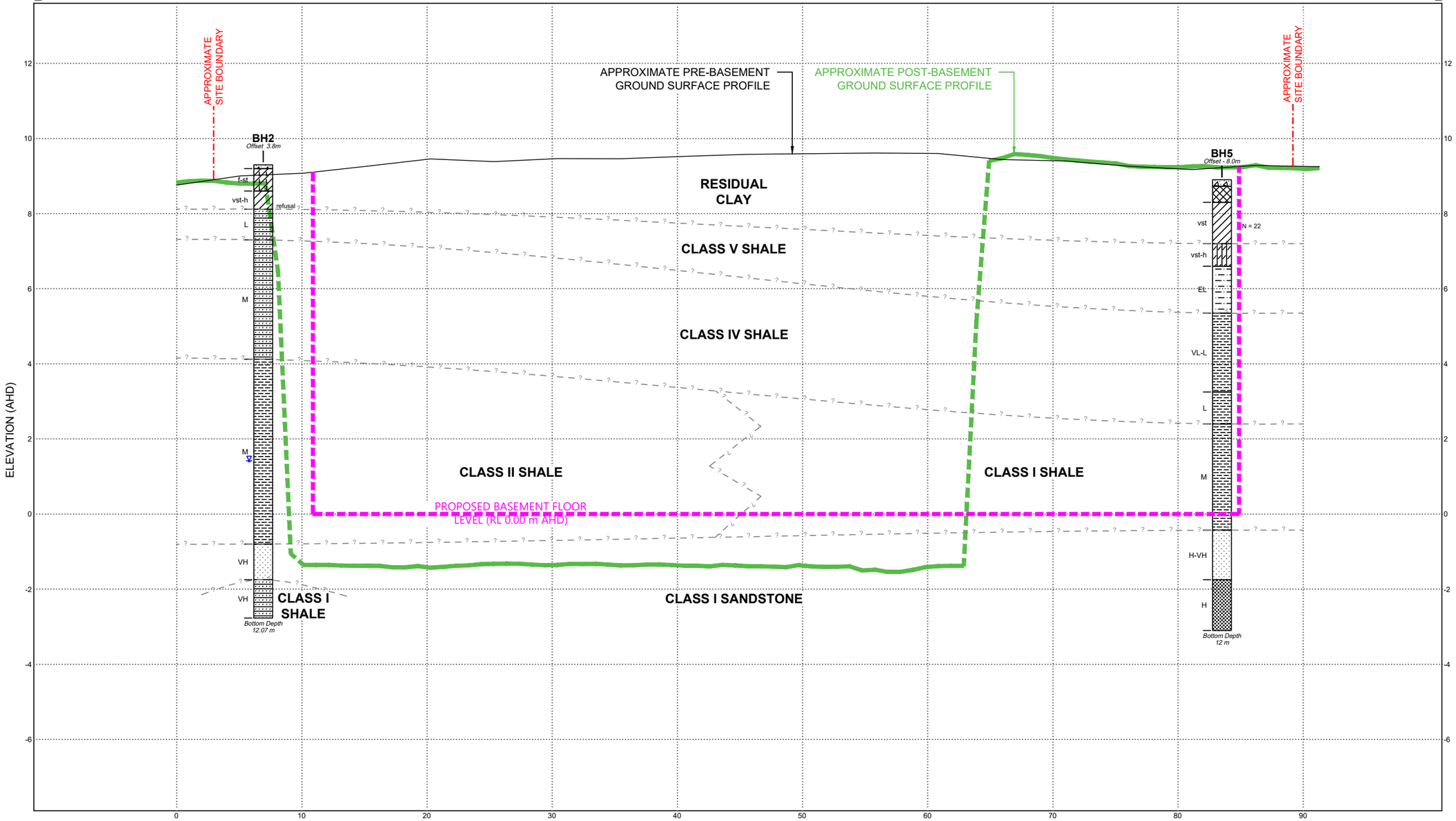
CLIENT: LSH Property (Alexandria) Pty Ltd	TITLE: **Interpreted Geological Cross-Section A - A'**		PROJECT No: 207969.01
OFFICE: Sydney / DRAWN BY: AK	**Proposed Croydon Vertical Village**		DRAWING No: 2
SCALE: 1:400 (H) 1:100 (V) @ A3 / DATE: 01.06.2022	**166-204 Parramatta Road, Croydon**		REVISION: 0



LEGEND

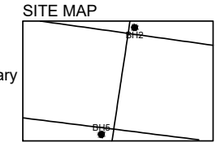
- Concrete
- Silty Clay
- Clay
- Laminite
- Shale
- Sandstone fine grained
- Filling
- Clayey Silt
- Siltstone
- Sandstone coarse grained

NOTES:

1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

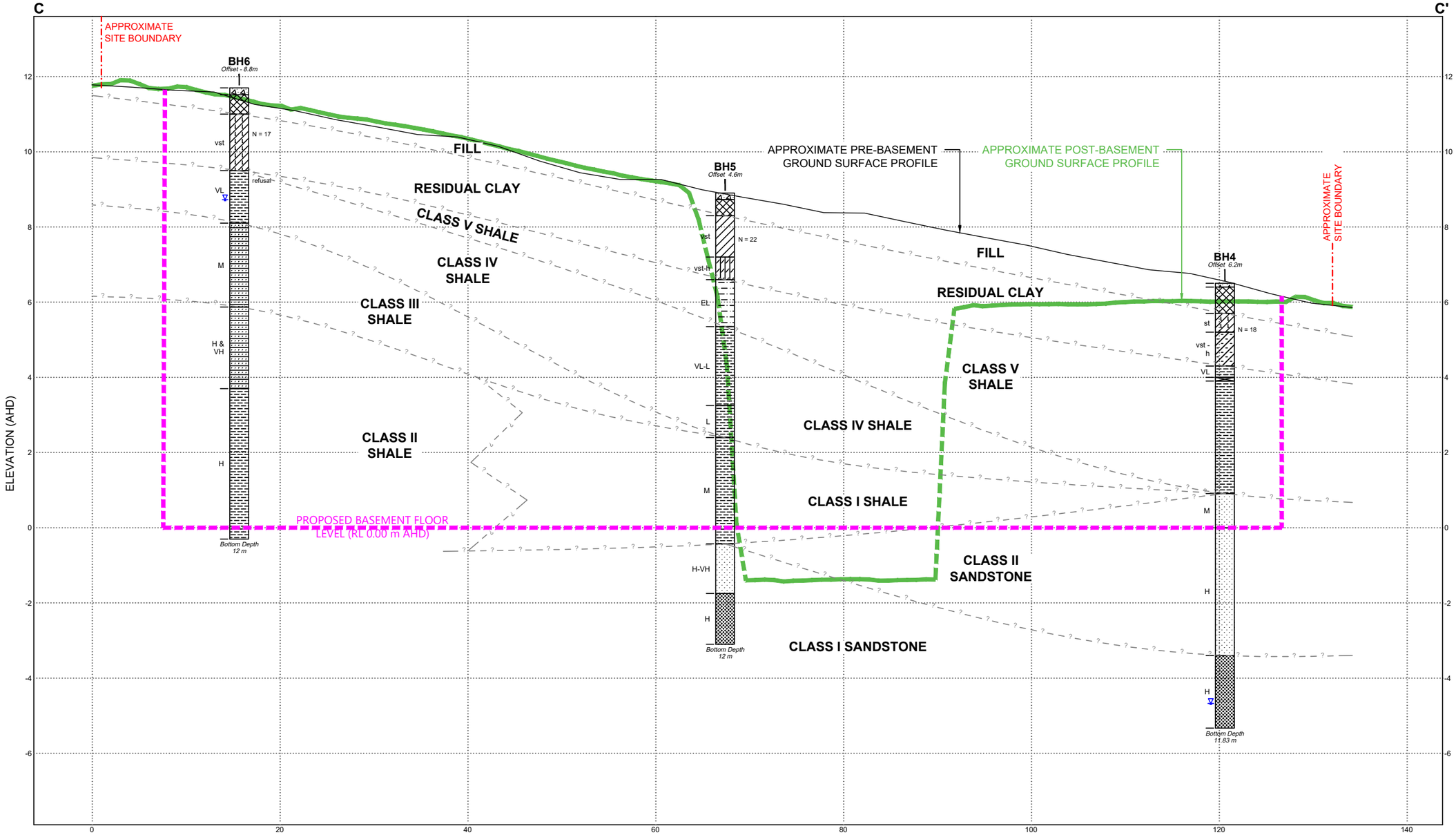
ROCK STRENGTH		SOIL CONSISTENCY		TESTS / OTHER	
EL -	Extremely Low	vs -	Very Soft	N	- Standard penetration test value
VL -	Very Low	s -	Soft	— ? — —	- Interpreted geotechnical boundary
L -	Low	f -	Firm	▽	- Water level
M -	Medium	st -	Stiff		
H -	High	vst -	Very Stiff		
VH-	Very High	h -	Hard		

SITE MAP



Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: LSH Property (Alexandria) Pty Ltd	TITLE: **Interpreted Geological Cross-Section B - B'**	PROJECT No: 207969.01
OFFICE: Sydney / DRAWN BY: AK	**Proposed Croydon Vertical Village**	DRAWING No: 3
SCALE: 1:300 (H) 1:100 (V) @ A3 / DATE: 01.06.2022	**166-204 Parramatta Road, Croydon**	REVISION: 0



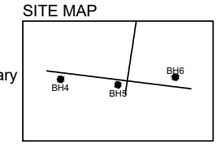
LEGEND

Core Loss	Filling	Shale
Clay	Laminite	Shaly Clay
Clayey Silt	Sandstone coarse grained	Siltstone
Concrete	Sandstone fine grained	Silty Clay

NOTES:
1. Subsurface conditions are accurate at the borehole locations only. Variations in subsurface conditions may occur between borehole locations. Interpreted strata boundaries are approximate and should be used as a guide only.
2. Summary logs only and should be read in conjunction with detailed logs.
3. Horizontal and vertical scales are not equal.

ROCK STRENGTH	SOIL CONSISTENCY	TESTS / OTHER
EL - Extremely Low	vs - Very Soft	N - Standard penetration test value
VL - Very Low	s - Soft	— ? — — - Interpreted geotechnical boundary
L - Low	f - Firm	▽ - Water level
M - Medium	st - Stiff	
H - High	vst - Very Stiff	
VH- Very High	h - Hard	

SITE MAP



Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: LSH Property (Alexandria) Pty Ltd	TITLE: **Interpreted Geological Cross-Section C - C'**	PROJECT No: 207969.01
OFFICE: Sydney / DRAWN BY: AK	**Proposed Croydon Vertical Village**	DRAWING No: 4
SCALE: 1:400 (H) 1:100 (V) @ A3 / DATE: 01.06.2022	**166-204 Parramatta Road, Croydon**	REVISION: 0

Appendix C

Previous Field Work Results

Sampling Methods

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Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

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Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are generally based on Australian Standard AS1726:2017, Geotechnical Site Investigations. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	19 - 63
Medium gravel	6.7 - 19
Fine gravel	2.36 – 6.7
Coarse sand	0.6 - 2.36
Medium sand	0.21 - 0.6
Fine sand	0.075 - 0.21

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

The proportions of secondary constituents of soils are described as follows:

In fine grained soils (>35% fines)

Term	Proportion of sand or gravel	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	>30%	Sandy Clay
With	15 – 30%	Clay with sand
Trace	0 - 15%	Clay with trace sand

In coarse grained soils (>65% coarse)
- with clays or silts

Term	Proportion of fines	Example
And	Specify	Sand (70%) and Clay (30%)
Adjective	>12%	Clayey Sand
With	5 - 12%	Sand with clay
Trace	0 - 5%	Sand with trace clay

In coarse grained soils (>65% coarse)
- with coarser fraction

Term	Proportion of coarser fraction	Example
And	Specify	Sand (60%) and Gravel (40%)
Adjective	>30%	Gravelly Sand
With	15 - 30%	Sand with gravel
Trace	0 - 15%	Sand with trace gravel

The presence of cobbles and boulders shall be specifically noted by beginning the description with 'Mix of Soil and Cobbles/Boulders' with the word order indicating the dominant first and the proportion of cobbles and boulders described together.

Soil Descriptions

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	VS	<12
Soft	S	12 - 25
Firm	F	25 - 50
Stiff	St	50 - 100
Very stiff	VSt	100 - 200
Hard	H	>200
Friable	Fr	-

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	Density Index (%)
Very loose	VL	<15
Loose	L	15-35
Medium dense	MD	35-65
Dense	D	65-85
Very dense	VD	>85

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Extremely weathered material – formed from in-situ weathering of geological formations. Has soil strength but retains the structure or fabric of the parent rock;
- Alluvial soil – deposited by streams and rivers;
- Estuarine soil – deposited in coastal estuaries;
- Marine soil – deposited in a marine environment;
- Lacustrine soil – deposited in freshwater lakes;
- Aeolian soil – carried and deposited by wind;
- Colluvial soil – soil and rock debris transported down slopes by gravity;
- Topsoil – mantle of surface soil, often with high levels of organic material.
- Fill – any material which has been moved by man.

Moisture Condition – Coarse Grained Soils

For coarse grained soils the moisture condition should be described by appearance and feel using the following terms:

- Dry (D) Non-cohesive and free-running.
- Moist (M) Soil feels cool, darkened in colour.
  Soil tends to stick together.
  Sand forms weak ball but breaks easily.
- Wet (W) Soil feels cool, darkened in colour.
  Soil tends to stick together, free water forms when handling.

Moisture Condition – Fine Grained Soils

For fine grained soils the assessment of moisture content is relative to their plastic limit or liquid limit, as follows:

- 'Moist, dry of plastic limit' or 'w <PL' (i.e. hard and friable or powdery).
- 'Moist, near plastic limit' or 'w ≈ PL (i.e. soil can be moulded at moisture content approximately equal to the plastic limit).
- 'Moist, wet of plastic limit' or 'w >PL' (i.e. soils usually weakened and free water forms on the hands when handling).
- 'Wet' or 'w ≈LL' (i.e. near the liquid limit).
- 'Wet' or 'w >LL' (i.e. wet of the liquid limit).

Rock Descriptions

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Rock Strength

Rock strength is defined by the Unconfined Compressive Strength and it refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects.

The Point Load Strength Index $Is_{(50)}$ is commonly used to provide an estimate of the rock strength and site specific correlations should be developed to allow UCS values to be determined. The point load strength test procedure is described by Australian Standard AS4133.4.1-2007. The terms used to describe rock strength are as follows:

Strength Term	Abbreviation	Unconfined Compressive Strength MPa	Point Load Index * $Is_{(50)}$ MPa
Very low	VL	0.6 - 2	0.03 - 0.1
Low	L	2 - 6	0.1 - 0.3
Medium	M	6 - 20	0.3 - 1.0
High	H	20 - 60	1 - 3
Very high	VH	60 - 200	3 - 10
Extremely high	EH	>200	>10

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Residual Soil	RS	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible, but the soil has not been significantly transported.
Extremely weathered	XW	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible
Highly weathered	HW	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Moderately weathered	MW	The whole of the rock material is discoloured , usually by iron staining or bleaching to the extent that the colour of the original rock is not recognisable, but shows little or no change of strength from fresh rock.
Slightly weathered	SW	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
Fresh	FR	No signs of decomposition or staining.
Note: If HW and MW cannot be differentiated use DW (see below)		
Distinctly weathered	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by iron staining. Porosity may be increased by leaching or may be decreased due to deposition of weathered products in pores.

Rock Descriptions

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with occasional fragments
Fractured	Core lengths of 30-100 mm with occasional shorter and longer sections
Slightly Fractured	Core lengths of 300 mm or longer with occasional sections of 100-300 mm
Unbroken	Core contains very few fractures

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections > 100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or stronger. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Douglas Partners

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

May 2017

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

General

- Asphalt
- Road base
- Concrete
- Filling

Soils

- Topsoil
- Peat
- Clay
- Silty clay
- Sandy clay
- Gravelly clay
- Shaly clay
- Silt
- Clayey silt
- Sandy silt
- Sand
- Clayey sand
- Silty sand
- Gravel
- Sandy gravel
- Cobbles, boulders
- Talus

Sedimentary Rocks

- Boulder conglomerate
- Conglomerate
- Conglomeratic sandstone
- Sandstone
- Siltstone
- Laminite
- Mudstone, claystone, shale
- Coal
- Limestone

Metamorphic Rocks

- Slate, phyllite, schist
- Gneiss
- Quartzite

Igneous Rocks

- Granite
- Dolerite, basalt, andesite
- Dacite, epidote
- Tuff, breccia
- Porphyry

May 2017

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 7.1 AHD
EASTING: 325371
NORTHING: 6250669
DIP/AZIMUTH: 90°/--

BORE No: BH1
PROJECT No: 85862.00
DATE: 27/2/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.12	CONCRETE - grey concrete with angular to sub-angular igneous gravel		A			
	0.4	CLAY - apparently firm, grey, high plasticity clay, trace of silt, wet		E			2 subsamples BD1
				A			
				E			
	1	CLAY - very stiff, grey mottled red clay, with some silt and ironstone gravel, moist		A/E			
				S			3,7,12 N = 19
	2		Unless otherwise noted, defects comprise B, 0-10°, pl, sm, co, cly/fe	A			2 subsamples
	2.2	SHALE - extremely low to very low strength, moderately to highly weathered, fragmented, grey mottled red shale, with some ironstone bands	2.33 - 3.89m: 5 x Cs, 30 - 130mm	C	100	0	
	3		3.05m: CORE LOSS: 150mm				
	3.2	SHALE - very low strength, highly weathered, fragmented to highly fractured, grey and light grey shale, with some low to medium strength bands	3.45 - 3.80m: 3 x J, 45°, st, ro, cln				PL(A) = 0.27
	4		4.08 - 4.69m: 2 x J, 80°, ir, ro, cln	C	91	0	
	5						PL(A) = 0.36
			5.26 - 5.74m: 2 x J, 30°, ir, ro, cln	C	100	13	PL(A) = 0.39
	6		6m: Cs, 110mm				
	6.2	SANDSTONE - medium then high strength, moderately weathered then fresh, slightly fractured and unbroken, light grey-brown, fine sandstone, with some medium strength siltstone bands	6.13 - 6.58m: 6 x B, 0°, pl, he				
			Below 6.5m depth: Unless otherwise noted, defects are B, 0-10°, pl, ro, stn, cbs				PL(A) = 1.23
	7						PL(A) = 2.27
			7.35 - 7.41m: 2 x J, 0-30°, cu, he	C	100	73	
	8						PL(A) = 0.77
	9		8.94m: CORE LOSS: 60mm				
	9.0			C	98	96	PL(A) = 2.18

Degree of Weathering: EW, HW, MW, SW, FS, FR
Graphic Log
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Water
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP/SI **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.12m; solid flight auger to 2.5m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 7.1 AHD
EASTING: 325371
NORTHING: 6250669
DIP/AZIMUTH: 90°/--

BORE No: BH1
PROJECT No: 85862.00
DATE: 27/2/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
	10.1	SANDSTONE - high strength, fresh, unbroken, medium to coarse, light grey sandstone, with some carbonaceous laminations										PL(A) = 2.16
-4	11								C	98	96	
												PL(A) = 1.47
	12 12.0	Bore discontinued at 12.0m - limit of investigation										
-5												
-6	13											
-7	14											
-8	15											
-9	16											
-10	17											
-11	18											
-12	19											

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP/SI **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.12m; solid flight auger to 2.5m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BORE: 1 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics / Environment / Groundwater
Project No: 85862.00
BH ID: BH1
Depth: 2.20 - 7.00 m
Core Box No.: 1
8586200 START 2.2m
CORE LOSS 0.15m
3.0
4.0
5.0
6.0
2.2 – 7.0m

BORE: 1 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics / Environment / Groundwater
Project No: 85862.00
BH ID: BH1
Depth: 7.00 - 12.00 m
Core Box No.: 2
7.0
8.0
9.0
10.0
11.0
7.0 – 12.0m

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 9.3 AHD
EASTING: 325424
NORTHING: 6250665
DIP/AZIMUTH: 90°/--

BORE No: BH2
PROJECT No: 85862.00
DATE: 27 - 28/2/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.1	CONCRETE - grey concrete, subangular to angular, igneous gravel					
		SILTY CLAY - apparently firm to stiff, grey-brown, high plasticity, silty clay, trace of ironstone gravel, moist		A E			2 subsamples
	0.7			A E			2 subsamples
	1.18	CLAY - apparently very stiff to hard, light grey clay with some, with some silt and shaly gravel	Unless otherwise noted, defects are B, 0-10°, pl, sm, co, cly	S			18, 19/30 Ref
	2.0	LAMINITE - low strength, highly weathered, fragmented, dark grey laminite, with some extremely low strength bands	1.56m: Cs, 10mm 1.66m: Cs, 30mm 1.79m: Cs, 40mm	C	100	54	PL(A) = 0.94 PL(A) = 0.43
		LAMINITE - medium strength, moderately weathered, fractured, grey-brown laminite, with approximately 25% sandstone laminations	2.69m: Cs, 20mm 2.81m: Cs, 10mm 3m: J, 60°, pl, sm, cln 3.21 - 4.24m: 8 x J, 0-30°, cu, sm, cln or he				PL(A) = 0.61
			4.38m: J, 75°, pl, sm, cln 5.08m: J, 60-90°, ir, sm, cln 5.81 - 7.14m: 4 x J, 70°, pl, sm, cln	C	100	28	PL(A) = 0.51 PL(A) = 0.73
	5.18	SHALE - medium strength, fresh, slightly fractured, dark grey shale	7.82m: J, 85°, pl, sm, cln	C	100	95	PL(A) = 0.94 PL(A) = 0.84 PL(A) = 1.08
				C	100	96	PL(A) = 0.71

Degree of Weathering: EW, HW, MW, SW, FS, FR
Graphic Log
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Water: 10-03-17
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 1.35m

TYPE OF BORING: Diatube coring to 0.10m; solid flight auger to 1.35m; NMLC diamond coring to 12.07m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 3.0m depth, screen from 3.0m to 12.0m depth, gravel pack from 2.6m to 12.0m depth, bentonite from 2.1m to 2.6m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 9.3 AHD
EASTING: 325424
NORTHING: 6250665
DIP/AZIMUTH: 90°/--

BORE No: BH2
PROJECT No: 85862.00
DATE: 27 - 28/2/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
	10.1	SANDSTONE - very high strength, fresh, slightly fractured, grey, fine sandstone										PL(A) = 5.12
	11.05	LAMINITE - very high strength, fresh, unbroken, light grey and grey laminite with approximately 20% fine sandstone laminations							C	100	96	PL(A) = 3.84
	12.07	Bore discontinued at 12.07m- limit of investigation										

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 1.35m

TYPE OF BORING: Diatube coring to 0.10m; solid flight auger to 1.35m; NMLC diamond coring to 12.07m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 3.0m depth, screen from 3.0m to 12.0m depth, gravel pack from 2.6m to 12.0m depth, bentonite from 2.1m to 2.6m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BORE: 2 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics | Environment | Groundwater
Project No: 85862.00
BH ID: BH2
Depth: 1.35 – 6.00
Core Box No.: 1
85862.00 START 1.35 BH2
2.0
3.0
4.0
5.0
1.35 – 6.0m

BORE: 2 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics | Environment | Groundwater
Project No: 85862.00
BH ID: BH2
Depth: 6.00 – 11.00m
Core Box No.: 2
6.0
7.0
8.0
9.0
10.0
6.0 – 11.0m

BORE: 2 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics | Environment | Groundwater
Project No: 85862.00
BH ID: BH2
Depth: 11.00 – 12.07m
Core Box No.: 3
ENDS 12.07m 85862.00 BH2
11.0 – 12.07m

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.2 AHD
EASTING: 325381
NORTHING: 6250641
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 85862.00
DATE: 28/2/2017
SHEET 1 OF 2

Depth (m)	Description of Strata	Type	Core Rec. %	RQD %	Test Results & Comments
0.12	CONCRETE - grey concrete, subangular igneous gravel, 8mm steel reinforcement	A/E			2 subsamples
0.5	FILLING - apparently poorly compacted, dark grey silty clay filling, with some crushed ironstone gravel, moist	B			
		A/E			2 subsamples
1	CLAY - firm to stiff, brown, high plasticity clay, with some silt, moist	S			3,3,5 N = 8
1.5	SILTY CLAY - very stiff to hard, grey-brown, silty clay, with some ironstone gravel, moist				
		A/E			2 subsamples
2	Unless otherwise noted, defects are B, 0-10°, pl, sm, co, cly or fe	A			2 subsamples
		S			17,15/50 Ref
2.5	SHALE - extremely low to very low strength, extremely to highly weathered, fragmented, grey shale, with some ironstone bands	C	100	0	
3	2.9m: Cs, 30mm 3m: CORE LOSS: 560mm				
3.56	3.56m: Cs, 170mm 3.81 - 4.00m: 3 x Cs, 20 - 60mm 4.12m: J, 85-90°, ir, he 4.19m: Cs, 230mm	C	81	0	PL(A) = 0.83
4.5	SHALE - very low strength, highly to moderately weathered, fragmented to fractured, grey-brown shale				
5	4.52m: Cs, 40mm 4.64 - 4.87m: 8 x J, 0-30°, cu, he 4.75m: Cs, 80mm 5.05m: Cs, 10mm 5.12m: Cs, 20mm				PL(A) = 0.13
6	6.02m: J, 30°, pl, sm, cln 6.13 - 6.44m: 3 x J, 70-90°, cu, sm, stn, fe 6.45 - 6.86m: 7 x J, 45-90°, cu, sm, cln 6.8m: J, 80°, pl, he				
6.3	SHALE - low then medium strength, slightly weathered then fresh, fractured and slightly fractured, dark grey shale				PL(A) = 0.36
7	7.21m: J, 85°, pl, sm, cln 7.62 - 7.89m: 4 x J, 30-45°, pl, sm, cln	C	100	60	PL(A) = 1.15
8.07	SANDSTONE - high and very high strength, fresh, unbroken, light grey-dark grey, fine sandstone with some carbonaceous laminations				PL(A) = 4.34
9		C	100	100	PL(A) = 2.63

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.12m; solid flight auger to 2.7m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.2 AHD
EASTING: 325381
NORTHING: 6250641
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 85862.00
DATE: 28/2/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
-2		SANDSTONE - high and very high strength, fresh, unbroken, light grey-dark grey, fine sandstone with some carbonaceous laminations *(continued)*										PL(A) = 4.8
-3	11								C	100	100	PL(A) = 3.03
	12 12.0	Bore discontinued at 12.0m- limit of investigation										
-4												
-5	13											
-6	14											
-7	15											
-8	16											
-9	17											
-10	18											
-11	19											

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.12m; solid flight auger to 2.7m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BORE: 3 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics | Environment | Groundwater
Project No: 85862.00
BH ID: BH3
Depth: 2.50 - 7.00m
Core Box No.: 1
85862.00 BH3 START 2.50m
CORE LOSS 0.56m
3.0
4.0
5.0
6.0
2.5 – 7.0m

BORE: 3 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics | Environment | Groundwater
Project No: 85862.00
BH ID: BH3
Depth: 7.00 - 12.00m
Core Box No.: 2
7.0
8.0
9.0
10.0
11.0
7.0 – 12.0m

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 6.5 AHD
EASTING: 325348
NORTHING: 6250596
DIP/AZIMUTH: 90°/--

BORE No: BH4
PROJECT No: 85862.00
DATE: 2/3/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.1	CONCRETE - dark grey concrete, subangular igneous gravel, N8 steel reinforcement					
		FILLING - apparently poorly compacted, dark grey, high plasticity, clay filling, with some silt, trace of clay pipe and organics, moist		A/E			3 subsamples
	0.8			A/E			2 subsamples
	1.3	SILTY CLAY - stiff silty clay, with some sand, moist		S			3,4,14 N = 18
		SHALY CLAY - very stiff to hard, mottled grey and red, shaly clay, with some ironstone gravel, silt and sand	Unless otherwise noted, all defects are B, 0-5°, pl, sm, cln/co cly	A/E			2 subsamples
	2.2	SHALE - very low strength, highly weathered, fragmented, grey mottled red shale, with some low strength bands		A			
	2.6		2.5m: CORE LOSS: 100mm 2.83 - 3.93m: 6 x Cs, 20 - 150mm	C	80	0	
			3.57m: J, 60°, pl, sm, co, cly	C	100	0	
			4.1m: Cs, 80mm 4.28m: Cs, 100mm 4.49 - 4.72m: 3 x J, 30°, pl, sm, cln 4.95m: Cs, 50mm 5.43m: J, 80°, cu, ro, cln	C	100	0	
	5.59	SANDSTONE - medium strength, slightly weathered, fractured, grey, fine sandstone		C	100	98	PL(A) = 0.93
	6.5	SANDSTONE - high strength, fresh, slightly fractured and unbroken, light grey, fine to medium sandstone with some carbonaceous laminations and beds					PL(A) = 2.5
			7.48m: Cs, 10mm 7.91m: Cs, 10mm	C	100	96	PL(A) = 2.31 PL(A) = 2.87
				C	100	100	
	9.9						PL(A) = 1.87

Degree of Weathering: EW HW MW SW FS FR
Graphic Log
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Water
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m

TYPE OF BORING: Diatube coring to 0.10m; solid flight auger to 2.5m; NMLC diamond coring to 12.0m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 2.6m depth, screen from 2.6m to 11.6m depth, gravel pack from 2.4m to 11.6m depth, bentonite from 1.4m to 2.4m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 6.5 AHD
EASTING: 325348
NORTHING: 6250596
DIP/AZIMUTH: 90°/--

BORE No: BH4
PROJECT No: 85862.00
DATE: 2/3/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
-4		SANDSTONE - high strength, fresh, unbroken, light grey, medium to coarse sandstone, trace of thin siltstone laminations *(continued)*										PL(A) = 1.61
	11					10-03-17			C	100	100	
-5												PL(A) = 1.9
	11.83	Bore discontinued at 11.83m- limit of investigation										
	12											
-6												
	13											
-7												
	14											
-8												
	15											
-9												
	16											
-10												
	17											
-11												
	18											
-12												
	19											
-13												

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m

TYPE OF BORING: Diatube coring to 0.10m; solid flight auger to 2.5m; NMLC diamond coring to 12.0m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 2.6m depth, screen from 2.6m to 11.6m depth, gravel pack from 2.4m to 11.6m depth, bentonite from 1.4m to 2.4m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
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BORE: 4 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics | Environment | Groundwater
Project No: 85862.00
BH ID: BH4
Depth: 2.50 – 7.00m
Core Box No.: 1
85862.00 BH4 START 2.5m
CORE LOSS 0.10 m
3.0
4.0
5.0
6.0
2.5 – 7.0m

BORE: 4 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics | Environment | Groundwater
Project No: 85862.00
BH ID: BH4
Depth: 7.00 – 11.85 m
Core Box No.: 2
7.0
8.0
9.0
10.0
11.0
7.0 – 11.85m

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.9 AHD
EASTING: 325401
NORTHING: 6250591
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 85862.00
DATE: 1 - 2/3/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.17	CONCRETE - dark grey concrete, subangular to angular igneous gravel, 12mm steel reinforcement		A/E			2 subsamples
	0.6	FILLING - poorly compacted, dark grey, silty clay filling, with some gravel, faint hydrocarbon odour		B			
	1	CLAY - very stiff, mottled grey-brown clay, with some silt and ironstone gravel, moist		A/E			2 subsamples
				S			7,8,14 N = 22
	1.7	CLAYEY SILT - very stiff to hard, grey clayey silt, trace of shaley gravel, moist, strong hydrocarbon odour		E			
	2.3	SILTSTONE - extremely low strength, highly to moderately weathered, fragmented, grey siltstone, trace of ironstone bands	Unless otherwise noted, defects are B, 0-5°, pl, sm, cln/co, cly	A			
			2.67 - 3.62m: 6 x Cs, 20 - 60mm	C	100	0	
	3.55	SHALE - very low to low strength, highly to moderately weathered, fractured, grey-brown shale		C	100	0	PL(A) = 0.53
			4.95 - 5.38m: 3 x J, 45°, pl, sm, cln; 5.05 - 5.21m: 2 x Cs, 30 - 40mm; 5.31m: Cs, 40mm				
	5.65	SHALE - low strength, slightly weathered, fragmented to fractured, dark grey shale		C	100	56	PL(A) = 0.2
	6.5	SHALE - medium strength, fresh, slightly fractured and unbroken, dark grey shale					PL(A) = 0.94
			7.57m: J, 60°, pl, sm, cln				PL(A) = 0.88
				C	100	100	PL(A) = 0.78
			9.1m: J, 80°, pl, sm, cln				
	9.33	SANDSTONE - high to very high strength, fresh, unbroken, grey, fine sandstone		C	100	100	PL(A) = 5.15

Degree of Weathering: EW, HW, MW, SW, FS, FR
Graphic Log
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Water
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.17m; solid flight auger to 2.3m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 8.9 AHD
EASTING: 325401
NORTHING: 6250591
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 85862.00
DATE: 1 - 2/3/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
		SANDSTONE - high to very high strength, fresh, unbroken, grey, fine sandstone *(continued)*										PL(A) = 2.78
	10.65	SANDSTONE - high strength, fresh, unbroken, grey, medium to coarse sandstone, trace of siltstone bands							C	100	100	PL(A) = 2.27
-2	11											
-3	12 12.0	Bore discontinued at 12.0m- limit of investigation										
-4	13											
-5	14											
-6	15											
-7	16											
-8	17											
-9	18											
-10	19											
-11												

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m
TYPE OF BORING: Diatube coring to 0.17m; solid flight auger to 2.3m; NMLC diamond coring to 12.0m
WATER OBSERVATIONS: Free groundwater not observed during drilling
REMARKS:

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BORE: 5 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics / Environment / Groundwater
Project No: 85862.00
BH ID: BH5
Depth: 2.57 – 7.00m
Core Box No.: 1
85862.00 BH5 START 2.57m
3.0
4.0
5.0
6.0
2.57 – 7.0m

BORE: 5 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics / Environment / Groundwater
Project No: 85862.00
BH ID: BH5
Depth: 7.00 – 11.00m
Core Box No.: 2
7.0
8.0
9.0
10.0
11.0
7.0 – 12.0m

BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 11.7 AHD
EASTING: 325454
NORTHING: 6250598
DIP/AZIMUTH: 90°/--

BORE No: BH6
PROJECT No: 85862.00
DATE: 1/3/2017
SHEET 1 OF 2

RL	Depth (m)	Description of Strata	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Type	Core Rec. %	RQD %	Test Results & Comments
	0.18	CONCRETE - dark grey concrete, subangular igneous gravel, 12mm steel reinforcement		A			2 subsamples
				A/E			2 subsamples; BD2
	0.7	FILLING - apparently poorly compacted, dark grey, silty clay filling, trace of ironstone gravel		E			
	1	SILTY CLAY - very stiff, mottled grey-brown, silty clay, with some ironstone gravel		A			2 subsamples
				S			4,6,11 N = 17
	2		Unless otherwise noted, defects are B, 0-5°, pl, sm, cln/co, cly	A			2 subsamples
	2.2	SHALE - very low strength, highly weathered, fragmented to highly fractured, dark grey shale		A			
				S			25/120, Ref
	3		2.56 - 3.00m: 4 x Cs, 30 - 50mm	C	100	0	
	3.6	LAMINITE - medium strength, moderately weathered, fractured and slightly fractured, grey-brown laminite, with approximately 40% fine sandstone laminations					PL(A) = 1.04
	4		3.84 - 4.32m: 4 x J, 80°, cu, sm, cln 4.09m: Cs, 10mm				
			4.42m: Cs, 10mm 4.44 - 5.59m: 10 x J, 0-70°, cu, he 4.85m: Cs, 10mm	C	100	0	PL(A) = 0.8
	5						PL(A) = 0.65
			5.45m: J, 70°, pl, sm, cln				
	5.83	LAMINITE - high and very high strength, fresh, slightly fractured, dark grey laminite, with approximately 20% fine sandstone laminations	5.81m: J, 60°, pl, sm, cln				
	6		6.31m: J, 60°, pl, sm, cln				PL(A) = 1.92
	7			C	100	81	PL(A) = 3.06
	8.0	SHALE - high strength, fresh, slightly fractured and unbroken, dark grey shale, trace of fine sandstone laminations					PL(A) = 1.86
	9			C	100	100	PL(A) = 1.43

Degree of Weathering: EW, HW, MW, SW, FS, FR
Graphic Log
Rock Strength: Ex Low, Very Low, Low, Medium, High, Very High, Ex High
Water: 10-03-17
Fracture Spacing (m): 0.01, 0.05, 0.10, 0.50, 1.00

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m

TYPE OF BORING: Diatube coring to 0.18m; solid flight auger to 2.7m; NMLC diamond coring to 12.0m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 3.0m depth, screen from 3.0m to 12.0m depth, gravel pack from 2.4m to 12.0m depth, bentonite from 1.4m to 2.4m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BOREHOLE LOG

CLIENT: Star Auto Properties Pty Ltd
PROJECT: Mercedes Benz Croydon Showroom
LOCATION: 180 Parramatta Road, Croydon

SURFACE LEVEL: 11.7 AHD
EASTING: 325454
NORTHING: 6250598
DIP/AZIMUTH: 90°/--

BORE No: BH6
PROJECT No: 85862.00
DATE: 1/3/2017
SHEET 2 OF 2

RL	Depth (m)	Description of Strata	Degree of Weathering (EW, HW, MW, SW, FS, FR)	Graphic Log	Rock Strength (Ex Low, Very Low, Low, Medium, High, Very High, Ex High)	Water	Fracture Spacing (m) (0.01, 0.05, 0.10, 0.50, 1.00)	Discontinuities (B - Bedding, J - Joint, S - Shear, F - Fault)	Sampling & In Situ Testing: Type	Core Rec. %	RQD %	Test Results & Comments
		SHALE - high strength, fresh, slightly fractured and unbroken, dark grey shale, trace of fine sandstone laminations *(continued)*										PL(A) = 1.83
	11								C	100	100	
								11.35m: J, 60°, pl, sm, cln				PL(A) = 1.47
	12 12.0	Bore discontinued at 12.0m- limit of investigation										
	13											
	14											
	15											
	16											
	17											
	18											
	19											

RIG: Hanjin DB8 **DRILLER:** Terratest Pty Ltd **LOGGED:** JAP **CASING:** HW to 2.5m

TYPE OF BORING: Diatube coring to 0.18m; solid flight auger to 2.7m; NMLC diamond coring to 12.0m

WATER OBSERVATIONS: Free groundwater not observed during drilling

REMARKS: Well installed, PVC pipe to 3.0m depth, screen from 3.0m to 12.0m depth, gravel pack from 2.4m to 12.0m depth, bentonite from 1.4m to 2.4m depth, gatic cover

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

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BORE: 6 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics | Environment | Groundwater
Project No: 85862.00
BH ID: BH6
Depth: 2.52 – 7.00m
Core Box No.: 1
85862.00 BH6 START 2.52m
3.0
4.0
5.0
6.0
2.52 – 7.0m

BORE: 6 PROJECT: CROYDON MARCH 2017
Douglas Partners
Geotechnics | Environment | Groundwater
Project No: 85862.00
BH ID: BH6
Depth: 7.00 – 12.00m
Core Box No.: 2
7.0
8.0
9.0
10.0
11.0
7.0 – 12.0m

Douglas Partners
Geotechnics / Environment / Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au

Permeability Testing - Rising or Falling Head Test Report

Client:	Star Auto Properties Pty Ltd	Project No:	85862.00
Project:	Mercedes Benz Croydon Showroom	Test date:	7-Mar-17
Location:	180 Parramatta Road, Croydon	Tested by:	JAP

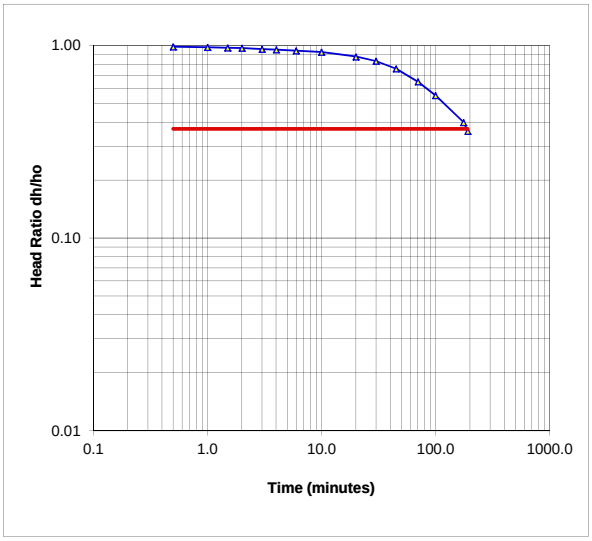
Test Location		**Test No.**	BH2	
Description:	Standpipe in borehole	Easting:	325424	m
Material type:	Rock	Northing	6250665	m
		Surface Level:	9.31	m AHD

Details of Well Installation

Well casing diameter (2r)	76	mm	Depth to water before test	6.65	m
Well screen diameter (2R)	76	mm	Depth to water at start of test	11.52	m
Length of well screen (Le)	9	m			

Test Results

Time (min)	Depth (m)	Change in Head: δH (m)	δH/Ho
0.0	11.52	4.87	1.000
0.5	11.45	4.80	0.986
1.0	11.41	4.76	0.977
1.5	11.39	4.74	0.973
2.0	11.37	4.72	0.969
3.0	11.31	4.66	0.957
4.0	11.28	4.63	0.951
6.0	11.23	4.58	0.940
10.0	11.15	4.50	0.924
20.0	10.91	4.26	0.875
30.0	10.69	4.04	0.830
45.0	10.34	3.69	0.758
70.0	9.81	3.16	0.649
100.0	9.33	2.68	0.550
176.0	8.59	1.94	0.398
191.0	8.40	1.75	0.359



To = 185 mins
11100 secs

Theory: Falling Head Permeability calculated using equation by Hvorslev

$k = [r^2 \ln(Le/R)]/2Le\ To$

where r = radius of casing
R = radius of well screen
Le = length of well screen
To = time taken to rise or fall to 37% of initial change

Hydraulic Conductivity	**k =**	**4.0E-08**	m/sec
	=	**0.014**	cm/hour

Douglas Partners
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Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au

Permeability Testing - Rising or Falling Head Test Report

Client:	Star Auto Properties Pty Ltd	Project No:	85862.00
Project:	Mercedes Benz Croydon Showroom	Test date:	7-Mar-17
Location:	180 Parramatta Road, Croydon	Tested by:	JAP

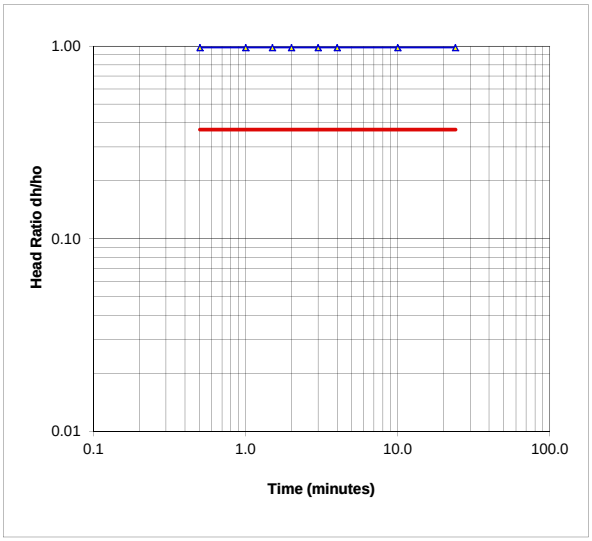
Test Location		**Test No.**	BH4	
Description:	Standpipe in borehole	Easting:	325348	m
Material type:	Rock	Northing	6250596	m
		Surface Level:	6.5	m AHD

Details of Well Installation

Well casing diameter (2r)	76	mm	Depth to water before test	6.58	m
Well screen diameter (2R)	76	mm	Depth to water at start of test	11.36	m
Length of well screen (Le)	9	m			

Test Results

Time (min)	Depth (m)	Change in Head: δH (m)	δH/Ho
0.0	11.36	4.78	1.000
0.5	11.29	4.71	0.985
1.0	11.29	4.71	0.985
1.5	11.29	4.71	0.985
2.0	11.29	4.71	0.985
3.0	11.29	4.71	0.985
4.0	11.29	4.71	0.985
10.0	11.29	4.71	0.985
24.0	11.29	4.71	0.985



To = mins
secs

Theory: Falling Head Permeability calculated using equation by Hvorslev

$k = [r^2 \ln(Le/R)]/2Le\ To$

where r = radius of casing
R = radius of well screen
Le = length of well screen
To = time taken to rise or fall to 37% of initial change

Hydraulic Conductivity	**k =**	**#DIV/0!**	m/sec
	=	**#DIV/0!**	cm/hour

Douglas Partners
Geotechnics / Environment / Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au

Permeability Testing - Rising or Falling Head Test Report

Client:	Star Auto Properties Pty Ltd	Project No:	85862.00
Project:	Mercedes Benz Croydon Showroom	Test date:	7-Mar-17
Location:	180 Parramatta Road, Croydon	Tested by:	JAP

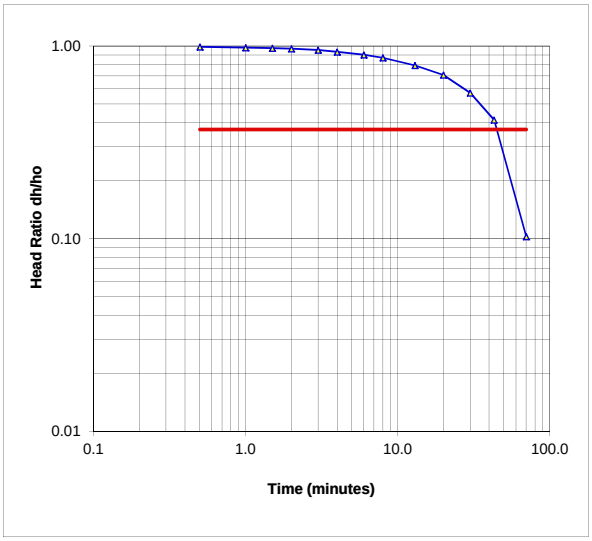
Test Location		**Test No.**	BH6	
Description:	Standpipe in borehole	Easting:	325454	m
Material type:	Rock	Northing	6250598	m
		Surface Level:	11.68	m AHD

Details of Well Installation

Well casing diameter (2r)	76	mm	Depth to water before test	6.58	m
Well screen diameter (2R)	76	mm	Depth to water at start of test	11.34	m
Length of well screen (Le)	9	m			

Test Results

Time (min)	Depth (m)	Change in Head: δH (m)	δH/Ho
0.0	11.34	4.76	1.000
0.5	11.3	4.72	0.992
1.0	11.25	4.67	0.981
1.5	11.22	4.64	0.975
2.0	11.2	4.62	0.971
3.0	11.12	4.54	0.954
4.0	11.02	4.44	0.933
6.0	10.87	4.29	0.901
8.0	10.73	4.15	0.872
13.0	10.36	3.78	0.794
20.0	9.95	3.37	0.708
30.0	9.3	2.72	0.571
43.0	8.55	1.97	0.414
70.0	7.07	0.49	0.103



To = 45 mins
2700 secs

Theory: Falling Head Permeability calculated using equation by Hvorslev

$k = [r^2 \ln(Le/R)]/2Le\ To$

where r = radius of casing
R = radius of well screen
Le = length of well screen
To = time taken to rise or fall to 37% of initial change

Hydraulic Conductivity	**k =**	**1.6E-07**	m/sec
	=	**0.058**	cm/hour

Appendix D

Previous Laboratory Test Results

Client Reference: 85862, Croydon Contamination Testing

Misc Inorg - Soil				
Our Reference:	UNITS	162987-3	162987-7	162987-8
Your Reference	---------- -	BH3	BH4	BH5
Depth	----------	0.2-0.4	0.8-1.0	0.3-0.4
Date Sampled		28/02/2017	2/03/2017	1/03/2017
Type of sample		Soil	Soil	Soil
Date prepared	-	09/03/2017	09/03/2017	09/03/2017
Date analysed	-	09/03/2017	09/03/2017	09/03/2017
pH 1:5 soil:water	pH Units	7.7	6.3	10.5
Electrical Conductivity 1:5 soil:water	µS/cm	130	330	300
Chloride, Cl 1:5 soil:water	mg/kg	87	250	22
Sulphate, SO4 1:5 soil:water	mg/kg	76	160	280

Material Test Report

Douglas Partners
Geotechnics / Environment / Groundwater
Douglas Partners Pty Ltd
Sydney Laboratory
96 Hermitage Road West Ryde NSW 2114
Phone: (02) 9809 0666
Fax: (02) 9809 0666
Email: mick.gref@douglaspartners.com.au

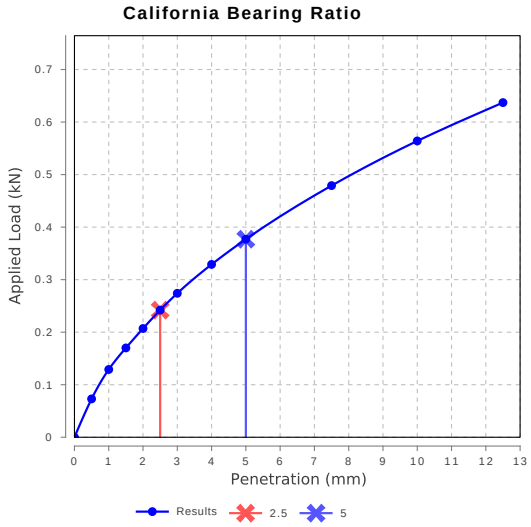
Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Michael Gref
Nata Accredited Laboratory Number: 828

Report Number: **85862.00-1**
Issue Number: 1
Date Issued: 21/03/2017
Client: Star Auto Properties Pty Ltd
C/o AECOM Australia Pty Ltd, Sydney NSW 2000
Contact: Andrew Kyriacou
Project Number: 85862.00
Project Name: Mercedes Benz Croydon Showroom
Project Location: 180 Parramatta Road, Croydon
Work Request: 613
Sample Number: 17-613A
Date Sampled: 02/03/2017
Sampling Method: Sampled by Engineering Department
Sample Location: **BH3 (0.4 - 0.8m)**
Material: Filling - dark grey silty clay filling with some ironstone gravel & brown clay with some silt

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**2.0**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Maximum Dry Density (t/m^3)	1.68		
Optimum Moisture Content (%)	20.0		
Laboratory Density Ratio (%)	100.0		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.68		
Field Moisture Content (%)	25.3		
Moisture Content at Placement (%)	20.2		
Moisture Content Top 30mm (%)	24.6		
Moisture Content Rest of Sample (%)	22.7		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	5		



Material Test Report

Douglas Partners
Geotechnics / Environment / Groundwater
Douglas Partners Pty Ltd
Sydney Laboratory
96 Hermitage Road West Ryde NSW 2114
Phone: (02) 9809 0666
Fax: (02) 9809 0666
Email: mick.gref@douglaspartners.com.au

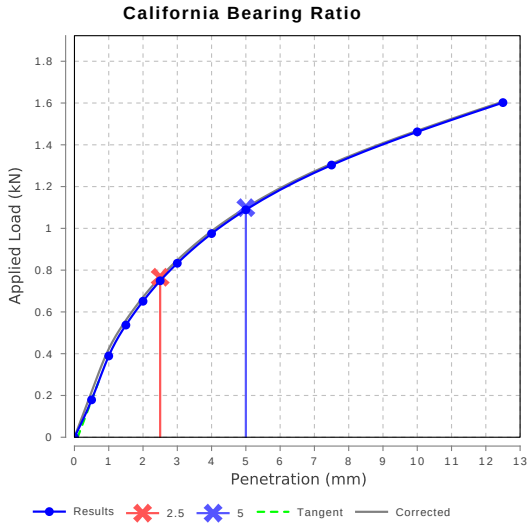
Accredited for compliance with ISO/IEC 17025 - Testing

NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Michael Gref
Nata Accredited Laboratory Number: 828

Report Number: **85862.00-1**
Issue Number: 1
Date Issued: 21/03/2017
Client: Star Auto Properties Pty Ltd
C/o AECOM Australia Pty Ltd, Sydney NSW 2000
Contact: Andrew Kyriacou
Project Number: 85862.00
Project Name: Mercedes Benz Croydon Showroom
Project Location: 180 Parramatta Road, Croydon
Work Request: 613
Sample Number: 17-613B
Date Sampled: 02/03/2017
Sampling Method: Sampled by Engineering Department
Sample Location: **BH5 (0.5 - 0.8m)**
Material: Filling - dark grey silty clay filling with some gravel & grey-brown clay with some silt and ironstone gravel

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**6**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Maximum Dry Density (t/m^3)	1.63		
Optimum Moisture Content (%)	22.0		
Laboratory Density Ratio (%)	100.0		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.62		
Field Moisture Content (%)	27.1		
Moisture Content at Placement (%)	22.2		
Moisture Content Top 30mm (%)	23.2		
Moisture Content Rest of Sample (%)	22.7		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Swell (%)	0.0		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	2		



166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon

Site-specific Development Control Plan

DRAFT

Note: This Draft DCP has been prepared to communicate the design intent for the proposal as submitted. Following any discussion and feedback from Council or the Burwood Design Review Panel, the DCP may be updated prior to consideration of Council for endorsement

June 2023

Explanatory Note

166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon (Lot 1 DP206411, Lot 1 DP86926, Lots A-C DP84812, Lot 1 DP 86033, Lots 100-101 DP850953 and Lot 1 DP 817488) – combined to be considered as the site. on the southern side of Parramatta Road and is bound by Lucas Road and Cheltenham Road in the Burwood Local Government Area. The Site is approximately 1km from Burwood Station and Town Centre and 150m east of Concord Oval.

PART A - PRELIMINARY

A1 Land to which the DCP applies

This section of the DCP applies to development within the boundary of the Site as shown in Figure 1: Land Application Map and includes 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon (Lot 1 DP206411, Lot 1 DP86926, Lots A-C DP84812, Lot 1 DP 86033, Lots 100-101 DP850953 and Lot 1 DP 817488) – combined to be considered as "the site", located on the southern side of Parramatta Road and is bound by Lucas Road and Cheltenham Rd in the Burwood local government area. The Site is approximately 1km from Burwood Station and Town Centre and 150m east of Concord Oval.

Figure 1 Land Application Map

A2 Aims of this DCP

The purpose of this section of the DCP is to guide the future development of the Site by:

- identifying the key elements and supporting development provisions that relate to the Site;
- communicating the planning, design and environmental provisions against which the consent authority will assess future development applications;
- ensuring the orderly, efficient and environmentally sensitive development of the Site; and
- promoting a high quality urban design outcome.

PART B - BACKGROUND

B1 Purpose

The purpose of this DCP is to provide site specific controls for any future development on 4166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon to specifically align with the site specific planning controls for the site, which were gazetted on [INSERT GAZETTAL DATE].

B2 Vision

The vision is for the site as a mixed-use development that places greenery at its heart, combining all the elements that make a world-class Sydney neighbourhood within a single precinct.

Responding to the needs of current and future residents, the site will provide neighbourhood retail, great public spaces, short term accommodation, community facilities and much-needed diversity of housing.

B3 Relationship to other Sections of the Burwood DCP

This draft site-specific DCP is intended to form part of the Burwood DCP under section 3.

Development of the Site will need to have regard to this sub-section of the DCP, along with other sections of the DCP as relevant. In the event of any inconsistency between this sub-section and other sections of the Burwood DCP, this sub-section will prevail to the extent of the inconsistency.

This DCP applies to the site if a Development Application is subject to Clause ## [Clause TBC] of the Burwood Local Environmental Plan 2012. Where there are discrepancies between the controls outlined in this DCP and the LGA wide Burwood Development Control Plan, the controls in this DCP take precedence.

Any development on this site, is subject to the provisions of the 'State Environmental Planning Policy No. 65 Design Quality of Residential Apartment Development' and accompanying 'Apartment Design Guide' (ADG), except otherwise stated in this DCP.

B5 Development application requirements

Any Development Application for new buildings (where relevant) on the subject site must be accompanied by the following specialist consultant documentation:

- Public Domain Plan.
- Public Art Plan
- Signage/Wayfinding Strategy.
- Architectural Lighting Strategy.
- Crime Prevention Through Environmental Design (CPTED) Report.
- Sustainability Strategy.

Note: the above documentation is in addition to the relevant requirements outlined in Burwood Council's "Checklist for lodgement Development Applications" and the Environmental Planning and Assessment Act 1979.

C - CONTROLS

C1 Site Planning

Objectives

1. To ensure buildings are appropriately located to support a range of uses including residential, business and retail.
2. To ensure that new development provides a strong interface to the Parramatta Road and is responsive to the residential dwellings to the south of the site.
3. To create high quality urban spaces that retain a pedestrian scale.
4. To provide for multiple tower forms which minimise overshadowing on surrounding buildings and minimise view impacts on adjacent residential buildings.

Provisions

1. The buildings will be configured in accordance with the Structure Plan as shown in Figure 2.
2. Future buildings will generally be located as shown in Figure 3 (subject to detailed design).
3. The building line to Parramatta Road will be set back 6m from the property boundary.
4. The building line to Cheltenham and Lucas Roads will be set back 3m from the property boundary as shown in Figure 2.

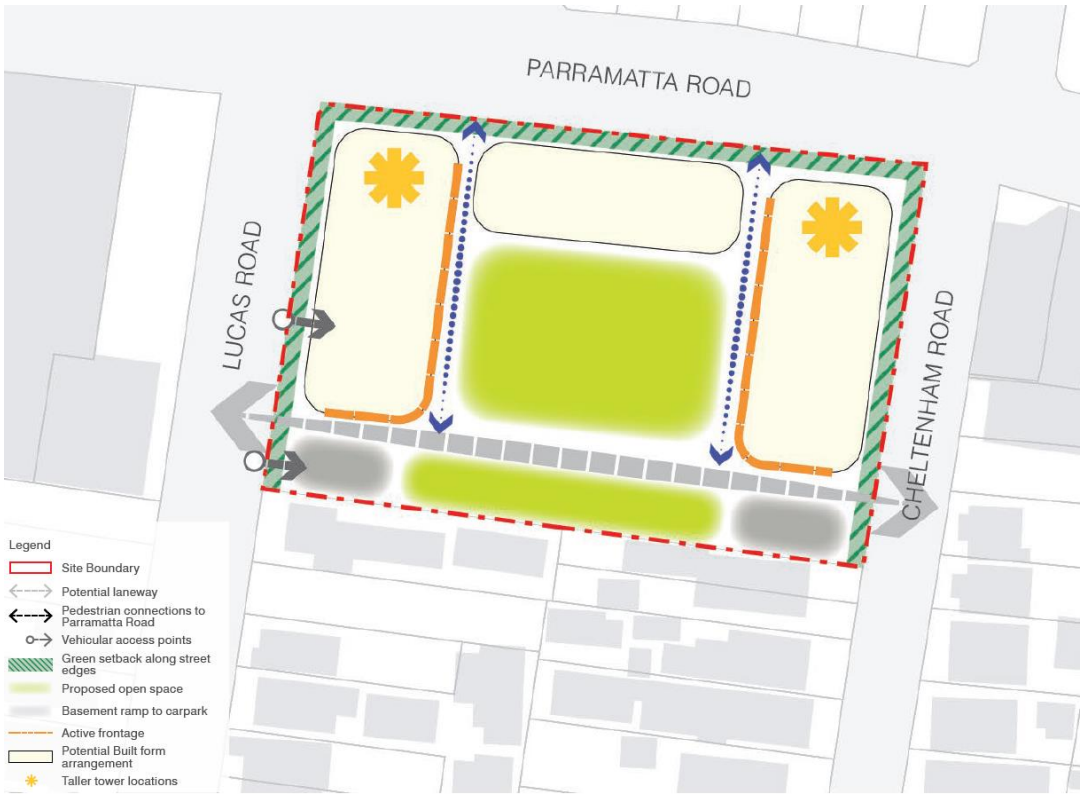


Figure 2 – Structure Plan

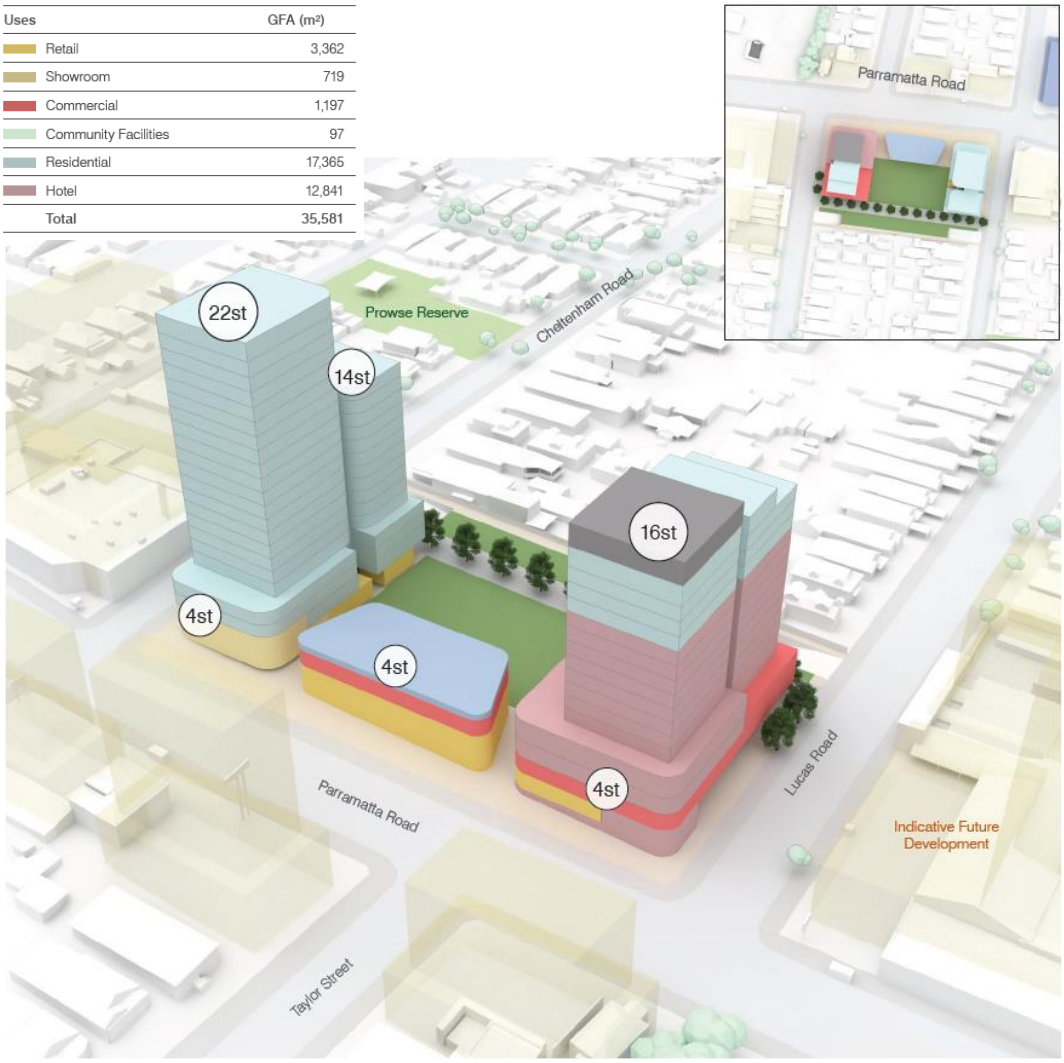


Figure 3 – Building Envelope Plan

C2 Land uses

Provisions

1. Future development will provide a range of residential, hotel, retail, commercial, and community facilities with varying tenancy sizes suitable for a diversity of large scale to fine grain uses.
2. Residential accommodation and hotels rooms are not to be located at ground level, except for entrances, lobbies, common rooms and service facilities.
3. Controls relating to hotel, commercial and retail uses on the site are to refer to other provisions within the Burwood DCP (as applicable).

C3 Landscaping and Public Domain

Objectives

1. To encourage new publicly accessible areas and through-site pedestrian links.
2. To incorporate pedestrian links through the site, at points where these links are most legible and safely connected to the existing street and pedestrian network.
3. To promote pedestrian and cycle activity, along with provisions for vehicles and services vehicles.
4. To provide attractive publicly accessible private land that maximises the possibility of stormwater management, mature tree growth, and access to sunlight.

C4 Access and Permeability

Provisions

1. Publicly accessible open space shall be provided in accordance with the locations in Figure 2.
2. Publicly accessible open space shall equate to a minimum of 2,700 sqm, generally in accordance with the areas shown in Figure 2 and 4.
3. Public through site links shall be provided in accordance with the indicative locations detailed in Figure 2 and 4. These links shall provide public access 24 hours, 7 days per week.
4. Public through site links shall be designed with dimensions that are suitable to promote permeability and visual connection.
5. CCTV cameras and other appropriate security measures shall be installed within the site to ensure the safety of members of the public and residents using the publicly accessible private land, southern pedestrian link, and through-site links.
6. The publicly accessible private land shall be designed to create a high-quality address and setting for buildings, including the provision of a variety of plant types and sizes; trees capable of offering shade to public spaces; a variety of seating options for use by the public (not restricted to outdoor dining); a high quality pavement design; and public art
7. The development shall provide for communal open space and landscaped areas on the top of podium levels.
8. Public art shall be provided within new publicly accessible private land along ground level.
9. Public through site links and publicly accessible through site links shall:
    a. Be legible and direct throughways for pedestrians.
    b. Have signage at the street entries indicating public accessibility and the street to which the through site link connects.
10. Publicly accessible private land and public through site links may be partially covered.
11. Through-site links are to:
    a. be made safe through adequate lighting and passive surveillance
    b. be clearly distinguished from vehicle accessways
    c. be easily identified by users and include wayfinding signage
    d. include materials and finishes such as paving materials, tree planting and furniture consistent with adjoining streets and public spaces.
12. A Public Domain Plan is to be prepared and submitted with development applications demonstrating a high quality, co-ordinated public domain, addressing:
    a) street trees and other vegetation
    b) paving and other hard surfaces
    c) lighting, including the use of LED
    d) seating
    e) refuse bins

f) signage, including wayfinding signage

g) public art.

13. Footpath paving along property frontages are to be in accordance with Council's specifications.

C5 Height of Buildings

Objectives

1. To ensure that there is no significant loss of amenity to surrounding buildings, streets or urban spaces.
2. To minimise overshadowing of new and existing public domain areas and publicly accessible private land.
3. To recognise this site as an important site along Parramatta Road.
4. To provide multiple tower forms and varying heights.

Provisions

1. Development shall comply with the Building Height as outlined in Clause 4.3A of the Burwood Local Environmental Plan 2012.
2. Development on eastern side of the site shall not result in a building with a building height that exceeds 72.5m or 22 storeys (not including rooftop access, lift overrun or plant)
3. Development on western side of the site shall not result in a building with a building height that exceeds 65m (not including rooftop access, lift overrun or plant);
4. Development shall incorporate the setbacks and secondary setbacks as articulated in Figure 3.
5. Podiums shall not exceed the heights as detailed in Figure 3. Structures used for landscaping and communal open space such as barbeques, pergolas and planters may exceed these heights.

C6 Built Form

Objectives

1. To ensure Building Setbacks, tower configuration, height and form provided in accordance with the approved structure plan.
2. To establish zones for transition and interface in building height

Provisions

1. Building setbacks and heights are to be in accordance with Figure 2.
2. Building mass and facade is to be broken down into individual building components that step and terrace along frontages to Parramatta Road, Lucas Road and Cheltenham Road.
3. Setbacks above the street wall height, as defined by the top of the podium, are to be provided in accordance with Figure 3.
4. Buildings on the site are to comprise two distinct towers that are separated by a centralised open space and low rise building to Parramatta Road.

C7 Active Frontages

Objectives

1. To promote pedestrian activity and safety in publicly accessible private land through passive surveillance.
2. To provide transparency and visual contact between public areas and the building interior.
3. To create a 'public face' for buildings to enhance the character of streets.
4. To provide access directly to the street

Provisions

1. All Street frontages at ground level are to include activate uses.
2. All non-residential ground floor uses fronting the open space are to be designed as active frontages.
3. Necessary building access, plant and equipment to these frontages is to be minimised, where possible.
4. Other than the key active street frontages, the building facades, where possible, must be treated through public art, feature wall or the like, so that they are sympathetic to the surrounding environment.
5. Building services and utilities shall be screened or otherwise treated to maintain attractive and safe frontages for pedestrians.
6. Footpaths shall be provided along all active street frontages.
7. Separate entrances shall be provided to commercial and residential development. All entrances shall be clearly visible and well lit.
8. Building entrances must have a direct physical and visual connection with either the street, publicly accessible private land, public through site link or publicly accessible through site link.

C8 Façade Composition and Articulation

Objectives

1. To ensure the development has well articulated and harmonious facades which define the publicly accessible private land and create an appropriate human scale.
2. To ensure that building openings and through-site links are clearly visible from the street.
3. To ensure that building elements, such as balustrades, awnings and signage are integrated.
4. To ensure that corners are articulated to address both frontages.

Provisions

1. Facades are to incorporate a balance of horizontal and vertical elements to provide visual relief in the building. This is to be considered when establishing design excellence for the site.
2. Articulation is to be provided to building facades where the length exceeds 45m
3. The dominance of a single architectural style across the site should be minimised, where appropriate
4. Roof forms are to be designed to generate an interesting skyline
5. The composition of the building facades should be characterised by vertical proportions over the full height of the building.
6. Buildings incorporate design measures to visually break long building facades through façade modulation.
7. Balconies or wintergardens are to be designed and shaped to maximise visual privacy for residents.
8. Building services are to be contained and hidden from the public view as much as possible, largely within the basement levels.

C9 Solar Access

Objectives

1. To not unreasonably reduce solar access so surrounding land uses.
2. To orientate development to optimise opportunities solar access to proposed development.

Provisions

1. Solar access is to be provided for uses on the site in accordance with the DCP and Apartment Design Guide.
2. Solar access to be maintained for uses adjoining the site accordance with the DCP and Apartment Design Guide.

C10 Public Domain Interface and Landscaping

Objectives

1. A Landscape Plan is to accompany any future development applications for new buildings on the Site, provided generally in accordance with Figure 4 and 5.
2. Perimeter planting is to be established along the edges of the podium and rooftop terraces to minimise overlooking from adjacent properties.

Figure 4 – Public Domain Plan

Figure 5 – Indicative Landscape Plan

C11 Noise

Provisions

1. Elevations of buildings facing Parramatta Road are to be designed and incorporate design features to minimise traffic noise transmission.

C12 Transport, Access and Parking

Objectives

1. To ensure that building vehicular ingress and egress points are best located to reduce potential for vehicle and pedestrian conflict.
2. To create a hierarchy of transport within the site which prioritises pedestrians and cyclists.
3. To improve vehicle access and safety to minimise traffic impact.
4. To provide end of trip facilities for active transport.
5. To facilitate safe and efficient access for all transport modes.

Provisions

1. Vehicular access and service entry points are to be provided in accordance with proposed Structure Plan (Figure 2).
2. Parking and loading facilities are to be located underground except for the rear laneway.
3. Car parking shall be provided in accordance with *[SECTION TBC WITH COUNCIL]*
4. Appropriate end of trip facilities is to be provided for commercial, office, retail and hotel uses.
5. Car share is to be provided on the site that is publicly accessible.

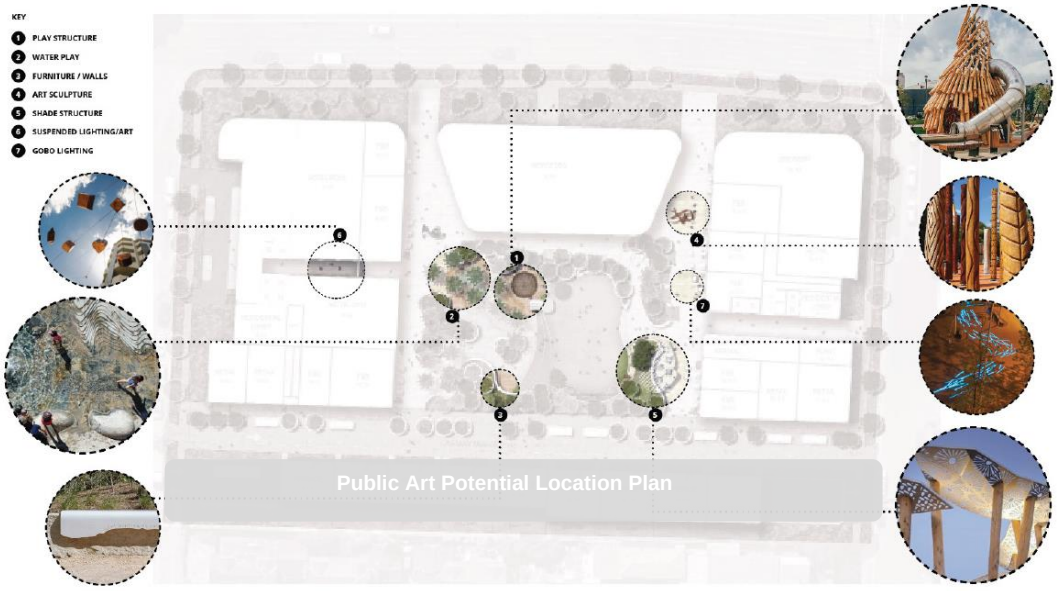
C13 Public Art

Objectives

1. To ensure that the development contributes to public art within the Burwood Local Government Area.
2. To include public art so as to better integrate development into the environmental and cultural aspects of a locality and ensure the development contributes positively to the streetscape.

Provisions

1. The development must provide public art. The provision of multiple art items across the development site is preferred.
2. Public art is to be delivered on the site in accordance with the public art plan as shown in Figure 6.
3. The public artwork is to be generally located within the development site, within the publicly accessible private land and publicly-accessible through site links; except where the proponent has entered into a mutual agreement with Council to provide the public artwork on public land.
4. Council must be satisfied that a Public Art Plan has been submitted which confirms the value of the artworks, their placement within the site, timing for installation, and ongoing management requirements.



8. **Play Structure**
9. **Water Play**
10. **Furniture/Walls**
11. **Art Sculptures**

1. **Shade Structure**
2. **Suspended Lighting/Artworks**
3. **Gobo Lighting**

Figure 6 – Public Art Plan

Burwood Local Environmental Plan 2012

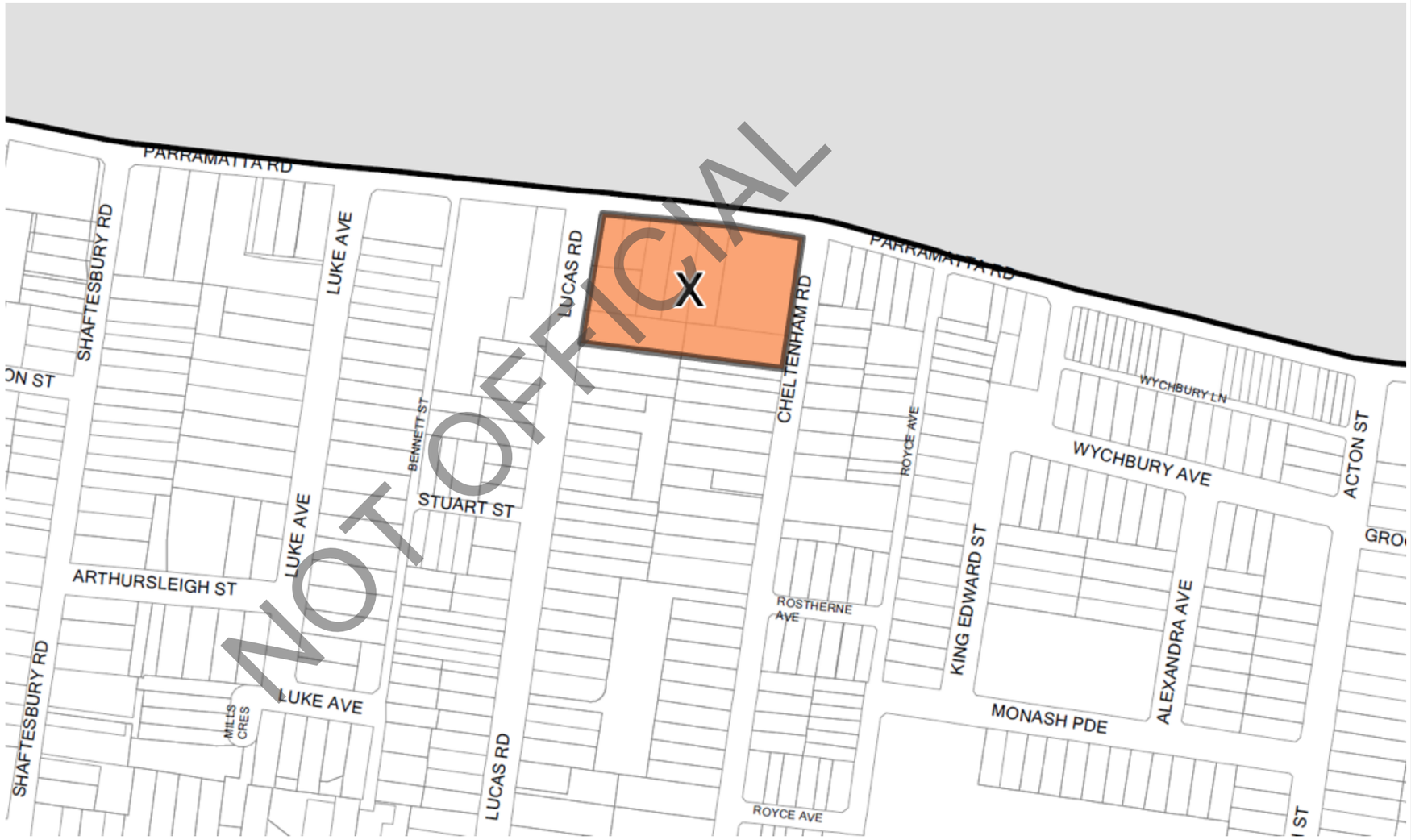
Alternate Floor Space Ratio Map - Sheet FSR_001

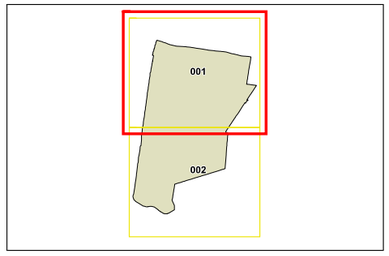
Maximum Floor Space Ratio (n:1)

X 3.4:1

Alternate Floor Space Ratio Map

Planning Proposal Map – For Information Only





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Projection GDA 1994
Zone 56

DRAFT FOR PLANNING PROPOSAL - NOT APPROVED

Burwood Local Environmental Plan 2012

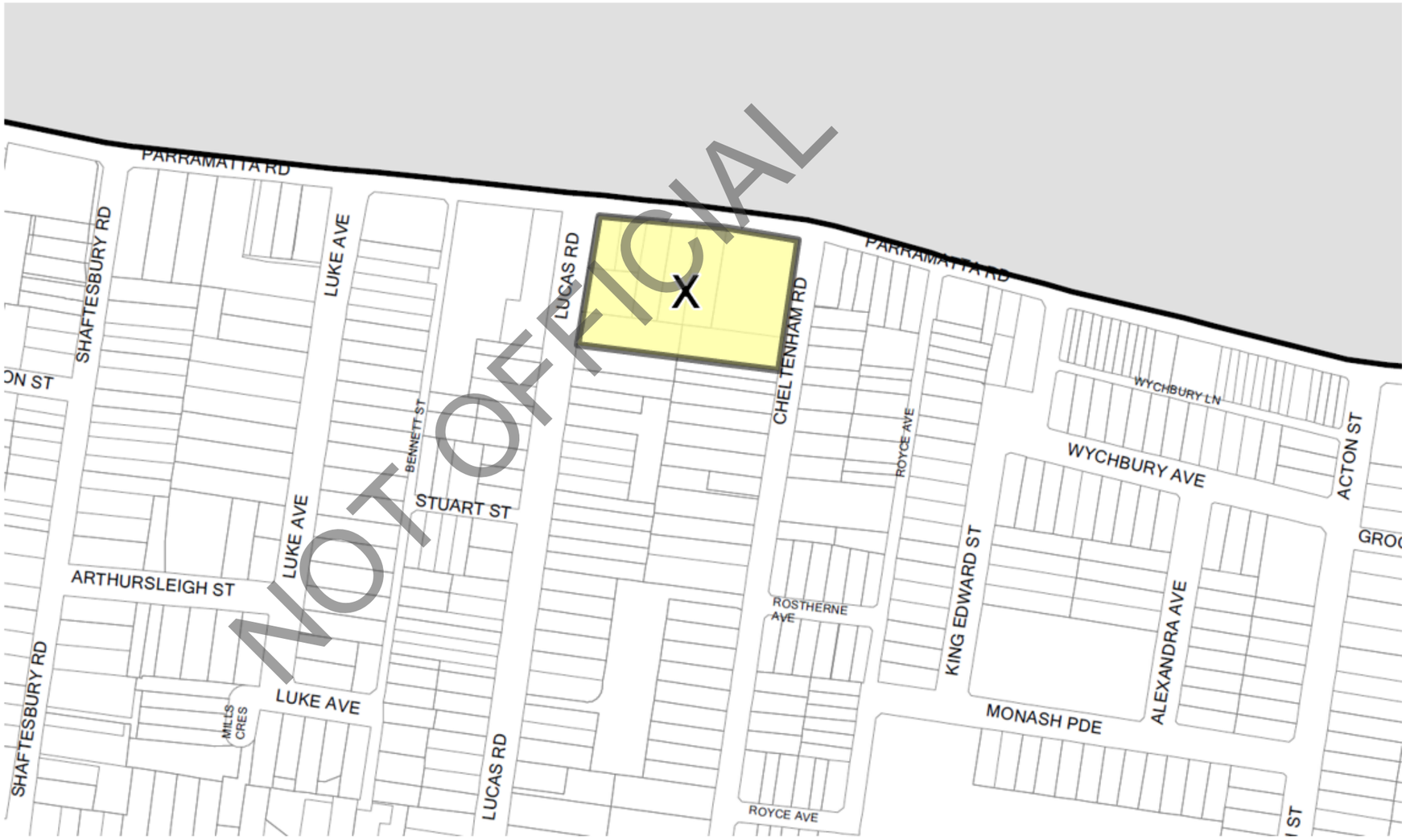
Alternate Height of Buildings Map

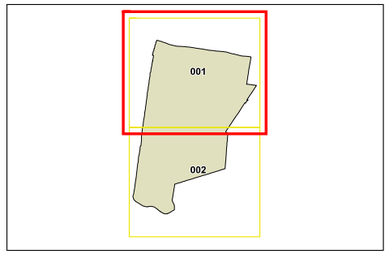
Maximum Building Height (m)

X 72.5m

Alternate Height of Buildings Map

Planning Proposal Map – For Information Only





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Projection GDA 1994
Zone 56

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Attachment 15 - Proposed LEP Mapping

Burwood

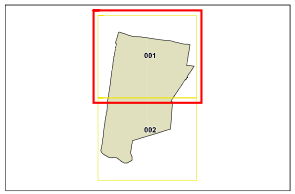
Burwood Local Environmental Plan 2012

Land Zoning Map

-

Zone

- MU - Mixed Use
- MU1 - Mixed Use
- E1 - Local Centre
- E2 - Commercial Centre
- E3 - Productivity Support
- E4 - General Industrial
- R1 - General Residential
- R2 - Low Density Residential
- R3 - Medium Density Residential
- R4 High Density Residential
- R5 - Large Lot Residential
- RE1 - Public Recreation



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Projection GDA 1994
Zone 56

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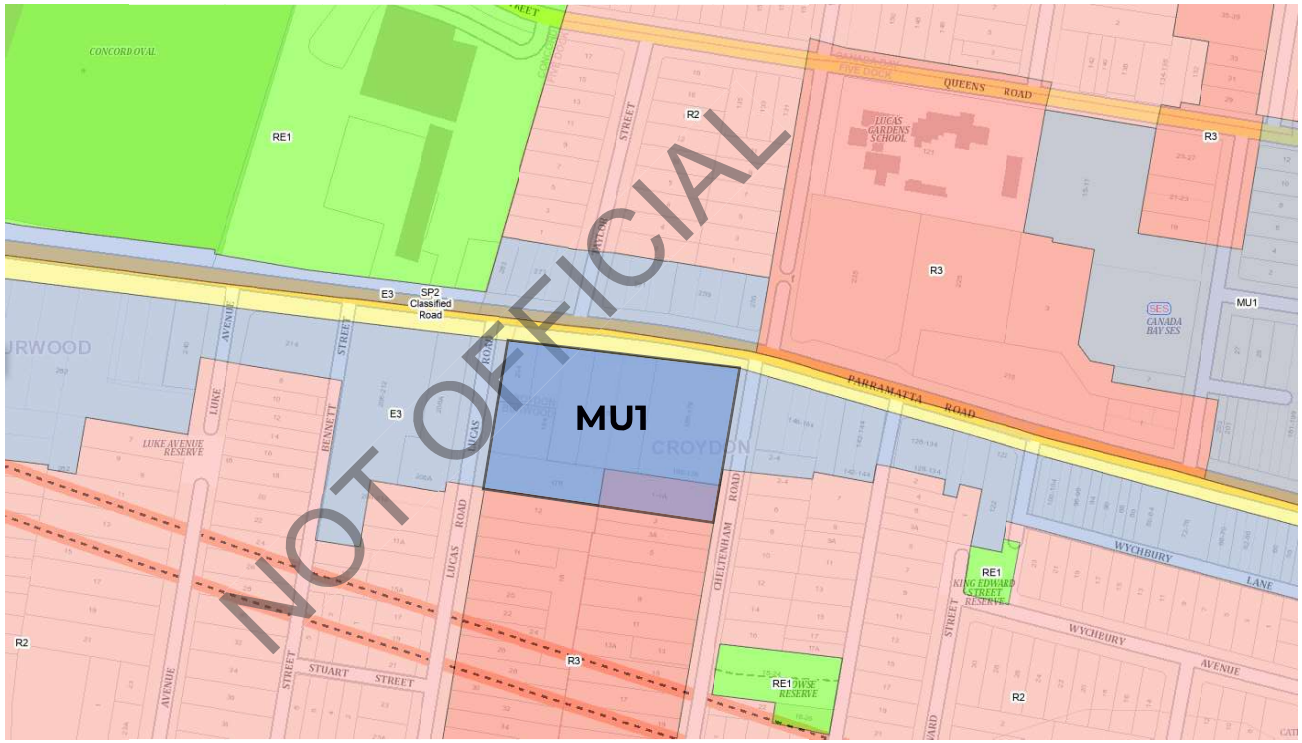
Land Zoning Map

Planning Proposal Map – For Information Only



Burwood Local Environmental Plan 2012

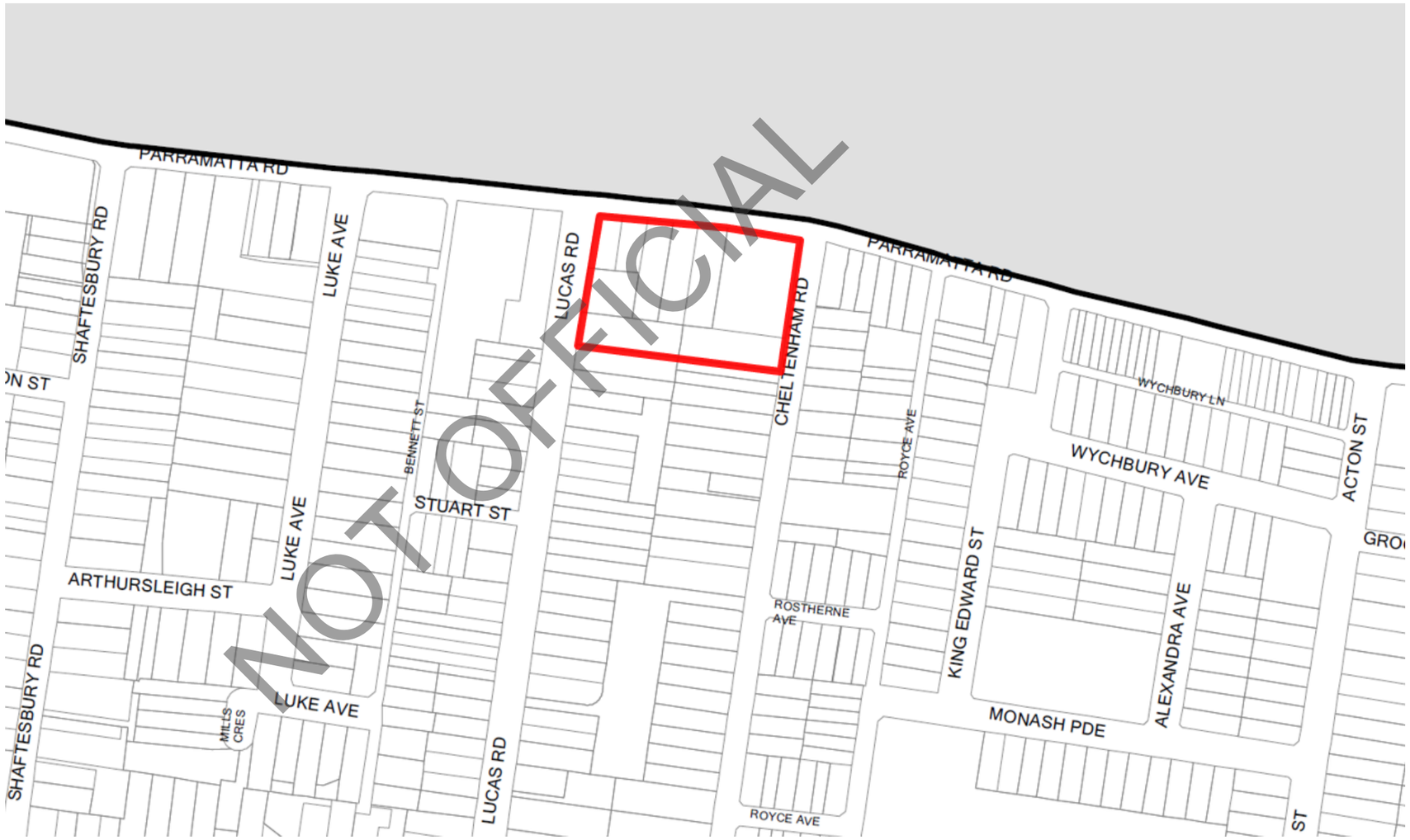
Key Sites Map

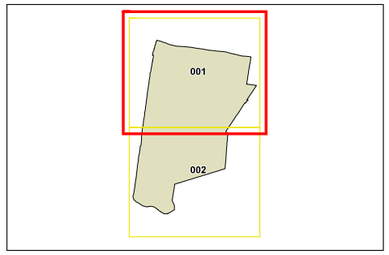
Key Site

Refer to Clause X.X

Key Sites Map

Planning Proposal Map – For Information Only





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Metres

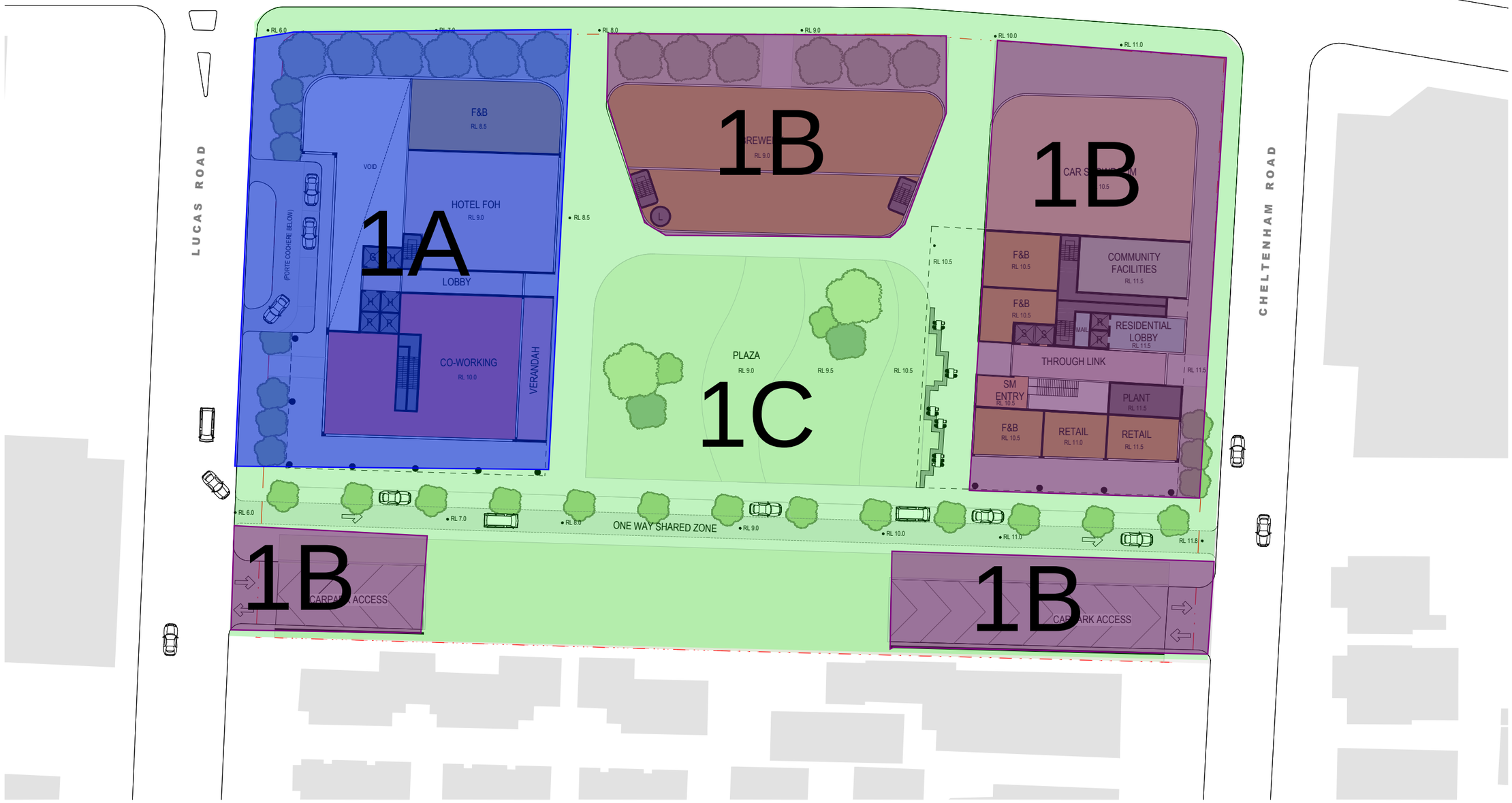
Scale 1:10,000 @ A3

Projection GDA 1994
Zone 56

DRAFT FOR PLANNING PROPOSAL - NOT APPROVED

Proposed Staging Plan - Planning Proposal

OVERVIEW -
At the date of the Planning Proposal, the intention is to construct and deliver the development in one single stage. However, the below diagram depicts the likely construction and delivery sequence as part of the single stage delivery. The delivery sequence is subject to change.



Drawing:	**Upper Ground Floor Plan**
Drawing no:	A.1100
Issue:	10
Scale@A1:	1 : 250
Date:	12/05/23

Transport for NSW

8 August 2022

TfNSW Reference: SYD22/00815/1

Alexander Galea
Manager
Eastern and South District
NSW Department of Planning and Environment
Locked Bag 5022
Parramatta NSW 2124

SCOPING PROPOSAL – 166-204 PARRAMATTA ROAD AND 1-1A CHELTENHAM ROAD, CROYDON

Dear Mr Galea,

Thank you for the pre-lodgement referral of the scoping proposal to Transport for NSW ('TfNSW') on 12 July 2022 for 166-204 Parramatta Road and 1-1a Cheltenham Road, Croydon (the 'site').

The Department of Planning & Environment ('DPE') is finalising the requirements of the pre-lodgement referral process. The referral is not mandatory in the interim but a recommended step in the *Local Environmental Plan Making Guideline* (December 2021). TfNSW notes the purpose of the referral is to facilitate early consultation with key authorities and government agencies to identify planning issues upfront, necessary information requirements for assessment and to confirm the strategic and site-specific merit of a proposal before lodgement.

The scoping proposal seeks to amend the Burwood Local Environmental Plan (LEP) 2012 by changing the zone, maximum height of building (HOB) and floor space ratio (FSR) to facilitate a mixed-use development on the site potentially comprising residential dwellings, commercial, retail and hotel accommodation uses.

The site is located within Kings Bay Precinct and is outside of the 2016-2023 Release Area as identified in the *Parramatta Road Corridor Urban Transformation Strategy* (PRCUTS). The proposed density and height of building exceeds the recommended development standards under PRCUTS Planning and Design Guidelines is noted.

In consideration of the proximity of the site to the future Burwood North Metro Station, future staging of the development is essential to encourage customers to use the transport system differently, by shifting to walking, cycling or public transport and deliver long-term sustainable travel behaviour change.

The proposed rezoning to 'B4 Mixed Use' and changes to development standards would facilitate almost a doubling of the FSR on the site, noting PRCUTS recommended an FSR of 1.8:1. A B4 zoning also increases the range of permissible uses on the site including 'commercial premises', which encompasses retail premises and uses including specialised retail premises. Noting the proposed request seeks to incorporate site-specific provisions relating to the mix of land uses in the LEP, TfNSW recommends the planning authority to consider the application of *Local Planning Direction 5.1 – Integrating Land Use and Transport* and the supporting planning policies. Given this site is being brought forward earlier than anticipated under PRCUTS, is critical that the proposed scale and density of any development is aligned to public transport service levels in the locality, so as to minimise private vehicle trip generation.

TfNSW is investigating potential transport options for the Parramatta Road corridor in line with the broader future transport network, which includes the subject site. TfNSW is currently working on a plan for potential short, medium and long term options to enhance public transport and support the corridor's urban transformation. A draft indicative plan has been provided to outline additional land that would potentially be required of the site to provide opportunities for public and active transport enhancements along the corridor. Please note this plan has a confidential status and is provided solely for the purpose of providing advice on this scoping proposal. **It is not a public document**.

Detailed comments are provided in **Attachment A** for consideration. Comments provided at the pre-lodgement stage are of a preliminary nature and relate to the current proposed concept scheme. They are not to be interpreted as binding upon TfNSW and may change following review of the formal planning proposal referred from the appropriate planning authority.

Should you have any further enquiries in relation to this matter, **Alan Chen – Land Use Planner** can be contacted on 0457 647 414 or email: development.sydney@transport.nsw.gov.au

Sincerely,

Carina Gregory
Senior Manager Strategic Land Use Planning
Greater Sydney Division

ATTACHMENT A – DETAILED COMMENTS

1. **Integrating land use and transport**

TfNSW acknowledges the changes in planning and policy since the release in 2016 of the *Parramatta Road Corridor Urban Transformation Strategy* (PRCUTS), namely Sydney Metro West. In consideration of the site being identified outside the 2016-2023 Release Area, it is important to ensure future development will not further increase car dependence but rather maximise access for pedestrians, cyclists and public transport users.

TfNSW recommends that future development is considered in alignment with the planned opening of Sydney Metro West.

2. **Proposed non-residential uses**

TfNSW supports the proposed co-location of uses and its proximity to existing and future public transport as it supports the '30-minute city' concept where residents can access jobs and services within 30 minutes by public transport, walking and/or cycling seven days a week.

However, TfNSW recommends the relevant planning authority to consider the appropriate limitations for potential floor space that may be dedicated to 'commercial premises', especially for 'retail premises' and 'specialised retail premises' (i.e.. bulky goods). The proposed density and height would permit a greater capacity for uses known for high traffic generation and would likely lead to detrimental impacts to the surrounding road network.

In consideration of *Local Planning Direction 5.1 – Integrating Land Use and Transport*, '*The Right Place for Business and Services – Planning Policy (2001)* outlines that: "*Retail is essential to the activity and viability of most centres because of its dominance of economic activity and relationship with personal and other services. Shops typically generate high trip levels and those* ***serving more than a neighbourhood catchment should always be located in centres*** *and be provided with pedestrian, cycling and public transport access*".

PRCUTS also outlines the following which Council should note:

- PRCUTS Planning and Design Guidelines (pp.176) – Vision for Kings Bay Precinct to create a *new village centre that complements but does not compete with the nearby Five Dock Town Centre;*

- PRCUTS Economic Analysis Report (Table 5.14) – The proposed floor space for 'retail premises' on the subject site represents a substantial amount of the recommended retail floorspace demand for Kings Bay Precinct overall and for a site that is located outside the 2016-2023 release area.

Additionally, Burwood Council should be made aware of the retail capacity within Stage 1 Kings Bay Precinct as proposed in Canada Bay Council's recent planning proposal.

3. **Proposed Access Arrangement**

TfNSW supports no proposed vehicular access arrangements from Parramatta Road which is a classified 'state road'. TfNSW's current practice is reflected in Section 6.2.1 of TfNSW current publication of the *Guide to Traffic Generating Developments*, which states 'access across the boundary with a major road is to be avoided wherever possible'.

4. **Freight and Servicing**

TfNSW recommends reference to the Last Mile Toolkit to give consideration and guidance to proposed freight and servicing demands for new high density buildings. The toolkit provides best practice approaches to building serviceability to enable good place outcomes.

5. **Proposed Shared Zone**

Should the proposed shared zone become dedicated as a public road, then the speed limit will need to be approved by TfNSW. Should it not, TfNSW recommends an estimate of the vehicle volume using the road should be provided to ensure that excessive vehicle volumes are not using the Shared Zone, creating an unsafe environment for pedestrians.

6. **Active Transport**

The PRCUTS precincts are ideally placed to take advantage of the future Metro West stations to encourage the mode shift to sustainable transport options.

TfNSW recommends Council to consider improving walking and cycling connections as 'first/last mile' trips to and from these new stations. In addition, sufficient bicycle parking for short journeys (ie. errand runs) typically outdoors, should be provided for areas where intensification of activity would occur from the future development of the precincts. Future connection opportunities to existing local cycleway routes should be considered.

TfNSW recommends that consideration be given to TfNSW's Cycleway Design Toolbox – Designing for cycling and micromobility (December 2020). The toolbox provides a range of design tools for on and off-road environments that can be tailored to specific environments to deliver high-quality cycling infrastructure.

As the proposal is inconsistent with PRCUTS Planning and Design Guideline. The proposal should provide additional or alternative active transport solutions as outlined in the PRCUTS Implementation Update 2021 (pp.8).

7. **Car Parking**

Ultimately, future car parking provision on the site would be dependent on the alignment of the development with the opening of the future metro.

TfNSW notes the proposal incorporates car parking rates consistent with Burwood Development Control Plan (DCP) 2021 and encourages that this rate should be at least be applied as a maximum. A maximum car parking rate can be used as a travel demand measure to reduce private car travel and encourage mode shift to public transport in consideration of the site's proximity to the future metro.

TfNSW recommends, where possible, the consideration of Section 3.8 of the PRCUTS Planning and Design Guidelines regarding car parking to support the transition of future communities in Kings Bay Precinct to low car dependency.

8. **Transport Impact Assessment**

The proposal should make reference to the cumulative impacts, where appropriate, as identified in the wider precinct traffic and transport study by Bitzios Consulting that has been undertaken for Stage 1 Precincts located along the broader corridor.

ATTACHMENT A – DETAILED COMMENTS

As highlighted in the precinct study, congestion on Parramatta Road in 2036 is the key constraint with or without the uplift areas. Therefore, a balanced approach to traffic congestion should be considered by improving local access and emphasis on improving walking, cycling and public transport infrastructure, while implementing appropriate parking policies.

It is recommended that Council or proponent submits the SIDRA Modelling files to TfNSW for verification and comment prior to lodgement.

Based on the current concept plan, the below points have been raised for consideration:

- Luke Avenue has existing measures that facilitate filtered permeability.
- A scenario for Weekend or Thursday peak hour traffic generation for the proposed development.
- An alternative assessment to assess the difference in vehicle trip generation based on the conditions 'with' and 'without' Metro West can be undertaken should Council seek to better understand the proposed impacts on the local road network. Two different sets of bespoke peak hour vehicle trip rates can be used based on other surveyed site's rail accessibility.

  TfNSW can be contacted for further clarification and to confirm these rates should this exercise be undertaken.

9. **Proposed Green Edge Setback**

TfNSW notes that a proposed 6m green edge setback is applied on the frontage of the site.

TfNSW is investigating potential transport options for the Parramatta Road corridor in line with the broader future transport network, which includes the subject site. TfNSW considers that some of the 6m wide area could potentially be utilised to accommodate road widening necessary to support future public transport and active transport plans. Alternatively, if Council prefers to maintain the 6m wide area exclusively for public domain enhancement then additional land for the necessary road widening may be needed in addition to the 6m green edge setback. TfNSW recommends, that additional land for road widening could be achieved by including SP2 Infrastructure zone or other viable planning mechanisms.

It is recommended that Council undertakes consultation with TfNSW and Department of Planning and Environment (DPE) on the way forward on this matter prior to the making of this Plan.

Attachment B contains draft indicative plans for the extent of affected land beyond the proposed 6m offset as measured from the private property boundary. TfNSW reiterates that these plans are **not a public document**.

10. **Funding and Implementation**

There is no certainty that the proposed Regional Infrastructure Contribution (RIC) will be implemented/gazetted ahead of rezoning and development envisaged within the PRCUTS. The area covered by the proposal and the Kings Bay Precinct as identified in PRCUTS is not under any special infrastructure contributions plan.

TfNSW recommends DPE or Council to consider the appropriate funding mechanism pathway for regional/state infrastructure for the proposed site and for the broader Kings Bay precinct plan that is consistent with the PRCUTS Infrastructure Schedule List (2016).

Planning Proposal - 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon

Submissions Summary Table

Summary of submissions received during Community Feedback period to Planning Proposal by Burwood Council between 16 September and 18 October 2024.

Planning Proposal - 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon

Summary of Submissions and Key issues Raised

	Congestion	Parking	Traffic	Shadow	Privacy	Design	Construction	Waste Management	Amenity and Noise	Stormwater	Height, Scale Character	Soil erosion	Overdevelopment	Strategic alignment/PRCUTs	Community Engagement	Currency of Documentation	Heritage	Community Benefit	General
1	X	X	X	X	X														
2A+B				X	X														
3			X			X													
4		X	X				X	X											
5*				X							X			X					
6		X	X	X	X		X	X	X	X									
7*											X			X	X	X			
8		X									X								
9*				X															
10		X																	
11*		X	X																
12*		X	X								X			X			X	X	
13		X	X								X								
14*	X	X	X				X				X		X	X					X
15		X	X									X							
16*																			
17	X	X	X	*Duplicate of Submission 14 (not included in to totals below)*							X		X	X					X
18*				X															
19		X	X						X		X								
20	X												X						X
21	X	X	X	X							X								
#	4	12	11	7	3	1	2	2	2	1	8	1	2	4	1	1	1	1	2

Note:
- * denotes a submission was prepared as an attachment to the email
- This summary has been prepared to assist in the summation of the main issues raised in the written submissions
- Some descriptions of an issue may be similar to others but have been included to represent the key matters raised in the particular submissions
- Submissions 2A+B have been combined and Submission 14 and 17 are duplicate from the same submitted (made via separate email addresses)
- Refer to Response to Submissions Report for detailed response

Response to Submissions

Community Feedback

Planning Proposal

166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon

Submitted to Burwood Council

PP-2023-1406

Ethos Urban

Prepared by Ethos Urban

28 November 2024 | 2210896

'Gura Bulga'
Liz Belanjee Cameron

'Gura Bulga' – translates to Warm Green Country. Representing New South Wales.

'Dagura Buumarri'
Liz Belanjee Cameron

'Dagura Buumarri' – translates to Cold Brown Country. Representing Victoria.

'Gadalung Djarri'
Liz Belanjee Cameron

'Gadalung Djarri' – translates to Hot Red Country. Representing Queensland.

Ethos Urban acknowledges the Traditional Custodians of Country throughout Australia and recognises their continuing connection to land, waters and culture.

We pay our respects to their Elders past, present and emerging.SSS

In supporting the Uluru Statement from the Heart, we walk with Aboriginal and Torres Strait Islander people in a movement of the Australian people for a better future.

Contact: Stephen Gouge, Director - Planning; sgouge@ethosurban.com, 0410 291 014

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Ethos Urban Pty Ltd | ABN 13 615 087 931 | Sydney NSW | Melbourne VIC | Brisbane QLD | ethosurban.com

1.0 Summary

This Submissions Report has been prepared by Ethos Urban on behalf of LSH Property Alexandria Pty Ltd (the Applicant) to address the matters raised during the Community Feedback period undertaken by Burwood Council for the Planning Proposal at 106 & 120-122 Smith St And 3a Charlotte St, Wollongong (the site).

1.1 Council - Planning Proposal Feedback

Burwood Council is seeking community feedback on the Planning Proposal to amend the *Burwood Local Environmental Pla*n (BLEP) 2012 relating to 166-204 Parramatta Road and 1-1A Cheltenham Road, Croydon. Separate formal consultation in accordance with the Local Environmental Plan Making Guideline, will be undertaken following a Gateway Determination of the Planning Proposal.

As set out in the Guidelines, before Council considers the Planning Proposal, it will first be considered by the Burwood Local Planning Panel (LPP). Following the LPP meeting Following the Panel meeting, Council will consider the Planning Proposal and whether to recommend that Gateway approval be granted

1.2 Overview of Submissions

During the community feedback period a total of 20 submissions were received (total of 22 with 2 x submissions were duplicates). The submissions are provided primarily from residents surrounding the site and in the local area, being primarily from two street adjoining the site

The submissions related to a range of issues that included:

- Congestion
- Traffic and Parking
- Overshadowing/Solar Access
- Privacy
- Design
- Construction Related Matters (including Soil Erosion)
- Waste Management
- Amenity and Noise
- Stormwater
- Height, Scale Character
- Overdevelopment
- Strategic Alignment
- Community Engagement
- Currency of Documentation
- Heritage
- Community Benefits
- General

2.0 Community Consultation - Proponent

2.1 Proposed Community Engagement – Pre-Lodgement

The Proponent undertook extensive community consultation with the immediate and wider community, prior to lodgement of the Planning Proposal. A summary of the engagement activities undertaken is provided below, with more detail included in the Consultation Outcomes Report appended to the Planning Proposal.

This engagement activities included:

- **Letterbox Drops**
  - 36 immediate neighbours surrounding the site to provide further information about the planning proposal and the invitation to book a one-on-one meeting with the project team to discuss the proposal in more detail.
  - 219 wider community members within 200m+ of the site
- **In Person Information Sessions** (held at Concord Oval) - 2 x 2 hours in person sessions at Concord Oval (5:30pm to 7:30pm) with 27 registration and 19 groups attending
- **Community Webinar Session** – 1 x 1.5 online webinar with 20 registrations and 15 attendees
- **Dedicated Project Email Address** – to field and response to any enquiries
- **Dedicated 1800 Phone line** – to field any enquiries

The purpose of engagement on the Planning Proposal at the early stage prior to lodgement, was to:

- Seek feedback from immediate neighbours and the wider community to better understand local views and potential concerns.
- Provide clear, timely and accessible information and opportunities for neighbours to provide feedback during the initial planning phases of the project.
- Explain how the proposed design concept and site planning approach addresses key community issues and long terms NSW Government strategic planning priorities.
- Create effective lines of communication between the local community and the project team.

This early engagement process provided opportunities for open conversations and feedback from:

- immediate neighbours to the site,
- community located within a 200m+ radius of the site; and
- several key government agencies and service providers.

A summary of the engagement activities undertaken is provided below, with more detail included in the Consultation Outcomes Report appended to the Planning Proposal.

2.2 The Key Feedback

Feedback raised during pre-lodgement consultation related to:

- **LSH as a developer.** Understanding LSH Property's long-term ownership and management of the proposed precinct.
- **Site use and precinct design**. Interest in the rationale behind the proposed building mix and projected population/visitation. There was an acknowledgement that higher density development was inevitable for the area, however, many were concerned with how this could be achieved in a way that is appropriate and sensitive to the surrounding context and local character. There was also concern around the intended quality of the built form and construction outcomes, as other developments in the area were considered poor quality and 'unattractive'.
- **Building heights and density**. Concern was shown regarding how the proposed height and building massing would impact the amenity of surrounding neighbours. There is a desire for more certainty regarding final building heights and density figures.
- **Community open space, amenities and services**. Many residents showed strong support for the proposed public open space, activation and greening along Parramatta Road. There was strong interest and support in the proposed retail / commercial mix and various suggestions were put forward on potential community services, amenities, and facilities that reflected local needs and expectations.
- **Traffic management and parking**. There were concerns regarding the proposed location of the entry / exit points of the proposal and parking provisions, given the increased activity and projected population growth. Considerable impacts to surrounding streets were raised, with particular reference to ongoing traffic congestion, narrowness and limited street parking on Cheltenham Road and a need to consider and address pedestrian safety concerns.
- **Planning pathway and consultation**. Interest in indicative timelines for approvals and construction. Overwhelmingly, the community want transparent and holistic engagement where possible in anticipation of other surrounding developments that will create cumulative impacts.
- **Development impacts.** Issues relating to view loss, solar access, overshadowing, noise, privacy, services and utilities were raised. Many residents also expressed the need for LSH to consider how the development would change and impact the quality of life for surrounding residents and properties who have lived in the area for many years and already endured construction impacts from surrounding development such as WestConnex.

This feedback was considered and incorporated into the preparation of the Planning Proposal

3.0 Analysis of Submissions

This section analyses the submissions received by providing a breakdown of the type of submissions received and identifies the issues raised.

3.1 Breakdown of Submissions

In relation to the Public Exhibition of the SSDA, a total of 20 submissions were received (noting that 2 x submission were duplicated) which included submissions made by relevant government agencies, organisations and members from the public. A summary of the key themes is provided in **Table 1** below, also refer to attached Submissions Summary Table.

Table 1 Summary of Submissions Received

Key Theme	Summary of Details	No. times raised in submissions
Traffic and Parking	▪ Concern over the existing traffic and parking issues ▪ Additional traffic on Cheltenham and Lucas Road ▪ Concern around under/oversupply of parking	12
Height, Scale Character	▪ The Proposed Development is out of keeping with the nature and character of Croydon ▪ Multiple tall buildings, a hotel, and commercial spaces will disrupt the visual harmony and character of the street.	8
Overshadowing/Solar Access	▪ Impacts to surrounding residential as a result of the proposed development	7
Congestion and overdevelopment	▪ Concern over development, traffic and existing road and neighbourhood congestion	4
Privacy	▪ Concerns regarding privacy and overlooking from the height of the proposed development	3
Design	▪ Concerns over the design of the proposal and its physical appearance and presentation	1
Construction Related Matters (including Soil Erosion)	▪ Concerns on how the construction process will be managed including risks such as erosion, construction vehicles, noise and dust	2
Waste Management	▪ Concern over unmanaged waste and dumping on street from residents (including renters)	2
Amenity and Noise	▪ Impact on the amenity of existing character and quiet neighbourhood from a chance in the nature of the site	2
General	▪ Other miscellaneous items such as vermin management	2
Stormwater	▪ Concern over ongoing stormwater issues that may be exacerbated by the proposal	1
Strategic Alignment	▪ Proposal is inconsistent with the vision within PRCUTs ▪ Competition with surrounding centres and other plans, including Burwood North and isolated nature of the site	4
Community Engagement	▪ Concerns over lack of engagement and notice, along with timing of proposal	1
Currency of Documentation	▪ Commentary regarding the currency of the documentation provided in the Planning proposal and the progression of surrounding strategic plans	1
Heritage	▪ Impacts to heritage areas and particular dwellings nearby	1
Community Benefits	▪ Question of the benefits provided to the community from the proposal	1

4.0 Response to Submissions - Table

This section provides a detailed summary of the Applicant's response to the matters raised in submissions received.

Summary of Matters Raised			
Item	**Issue**	**Summary**	**Response**
1	**Traffic and Parking**	*Concern over the existing traffic and parking issues* *Additional traffic on Cheltenham and Lucas Road* *Concern around under/oversupply of parking*	▪ Traffic and parking assessments (including multiple options for alternate layouts) have been undertaken to identify potential traffic impacts, access arrangements, car parking requirements, and other traffic and pedestrian considerations, including the safety and necessary spatial requirements to take vehicle off streets and allow servicing/waste/deliveries from within the site. This is provided with the Planning Proposal ▪ This report has taken into consideration various requests and concerns raised by Transport for NSW including the necessity to not locate the proposal entries and exits of Parramatta Road (as is the case for all new development) as well as the concerns of residents ▪ A shared entry and exit are proposed to be located off both Lucas Rd and Cheltenham Rd in order split the number of vehicle movements instead of concentrating them on one street only. ▪ Traffic surveys were undertaken over several months, to ensure road volumes were measured to account for peak and off peak times. ▪ The proposed car parking provision on the site has been discussed with Council, with a view to reduce the minimum requirements as current set out in the Burwood DCP, in order to reduce overall traffic movements, and discourage car use. Whilst the concerns of the feedback that this may force cars to seek parking on street are noted, the proliferation of additional car and reliance on private vehicles is not encouraged ▪ Electric Vehicle (EV) charging points and car share along with visitor spaces will also be provided within the basement. ▪ Whilst concerns were raised in the submissions over the unlikely uptake of public transport, the site located within an easy walk from the future Burwood North metro, providing direct services to both the Parramatta and Sydney CBDs. ▪ A range of measures are introduced to support access by walking, cycling and public transport including the preparation of a Green Travel Plan (as required by TfNSW)
2	**Height, Scale Character**	*Height and scale too large* *The Proposed Development is out of keeping with the nature and character of Croydon*	▪ From the outset, the proposal has been designed to mitigate external impacts, respond to the strategic merits of the site and its location to transport infrastructure, location within a renewal corridor and to maximise the public benefit, including the consolidated central 2,700sqm + open space within built form layout. The siting of the podiums is intended to wrap the open space protecting it from Parramatta Road. Two towers are oriented north-south with large separation to increase solar access to the publicly accessible open space and minimise overshadowing to the southern neighbours.

Summary of Matters Raised			
		Multiple tall buildings, a hotel, and commercial spaces will disrupt the visual harmony and character of the street.	▪ This proposed height has been established through a considered approach to the building envelopes on the site to ensure that amenity can be retained to surrounding residential areas, whilst also maximising the amenity. ▪ A similar approach has been adopted by Council for the recently endorsed Burwood North Precinct, whereby the building footprints are reduced and building height are increased, which in turn allows for substantially more publicly accessible space and landscaping, rather than proposing building that are shorter and wider, and aren't able to achieve the same outcome. By reference, this is identified as one of the top priorities of the Burwood North Masterplan ▪ In the circumstances of the subject site, being located on the southern side of Parramatta Road, there is opportunity of maximising solar access into the site and landscaped areas (publicly accessible) but needs to be balanced and considerate of the impacts that arise to the south. ▪ The precinct and Parramatta Road corridor has been identified for renewal and change by the State Government. This has been re-examined as part of the recent considerations in response to the National Housing Crisis and the NSW Government Transit Oriented Development Program. This will see a change in character form what exists today. ▪ Whilst the heights proposed are beyond those envisaged in the historic PRCUTs (prior to the announcement of Sydney Metro West), the proposal is considered to provdie a more considered approach and delivering substantially more community benefit. ▪ A separate assessment on the visual impacts is provided below and appended to the Planning Proposal. ▪ Previous consultation with the community identified strong support for activated and 'lively' retail uses within the central public open space to avoid reduce and prevent crime / anti-social behaviour caused by proposed commercial / retail activity in the area.
3	**Overshadowing/Solar Access**	*Impacts to surrounding residential as a result of the proposed development*	▪ In preparing the proposal, analysing options, in consultation with Council and the Burwood Design Review Panel to date, the proposed built form and height configuration on the site is able to ensure solar access is provided to surrounding residents, whilst also allowing solar access to the site and publicly accessible area. These options and testing are set out in the Design Report accompanying the Planning Proposal ▪ Whist some additional overshadowing will occur, as compared to the existing circumstances of a vacant site, or a development under the current planning controls, minimum requirements for solar access have been maintained and will be provided (as set out in the Apartment Design Guide). ▪ The Design Report demonstrates that the proposed building envelopes, which incorporate a large separation at the centre of the site, ensure that minimum solar access requirements to living room windows are provided as a result of the proposal, while evenly distributing any impacts across southern neighbours and retaining high proportions of 2+ hours of solar access. The planning proposal envelopes also ensures areas of all private open spaces adjoining the site receive 2 hours or greater solar access. ▪ As a foundational principle of the proposal, the envelopes were considered to ensure that there is no overshadowing impact on Prowse Reserve at any time of the day on any day of the year.

Summary of Matters Raised			
			▪ The proposed building envelopes have evolved (taller slender towers and deletion of proposed terraces along the southern boundary) following feedback from Burwood DRP.
4	**Privacy**	*Concerns regarding privacy and overlooking from the height of the proposed development*	▪ The concerns of privacy and overlooking are understood and with the transition of development in areas, it is important that these are managed. ▪ Numerous options have been explored to the building form to resolve the transition between the site and surrounds and ensure visual privacy is maintained. ▪ As set out in the Design Report and Planning Proposal, the visual separation of the proposed building significantly exceeds the guidance provided in the NSW Apartment Design Guide (ADG), to appropriately manage privacy.
5	**Amenity and Noise**	*Impact on the amenity of existing character and quiet neighbourhood from a chance in the nature of the site*	▪ The proposal has sought to distribute the building envelope and massing to the northern end of the site, allowing for transition and stepping down of the building to the rear (south). This has been a conscious decision to ensure the amenity of residents adjoining is considered, whilst recognising the suitability of the overall building envelopes proposed and the benefits provided onsite and reduction in overall impacts offsite (such as overshadowing). ▪ With separation distances beyond those of the ADG, suitable visual privacy separation will be provided. ▪ Any retail and other non-residential uses proposed on the site will also be located a significant distance from the property boundaries to the south. As part of any option of these tenancies, suitable conditions of consent and acoustic management mitigations will be impacted by Council relating to their operations.
6	**Design**	*Concerns over the design of the proposal and its physical appearance and presentation*	▪ A submission raised concerns over the design outcome and aesthetic appearance of future development ▪ The current information is provided as massing and envelopes for future development, which, as set out in the Planning Proposal, will be subject to design excellence provisions and requirements, to be specified by Council in the site-specific provisions of the Burwood Loal Environmental Plan and accompany site specific Development Control Plan.
7	**Construction Related Matters (including Soil Erosion)**	*Concerns on how the construction process will be managed including risks such as erosion, construction vehicles, noise and dust*	▪ The concerns expressed by the residents are understood, and recognised ▪ During any construction, suitable mitigation measures will be imposed in the relevant development approvals to mitigate the construction impacts during the process.
8	**Waste Management**	*Concern over unmanaged waste and dumping on*	▪ All waste management for the site will take place within the site and not on street

Summary of Matters Raised			
		street from residents (including renters)	▪ Commercial waste collection will be undertaken by private contractor and schedule for collection at times that consider the potential disruption to traffic and surrounding residents ▪ Should there be any dumping of material that occurs, this would be managed in the same way as any other surrounding dwelling or residential use, and enforcement action taken accordingly ▪ Within any future development, area for bulky waste storage (such as Council clean up of household items (such as a fridge or sofa) will be provided as part of the waste rooms
9	**Stormwater**	*Concern over ongoing stormwater issues that may be exacerbated by the proposal*	▪ The concern over stormwater and flooding is noted and is important to be considered in the development of land. ▪ The Planning Proposal is accompanied by a Flood Risk and Stormwater report that considered the impacts of the proposed on surrounding land, as well as the ability for the proposed development to comply (regarding flood levels). ▪ The necessary technical details, assessment and infrastructure will be provided on site, detailing in a future development application, to appropriately manage stormwater.
10	**Strategic Alignment**	*Proposal is inconsistent with the vision within PRCUTs* *Competition with surrounding centres and other plans, including Burwood North and isolated nature of the site*	▪ Some submissions identify that the proposal does not align with the PRCUTs and accompanying controls for future development. ▪ The Planning Proposal is responsive to the changing nature of the precinct and is responsive to the infrastructure delivery of Sydney Metro West. The Planning Proposal is required, in order to enable development into the future, that is commensurate to this infrastructure and go beyond the previous setting of the BLEP 2012 or PRCUTS (2016), in recognition of Sydney Metro west along with the State Governments policy regarding density surrounding major transport infrastructure. ▪ The planning proposal is consequential to, and consistent with, the State Government's Parramatta Road Corridor Urban Transformation Strategy (PRCUTS), which is approved by the Secretary of the Department of Planning, Industry and Environment. The proposed development, as a result of detailed built form analysis remains consistent with principles PRCUTS and the changing nature of the corridor to provdie the most urban design and community outcomes. ▪ Whilst other areas such as Burwood North, Kings Bay and Croydon have progressed during the initial assessment of Council, the fundamental principles and priorities that have been identified in these plans, particularly Burwood North, exist in the proposal. That is, ensuring that where density is proposed, amenity is retained to surrounding land and public benefit is provided.
11	**Community Engagement**	*Concerns over lack of engagement and notice, along with timing of proposal*	▪ Submissions identified that whilst items were raised in the proponent consultation, it is concerning that they have not been reflected in the proposed built form outcome. This specifically related to the transition to surrounding residential, building heights and noise impacts (including from hotel patrons).

Summary of Matters Raised			
			▪ As set out above, the proposed building envelope and configuration of massing has been reviewed in detail to explore multiple options, benefits and impacts and has been reviewed by the Burwood Design Review Panel on two occasions. As a result, the initial proposal was revised, in order to maximum additional open space and separate building form the southern boundary. ▪ As set out in the Design Report accompanying the Planning Proposal, the outcomes achieved in the final proposal, including building separation, privacy, solar access and provision of significant public domain and landscaping at the ground plane.
12	**Currency of Documentation**	*Commentary regarding the currency of the documentation provided in the Planning proposal and the progression of surrounding strategic plans*	▪ The submissions suggest that the nature and age of some of the information provided with the planning proposal is no suitable and should be updated. ▪ Should the application proceed to gateway determination, it is recognised that information and analysis may be required to be updated to reconfirm the assumptions prepared for the Planning Proposal. ▪ It is also anticipated that the Local Planning Panel and/or Council may recommend conditions or analysis to be undertaken in response to the initial assessment and consideration.
13	**Heritage**	*Impacts to heritage areas and particular dwellings nearby*	▪ The site has been identified within the Parramatta Road corridor for renewal and transformations The intent of the Planning proposal is to ensure that the outcome delivered is cognisant of the location and context, which in turn, will reduce pressure on the need for change to occur across other areas of the LGA, including conservation areas. ▪ There are not considered to be any direct impacts to the heritage items surrounding the site.
14	**Community Benefits**	*Question of the benefits provided to the community from the proposal*	▪ As set out above, the approach to the site aligns with the fundamental principles and priorities that have been identified in other recent strategic plans and masterplans to managed change in the precinct. That is, ensuring that where density is proposed, amenity is retained to surrounding land and public benefit is provided. ▪ The proposal seeks to provdie for more than 25% of the site (2,700sqm+) as publicly accessible open space to be landscaped and embellished, including pubic art and play equipment. This will be surrounded by retail uses fronting the landscape area. ▪ The proposal also seeks to provdie a contribution towards affordable Housing of 5% ▪ A letter of offer has been provided to Council and will form part of the consideration by the Council following the LPP.
15	**General**	*Other miscellaneous items such as vermin management*	▪ Items relating to the future management and impacts arising from the future development will be appropriately conditioned within any development consent and controlled by other existing legislation.

Plan of Management

Skye Lounge

1. Description:

- The Skye Lounge situated on the 11th floor of the Crowne Plaza Hotel, Burwood (**premises**), accommodating up to 180 guests
- The venue features a mix of lounges, high chairs, and tables for an enjoyable view. Guests can stand in prime spots to appreciate the scenic views.

2. Objectives of the POM

- Maintain the premises' identity as a world-class brand, targeting the mid-age market.
- Offer high-standard food and beverages to compliment the hotel operations and create a lounge-style environment with music.
- Trade successfully and be recognised as a responsible and responsive member of the local community.
- Create an environment that is safe and non-threatening to staff, patrons and other members of the community.
- Alcohol will be served in accordance with the on-premises liquor licence and RSA requirements.
- Discourage rapid or excessive consumption of alcohol (in line with RSA requirements).
- Ensure patrons and guests are served in a responsible manner and receive friendly service from well trained staff.
- Ensure all staff receive training and are aware of their responsibilities within the premise, in food service and preparation and alcohol service.

3. Compliance with Zoning Regulations:

- Adhere to all legal requirements, considering the community at all operational levels, including in line with liquor and gaming licenses.

-All staff are to be trained and hold RSA certifications to monitor the use of alcohol. Additionally, a qualified CPR and first aid certified duty manager is always on the premises.

- Operational hours:

  - Monday-Saturday: 2.00pm to 12.00am; and
  - Sunday: 2.00pm to 10.00pm.

4- Noise and Disturbances

The following measures are implemented to address noise and disturbances at the premises:

a. Sound Monitor Cut-Off Switch:

- A sound monitor cut-off switch is installed to ensure that noise levels remain within acceptable limits. This feature allows for continuous monitoring and regulation of sound output, preventing any potential excessive noise disruptions.

b. Regular Monitoring and Auditing:

- Staff will conduct regular monitoring of sound levels throughout the evening to ensure compliance with noise regulations. Periodic audits by the Council may be performed to identify any non-compliance with requirements. Records of these activities are maintained on a message platform, including photos of both the monitoring devices and signage. Audits may occur for a period of 5 years following grant of the development consent, after which time if there are less than 50 non-compliances recorded since grant of the development consent, the requirement to keep sound monitoring records will cease.

c. Collaboration with Venue Security Personnel:

- Skye Lounge staff will maintain close collaboration with venue security personnel to proactively identify potential risks and promptly address any disturbances. Effective communication and coordination will ensure a swift response to maintain a secure and peaceful environment.

d. Additional Signage:

- Additional signage is displayed to remind patrons and guests to be considerate towards residents when leaving the venue. This proactive measure aims to foster awareness and encourage responsible behaviour, minimizing any potential impact on the surrounding community.

5. Security and Safety Measures:

The measures include:

a. Licensed security personnel will be engaged on Friday and Saturday nights to ensure a secure environment during peak periods.

b. Body cameras will be worn by venue Security Guards and the Venue Manager to enhance security measures and provide an additional layer of surveillance to monitor and address potential incidents effectively.

c. Security guards will be present in front of the hotel, promoting public transport options (as required) including services like Uber and other private companies, to ensure patrons leave quietly.

d. A comprehensive digital and log compliance program will be implemented, to maintain a high level of compliance and to ensure that all operational aspects adhere to established standards and regulations.

e. A Compliance Committee will take part in monthly compliance meetings and conduct regular reviews, to foster continuous improvement through regular reviews of safety and security protocols and procedures.

6. Environmental Sustainability:

- LED lights are fitted for energy efficiency.
- Bottles will be recycled through Citizen Blue Depot and Return and Earn, with revenue donated to charity.
- Cardboard will be collected for recycling through WASTE.
- Eco-friendly chemicals will be used, through echo lab.

7. Traffic and Parking Plan:

- Onsite parking will be provided with a fee, with available parking in the area listed on the website.
- Taxi service or alternative transport will be offered for Skye Lounge guests through the hotel reception.

8. Community Engagement:

- Crowne Plaza Management team members will be available on-site to address community concerns.
- Skye Lounge commits to supporting the community through involvement with local businesses and community events.

9. Marketing and Promotion:

- Digital marketing will be published on platforms like Instagram, Facebook, and the official website.
- Promotional activities will be conducted responsibly within all relevant guidelines.

10. Ongoing Monitoring and Reporting for Plan of Management:

- A system will be established for ongoing monitoring and reporting with the Council, with reports to be provided to Council every six (6) months for a period of two (2) years following the grant of the development consent. Following reporting and from time to time, as appropriate, this Plan of Management may be amended by agreement with the Council. Any proposed amendments to this Plan of Management are to be considered by the Council in a timely fashion.
- Regular communication will occur with the council to address any concerns or feedback promptly.

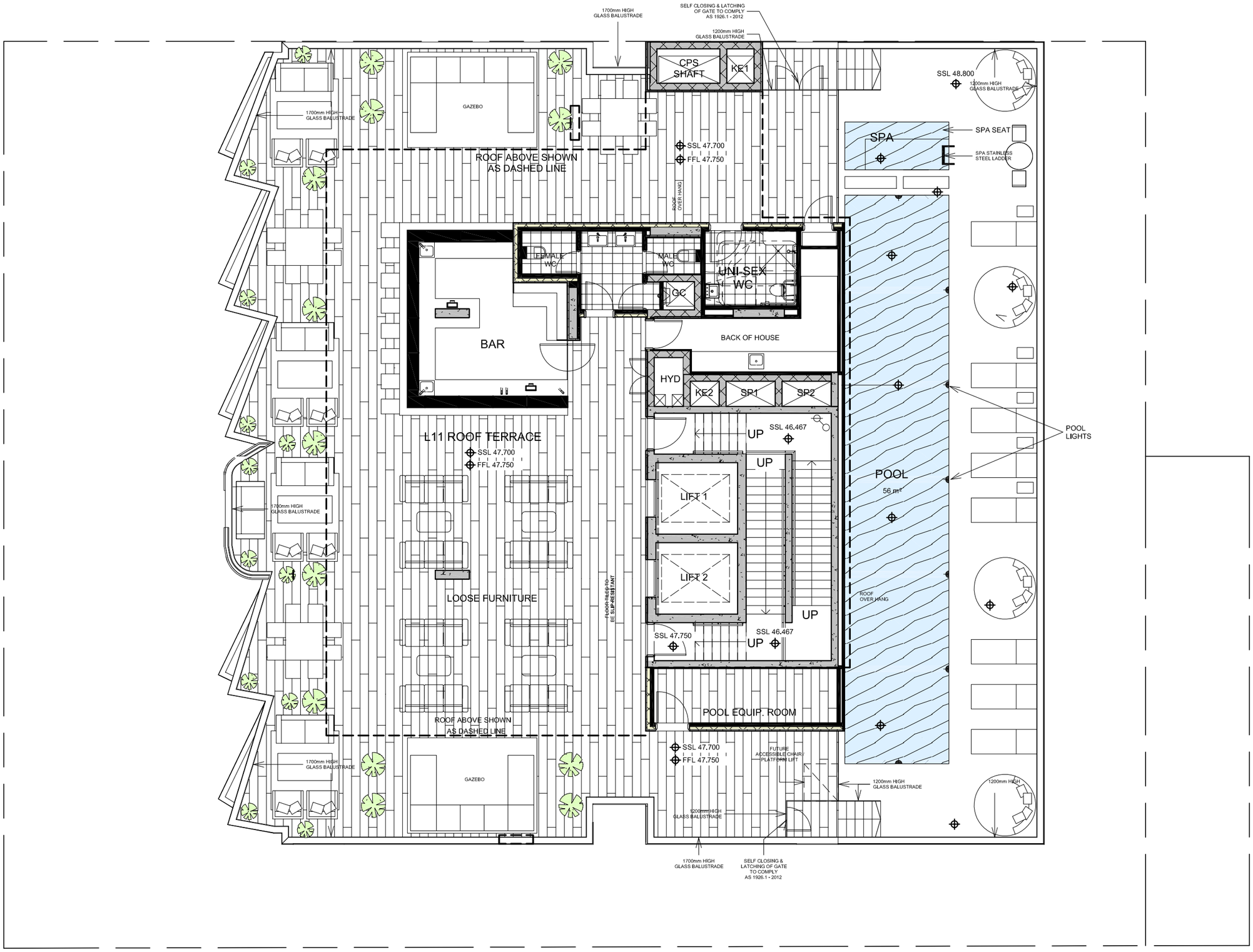
11. Public Liability Insurance:

- The premises is covered by hotel premises public liability insurance for guests and staff onsite.
- The premises is adequately insured against potential liabilities, including cyber breach, workers' claims.

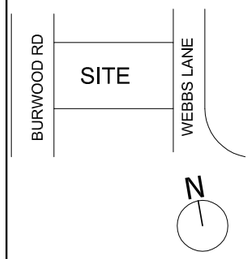
12. Conclusion:

In summary, the comprehensive management plan for the Skye Lounge reflects a commitment to responsible and community-friendly operation. The measures outlined, ranging from compliance with zoning regulations to security enhancements, noise control, and environmental sustainability, collectively contribute to a unique and upscale experience for guests. The engagement with local regulations, emphasis on community values, and proactive initiatives showcase a dedication to harmonious coexistence. Through ongoing monitoring, collaboration with stakeholders, and a commitment to continuous improvement, the management ensures a secure, sustainable, and enjoyable environment for patrons while maintaining a positive relationship with the community. This plan underscores the Skye Lounge’s commitment to excellence, safety, and responsible business practices.

Attachment 2 - Rooftop Plan



KEYPLAN:



NOTES:

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Client:
CVA APARTMENTS PTY LTD

Project:
CVA APARTMENTS

Project address:
56-60 Burwood Rd, Burwood

Design Team:
BUILTCOM CONSTRUCTIONS PTY LTD

Phone: (02) 8212 5592
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Amendments:	Date
ISSUED TO COUNCIL	02/09/24

ISSUED TO COUNCIL

Drawing Number: CCA-210
Drawing: GA PLAN - LEVEL 11

Scale: 1 : 200 @ A3
Rev: 1

ANAVS-ACOUSTIC NOISE & VIBRATION SOLUTIONS P/L
Office 9, 438 Forest Rd, Hurstville , NSW 2220. ABN: 42 663 590 430
Phone: 9793 1393 Fax: 9708 3113 Email: info@acousticsolutions.com.au

Acoustic Report

For Proposed Rooftop Lounge
at

No. 56-60 Burwood Road, Burwood

Prepared By: Domeniki Tsagaris (MIE. Aust), B.E.(UNSW)
Australian Acoustical Society (Sub).
Approved By: Moussa Zaioor (M.I.E. Aust), CPENG
Australian Acoustical Society (Member).

Date: March 12, 2024
Reference No: 2024-033

Australian Acoustical Society
#1032
Membership Type
Member
Member Since
19 May, 2008

DOCUMENT CONTROL

Date	*Revision History*	*Prepared By*	*Reviewed and Authorised by*
14/02/2024	Initial Report	Moussa Zaioor	Moussa Zaioor
27/02/2024	Draft Report	Moussa Zaioor	Moussa Zaioor
12/03/2024	Submitted Report		Moussa Zaioor

TABLE OF CONTENTS

1.0 SCOPE & INTRODUCTION 4
2.0 NOISE SURVEY, INSTRUMENTATION & RESULTS 5
3.0 NOISE BREAKOUT FROM ROOFTOP AREA & NOISE LIMITS CRITERIA . 6
3.1 NOISE GUIDE FOR LOCAL GOVERNMENT 7
3.1.1 SLEEP DISTURBANCE 8
3.2 OLGR CRITERION RELATED TO NOISE FROM HOTELS, CLUBS & RESTAURANTS 8
4.0 PREDICTED NOISE LEVELS FROM ROOFTOP USAGE 9
5.0 RECOMMENDATIONS 11
5.1 BACKGROUND MUSIC IN ROOFTOP AREA 11
5.2 PATRON MANAGEMENT 11
5.3 SIGNS 11
5.4 NOISE MANAGEMENT PLAN 12
5.0 NOISE IMPACT STATEMENT AND CONCLUSION 12
6.0 APPENDIX A 13

1.0 SCOPE & INTRODUCTION

The following report will examine the potential environmental noise impacts from the proposed Hotel Rooftop's at No. 56-60 Burwood Road, Burwood, on the nearest potential noise receivers as per the requirements of the Liquor Administration Board (LAB) and Burwood City Council requirements.

The existing Hotel (Crowne Plaza Burwood) is currently located at No. 56-60 Burwood Road in the suburb of Burwood (Figure 1 – Site Location). The existing building is an eleven (11) storey mixed used building with four (4) levels of basement parking. The site includes two (2) commercial levels and the hotel is located between level 2 and level 10.

The roof top consists of a lounge and seating area facing Burwood Road and a pool and spa area facing the rear of the site (Figure 2 – Existing Rooftop Layout).
The rooftop is situated on the 11th floor of the Crown Hotel and can accommodate a maximum of 180 patrons. The proposed operating hours of the roof top lounge will be:

- Monday-Saturday: 2:00pm – 12:00am.
- Sunday: 2:00pm – 10:00pm.

The site is located in a mixed residential and commercial area with high traffic noise arising from the Burwood Road and retail/commercial premises located adjacent to the northern and southern boundaries of the site (Figure 3 – Surrounding Environment).

The nearest residential and commercial receivers that may be affected by the proposed rooftop are as follows (Figure 4 – Nearest Residential & Commercial Receivers):

- Seven (7) storey mixed use building west of the site at No. 351 Burwood Road - (R1) and,
- Single & Double storey residential dwellings east of the site at No. 47 & 49 Esher Street (R2 & R3).
- Two storey commercial building north of the site at No. 54 Burwood Road (C1), and
- Two storey commercial building south of the site at No. 26-64 Burwood Road (C2).

All provided recommendations are listed in Section 5.0 of this report to ensure that noise levels emanating from the proposed lounge use comply with the noise limits adopted in council requirements.

2.0 NOISE SURVEY, INSTRUMENTATION & RESULTS

Unattended and attended noise readings were carried out **north of the site away from any existing noise that might be associated with any existing use of the lounge**. Noise readings were carried out near the street boundary of No. 36 Burwood Rd. (Figure 5-Noise Reading Locations).

The unattended environmental noise monitoring was conducted for a period of seven (7) days between February 14th and February 20th, 2024. The noise surveys were conducted to determine a conservative reading of the existing $L_{(A90,\ 15\ minutes)}$ and $L_{(Aeq,\ 15\ minutes)}$ during the Day & Evening [7:00 – 22:00] & Night/Early Morning [22:00 – 7:00].

The unattended sound level measurements and analysis performed throughout this study are performed using wireless sound level data logger (Serial No. CPp0Dd04c1c9iLtiSwBRPD- Office tag -machine 1-). The wireless sound logger specification is as follows:

- Type 1 digital MEMS microphone
- Non-volatile 128 Mb recording memory
- Records L-max, L-min and Leq levels
- Log interval adjustable from 125 ms (8 points per second) up to hours
- A, C and Z weighting curves
- Oscilloscope and spectrum analyser features
- Observes and records 100% of the acoustic signal
- Software calculates global Leq according to ISO and OSHA methods
- WIFI connectivity to report measured levels remotely
- Weatherproof casing designed for indoor/outdoor applications
- Activity detection and logging.
- Long-term measurement and recording of acoustic levels for environmental impact studies.

The above logger is factory calibrated and calibration certificate dated 14/08/2023 is presented in (Figure 6 – Calibration Certificate.)

The logger microphone was positioned at 1.5m from ground level. The noise logger was calibrated prior and after reading using our Svantek SV 33A S/N: 90200 class 1 Calibrator with no significant drift recorded. Any readings affected by strong wind or rain have been disregarded [1]. A summary of those noise readings are presented in the Table below:

Note [1]: Noise data is validated using the weatherzone websites addresses:
https://www.weatherzone.com.au/station/SITE/66194/observations/2024-02-14 to
https://www.weatherzone.com.au/station/SITE/66194/observations/2024-02-20

Table 2.1- Unattended Noise Readings from February 14th-February 20th, 2024 (1)

Measurement Location	*Time Period*	*LAeq 15min dB(A)**	*LA90 15min dB(A)*	*(RBL)**,*** dB(A)*
Point A – Near Street Boundary - No. 36 Burwood Rd	***Day (7am-6pm)***	62	53	52
	Evening 6pm-10pm	61	52	47
	Night/Early Morning (10pm-7am)	53	45	40

***Site is mainly affected by traffic noise from Burwood Rd**
****RBL is calculated as per Fact Sheet B of the NPfI (2017)**
*****NPfI does not apply to Patron Noise. Section 1.5 exclusion.**

Attended noise measurements were also carried out on February 21st, 2024 between 11:20 pm and 12:00 am using our factory calibrated SVAN 957 (Serial No. 21437 – Factory calibration date 10-Oct-2023) (Figure 5 – Noise Reading Locations -). Attended noise readings were utilised to ascertain the unattended noise results and to provide the octave band centre frequencies characteristics of the noise levels in the area.

The LA90 (Night/Early morning) octave band centre frequencies configuration is presented in the Table below:

Table 2.2- LA90 - Octave band centre frequencies configuration (Burwood Rd)

Description	**L(A90, 15 minutes)**	**Octave Band Centre Frequencies (Hz)**								
LA90 Night/Early morning 36 Burwood Rd 14th -20st February, 2024 -	**dB(A)**	**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
	45	17	30	34	37	40	40	38	32	27

3.0 NOISE BREAKOUT FROM ROOFTOP AREA & NOISE LIMITS CRITERIA

Noise emitted by the proposed hotel rooftop area must comply with the noise criteria listed in the following guidelines:

- NSW Noise Guide for Local Government
- Sleep Disturbance Criteria
- NSW Office of Liquor, Gaming and Racing (OLGR)

- Noise from Mechanical Plant (not addressed in this report as it is approved as part of the original building approval).

The noise limits governing the above proposal are the noise limits determined using the following documents:

- Noise Guide for Local Government including Sleep disturbance and the
- NSW Office of Liquor, Gaming and Racing (OLGR) Noise conditions.

3.1 NOISE GUIDE FOR LOCAL GOVERNMENT

The Department of Environment and Conservation (NSW) published the amended *Noise Guide for Local Government* in October 2010. The policy is specifically aimed at assessing noise from light industry, shops, entertainment, public buildings, air conditioners, pool pumps and other noise sources in residential areas.

Section 2.2.1 of the Noise Guide for Local Government states that a noise source is generally considered to be intrusive if the noise from the source when measured over a 15-minute period exceeds the ***background noise by more than 5 dB(A).*** Therefore, the noise criteria for the proposed roof top lounge is as follows:

- **45 + 5 = 50 dB (A)**

The appropriate regulatory authority (Local Council) may, by notice in writing given to such a person, prohibit the person from causing, permitting or allowing:

1. any specified activity to be carried on at the premises, or
2. any specified article to be used or operated at the premises.

or both, in such a manner as to cause the emission from the premises to exceed a specified level when measured at any specified point (whether within or outside the premises), at all times or at specified times and/or days.

It is an offence to contravene a noise control notice. Prior to being issued with a noise control notice, no offence has been committed.

The Protection of the Environment Operations Act 1997 defines “Offensive Noise” as noise:

1. (a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:

(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or

(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or

2. (b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances prescribed by the regulation.

3.1.1 SLEEP DISTURBANCE

In order to minimize the potential of sleep disturbance due to transient noises from the Rooftop Area during night hours (10:00pm – 7:00am), Section 2.2.4 of the Noise Guide For Local Government recommends that $L_{A1,1\text{-minute}}$ level of any noise outside a bedroom should not exceed the background noise level by more than 15dB. Therefore, the Sleep Disturbance criteria is as follows:

- **$L_{A1,\ 1\ minute}$ =< 45 + 15= 60 dB(A) outside window of any residential receiver**

3.2 OLGR CRITERION RELATED TO NOISE FROM HOTELS, CLUBS & RESTAURANTS

NSW Office of Liquor, Gaming and Racing (OLGR) requires the amplified noise emitted from licensed premises such as pubs, restaurants, nightclubs etc. be as follows:

"The LA10* noise level emitted from the licensed premises shall not exceed the background noise level in an Octave Band Centre Frequency (31.5Hz – 8kHz inclusive) by more than 5dB between 7:00am and 12:00 midnight at the boundary of any affected residence".- (Applicable to this Application)-

The LA10 noise level emitted from the licensed premises shall not exceed the background noise level in an Octave Band Centre Frequency (31.5Hz – 8kHz inclusive) between 12:00 midnight and 7:00am at the boundary of any affected residence.*

Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12:00 midnight and 7:00am. ***".- (Not applicable to this application as roof top ceases operation qt 12:00 a.m Mon-Sat and 10 pm on Sunday)***

Interior noise levels which still exceed safe hearing levels are in no way supported or condoned by the NSW Office of Liquor, Gaming and Racing.
**For the purposes of this condition, the LA10 can be taken as the average maximum deflection of the noise emission from the licensed premises."*

Therefore, the LA_{10} (Total noise from Rooftop, including music between 2:00pm-12:00am) at each Octave Band Frequency will not exceed the background noise level by more than 5 dB in any Octave Band Frequency at receiver R1 (Burwood Road) and receivers R2 and R3 (Esher Street).

4.0 PREDICTED NOISE LEVELS FROM ROOFTOP USAGE

The existing Hotel (Crown Plaza Hotel) is currently located on No. 56-60 Burwood Road in the suburb of Burwood (Figure 7– Existing Hotel). The existing building is an eleven (11) storey mixed used building with four (4) levels of basement parking. The site includes two (2) commercial levels and the hotel is located between level 2 and level 10.

The rooftop area consists of a lounge and seating area facing Burwood Road (Figure 8 - Rooftop Seating Area & Lounge) and a pool and spa area facing the rear of the site (Figure 9 – Rooftop Pool & Spa Area).

A glass barrier is currently located around the perimeter of the rooftop area (Figure 10 – Glass Barrier). The barrier facing Burwood Road is over 1.8m in height (720mm concrete balustrade + 1.2m glass).

The seating area currently has a pergola that covers a portion of the outdoor area (Figure 11 – Pergola over Seating Area).

Between Monday and Friday, an average of 30 patrons accesses the rooftop area. However, a maximum of 180 patrons are expected in the rooftop area at any one time. Background music may also be played through speakers in the rooftop seating area adjacent to the lounge . The following table lists the sound level of different levels of speech while people are seated in the rooftop area:

Table 4.1 - Noise produced in conversation

Descriptor	***Mean Sound Level***	***Standard Deviation***
Casual Speech	52 dB(A)	± 5dB
Normal Speech	58 dB(A)	± 5dB
Raised Speech	65 dB(A)	± 7dB
Loud Speech	74 dB(A)	± 9dB
Shouting	82 dB(A)	± 9dB

The noise level L_{Aeq} from the crowd on the rooftop outdoor seating area is determined using the noise levels of different male/female voice spectrums as presented in Cyrail M. Harris (1991- Handbook of Acoustical Measurements and Noise).

The predicted noise levels at the most sensitive residential receivers from people congregating in the rooftop seating area is calculated using **SoundPLAN 8.2.** SoundPLAN 8.2 and its geo-database module were utilised to calculate the noise levels and noise contours along all nearest residential receivers.

SoundPLAN 8.2 allows for predicted noise levels and contours to be generated whilst accounting for ground elevation, distance and barrier attenuations, reflections, and reverberation (Figure 12 – SoundPLAN Noise Contours)

The predicted noise level results from the proposed roof top activities including music and their compliance with the Noise Guide For Local Government including Sleep disturbance are shown in Table 4.1 below.

Table 4.1- Predicted $LA_{eq15min}$ Noise Level from Rooftop at Receivers R1, R2,R3 and Compliance with NSW Noise Guide for Local Government + Sleep Disturbance

Receiver	Predicted $L_{Aeq15min}$ Noise Level from Rooftop between 2pm and 12am.	Compliance with Noise Guide $LA_{eq15min} < L_{90} + 5$	Predicted $LA_{1,1\ min}$ Noise Level from Rooftop at External Window of Receiver	Compliance with Sleep Disturbance $LA_{1,1min} < L_{90} + 15$
R1 – 351 Burwood Rd	40 dB(A)	**Yes ✓** **LAeq < L_{90} + 5** 40 < 45 + 5 dB(A)	41 dB(A)*	**Yes ✓** **$LA_{1,1\ min} < L_{90} + 15$** 34 < 45 + 15 dB(A)
R2 & R3 – 47&49 Esher St	33 dB(A)	**Yes ✓** **LAeq < L_{90} + 5** 33 < 45 + 5 dB(A)	48 dB(A)*	**Yes ✓** **$LA_{1,1\ min} < L_{90} + 15$** 24 < 40 + 15 dB(A)

*** All patrons talking in loud voice at the same time with music on.**

The predicted noise from the proposed roof top activities including music, at each octave band centre frequency level and its compliance with the OLGR Noise conditions are shown in Tables 4.2 & 4.3 below.

Table 4.2- Predicted LA_{10} Noise Level from Rooftop at Boundary of Receiver R1 (No. 351 Burwood Rd) & Compliance with OLGR

Description		Octave Band Centre Frequencies (Hz)								
	dB(A)	31.5	63	125	250	500	1k	2k	4k	8k
$L_{(A90,\ 15\ minutes)}$ +5	**50**	22	35	39	42	45	45	43	37	32
Predicted LA_{10} Noise Levels from Rooftop at Boundary of R1	**43***	15	28	32	35	38	38	36	30	25
Complies OLGR Criteria **$LA_{10} < L_{90} + 5$**	**Yes ✓**	**Yes ✓**	**Yes ✓**	**Yes ✓**	**Yes ✓**	**Yes ✓**	**Yes ✓**	**Yes ✓**	**Yes ✓**	**Yes ✓**

	43 < 45 + 5 dB(A)									

*$LA_{10} \sim LA_{eq} + 3$

Table 4.3- Predicted LA_{10} Noise Level from Rooftop at Boundary of Receivers R2 & R3 (47 & 49 Esher St)

Description		Octave Band Centre Frequencies (Hz)								
	dB(A)	31.5	63	125	250	500	1k	2k	4k	8k
$L_{(A90, 15 minutes)}$ +5	50	22	35	39	42	45	45	43	37	32
Predicted LA_{10} Noise Levels from Rooftop at Boundary R2 & R3	36	8	21	35	31	31	30	29	23	18
Complies OLGR Criteria $LA_{10} < L_{90} + 5$	Yes ✓ 36 < 40 + 5 dB(A)	Yes ✓	Yes ✓	Yes ✓	Yes ✓	Yes ✓	Yes ✓	Yes ✓	Yes ✓	Yes ✓

*$LA_{10} \sim LA_{eq} + 3$

5.0 RECOMMENDATIONS

In order for the noise levels arising from the use of the roof at above address to comply with the Noise Guide for Local Government including Sleep disturbance and the NSW Office of Liquor, Gaming and Racing (OLGR) noise criteria, we recommend the following:

5.1 BACKGROUND MUSIC IN ROOFTOP AREA

- A Sound Limiter should be used to control the music sound levels from all speakers. The combined noise levels from all lounge speakers are not to exceed 82 dB(A)- Total Sound Power-.

5.2 PATRON MANAGEMENT

- Hotel personnel are to ensure that people leaving the club do not congregate at the front of the building, and that they disperse in an orderly manner.

5.3 SIGNS

Signs are to be placed around the rooftop area, asking patrons to be mindful of the residential receivers during the night period .

5.4 NOISE MANAGEMENT PLAN

A Noise Management Plan should be implemented and should include the following:

- Install a contact number at the front of the hotel so that complaints regarding the station operation can be made.
- Implement a complaint handling procedure. If a noise complaint is received the complaint should be recorded on a Complaint Form, containing the following:
    - Name and address of the complainant
    - Time and date the complaint was received
    - The nature of the complaint and the time/date the noise was heard
    - The name of the employee that received the complaint
    - Actions taken to investigate the complaint and the summary of the results of the investigation
    - Indication of what was occurring at the time the noise was happening (if applicable)
    - Required remedial action (if applicable)
    - Validation of the remedial action
    - Summary of feedback to the complaint

Also, a permanent register of complaints should be held on the premises, which shall be reviewed monthly by staff to ensure all complaints are being responded to. All complaints received shall be reported to management with initial action/investigation commencing within 7 days. The complaint should also be notified of the results and actions arising from the investigation.

5.0 NOISE IMPACT STATEMENT AND CONCLUSION

ANAVS, Acoustic Noise and Vibration Solutions Pty Ltd have taken noise level measurements at the most noise sensitive locations for the operation of the proposed hotel rooftop at No. 56-60 Burwood Road, Burwood. The levels of noise emission from the proposed hotel rooftop operation have been calculated and quantified using reliable test data.

Provided the noise controls as recommended in Section 5 of this report are fully implemented, we are confident that the noise emission levels from the proposed rooftop will be controlled and will not exceed the criteria outlined in the OLGR Criteria and Burwood City Council requirements.

We hope this report meets your requirements. Should you require further explanations, please do not hesitate to contact us.

Yours sincerely,

M. Zaioor

Australian Acoustical Society (Member).
M.S. Eng'g Sci. (UNSW).
M.I.E.(Aust), CPEng.

6.0 APPENDIX A

Figure 1 - Site Location....14
Figure 2 – Rooftop Layout....15
Figure 3 - Surrounding Environment....16
Figure 4 – Nearest Residential & Commercial Receivers....17
Figure 5 – Noise Reading Locations....18
Figure 6 - Calibration Certificate....19
Figure 7 - Existing Hotel at No. 56-60 Burwood Rd....20
Figure 8 – Rooftop Seating Area & Lounge....21
Figure 9 – Rooftop Pool & Spa Area....22
Figure 10 – Glass Barrier....23
Figure 11 - Pergola....24
Figure 12 – SoundPLAN Noise Contours....25

Figure 1 - Site Location

Australian Acoustical Society
#1032
Membership Type
Member
Member Since
19 May, 2008

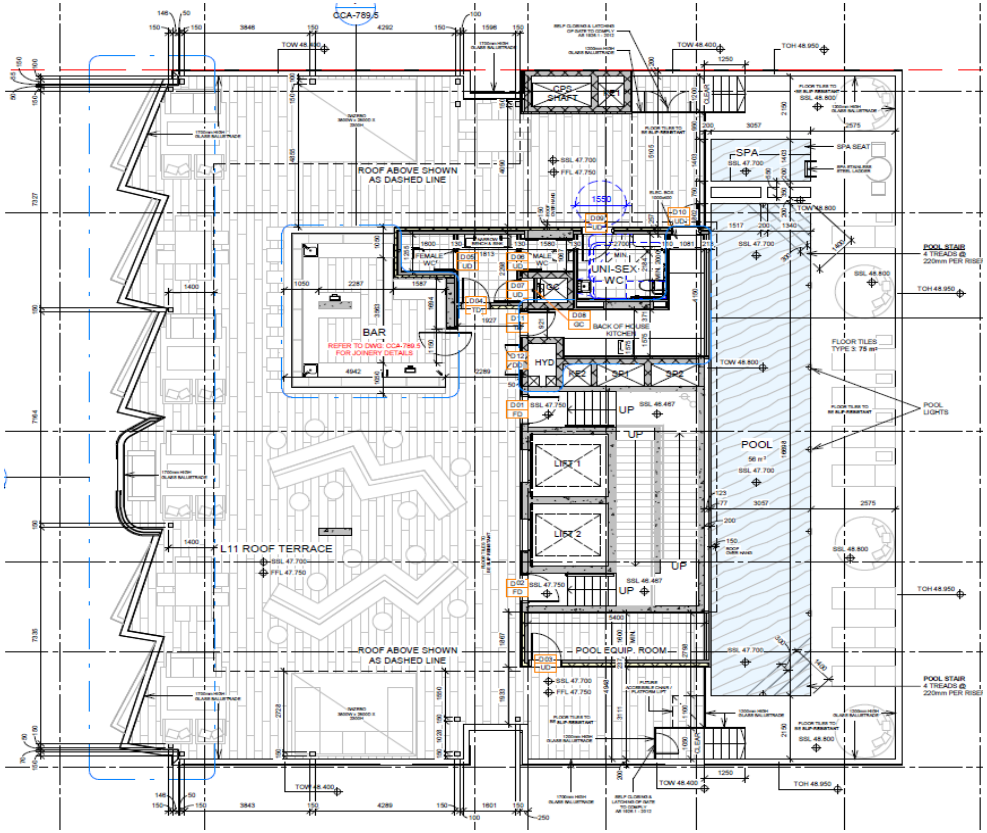

Figure 2 – Rooftop Layout

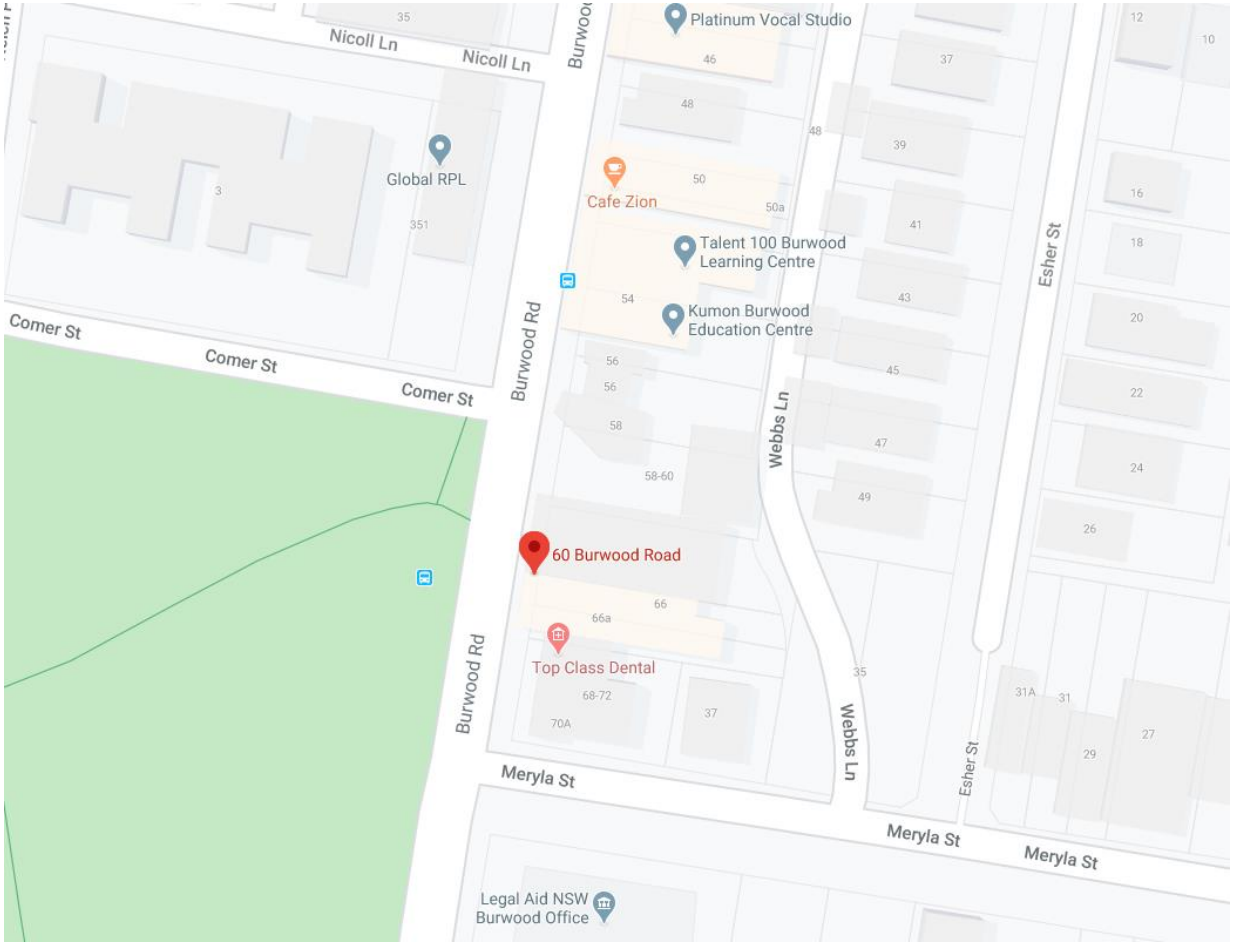

Figure 3 - Surrounding Environment

Figure 4 – Nearest Residential & Commercial Receivers

Figure 5 – Noise Reading Locations

instrument choice.com.au

22A Cavan Road | Dry Creek | South Australia 5094
Phone: 1300 737 871 | Fax: 1300 882 503
customer-service@instrumentchoice.com.au
www.instrumentchoice.com.au
Instrument Choice is a trading name of Synotronics Pty Ltd
(ABN: 82836821718)

Category-2S - Traceable Certificate

Calibration Certificate Details		Calibration Schedule	
Calibration Date	14/08/2023	Calibration Interval	1 year
Certificate Number	2S-14082023018	Next Due Date	07/2024

Company Details

Company Name	ANAVS - Acoustic Noise & Vibration Solutions P/L Office 9, 438 Forest Rd Hurstville NSW 2220 Australia

Equipment Details

Instrument Type	Sound Meter	Serial Number	CPp0Dd04c1c9iLtiSwBRPD 96043
Manufacturer	Convergence	Model	NSRTW_mk3
Physical Condition	Good		

Accuracy Calibration-2S performed (final after adjustments)

(Adjustments noted in "Any problems identified" below)

Ambient Temperature & RH whilst performing test		20.3°C and 52% RH			
Reference Meter Reading	Acceptable Difference	Supplied Meter Reading Before Calibration	Supplied Meter Reading After Calibration	Difference	Pass/Fail
94.0dB	±1dB	93.9dB	94.0dB	0.0dB	Pass
114.0dB	±1dB	113.8dB	113.9dB	0.1dB	Pass

Traceability Details

Make	S/N	Cal Report No:	Tested at NATA Lab
Casella CEL-120/1	5230660	C35894A	9262

Any Problems Identified

The meter is performing as expected

Category-2S Pass: (Yes) / No **Battery Replacement:** (Yes) / No

Name	Bang Hoang
Signed	
Date	14/08/2023

The support of a scientist with every product. Call **1300 737 871** for expert advice.

Figure 6 - Calibration Certificate

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Member
Member Since
19 May, 2008

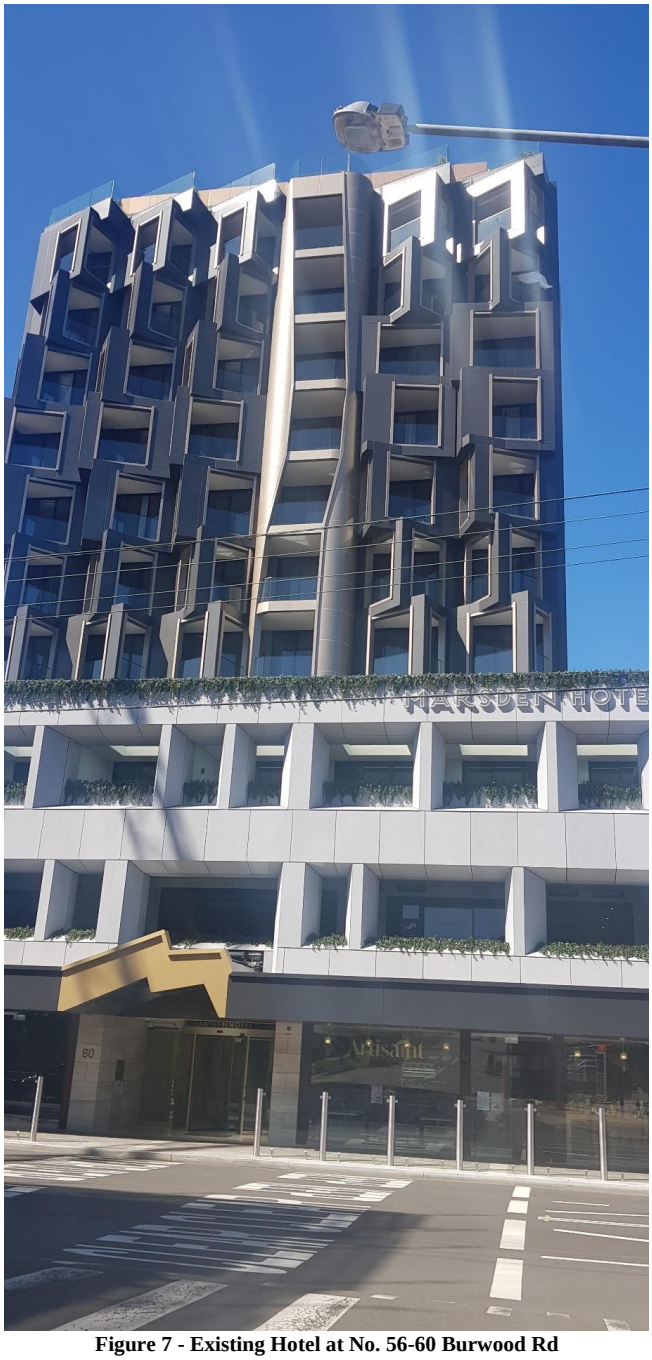

Figure 7 - Existing Hotel at No. 56-60 Burwood Rd

Figure 8 – Rooftop Seating Area & Lounge

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Figure 9 – Rooftop Pool & Spa Area

Figure 10 – Glass Barrier

Figure 11 - Pergola

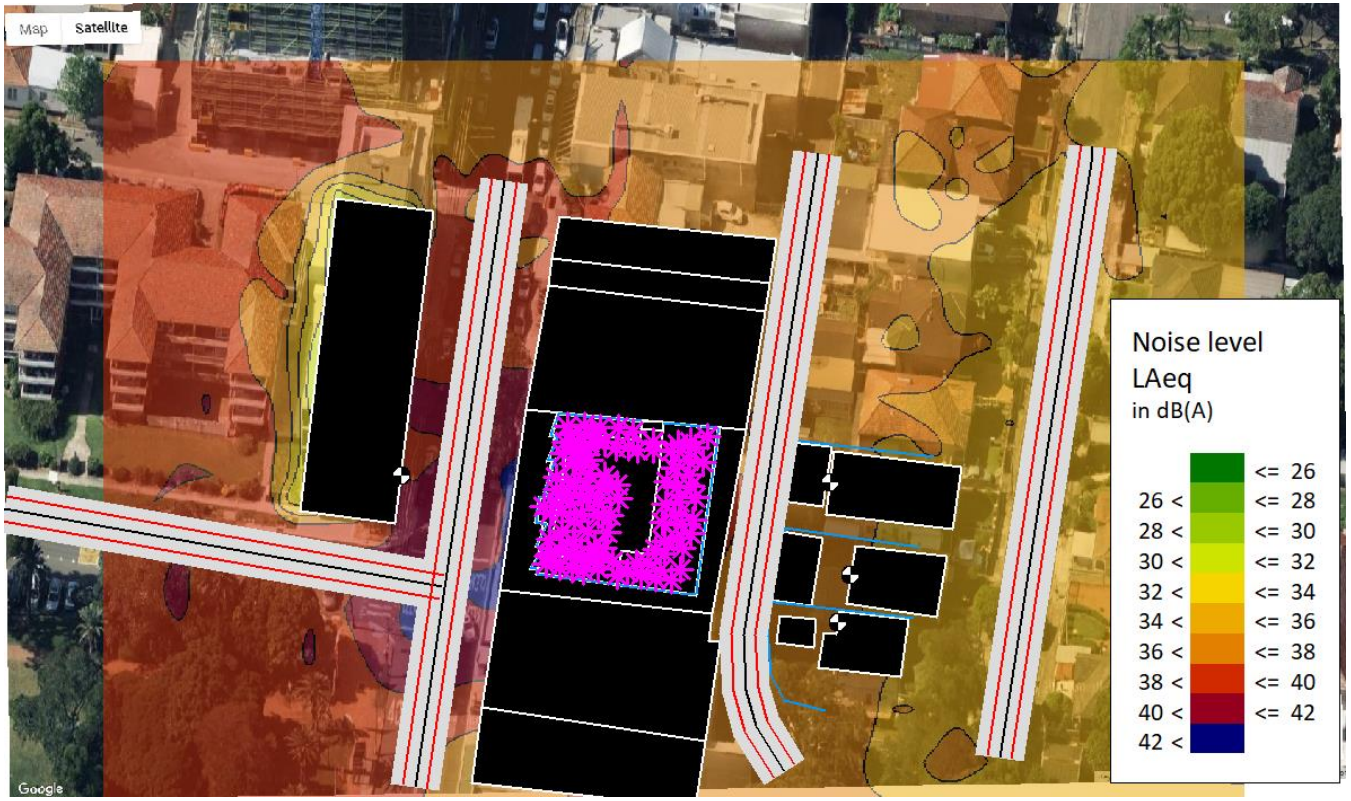

Figure 12 – SoundPLAN Noise Contours

Conditions of Approval

The following conditions of consent included in this Part identify the requirements, terms and limitations imposed on this development.

1. **Approved Plans/Documents.** Except where otherwise provided in this consent, the development is to be carried out strictly in accordance with the following plans (stamped approved by Council) and support documents:

Document Description	Date	Plan No/Reference
Rooftop Plan	2.09.2024	Builtcom Constructions Pty Ltd, Drawing No. CCA-210
Acoustic Report	12.03.2024	ANAVS – Acoustic Noise and Vibration Solutions P/L.
Category 1 Fire Safety Letter	27.08.2024	Allcert P/L, Project Reference No. BCA-240286.
Plan of Management	27.08.2024	Prepared by Crowne Plaza Hotel.
Statement of Environmental Effects	14.03.2024	Planning Ingenuity, Reference No. M230539.

2. The hours of operation of the licensed premises (known as Sky Lounge) are confined to **2:00pm** to **12:00am** Monday to Saturday, and **2:00pm** to **10:00pm** on Sundays.

3. **Inconsistency between documents.** In the event of any inconsistency between conditions of this consent and the drawings/documents referred to above, the conditions of this consent prevail.

   In order for the noise levels arising from the use of the rooftop to comply with the Noise Guide for local Government including Seel disturbance and the NSW Officer of Liquor and Gaming and Racing (OLGR) noise criteria, the following conditions recommended by the Acoustic Report, prepared by ANVAS Acoustic Noise and Vibration Solutions are imposed:

4. **Background Music in Rooftop Area** – A sound limiter must be used to control the music sound levels from all speakers. The combined noise levels from all lounge speakers are not to exceed 82 dB(A) – Total Sound Power.

5. **Patron Management** – Hotel personnel are to ensure that people leaving the club do not congregate at the front of the building, and that they disperse in an orderly manner.

6. **Signs** – Signs are to be placed around the rooftop area, asking patrons to be mindful of the residential receivers during the night period.

7. **Noise Management Plan** – A noise management plan must be implemented

   - Install a contact number at the front of the hotel so that complaints can be made.

- Implement a complaint handling procedure. If a noise complaint is received the complaint should be recorded on a Complaint Form, containing the following: - -
  - -Name and address of the complainant
  - -Time and date the complaint was received
  - -The nature of the complaint and the time/date the noise was heard
  - -The name of the employee that received the complaint
  - -Actions taken to investigate the complaint.
  - -Indication of what was occurring at the time the noise was happening
  - -Required remedial action (if applicable)
  - -Validation of the remedial action - Summary of feedback to the complaint

8. Register – A register of complaints should be held on the premises, which shall be reviewed monthly by staff to ensure all complaints are being responded to. All complaints received shall be reported to management with initial action/investigation commencing within 7 days. The complaint should also be notified, of the results and actions arising from the investigation.

NSW POLICE CONDITIONS

9. **POM** - The premises is to be operated at all times in accordance with the Plan of Management and may be varied from time to time after consultation with the Local Area Commander of NSW Police. A copy of the Plan of Management is to be kept on the premises, and made available for inspection on the request of a police officer, council officer, Liquor and Gaming NSW inspector, or any other person authorised by the Independent Liquor and Gaming Authority.

10. **SECURITY** – The licensee must ensure that from 8:00pm, every Friday, Saturday and every day preceding a public holiday, at least two (2) uniformed licensed security guards are employed at the premises. Uniformed licensed security officers must have direct contact with the duty manager via portable Page 9 of 29 radio or mobile phone. One (1) uniformed licensed security officer is to patrol the vicinity until (30) thirty minutes after closing.

11. **CRIME SCENE PRESERVATION** - Immediately after the person in charge of the licensed premises or a staff member becomes aware of any incident involving an act of violence causing injury to a person on the premises, the person in charge of the licensed premises and/or staff member must:

    (a) take all practical steps to preserve and keep intact the area where the act of violence occurred,
    (b) retain all material and implements associated with the act of violence in accordance with the crime scene preservation guidelines issued by the NSW Police, as published from time to time on the Liquor & Gaming NSW website,

(c) make direct and personal contact with the NSW Police Local Area Commander or his/her delegate, and advise the Commander or delegate of the incident, and
(d) comply with any directions given by the Commander or delegate to preserve or keep intact the area where the violence occurred. In this condition, "staff member" means any person employed by, or acting on behalf of, the licensee of the premises, and includes any person who is employed to carry on security activities (e.g. crowd controller or bouncer) on or about the premises.

12. **CCTV** - The licensee must maintain a closed-circuit television (CCTV) system on the premises in accordance with the following requirements:

1) the system must record continuously from opening time until one hour after the premises is required to close (or, in the case of a premises that is not required to cease trading, continuously at all times),

(a) recordings must be in digital format and at a minimum of six (6) frames per second,
(b) any recorded image must specify the time and date of the recorded image,
(c) the system's cameras must cover the following areas:
    i) all entry and exit points on the premises,
    ii) the footpath immediately adjacent to the premises, and
    iii) all publicly accessible areas (other than toilets) within the premises.

2) The licensee must also:

(a) keep all recordings made by the CCTV system for at least 30 days,
(b) ensure that the CCTV system is accessible at all times the system is required to operate pursuant to clause 1(a), by at least one person able to access and fully operate the system, including downloading and producing recordings of CCTV footage, and
(c) provide any recordings made by the system to a police officer or Liquor & Gaming NSW inspector within 24 hours of any request by the police officer or Liquor and Gaming NSW inspector to provide such recordings.

13. No person is to be permitted to take glass receptacles or open containers of liquid off the premises.

14. Signs shall be displayed in the hotel requiring patrons to depart in a manner that respects nearby residents.

15. The licensee or its representative must join and be an active participant in the local liquor accord.

16. The licensee must keep a complaints register for any complaints made directly to the Hotel’s management or staff regarding the operation of the Hotel or the behaviour of its patrons. The Complaints Register must record the following information:

i) complaint time and date
ii) name, contact details and address of the person/s making the complaint
iii) details of the nature of the complaint
iv) name of the staff member recording the complaint
v) Details of the action taken by the Hotel to resolve the complaint
vi) Details of follow up - time, date, and method of communication
vii) Any outcome achieved The licensee (or in the licensee's absence, the duty manager) must contact the complainant within 72 hours of the receipt of the complaint and notify the complainant of the result of the inquiries made and any outcomes as a result of the complaint being made. The Hotel's website must disclose the relevant contact telephone number that can be called at any time to register a complaint regarding the Hotel's operation, and which is to be answered either in person or by the ability to leave a message.

17. An Incident Register will be maintained at the premises. The incident register shall be used at all times the premises is trading and be readily available for inspection at any time the premises are trading by NSW Police and Inspectors of Liquor and Gaming NSW. The Incident Register shall record the occurrence, at any time of the day, of:

(a) any incident involving violence or anti-social behaviour occurring on the licensed premises;
(b) any incident of which the licensee is aware that involves violence or anti-social behaviour occurring in the immediate vicinity of the licensed premises and that involves a person who has recently left, or been refused admission to, the premises;
(c) any incident that results in a person being turned out of the licensed premises under section 77;
(d) any other incident of a kind prescribed by the Liquor Regulation 2018 with regard to requirements for the maintenance of an Incident Register;
(e) any third-party disturbance complaint received by the premises in relation to the premises; and
(f) any malfunction of breath analysis equipment, CCTV or noise limitation equipment, and the action taken in relation to all such matters.

NOISE

18. **Noise** – Structure Borne Impact on Separate Residential Premise

    (a) Structure borne noise emanating from the premises is not to exceed the following criterion when measured within any separate residential accommodation:

        (i) LA1, Slow 15 minute ≤ LA90, 15 minute dB(A).

19. **Noise –** Structure Borne Impact on Separate Commercial Premise

    (a) Structure borne noise emanating from the premises is not to exceed the following criterion when measured within any separate commercial premise.

        (i) LA1, Slow 15 minute ≤ LA90, 15 minute dB(A).

20. **Vibration –** Operation of the use is not to result in the transmission of any perceptible vibration to an occupiable area within a separate premises.

21. **Noise – Entertainment**

    (a) The $L_{Aeq,\ 15\ minute}$ noise level from the use must not exceed the background noise level ($L_{A90,\ 15minute}$) in any octave band (reference frequency 31.5 Hz to 8 kHz inclusive) by more than 5dB between 7.00am and 12.00 midnight when assessed at the nearest residential boundary.

    (b) The $L_{Aeq,\ 15\ minute}$ noise level from the use must not exceed the background noise level (LA90, 15 minute) in any octave band (reference frequency 31.5 Hz to 8 kHz inclusive) between 12.00 midnight and 7.00am when assessed at the nearest residential boundary.

    (c) Notwithstanding (a) above, the $L_{Aeq,\ 15\ minute}$ noise level from the use must not exceed the greater of the following levels between 7am and 12 midnight inside any habitable room of the nearest residential dwelling or commercial premises:

        (i) The existing internal $L_{A90,\ 15\ minute}$ (from external sources excluding the use) in any octave band (reference frequency 31.5 Hz to 8 kHz inclusive). Or

        (ii) If the $L_{Z90,\ 15\ minute}$ background level is below the hearing threshold curve (Tf - Table 1 of ISO 226 : 2003) in an above octave band, the lowest audible sound level (Lp) of the Tf curve in that octave band shall become that octave's LZeq 15 minute noise criteria level.

    (d) Notwithstanding (b) above, the $L_{A1\ 15\ minute}$ noise level from the use must not exceed the greater of the following sound pressure levels inside any

habitable room between 12 midnight and 7am inside any habitable room of the nearest residential dwelling or commercial premises:

(i) The existing internal $L_{A90, 15\ minute}$ (from external sources excluding the use) minus 10 dB in any octave band (reference frequency 31.5 Hz to 8 kHz inclusive) inside a habitable room of an affected residential dwelling or commercial premises. Or,

(ii) If the $L_{Z90, 15\ minute}$ minus 10 dB level is below the hearing threshold curve (Tf - Table 1 of ISO 226 : 2003) in an above octave band, the lowest audible sound level (Lp) of the Tf curve in that octave band shall become that octave's $L_{Z1\ 15\ minute}$ noise criteria level.

Note: L_{eq}, $L_{01,}$ and $L_{90,}$ metrics and 'A' (weightings) are as per the definitions in the standard AS1055-20148. 'Z' means unweighted noise. An internal L_{A90} level must be determined in the absence of noise emitted by the use and be sufficiently representative of the receiver in a low noise level quiet state. External L_{A90} levels for planning must be established as per the long-term methodology in Fact Sheet B of the NPfI unless otherwise agreed by the City's Area Planning Manager.

22. **Noise – Installation, Setup, Testing and Calibration of Limiter/s, prior to an occupation certificate.**

Note: L_{eq}, $L_{01,}$ and $L_{90,}$ metrics and 'A' (weightings) are as per the definitions in the standard AS1055-20148. 'Z' means unweighted noise. An internal L_{A90} level must be determined in the absence of noise emitted by the use and be sufficiently representative of the receiver in a low noise level quiet state. External L_{A90} levels for planning must be established as per the long-term methodology in Fact Sheet B of the NPfI unless otherwise agreed by the City's Area Planning Manager.

(a) All sound amplification equipment in the premises must be controlled by a Root Mean Square (RMS) noise limiter with an attack time constant not exceeding 0.5 seconds, release time constant not less than 1 second and a compression ratio equal of at least 20:1. The limiter shall be set by a suitably qualified acoustic consultant* as per the manufacturer's specification. The consultant must ensure that resultant amplified sound complies with the Council's criteria for entertainment noise.

(b) All Limiters and all post-limiter equipment including power amplifiers must be tamper proof and only operable by the acoustic consultant, a licensee and business owner who must keep a completed report on the premises.

(c) This report must certify that limiter/s were installed, tested and calibrated so amplified noise will comply with the NOISE – ENTERTAINMENT Condition. The report will be prepared in accordance with and provide detail on the following requirements:

(i) An initial calibration of the operation of the limiter with the sound amplification equipment is to be undertaken. This assessment must include setting of the amplification system in addition to a documented overview of the system so that compliance is achieved with the noise criteria as referenced in parts (a) to (c) above.

(ii) Limiter settings and subsequent equipment must be benchmarked at the time of the above operational assessment. Pink noise and a swept sine wave signal must be fed into the amplification system and the level of the noise increased until the limiter operates continuously to comply with criteria. The L_{Aeq}, L_{A1}, L_{Ceq} and L_{C1} (1/1 octave bands - 31.5 Hz to 8 kHz centre frequencies) levels must be measured at suitable relevant reference location/s in the premises, with the premises empty other than essential staff. Correlating L_{Aeq}/L_{A1} and L_{Ceq}/L_{C1} measurements must be taken at identified nearby noise sensitive receivers during this process.

(iii) Music must then be played through the sound system(s) with the limiter(s) in continuous operation to verify the limiters work correctly and meet noise criteria at the locations detailed above.

(iiii) The report will address the limiter installed within the premises (including but not limited to its brand, type specifications and location) including the noise control levels the limiter was set to (including a copy of the software configuration file for any digital signal processing device used). Furthermore, all post limiter equipment will be photographed, documented and catalogued in the report including location on a layout drawing.

Note: Suitably Qualified Acoustic Consultant means a consultant who possesses the qualifications to join the Australian Acoustical Society, Institution of Engineers Australia (grade of member) or the Association of Australasian Acoustical Consultants (grade of member firm).

23. **Noise – Amplified sound and the upkeep and operation of limiter/s**

Following receipt of the report as per part (b) of the NOISE - INSTALLATION, SETUP, TESTING & CALIBRATION OF LIMITER/S, PRIOR TO AN OCCUPATION CERTIFICATE condition (and receipt of the a relevant occupation certificate, the report is to be kept on the premises at all times, signed and dated by the licensee and business owner. From this point forward the licensee and business owner must ensure the following:

(a) The limiter/s and sound amplification system must be maintained and not tampered with. That unauthorised modifications are not made which are contrary to the report. Repairs and replacements may be made to the system as necessary with any like component but must not be capable of increasing the permitted noise amplification levels outlined in the report.

(b) That additional amplification equipment must not be brought onsite which if used could cause cumulative entertainment noise (including amplified sound) from the development to exceed controls in this consent. This does not apply to:

(i) Equipment that is only used when routed through and controlled by the limiter/s, i.e. the limiters and amplified sound system on the premises are capable of receiving and controlling that equipment, and

(ii) Such that use of the equipment must not cause amplified sound which exceeds the cumulative entertainment noise controls in this consent.

TRAFFIC ENGINEER CONDITIONS

24. On-site parking for patrons of the bar area must be made available upon request, provided there is availability of parking not allocated to hotel guests.

End of consent

Modified Conditions of Approval

1. ~~*The development being carried out in accordance with the plans and documentation listed below, except where amended by the conditions of consent.*~~

   a. ~~*Architectural Plans prepared by Ghazi Al Ali Architect Pty Ltd dated 1 July 2019, unless otherwise specified:*~~

      - ~~*A 0000 TITLE PAGE*~~
      - ~~*A 1020 UNIT SCHEDULE Issue B*~~
      - ~~*A 1000 SITE ANALYSIS Issue A dated 23 April 2018*~~
      - ~~*A 1010 SITE PLAN Issue B*~~
      - ~~*A 1150 STREETSCAPE ANALYSIS Issue B*~~
      - ~~*A 1101 DEMOLITION PLAN Issue A dated 23 April 2018*~~
      - ~~*A 1201 BASEMENT 02 Issue G dated 29 August 2019*~~
      - ~~*A 1202 BASEMENT 01 Issue G dated 29 August 2019*~~
      - ~~*A 1203 GROUND FLOOR PLAN Issue M dated 1 November 2019*~~
      - ~~*A 1204 LEVEL 01 Issue F*~~
      - ~~*A 1205 LEVEL 02 Issue F*~~
      - ~~*A 1206 LEVEL 03 Issue F*~~
      - ~~*A 1207 LEVEL 04 Issue F*~~
      - ~~*A 1208 LEVEL 05 Issue F*~~
      - ~~*A 1209 ROOF PLAN Issue F*~~
      - ~~*A 1301 ELEVATIONS 01 Issue F*~~
      - ~~*A 1302 ELEVATIONS 02 Issue F*~~
      - ~~*A 1303 ELEVATIONS 03 Issue F*~~
      - ~~*A 1304 ELEVATIONS 04 Issue F*~~
      - ~~*A 1401 SECTION AA Issue F*~~
      - ~~*A 1402 SECTION BB Issue F*~~
      - ~~*A 2000 GFA CALCULATION Issue F*~~
      - ~~*A 2010 SOLAR ACCESS DIAGRAM 2D Issue F*~~
      - ~~*A 2011 SOLAR ACCESS DIAGRAM 3D Issue F*~~
      - ~~*A 2020 CROSS-VENTILATION DIAGRAM 2D Issue F*~~
      - ~~*A 2030 LANDSCAPE CALCULATION Issue D dated 30 September 2019*~~
      - ~~*A 2040 STORAGE DIAGRAM Issue B*~~
      - ~~*A 2101 SHADOW DIAGRAM 9AM JUNE Issue D*~~
      - ~~*A 2102 SHADOW DIAGRAM 12PM JUNE Issue D*~~
      - ~~*A 2103 SHADOW DIAGRAM 3PM JUNE Issue D*~~
      - ~~*A 2201 MATERIAL SCHEDULE Issue G*~~
      - ~~*A 2202 MATERIAL SCHEDULE Issue G*~~

   b. ~~*Landscape Plans prepared by Conzept Landscape Architects:*~~
      - ~~*LPS34-18-225 GROUND FLOOR Issue H dated 30 October 2019*~~
      - ~~*LPDA 18-225 LEVEL 5 Issue D dated 22 March 2019*~~
      - ~~*LPDA_18-225_SPECIFICATION_AND_DETAIL_Issue_D_dated_22 October 2019*~~

   c. ~~*SURVEY Prepared by CitiSurv Pty Ltd Issue A dated 13/10/2017*~~
   d. ~~*BASIX Certificate 914803M_02 dated 18 July 2018 prepared by Sustainable Thermal Solutions*~~
   e. ~~*Nathers Summary Certificate 0004032720 dated 18 July 2019 prepared by Sustainable Thermal Solutions.*~~
   f. ~~*Letter of Response prepared by PDC Consultants dated 18 July 2019*~~

~~***g. Waste Management Plan prepared by Elephants Foot Revision J dated 30 August 2019***~~
~~***h. Signage and Linemarking Concept Plan by PDC Consultants numbered 005 Rev- dated 10 September 2019***~~
~~***i. Aeropac Acoustic Air Ventilator brochure and appended Level 01 and Level 02 plans (Exhibit K)***~~
~~***j. Fire Engineering Report by BCA Innovations dated 1 November 2019***~~
~~***k. Section 4.55 Application Architectural Plans prepared by Ghazi Al Ali:***~~
~~***a. DA A 1201 'A' Basement 02 Plan dated 8 April 2020;***~~
~~***b. DA A 1202 'A' Basement 01 Plan dated 8 April 2020;***~~
~~***c. DA A 1203 'A' Ground Floor Plan dated 8 April 2020;***~~
~~***l. Statement of Environmental Effects for Modification to Development Consent No. 048/2018 prepared by NEXUS Environmental Planning dated 8 April 2020.***~~

(Condition 1 above has been DELETED by this Section 4.56 modification application, dated 25 February 2025).

1. ***The development being carried out in accordance with the plans and documentation listed below, except where amended by the conditions of approval:***

   a. ***Architectural Plans prepared by Ghazi Al Ali Architect Pty Ltd dated 12 December 2024, unless otherwise specified:***

      - ***B 0000 TITLE PAGE***
      - ***A 1010 SITE PLAN Issue B***
      - ***A 1101 DEMOLITION PLAN Issue A dated 23 April 2018***
      - ***A 1201 Basement 02 Plan dated 8 April 2020;***
      - ***A 1202 Basement 01 Plan Issue B***
      - ***A 1203 Ground Floor Plan Issue B;***
      - ***A 1204 LEVEL 01 Issue B***
      - ***A 1205 LEVEL 02 Issue B***
      - ***A 1206 LEVEL 03 Issue B***
      - ***A 1207 LEVEL 04 Issue B***
      - ***A 1208 LEVEL 05 Issue B***
      - ***A 1209 ROOF PLAN Issue B***
      - ***A 1210 ADAPTABLE ROOM Issue A***
      - ***A 1301 ELEVATIONS 01 Issue B***
      - ***A 1302 ELEVATIONS 02 Issue B***
      - ***A 1303 ELEVATIONS 03 Issue B***
      - ***A 1401 SECTION AA Issue B***
      - ***A 1402 SECTION BB Issue B***
      - ***A 2030 LANDSCAPE CALCULATION Issue B***
      - ***A 2201 MATERIAL SCHEDULE 01 Issue A***
      - ***A 2202 MATERIAL SCHEDULE 02 Issue A***

   b. ***Landscape Plans prepared by Conzept Landscape Architects:***

      - ***LPS34-18 225 GROUND FLOOR Issue H dated 30 October 2019***
      - ***LPDA 18-225 SPECIFICATION AND DETAIL Issue D dated 22 October 2019***

   c. ***SURVEY Prepared by CitiSurv Pty Ltd Issue A dated 13/10/2017***
   d. ***Revised BASIX Certificate 914803M dated 17 February 2025 prepared by Sustainable Thermal Solutions***
   e. ***Waste Management Plan prepared by Elephants Foot Revision J dated 30 August 2019***

f. Signage and Linemarking Concept Plan by PDC Consultants numbered 005 Rev- dated 10 September 2019
g. Aeropac Acoustic Air Ventilator brochure and appended Level 01 and Level 02 plans (Exhibit K)
h. Fire Engineering Report by BCA Innovations dated 1 November 2019

(Condition 1 above has been ADDED by this Section 4.56 modification application, dated 25 February 2025).

FEES

2. The fees and/or bonds shown in the Table of Fees, are to be paid to Council or another approved collection agency (the Long Service Levy Corporation and its agents and an approved insurer under the *Home Building Act 1989*) and suitable evidence of payment is to be provided to the Principal Certifier **prior to the issuing of a Construction Certificate**.

TABLE OF FEES

FEES/BONDS TO BE PAID TO COUNCIL OR TO THE NOMINATED BODY PRIOR TO ISSUING A CONSTRUCTION CERTIFICATE

3. Building and Construction Industry Long Service Corporation Levy **$22,672.00 (Payment to be made to Council, the Corporation or its Agent)**

4. Damage Deposit - security deposit against damage occurring to Council's assets (footpath, road, stormwater drainage system, kerb and gutter, etc) during building work **$20,400.00 (Payment to be made to Council as a bond prior to issue of a Construction Certificate and/or commencement of demolition/bulk excavation)**

   NOTE: This deposit is refundable if no damage occurs.

~~***5. If Council is nominated as the Principal Certifier (PC) an inspection fee is to be paid. This fee is for inspections at the rate listed in Council's current Schedule of Fees and Charges. Any additional inspections, including re-inspections, shall be levied and paid to Council upon booking of an appointment at the rate listed in Council's current Schedule of Fees and Charges. (Payment to be made to Council).***~~

   (Condition 5 above has been DELETED by this Section 4.56 modification application, dated 25 February 2025)

6. Pursuant to Section 7.12 of the Environmental Planning and Assessment Act 1979 and the Section 7.12 Contributions Plan for the Burwood Local Government Area (Excluding Burwood Town Centre), the following monetary contribution towards public services and amenities is required:

Contribution Element			***Contribution***
A levy of 1% of the cost of carrying out the development, where the cost calculated and agreed by Council is ~~$6,477,799.00~~ $6,917,799.00.			***~~$64,778.00~~ $69,177.99***
Index Period	***June 2019***	***CPI1***	***115.9***

Office Use: T56

The above contribution will be adjusted at the time of payment. Applicants are advised to contact Council for the adjusted amount immediately prior to arranging payment.

The contribution will be adjusted in accordance with the following formula:

$$\text{Contribution (at time of payment)} = \frac{C \times CPI2}{CPI1}$$

Where:

C:	***the original contributions amount as shown in the development consent;***
CPI2	***the Consumer Price Index: All Groups Index for Sydney, for the immediate past quarter (available from the Australian Bureau of Statistics at the time of payment)***
CPI1	***the Consumer Price Index: All Groups Index for Sydney, applied at the time of granting the development consent as shown on the development consent.***

Note: The minimum payment will not be less than the contribution amount stated on the consent.

The contribution is to be paid to Council, or evidence that payment has been made is to be submitted to the Principal Certifier, prior to the issuing of a Construction Certificate.

Council may accept works in kind or other material public benefits in lieu of the contribution required by this condition subject to and in accordance with the requirements specified in the Section 7.12 Contributions Plan for the Burwood Local Government Area (Excluding Burwood Town Centre).

Note: The payment of a Section 7.12 contribution over an amount of $5,000.00 may only be paid by Bank Cheque (i.e. personal or company cheques will not be accepted). Contributions of $5,000.00 or less may be paid by cash, EFTPOS, cheque or credit card. Payments by credit card may be subject to a surcharge.

(Condition 6 above has been AMENDED by this Section 4.56 modification application, dated 25 February 2025)

PLANNING

7. The ground floor landscape plan shall be amended as follows **prior to the issuing of a Construction Certificate:**

   a. Exit doors from the ground floor of the building are to be in the same location as per architectural ground floor plan Drawing No. A 1203 Ground Floor Plan Issue B dated 12/12/2024.

7A. A landscape plan (inclusive of specifications and details) shall be prepared for the Level 03 rooftop communal open space. The plan must be prepared by a qualified landscape architect and incorporate a diverse range of plant species suitable for a rooftop garden and include perimeter plantings to enhance privacy, particularly between the communal open space and properties to the north. The landscape plan must be approved in writing by Council's Manager of City Development, prior to the issue of a Construction Certificate.

(Condition 7A above has been ADDED by this Section 4.56 modification application, dated 25 February 2025)

7B. ***Use of the rooftop communal open space on Level 3 is not permitted between the hours 10pm and 7am. Access is to be restricted to residents of the building and their guests only. A security system linked to each apartment is to be used to restrict access. Details on these matters are to be submitted and approved by the certifier prior to the issue of a Construction Certificate.***

Reason: To maintain residential amenity at night for occupants of the development and of nearby properties.

(Condition 7B above has been ADDED by this Section 4.56 modification application, dated 25 February 2025)

7C. ***Any changes to external colours, finishes and materials must be reviewed and approved in writing by Council's Manager of City Development.***

Reason: To ensure the design integrity of the building including finishes.

(Condition 7C above has been ADDED by this Section 4.56 modification application, dated 25 February 2025)

7D. ***Ceiling fans be installed within all living rooms and bedrooms of residential apartments where practicable.***

Reason: To increase the sustainability of the building and to achieve design excellence.

(Condition 7D above has been ADDED by this Section 4.56 modification application, dated 25 February 2025)

8.

(a) Prior to the issue of the Occupation Certificate, an easement (right of way) across No's 325-329 Liverpool Road, Strathfield shall be created to address the proposed vehicular access arrangements and the proposed relocation of the three (3) car parking spaces from the basement level at 319-321 Liverpool Road, to the basement of the adjoining development at 325-329 Liverpool Road.

Evidence of registration of the establishment of this access easement and the allocation of the three (3) car parking spaces shall be provided to Council accordingly <u>prior to the release of any Occupation Certificate.</u>

(b) The six storey development shall contain 17 residential apartments (4 x 1 bedroom units, 10 x 2 bedroom units, and 3 x 3 bedroom units), two commercial suites (at ground level) above two levels of basement car parking.

9.

(a) A total of 25 off street car parking spaces shall be provided as follows:

- ***Residential Apartment Spaces = ~~19~~ 21***
- ***Residential Visitor Spaces = ~~3~~ 2***
- ***Commercial Spaces = ~~3~~ 2***

(b) Of the 25 car parking spaces required to be provided on site, three (3) of these spaces are to be located in the adjacent basement car park of 325-329 Liverpool Road with access to be provided via the shared driveway in Willee Street. These spaces are to be allocated to residential parking.

(Condition 9 above has been AMENDED by this Section 4.56 modification application, dated 25 February 2025)

10. All visitor parking spaces shall be clearly signposted and line marked as available for public use.

11. Two (2) dwellings shall be provided as Adaptable Housing Class A or B standard to cater for ageing in place and mobility impaired residents, in accordance with Australian Standard (AS) 4299: adaptable Housing.

12. All external lighting shall be designed and installed in a manner which prevents glare and/or spillage adversely impacting on occupants of the building, residents of properties in the locality and/ or passing motorists.

13. Safety and security night lighting shall be provided for the development with such details being incorporated in the landscape plans to be submitted to Council for approval **prior to the issuing of a Construction Certificate.**

14. All terrace and balcony balustrades shall be of solid construction ~~or of opaque glazing~~ or non-transparent panels as per the approved architectural plans, and to have a minimum height of 1.2m measured from the balcony/terrace floor level. This height is to be satisfied notwithstanding 1m height identified in the Building Code of Australia (BCA). Details of the method of achieving this must be noted on the plans or in the specifications prior to the issuing of a Construction Certificate.

Reason: To ensure that glazing is not used for balcony balustrades.

(Condition 14 above has been AMENDED by this Section 4.56 modification application, dated 25 February 2025)

15. The applicant shall consult with Energy Australia to determine the need for an electrical supply isolation junction box within the front landscaped area and if such installation is required, it being setback at least 1m from the front or side boundary to enable adequate landscape planting to be provided to screen such installation. The location of such installation is to be shown on the landscaping plan for approval by Council and Energy Australia, **prior to the issuing of a Construction Certificate.**

16. All side boundary fences and any internal fences behind the building line shall have a maximum height of 1.8m above Finished Ground level or Floor level whichever the case may be.

17. Lockable mail boxes shall be provided at the secure access doorways to the residential lobby, such that mail can be delivered by Australia Post from outside the security door, and accessed by residents inside the secure area. The mail boxes are to comply with the requirements of Australia Post. Details to be submitted to the Principal Certifying Authority and approved **prior to the issue of a Construction Certificate**.

18. CCTV cameras shall be installed at the building so that they can survey the pedestrian entrance walkway from Liverpool Road, the entrance to the driveway to the parking levels, waste rooms, and letter box area. The CCTV system shall provide a quality image that can assist with the detection of crime and be used by the NSW Police in any investigation (preferably a quality digital system). CCTV system footage shall be retained for a period of no less than fourteen days and be available upon request by the NSW Police when required. Details are to be submitted and approved **prior to the issue of a Construction Certificate**.

19. Mechanical Clothes Dryers shall be provided in each of the residential apartments.

20. The *Commonwealth Disability Discrimination Act 1992* may apply to this particular proposal. Submissions and/or approval of the application does not imply or confer compliance with this Act. Applicants should satisfy themselves and make their inquiries to the Human Rights and Equal Opportunity Commission.

21. External gas water heaters are to be located in recessed enclosures within external walls and are to be located so as to be not visible from a public road or place or adjoining property. Similarly, air conditioning units and plant are to be located so as not to be visible from a public road or place or adjoining property.

22. The doors of the residential entry foyer to the building are to be security grade features and are to be appropriately security keyed to ensure the personal safety and security of residents of the development. An intercom system linked to each apartment is to be included in these security arrangements. Details on these matters are to be submitted and approved **prior to the issue of a Construction Certificate**.

23. All hydrant booster pump and fire service equipment shall to be provided in accordance with the Building Code of Australia and **housed within an enclosed cupboard of a design and finish that enhances the streetscape**. Details of these areas and the enclosures are to be assessed by an Accredited Fire Safety Engineer and shall comply with the performance requirements of the Building Code of Australia; shown on plans and submitted to the Principal Certifying Authority for approval **prior to release of a Construction Certificate**.

24. Adequate lighting is required to be provided for the length of the building for all common areas to ensure the safety and security of residents. Details are to be submitted and approved **prior to the issue of a Construction Certificate**.

25. Apartment numbers shall be clearly identified within the development **prior to issue of the Occupation Certificate**.

26. The building name and street number (at least 150mm in height) of the development shall be clearly displayed at the entry outside the development, with

suitable illumination for after- hours recognition, **prior to issue of the Occupation Certificate**.

27. No drying of clothing being permitted on balcony and patio areas which are visible from a public place.

28. All services including electricity mains, telephone, water and sewerage are to be installed underground.

ADVISORY NOTE:

Telecommunications infrastructure in new developments

Developers, home, property and business owners are responsible for providing telecommunications infrastructure in their developments. To provide this infrastructure, developers, home, property and business owners need to contract a carrier to install telecommunications infrastructure in their new development. Individuals are free to choose which carrier they want to service their development.

For larger developments (100 lots or more) nbn is the infrastructure provider of last resort. This means nbn is obliged to service the development on commercially agreed terms if you apply to nbn.
Telstra is the infrastructure provider of last resort in smaller developments (less than 100 lots) until nbn publicly identifies an area as “ready for service” in its fixed line rollout region.

Developers, home, property and business owners are requested to apply at least six (6) months before the required date of service to ensure a connection is ready when residents move in.

SUBDIVISION

29. A separate Development Application shall be submitted to Council for any proposed subdivision of the development. Any such application shall designate car spaces to the respective allotments with visitor spaces being designated as common property. Car spaces shall not be designated as individual allotments within the proposed plan of subdivision.

BUILDING

30. All building work must be carried out in accordance with the provisions of the Building Code of Australia.

31. Fire Resistance Levels of all structural members, including external and internal walls, spandrels, external and internal columns, lift shafts and stair shafts, ventilation, pipe and like shafts, floors and roofs shall comply with the requirements of Specification C1.1 of the Building Code of Australia. Details of the method of achieving this must be noted on the plans or in the specifications **prior to the issuing of a Construction Certificate**.

32. A Fire Safety Certificate (copies available from Council) A Fire Safety Certificate (copies available from Council) is to be given to the Principal Certifier prior to applying for an Occupation Certificate and thereafter once in every 12 month period an Annual Fire Safety Statement is to be given to

Council. The certificate and statement attest to both the inspection of all essential fire safety measures by a suitably qualified person and to the regular maintenance of the fire safety measures. A copy of the Fire Safety Certificate and the Fire Safety Schedule are to be given to the Commissioner of Fire and Rescue NSW by the building owner and copies of these documents are to be prominently displayed in the building. Similarly copies of Annual Fire Safety Statements are also to be given to the Commissioner and displayed in the building.

33. All materials used in the building must comply with early fire hazard criteria of Specification C1.10 of the Building Code of Australia.

34. Prior to the commencement of building work, the following is to be carried out:-

    a. Submit to Council a “Notice of Intention to Commence Building Work and Appointment of a Principal Certifier” form. Council's “Notice of Intention to Commence Building Work and Appointment of a Principal Certifier” form is to be used where application is made to Council.

    b. Ensure detailed plans and specifications of the building are endorsed with a Construction Certificate by Council or an Accredited Certifier. Council's “Construction Certificate Application” form is to be used where application is made to Council. Copies are available on request.

    (Vide Section 6.6 *Environmental Planning & Assessment Act 1979*)

35. Should an electricity supply power pole be located within the front of the property, the pole is to be painted with a colour that blends with the surrounding area to the satisfaction of Council.

36. **Utility Services**

    Before Construction – apply early as building of water and sewer services can be time consuming or may impact on other parts of your development.

    Section 73 Compliance Certificate

    A compliance certificate must be obtained from Sydney Water, under Section 73 of the *Sydney Water Act 1994*. Our assessment will determine the availability of water and sewer services, which may require extension, adjustment or connection to our mains. A Section 73 Compliance Certificate must be completed **before an occupation certificate will be issued**. Sydney Water will assess the development and if required will issue a Notice of Requirements letter detailing all requirements that must be met. Applications can be made either directly to Sydney Water or through a Sydney Water accredited Water Servicing Coordinator (WSC).

    Go to http://www.sydneywater.com.au/section73 or call 1300 082 746 to learn more about applying through an authorised WSC or Sydney Water.

37. Elements of the building which project into the airspace of Liverpool Road shall be the subject of an easement which shall be registered on the title prior to or concurrently with the registration of the Strata Plan. All other parts of the building shall be erected wholly within the boundaries of the property.

38. All sanitary plumbing being concealed in suitably enclosed ducts. Such ducts are to be constructed internally (i.e. not on the outside face of an external wall) and are to be adequately sound-proofed.

39. All plumbing and drainage work being carried out by licensed tradesmen and in accordance with the requirements of the Plumbing Code of Australia.

40. The floor of the wet areas being of a material impervious to moisture and graded and drained to the sewers of Sydney Water.

41. The noise emitted by any air-conditioning equipment being inaudible in your neighbours' homes between 10:00pm and 7:00am weekdays and 10:00pm and 8:00am on weekends and public holidays. Council is to be consulted prior to the installation of any air-conditioning equipment.

42. Safety glazing being used in every glazed door or panel that is capable of being mistaken for a doorway or unimpeded path of travel. The glazing must comply with Australian Standard AS 1288-2006 - Glass in Buildings - Selection and Installation. Details of the method of complying with this requirement must be noted on the plans or in the specifications **prior to the issuing of a Construction Certificate**.

43. Framed panels or doors enclosing or partially enclosing a shower or bath shall be glazed with "A" or "B" grade safety glazing material in accordance with Australian Standard AS 1288-2006, Table 4.5 SAA Glass Installation Code (Human Impact Considerations). Details of the method of complying with this requirement must be noted on the plans or in the specifications **prior to the issuing of a Construction Certificate**

44. Treatment for the protection of the building from subterranean termites must be carried out in accordance with Australian Standard AS 3660.1-2014 "Termite management - New building work."

    If the method of protection is to be by way of a chemical barrier, it becomes the responsibility of the owner to maintain a suitable maintenance procedure in accordance with the manufacturer's requirements. Such responsibility is placed solely upon the owner.

    Details showing compliance with this requirement must be noted on the plans or in the specifications **prior to the issuing of a Construction Certificate**.

    After treatment the following is to be carried out:

    a. A durable notice must be permanently fixed to the building in a prominent location, such as the meter box, indicating:

        (i) The method of protection.
        (ii) The date of installation of the system.
        ( ) Where a chemical barrier is used, its life expectancy as listed on the National Registration Authority label.
        (i) The installer's or manufacturer's recommendation for the scope and frequency of future inspection for termite activity.

    b. Provide the Principal Certifier with a Certificate which verifies that termite protection has been provided in accordance with Australian Standard AS 3660.1-2014. In the case of Reinforced Concrete Slab construction the

Certificate is to verify that the protection incorporates both beneath slab (Part A) and slab penetrations (Part B) treatment.

45. Means of egress complying with Part D of the Building Code of Australia. Details of the method of achieving this must be noted on the plans or in the specifications **prior to the issuing of a Construction Certificate**

46. The performance solution to achieve compliance with Part D of the Building Code of Australia shall be generally in accordance with the proposal described in the Fire Engineering Report by BCA Innovations dated 1 November 2019. In addition:

    a. all doors within paths of travel which are required to be fire doors shall be fitted with viewing panels

    b. any glazed doors within paths of travel shall be minimum 10mm tick toughened glass with smoke seals.

    c. the doors from residential Unit G.01, commercial Unit COMM.01 and the bin rooms into the path of travel shall be self-closing FRL -/60/30 fire rated doors.

47. Continuous balustrades shall be provided along the side/s of any stairway or ramp, any corridor, hallway, balcony, access bridge or the like, any path of access to a building if:-

    a. It is not bounded by a wall; and

    b. The change in level is more than one (1) metre, or five (5) risers in the case of a stairway, from the floor or ground surface beneath;

    except where specific exemptions are provided in the Building Code of Australia.

    Balustrades shall prevent as far as practicable:

    a. Children climbing over or through it; and

    b. Persons accidentally falling from the floor; and

    c. Objects which might strike a person at a lower level falling from th floor surface.

48. Balustrade heights and designs shall comply with Part D2.16 of the Building Code of Australia and Australian Standard/New Zealand Standard AS/NZS 1170 Part 1 – Structural design actions.

    Details of the method of satisfying these requirements must be noted on the plans or in the specifications **prior to the issuing of a Construction Certificate**.

49. Dividing *Fences Act 1991* - Your attention is directed to any obligations or responsibilities under the *Dividing Fences Act 1991* in respect of adjoining property owner/s which may arise from this application.

50. No part of the front fencing including footings must encroach upon Council's footpath. Entrance gates must open within/into the property.

51. All excavations and backfilling associated with the erection or demolition of a building shall be carried out in a safe and careful manner and in accordance with appropriate professional standards. All necessary planking and strutting shall be of sufficient strength to retain the sides of excavations. A Certificate verifying the suitability of structural details for any proposed shoring is to be submitted to the Principal Certifier before excavating.

52. All excavations associated with the erection or demolition of the building are to be properly guarded and protected to prevent them from being dangerous to life or property.

53. Where soil conditions require it:

    a. retaining walls must be provided so as to prevent soil movement; and

    b. adequate provision must be made for drainage.

54. If an excavation associated with the erection or demolition of a building extends below the level of the base of the footings of a building on an adjoining allotment of land, the person causing the excavation to be made:

    a. must preserve and protect the building from possible damage, and

    b. if necessary, must underpin and support the building in an approved manner, and

    c. must, at least 7 days before excavation below the level of the base of the footings of a building on an adjoining allotment of land, give notice of intention to do so to the owner of the adjoining allotment of land and furnish particulars of the excavation to the owner of the building being erected or demolished.

    Allotment of land includes a public road and any other public place.

55. If the work involved in the erection or demolition of a building:

    a. is likely to cause pedestrian or vehicular traffic in a public place to be obstructed or rendered inconvenient, or

    b. building involves the enclosure of a public place.

    A hoarding or fence must be erected between the work site and the public place.

    If necessary, an awning is to be erected, sufficient to prevent any substance from, or in connection with, the work falling into the public place.

    The work site must be kept lit between sunset and sunrise if it is likely to be hazardous to persons in the public place.

    Any such hoarding, fence or awning is to be removed when the work has been completed.

56. Your attention is directed to the following:

WARNING

Utility Services

Before Construction – apply early as building of water and sewer services can be time consuming or may impact on other parts of your development.

Building Plan Approval

The plans approved by Council or the Principal Certifier as part of the Construction Certificate for the development must also be approved by Sydney Water **prior to excavation or construction works commencing**. This allows Sydney Water to determine if sewer, water or stormwater mains or easements will be affected by any part of your development. Please go to http://www.sydneywater.com.au/tapin to apply.

57. No opening is to be made in any road or footpath, nor is any hoarding to be erected without the prior consent of Council. The builder is to obtain the relevant permit for which fees will be charged in accordance with Council's current Schedule of Fees and Charges.

58. No materials are to be stored on Council's roads, footpaths, nature strips or parks.

59. The builder shall erect and maintain in good order all necessary hoardings, barricades and warning signs required to provide adequate public safety. Night warning lamps are to be provided where necessary. A Principal Certifier sign should also be displayed in a prominent position at the front of the development site.

60. Hours of work shall be from 7:00am to 6:00pm Mondays to Fridays inclusive, and from 7:00am to 4:00pm on Saturdays. Demolition, excavation and/or construction works that involve heavy machinery, noisy trades or the like are **not permitted** to be carried out from 1:00pm to 4:00pm on Saturdays. No work shall be carried out on Sundays or Public Holidays. The owner/builder shall be responsible for the compliance of this condition by all sub-contractors, including demolishers.

61. The approved structure shall not be used or occupied unless an Occupation Certificate as referred to in Section 6.4 (c) of the *Environmental Planning & Assessment Act 1979* has been issued.

    (Vide Section 6.9 *Environmental Planning & Assessment Act 1979*)

62. An application for a Construction Certificate is to be made to ~~Council or~~ an Accredited Certifier. ~~Council's "Construction Certificate Application" form is to be used where application is made to Council. Copies are available upon request.~~ A Construction Certificate must be obtained prior to the commencement of any building work.

(Condition 62 above has been AMENDED by this Section 4.56 modification application, dated 25 February 2025)

63. Dial Before You Dig is a free national community service designed to prevent damage and disruption to the vast pipe and cable networks which provides Australia with the essential services we use everyday – electricity, gas, communications and water.

Before you dig call "Dial Before You Dig" on 1100 (listen to the prompts) or register on line at www.1100.com.au for underground utility services information for any excavation areas.

The Dial Before You Dig service is also designed to protect Australia's excavators. Whether you are a backyard renovator, an individual tradesman or a professional excavator, the potential for injury, personal liability and even death exists everyday. Obtaining accurate information about your work site significantly minimises these risks.

Reason: To ensure that essential services such as electricity, gas, communications and water are not affected by excavation or construction works.

64. Structural Engineer details prepared and certified by a practicing Structural Engineer for all reinforced concrete and structural members being submitted to the Principal Certifier for approval **prior to the issuing of a Construction Certificate**.

65. The Principal Certifier **or** Structural Engineer is to also supervise the construction. All Certificates from the supervising Structural Engineer are to be submitted to the Principal Certifier before an Occupation Certificate is issued stating that all reinforced concrete and/or structural members have been erected in accordance with his/her requirements and the relevant SAA Codes.

66. Timber sizes and the framework in general are to conform with the requirements of Australian Standard AS 1684 "Residential timber-framed construction."

67. Engineering Design – Basement Excavation
The following engineering details or design documentation shall be submitted to the Principal Certifying Authority (Council or Accredited Certifier) **prior to the issuing of a Construction Certificate**:

    (a) Documentary evidence prepared by a suitably qualified professional geotechnical engineer that confirms the suitability of the site for the proposed excavation and building, as well as certifying the suitability and adequacy of the proposed design and construction of the building for the site.

    (b) A report shall be prepared by a professional engineer **prior to the issuing of a Construction Certificate**, detailing the proposed methods of excavation, shoring or pile construction including details of vibration emissions and detailing any possible damage which may occur to adjoining or nearby premises due to building and excavation works. Any practices or procedures specified in the engineer's report in relation to the avoidance or minimisation of structural damage to nearby premises, are to be fully complied with and incorporated into the plans and specifications for the Construction Certificate.

A copy of the engineer's report is to be submitted to Council, even if the Council is not the Principal Certifying Authority.

68. Dilapidation surveys are to be carried out by a Practicing Structural Engineer, which is to include a full photographic record of the exterior and interior of the buildings at the applicants/owners expense on all premises adjoining the site and the survey is to be submitted to Council and the adjoining land owners **prior to**

the commencement of any works. A further dilapidation survey is also to be carried out and submitted to Council and the adjoining owners **prior to the issuing of an Occupation Certificate**. The dilapidation surveys shall be dated accordingly.

69. Noise transmission and insulation ratings for building elements being in accordance with Specification Part F5 of the Building Code of Australia.

70. Mechanical ventilation/air conditioning details are to be submitted to Council or the Accredited Certifier for approval **prior to the issuing of a Construction Certificate** and must include the following:-

    a. The location and size of proposed ductwork;

    b. The location of equipment;

    c. The performance characteristics of the proposed motor/s and fan/s;

    d. The air flow characteristics of the system.

    At the completion of work a Certificate from an Accredited Certifier, Mechanical Engineer or other suitably qualified person, to the effect that the ventilation system has been installed and performs in accordance with the provisions of Part F4 of the Building Code of Australia, Australian Standard New Zealand Standard AS/NZS 1668 "The use of mechanical ventilation and air-conditioning in buildings", Part 1 and Part 2, Australian Standard New Zealand Standard AS/NZS 3666-2002 and the Noise Control Act, 1975, must be submitted to the Principal Certifying Authority before an Occupation Certificate is issued.

71. The Class 2 and 7a building being equipped with a smoke alarm system as required by Table E2.2a of the Building Code of Australia. Mains powered smoke alarms complying with AS 3786-1993 are to be installed at or near the ceiling in

    a. any storey containing bedrooms –

        (i) between each part containing bedrooms and the remainder; and

        (ii) where bedrooms are served by a hallway; in that hallway; and

    b. any other storey not containing bedrooms, in egress paths; and

    c. in public corridors and other internal public spaces so that a sound pressure level of 85 dB(A) is provided at the door to each sole-occupancy unit.

    Details of the method of complying with this requirement must be noted on the plans or in the specifications **prior to the issuing of a Construction Certificate**.

72. A registered surveyor's certificate being submitted to the Principal Certifying Authority as follows:-

    a. Before pouring of concrete slab on every level to indicate the height of the finished floor level and to show boundary clearances; and

b. On completion of the buildings to indicate the height of the roof/parapet, show boundary clearances and areas of the site occupied by the building.

DEMOLITION

73. Demolition of the building is to be carried out in accordance with the requirements of Australian Standard AS 2601 – 2001, where applicable.

74. Hours of demolition work shall be from 7:00am to 6:00pm Mondays to Fridays inclusive, and from 7:00am to 4:00pm on Saturdays. Demolition works that involve heavy machinery, noisy trades or the like are **not permitted** to be carried out from 1:00pm to 4:00pm on Saturdays. No demolition work shall be carried out on Sundays or Public Holidays. The owner/builder shall be responsible for the compliance of this condition by all sub-contractors, including demolishers.

75. Access to the site is to be restricted and the site is to be secured when demolition work is not in progress or the site is otherwise occupied.

76. The demolition site is to be provided with measures to mitigate against dust nuisances arising on adjoining sites and roadways. To achieve this, a fence or barrier is to be erected around the site. The construction may be steel mesh which is covered with a suitable filtering medium or such other construction acceptable to Council. An effective program of watering the site is also required to be maintained.

77. All demolition, excavation and construction materials are to be removed from the site or disposed of on-site using methods that comply with relevant environmental protection legislation.

78. When demolition of any existing building is involved, burning of any demolition materials on the site is prohibited. All waste materials to be removed from the site.

HEALTH

79. A WorkCover licensed contractor must undertake removal of more than 10 square metres of any bonded asbestos. Removal of any friable asbestos must only be undertaken by a contractor that holds a current friable asbestos removal licence.

80. Removal of any asbestos must be undertaken in compliance with the requirements of SafeWork NSW. Refer to their Code of Practice “How to Safely Remove Asbestos” dated August 2019.

81. Demolition sites that involve the removal of any asbestos must display a standard commercially manufactured sign containing the words “DANGER ASBESTOS REMOVAL IN PROGRESS” measuring not less than 400mm x 300mm erected in a prominent visible location at the site to the satisfaction of Council Officers. The sign is to be erected prior to the commencement of demolition works and is to remain in place until such time as all asbestos has been removed from the site to an approved waste facility. This will ensure compliance with Clause 469 of the *Work Health and Safety Regulation 2017.*

82. All asbestos waste must be stored, transported and disposed of in compliance with the *Protection of the Environment Operations (Waste) Regulation 2014*.

83. All asbestos laden waste must be disposed of at an approved waste disposal depot (Refer to the Office of Environment and Heritage or Waste Service NSW for details of sites).

84. Written notice must be provided to Council and adjoining neighbours at least two working days prior to commencement of any works. Such written notice is to include the following details:

    - Date of asbestos removal; and
    - Name, address contact details (including after hours contact telephone number) and WorkCover licence number of the asbestos removal contractor.

    Work is not to commence prior to the nominated date.

ENGINEERING

85. All activities and works external to the site, or that affect public roads, are to be carried out in accordance with Council's Policies including but not limited to the Works on Council's Road Reserve Assets Policy, Rubbish Skips Policy, Work Zone Policy and Temporary Road Closure (Including Standing Plant) Policy

86. A road-opening permit shall be obtained for all works carried out on public or Council controlled lands. Restoration of landscaping, roads and paths shall be carried out by Council at the applicant's expense in accordance with Council's **Schedule of Fees and Charges**. The applicant or any contractors carrying out works in public or Council controlled lands shall have public liability insurance cover to the value of $20 million, and shall provide proof of such cover to the Principal Certifier prior to carrying out the works. **Please see Burwood Council's web site www.burwood.nsw.gov.au - Go to Development/Working on Council property/Works on Council Property (Application Form)**.

87. Spoil and building materials shall not be placed, stored, thrown or caused to fall on any public roadway or footpath. Waste containers shall be placed in accordance with Council's Rubbish Skips Policy. Contact Council for a list of approved skip bin suppliers.

88. The builder is to ensure footpaths and roads affected by construction works are kept safe and prevent any damage to Council property. The builder shall erect and maintain where necessary approved hoardings, barricades, warning signs and night warning lamps to ensure public safety. Pedestrian access across the footpath must be maintained at all times.

89. The following matters apply to the construction of the proposed vehicular crossing listed in the Table of Fees:

    a. A vehicular crossing 6m wide to Willee Street shall be constructed by the Applicant/Council at the applicant's cost.

    b. The cost of any necessary adjustments to public utility services is not included, and shall be paid by the applicant to the relevant authority prior to Council commencing the work.

    c. The driveway shall be 1m clear of any pits, lintels, poles and 2m clear of trees in the road reserve.

d. All redundant vehicular crossings shall be removed and replaced with kerb and gutter and footpath at no cost to Council.

90. Internal driveway levels shall be designed and constructed to conform with existing footpath and road profiles such that vehicles are not damaged while accessing the property. Council footpath and road profiles will not be altered for this purpose.

91. Stormwater from all roof and paved surfaces shall be collected and discharged by means of a gravity pipe to Council's street drainage system.

92. The applicant is to have prepared a longitudinal section of the proposed vehicular ramp access, drawn at 1:25 natural scale.

    a. The longitudinal section shall be prepared by a competent practicing civil engineer in accordance with AS 2890.1.
    b. The design is to be reviewed by Council or an Accredited Certifier - Civil Engineering **prior to the issuing of a Construction Certificate**.

93. Temporary measures shall be provided during demolition, excavation and/or construction to prevent sediment and polluted waters discharging from the site.

94. An erosion and sediment control plan showing such measures shall be prepared by a competent practicing hydraulic/civil engineer in accordance with Supplement 10 of Council's Stormwater Management Code.

95. All demolition, excavation and construction materials are to be removed from the site or disposed of on-site using methods that comply with relevant environmental protection legislation.

96. No opening is to be made in any road or footpath, nor is any hoarding to be erected without the prior consent of Council. The builder is to obtain the relevant permit for which fees will be charged in accordance with Council's Schedule of Fees and Charges.

97. The builder shall erect and maintain in good order all necessary hoardings, barricades and warning signs required to provide adequate public safety. Night warning lamps are to be provided where necessary.

98. Public roads to be kept clean and free of any material which may fall from vehicles or plant. Waste containers shall be placed in accordance with Council's Code for Activities Affecting Roads and are subject to the payment of appropriate fees.

99. Heavy vehicles entering and leaving the site must only cross the footpath where it is adequately timbered and strapped. Pedestrian access across this footpath must be maintained in good order at all times during the excavation work.

100. The contractor shall strictly implement all erosion and sediment control measures prior to the commencement of excavation. Such measures shall be inspected at site by a competent practicing hydraulic/civil engineer and the PCA shall be provided with a compliance certificate in regards to that.

101. The Applicant shall prepare detailed survey reports of all existing service authority assets in and around the site of the proposed development that may be affected in any way by the proposed excavation. Surveys should include, but not be limited

to, high and low voltage electricity, water, stormwater, sewer, gas, telecommunications, street lighting and drainage assets, etc.

102. The Applicant shall liaise with all relevant service authorities (including, but not limited to electricity, water, stormwater, sewer, gas, telecommunications, street lighting and drainage) to develop final designs that satisfy all requirements of the service authority providers in respect of protection, termination or relocation of existing assets, temporary access and future permanent access for maintenance of assets.

103. The Applicant shall prepare detailed method statements to demonstrate how the proposed excavation is to be conducted such that all relevant utility authority assets are protected and maintained throughout the construction stage of the development, or are relocated. Method statements are to be submitted to the relevant utility authorities for their written approval.

Installation of Temporary Ground Anchors

a. Should the applicant requires the use of temporary ground anchors to shore the bulk excavation within public roads an NPER Registered Structural Engineer's certificate along with certified plans showing the details and extent of work shall be submitted to Council for its record. The following conditions shall be complied with by the Applicant.

b. The Applicant is required to obtain a 'Temporary Ground Anchor Permit' from Council for which an 'Application for Works on Council's Property' shall be lodged with Council. Subject to the application being approved by Council, the applicant shall pay Council calculated Anchor Fees and the 'Refundable Deposit' as required under Council's Statement of Revenue Policy 2017 – 2018. Payment of the 'Refundable Deposit' shall be made in the form of a Bank Guarantee.

NOTE: This deposit is refundable if no damage occurs.

104. The contractor shall be responsible to obtain and submit to Council a written authority from all public utility authorities that they have no objection in regards to the installation of temporary ground anchors, prior to works commencing.

105. The contractor shall be responsible to obtain permission from the neighbours of the adjoining properties prior to installation of anchors.

106. The contractor shall be responsible for any injury or damage either to persons or property due to the presence or failure of the supporting structure on the public way and the contractor shall indemnify the Council against all claims that may arise from the installation of the supporting structure. In this regard the contractor shall provide written evidence of public liability insurance cover to the minimum value of $20 million, with Council named in the insurance policy, prior to work commencing.

107. The anchors shall be installed in accordance with the manufacturer's instructions.

108. The construction of ground anchors shall be of a temporary nature only and a written undertaking shall be given that the ground anchors are temporary only

and shall be de-stressed after final lateral supports are in place. The written undertaking is to be provided to Council, prior to work commencing.

109. Council may reasonably use the damage deposit for the demolition and removal of the shoring elements constructed within the public road including the repair/reconstruction of any damage to Councils infrastructure associated with the construction of ground anchors.

110. All shoring with the exception of the released temporary ground anchors shall be completely removed from the public road to a depth of 2.5m on completion. The void shall be backfilled by suitable materials and compacted.

111. All shoring including ground anchors are to be certified by a practicing professional structural engineer. Certification is required as follows:

    i. That the proposed shoring and anchor scheme is capable of supporting the public road, to be submitted prior to work commencing.

    ii. Certification that the shoring and anchor scheme has been adequately constructed, following installation.

    iii. Final certification that the anchors have been de-stressed and all shoring with the exception of the anchors have been removed to a depth of 2.5m, on completion following de-stressing of the anchors.

112. Council's footpath and roadway are to be kept safe for the passage of motorists and pedestrians at all times. Closure of any part of the public thoroughfare shall only be carried out with the approval of Council's Traffic Engineer.

113. All stockpiled shoring materials and equipment shall be kept solely within the private property and not obstruct the footpath or roadway at any time.

114. All earth and rock anchors shall be released before the completion of building work.

ENGINEERING - STORMWATER

115. A detailed drainage design shall be submitted to the Principal Certifying Authority.

    a. The design and calculations shall indicate the details of the proposed method of stormwater disposal and shall be prepared by a competent practicing hydraulic/civil engineer in accordance with Council's Stormwater Management Code.

    b. Allowance shall be made for surface runoff from adjacent properties, and to retain existing surface flow path systems through the site. Any redirection or treatment of these flows shall not adversely affect any other property.

    c. Overflow paths shall be provided to allow for flows in excess of the capacity of the pipe/drainage system draining the site, as well as from any on-site stormwater detention storage.

d. The design is to be reviewed by Council or an Accredited Certifier - Civil Engineering **prior to the issuing of a Construction Certificate.**

116. Details and calculations shall be prepared by a competent practicing Hydraulic/Civil Engineer. They shall include:

a. a catchment plan

b. plans showing proposed and existing floor, ground and pavement levels to Australian Height Datum (AHD)

c. details of pipelines/channels showing calculated flows, velocity, size, materials, grade, invert and surface levels

d. details and dimensions of pits and drainage structures

e. hydrologic and hydraulic calculations

f. details of any services near to or affected by any proposed drainage line

g. any calculations necessary to demonstrate the functioning of any proposed drainage facility is in accordance with Council's requirements

h. the depth and location of any existing stormwater pipeline and/or channel being connected to shall be confirmed by the applicant on site. Certification of such is to be provided to Council prior to the release of the construction certificate

The details and calculations are to be reviewed by Council or an Accredited Certifier - Civil Engineering**, prior to the issuing of a Construction Certificate**.

117. On-site stormwater detention storage shall be provided in conjunction with the stormwater disposal system.

a. This storage shall be designed by a competent practicing Hydraulic/Civil Engineer in accordance with Council's Stormwater Management Code and submitted to the Principal Certifying Authority.

b. The design is to be reviewed by Council or an Accredited Certifier - Civil Engineering, **prior to the issuing of a Construction Certificate.**

118. The stormwater works on the development property and connection to Council's stormwater system are to be inspected during construction by a competent practicing hydraulic/civil engineer. The inspections are to be carried out at the stages of construction listed in the following schedule. A compliance Certificate verifying that the construction is in accordance with the approved design, this development consent and satisfies the relevant Australian Standard is to be submitted to the Principal Certifying Authority before proceeding beyond the relevant stage of construction.

SCHEDULE OF CONSTRUCTION STAGES REQUIRING INSPECTION

a. Following placement of pipe bedding material. Confirm trench/pipe location, adequacy of depth of cover, bedding material and depth.

b. Following joining of pipes and connection to Council's stormwater system.

c. For on-site detention systems:-

(i) Following set out of detention tank/area to confirm area and volume of storage.

(iii) Following placement of weep-holes, orifice and/or weir flow control, outlet screen and overflow provision.

d. Following backfilling. Confirm adequacy of backfilling material and compaction.

119. Following completion of all drainage works:-

a. Works-as-executed plans, prepared and signed by a registered surveyor, shall be prepared. These plans shall include levels and location for all drainage structures and works, buildings (including floor levels) and finished ground and pavement surface levels. These plans are to be reviewed by the competent practicing hydraulic/civil engineer that inspected the works during construction.

b. The Principal Certifying Authority is to be provided with a Certificate from a competent practicing hydraulic/civil engineer. The Certificate shall state that all stormwater drainage and related work has been constructed in accordance with the approved plans and consent conditions as shown on the work-as-executed plans, prior to the issuing of an Occupation Certificate.

120. Positive Covenant under section 88E of the *Conveyancing Act* shall be created on the title of the property(s) detailing the On-site Stormwater Detention system AND pump and rising main system incorporated in the development. The wording of the Instrument shall include but not be limited to the following:

a. The proprietor of the property agrees to be responsible for keeping clear and the maintenance of the facilities consisting of:

i) On-site Stormwater Detention system
ii) Pump and rising main system

b. The proprietor agrees to have the facilities inspected annually by a competent practicing Hydraulic/Civil Engineer.

c. The Council shall have the right to enter upon the land referred to above, at all reasonable times to inspect, construct, install, clean repair and maintain in good working order the facilities in or upon the said land; and recover the costs of any such works from the proprietor.

d. The registered proprietor shall indemnify the Council and any adjoining land owners against damage to their land arising from failure of any component of the facilities.

The applicant shall bear all costs associated with the preparation of the 88E Instrument. The wording of the Instrument shall be submitted to, and approved by Council prior to lodgement at the Land and Property Information office. Evidence that the Instrument has been registered at the Land and Property Information office shall be submitted to Council, **prior to issuing of an Occupation Certificate**.

121. The pump system is only permitted for the drainage of the basement areas where the finished slab is below the ground level. The following conditions are to be satisfied:

a. A pump and rising main design shall be submitted to the Principal Certifying Authority and shall satisfy the following conditions:

(i) The holding tank for the pump shall be capable of storing runoff from a one hour, 1 in 100 year ARI storm event.

(ii) The pump system shall consist of two (2) pumps, connected in parallel, with each pump being capable of emptying the holding tank at a rate equal to the lower of the allowable on site detention discharge rate, or the rate of inflow for the one hour duration storm.

(iii) An overflow, flashing light and audible alarm are to be provided, to warn of pump failure.

(iv) Full details of the holding tank, pump type, discharge rate and the delivery line size are to be documented.

(v) Any drainage disposal to the street gutter, from a pump system must have a stilling sump provided at the property line, and connected to the street gutter by a suitable gravity line.

(vi) The capacity of the stilling sump and outlet pump shall be determined and verified by calculations which are to be documented.

b. Pumping system details shall be submitted to Council or an Accredited Certifier - Civil Engineering, **prior to the issuing of a Construction Certificate.**

c. The applicant shall submit written evidence to the Principal Certifying Authority that a contract has been let for the regular maintenance of the pumping system for a minimum period of 12 months. Information to be submitted to the Principal Certifying Authority **prior to issuing of an Occupation Certificate**.

ENGINEERING - TRAFFIC

122. All owners, tenants and occupiers of this building are not eligible to participate in any existing or proposed Council on-street resident parking schemes.

123. Signs reading 'all owners, tenants and occupiers of this building are advised that they are not eligible to obtain an on-street resident parking permit from Council' must be permanently displayed and located in prominent places such as at display apartments and on all directory boards or notice boards, where they can easily be observed and read by people entering the building. The signs must be erected prior to an Occupation Certificate being issued and must be maintained in good order at all times by the Owners Corporation.

124. A total of 25 off-street car parking spaces and 8 bicycle parking spaces must be provided as approved under Section 4.55 Application No. 2018/48 and approved plans as listed in Point 1 of this Consent. The design, layout, signage, line marking, lighting and physical controls of all off-street parking facilities must comply with the minimum requirements of Australian Standard AS/NZS 2890.1-2004 Parking Facilities Part 1: Off-street car parking and Council's Development Control Plan. The layout, design and security of bicycle facilities either on-street or off-street must comply with the minimum requirements of Australian Standard AS 2890.3-1993 Parking Facilities Part 3: Bicycle Parking Facilities.

125. The approved parking spaces must be allocated as detailed below. All spaces must be appropriately line-marked and labelled according to this requirement prior to the issue of an Occupation Certificate. If the development is to be strata subdivided, the car park layout must respect the required allocation:

(a) ~~19~~ 21 residential parking spaces.
(b) ~~3~~ 2 residential visitor parking spaces.
(c) ~~3~~ 2 commercial parking spaces.

(Condition 125 above has been AMENDED by this Section 4.56 modification application, dated 25 February 2025)

126. No part of the common property, apart from the visitor vehicle spaces which are to be used only by visitors to the building, and service vehicle spaces which are to be used only by service vehicles, is to be used for the parking or storage of vehicles or trailers.

127. Visitor parking spaces must not at any time be allocated, sold or leased to an individual owner/occupier and must be strictly retained as common property by the Owners Corporation for use by building visitors.

128. All visitor parking spaces must be grouped together, and located at the most convenient location to the car parking entrance. All spaces must be clearly

marked ‘visitor’ prior to the issue of an Occupation Certificate. All signs must be maintained in good order at all times.

Where a boomgate or barrier control is in place, the visitor spaces must be accessible to visitors by the location of an intercom (or card controller system) at the car park entry and at least 6m clear of the property boundary, wired to all units. The intercom must comply with 'Australian Standard AS 1428.2-1992: Design for access and mobility - Enhance and additional requirements - Building and facilities Sections 22 and 23'.

129. Of the required car parking spaces, at least 3 must be designed and provided for accessible car parking for people with mobility impairment in accordance with Australian Standard AS/NZS 2890.1 - 2004 Parking facilities Part 1: Off-street car parking. Accessible car parking spaces must have a minimum headroom of 2.5m and must be clearly marked and appropriately located as accessible parking for people with mobility impairment. The following allocation must be observed:

    a. 2 residential accessible spaces
    b. 1 commercial accessible parking space

130. Where a car park is serviced by lifts, accessible spaces for people with mobility impairment are to be located close to lifts. Where a car park is not serviced by lifts, accessible spaces for people with mobility impairment are to be located at ground level, or accessible to ground level by a continually accessible path of travel, preferably under cover.

131. The site must be configured to allow a vehicle to be driven onto and off the site in a forward direction.

132. The following signs must be provided and maintained within the site at the point(s) of vehicle egress:

    a. Compelling drivers to stop before proceeding onto the public way
    b. Compelling drivers to "Give Way to Pedestrians" before crossing the footway.

133. A system of traffic lights and/or mirrors must be installed at the ends of any single lane ramp(s), to indicate traffic movement on the ramp(s). This system must be detailed in the application for a Construction Certificate. Any system using traffic light signals must maintain a green signal to entering vehicles at the point of entry, and must maintain a red signal when an exiting vehicle is detected upon the ramp or driveway.

134. A detailed design drawing of the proposed amendments at the intersection of the Site Access/Willee Street/Liverpool Road is to be submitted and approved by Council **prior to the issue of a Construction Certificate**. The design shall incorporate the proposed linemarking and signage amendments as shown on the

Concept Plan Drawing No.005 dated 10/09/2019 prepared by PDC Consultants. The applicant/developer is to bare the cost of such works which must be completed to the satisfaction of Council prior to the issue of an Occupation Certificate.

135. Solid walls immediately adjacent to the basement entry and exit must not exceed 0.6m in height for the first 2.5m within the boundary so as to ensure adequate sight lines for motorists and pedestrians.

136. All loading and unloading operations associated with servicing the site must be carried out within the confines of the site, at all times and must not obstruct other properties/units or the public way.

137. At all times car parking spaces and access driveways must be kept clear of goods and must not be used for storage purposes, including garbage storage.

138. The size of vehicles servicing the property must be a maximum length of 6.4 metres.

139. Any proposals for alterations to the public road, involving traffic and parking arrangements, must be designed in accordance with RMS Technical Directives and must be referred to and agreed to by the Traffic Committee prior to any work commencing on site.

140. All costs associated with the construction of any new road works including kerb and gutter, road pavement, street lighting, drainage system and footway shall be borne by the developer. The new road works must be designed and constructed in accordance with any relevant Australian Standards, Austroads Guides and RMS Technical Directions.

141. All costs associated with signposting for any kerbside parking restrictions and traffic management measures, including any relocation of parking meters, associated with the development shall be borne by the developer.

142. A Construction Traffic Management Plan must be submitted and approved by Council prior to the commencement of demolition and excavation or issuing of the Construction Certificate (whichever occurs first). The Construction Traffic Management Plan must be complied with at all times. The following matters should be addressed in the plan (where applicable):

    a. A plan view of the entire site and frontage roadways indicating:
        i. Dedicated construction site entrances and exits, controlled by a certified traffic controller, to safely manage pedestrians and construction related vehicles in the frontage roadways.
        ii. Turning areas within the site for construction and spoil removal vehicles, allowing a forward egress for all construction vehicles on the site.
        iii. The proposed locations of work zones where it is not possible for loading/unloading to occur on the site in the frontage roadways (which will require separate approval by Council).
        iv. Location of any proposed crane and concrete pump and truck standing areas on and off the site (which will require separate approval by Council).
        v. A dedicated unloading and loading point within the site for all construction vehicles, plant and deliveries.
        vi. Details of vertical and horizontal material handling and deliveries.
        vii. Any on-site parking area for employees, tradespersons and construction vehicles where possible.
        viii. Traffic routes to and from the site from the closest arterial road in all directions.

b. Traffic control plan(s) for the site must be in accordance with the Roads and Maritime Services publication "Traffic Control Worksite Manual" and prepared by a suitably qualified person. The main stages of the development requiring specific construction management measures are to be identified and specific traffic control measures identified for each stage.

143. All works carried out in conjunction with the development including during the course of demolition, excavation and construction must be implemented in accordance with the approved Construction Traffic Management Plan (CTMP) and/or approved permits for works on Council's property.

144. Heavy Vehicles approaching, entering and exiting the site must approach, enter and exit the site in accordance with the approved route(s) as set out in the Construction Traffic Management Plan (CTMP).

145. Should works require any of the following on public property (footpaths, roads, reserves), an application shall be submitted and approved by Council prior to the commencement of the works associated with such activity:

a. Work zone.
b. Temporary closure of roadway/footpath.
c. Mobile crane or any standing plant
d. Scaffolding/Hoardings (fencing on public land)
e. Road works including vehicle crossing/kerb & guttering, footpath, stormwater provisions etc.
f. Installation or replacement of private stormwater drain, utility service or water supply

LAND CONTAMINATION

146. Any soils or materials requiring removal from the site as part of the site excavation are to be classified in accordance with the 'Waste Classification Guidelines, Part 1: Classifying Waste' NSW EPA (2014)

ENVIRONMENTAL MANAGEMENT

147. An Environmental Management Plan is to be submitted to Council for approval, prior to the issue of a Construction Certificate, detailing the control and management methods to be implemented in addressing the following issues during the demolition, excavation and construction phases of the project:

- Noise and vibration control
- Dust and odour suppression and control
- Storm water control and discharge
- Erosion control
- Waste storage and recycling control
- Litter control
- Construction material storage
- Truck cleaning methods on site so as to prevent spread of soil and like materials onto Council's roadways

148. The use of the premises, building services, equipment, machinery and ancillary fittings shall not give rise to "offensive noise" as defined under the provision of the Protection of the Environment Operation Act 1997. The sound level output

shall not exceed 5 dB(A) above the ambient background level at the received boundary.

149. The construction of windows / sliders, doors, external walls and roofs are to be comply with the recommendations listed in Part 7 of the Acoustic Assessment prepared by Acoustic Consulting Engineers (ref: 180962-01L-DD dated 20 February 2018) in order to achieve the required noise reduction targets and levels as required by Clause 102 of the State Environmental Planning Policy–(Infrastructure) 2008 and NSW Department of Planning's 'Development near Rail Corridors and Busy Roads – Interim Guideline'.]

150. Mechanical ventilation and or air conditioning systems and equipment are to be designed and installed in locations that do not cause any noise nuisance or disturbance to near-by residential or commercial premises. Details certified by an accredited acoustic consultant of the type of equipment locations and any noise attenuation treatment are to be submitted to Council for approval prior to the issue of the Construction Certificate. Units 1.01 and 2.01 shall be fitted with acoustic air ventilation units (2 per apartment) in accordance with the Aeropac Acoustic Air Ventilator brochure and appended Level 01 and Level 02 plans (Exhibit K).

WASTE MANAGEMENT

151. The waste management for the development shall be carried out as specified in the amended Waste Management Plan prepared by Elephants Foot (Report 319-321 Liverpool Road Strathfield – Operational Waste management Plan dated 30/8/19 Revision J).

152A. The Waste Management Plan prepared by Elephants Foot (Report 319321 Liverpool Road Strathfield – Operational Waste management Plan dated 30/8/19 Revision J), is to be updated to reflect the increased number of units (a total of nineteen (19) residential units), and is to be submitted to the Principal Certifier prior to the issue of a Construction Certificate.

(Condition 152A has been ADDED by this Section 4.56 modification application, dated 25 February 2025)

152. A waste cupboard or other storage area is to be provided within each dwelling which is of sufficient size to hold a single day's waste and to enable source separation of general waste, recyclables and compostable materials.

153. A separate area is to be provided within the development (minimum 15 square metres) for the temporary storage of unwanted large bulky house hold items (clean up material) awaiting disposal either privately or through Councils clean up service.

154. Both residential and commercial garbage and recycling storage areas are to be:

a. Supplied with both hot and cold water;
b. Paved with impervious floor materials;
c. Coved at the intersection of the floor and the walls;
d. Graded and drained to a floor waste which is connected to the sewer in accordance with the requirements of Sydney Water;
e. Adequately ventilated (mechanically or naturally) so that odour emissions do not cause offensive odour as defined by the Protection of the Environment Operations Act 1997;

f. Fitted with appropriate interventions to meet fire safety standards in accordance with the Building Code of Australia.
g. Suitable signage is to be installed in each waste service room encouraging the separation of recyclables from the general waste stream.

155. Certification is to be provided by the installer of the chute system prior to the issue of an occupation certificate certifying that the Chute has been installed in accordance with the manufacturer's specification.

156. Suitable signage is to be installed in each level of the chute waste service rooms encouraging the separation of recyclables from the general waste stream.

157. A Caretaker is to be appointed for the development who will have ongoing responsibility for the proper management of the waste and recycling services.

158. All waste collections are to be carried out from within the building (not from the kerb side). The caretaker is to wheel the waste and recycling bins to the nominated bin holding area for collection.

159. The applicant shall provide to Council a legally drafted agreement at their own expense in the form approved by Council which gives right of access and absolves Council and / or any of its waste collection contractors from any damage or injury that may arise from the onsite collection of waste and recyclables.

161. Residential and commercial waste and recycling collections are to be carried out in a manner and at times which do not cause a noise nuisance to the immediate or nearby residents.

Note: Council reserves the right to issue a direction under the Protection of the Operations Act to address any noise or other nuisance complaints.

162. Waste and recycling bins shall be kept clean and hygienic condition. Bins are to be washed regularly within the garbage storage room with any waste water being discharged to the sewer by way of a grated drain.

163. **Prior to the issue of an Occupation Certificate**, the applicant is to arrange with Council's Environment and Health Section the issue of the appropriate number of garbage and recycling bins and payment of the necessary fees to enable commencement of the waste and recycling service.

LANDSCAPING

164. Landscaping is to be completed prior to the issuing of an Occupation Certificate or Interim Occupation Certificate.

(Condition 164 has been ADDED by this Section 4.56 modification application, dated 25 February 2025)

DRAWING SCHEDULE

A 0000 TITLE PAGE

A 1001 SITE PLAN
A 1202 BASEMENT 01 PLAN
A 1203 GROUND FLOOR PLAN
A 1204 LEVEL 01 PLAN
A 1205 LEVEL 02 PLAN
A 1206 LEVEL 03 PLAN
A 1207 LEVEL 04 PLAN
A 1208 LEVEL 05 PLAN
A 1209 ROOF PLAN
A 1210 ADAPTABLE ROOM

A 1301 NORTH ELEVATION
A 1302 EAST ELEVATION
A 1303 WEST ELEVATION

A 1401 SECTION AA
A 1402 SECTION BB

A 2000 GFA CALCULATION
A 2030 LANDSCAPE CALCULATION
A 2050 3D HEIGHT DIAGRAM

A 2150 3D SOLAR ACCESS DIAGRAM 3D 21 JUNE

A 2201 MATERIAL SCHEDULE 01
A 2202 MATERIAL SCHEDULE 02

LIST OF AMENDEMENTS

ISSUE A CHANGES
ISSUE B ADDITIONAL AMENDMENTS

BASMENT 01:
- REMOVAL OF COMMERCIAL LIFT AND REPLACED WITH PLANT ROOM

GROUND FLOOR:
- REMOVAL OF COMMERICAL LIFT AND INCREASE TO COMMERICAL AREA

LEVEL 02:
- UNITS 201 AND 204 REDESIGNED AND EXTENDED OVER THE NON-TRAFFICABLE AREA AND CONVERTED TO 3 BEDROOM UNIT

LEVEL 03:
- COMMON AREA MOVED TO BE ABOVE THE 3 BEDROOM UNIT 201 AND 204
- 2 BEDROOM UNIT 303 REDESIGNED TO ALIGN WITH UNIT 403 PROPOSED LAYOUT

LEVEL 04:
- 1 BEDROOM UNIT 403 REDESIGNED AND CONVERTED TO 2 BEDROOM UNIT

LEVEL 05:
- 2 BEDROOM UNIT 501 REDESIGNED AND CONVERTED TO 3 BEDROOM UNIT
- 3 BEDROOM UNIT 502 PROPOSED
- 1 BEDROOM UNIT 503 PROPOSED

LEVEL 06:
- ADDITION OF A COMMON OPEN SPACE MOVED FROM LEVEL 05
- COMMON SPACE RELOCATED TO LEVEL 03 NON-TRAFFICABLE ROOF AREA

ADAPTABLE ROOM
- PRE AND POST ADAPTABLE ROOM DRAWING PROVIDED

ELEVATIONS AND SECTIONS
- UPDATED TO MATCH FLOOR PLAN CHANGES

MATERIALS
- UPDATED TO MATCH APPORVED 325-329 LIVERPOOL ROAD NEIGHBOURING SITE

UNIT MIX:

1 BED: 04
2 BED: 08
3 BED: 07
TOTAL UNITS: 19

COMMERCIAL: 02
TOTAL = 19+02 = 21

GFA CALCULATION

SITE AREA: 835 SQM
PERMISSIBLE FSR: 2.5:1
PERMISSIBLE GFA: 2087.5 SQM

PERMISSIBLE FSR FOR RESIDENTIAL: 2.2:1
PERMISSIBLE GFA FOR RESIDENTIAL: 1837 SQM

PROPOSED RESIDENTIAL GFA: 1831.25 SQM
PROPOSED RESIDENTIAL FSR: 2.19:1

TOTAL GFA: 2056.52 SQM
TOTAL PROPOSED FSR : 2.46 : 1

S4.56

319-321 LIVERPOOL RD

STRATHFIELD NSW 2135
MIXED USE DEVELOPMENT

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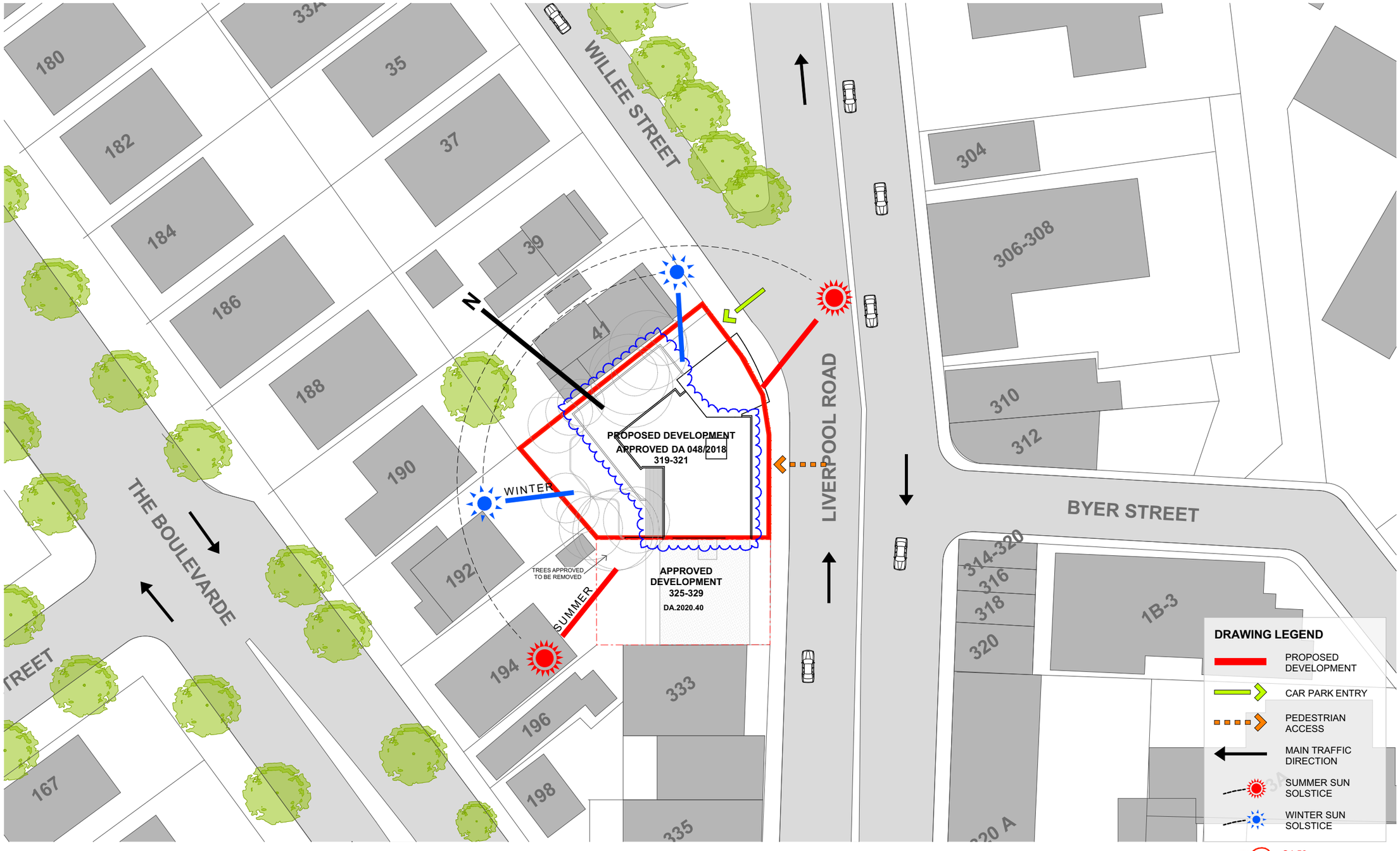

SCALE 1:200 @ A3

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SITE PLAN
1:500

S4.56 MODIFICATION ISSUE A

S4.56 MODIFICATION ISSUE B

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S4.56

A3 Drawing Original Size

Issue	Date	Description
B	12/12/24	FOR S4.56
A	26/4/21	FOR S4.56

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PROJECT
325-329 LIVERPOOL RD, STRATHFIELD

CLIENT
O and E DEVELOPMENTS PTY LTD

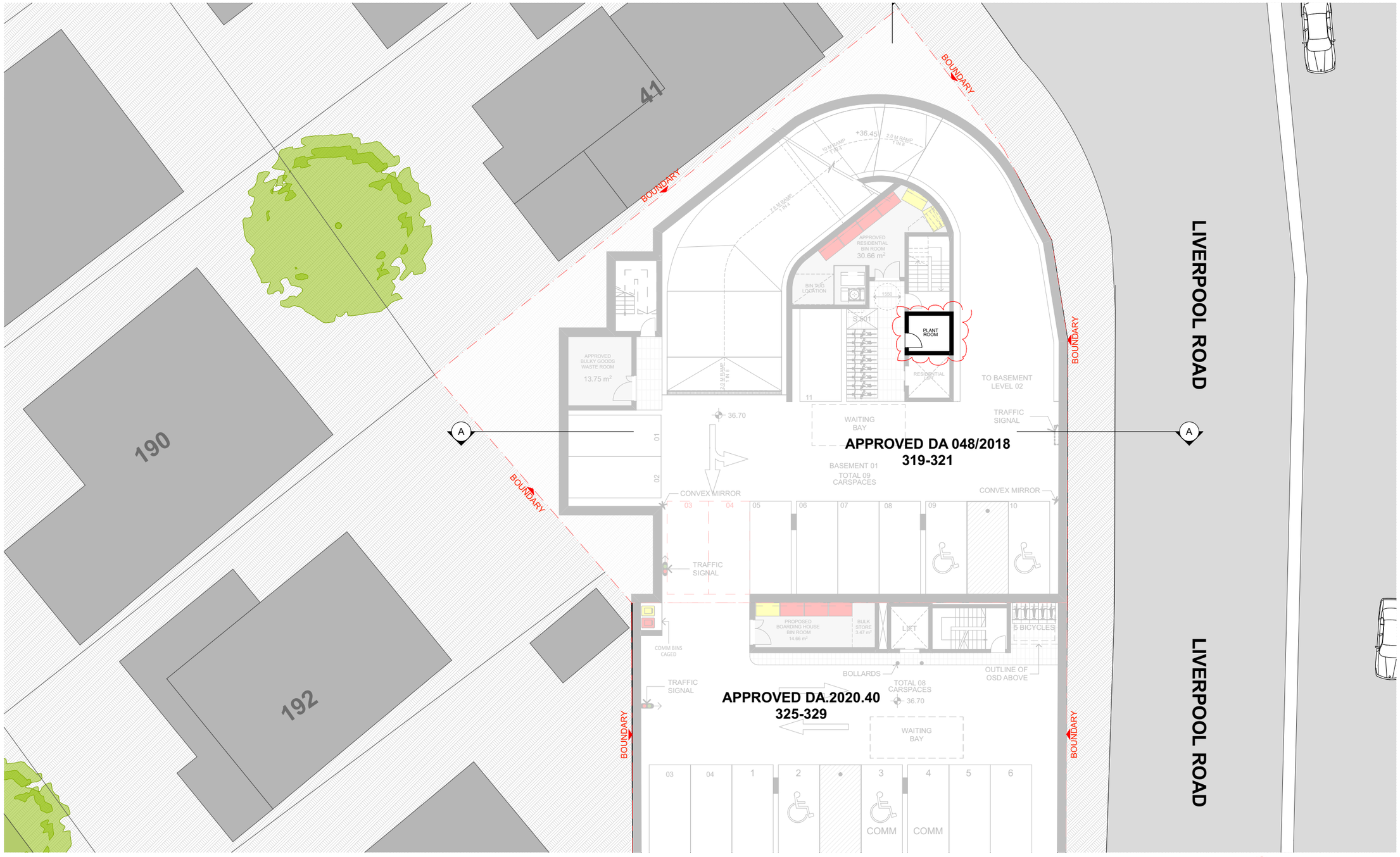
SCALE	DATE	
1:500	12/12/2024	
DRAWN: MO, SN	PROJECT ARCHITECT: GA	PROJECT DIRECTOR: GA, MO

DRAWING NAME: **SITE PLAN**

PROJECT NUMBER: 57.17

DRAWING NUMBER: DA A 1001

ISSUE: B



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BASEMENT 01 PLAN

1:200

S4.56 MODIFICATION ISSUE A

S4.56 MODIFICATION ISSUE B

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A3 Drawing Original Size

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325-329 LIVERPOOL RD, STRATHFIELD

CLIENT
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SCALE	DATE	
1:200	12/12/2024	
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
BASEMENT 01 PLAN

PROJECT NUMBER 57.17

DRAWING NUMBER DA A 1202

ISSUE B

SCALE 1:200 @ A3

0 1 2 5 10M

GROUND FLOOR PLAN
1:200

S4.56 MODIFICATION ISSUE A

S4.56 MODIFICATION ISSUE B

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325-329 LIVERPOOL RD, STRATHFIELD

CLIENT
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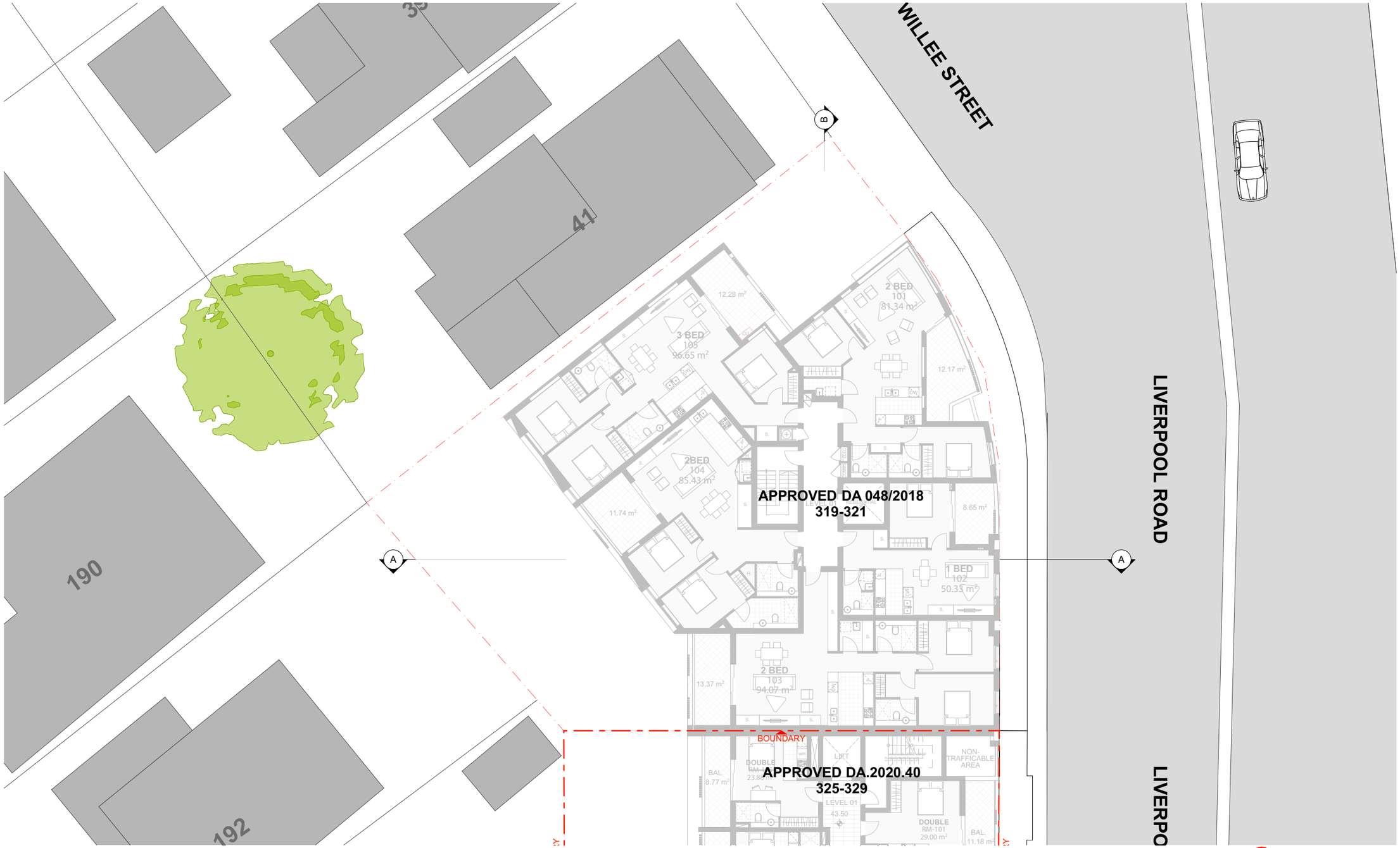
SCALE	DATE	
1:200	12/12/2024	
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
GROUND FLOOR PLAN

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1203

ISSUE
B



SCALE 1:200 @ A3

0 1 2 5 10M

LEVEL 01 PLAN
1:200

S4.56 MODIFICATION ISSUE A

S4.56 MODIFICATION ISSUE B

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CLIENT
O and E DEVELOPMENTS PTY LTD

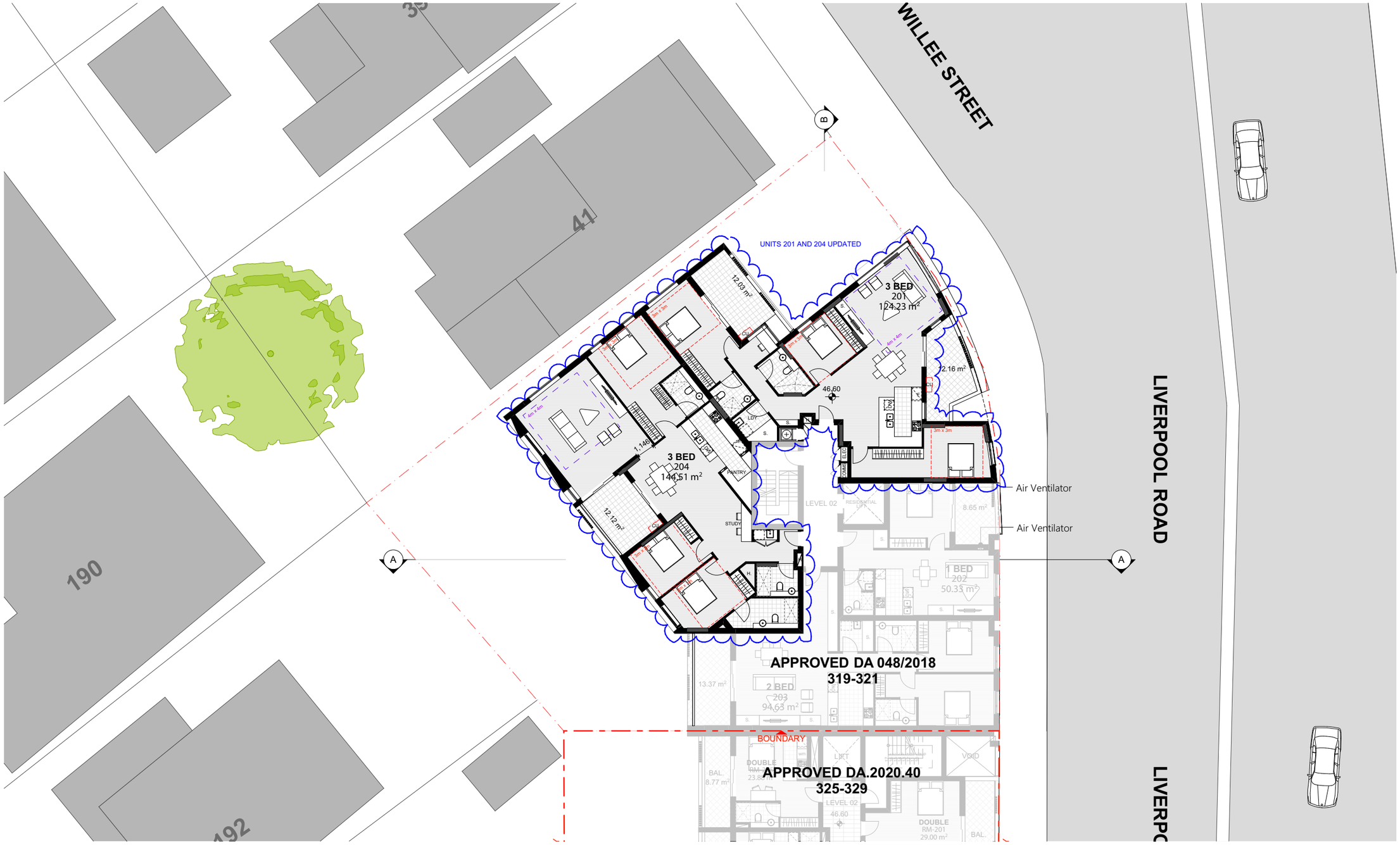
SCALE	DATE	
1:200	12/12/2024	
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
LEVEL 01 PLAN

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1204

ISSUE
B



SCALE 1:200 @ A3

0 1 2 5 10M

LEVEL 02 PLAN

1:200

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CLIENT
O and E DEVELOPMENTS PTY LTD

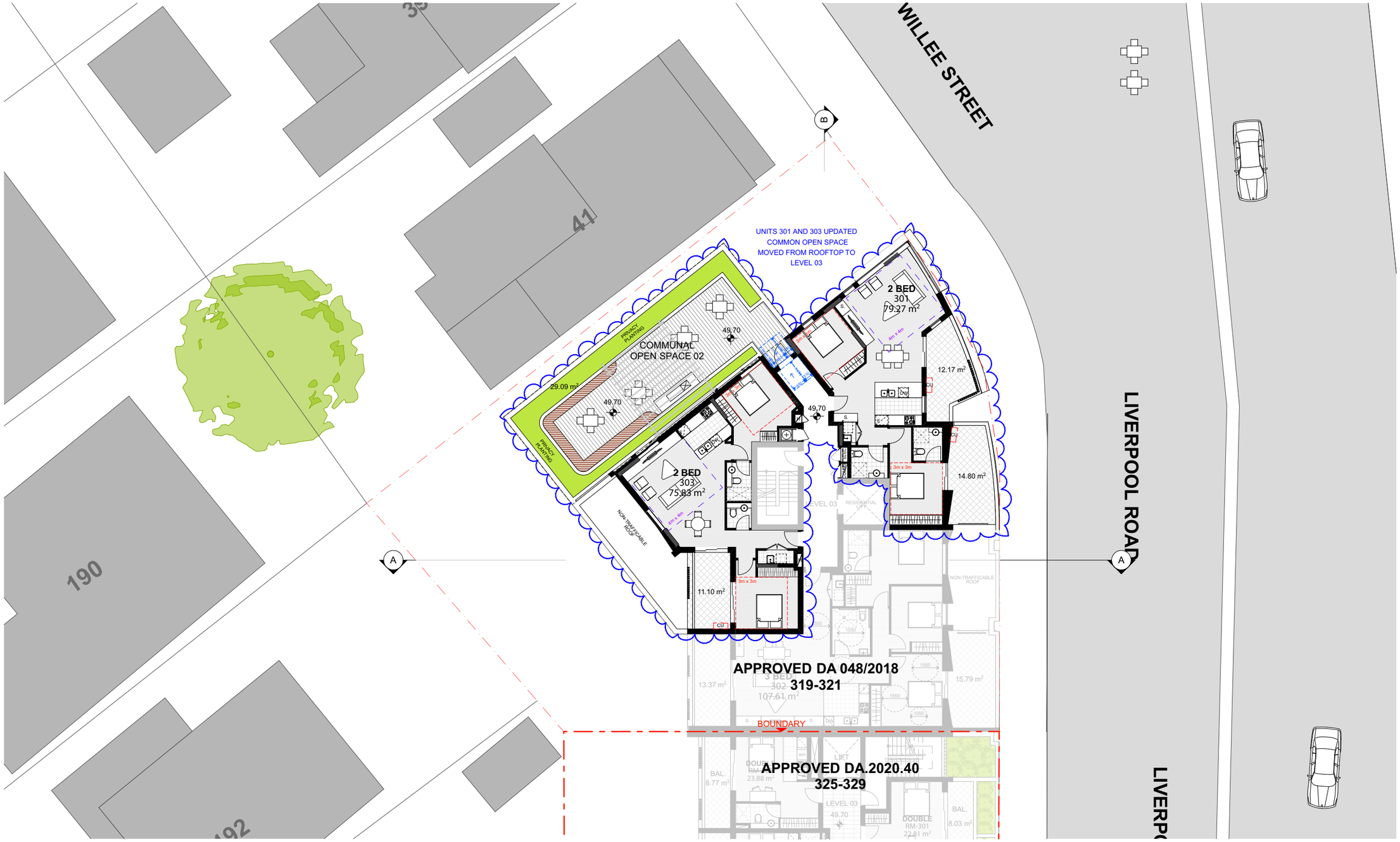
SCALE	DATE	
1:200	12/12/2024	
DRAWN: MO, SN	PROJECT ARCHITECT: GA	PROJECT DIRECTOR: GA, MO

DRAWING NAME
LEVEL 02 PLAN

PROJECT NUMBER: 57.17

DRAWING NUMBER: DA A 1205

ISSUE: B



SCALE 1:200 @ A3

0 1 2 5 10M

LEVEL 03 PLAN

1:200

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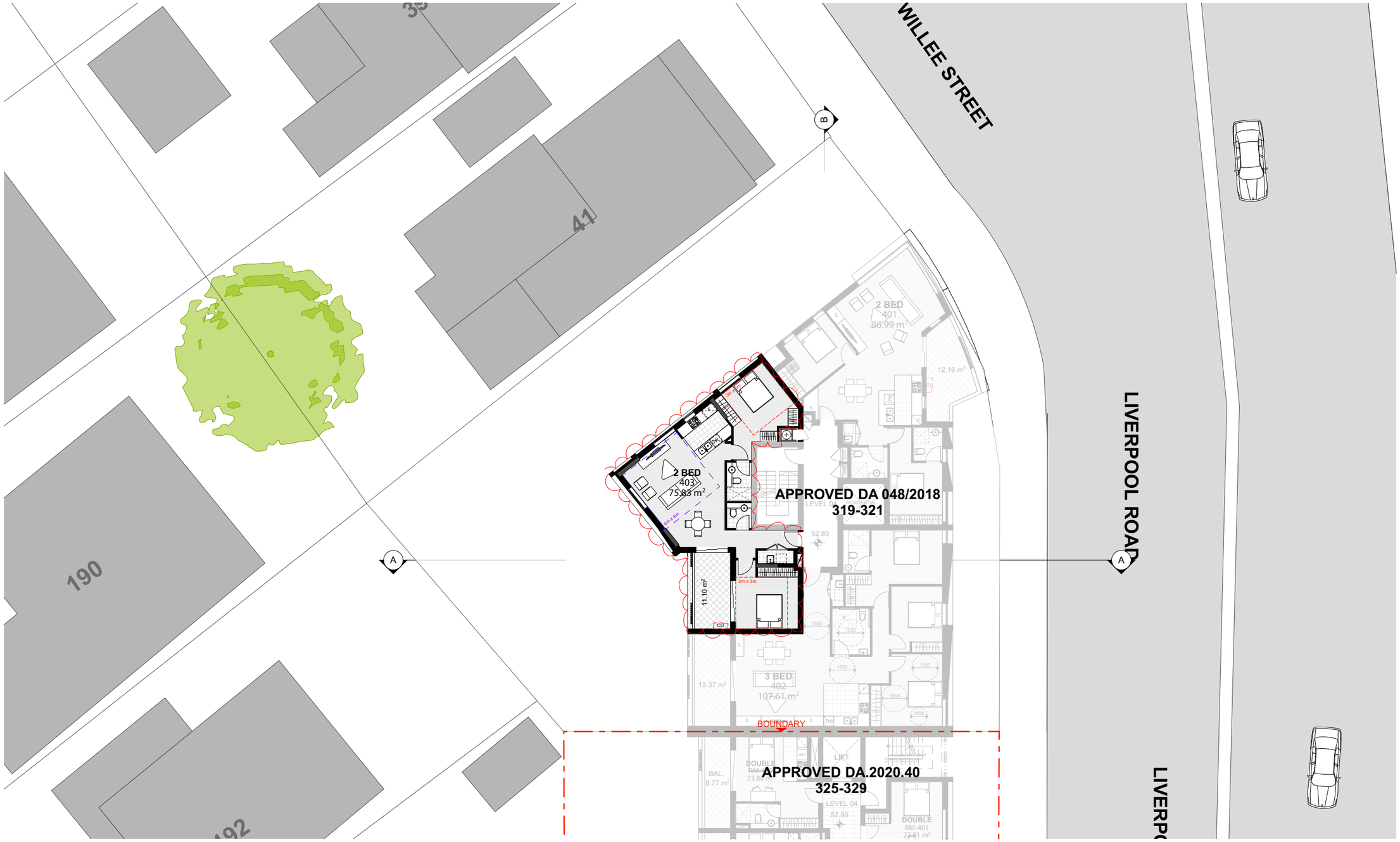
SCALE	DATE	
1:200	12/12/2024	
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
LEVEL 03 PLAN

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1206

ISSUE
B



SCALE 1:200 @ A3

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LEVEL 04 PLAN

1:200

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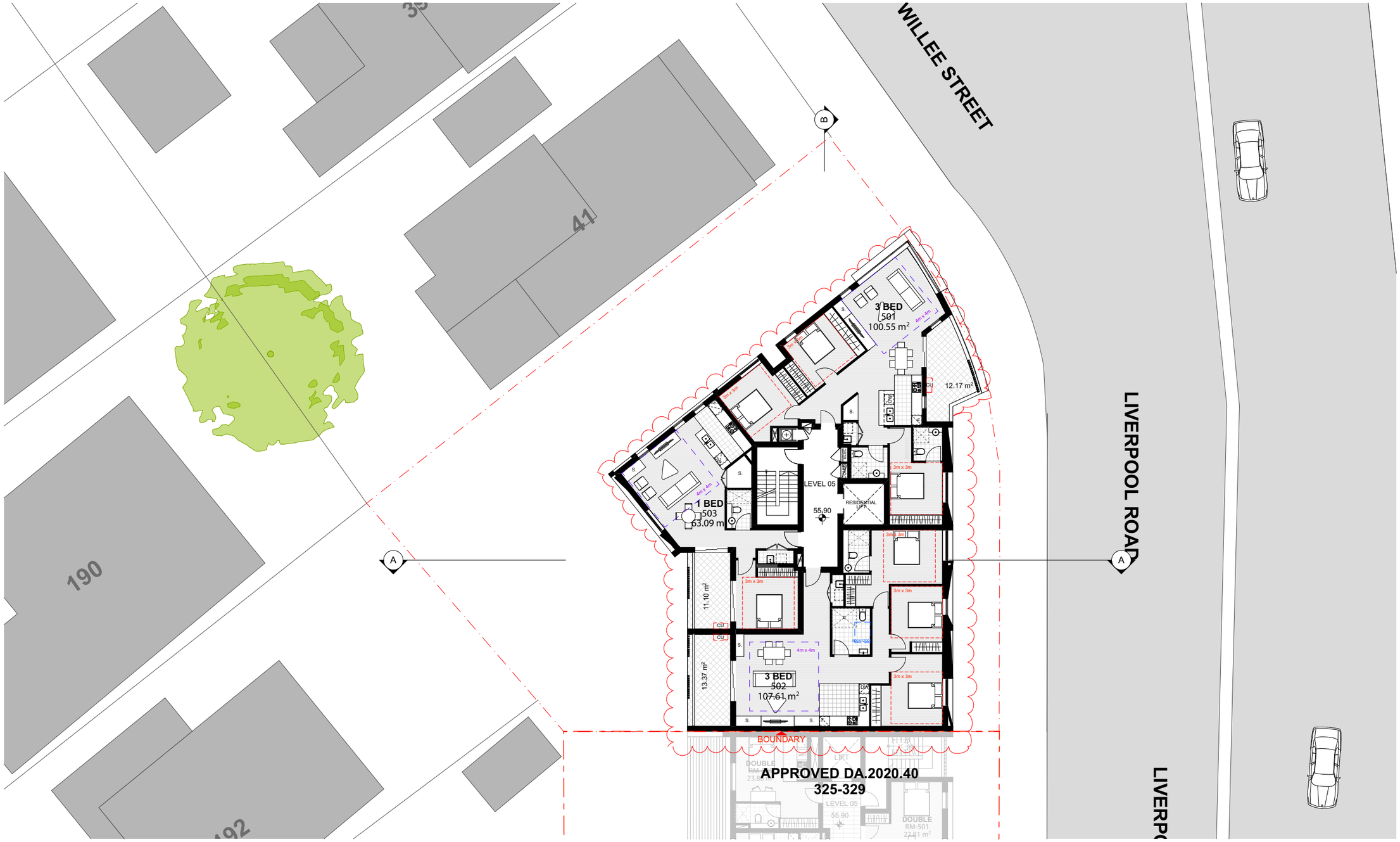
SCALE	DATE	
1:200	12/12/2024	
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
LEVEL 04 PLAN

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1207

ISSUE
B



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0 1 2 5 10M

LEVEL 05 PLAN

1:200

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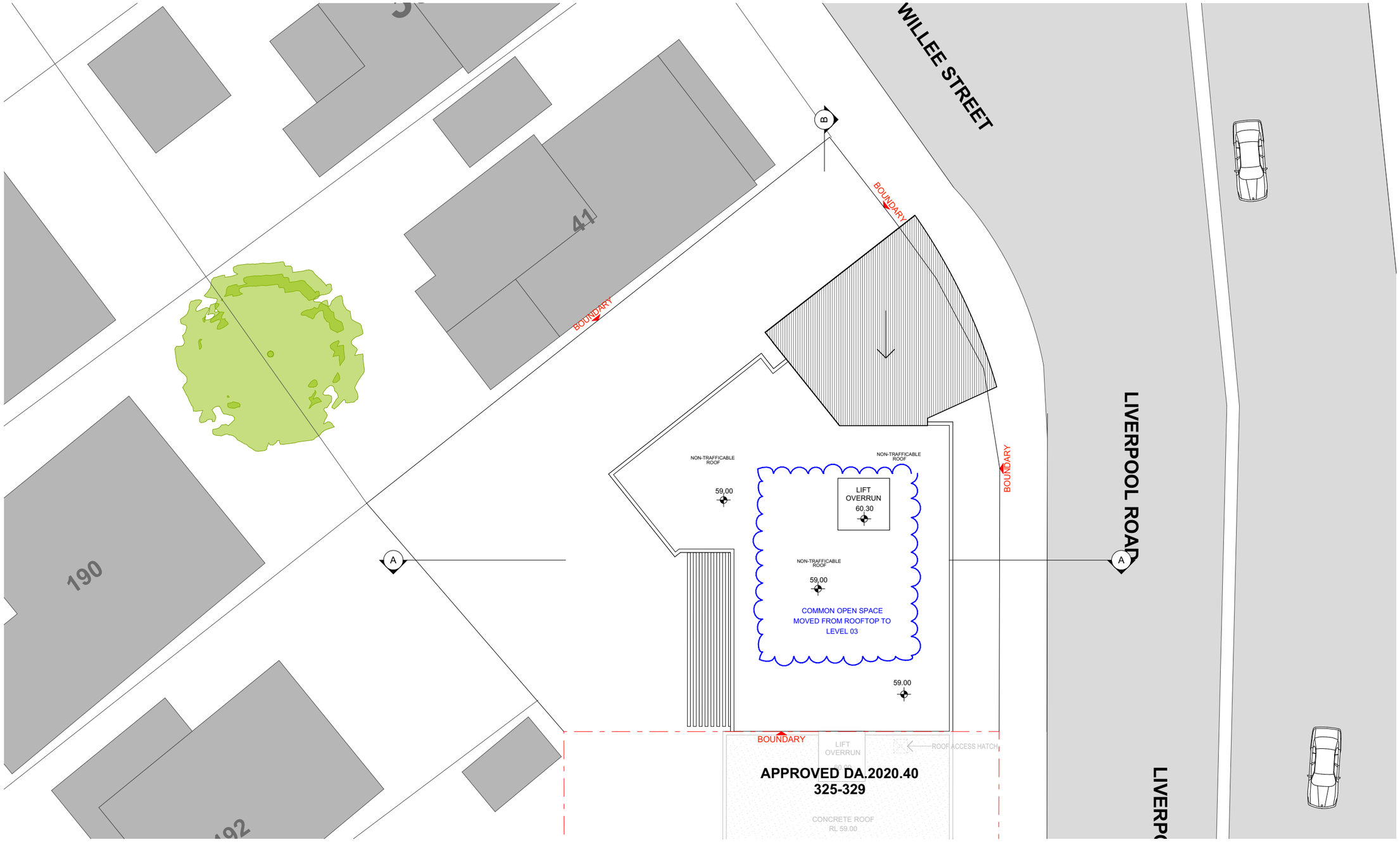
SCALE	DATE	
1:200	12/12/2024	
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
LEVEL 05 PLAN

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1208

ISSUE
B



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0 1 2 5 10M

ROOF PLAN
1:200

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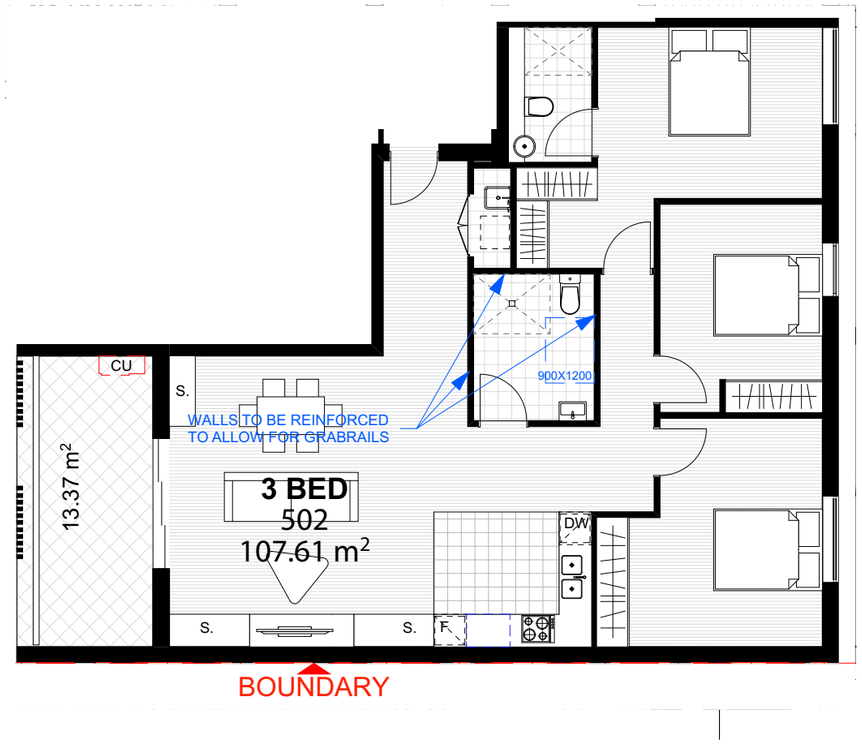
SCALE	DATE	
1:200	12/12/2024	
DRAWN: MO, SN	PROJECT ARCHITECT: GA	PROJECT DIRECTOR: GA, MO

DRAWING NAME
ROOF PLAN

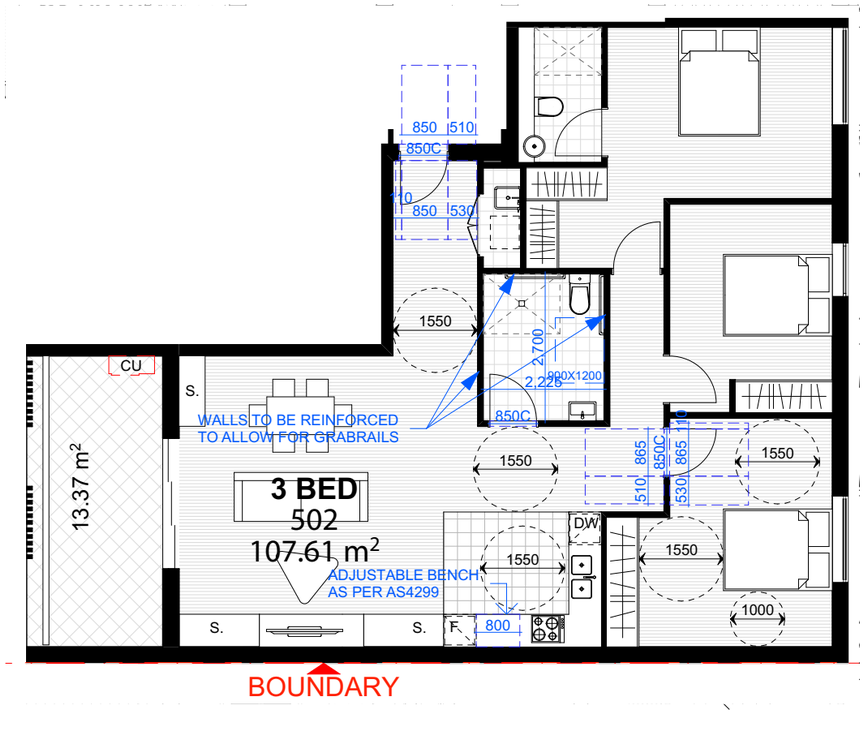
PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1209

ISSUE
B



UNIT 502 PRE ADAPTABLE PLAN
Scale 1:100



UNIT 502 POST ADAPTABLE PLAN
Scale 1:100

SCALE 1:200 @ A3

0 1 2 5 10M

S4.56
MODIFICATION ISSUE A

S4.56
MODIFICATION ISSUE B

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S4.56

Drawing Original Size A3

Issue	Date	Description
A	12/12/24	FOR S4.56

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PROJECT
325-329 LIVERPOOL RD, STRATHFIELD

CLIENT
O and E DEVELOPMENTS PTY LTD

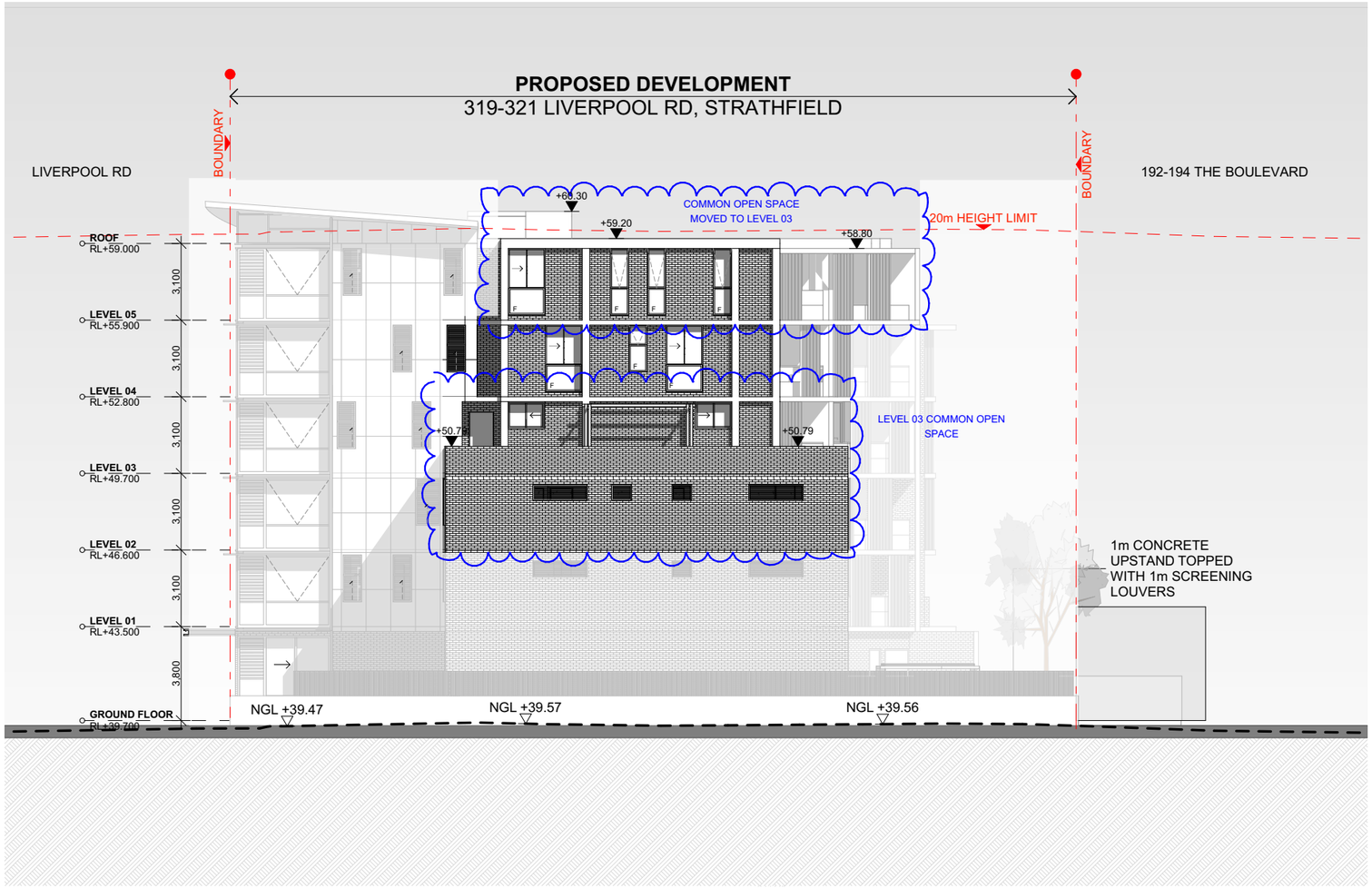
SCALE	DATE	
1:100	12/12/2024	
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
ADAPTABLE ROOM

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1210

ISSUE
A



NORTH ELEVATION
1:200

SCALE 1:200 @ A3

0 1 2 5 10M

S4.56
MODIFICATION ISSUE A

S4.56
MODIFICATION ISSUE B

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S4.56

Drawing Original Size A3

Issue	Date	Description
B	12/12/24	FOR S4.56
A	26/4/21	FOR S4.56

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PROJECT
325-329 LIVERPOOL RD, STRATHFIELD

CLIENT
O and E DEVELOPMENTS PTY LTD

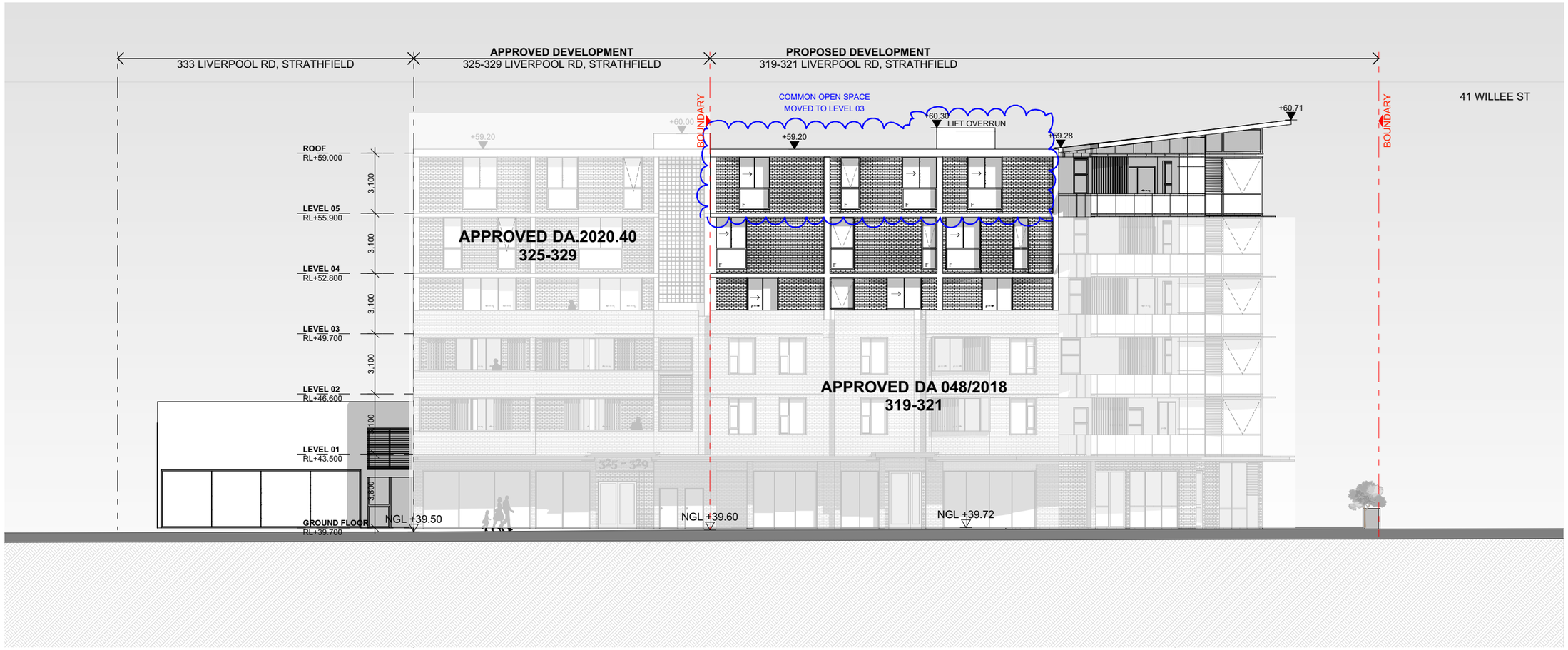
SCALE	DATE	
1:200	12/12/2024	
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
NORTH ELEVATIONS

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1301

ISSUE
B



EAST ELEVATION
1:200

SCALE 1:200 @ A3

0 1 2 5 10M

S4.56
MODIFICATION ISSUE A

S4.56
MODIFICATION ISSUE B

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S4.56

Drawing Original Size A3

Issue	Date	Description
B	12/12/24	FOR S4.56
A	26/4/21	FOR S4.56

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CLIENT
O and E DEVELOPMENTS PTY LTD

SCALE	DATE
1:200	12/12/2024

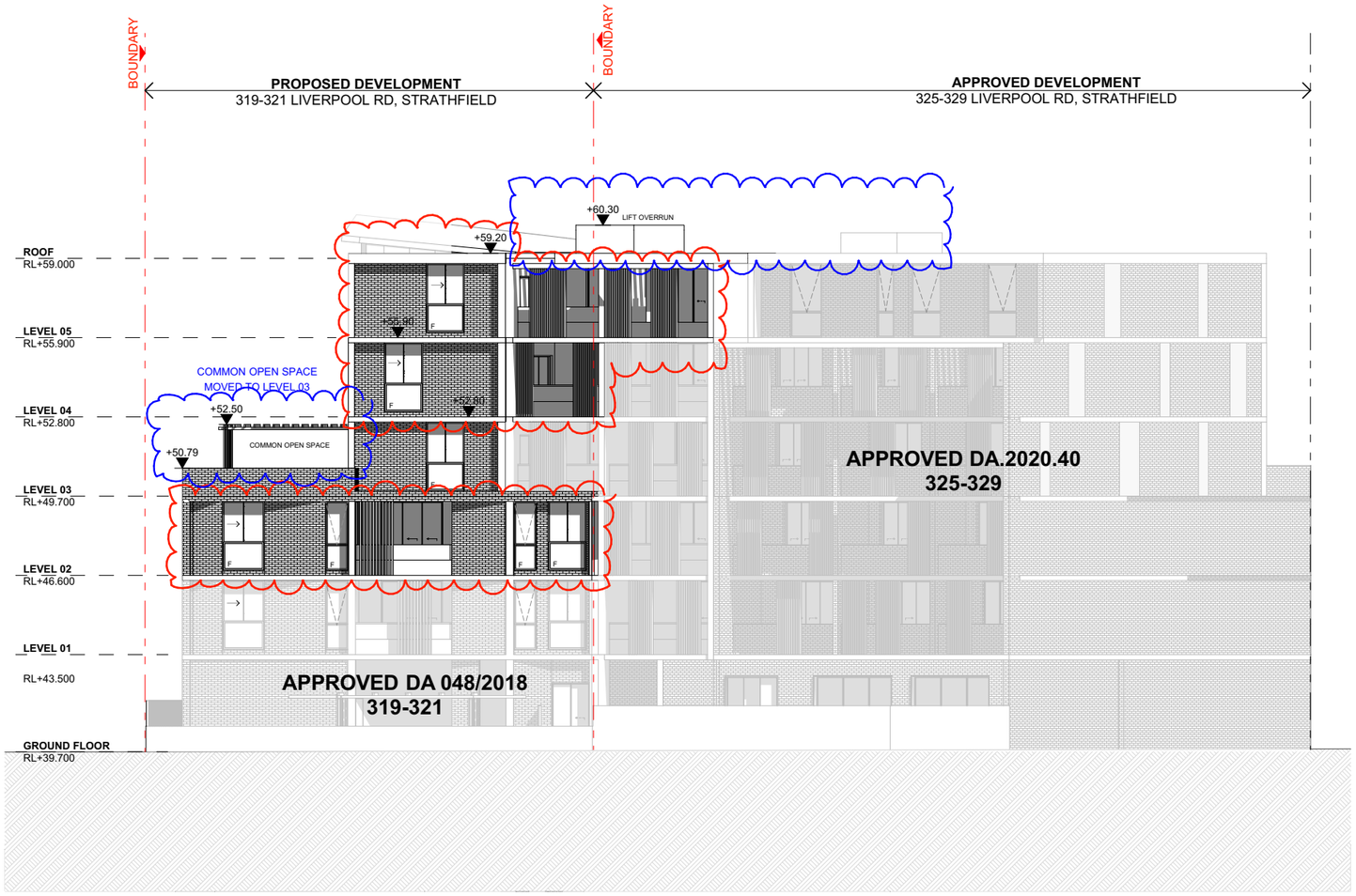
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
EAST ELEVATIONS

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1302

ISSUE
B



WEST ELEVATION
1:200

SCALE 1:200 @ A3

0 1 2 5 10M

S4.56
MODIFICATION ISSUE A

S4.56
MODIFICATION ISSUE B

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B	13/12/24	FOR S4.56
A	26/4/21	FOR S4.56

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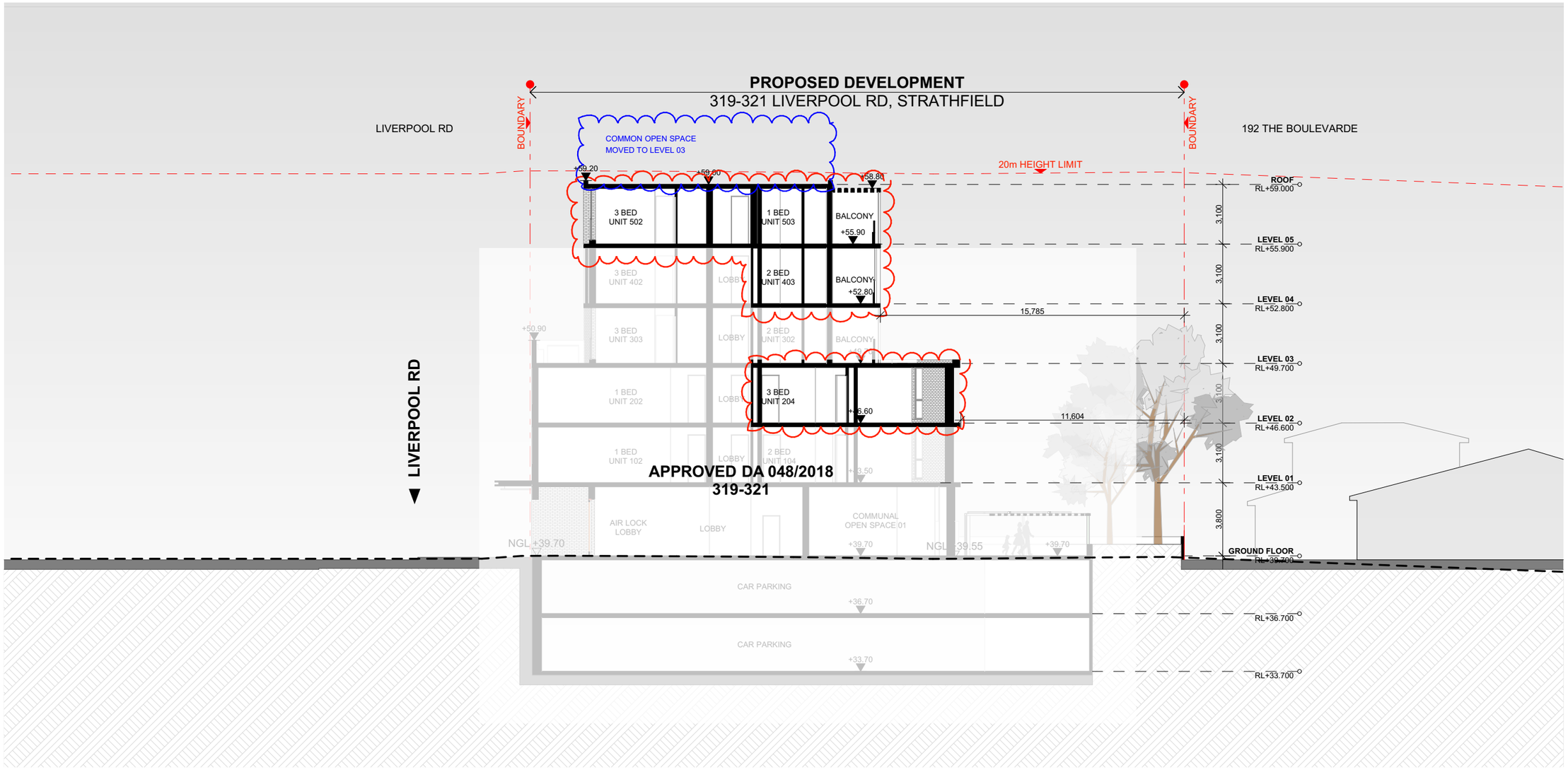
SCALE	DATE	
1:200	12/12/2024	
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
WEST ELEVATIONS

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1303

ISSUE
B



SECTION AA
1:200

SCALE 1:200 @ A3

0 1 2 5 10M

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S4.56
MODIFICATION ISSUE B

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Issue	Date	Description
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A	26/4/21	FOR S4.56

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PROJECT
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CLIENT
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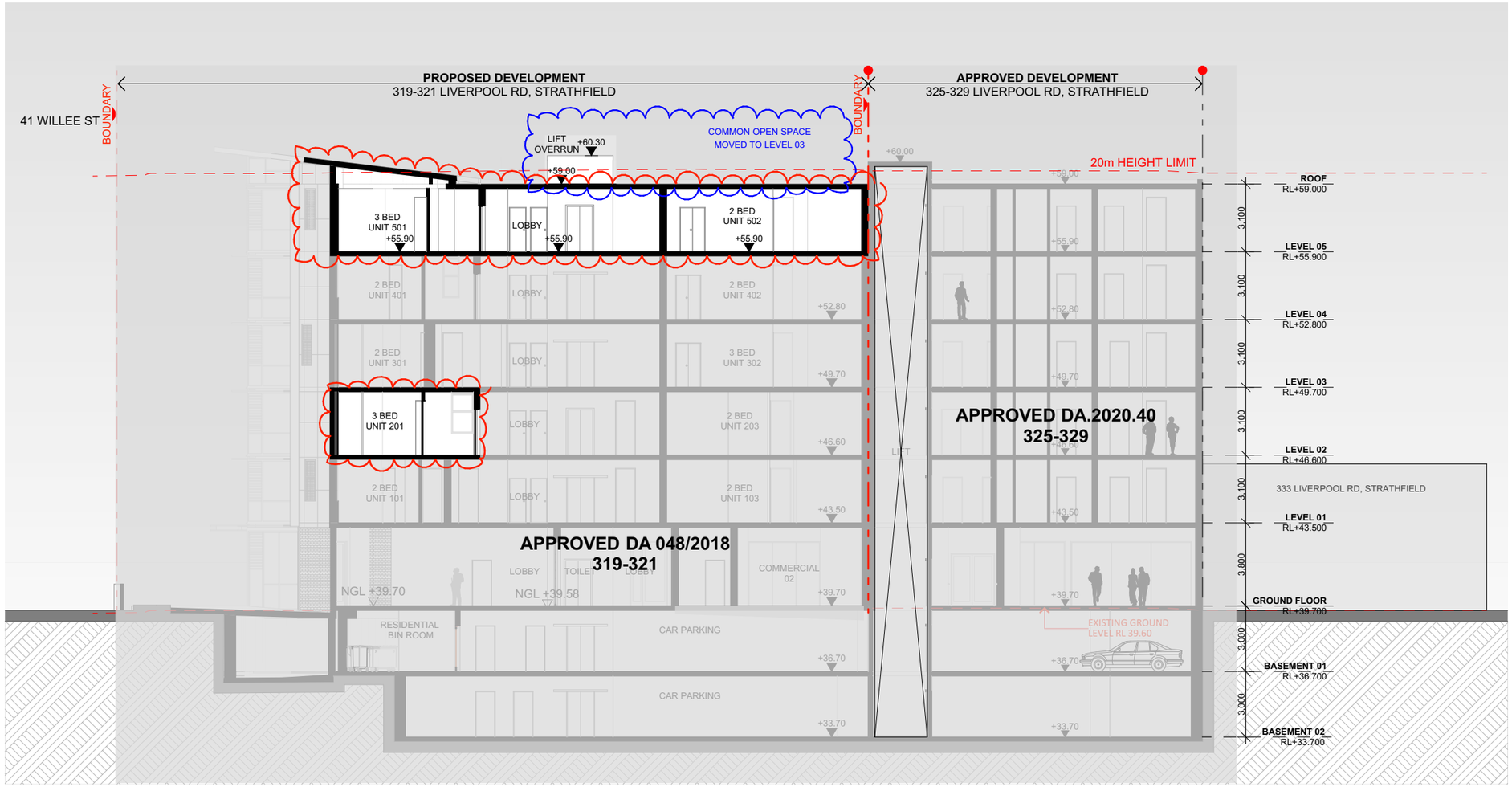
SCALE	DATE	
1:200	12/12/2024	
DRAWN: MO, SN	PROJECT ARCHITECT: GA	PROJECT DIRECTOR: GA, MO

DRAWING NAME
SECTION AA

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1401

ISSUE
B



SECTION BB
1:200

SCALE 1:200 @ A3

0 1 2 5 10M

S4.56 MODIFICATION ISSUE A

S4.56 MODIFICATION ISSUE B

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B	12/12/24	FOR S4.56
A	26/4/21	FOR S4.56

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PROJECT
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CLIENT
O and E DEVELOPMENTS PTY LTD

SCALE	DATE	
1:200	12/12/2024	
DRAWN	PROJECT ARCHITECT	PROJECT DIRECTOR
MO, SN	GA	GA, MO

DRAWING NAME
SECTION BB

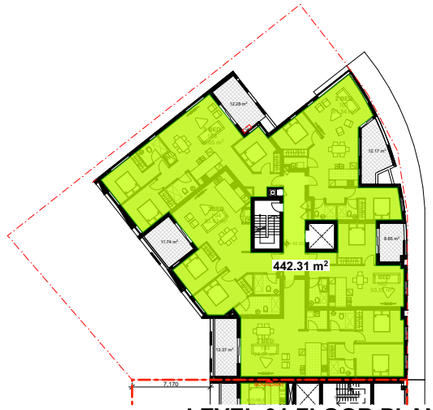
PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 1402

ISSUE
B

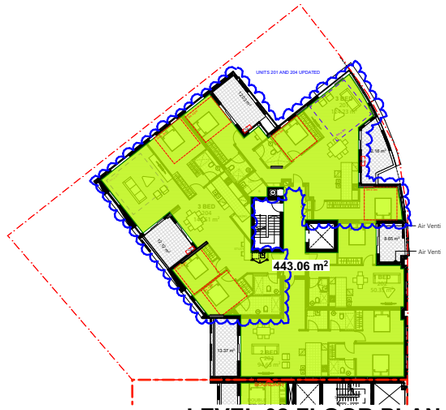
GROUND FLOOR PLAN
Scale 1:500

60.71 SQM
225.27 SQM



LEVEL 01 FLOOR PLAN
Scale 1:500

442.31 SQM



LEVEL 02 FLOOR PLAN
Scale 1:500

443.06 SQM

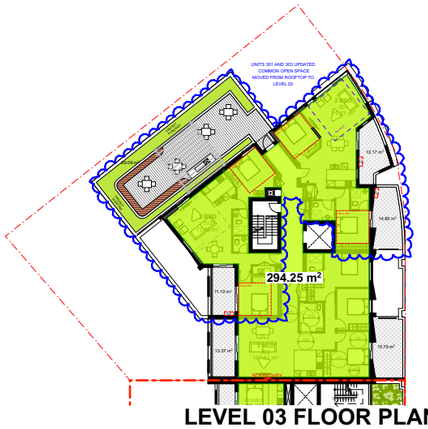
GFA CALCULATION

SITE AREA: 835 SQM
PERMISSIBLE FSR: 2.5:1
PERMISSIBLE GFA: 2087.5 SQM

PERMISSIBLE FSR FOR RESIDENTIAL: 2.2:1
PERMISSIBLE GFA FOR RESIDENTIAL: 1837 SQM

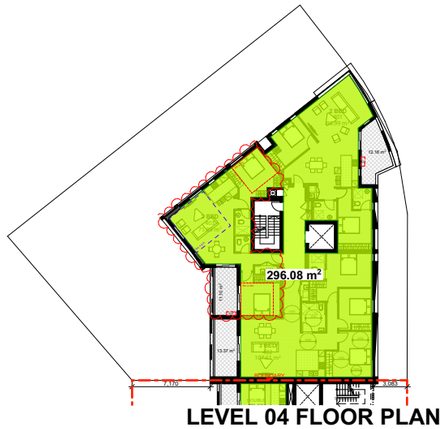
RESIDENTIAL GFA	**1831.25 SQM**
OTHER GFA	**225.27 SQM**

TOTAL GFA: 2056.52 SQM
TOTAL PROPOSED FSR : 2.46 : 1



LEVEL 03 FLOOR PLAN
Scale 1:500

294.25 SQM



LEVEL 04 FLOOR PLAN
Scale 1:500

296.08 SQM

LEVEL 05 FLOOR PLAN
Scale 1:500

294.84 SQM

SCALE 1:200 @ A3

0 1 2 5 10M

S4.56
MODIFICATION ISSUE A

S4.56
MODIFICATION ISSUE B

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Drawing Original Size A3

Issue	Date	Description
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A	26/4/21	FOR S4.56

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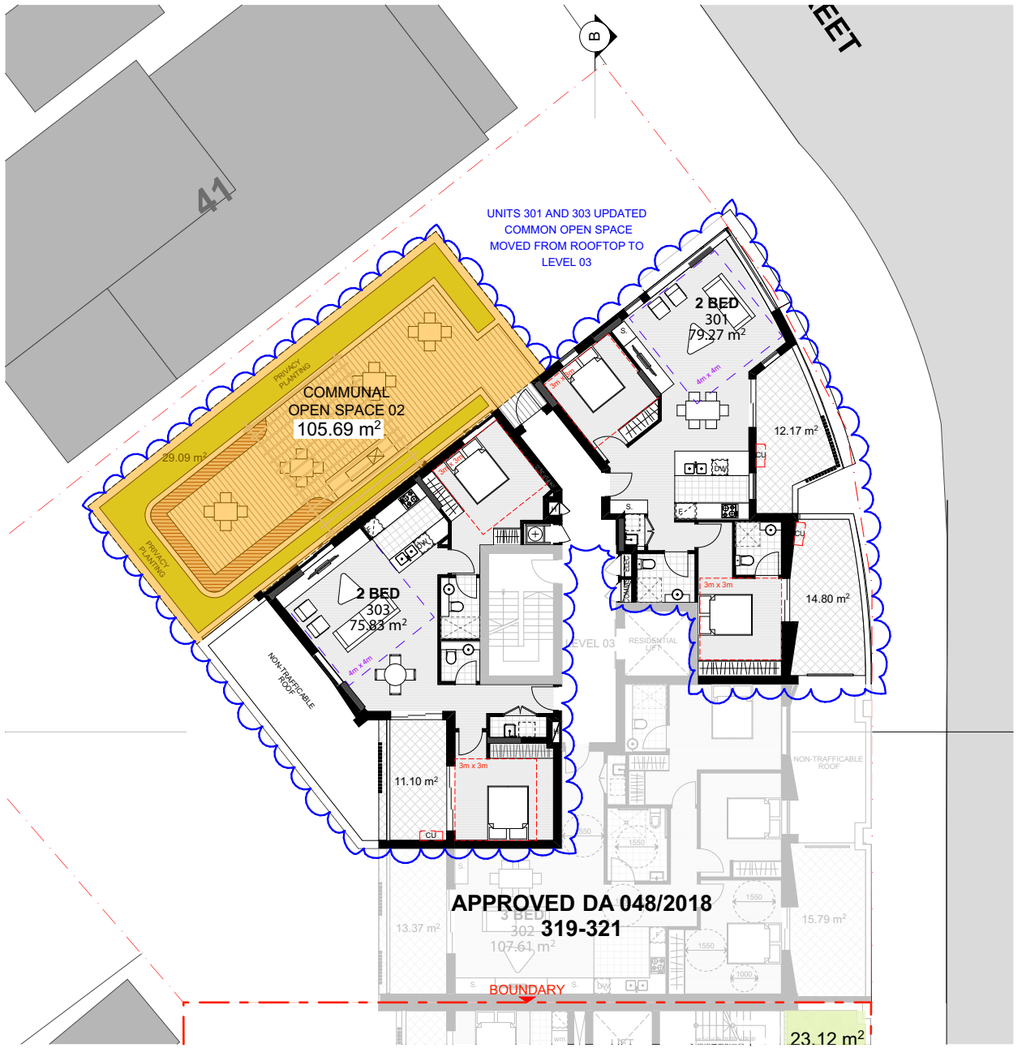
DRAWING NAME
GFA CALCULATION

PROJECT NUMBER: 57.17

DRAWING NUMBER: DA A 2000

ISSUE: B

GROUND FLOOR PLAN
Scale 1:200



LEVEL 06 FLOOR PLAN
Scale 1:200

LANDSCAPE CALCULATION

- DEEP SOIL
- LANDSCAPING
- COMMUNAL OPEN SPACE

SITE AREA: 835 SQM

DEEP SOIL: 98.40 SQM (11.78%)

LANDSCAPING ON TOP OF BASEMENT 01 : 21.28 SQM

LANDSCAPING AT LEVEL 03 - PLANTER BOXES: 29.09 SQM

TOTAL LANDSCAPING: 98.40+ 21.28+ 29.09 = 148.77 SQM **(17.8%)**

TOTAL COS: **280.52 SQM (33.6%)**

S4.56 MODIFICATION ISSUE A

S4.56 MODIFICATION ISSUE B

SCALE 1:200 @ A3

0 1 2 5 10M

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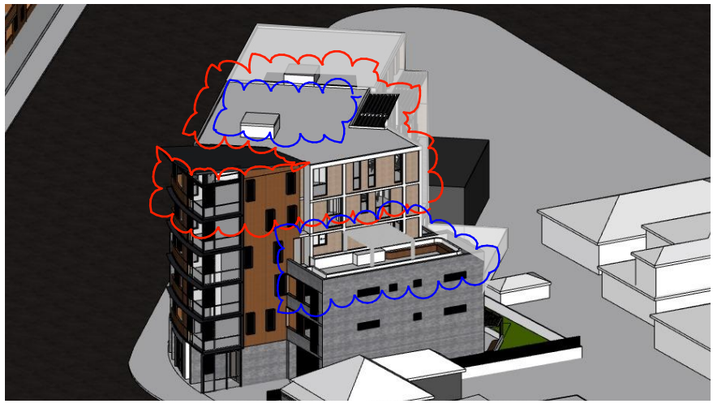
SCALE	DATE	
1:200	30/09/2019	
DRAWN: MO, SN	PROJECT ARCHITECT: GA	PROJECT DIRECTOR: GA, MO

DRAWING NAME
LANDSCAPE CALCULATION

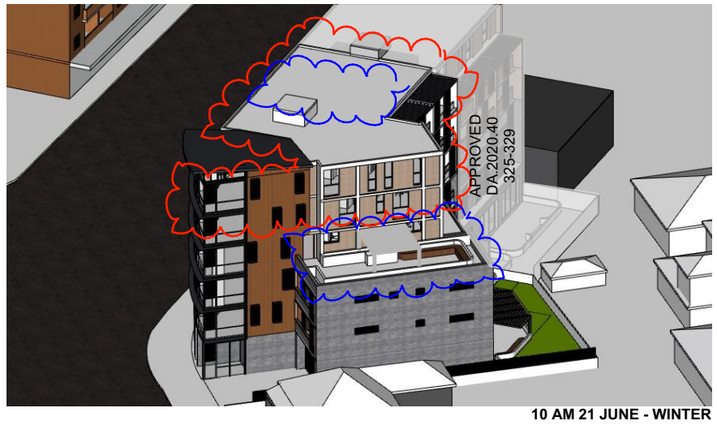
PROJECT NUMBER **57.17**

DRAWING NUMBER **DA A 2030**

ISSUE **B**



9 AM 21 JUNE - WINTER SOLSTICE



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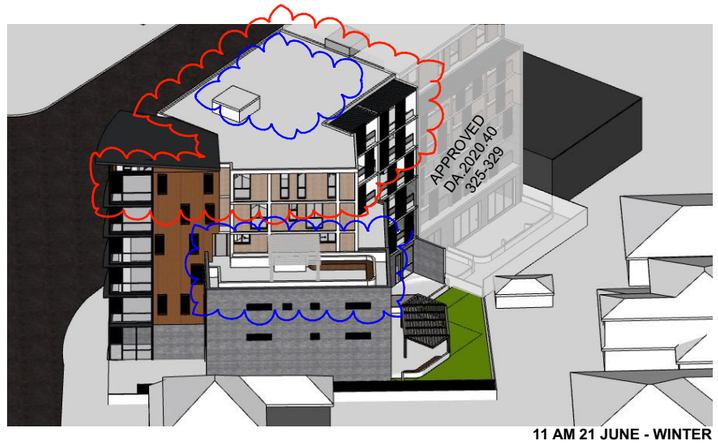

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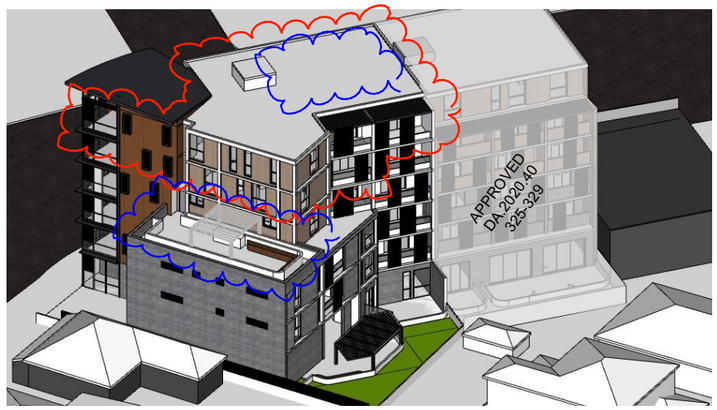
12 PM 21 JUNE - WINTER SOLSTICE



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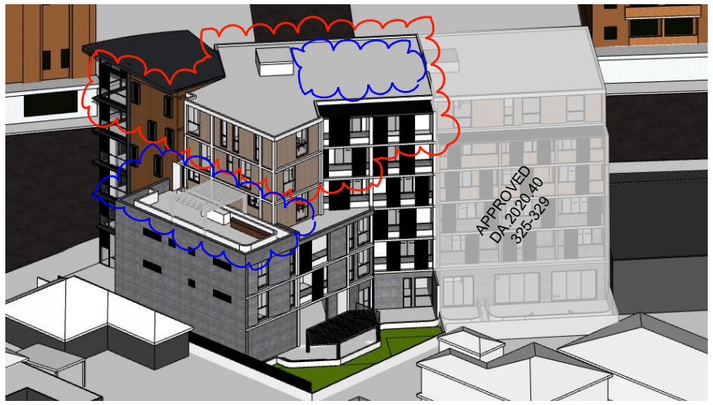

2 PM 21 JUNE - WINTER SOLSTICE

3 PM 21 JUNE - WINTER SOLSTICE

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SCALE	DATE	
1:250	12/12/2024	
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MO, SN	GA	GA, MO

DRAWING NAME
SOLAR ACCESS DIAGRAM 3D 21 JUNE

PROJECT NUMBER 57.17

DRAWING NUMBER DA A 2150

ISSUE B

FRONT ELEVATION
1:200

A - ALUMINIUM BATTENS
- HORIZONTAL LOUVRES
- WINDOW/ SLIDING DOOR FRAMES

POWDER COATED DULUX "MONUMENT"

B AUSTRAL BRICKS "METALLIX BLACKSTONE"

C - ALUMINIUM BATTENS
- WINDOW FRAMES
- BALCONY FRAMES

POWDER COATED DULUX "DOESKIN"

D AUSTRAL BRICKS "SIMMENTAL SILVER"

E DARK GREY RENDER DULUX "MONUMENT"

F LIGHT GREY RENDER DULUX "LEXICON"

G GLASS BLOCK

H ALUMINIUM PANEL CLADDING

SCALE 1:200 @ A3

0 1 2 5 10M

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DRAWING NAME
MATERIAL SCHEDULE 01

PROJECT NUMBER
57.17

DRAWING NUMBER
DA A 2201

ISSUE
A

ELEVATION 02
1:200

REAR ELEVATION
1:200

A - ALUMINIUM BATTENS
- HORIZONTAL LOUVRES
- WINDOW/ SLIDING DOOR FRAMES

POWDER COATED DULUX "MONUMENT"

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0 1 2 5 10M

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MATERIAL SCHEDULE 02

PROJECT NUMBER **57.17**

DRAWING NUMBER **DA A 2202**

ISSUE **A**

STATEMENT OF ENVIRONMENTAL EFFECTS

319-321 Liverpool Road, Strathfield NSW

Section 4.55(2) modification to DA 48/2018 for a mixed use development comprising commercial premises and a residential flat building

29 April 2021 | P402

Weir Phillips Heritage and Planning

Level 19, 100 William Street, Sydney, NSW 2011
Phone: (02) 8076 5317

Report Preparation	
Associate Director	Philip North, BAppSc(EnvDes), BArch, MURP, GradCertHeritCons, RAIA RIBA MPIA CPP
Consultant	N.P.

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Table of Contents

1.0	**INTRODUCTION**	**4**
1.1	Purpose	4
1.2	Summary of Compliance	4
1.3	Material Relied Upon	4
2.0	**THE SITE**	**5**
2.1	Site Location	5
2.2	Site Surrounds	6
2.3	The Site	7
2.4	Existing Site Features	8
2.5	Previous Development Consents	8
3.0	**THE PROPOSAL**	**9**
3.1	Proposed Modification	9
3.2	Modified Development Data	10
4.0	**CONSENT AUTHORITY**	**10**
5.0	**SECTION 4.55(2)**	**10**
6.0	**ENVIRONMENTAL PLANNING ASSESSMENT**	**12**
6.1	Section 4.15(1)(a)(i): Environmental Planning Instruments	12
6.1.1	SEPP No. 55: Remediation of Land	12
6.1.3	State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004	13
6.1.4	State Environmental Planning Policy (Infrastructure) 2007	13
6.1.5	Burwood Local Environmental Plan 2012	14
6.2	Section 4.15(1)(a)(ii) – Draft Environmental Planning Instruments	18
6.3	Section 4.15(1)(a)(iii) – Development Control Plans	18
6.3.1	Burwood Development Control Plan 2013	19
6.4	Section 4.15(1)(a)(iiia) Planning Agreements	22
6.5	Section 4.15(1)(a)(iv) Matters Prescribed by the Regulations	22
6.6	Section 4.15(1)(b) Likely Impacts of the Proposed Development	22
6.6.1	Privacy	22
6.6.2	Streetscape	23
6.6.3	Overshadowing	23
6.7	Section 4.15(1)(c) – Suitability of the Site for Development	23
6.8	Section 4.15(1)(d) – Submissions	23
6.9	Section 4.15(1)(e) – Public Interest	23
7.0	**CONCLUSION**	**23**

1.0 INTRODUCTION

1.1 Purpose

This Statement of Environmental Effects has been prepared in accordance with Schedule 1(2)(1)(c) of the Environmental Planning and Assessment Regulation 2000 ('EPA Reg. 2000') for the purposes of indicating, as required, the following:

(a) the environmental impacts of the development,

(b) how the environmental impacts of the development have been identified,

(c) the steps to be taken to protect the environment or to lessen the expected harm to the environment,

(d) any matters required to be indicated by any guidelines issued by the Planning Secretary for the purposes of this clause.

It has been prepared to accompany an application for modification under section 4.55(2) to an existing consent DA 48/2018 for a mixed-use development comprising commercial premises and a residential flat building at 319-321 Liverpool Road, Strathfield Hill NSW.

1.2 Summary of Compliance

Performance against Council's general numerical controls is summarised as follows:

General Development Data					
Site Area:		**Zone**	**Heritage**		
835m²		• B2 Local Centre	N/A		
Summary Numerical Compliance Table					
Planning Document	**Standard**	**Control**	**Approved**	**Proposed**	**Comp**
BLEP 2012	Zone	B2 Local Centre	Residential flat building	No change.	N/A
			Commercial premises	No change.	N/A
BLEP 2012	Height	20m	Complies	23.23m	N
BLEP 2012	FSR	2.5:1 (2087.5m²)	2.065:1 (1724.75m²)	2.46:1 (2,057.13m²)	Y
Legend: Y=Complies, N = Does not Comply, C = Condition of consent, N/A = Not applicable, A = Does not strictly comply but acceptable					

As can be seen above, the modifications would alter the height of building control. However, the proposal would align with the five-storey development approved for the adjoining site at 325-329 Liverpool Road, and with the desired future character of the mixed-use precinct envisaged by Council.

1.3 Material Relied Upon

This Statement of Environmental Effects is based upon the following material:

- Architectural Plans by Ghazi Al Ali Architects;
- Site Survey;
- Applicable planning legislation.

2.0 THE SITE

2.1 Site Location

The site is located at 319-321 Liverpool Road, Strathfield NSW in the Burwood Local Government Area. It is located in close proximity to the corner of the intersection of Liverpool Road with The Boulevarde. It is approximately the following distances from:

- Enfield Public School: 750m
- Enfield Aquatic Centre: 950m
- Strathfield Park: 1km
- Henley Park: 1.5km
- Woolworths Strathfield: 1.6km
- Strathfield Railway Station: 1.8km
- Burwood Railway Station: 2.0km
- Sydney CBD: 12.2km.

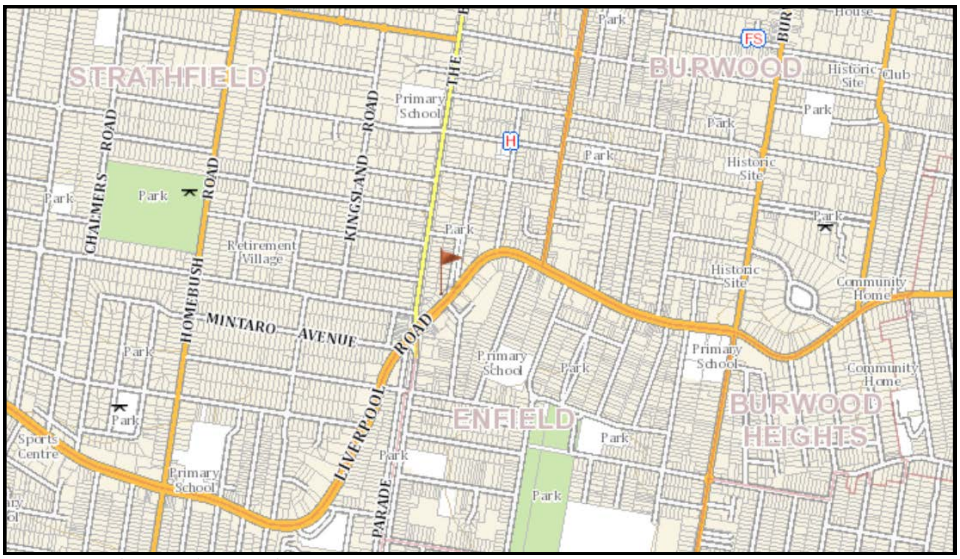

Figure 1: Site location (SIX Maps).

2.2 Site Surrounds

The site is located in a precinct undergoing transition from low to higher density development. To the north of the site is 41 Willee Street and to the south-west is located 325-329 Liverpool Road, for which development approval has been granted for a five-storey development.

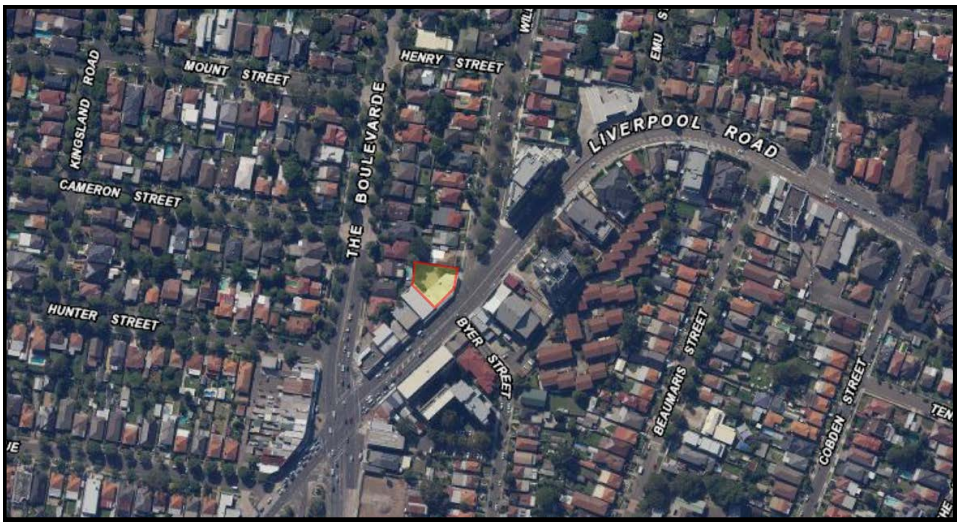

Figure 2: Site surrounds (SIX Maps).

Figure 3: Liverpool Road looking north east showing the site on the left.

Figure 4: Liverpool Road looking south west showing the site on the right.

2.3 The Site

The site consists of an irregularly shaped allotment on Liverpool Road.

Numerical Site Data					
Street Address	**Lot No.**	**Section**	**Deposited Plan**	**Dimensions**	**Total Site Area**
319-321 Liverpool Road, Strathfield	1	-	236134	Various	835m²
TOTAL					**835m²**

Figure 5: Aerial photo of the site (SIX Maps).

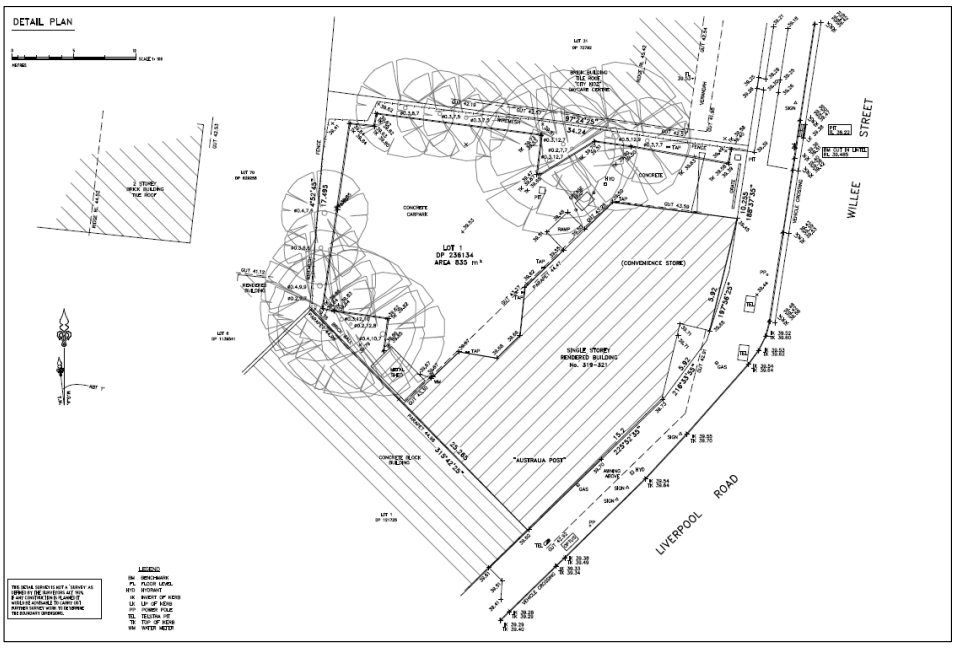

Figure 6: Survey of the site.

2.4 Existing Site Features

Demolition and construction works have commenced on the site based on the previous consents.

2.5 Previous Development Consents

The site benefits from the following development consents:

Summary of Previous Consents		
DA No.	**Description**	**Determination**
48/2018	Demolition of existing structures and construction of a six-storey mixed use development comprising two commercial premises at ground floor, 17 apartments and two levels of basement car parking for 25 cars and 8 bicycles.	Approved: 22.11.2019
48/2018 S4.55 modification	Modify approved basement layouts on Level 2, 1 and Ground Level to facilitate vehicular access through No. 319-321 Liverpool Road to the adjoining development at No. 325-329 Liverpool Road, Strathfield, by establishing an easement (right of way) and the relocation of 3 car parking spaces of No. 319-321 Liverpool Road, to the adjoining basement car parking level at No. 325-329 Liverpool Road.	Approved: 12.08.2020

3.0 THE PROPOSAL

3.1 Proposed Modification

The proposal involves modifications to the existing consent as follows:

Basement:

- Deletion of commercial lift and replacement with plant room.

Ground Floor:

- Deletion of commercial lift and increase in size of commercial area.

Level 2:

- Unit 201 and 204 redesigned and extended over the non-trafficable area and converted to a three bedroom unit.

Level 3:

- The addition of a non-trafficable roof above the three-bedroom Unit 201 and 204.

Level 4:

- 1 bedroom Unit 403 redesigned and converted to a 2 bedroom unit.

Level 5:

- Communal open space relocated to the rooftop;
- 2 bedroom Unit 501 redesigned and converted to a 3 bedroom unit;
- 3 bedroom Unit 502 added;
- 1 bedroom Unit 503 added.

Level 6:

- Addition of relocated communal open space.

The resultant modified development summary is shown below:

Development Summary			
Item		**Approved**	**Proposed**
Proposed Use		Residential flat building	No change.
		Commercial premises	No change.
Storeys		6	No change.
GFA		1,724.75m²	2,057.13m²
Dwellings	**Total**	17	19
	1 bed	4	4
	2 bed	10	8
	3 bed	3	7
Commercial units		2	No change.
Parking	Total	25 car spaces (incl. disabled) 8 bicycles	No change.

3.2 Modified Development Data

The modified proposal is as follows.

Level	Unit No	Unit type/beds				Internal Area m²	Balcony Area m²
		1	2	3	Commercial		
Ground	Comm. 01				X	75.48	
	Comm. 02				X	91.07	
	G01	X				60.71	23.29
First	101		X			81.34	12.17
	102	X				50.33	8.65
	103		X			94.63	13.37
	104		X			85.43	11.74
	105			X		96.65	12.28
Second	201			X		124.23	24.44
	202	X				50.33	8.65
	203		X			94.63	13.37
	204			X		144.51	12.12
Third	301		X			86.98	26.97
	302			X		107.61	13.37
	303		X			75.83	11.10
Fourth	401		X			86.99	12.16
	402			X		107.61	13.37
	403		X			75.83	11.10
Fifth	501			X		100.55	12.17
	502			X		107.61	13.37
	503	X				63.09	11.10
TOTALS	**19**	**4**	**8**	**7**	**2**		

4.0 CONSENT AUTHORITY

Under section 4.5 of the Environmental Planning and Assessment Act, 1979 (EP&A Act), Burwood Council is the consent authority for the land on which the development is proposed.

5.0 SECTION 4.55(2)

MODIFICATION OF CONSENT INVOLVING MINIMAL ENVIRONMENTAL IMPACT

Under Section 4.55(2) of the Environmental Planning and Assessment Act, 1979, a consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:

s4.55(2) clause	Provision	Performance	Compliance
(a)	it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as	The proposed amendments would not alter the substance of the approved development in that: • The use would be unchanged. • The footprint would remain the same;	Y

	originally granted was modified (if at all),	• The overall height would remain substantially the same; • The overall bulk and scale would remain substantially the same; and • The general appearance would remain substantially the same.	
(b)	it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 5) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent	Not applicable.	N/A
(c)	it has notified the application in accordance with: (i) the regulations, if the regulations so require, or (ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and	The onus is on the consent authority to suitably notify the application.	N/A
(d)	it has considered any submissions made concerning the proposed modification within the period prescribed by the regulations or provided by the development control plan, as the case may be.	The onus is on the consent authority to consider any submissions.	N/A

6.0 ENVIRONMENTAL PLANNING ASSESSMENT

This section provides an environmental assessment of the proposed development in respect of the relevant matters for consideration under Section 4.15(1) of the Environmental Planning and Assessment Act, 1979 (EP&A Act).

Under Section 4.15(1), the consent authority must take into consideration the provisions of:

1) Section 4.15(1)(a)(i) Environmental Planning Instruments;
2) Section 4.15(1)(a)(ii) Draft Environmental Planning Instruments;
3) Section 4.15(1)(a)(iii) Development Control Plans;
4) Section 4.15(1)(a)(iii) Planning Agreements;
5) Section 4.15(1)(a)(iv) The Regulations;
6) Section 4.15(1)(b) Likely impacts of the development on natural and built environments;
7) Section 4.15(1)(c) Suitability of site for the development;
8) Section 4.15(1)(d) Submissions; and
9) Section 4.15(1)(e) The public interest.

6.1 Section 4.15(1)(a)(i): Environmental Planning Instruments

The relevant environmental planning instruments applicable to this proposal include:

- State Environmental Planning Policy No. 55 (SEPP No. 55) - Remediation of Land
- State Environmental Planning Policy No. 65 - Design Quality of Residential Apartment Development
- State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004
- State Environmental Planning Policy (Infrastructure) 2007
- Burwood Local Environmental Plan 2012

6.1.1 SEPP No. 55: Remediation of Land

Under clause 7 of the State Environmental Planning Policy No. 55 (SEPP No. 55): Remediation of Land, Council cannot consent to the carrying out any development on land unless it has considered whether the land is contaminated, and if so, it is satisfied that the land is suitable (or will be suitable after remediation) for the purpose for which the proposed development is to be carried out.

Remediation of the site has been addressed under the initial development consent.

6.1.2 State Environmental Planning Policy No. 65 - Design Quality of Residential Apartment Development (SEPP No. 65):

SEPP 65 applies to development identified in clause 4 of the policy as noted below:

State Environmental Planning Policy No. 65:			
Clause	**Standard**	**Proposed**	**Complies**
4	**Application of Policy**		
4(1)	This Policy applies to development for the purpose of a residential flat building, shop top housing or mixed-use development with a residential accommodation component if:		
4(1)(a)	the development consists of any of the following:		
4(1)(a)(i)	the erection of a new building,	The proposal is for a new building for which development consent has already been granted.	Y
4(1)(a)(ii)	the substantial redevelopment or the substantial refurbishment of an existing building,	The proposal is for a new building for which development consent has already been granted.	N/A
4(1)(b)	the building concerned is at least 3 or more storeys (not including levels below ground level (existing) or levels that are less than 1.2 metres above ground level (existing) that provide for car parking), and	Proposal is more than 3 storeys.	Y
4(1)(c)	the building concerned contains at least 4 or more dwellings.	The proposal contains more than 4 dwellings.	Y

Legend: Y=Complies, N = Does not Comply, C = Condition of consent, N/A = Not applicable, A = Does not strictly comply but acceptable

Accordingly, the proposal is subject to the provisions of SEPP 65.

In accordance with the clause 50(1A) of Environmental Planning and Assessment Regulation 2000:

Environmental Planning and Assessment Regulation 2000:			
Clause	**Standard**	**Proposed**	**Complies**
50(1A)	If a development application that relates to residential apartment development is made on or after the commencement of the *Environmental Planning and Assessment Amendment (Residential Apartment Development) Regulation 2015*, the application must be accompanied by a statement by a qualified designer.	A statement by a qualified designer accompanies the application.	Y
50(1AB)	The statement by the qualified designer must:	See below:	-
50(1AB)(a)	verify that he or she designed, or directed the design, of the development, and	A Design Verification Statement from the design architect accompanies the application.	Y
50(1AB)(b)	provide an explanation that verifies how the development:	See below:	-
50(1AB)(b)(i)	addresses how the design quality principles are achieved, and	A Design Quality Principles Statement from the design architect accompanies the application.	Y
50(1AB)(b)(ii)	demonstrates, in terms of the Apartment Design Guide, how the objectives in Parts 3 and 4 of that guide have been achieved.	An Apartment Design Guide Statement from the design architect accompanies the application.	Y
Legend: Y=Complies, N = Does not Comply, C = Condition of consent, N/A = Not applicable, A = Does not strictly comply but acceptable			

The accompanying documentation verifies that the proposal is consistent with the provisions of SEPP 65.

6.1.3 State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004

The proposal is development which is subject to this policy. Accordingly, the application is accompanied by an amended BASIX certificate.

6.1.4 State Environmental Planning Policy (Infrastructure) 2007

The proposal is located on a site with frontage to a classified road and as such is subject to the provisions of the SEPP.

State Environmental Planning Policy (Infrastructure) 2007 Summary Compliance Table				
Clause No.	**Standard**	**Approved**	**Proposed**	**Complies**
101	**Development with frontage to classified road**			
101(2)	The consent authority must not grant consent to development on land that has a frontage to a classified road unless it is satisfied that:			
101(2)(a)	where practicable, vehicular access to the land is provided by a road other than the classified road, and	Vehicular access would be provided via Willee Street.	No change.	N/A
101(2)(b)	the safety, efficiency and ongoing operation of the classified road will not be adversely affected by the development as a result of:			

State Environmental Planning Policy (Infrastructure) 2007 Summary Compliance Table				
Clause No.	**Standard**	**Approved**	**Proposed**	**Complies**
(i)	the design of the vehicular access to the land, or	Design of the vehicular access to the Site has been approved as part of a previous 4.55 amendment.	No change.	N/A
(ii)	the emission of smoke or dust from the development, or	The proposal would result in minimal emission of smoke or dust.	No change.	N/A
(iii)	the nature, volume or frequency of vehicles using the classified road to gain access to the land, and	The number of parking spaces has been approved as part of a previous 4.55 amendment.	No change.	N/A
101(2)(c)	the development is of a type that is not sensitive to traffic noise or vehicle emissions, or is appropriately located and designed, or includes measures, to ameliorate potential traffic noise or vehicle emissions within the site of the development arising from the adjacent classified road.	Being a residential development, the proposal is inherently sensitive to traffic noise. Nevertheless, adequate measures have been implemented in the form of louvres to protect the inhabitants from excessive traffic noise.	No change.	N/A
Legend: Y=Complies, N = Does not Comply, C = Condition of consent, N/A = Not applicable, A = Does not strictly comply but acceptable				

6.1.5 Burwood Local Environmental Plan 2012

The proposed development is subject to the provisions of the Burwood Local Environmental Plan 2012 (BLEP 2012).

6.1.5.1 Zoning:

Clause 2.2: Zoning of land to which this clause applies: The site is zoned B2 Local Centre under the BLEP 2012.

6.1.5.2 Zone Objectives and land use table:

Clause 2.3: Zone objectives and land use table specifies the following objectives for the zone:

- *To provide a range of retail, business, entertainment and community uses that serve the needs of people who live in, work in and visit the local area.*
- *To encourage employment opportunities in accessible locations.*
- *To maximise public transport patronage and encourage walking and cycling.*

6.1.5.3 Land use table:

Clause 2.3: Zone objectives and land use table specifies the following land uses permitted in the zone:

Attached dwellings; Boarding houses; Centre-based child care facilities; ***Commercial premises****; Community facilities; Dwelling houses; Educational establishments; Entertainment facilities; Function centres; Group homes; Home industries; Hostels; Information and education facilities; Medical centres; Oyster aquaculture; Passenger transport facilities; Recreation facilities (indoor); Registered clubs;* ***Residential flat buildings****; Respite day care centres; Restricted premises; Seniors housing; Service stations; Shop top housing; Tank-based aquaculture; Tourist and visitor accommodation; Any other development not specified in item 2 or 4*

The proposal is defined as both a *commercial premise* and a *residential flat building*, and as such is permissible in the zone.

6.1.5.4 Heritage

The site is not listed as a heritage item nor is it located in a heritage conservation area or in the immediate vicinity of either.

6.1.5.5 Compliance Table:

The following table summarises the relevant clauses of the BLEP 2012 and the performance of the proposal against them.

Burwood Local Environmental Plan 2012 Compliance Table					
Clause	**Clause**	**Standard**	**Approved**	**Proposed**	**Complies**
Part 2	**Permitted or Prohibited Development**				
2.2	Zoning of the land to which Plan applies	Zone B2 Local Centre	Mixed use development including: • Residential flat building; • Commercial premises.	No change	N/A
2.7	Demolition requires development consent	The demolition of a building or work may be carried out only with development consent.	Demolition of the existing structures was sought as part of the application.	No change	N/A
Part 3	**Exempt and complying development**				
Not applicable					
Part 4	**Principal Development Standards**				
4.3	Height	20m	Complies	23.23m	N
4.4	FSR	2.5:1 (2087.5m²)	2.065:1 (1724.75m²)	2.46:1 (2,057.13m²)	Y
4.4A(3)(e)	Exceptions to floor space ratio	Despite clause 4.4, the ratio of the gross floor area of any part of a building used for the purpose of residential accommodation to the site area must not exceed— 2.2:1—if the building is on land in Area 5 Permissible FSR for residential: 2.2:1 (1837m²)	Complies	Proposed residential GFA: 1,831.86m²	Y
4.6	Exceptions to development standards	Written request required to contravene development standard.	This clause does not apply to a modification application.	N/A	N/A
Part 6	**Additional local provisions**				
6.1	Acid Sulfate Soils	Development consent is required for the carrying out of works described in the table to this subclause on land shown on the Acid Sulfate Soils Map as being	Class 5. No works are proposed which would invoke the provisions of this clause.	No change	N/A

Burwood Local Environmental Plan 2012 Compliance Table					
Clause	**Clause**	**Standard**	**Approved**	**Proposed**	**Complies**
		of the class specified for those works. *Class 5 land* Works within 500 metres of adjacent Class 1, 2, 3 or 4 land that is below 5 metres Australian Height Datum and by which the watertable is likely to be lowered below 1 metre Australian Height Datum on adjacent Class 1, 2, 3 or 4 land.			
6.5(2)	Design excellence in Zones B2 and B4	This clause applies to development involving the erection of a new building of 3 or more storeys on land in Zone B2 Local Centre or Zone B4 Mixed Use.	This clause applies to the proposed development.	No change.	N/A
6.5(3)		Development consent must not be granted for development to which this clause applies unless the consent authority is satisfied that the development exhibits design excellence.	Noted. See below.	No change.	N/A
6.5(4)		In deciding whether the development exhibits design excellence, the consent authority must have regard to the following matters— (a) whether a high standard of architectural, landscape and urban design has been achieved (including in the materials used and in detailing appropriate to the location, building type and surrounding buildings), (b) whether the form and external appearance of the proposed building, and ground level detailing, will significantly improve the quality and amenity of the public domain, (c) how any streetscape and heritage issues have been addressed, (d) whether the amenity of the surrounding area, including any view corridors, vistas or	The proposed development • achieves a high standard of architectural design in keeping with the desired future character of the area. • establishes a form and external appearance such that a significant improvement to the streetscape would result. • does not impact on any heritage items or interrupt any significant views in the locality. • provides for pedestrian access from Liverpool Road thus activating the street frontage and provides vehicle access via Willee Street to ensure that traffic generated by the development does	No change.	N/A

Burwood Local Environmental Plan 2012 Compliance Table					
Clause	**Clause**	**Standard**	**Approved**	**Proposed**	**Complies**
		landmark locations, will be adversely affected, (e) how traffic circulation and vehicular access will be addressed and whether the proposed development supports the provision of high quality pedestrian, cycle and service access, (f) whether any adverse effect on pedestrian movement and experience will be avoided (and whether the public transport interchange as the focal point for pedestrian movement in the surrounding area will be reinforced and the ease of pedestrian access to and from that interchange will be facilitated), (g) whether the development supports an integrated land use mix in Zones B2 and B4, including a diversity of public open spaces at the ground level, as well as the roof and other levels of buildings, (h) how the bulk, mass, modulation, separation, setback and height of buildings have been addressed and whether they are appropriate in the context of existing and proposed buildings, (i) whether a high standard of ecologically sustainable design (including low-energy or passive design) will be achieved and overshadowing, wind effects and reflectivity will be minimised.	not directly impact the flow of traffic in Liverpool Road. • provides for a significant area of open space at the rear of the development to allow quality north facing outdoor and communal areas with quality deep soil landscaping. • establishes an appropriate building form and setbacks at the upper levels to ensure that a quality design is provided at the intersection of Liverpool Road with Willee Street.		
Legend: Y=Complies, N = Does not Comply, C = Condition of consent, N/A = Not applicable, A = Does not strictly comply but acceptable					

As can be seen above, the proposed modifications would result in non-compliance of the height of building. It is noted, however, that the portion of the roof currently exceeding the height limit would be that of the lift overrun and the pergola. As most of the development would comply with the 20m height limit, with the non-compliant lift overrun and pergola set back from Liverpool Road and Willee Street, volumetrically, the non-compliance would be viewed minimally from the streetscape.

Although clause 4.6 is not a relevant consideration for a cl. 4.55 modification application, it is nevertheless necessary to consider the performance of the proposal against the objectives of both the zone and the relevant development standards for which variation is sought; refer to the below table for this analysis.

Justification of contravention of development standards against development standard and zone objectives		
Clause	**Objectives**	**Justification**
4.3	**Height of buildings**	
(a)	to achieve high quality built form for all buildings,	The proposed replacement of the communal open space on level 5 with units and the placement of the communal open space on level 6 would align with the five- storey development approved for the adjoining site at 325-329 Liverpool Road, and with the desired future character of the mixed-use precinct envisaged by Council. Further, the lift overrun, and the pergola proposed on the sixth floor would be set back from Liverpool Road and Willee Street, and would be viewed minimally from the streetscape.
(b)	to maintain satisfactory sky exposure and daylight to existing buildings, to the sides and rear of taller buildings and to public areas, including parks, streets and lanes,	The proposal would not materially alter the exposure to sky or daylight for existing buildings or public areas. The small amount of additional shadow would generally be cast over Liverpool Road and not impact the neighbouring properties.
(c)	to provide a transition in built form and land use intensity between different areas having particular regard to the transition between heritage items and other buildings,	The site is located at the corner of Liverpool Road and Willee Street. Along Liverpool Road, it is located adjacent other sites of the same zoning and general height and floor space development standards. Along Willee Street, it is located immediately adjacent sites with a lower scale or density, and the proposal would therefore provide a scale transition so that the building reads as only three storeys adjacent 41 Willee Street. The 3 storey scale adjacent the R2 zone provides a scale transition from 3 to a possible 2 in the context of the R2 zone where a scale transition between properties of one storey is common and acceptable.
(d)	to maintain satisfactory solar access to existing buildings and public areas.	The proposal would not alter solar access to adjacent buildings, or any significant public space given that any additional overshadowing would primarily be cast upon Liverpool Road.
2.3	**Zone B2 – Local Centre**	
	To provide a range of retail, business, entertainment and community uses that serve the needs of people who live in, work in and visit the local area.	The proposal would continue to provide a compatible mixture of both residential and commercial land uses.
	To encourage employment opportunities in accessible locations.	The proposal would continue to provide commercial uses on the ground floor.
	To maximise public transport patronage and encourage walking and cycling.	The proposal would continue to provide for pedestrian access from Liverpool Road thus activating the street frontage. Further, bicycle parking facilities would continue to be provided.

6.1.5.6 Summary:

Given the above, the proposed modification is considered to be consistent with the objectives and specific provisions of the applicable environmental planning instruments.

6.2 Section 4.15(1)(a)(ii) – Draft Environmental Planning Instruments

There are no draft environmental planning instruments applicable to the site.

6.3 Section 4.15(1)(a)(iii) – Development Control Plans

Development control plans applicable to this proposal include:

- Burwood Development Control Plan 2013.

6.3.1 Burwood Development Control Plan 2013

The proposed modified development is subject to the provisions of the *Burwood Development Control Plan 2013* (BDCP 2013).

Burwood Development Control Plan 2013 Summary Compliance Table					
No.	**Standard**	**Required**	**Approved**	**Proposed**	**Complies**
3	**Development in Centres and Corridors**				
3.5	**Area based controls – Local and Neighbourhood Centres**				
3.5.2	**Enfield Local Centre**				
P1	Street Front Setbacks	Development must be built to the street front boundary.	Development would be built to the Liverpool Road street frontage.	No change.	N/A
P2		All development located on a corner site must be built to the street front boundary except the area required for any rear setback.	The proposed development would be built to both street frontages except for the part of the site which would provide vehicular access to the basement car parking.	No change.	N/A
P3		All ground level setbacks are to be finished at-grade with the Council footpath and finished with footpath materials to match Council's current public domain requirements.	All ground level areas of the development would be at grade with the Council footpath.	No change.	N/A
P4		Development at ground level must have an active street frontage (entrances, shop front, glazing) at the same general level as the footpath, and be accessible directly from the street.	The development of commercial units at the ground floor level would ensure that the Liverpool Road frontage of the Site is activated.	No change.	N/A
P5		The front setback area must be free of projections or encroachments, except for approved awnings and at-grade landscaping.	The front setback would be free of projection except for awnings.	No change.	N/A
P1	Podium Height	Development built to the street along Georges River Road, Coronation Parade, Liverpool Road and Burwood Road must not have a podium height greater than 9m.	The podium level at the Liverpool Road frontage would be greater than the 9-metre provision due to the size and shape of the site and it being adjacent to R2 low density residential areas, which requires a	No change.	N/A

Burwood Development Control Plan 2013 Summary Compliance Table					
No.	**Standard**	**Required**	**Approved**	**Proposed**	**Complies**
			different treatment than would otherwise apply. This would push the bulk of the development towards Liverpool Road. It is considered that a variation to this provision is warranted pursuant to clause 4.15(3A).		
P2		Street front development must enhance the existing streetscape and be of a similar scale, form, bulk, placement and character to adjoining and nearby street front development.	The proposed development would significantly enhance the existing streetscape and would be consistent in form to other recently constructed development in the locality.	The proposed development would significantly enhance the existing streetscape and would be consistent in form to other recently constructed development in the locality and the approved development for the adjoining property at 325-329 Liverpool Road.	Y
P3		Buildings on corner sites are to be articulated to address each street frontage and are to define prominent corners.	The proposal would suitably address both Liverpool Road and Willee Street.	No change.	N/A
P1	Secondary Setbacks	Where development exceeds 9m in height, the part of the development above 9m must be set back a minimum of 3m from the street front boundary.	The upper levels of the development have been setback between 2.7 and 3 metres (due to the shape of the site) from the Liverpool Road boundary. The proposed development would meet the objectives of the control.	No change.	N/A
P2		Setback areas must be free of any projections or encroachments, except for lightweight balconies on the front façade.	The proposal would comply with this design requirement.	No change.	N/A
P1	Side and Rear Setbacks	For the residential component of development (shop top housing) refer to the building separation setback provisions of the ADG which supplements SEPP 65 - Design Quality of Residential Apartment	The proposed setbacks would be consistent with the Apartment Design Guide except for the side setback adjoining 41 Willee Street on the lower levels.	No change.	N/A

Burwood Development Control Plan 2013 Summary Compliance Table					
No.	**Standard**	**Required**	**Approved**	**Proposed**	**Complies**
		Development.			
P2		Other development up to 9m in height must be built to the side boundary and setback 5m from a laneway or rear boundary with a lot zoned Residential.	The proposal would meet this design provision.	No change.	N/A
P3		In addition, where a lot adjoins a Residential zone containing residential development, buildings are not to exceed a 45 degree height plane projected over the site and commencing 1.8m above the rear or side boundary, or from the boundary of a laneway (where such exists) and an adjoining Residential zone containing residential development.	The proposed development is bound at the rear and on one side by the R2 Low Density residential zone, however, the adjoining land in Willee Street is not used for residential purposes. The proposed development would have a non-compliance with the 45-degree height plane. A variation to this provision of warranted in that the non-compliance would have negligible impact and meets the objectives of the provision.	No change.	N/A
P4		Where a new laneway is created, it can be used as part of the rear or side setback and for the application of P3.	N/A	N/A	N/A
P5		Side and/or rear setbacks must be free of any projections or encroachments except for at-grade landscaping.	The proposal would comply with this requirement.	No change.	N/A
P1	Building Separation/Frontage	For all development refer to the building separation provisions of the ADG which supplements SEPP 65 - Design Quality of Residential Apartment Development.	The proposed building separation setbacks would be consistent with the Apartment Design Guide except for the side setback adjoining 41 Willee Street on the lower levels.	No change.	N/A
P2		The building separation requirements established under P1 must be shared equally with adjoining development across a	The proposed building separation setbacks would be consistent with the Apartment Design	No change.	N/A

Burwood Development Control Plan 2013 Summary Compliance Table					
No.	**Standard**	**Required**	**Approved**	**Proposed**	**Complies**
		boundary (refer to Figure 8). The applicant must demonstrate that daylight access, urban form, open space and visual and acoustic privacy can be satisfactorily achieved.	Guide except for the side setback adjoining 41 Willee Street on the lower levels.		
P3		The maximum length in any direction of any part of a building parallel to the street above 9m in height is 30m. This portion of the building must be suitably articulated to alleviate building mass and improve building appearance.	The proposal would comply with this provision.	No change.	N/A
P1	Communal Open Space	Accessible communal open space may be provided on rooftops of development.	An accessible rooftop communal open space would be provided.	No change.	N/A
P2		The design of rooftop communal open space must have regard to its visual and acoustic impact and the effects of wind, with suitable screening being provided.	The rooftop communal open space would be set away from Willee Street to minimize any visual or acoustic impacts.	No change.	N/A
P3		For residential development refer to the communal open space provisions of the ADG which supplements SEPP 65 – Design Quality of Residential Apartment Development.	The proposal would comply with the communal open space requirements as specified in the ADG.	No change.	N/A
Legend: Y=Complies, N = Does not Comply, C = Condition of consent, N/A = Not applicable, A = Does not strictly comply but acceptable					

As can be seen above, the modified proposal would generally continue to comply with the development controls applying to the site.

6.4 Section 4.15(1)(a)(iiia) Planning Agreements

The site is not subject to any existing voluntary planning agreements.

6.5 Section 4.15(1)(a)(iv) Matters Prescribed by the Regulations

The proposal would not impact upon the applicable BCA provisions.

6.6 Section 4.15(1)(b) Likely Impacts of the Proposed Development

6.6.1 Privacy

The proposed modification would not alter the privacy impacts of the approved proposal as the modifications are configured primary towards Liverpool Road. The proposed modification along the boundary of 41 Willee Street would have minimal impact to the adjacent property as minimal windows would be placed on the boundary-facing side façade.

6.6.2 Streetscape

The modified proposal would minimally alter the approved streetscape appearance from Liverpool Road. It would be setback and treated in a different, light coloured material to distinguish it from the lower building elements allowing it to read from Liverpool Road as a recessive element. Further, the modified front elevation would be consistent with the approved development for 325-329 Liverpool Road.

6.6.3 Overshadowing

The modifications would not have any additional overshadowing impacts over adjacent properties due to the orientation of the site and the location of the modification and would cast additional shadows primarily over Liverpool Road.

6.7 Section 4.15(1)(c) – Suitability of the Site for Development

The site is suitable for the proposed development:

- It is suitably zoned for the proposal.
- It would not result in unacceptable amenity impacts upon adjacent properties.
- It is consistent with the existing and desired future character of the locality.

6.8 Section 4.15(1)(d) – Submissions

Not applicable prior to public notification of application.

6.9 Section 4.15(1)(e) – Public Interest

The proposed modified development is consistent with the objectives of the Environmental Planning and Assessment Act in so far as it promotes the co-ordinated and orderly, and economic use and development of the land. Given this, the development is consistent with the public interest.

7.0 CONCLUSION

The modified proposal involves an amendment to the mix of apartments provided, the addition of an apartment (three-bedroom) on the second level and two apartments (one-bedroom and three-bedroom) on the fifth level, and the addition of a communal open space on the sixth level. Whilst it would further vary the height standards, it would not alter the amenity impacts upon the streetscape or surrounding properties.

In particular, the modified proposal along Liverpool Road would be treated in a different, light coloured material to distinguish it from the lower building elements allowing it to read from Liverpool Road as a recessive element. It would generally be within the approved envelope and the non-compliant portion of the development would not be perceptible from the street or any public place. The modified proposal would maintain the approved amount of rooftop communal open space and its quality, and not generate adverse impacts in terms of streetscape, amenity, privacy or the like.

Given this, the proposal is consistent with the applicable statutory planning instruments and matters for consideration under section 4.15 and 4.55 of the *Environmental Planning & Assessment Act 1979*.