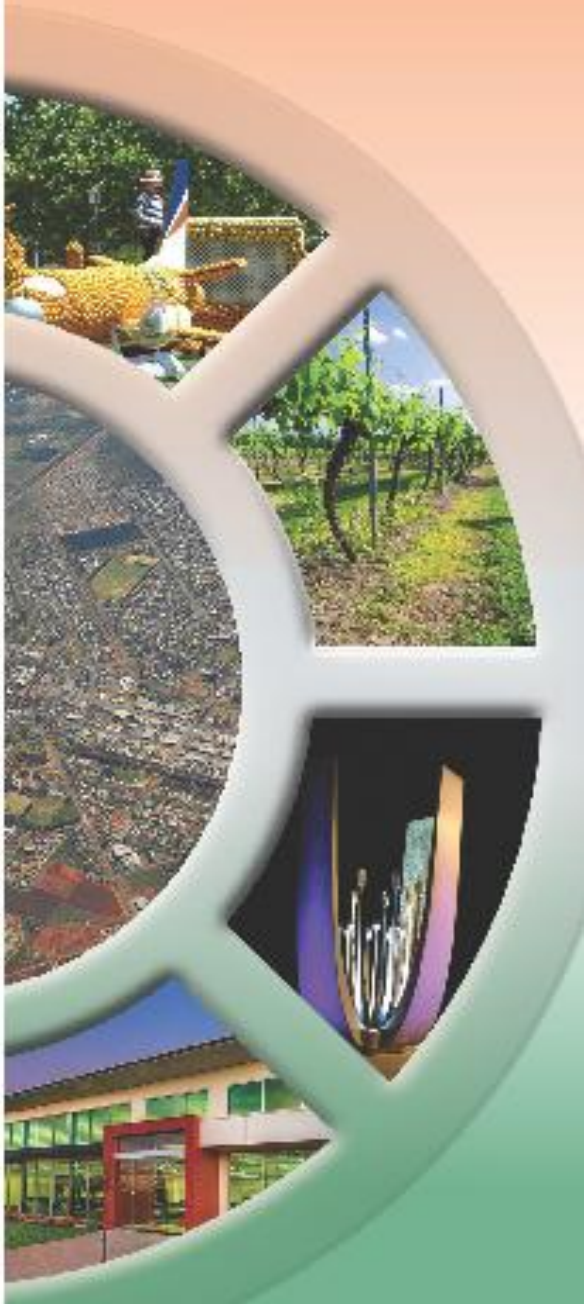
Ordinary Meeting

Tuesday, 27 January 2026

ATTACHMENTS UNDER SEPARATE COVER



CL01 Planning Proposal (PP-2025-1251) Leonard Road, Hanwood

(a) Attachment 1 - Subject Lands Mapping - PP-2025-1251

(b) Attachment 2a - Councils Preliminary Review of PP-2025-1251

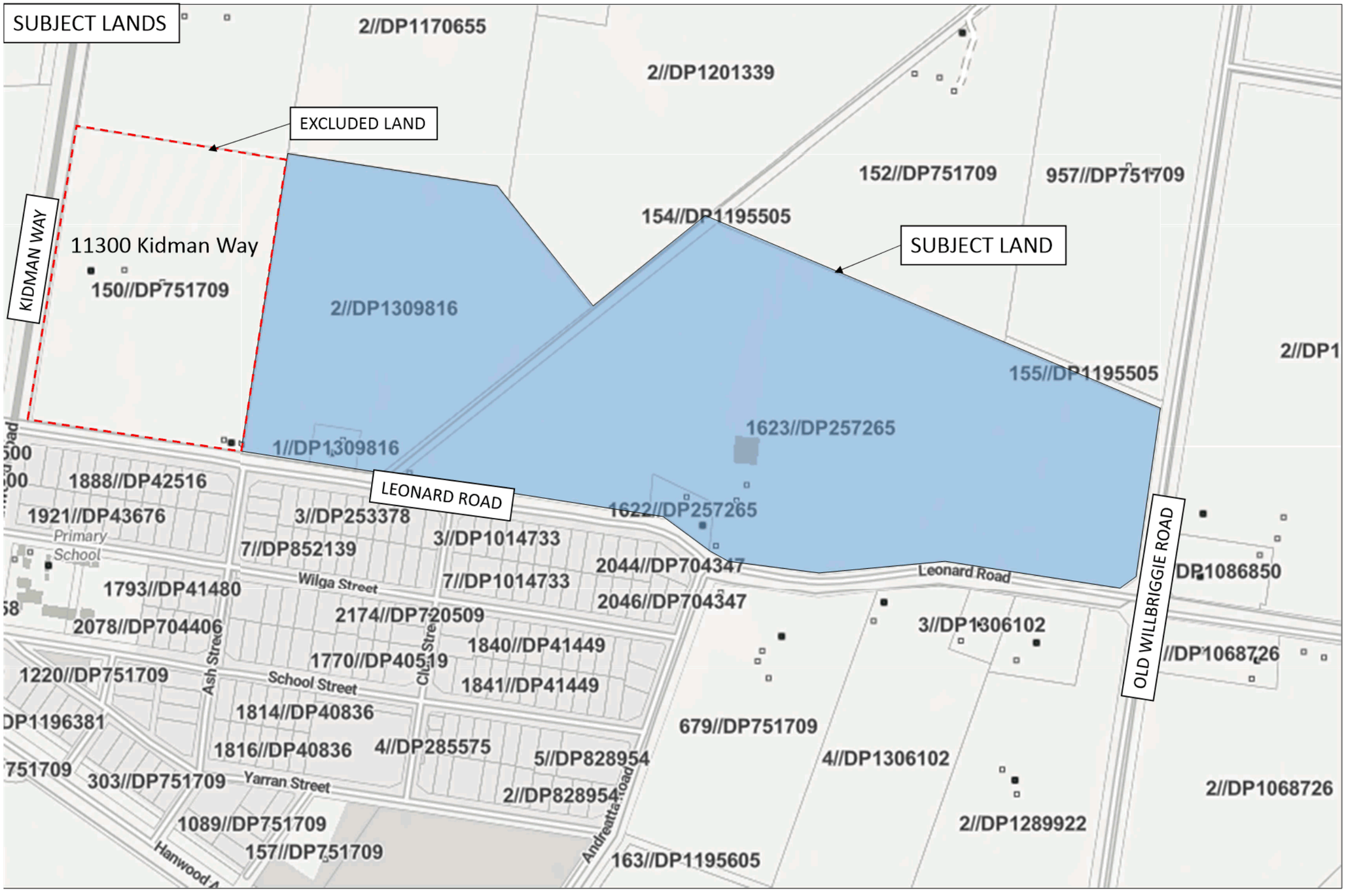
(c) Attachment 2b - Proponents Cover letter response to Council preliminary review PP-2025-1251

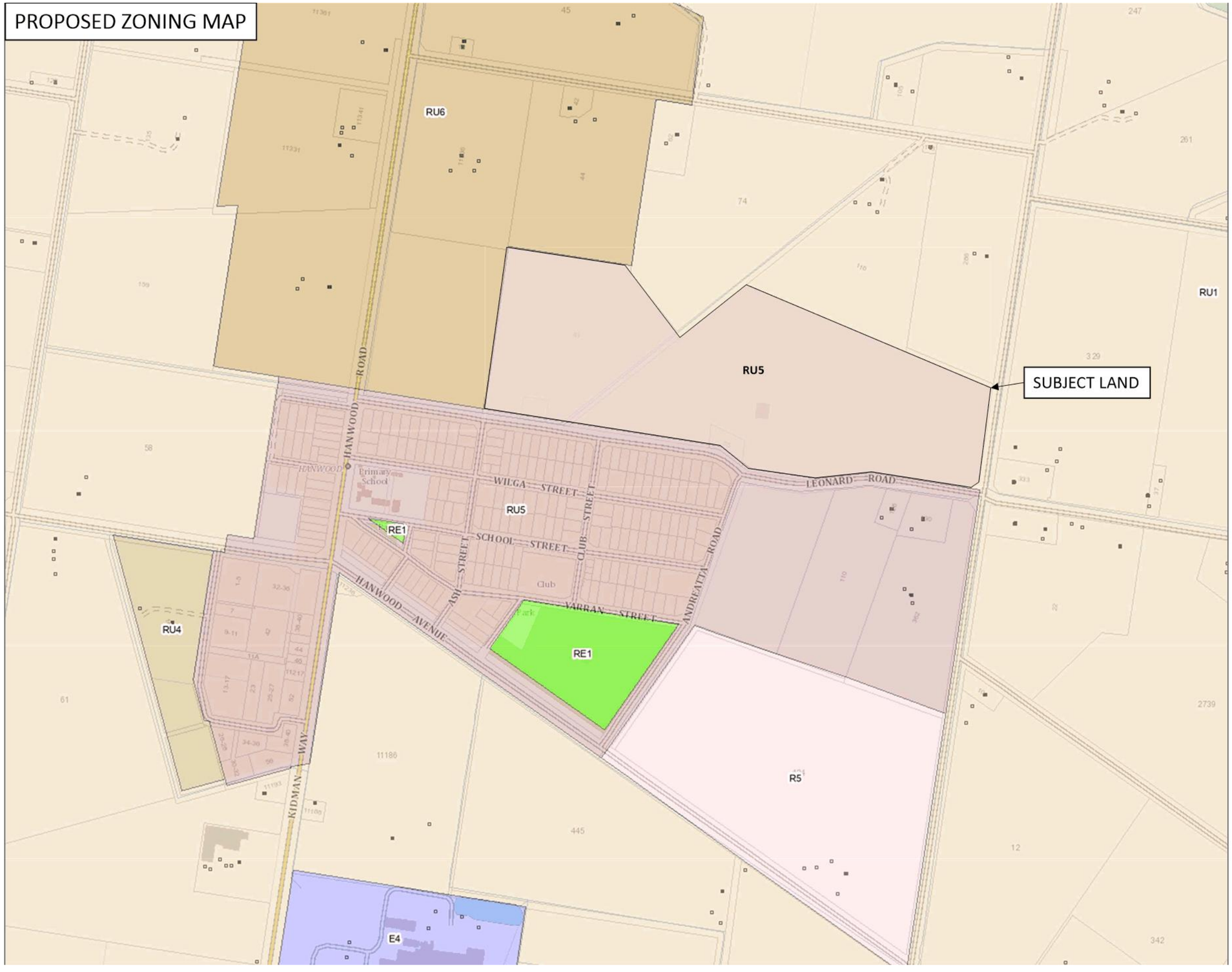
(d) Attachment 3 - Planning Proposal - amended post lodgement - Sept 2025_PP-2025-1251

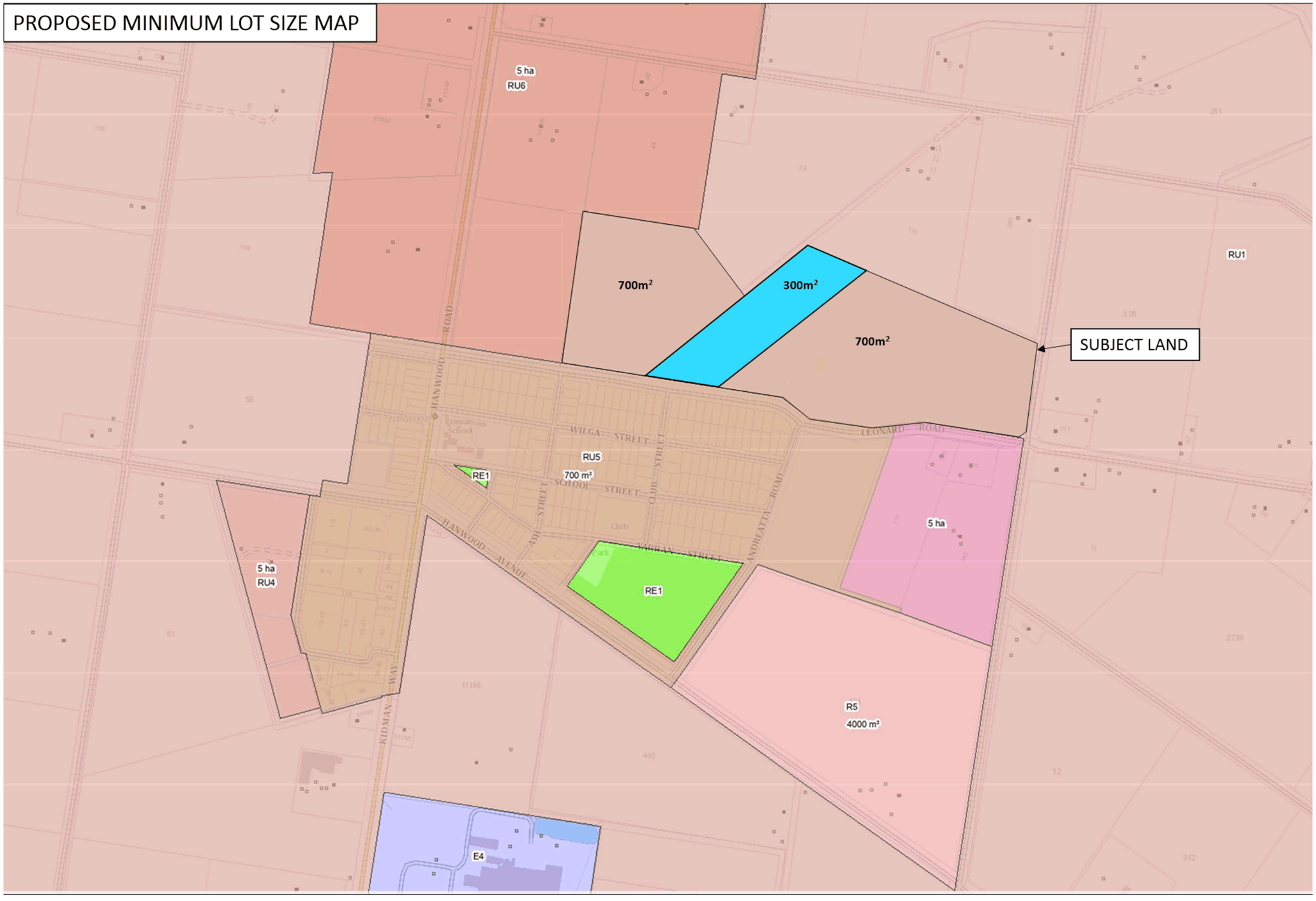
(e) Attachment 4 - Planning Proposal Appendices - amended post lodgement - Sept 2025_PP-2025-12511251)

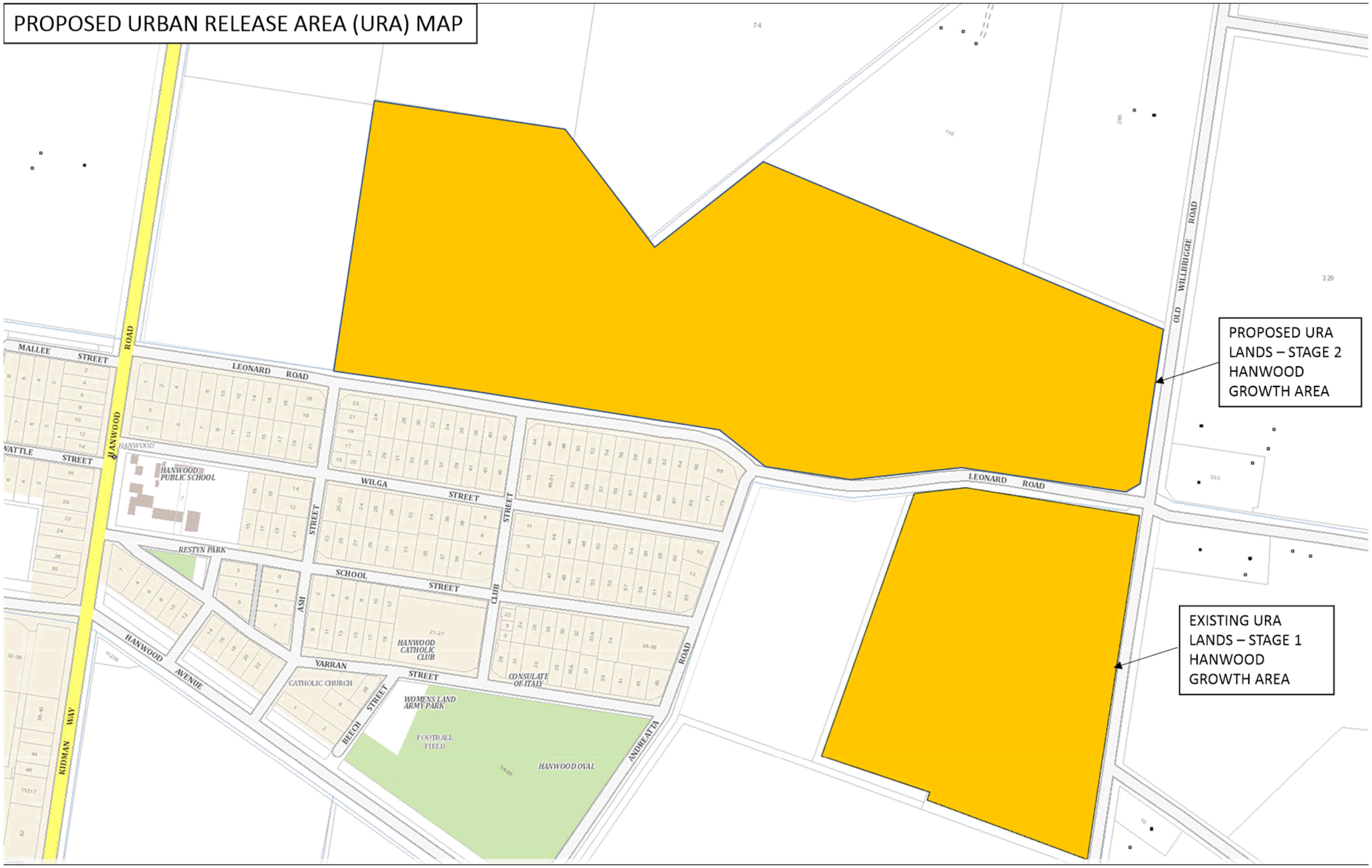
ATTACHMENTS UNDER SEPARATE COVER

Page


SUBJECT LANDS
EXCLUDED LAND
SUBJECT LAND
KIDMAN WAY
11300 Kidman Way
150//DP751709
2//DP1170655
2//DP1201339
152//DP751709
957//DP751709
154//DP1195505
2//DP1309816
155//DP1195505
1623//DP257265
1//DP1309816
1888//DP42516
LEONARD ROAD
1622//DP257265
1921//DP43676
3//DP253378
3//DP1014733
7//DP852139
Primary School
Wilga Street
7//DP1014733
2044//DP704347
Leonard Road
1793//DP41480
2046//DP704347
2174//DP720509
2078//DP704406
Ash Street
Club Street
1840//DP41449
1770//DP40519
1220//DP751709
School Street
1841//DP41449
1814//DP40836
1816//DP40836
4//DP285575
5//DP828954
303//DP751709
Yarran Street
2//DP828954
1089//DP751709
157//DP751709
Andreatta Road
679//DP751709
4//DP1306102
3//DP1306102
OLD WILLBRIGGIE ROAD
2//DP1289922
163//DP1195605
2//DP1068726


PROPOSED ZONING MAP
RU6
RU5
RU1
SUBJECT LAND
HANWOOD ROAD
WILGA STREET
LEONARD ROAD
SCHOOL STREET
ASH STREET
CLUB STREET
ANDREATTA ROAD
VARRAN STREET
HANWOOD AVENUE
KIDMAN WAY
RE1
RU4
R5
E4
Primary School
Club
Park


PROPOSED MINIMUM LOT SIZE MAP
5 ha
RU6
700m²
300m²
700m²
SUBJECT LAND
RU1
HANWOOD ROAD
WILGA STREET
LEONARD ROAD
RU5
RE1
700 m²
SCHOOL STREET
CLUB STREET
ASH STREET
ANDREATTA ROAD
HANWOOD AVENUE
MARRAN STREET
5 ha
RU4
RE1
5 ha
R5
4000 m²
KIDMAN WAY
E4


PROPOSED URBAN RELEASE AREA (URA) MAP
PROPOSED URA LANDS – STAGE 2 HANWOOD GROWTH AREA
EXISTING URA LANDS – STAGE 1 HANWOOD GROWTH AREA
MALLEE STREET
LEONARD ROAD
HANWOOD ROAD
WATTLE STREET
HANWOOD
HANWOOD PUBLIC SCHOOL
WILGA STREET
RESTYN PARK
SCHOOL STREET
ASH STREET
CLUB STREET
HANWOOD CATHOLIC CLUB
HANWOOD AVENUE
YARRAN STREET
CATHOLIC CHURCH
CONSULATE OF ITALY
BEECH STREET
WOMENS LAND ARMY PARK
FOOTBALL FIELD
HANWOOD OVAL
ANDREATTA ROAD
KIDMAN WAY
OLD WILLBRIGGIE ROAD

Attachment 1 – Council's Preliminary Review of PP-2025-1251 – Leonard Road – Hanwood.

General Comments and Requirements

- Owners Consent must be provided from the actual owners of the land.
- The Planning Proposal document does not have page numbers for ease of reference.
- The Planning Proposal is not considered Standard. Council considers the Planning Proposal as submitted to be a Complex Planning Proposal as per the Categories in the LEP Plan Making Guidelines. Section 4 of the Planning Proposal should be amended to reflect the proposal as Complex.

Request to Rezone 11300 Kidman Way (Lot 150 DP751709)

- The Planning Proposal requests the rezoning of the above noted lot from RU6 – Transition to RU5 – Village. This site was not included in the Stage 2 Release Area identified in the Griffith Land Use Strategy – Beyond 2030 (LUS). The land was identified in the LUS as "Future Agribusiness, Light Industrial & Transport Corridor". The land was then rezoned in the Griffith Local Environmental Plan in 2014 as RU6 – Transition permitting a range of rural industrial and transport related industries. The site has not been identified in any subsequent strategic documents for residential development including the 2019 Griffith Housing Strategy, the Draft 2025 Griffith Housing Strategy or the Griffith LSPS.
- Council requests the removal of Lot 150 DP 751709 from the Planning Proposal. Otherwise, provide the necessary strategic justification for the inclusion of this land in accordance with Ministerial Direction 9.1 and 9.2. Please note that, contrary to the assertions in the Planning Proposal, the Griffith LUS, LSPS, 2019 Housing Strategy or the Draft 2025 Housing Strategy does not provide the necessary strategic justification for rezoning Lot 150 DP751709. The LUS and Draft 2025 Housing Strategic provides some of the necessary strategic justification to bring forward the rezoning of the lands identified as the Stage 2 release area in the LUS.

  The Planning Proposal should ensure that it properly refers to the rezoning of Lot 150 DP751709 as inconsistent with Ministerial Direction 9.1 and the Planning Proposal, including the Need and Demand Assessment prepared by Remplan should focus on justifying this inconsistency and the merit in bringing this land forward for development as compared to other land strategically identified in the LUS and LSPS.

Additional Permitted Use

The Planning Proposal requests the additional permitted use (APU) of Residential Flat Buildings (RFBs) be permitted on the subject lands. Council does not support the proposed APU of an RFB in a rural village setting or context. The location of RFB's in a village setting does not align with the LUS, Griffith Housing Strategy 2019, Griffith Housing Strategy 2025, LSPS or accord to the RU5 – zone objectives as an apartment building could not be considered a land use which would be associated with a rural village. There is sufficient land zoned R1 and R3 in Griffith available for Residential Flat Buildings.

Should the Proponent be adamant that the Hanwood Village can support RFB's and to support their argument for the inclusion of the additional permitted use (APU), an economic feasibility assessment must be provided which provides evidence that the construction and ongoing occupation of apartment buildings in Hanwood based on market rental and sales

data, can provide the necessary returns on investment to legitimise the proposed APU. It should be noted that the Need and Demand Assessment prepared by Remplan does not assess the feasibility or demand in the locality for residential flat buildings. It also does not provide an assessment of the economic feasibility of the proposed commercial and public / private recreational areas. Further, section 6.1.3 of the Planning Proposal provides little justification for the inclusion of the APU and RFBs in rural village setting such as Hanwood.

- Note: the proposed Minimum Lot Size Map and the APU map in Figures 27 and 28 of the Planning Proposal do not contain all of the identified lands which contain RFB's on the Concept Master Plan.

Urban Release Area (URA)

Action 19 of the Griffith Housing Strategy 2025 is as follows:

Amend the LEP to rezone Stage 2 land in growth areas with an Urban Release Area overlay, allowing it to proceed ahead of Stage 1 where development has been delayed due to constraints or where it has not progressed in line with the area's master plan. Refer to Appendix 5 for proposed clauses, and Figure 15 for the location of the release areas.

As per the requirements of the Action, the Planning Proposal must be amended to include an URA overlay over the Stage 2 lands consistent with the URA on the Stage 1 lands.

Proposed Minimum Lot Size

Council supports the proposed minimum lot size of 700m^2 throughout the majority of the Stage 2 Release Area and would accept a 300m^2 minimum lot size as a medium density node within the broader growth area as identified in the Planning Proposal. Councils' DCP, Housing Strategy and the Griffith Housing Taskforce Report generally supports up to 50% of lots within growth areas being available for medium density development. The lot layout and housing typologies to be supported within the area of the land holdings with a reduced minimum lot size would be subject to a merit assessment as part of a future development application for the subject site. Please note, that Council's support of a reduced minimum lot size is based on the request for the APU being removed from the Planning Proposal.

Concept Master Plan

The concept master plan must be amended as follows:

- Removal of Lot 150 DP 751709 from the Planning Proposal. Otherwise, provide the necessary strategic justification for the inclusion of this land in accordance with Ministerial Direction 9.1 and 9.2 (as per commentary above and throughout this document).
- Remove all reference to residential flat buildings (RFBs) (as per discussions above).
- Remove all public open space areas above and beyond the requirements of the draft Hanwood Growth Area Master Plan. Where possible, open space areas should be collocated with stormwater detention areas to decrease the ongoing maintenance liability to Council.
- Any additional open spaces, market gardens and recreational uses proposed by the developer including the operation and ongoing maintenance of these spaces and facilities would be the ongoing burden of either the developer or a Neighbourhood Association created for the development area through a Community Title Subdivision. However, given that Griffith presently contains an abundance of contemporary recreational facilities including an indoor and outdoor pool and gym, a regional sports centre and sufficient capacity for soccer and netball associations including upgraded fields within the Hanwood Village, there is little likelihood that the

proposal would be economically viable (especially considering neighbourhood association fees burdened by the individual lot owners would be necessary to ensure the viable ongoing operation, management and maintenance of these private open space and recreational areas). As such, Council requests the pool, indoor sports building, gym, sports courts and fields and associated parking facilities be removed from the Concept Master Plan and replaced with residential allotments or indicative areas (or super lots) for residential development. Council also requests that the Planning Proposal provide the ongoing management structure for any private open space areas requested to remain including the market gardens which occupy a substantial area of the landholding.

  - The feasibility of market gardens within the Hanwood Village setting is also questionable, given the existing dominance of agricultural in LGA. Urban Market Gardens tend to prosper in urban areas where there is little land available for agriculture and apartment living makes it difficult to grow a vegetable patch in your yard. This is not the case for Hanwood.
  - Council would like to maximise the use of the Stage 2 Hanwood Growth Area identified in the LUS for much needed housing rather than replicating community recreational facilities and sporting fields already available to the public. To this end, the draft Hanwood Master Plan relies on the Hanwood Oval (Collectively the Women's Land Army Park, Hanwood Sports Complex and Graham McGann Oval) and surrounding public open space (crown land) to provide the Precinct Park necessary to support the growth area. We support the inclusion of green spaces (neighbourhood parks etc.) within Stage 2, but cannot support the replication of recreational facilities, parks and playing fields which are or can be provided elsewhere in the Village (on existing crown land) or throughout the LGA (including our contemporary sports precincts).

- Figure 4. of the Infrastructure Report prepared by Triaxial Consulting identifies the scale of proposed impervious surfaces required for the parking area, RFB's, sports courts, commercial areas etc. As discussed above, Council does not support the replication of services provided elsewhere in the LGA (including some within Hanwood) in new growth areas. Through the removal of these impervious surfaces there would be potential to increase lot yield in the area identified as a wetland and detention area. Further, based on Griffith's climate (average rainfall of 395mm per year) it is unlikely that a wetland would be viable unless it was being filled by raw water from the irrigation systems. This would be an additional ongoing burden of either the developer or the Neighbourhood Association.
- Any other particular uses, such as a day-care must be removed from the Concept Master Plan.
- Remove reference to the commercial buildings detailed in yellow as (1-6). Council does not support the creation of new village commercial centres without an adequate economic analysis of their feasibility in consideration of the Griffith Employment Lands Strategy including the vacancy rates seen within the Griffith CBD and Yenda Town Centre. Should a commercial precinct be proposed within the subject site, the Planning Proposal must adequately address Ministerial Direction 7.1 (1)(e) and provide the necessary strategic merit.

Needs and Demand Assessment

- The Need and Demand Assessment (NDA) prepared by Remplan at Appendix E of the Planning Proposal does not reference or include an assessment or analysis of

the Draft 2025 Griffith Housing Strategy which was exhibited from 29 May 2025 to 27 June 2025.

- The NDA does not consider Council's recent decision to permit 50% of all lots developed within the Lake Wyangan, Collina, Hanwood and Yenda Growth areas and other undeveloped greenfield subdivision to be utilised for multi-dwelling development. The NDA relies on an outdated Pipeline Audit which does not include the revised dwelling yields expected due to the increase in medium density development in undeveloped growth areas and greenfield land in Griffith.
- The Needs and Demand Assessment relies heavily on the use of a conversion rate to justify the need for additional zoned residential land in Griffith. A justification for the use of a dwelling approvals to dwelling construction conversion rate approach should be provided based on the NSW Local Housing Strategy Guidelines 2018 and best practices for supply and demand of residential zoned land in New South Wales. Ideally examples of other housing strategies which rely on a 50% conversion rate should also be provided.
- The NDA should be revised in consideration of the above to provide the necessary strategic justification for rezoning 11300 Kidman Way (Lot 150 DP751709). The NDA is not considered necessary to facilitate the rezoning of the land identified as Stage 2 of the Hanwood Growth Area as the 2025 Housing Strategy provides the strategic merit, subject to the inclusion of a URA overlay.

Traffic

Please find below comments regarding traffic from Council's Engineers regarding the Planning Proposal in General

- No additional road connection to Kidman Way would be supported.

The following are more specific comments related to the submitted Concept Design and not necessarily relevant to the rezoning of land:

- Roundabouts at 4 way intersections required
- Terminating streets located on the inside of curves potentially restricting safe intersection sight distances ie. northern end of 2nd and both ends of 3rd street;
- Skewed intersections at 1st Avenue and 2nd Avenue; 1st Avenue and 4th Street are not acceptable
- Terminating streets not perpendicular – eg. northern end of 4th Street
- Proposed lots where an access is too close to a corner eg. Block J – lots 27, 29 and 31; Block S – lots 9, 10 and 11; Block T – lot 18; etc..

Stormwater

- The recently completed stormwater works at Hanwood included a levy that was constructed along the northern side of Leonard Road to prevent flooding within the Hanwood Village. The Flood Impact Assessment is to address any proposed flood mitigation works required to the subject site and any displaced flood waters from the development to neighbouring allotments (north of subject site, east of Kidman Way and west of Old Willbriggie Road).
- The depth of the proposed detention basin exceeds the depth of the existing drainage channel along Leonard Road, therefore connection via gravity cannot be achieved without extensive fill.
- The Torrent Report appears to have modelled the existing channel catchment coming into the site. The Triaxial Report does not go into detail about the existing drainage channel coming into the site which it should.

- Stormwater impacts on neighbouring allotments should be addressed.
- The drain along Leonard Road that ultimately connects into Main Drain J can stay full for extending periods of time which potentially means the pumping of water into an already full stormwater system therefore contributing to additional flooding on the western side of Kidman Way.
- The proposed water course through the development site is unsatisfactory as the detention of water through that system has not been addressed. The proposal will also pose maintenance issues, attract insects and other adverse wildlife and be unsightly when dry.

Inconsistencies and misinformation in the Planning Proposal

Urban Release Area Requirements and the Release of Development Land

- The Planning Proposal has several statements regarding the lack of development in Stage 1 to date
    - "the southern Leonard Road area, which was rezoned in 2014, has seen minimal development. Since this time, only Farm 3 has been partially developed, with approval for large rural residential lots. The absence of new small-lot residential development in Hanwood highlights the opportunity for the subject site to provide a variety of housing options to meet market demands."
    - Despite the Stage 1 area being rezoned for residential purposes in 2014, development has remained stagnant. Two of the three farms continue to be used for agriculture, and subdivision has only partially progressed on the third.

These statements lack important information regarding the Urban Release Area overlay which was placed on the Stage 1 Release area lands in 2014. This URA overlay essentially requires the preparation and endorsement of a master plan, DCP and potentially a contribution plan prior to the release of the Stage 1 land for smaller lots. Council has completed the master plan and is reviewing the submissions presently. Essentially, development of the Stage 1 land cannot occur until:

- The master plan has been endorsed to satisfy the requirements of Part 6 of the GLEP.
- A Contribution Plan has been prepared to have a mechanism for fair and equitable provision for necessary infrastructure and sequencing.
- A Development Control Plan is prepared to meet the requirements of Clause 6.3(3) of the GLEP.

This is the manner which Council has proceeded with for the Lake Wyangan and Collina growth areas prior to releasing the land for residential development. The lack of development in Stage 1 to date should not therefore be used as an argument to progress to Stage 2. However, the recommendations of the Housing Strategy to ensure land banking is avoided and rezone Stage 2 does provide the Planning Proposal some strategic merit (for the lands identified as Stage 2 release area in the LUS)

The Planning Proposal notes the following:

- "Griffith Council is currently exhibiting a masterplan that includes the subject site. It would therefore be conceivable that the site will ultimately be rezoned by Council, making this proponent-led rezoning superfluous."

This statement is inaccurate as the Draft Hanwood Growth Area Master Plan only includes a portion of the site subject to the Planning Proposal. Lot 150 DP751709 does not form part of Council's master plan of Stage 2 of the Hanwood Growth Area as identified in the LUS.

Site Investigation Plan

The site Investigation Plan provided at Appendix I identifies the following:

- Potential education precinct where the existing Hanwood public school could be relocated as well as TAFE/Universities.
- Potential for the relocation of the Hanwood Cricket Club and Soccer Club and associated facilities.

It is requested that the Site Investigation Plan be removed as an Appendix to the Planning Proposal.

GYDE

25 September 2025

Mr J. Rizzo
Director Sustainable Development
Griffith City Council

Dear Joe,

Response to Council's Preliminary Review – PP-2025-1251 – Leonard Road, Hanwood

We appreciate Council's consideration and preliminary response (dated 26 August 2025) to the Planning Proposal (PP) lodged on 2nd July 2025 for the land at Leonard Road, Hanwood, proposing amendments to the *Griffith Local Environmental Plan 2014*.

This letter has been prepared on behalf of the Proponent, Hanwood Developments Pty Ltd, to provide a response to the key matters raised. It is supported by revised consultant inputs including:

- **Revised Planning Proposal** – prepared by Gyde Consulting.
- **Revised Concept Masterplan and Urban Design Report** (Appendix A and B) – prepared by MDP Architecture.
- **Revised Transport Impact Assessment** (Appendix D) – prepared by RSA Consulting.
- **Griffith Housing Needs Addendum Report** (Appendix F) – prepared by Gyde Consulting.
- **Revised Infrastructure Report** (Appendix H) – prepared by Triaxial Consulting.
- **Revised Flood Impact and Risk Assessment** (Appendix N) – prepared by Torrent Consulting.
- **Revised LEP Maps** (Appendix Q) – prepared by Gyde Consulting.

Table 1 outlines the key matters raised by Council and provides a brief response to each, with further detail available in the accompanying consultant reports and the revised PP document.

Table 1: High-level response to key matters raised by Council

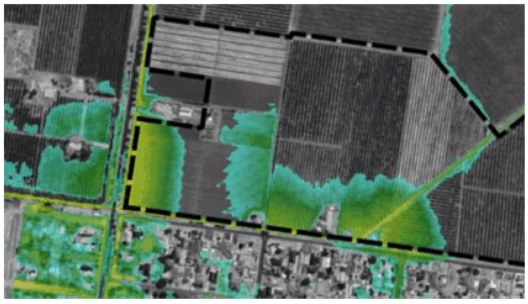
Key matter	Response
General comments and requirements	• As requested, the consent of all landowners has been included in **Appendix T**. • Page numbers have been inserted throughout the PP report. • Section 4 of the PP has been revised to identify the project as a 'Complex' PP.
Request to rezone 11300 Kidman Way (Lot 150 DP751709)	Lot 150 DP 7510709 is proposed be retained as part of the PP. Additional justification to support this approach has been provided in the PP. In summary: • The rezoning of Lot 150 will avoid the creation of land use conflict and therefore create a more cohesive and functional urban release area. • The current permissible uses under the RU6 – Transition zone, such as freight transport facilities, general industries, highway service centres, roadside stalls, and storage premises, are not compatible

Level 6, 120 Sussex Street, Sydney NSW 2000
ABN 58 133 501 774
gyde.com.au

GYDE

Key matter	Response
	with the urban release area. These uses would detract from the amenity and potential of the future neighbourhood village character. • Lot 150 has the potential to accommodate approximately 40 additional lots, supporting the expansion of the Hanwood Village. • An additional benefit of including Lot 150 is to actively manage flood-prone areas to unlock the additional urban release area. Please refer to the revised *Infrastructure Report* (**Appendix H**) and PP document for further detail on this matter.
Additional Permitted Use	As requested, the inclusion of an additional permitted use (APU) for residential flat buildings has been removed from the PP.
Urban Release Area	As requested, the PP has been amended to include an Urban Release Area (URA) under Part 6 of the GLEP, and to apply an urban release overlay. Please refer to the revised PP document and LEP Maps (**Appendix Q**) for further detail.
Minimum Lot Size	We note Council's support for the proposed minimum lot size provisions.
Concept Master Plan	As requested, the Concept Masterplan and PP report have been revised to remove references to residential flat buildings and public open space and facilities. This includes the omission of all indoor and outdoor recreational buildings or fields, commercial buildings, day-care facilities, etc. In response to Council's commentary regarding proposed impervious surfaces, a standard impervious fraction of 0.6 has been applied in the revised *Infrastructure Report* (**Appendix H**), consistent with the design requirements for other residential subdivisions in the LGA.
Need and Demand Assessment	The *Need and Demand Assessment* by REMPLAN dated November 2024 (**Appendix E**) was completed prior to the public exhibition of the *Draft Griffith Housing Strategy 2025*. As such, the *Griffith Housing Needs Addendum Report* has been prepared by Gyde Consulting (**Appendix F**) to accompany the PP and respond to the matters raised by Council. The addendum report is designed to supplement the original assessment, not replace it. In summary, it provides updates regarding the housing need and demand for Griffith and incorporates the most recent revised forecasts of population growth and housing demand from the *Draft Griffith Housing Strategy 2025* and recent ABS and NSW Government population and housing data. By aligning the earlier findings with the latest demographic, economic, and housing market trends, this addendum ensures the provision of up-to-date evidence base on the housing needs of Griffith LGA. Refer to **Appendix F** for further detail.
Traffic	As requested, the proposed road connection to Kidman Way has been removed from the Concept Masterplan. The *Transport Impact Assessment* (**Appendix D**) has been revised accordingly. All remaining matters would be appropriately addressed at a future development application stage.
Stormwater	The *Infrastructure Report* (**Appendix H**) and *Flood Impact Risk Assessment* (**Appendix N**) have been updated in response to the comments raised by Council. • The *Flood Impact Assessment* includes details of the Hanwood stormwater drainage upgrade and levee construction. The flood impact modelling results confirm the displacement of water from the development and increased runoff volume from the impervious surfaces does not result in adverse off-site impacts to the 1% AEP flood

GYDE

Key matter	Response
	conditions. This is a function of the conceptual wetland storage environment that has been modelled. • The *Flood Impact Assessment* has assessed all stormwater run-off for the area and shows a reduction in flood levels for the Hanwood Area in major events. All stormwater drainage elements for the development itself will drain to the OSD basin / wetlands areas, from where flows can be treated and downstream discharge managed. • The *Infrastructure Report* has been updated to align with the *Flood Impact Assessment*, in relation to: – consideration of flows from the upstream catchment and a more general approach to run-off considering an impervious area of 0.6 in line with recent residential subdivisions in the Griffith LGA. – creation of an OSD basin as part of the wetlands area which will be effectively aerated and treated to provide a habitat for flora and fauna. Water levels and discharge to the downstream channel can be managed by overflows, low-flow outlet and/or a stormwater pump station, therefore the depth does not have to be higher than that of the downstream channels. – stormwater generated off-site from the upstream catchment travelling along Leonard Road will be captured and managed within the proposed wetlands area. – the DRAINS modelling has been updated to include the upstream catchments flows. Torrent Consulting provided Triaxial with the Hydrograph data for the 5% and 1% storm events, and these were included in the DRAINS model to determine the critical storm events and flows entering the site via the Murrumbidgee Irrigation channel from the North. – site levels in certain areas will be raised to provide sufficient freeboard above the 1% AEP flood event. • Additional commentary has been provided around the benefits of including Lot 150 DP751709 in the PP. In particular, the southwest corner of the lot is the lowest point of the site and forms a low point for the catchment north of the Hanwood Town Centre, making it a suitable area to be used for a flood storage basin / wetlands area.  **Figure 1: Subject site during 1% AEP event (Source: Triaxial)** • Should this Lot not be utilised, the wetlands and basins for the development would have to discharge into the Leonard Road drain near Ash Street, which would mean flows from Kidman Way will not be able to be directed into the Wetlands area and managed as part of the flood storage.

GYDE

Key matter	Response
Inconsistencies and misinformation in the Planning Proposal	We acknowledge and appreciate Council's processes and note that this PP has been prepared in accordance with this understanding. We recognize that this PP forms part of the broader context of the draft Housing Strategy and the Hanwood Master Plan process. As noted above, the PP and supporting documentation have been revised to provide additional justification for the proposed rezoning/inclusion of Lot 150 DP751709.
Site Investigation Plan	The *Site Investigation Plan* has been removed as an Appendix to the PP.

We appreciate Council's consideration of the PP to date and trust that the above responses, together with the revised consultant inputs, provide the necessary information to facilitate its assessment.

Should you wish to discuss this further, please don't hesitate to contact me.

Yours sincerely,

Juliet Grant
Executive Director
julietg@gyde.com.au

GYDE

Planning Proposal

Amendments to the Griffith Local Environmental Plan 2014

Leonard Road, Hanwood

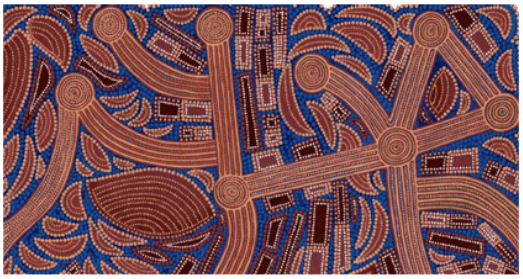
Submitted to Griffith City Council
on behalf of Hanwood Developments Pty Ltd

25 September 2025

gyde.com.au

GYDE

Acknowledgment of Country



Towards Harmony by Aboriginal Artist Adam Laws

Gyde Consulting acknowledges and pays respect to Aboriginal and Torres Strait Islander peoples past, present, Traditional Custodians and Elders of this nation and the cultural, spiritual and educational practices of Aboriginal and Torres Strait Islander people. We recognise the deep and ongoing connections to Country – the land, water and sky – and the memories, knowledge and diverse values of past and contemporary Aboriginal and Torres Strait communities.

Gyde is committed to learning from Aboriginal and Torres Strait Islander people in the work we do across the country.

This report was prepared by:

Approver:	Juliet Grant (Executive Director)
Author:	Hannah Collins (Project Planner)
Project:	Amendments to the Griffith Local Environmental Plan 2014
Report Version:	Final - Amended post lodgement

This report was reviewed by: Juliet Grant (Executive Director)

GYDE

Contents

GYDE

Appendices

Reference	Document	Author	Date
Appendix A	Concept Masterplan	MDP Architecture	August 2025
Appendix B	Urban Design Report	MDP Architecture	August 2025
Appendix C	Survey Plan	SRD Land Consulting	January 2024
Appendix D	Transport Impact Assessment	RSA	September 2025
Appendix E	Need and Demand Assessment	REMPLAN	November 2024
Appendix F	Griffith Housing Needs Addendum Report	Gyde Consulting	September 2025
Appendix G	Agricultural Land Assessment	AgEconPlus	June 2025
Appendix H	Infrastructure Report – Potable Water, Sewer and Stormwater	Triaxial Consulting	September 2025
Appendix I	Geotechnical Report / Letter	McMahon Earth Science	December 2023
Appendix J	Preliminary Site Investigation	McMahon Earth Science	December 2023
Appendix K	Flora and Fauna Assessment	Kingfisher Urban Ecology	June 2024
Appendix L	Bushfire Assessment	Bushfire Planning and Design	June 2025
Appendix M	Noise Impact Assessment	Reverb Acoustics	July 2025
Appendix N	Flood Impact and Risk Assessment	Torrent Consulting	September 2025
Appendix O	Archaeological Technical Report	OzArk	April 2025
Appendix P	Proposed Planning Agreement	Hanwood Developments Pty Ltd	July 2025
Appendix Q	Proposed LEP Maps	Gyde Consulting	September 2025
Appendix R	Correspondence with Council – Scoping Proposal	Griffith City Council	February 2024
Appendix S	Brochure for Community Consultation	Gyde Consulting	August 2024
Appendix T	Owners consent	Hanwood Developments Pty Ltd and landowners	September 2025

GYDE

Executive Summary

This Planning Proposal (PP) has been prepared to facilitate the northern expansion of the existing village of Hanwood, and enable the delivery of an innovative, master planned community that is distinguished by its commitment to housing diversity and sustainability. The intended outcome of the PP is a forward-thinking residential development that offers a rich spectrum of dwelling options designed to accommodate residents across different stages, family configurations and socio-economic circumstances.

The site-specific PP relates to approximately 44ha of land on the northern side of Leonard Road, Hanwood, between Kidman Way and Old Willbriggie Road, as shown in Figure 1. The proposal will retain the existing character of Hanwood Village while contributing to additional housing supply and improved affordability for the locality.

This approach is consistent with the *Griffith Land Use Strategy Beyond 2030* (2012), which promotes balanced urban expansion by extending development opportunities to Griffith and neighbouring villages such as Lake Wyangan, Hanwood and Yenda. The Strategy outlines a plan for staged land release on both the southern and northern sides of Leonard Road. The subject site falls within the Stage 2 land release earmarked for rezoning in 2022 – 2030. Griffith City Council's Local Housing Strategy workshops in June 2024 reaffirmed the site's role within the Hanwood release area. The majority of the site is part of the *Draft Hanwood Growth Area Master Plan*, adopted by Griffith Council on 27 May 2025 and on public exhibition at the time of lodging this PP.

The *Draft Griffith Housing Strategy 2025*, also on public exhibition at the time of lodging this PP, reinforces the importance of streamlining planning proposal processes and progressing LEP amendments to enable timely infrastructure delivery to support more diverse and affordable housing. In this context, it is reasonable to expect that Council will ultimately rezone the large majority of the site, rendering this proponent-led PP effectively superfluous.

The subject site offers significant advantages, benefiting from its well-connected location, proximity to employment hubs and access to health and education services. Importantly, the land ownership pattern, being in predominantly single corporate ownership, provides a real and tangible opportunity to deliver a diverse range of housing options in the short to medium term, with little or no impact on local or state government budgets.

The growing awareness of Australia's significant housing shortage has created a sharp focus on delays in planning approvals and housing completions. Supply is failing to keep pace with demand. In the year leading up to June 30, 2023, population growth created the need for approximately 244,000 new dwellings, yet only 173,000 were completed — the lowest annual figure in a decade (ABS, 2024). Over the same period, housing approvals declined, and project abandonments increased, further constraining the pipeline of new housing (Australian Government, 2024).

To date, the Griffith housing market has lacked significant housing diversity. This PP seeks to address this gap by enabling the delivery of contemporary, diverse and affordable housing options within a short commuting distance to Griffith. The proposed amendments to the *Griffith Local Environmental Plan 2014* (GLEP 2014) are designed to introduce meaningful choice into the market and generate substantial public benefits for the broader region.

The site is currently zoned RU1, and this PP seeks to amend the zoning and lot size controls within the GLEP as shown in Table 1. It also seeks to introduce an urban release overlay on the site. The PP demonstrates strategic and site-specific merit and addresses all relevant considerations under the LEP Making Guidelines. The proposal is largely consistent with State, Regional and Local planning policies and the relevant Section 9.1 Ministerial Directions as outlined in this report.

GYDE

Table 1: Summary of proposed LEP Amendments

Development standard	Existing	Proposed
Land use zone	Part RU1 Primary Production, Part RU6 Transition	RU5 Village
Minimum lot size	20ha (RU1 portion of the site), 5ha (RU6 portion of the site)	Part 300m^2 and part 700m^2
Urban release area	n/a	Urban release area and urban release overlay

This report addresses Section 3.33 of the *Environmental Planning and Assessment Act*, 1979 (EP&A Act) and relevant guidelines issued by the (then) NSW Department of Planning and Environment, including the *Local Environmental Plan Making Guideline* (August 2023), and includes:

- A description of the subject site and its present context,
- A description of the proposed development as relevant to the objectives and intended outcomes of the PP,
- An explanation of provisions that would give effect to the objectives or intended outcomes,
- Justification of the strategic and site-specific merit of the proposal,
- Proposed mapped provisions, and
- Recommendations with respect to consultation and the timeline to prepare the LEP amendment

Post-lodgement amendments

This PP has been amended post-lodgement, in response to Council's preliminary feedback dated 26 August 2025. The key amendments are summarised below:

- The inclusion of additional justification for the proposed rezoning of 11300 Kidman Way (Lot 150 DP751709),
- The removal of the request for an additional permitted use,
- The inclusion of an urban release area overlay on the site, consistent with the urban release area on the Stage 1 lands,
- Amendments to the Concept Masterplan and Urban Design Report (Appendix A and B).
- The preparation of a Griffith Housing Needs Addendum Report (Appendix F),
- The removal of the proposed road connection to Kidman Way,
- Further clarification regarding flooding and stormwater matters, and
- The removal of the Site Investigation Plan from the Appendices.

GYDE

SECTION A – OVERVIEW

1. Background

1.1 Proponent and vision

This Planning Proposal (PP) has been prepared by Gyde Consulting Pty Ltd on behalf of Hanwood Developments Pty Ltd (the Proponent).

Hanwood Developments is a Special Purpose Vehicle (SPV) of the Cite Group. With a 20-year track record, Cite Group has successfully delivered more than $600 million in residential and mixed-use projects and currently has a growing pipeline exceeding $1 billion of developments with a primary focus on master planned estates. This depth of experience highlights Cite Group's proven capability in delivering high-quality developments across a range of locations. Property development is the core of Cite Group's business. Originally a Sydney-based developer, the Group transitioned in 2022 to focus on regional opportunities. Since initiating this regional strategy, Cite Group has acquired over 1,500 residential lots across four separate projects, each at different stages of planning. Once approvals are secured, all projects move immediately into delivery.

The Proponent's vision for this project is to deliver an innovative, master planned community that is distinguished by its commitment to housing diversity and sustainability. The intended outcome is a forward-thinking residential development that continues the local farming tradition by focussing on the model of farm to table. The goal is to create long-term social sustainability and intergenerational living, with a rich spectrum of dwelling options designed to accommodate residents across different stages, family configurations and socio-economic circumstances.

1.2 Pre-lodgement consultation

The Proponent has engaged with Griffith City Council Officers on a number of occasions throughout 2023-25. Initial contact sought baseline information relating to existing infrastructure capacity to inform augmentation requirements and associated project costs to hence feasibility analysis.

A formal scoping report was submitted to the Council in January 2024, and feedback was subsequently received on 24 February 2024 (Appendix R). This PP responds to this feedback.

Additionally, consultation was undertaken in April 2025 with a representative of the Griffith Local Aboriginal Land Council (LALC), to assess the archaeological significance of any recorded Aboriginal objects or sites. Following the site inspection, the LALC representative confirmed that no tangible or intangible Aboriginal cultural values were identified. Further details are provided in Appendix O.

In August 2024, a community consultation campaign was undertaken within the local community. This included the distribution of a brochure to provide early information about the proposal to residents of the existing Hanwood community and inviting them to complete a survey about the project. Fourteen (14) survey responses were received, generally indicating community support for the proposal. Residents indicated mixed views on the types of housing they would like to see in Hanwood, with some indicating a preference for larger blocks, while others preferring a variety in new housing to address the ageing population and current housing shortages.

In summary, the community consultation program undertaken to-date includes:

- Community drop-in sessions (28, 29 and 30 August 2024)
- Project website with 'have your say' capability (https://hanwood.com.au)
- Distribution of an information brochure to 300 households through Hanwood Post Office, as well as brochures in local shops
- Meeting with Local Business Chamber
- Meeting with Mrs Helen Dalton, State MP, Member for Murray
- Discussions with Griffith City Council officers and elected representatives.

GYDE

2. The site

2.1 Site location and description

The subject site has an approximate total area of 44.03ha.and is located on the northern side of Leonard Road to the north of the Village of Hanwood and incorporates the following allotments as illustrated in Figure 1:

- Lot 150 DP 751709, The Kidman Way, Hanwood.
- Lots 1 & 2 DP 1309816, Leonard Road, Hanwood.
- Lots 1622 & 1623 DP 257265, Leonard Road, Hanwood.
- The southern portion of Lot 154 DP 1195505 (bordering the entire length of the south-eastern boundary of Lot 2 DP 1309816), off Leonard Road, Hanwood.

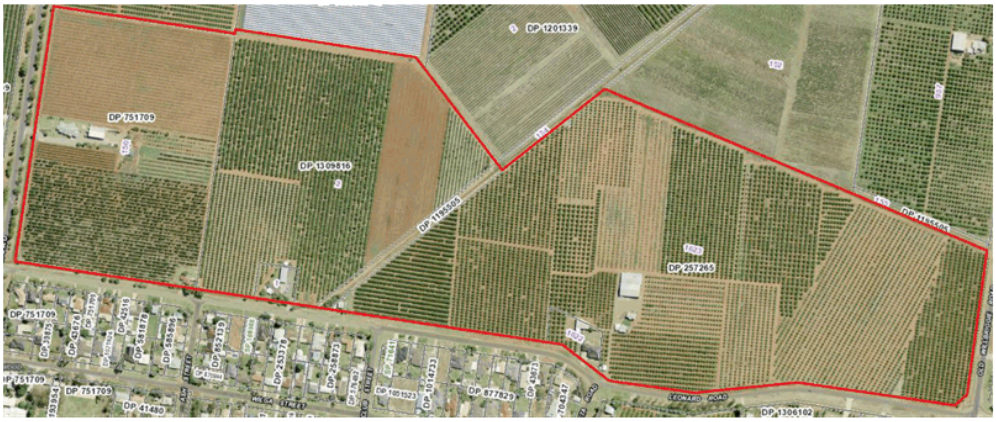


Figure 1: Aerial view of subject site, site outlined in red
(Source: SixMaps, amended by Gyde)

2.2 Existing development

The site is made up of three farming entities (referred to as Property A, B, and C). These properties are a combination of agricultural and rural residential (single residence) and farm buildings. The key property details are summarised in Table 2.

Table 2: Project site details

Item:	Property A	Property B	Property C
Address	51 Leonard Road, Hanwood	43 Leonard Road, Hanwood	11300 Kidman Way, Hanwood
Land area	24.9 ha	10.9 ha	8.2 ha
Street frontages	• 235m - Old Willbriggie Road • 963m - Leonard Road	174m - Leonard Road	• 264m - Leonard Road • 360.4m - Hanwood Road / Kidman Way
Existing infrastructure	Older cottages and shed that are leased	Dwelling house, shed, and citrus orchard	Dwelling house and citrus orchard

GYDE

2.2.1 Topography

The site has a predominantly flat topography with no notable natural landmarks. The survey plan (Appendix C) indicates a gentle slope toward the west, along with several smaller undulations across the site, as shown in the figure below.

Figure 2: Site typography
(Source: MDP)

2.3 Surrounding development

The area directly surrounding the site encompasses the Village of Hanwood to the south, surrounded by irrigation farms, intensive livestock operations, a prominent winery, food processing facilities, and agricultural research and industry-related offices. The village also features detached dwelling houses, Hanwood Public School (Prep to Year 6), sporting facilities such as Hanwood Oval, and isolated and sporadic neighbourhood shops (refer to the figures below).

The business economy in the immediate locality is diverse, with industries including retail, a service station, irrigation farming, intensive poultry farming, food processing, and a large winery. Agricultural-related industries and research facilities also contribute to economic activity, though agricultural support services are somewhat limited. The area is home to some of Griffith's largest employers, to the south including Baida and Steggles (poultry), McWilliams Wines, Rhinaland packing facility, and Nugan's (food processing). To the north between Hanwood and Griffith there are established truck depots, stores, agricultural produce facilities, rural supplies businesses, and tractor dealerships.

GYDE

Figure 3: Site locality, site identified with blue marker
(Source: Nearmap, amended by Gyde)

Figure 4: Detached dwelling houses along Leonard Road
(Source: Google Maps)

Figure 5: Detached dwelling houses along Kidman Way
(Source: Google Maps)

Figure 6: Hanwood Public School
(Source: Google Maps)

Figure 7: Hanwood Oval
(Source: Google Maps)

GYDE

2.4 Regional context and overview

The site is located within the Griffith Local Government Area (LGA), approximately 5km (7-minute drive) south of the heart of Griffith's Central Business District (refer to Figure 8). Griffith serves as a vital hub for businesses and infrastructure, playing a key role in supporting the region's population. As a major employment centre, it thrives on industries such as manufacturing, agriculture, healthcare, and construction. Well-connected to Sydney and Canberra through daily NSW Train Link rail and coach services, Griffith is strategically located 480 km southwest of Sydney and 450 km north of Melbourne.

In 2021, the Griffith LGA had an estimated population of 21,837, reflecting a steady growth rate of 2.5%. With an unemployment rate of just 2%, considerably lower than the national average of 4%. As of December 2023, Griffith's rental vacancy rate was low at 0.6%, compared to Sydney Metro's 1.7%, showcasing strong economic resilience and sustained demand for housing (ABS, 2021).

The Griffith Housing Forum 2024 reports that the region is set to see $258.7 million in project developments commence throughout the year. Planned projects include 20 units, five townhouses, 160 dwellings, and 642 residential lots. However, despite the high number of lots in the pipeline, ongoing delays mean there are still not enough new stand-alone dwellings to meet demand, further driving up property prices.

The site is conveniently located, being situated closer to Griffith CBD and key shopping precincts than the new growth areas of Collina and Lake Wyangan. It is located within a short walk or drive to key education, employment, and healthcare services, including:

- Charles Sturt University (Griffith campus)
- Hanwood Public School
- Griffith Public School
- Griffith High School
- Marian Catholic College
- Griffith Base Hospital

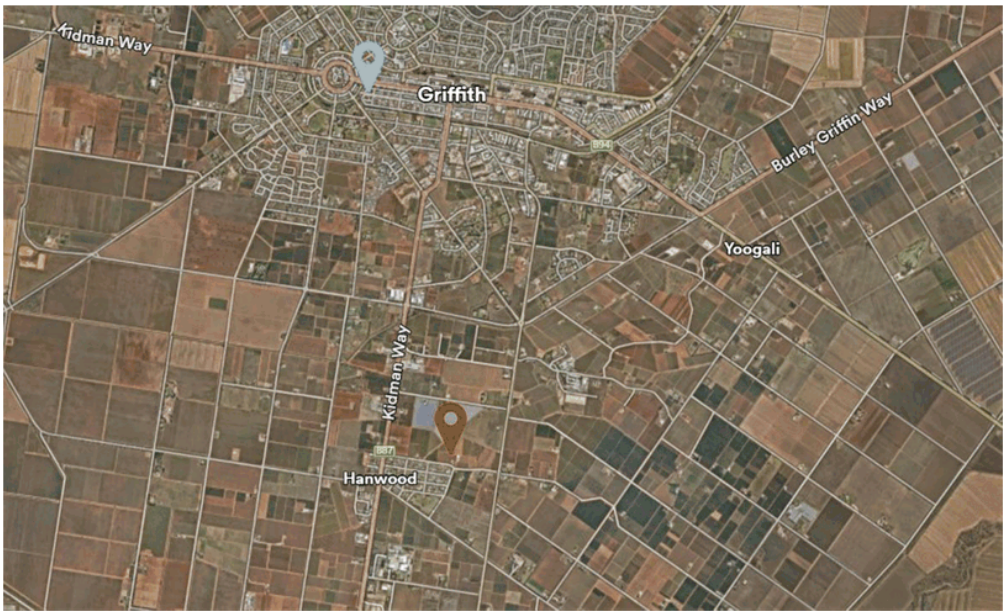


Figure 8: Local context map detailing the sites (red) regional context with Griffith (blue)
(Source: Nearmap, amended by Gyde)

GYDE

2.5 Accessibility and transport

The Transport Assessment prepared by RSA Australia (Appendix D) provides a detailed description and analysis of the existing traffic and transport conditions surrounding the site.

2.5.1 Road network

The road network surrounding the site is characterised by a mix of state and local roads, as detailed in Figure 9, particularly including Kidman Way (State Road) on the western boundary connecting the site to the Griffith CBD.

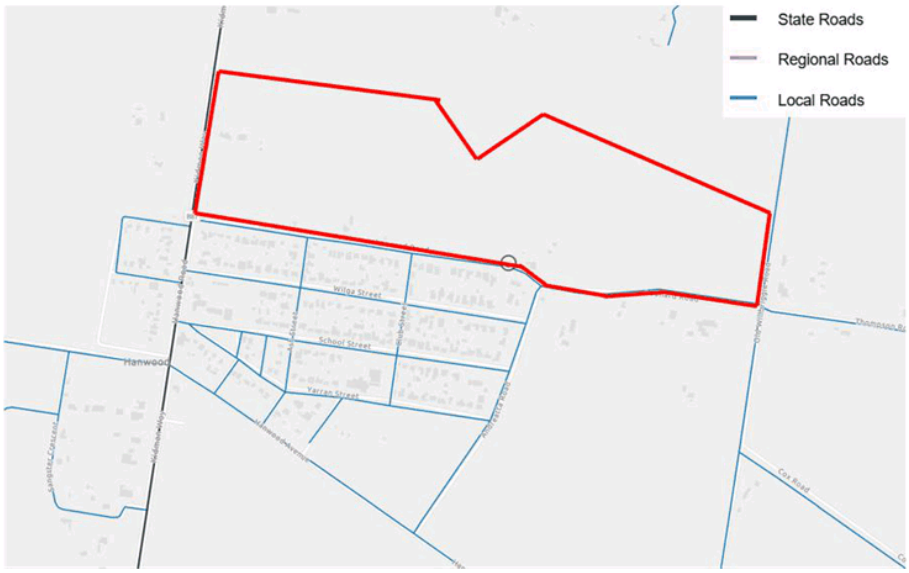


Figure 9: NSW Road Network Classifications Map, site identified in red
(Source: Transport for NSW, amended by Gyde)

Kidman Way

Kidman Way (Hanwood Road / B87) is an arterial road which is aligned in a north-south direction. In the vicinity of the site, it has an undivided carriageway with a single through lane in each direction. There is also a shared bicycle / pedestrian path in the verge along the western side of the road. Kidman Way carries in the order of 7,150 vehicles per day (two-way) and has a posted speed limit of 60km/h to the north of the site, which reduces to 50km/h from 100m north of Leonard Road.

Old Willbriggie Road

Old Willbriggie Road is a local road which is aligned in a north-south direction. In the vicinity of the site, it has an undivided carriageway with a single through lane in each direction. There are no formal pedestrian or cyclist facilities. Old Willbriggie Road has a posted speed limit of 80km/h in the vicinity of the site.

Leonard Road

Leonard Road is a local road which is aligned in an east-west direction. It has an undivided carriageway with a single through lane in each direction. There are no formal pedestrian or cyclist facilities. Leonard Road has a 50km/h speed limit.

GYDE

2.5.2 Public Transport

The site is serviced by nearby public transport. It is located near several bus stops, including those on Hanwood Road and School Street, which are served by Bus Route 945 (Griffith to Darlington Point via Hanwood). This route connects the site to Griffith Central in 16-24 minutes. Three services operate in each direction on weekdays.

Griffith Station is located 5km (7 min drive) north of the site. Griffith more broadly is accessible via daily rail and coach services to Sydney and Canberra, via NSW Train Link. The site is located 10km south of the Griffith Regional Airport, servicing travel to Sydney, Narrandera, Wagga Wagga, and other regional centres.

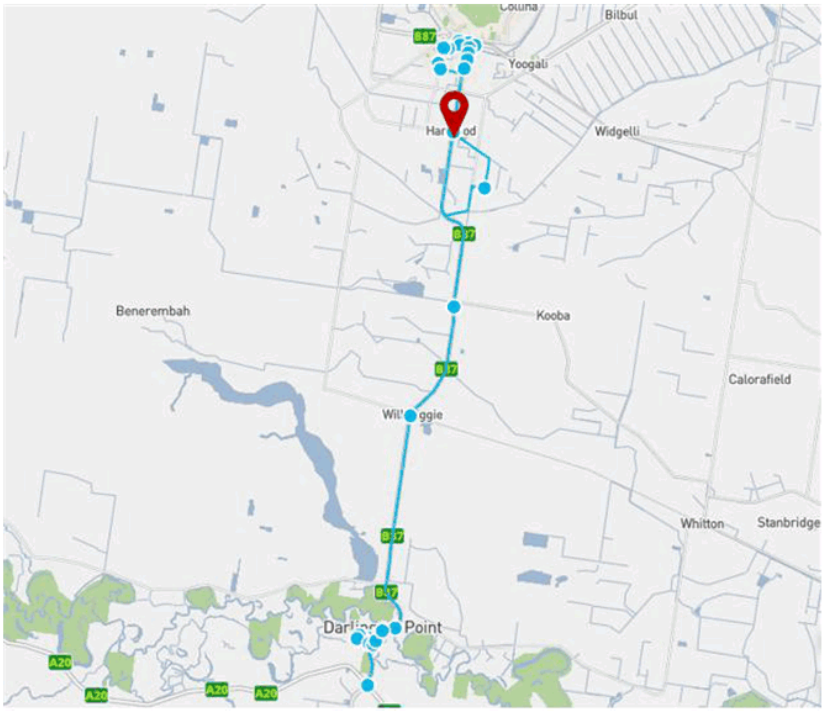


Figure 10: Route Map, Bus Service no. 945, site identified with red marker
(Source: Transport NSW)

2.5.3 Utility and services

An Infrastructure Report has been prepared by Triaxial Consulting (Appendix H), and provides the following overview of existing infrastructure servicing the site:

Stormwater

- There is a catchment to the eastern side of the site which falls towards Old Willbriggie Road at a grade of approximately 0.3%,
- A Murrumbidgee Irrigation (MI) channel runs through the centre of the site, draining west via Leonard Road and under Kidman Way at the southwest corner,
- An open drainage channel along the Kidman Way frontage captures runoff from the site and northern catchments, draining south to intersect with the Leonard Road channel,
- Additional inflows are captured from the south side of Leonard Road through headwalls at multiple points,

- West of the Kidman Way/Leonard Road intersection, stormwater is pumped via a piped system to the southwest, connecting to the broader MI drainage network,
- It is assumed existing tile drainage in agricultural areas connects to the central MI channel.

Potable Water

- Existing potable water infrastructure is located along Kidman Way, Leonard Road, and Old Willbriggie Road, according to BYDA records,
- Council has confirmed that water supply is available to support the proposed development; however, augmentation of trunk mains between Hanwood and Griffith will be required.

Sewer

- The site currently has two sewer connection points: one at 43 Leonard Road and another near 85 Leonard Road,
- Sewer is conveyed via pump stations through Hanwood to the main School Street SPS (HA1),
- Council's Development Servicing Plan (2012) identifies a proposed SPS (PSHA7) within Stage 1 of the GCC masterplan, though it is unclear whether it has been constructed.

2.6 Aboriginal cultural heritage

An Archaeological Technical Report has been prepared by OzArk Environment and Heritage (Appendix O) to accompany this PP. It outlines that a search of the Aboriginal Heritage Information Management System (AHIMS) completed prior to the survey shows there are no previously recorded Aboriginal sites within or near the site area.

No Aboriginal archaeological sites were recorded within the study area during the survey. Further, no landforms within the study area were assessed to have potential for intact subsurface archaeological deposits. The lack of potential for subsurface archaeological deposits is attributed to high levels of previous land disturbance, lack of topographic variation and distance to water. No tangible or intangible Aboriginal cultural values were identified by the site officer representing Griffith Local Aboriginal Land Council.

2.7 Flora and fauna

A Flora and Fauna Assessment has been undertaken by Kingfisher Urban Ecology (Appendix K).

The site is not identified as containing biodiversity values. The site and surrounds are classified as 'cleared' on the Vegetation Classes of NSW map as demonstrated in the figure below.

Figure 11: Terrestrial Biodiversity Map
(Source: GLEP 2014)

GYDE

2.8 Risks or hazards

2.8.1 Contamination

The site has historically been used as irrigated horticultural land since the Murrumbidgee Irrigation Area was developed in the early 1900s. Improvements have been on the site since at least the 1950s.

A Preliminary Site Investigation (PSI) has been undertaken by McMahon Earth Science (Appendix J).

The results of the investigation conclude there is no gross contamination across the site from pesticide use, fuel storage, or machinery maintenance. There are known occurrences of asbestos across the site, that would require management during future development.

This contamination on the site is acknowledged, and it is noted that a Detailed Site Investigation (DSI) and Remediation Actional Plan (RAP) will be prepared as part of future detailed DA stage.

Further investigate and assessment of the potential contamination and site suitability for the proposed land use has been discussed further in Section 7.3.

2.8.2 Flooding

The site is note identified on the NSW Government Spatial Viewer as being flood prone land. A Flood Analysis has been undertaken by Torrent Consulting (Appendix N) which details that the far western side of the Site (part of Lot 150 DP 751709 behind the Kidman Way) is identified as being located within the floodplain.

The existing design flood conditions at the Site are detailed in the Griffith Main Drain J and Mirrool Creek Yenda Flood Mapping Update as provided in Appendix N.

The analysis details that the flood mapping in this study was derived from an updated TUFLOW hydraulic model, originally developed for the Griffith Main Drain J and Mirrool Creek Flood Study (BMT WBM, 2015). However, these are regional flood studies and the modelled drainage detail local to Hanwood was limited to the principal drainage channel servicing the area. The flooding experienced during the March 2012 event and represented in the flood studies is dominated by the backwater flood inundation from Main Drain J.

Following the March 2012 flood event and subsequent completion of the Griffith Main Drain J and Mirrool Creek Floodplain Risk Management Study (BMT WBM, 2015), a levee design has been developed for Hanwood to protect it from backwater inundation within Main Drain J, DC 'A', DC 'DA' and DC 'Handepot'. The works include one-way outlets on local pipe drainage in Hanwood and a pumping station with a capacity of around 1 m^3 /s to discharge local catchment runoff during backwater flood conditions.

Further review of existing flood conditions and potential impacts relevant to this PP have been discussed in greater detail in Section 7.3.

2.8.3 Bushfire

A bushfire assessment has been prepared by BPAD (Appendix L) to accompany this PP. The site is not identified as bushfire prone land as demonstrated in Figure 12 below.

The site is located within proximity to bushfire prone land at the north-eastern corner (vegetation buffer). This area is limited to a grassland hazard only.

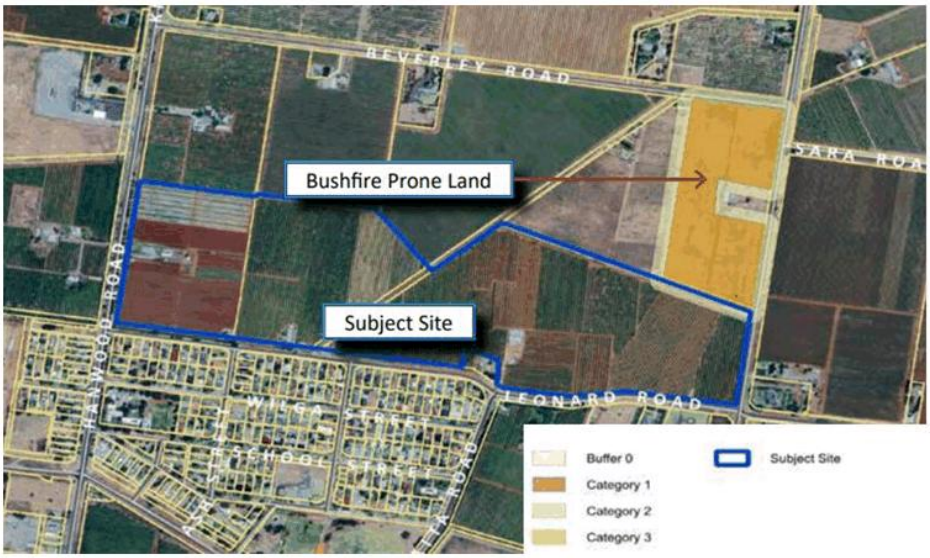


Figure 12: Bushfire prone land map
(Source: BPAD)

Accordingly, a Bushfire Risk Assessment has been prepared by BPAD to accompany the proposal (Appendix L). Further review of potential bushfire impacts has been discussed in greater detail in Section 7.3.

GYDE

3. Existing controls

The *Griffith Local Environmental Plan 2014* (GLEP 2014) is the relevant environmental planning instrument applicable to the site. The following controls of the GLEP are relevant to the site.

3.1 Griffith Local Environmental Plan 2014

Clause 2.1 Land Use Zones

The site is currently zoned RU1 Primary production and RU6 Transition under the GLEP 2014, as illustrated in the figure below.

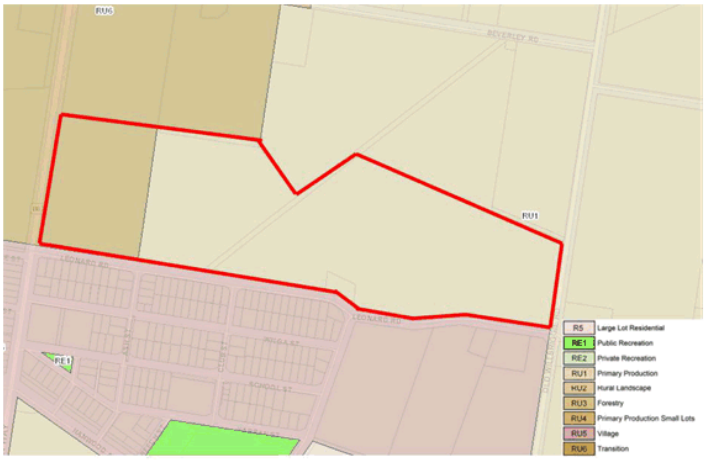


Figure 13: Extract of land zoning map, site outlined in red
(Source: GLEP 2014, amended by Gyde)

Clause 4.1 Minimum subdivision lot size

The site is currently subject to a minimum subdivision lot size of 20ha (RU1 portion of the site) and 5ha (RU6 portion of the site) as detailed in the figure below.

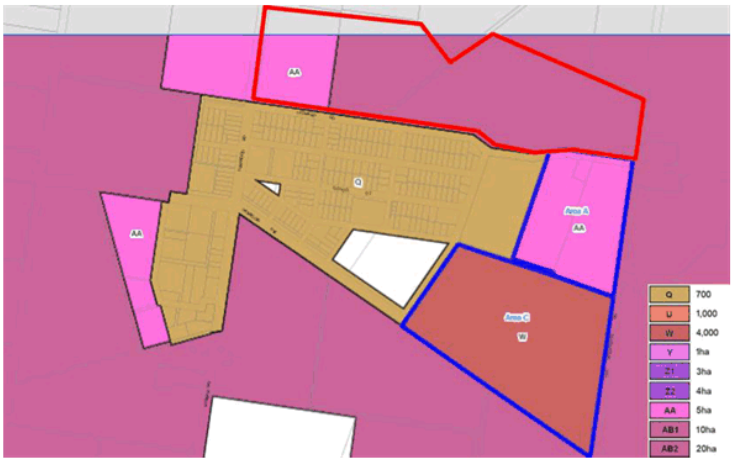


Figure 14: Extract of lot size map, site outlined in red
(Source: GLEP 2014, amended by Gyde)

GYDE

Clause 4.3 Height of Buildings and Clause 4.4 Floor Space Ratio

The GLEP 2014 has not adopted Height of Buildings and FSR controls, and therefore these development standards are not currently applicable to the subject site.

Clause 5.10 Heritage conservation

The site is not identified as a heritage item or in a heritage conservation area.

Clause 5.11 Bush fire hazard reduction

The site is not identified as bushfire prone land. The site adjoins bushfire prone land at the north-eastern corner.

A Bushfire Risk Assessment has been prepared to accompany this PP and is provided in Appendix L.

Clause 5.21 Flood Planning

The site is not mapped on the NSW Government's Spatial Viewer as being within the Flood Planning area.

As detailed in Section 2.8.2, a Flood Analysis has been undertaken by Torrent Consulting (Appendix N) which details that the far western side of the Site (part of Lot 150 DP 751709 behind the Kidman Way) is identified as being located within the floodplain.

Further review of flood conditions and potential impacts relevant to this PP have been discussed in greater detail in Section 7.3.

3.2 Griffith Residential Development Control Plan 2020

The Griffith Residential Development Control Plan (DCP) 2020 provides detailed design guidance that complements the provisions of the GLEP 2014.

The DCP plan applies to all land zoned R1 – General Residential, R3 – Medium Density Residential, R5 – Large Lot Residential and RU5 – Village.

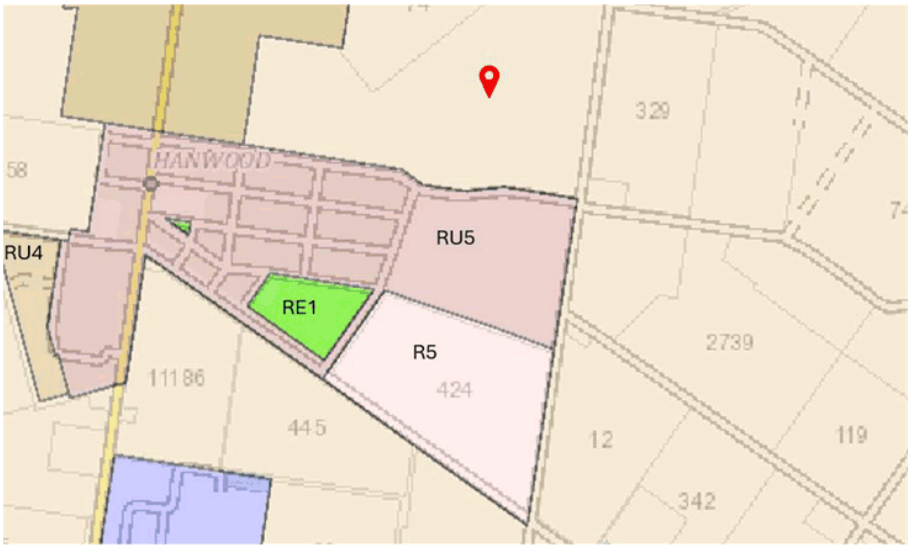


Figure 15: Current Hanwood Village zoning, subject site identified with red marker
(Source: GDCP 2020, amended by Gyde)

The GDCP 2020 outlines the important residential settings of Griffith's villages which offer alternative settings to the urban areas. It highlights that expansion of Lake Wyangan, Hanwood, Yenda and Yoogali have been promoted in Griffith's Land Use Strategy: Beyond 2030 and the GLEP 2014. The resulting minimum subdivision lot size for most villages is consistent with other low-density Precinct's in Griffith at 700m^2.

The GDCP 2020 notes that infill development in the Villages should be supported, including strategically placed multi-dwelling housing, aligning with the desired outcomes of this PP. Emphasis is placed on Hanwood being located in close proximity to employment generating rural industries with large work forces. Locating diverse housing options in these villages to support workers including boarding houses / co-living housing, multidwelling housing and secondary dwellings is encouraged.

The Proponent is open to working collaboratively with Council to identify and implement any amendments to the DCP to support this PP and its intended outcomes.

GYDE

4. Delivery of the proposal

The LEP Making Guidelines delineate four categories of planning proposals based on the strategic consistency and complexity. Council is required to identify the planning proposal category when submitting the planning proposal to the Department of Planning, Housing and Infrastructure (DPHI) for Gateway determination and DPHI will confirm the category during its review.

The categories of planning proposals are for administrative purposes only and not set out in the EP&A Act. The categories are used to indicate (for example) benchmark timeframes and the scope of information and technical studies required to support its assessment.

Under DPHI's LEP making guidelines, the PP is likely to be categorised as a 'Complex Planning Proposal' with an associated benchmark timeframe of 420 working days (total end-to-end) including pre-lodgement phase.

Complex

A complex planning proposal refers to any one or more of the following proposed LEP amendment types, including an amendment:

- To change in the land use zone and/or the principal development standards of the LEP, which would result in a significant increase in demand for supporting local, regional or State infrastructure and would require infrastructure funding
- To respond to a new policy e.g. local character or new provision not in the standard instrument template
- That is inconsistent with a District/Regional Plan or council's endorsed LSPS
- Responding to a change in circumstances, such as the investment in new infrastructure or changing demographic trends
- That is progressed under the Aboriginal Land SEPP
- Any other amendment or amendments that are not categorised as a principal LEP, standard or basic planning proposal

Figure 16: Planning Proposal Categories
(Source: DPHI LEP making guidelines)

As noted in the Griffith housing need addendum report (Appendix F), population forecasts have been progressively revised upwards, with the 2019 Housing Strategy projecting around 30,500 residents by 2036 and 1,744 new dwellings (about 79 per year), and the 2024 REMPLAN Need and Demand Assessment (Appendix E) increasing this to between 30,874 and 31,641 people by 2041, requiring 76–130 dwellings per year.

The *draft Griffith Housing Strategy 2025* projects even stronger growth, with the population reaching around 34,500 by 2046 and requiring about 2,725 new dwellings (118 per year). This represents a 50% increase in projected housing need compared with the 2019 Strategy and a 24% rise compared with the Need and Demand Assessment (Appendix E) prepared just one year earlier.

Despite these revised forecasts, housing delivery is not keeping pace with demand. Vacancy rates have remained below 2% for a decade and below 1% since 2020, highlighting severe unmet demand.

An analysis of NSW DPHI implied dwelling demand shows Griffith had a potential undersupply of around 2,500 homes in 2021 — equivalent to a 26% shortfall of existing housing stock.

While the LGA has enough land identified for thousands of homes, only 13% is classified as development-ready, creating a high risk that supply will continue to lag behind demand. Ongoing action will therefore be required from Council, working closely with the development industry and landowners, to accelerate delivery, unlock development-ready land, and support a more diverse housing mix.

The indicative concept plan, which includes approximately 500 dwellings, is being proposed by Cite Group, who are prepared to deliver at least 50 dwellings annually. With the company's experience and financial capacity, construction can begin promptly, without the need for pre-sales or reliance on external financing. The development can also proceed without third-party landowners, as the site is fully serviced by Council roads and its own land.

Civil construction is typically set to begin within four months of engineering approvals, with the first homes expected to be delivered within approximately 12 months. Given the ongoing demand for housing and the strategic importance of the site, the Leonard Road Release Area presents a timely opportunity for Griffith to support its next wave of population growth, offering diverse and affordable housing options for the community.

Cite Group's extensive experience demonstrates capability in delivering high-quality residential and mixed-use developments.

GYDE

SECTION B – PLANNING PROPOSAL

5. Part 1 – Objectives and Intended Outcomes

5.1 Objectives of the Planning Proposal

The objectives of this planning proposal are to:

- Increase housing supply and diversity to meet community needs and aspirations,
- Facilitate urban growth in a location with access to employment, education, recreation and open spaces,
- Grow and support the existing Hanwood village within minimum impact on existing character.
- Provide essential infrastructure for local residents.

5.2 Indicative development concept

A Concept Masterplan (Appendix A) and an accompanying Urban Design Report (Appendix B), prepared by MDP Architecture, support this PP and demonstrate the vision for the preliminary proposed LEP amendments. The Concept Masterplan presents a staged transition of the site from its current agricultural use into a series of future mixed-density residential neighbourhoods.

Ideally located adjacent to Hanwood Village and within easy commuting distance of Griffith, the site offers a unique opportunity to create a contemporary, inclusive, and more affordable residential community.

It should be noted that future land uses will be considered through subsequent development applications. This concept masterplan and urban design report are intended solely to illustrate the vision and support the rezoning of the site.

Concept master plan

The concept masterplan, extracted below, proposes rezoning the site to RU5 Rural Village to facilitate smaller, more affordable family homes and to promote a diverse range of housing types and affordability options.

Figure 17: Concept masterplan
(Source: MDP)

GYDE

Housing mix and distribution

The development will offer approximately 400 residential lots of varying lot sizes, designed to respond to local housing demands. This includes;

- Smaller minimum 300m^2 lots in the centre of the site to support medium-density housing and affordable dwelling options.
- Larger minimum 700m^2 for the remainder of the site to reflect an expansion of the existing Hanwood Village pattern and will be positioned near the site's edges to create a gradual transition to rural areas.

The proposed housing mix will comprise detached dwellings, dual occupancies, and terrace houses, subject to approval through future development applications. Detached homes and dual occupancies are envisaged along the site's edges to preserve a low-density character in keeping with the neighbouring Hanwood Village. The central area of the site is envisioned as a neighbourhood core, featuring a blend of terrace housing and dual occupancies, with the potential inclusion of seniors living and short-term accommodation.

This variety of housing types and sizes will support a diverse community, meet the needs of both existing and future residents, and address gaps in the local market for smaller, more affordable homes.

Access and connectivity

The proposed Concept Masterplan seeks to create a pedestrian friendly and publicly accessible environment. It presents a thoughtful framework for expanding the existing village in a connected, cohesive manner that honours the established community while addressing future growth needs.

The Concept Masterplan employs a network-based design approach that extends existing street patterns and creates logical connections between established neighbourhoods and new residential areas. This integrated promotes community cohesion through thoughtfully designed pedestrian and cycling pathways, ensuring that new residents feel connected to Hanwood's existing community centres, schools, and recreational facilities.

Key access features include:

- The provision of road infrastructure which encourages active transport usage for bicycles and pedestrian connections to open space, public facilities and offerings.
- Maintaining a northern boundary roadway to connect both neighbourhoods and provide possible future connections to the north.
- Locate an east-west pedestrian activated spine within the centre of the site.

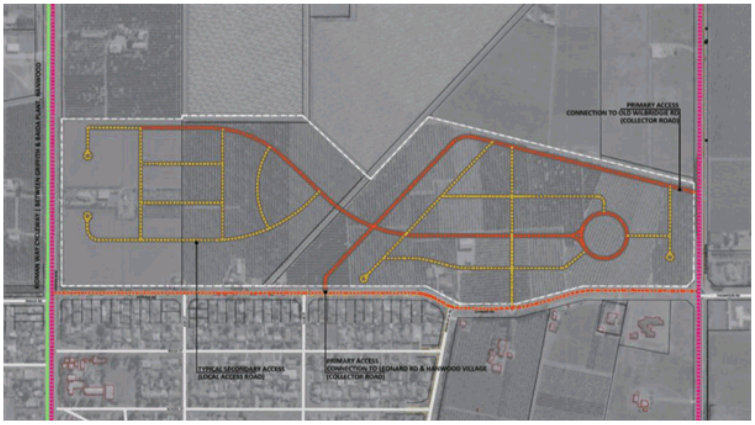


Figure 18: Proposed accessibility plan
(Source: MDP)

19

Staging and delivery

The Proponent is ultimately open to conversation with Council in regard to the staging of the development.

It is proposed that the development is delivered in stages, commencing along Kidman Way and moving east toward Old Willbriggie Road. The staged delivery approach ensures that essential infrastructure, including utilities, transportation networks, and community services, can be established progressively to support each stage of development without overwhelming existing systems or compromising the quality of life for early residents.

The initial phase focuses on establishing the foundational elements that will anchor the entire community development. This includes the construction of primary infrastructure such as roadways, utility corridors, and stormwater management systems, alongside the development of the first residential neighbourhoods featuring a strategic mix of housing types.

Early phases prioritise the delivery of single-family homes and townhouses in key locations that will help establish the community's character while generating the population base necessary to support subsequent commercial and community amenities.

The final phases focus on completing the housing diversity spectrum with medium density housing options that reflect the matured community's evolving needs and preferences.

Overall, the Concept Masterplan introduces a new residential model to the Griffith region that is inclusive, affordable, environmentally conscious, and responsive to local housing and community needs. The proposal aims to create a vibrant, resilient, and connected neighbourhood that complements the existing fabric of Hanwood and its surrounds.

It is important to note that the indicative concept scheme represents just one possible approach to redeveloping the site under the proposed controls. The final proposal will undergo further refinement, detailed analysis, and assessment in later development approval stages.

5.2.1 Indicative Development Statistics

The table below provides an indicative overview of the development statistics in relation to the Concept Master Plan.

Table 3: Indicative Development Statistics

Element	Proposal (Indicative only)
Site Area	Approximately 44ha
Land Uses	Rural Village development – land uses to be determined at future DA Stage but are likely to comprise; dwelling houses, dual occupancies, mutli-dwelling housing, shop top housing, seniors housing.
Lots	Approximately 400
Dwellings	Approximately 500

5.3 Proposed Planning Agreement

A proposed Planning Agreement accompanies this PP (Appendix P). It outlines the nature and extent of potential contributions that will form the basis of a formal offer and is intended to facilitate future discussions with Council. Additional details are provided in Appendix P and are intended to be subject to further discussion.

GYDE

6. Part 2 – Explanation of the Provisions

6.1 LEP amendments

This PP seeks to amend the GLEP 2014 as follows, with full, detailed maps provided in Section 8 and in Appendix Q:

- Amend the zoning of the land from Part RU1 and Part RU6 to RU5 Village, and,
- Amend the minimum lot size control of the site from part 20ha and part 5ha to part 300m² and part 700m² (for the exact locations of each lot size, refer to the LEP Maps in Section 8).
- Identify the site as an urban release area (URA) under Part 6 of the GLEP, and applying an urban release overlay, enabling development on the site to progress ahead of Stage 1 where development has been delayed by constraints or has not advanced in accordance with the *Hanwood Growth Are Masterplan.*

It is proposed to implement these amendments by updating the relevant GLEP 2014 Maps as follows:

- Amend the Land Zoning Map (Digital EPI) for land at 51 Leonard Road, 43 Leonard Road, and 11300 Kidman Way, Hanwood to RU5 Village.
- Amend the Lot Size Map (Sheet LSZ_004B) for the land at 51 Leonard Road, 43 Leonard Road, and 11300 Kidman Way, Hanwood to part 300m² and part 700m².
- Amend the Urban Release Area Map (Sheet URA_004) for the land at 51 Leonard Road, 43 Leonard Road, and 11300 Kidman Way, Hanwood to identify the land as an urban release area.

Table 4: Proposed amendments to the GLEP 2014

Control	Proposal
Clause 2.1 Land use zones	RU5 Village
Clause 4.1 Minimum subdivision lot size	Part 300m² and part 700m² (refer to LEP Maps in Section 8).
Part 6 – Urban release areas	Urban release area and urban release overlay.

6.1.1 Land Use Zone

As noted in the table above, this PP seeks to rezone the subject site from Part RU1 and Part RU6 to RU5 Village, aiming to provide an opportunity for a well-planned residential expansion of Hanwood Village while ensuring minimal impact on surrounding agricultural production.

The Agricultural Land Assessment (Appendix G), notes that the existing site represents just 0.03% of all RU1 Primary Production zoned land in the Griffith LGA, and its loss to commercial agriculture will have only a minor impact on the area's overall agricultural value. While the site contributes approximately 2% of the citrus gross value of production (GVP) in the Griffith LGA, which itself contributes around 3% to the Australian citrus industry's GVP, this shift in land use is not expected to significantly affect the broader agricultural economy.

The Need and Demand Assessment prepared by REMPLAN (Appendix E) emphasises the demand for additional housing within the Griffith LGA. Although the Griffith Housing Strategy and Housing Pipeline Audit identified significant land supply, Council has acknowledged that not all identified parcels will become available due to land banking and ongoing agricultural use. Sensitivity assessments show that if all parcels are developed, there could be between 21.9 and 37.3 years of housing supply, however this is highly unlikely. Sensitivity analysis suggests that without the rezoning and/or redevelopment of subject site, if 80% of parcels are developed and converted into dwellings, there is between 8.0- and 13.6 years of housing supply, while if 50% of parcels are developed and converted into dwellings, there is between 5.0 and 8.5 years of housing supply. It is important to note that it is unlikely that all dwellings in the housing pipeline audit will be constructed.

Griffith is an area popular amongst young families with children and persons of working age. The need for new detached properties can be considered essential to meeting the region's population projections and demand for dwellings. However, dwelling construction has been lower than the number of dwellings required to meet the expected dwelling demand and is likely to continue based on REMPLAN's sensitivity analysis as outlined above (Appendix E).

An increase in population projection has been reflected in the Griffith Housing Needs Addendum Report (Appendix F) prepared by Gyde Consulting. The figure below details the changes in the forecasted housing demand over time.

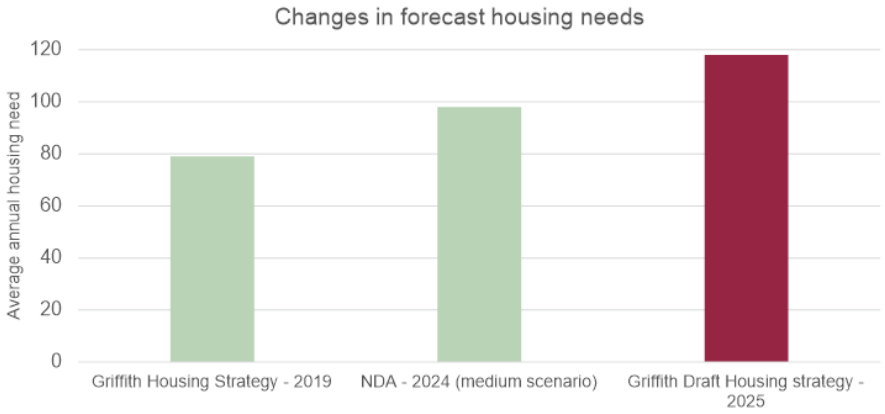


Figure 19: Changes forecast housing needs
(Source: Gyde Consulting, Appendix F)

The *draft Griffith Housing Strategy 2025* has projected that between 2023 and 2046 the LGA will require around 2,725 new homes, or about 118 per year. The *draft Griffith Housing Strategy 2025* acknowledges that "housing delivery is not keeping pace with demand" highlighting how difficult it has been to deliver the homes needed for the growing population.

An analysis of NSW DPHI implied dwelling demand shows Griffith had a potential undersupply of around 2,500 homes in 2021 — equivalent to a 26% shortfall of existing housing stock. While the LGA has enough land identified for thousands of homes, only 13% is classified as development-ready, creating a high risk that supply will continue to lag behind demand.

The site's strategic location adjacent to Hanwood Village presents an opportunity to create a well-planned, high-quality residential community that responds to evolving workforce needs, demographic shifts, and the above-mentioned population projection. Its proximity to employment hubs, educational facilities, sporting amenities, and green spaces will contribute to a liveable and resilient urban environment.

The proposal also ensures a natural extension of Hanwood Village, which is already zoned RU5 (refer to Figure 20), thereby integrating with the existing settlement pattern adjacent to the south. Through the rezoning of the land and therefore delivering contemporary, diverse, and affordable housing options within close commuting distance of Griffith, the rezoning will provide substantial public benefits and support sustainable regional growth. This rezoning is therefore necessary to support future population growth, provide greater housing choice, and improve housing affordability in the region.

GYDE

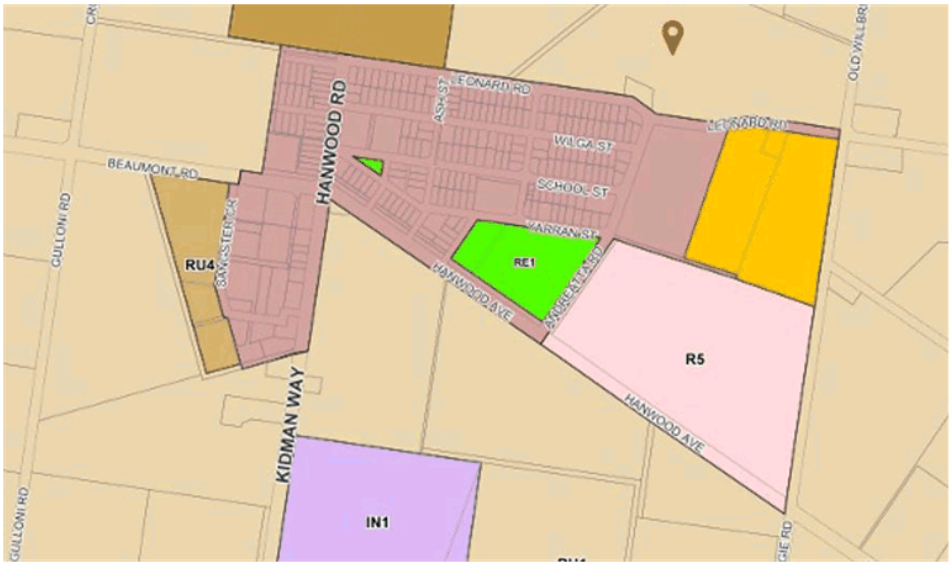


Figure 20: Current Hanwood Village zoning, subject site identified with red marker
(Source: GDCP 2020, amended by Gyde)

6.1.2 Minimum Lot Size

The proposal to amend the minimum lot size control for the subject site is a direct response to the demonstrated market and demographic driven demand for a broader range of housing options in the Griffith LGA. While there is a substantial supply pipeline for larger lots, the availability of small to medium-sized lots, which provide more affordable housing options, is significantly constrained. This results in limited opportunities for first home buyers, downsizers, and those seeking more compact and lower-maintenance housing.

The Need and Demand Assessment (Appendix E) emphasises this further, noting that between 2018 and 2022, the most commonly sold lot sizes in Griffith LGA ranged between 600m^2 and 999m^2, accounting for around 56% of all sales. In contrast, sales of dwellings on lots smaller than 600m^2 represented less than 10% of total transactions, primarily due to a shortfall in supply. The proposed development introduces minimum lot sizes ranging from 300m^2 to 700m^2, along with medium-density dwellings, aligning with the lot size categories that together represent approximately 65% of the market demand. This proposal seeks to expand the existing Hanwood Village, currently also subject to a 700m^2 lot size control, whilst introducing a mix of additional, medium-density and affordable housing types within the core of the site.

Reducing the minimum lot size supports both housing affordability and choice by introducing a new market segment previously underrepresented in Griffith. The inclusion of minimum 300m^2 lots, as well as 700m^2 lots, will cater to a wider range of residents, ensuring that the housing supply better matches the evolving needs of the community. This approach will not only provide more attainable housing options but also contribute to a more diverse and resilient residential landscape, strengthening Griffith's long-term growth and liveability.

GYDE

	2022		2021		2020		2019		2018	
	No.	% of sales	No.	% of sales	No.	% of sales	No.	% of sales	No.	% of sales
<600m2	19	6.1%	39	9.8%	34	9.4%	20	6.4%	24	6.7%
600-999m2	178	56.7%	222	56.1%	214	59.1%	179	57.4%	199	55.9%
1,000+m2	117	37.3%	135	34.1%	114	31.5%	113	36.2%	133	37.4%
Total	314	100%	396	100%	362	100%	312	100%	356	100%

Figure 21: Dwelling sales by lot size, Griffith LGA, 2018 to 2022
(Source: REMPLAN)

The *Draft Griffith Housing Strategy 2025* proposes planning measures to support affordable housing, including Item 2 being an amendment to Clause 4.1B of the GLEP 2014 to permit lot size averaging in residential zones. This PP seeks to amend the existing minimum lot size control, similarly, aiming to facilitate more diverse and affordable housing outcomes, consistent with the draft Strategy's intent to boost housing supply, improve affordability, and promote more efficient, diverse, and liveable neighbourhoods.

6.1.3 Urban Release Area

The *draft Griffith Housing Strategy 2025* identifies planning mechanisms to support affordable housing delivery. Action 19 of the strategic planning and policy development proposes to "*amend the LEP to rezone Stage 2 land in growth areas with an Urban Release Area overlay, allowing it to proceed ahead of Stage 1 where development has been delayed due to constraints or where it has not progressed in line with the area's master plan*".

The above action makes reference to Appendix 5 of the draft strategy, and the below figure for the location of the release areas, highlighting the subject site as can be seen in the below extract.

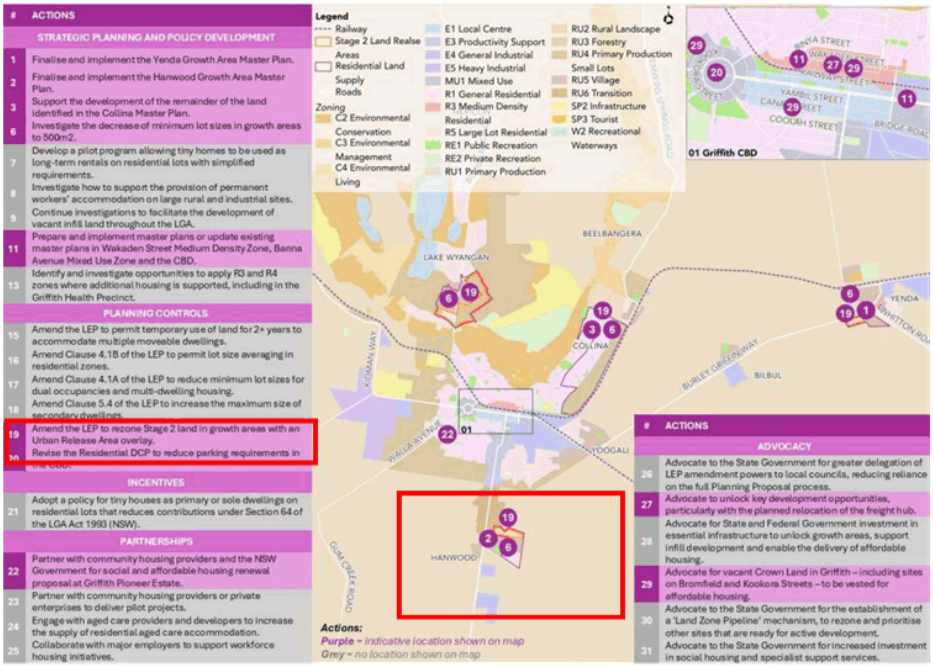


Figure 22: Key actions from the implementation plan
(Source: PSA Consulting, *Draft Housing Strategy 2025*, annotated by Gyde)

The draft strategy indicates that there is strong evidence of unmet demand, or that the existing housing stock is not meeting the current population needs. The Draft Housing Strategy states that

> "*Griffith is in a housing crisis: demand for affordable, diverse, and accessible rental opportunities is at an all-time high*"

The draft strategy states that Griffith has had a consistently tight rental market for the past decade, with vacancy rates never exceeding 2% between 2014 and 2024 and falling further since COVID-19. Vacancy rates have been at or below 1% since 2022.

As noted in the Griffith housing need addendum (Appendix F) Griffith in 2021 had a potential undersupply of around 2,500 homes when derived from the NSW DPHI implied dwelling demand. When compared to other LGAs surrounding Griffith, has a similar undersupply to its neighbours.

Accordingly, it is proposed that the subject site is designated as an URA and provided with an urban release overlay, to accelerate delivery, unlock development-ready land, and support a more diverse housing mix.

GYDE

7. Part 3 – Justification

7.1 Section A – Need for a Planning Proposal

7.1.1 Is the Planning Proposal a result of an endorsed local strategic planning statement, strategic study, or report?

Yes, this PP responds to a number of strategic studies and reports that set the intent for the future planning of Hanwood as set out in the sections below.

Griffith Land Use Strategy Beyond 2030 and Draft Hanwood Growth Area Masterplan 2025

The *Griffith Land Use Strategy Beyond 2030* (LUS), originally drafted in 2012, offers a long-term framework for balanced urban expansion for the LGA. It spans over 20 years and aims to guide land use and spatial development in Griffith, with a vision for the city's growth. The strategy identifies key areas for expansion, including the three Villages of Lake Wyangan, Hanwood, and Yenda, which have been put forward as areas suitable for future growth.

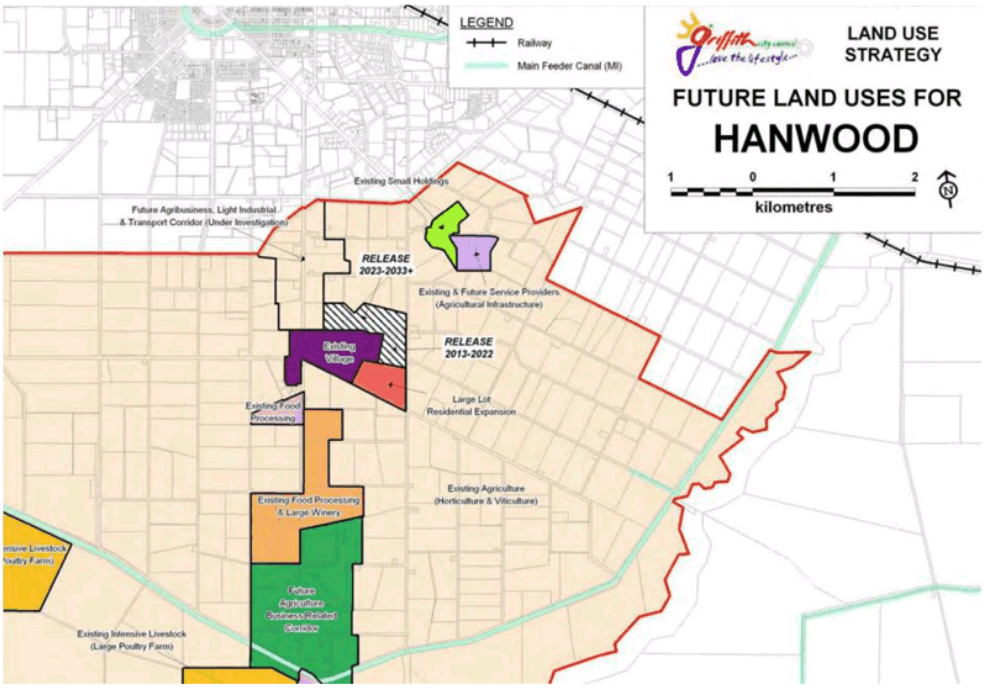


Figure 23: Griffith Land Use Strategy – Hanwood
(Source: Griffith City Council LUS)

For Hanwood, the LUS proposed a staged land release along Leonard Road. Between 2013 and 2022, the southern side of Leonard Road, known as Hanwood Farms 1–3, subsequently adopted as an urban release area within the GLEP 2014, was rezoned for residential use. Farm 1 allows for smaller lot sizes, while Farms 2 and 3 retain larger, rural residential lot sizes. However, as of 2024, two of the three farms are still actively being farmed, and no small-lot subdivisions have been lodged since the rezoning, leaving Farm 3 as the only developable site .

From 2022 to 2030, the northern side of Leonard Road (the large majority of the subject site) was earmarked for future rezoning. Council's *draft Hanwood Growth Area Master Plan* dated 02 May 2025

reinstated this vision and reaffirmed the importance of the site as identified in the Concept Masterplan in the figure below.

Figure 24: Hanwood Growth Area Concept Masterplan, site outlined in green
(Source: Draft Hanwood Growth Area Master Plan, annotated by Gyde)

It is acknowledged that the western most portion of the site (Lot 150 DP 7510709) is not highlighted in the Masterplan documents for urban release. It is considered that this land should be included to ensure the adequate development of the Stage 2 release area, and as such the expansion of the Hanwood Village. The land is capable of accommodating approximately 40 lots, and its inclusion has the opportunity to mitigate the risk of land use conflict. The current permissible uses under the RU6 – Transition zone, such as freight transport facilities, general industries, highway service centres, roadside stalls, and storage premises, are incompatible with the intended function of the urban release area and would adversely impact the amenity and future potential of the proposed rural, neighbourhood village.

As is noted in the Infrastructure Report (Appendix H), from a stormwater perspective, the southwest corner of the lot is the lowest point of the site, therefore it is the natural position to place the wetlands area and OSD basins. Should this lot not to be utilised, the wetlands and basins for the development would have to discharge into the Leonard Road drain near Ash Street, which would mean flows from Kidman Way will not be able to be directed into the Wetlands area and managed as part of the flood storage.

Council's *draft Hanwood Growth Area Masterplan* (2025) also proposes the inclusion of medium density lots within the core of the site as indicated in yellow shading in the figure above. It notes that "recently, the Griffith Worker and Housing Shortage Task Force recommended that 50% of lots in growth areas be designated for medium density development. In response, the layout has been revised to incorporate medium density housing on 25% of the lots within Stages 1 and 2, specifically in the nodes identified by Council. The remaining 25% allocation for medium density development across the broader growth area will be at the discretion of the developer." As previously outlined, the southern Leonard Road area, which was rezoned in 2014, has seen minimal development. Since this time, only Farm 3 has been partially developed, with approval for large rural residential lots. The

absence of new small-lot residential development in Hanwood highlights the opportunity for the subject site to provide a variety of housing options to meet market demands.

Encouraging residential development in Hanwood is seen as a critical step in boosting Griffith's population growth, providing affordable housing options, and fostering a stronger sense of community connectivity. The Council's *draft Hanwood Growth Area Masterplan*, which is still being developed, recognises the majority of the subject site as the third and final stage of the area's overall development. The strategic importance of the site calls for changes in zoning and development sequencing to align with the city's long-term housing needs.

The Griffith Housing Strategy Review (February 2025) emphasises the need for a minimum of 118 new residential lots per year across the LGA. Currently, the only other active land release in the area is Lake Wyangan, located 5 km northwest of Griffith. Despite approvals being in place since 2013, the site remains undeveloped.

Population forecasts have been progressively revised upwards, with the 2019 Housing Strategy projecting around 30,500 residents by 2036 and 1,744 new dwellings (about 79 per year), and the 2024 REMPLAN Need and Demand Assessment (Appendix E) increasing this to between 30,874 and 31,641 people by 2041, requiring 76–130 dwellings per year.

The Draft Griffith Housing Strategy 2025 projects even stronger growth, with the population reaching around 34,500 by 2046 and requiring about 2,725 new dwellings (118 per year). This represents a 50% increase in projected housing need compared with the 2019 Strategy and a 24% rise compared with the Need and Demand Assessment prepared just one year earlier.

In addition, dwelling approvals don't always result in new dwellings, and it is important to note that the average of 94 dwelling approvals per year falls short of the forecasted 98 dwellings needed annually to accommodate an increase of 4,610 new residents by 2046. This may raise concerns that, if current trends continue, the number of new dwellings will not adequately support future population growth. It is important to note that over the last 5 years, the average number of building approvals has been 121 per year, notably higher than the 10-year average of 94 dwellings per year. This highlights strong demand for dwellings in Griffith over recent years despite monumental periods of economic downturn as a result of COVID, and drought and floods across the wider region.

The NSW Government's Local Development Performance Monitoring (refer to Figure 25) supports this conclusion. While the evident increase in development applications over the past decade points to growing intent to build and demand for housing, the comparatively slower rise in construction certificates and subdivision certificates suggests delays in progressing from approval to actual construction, as summarised below.

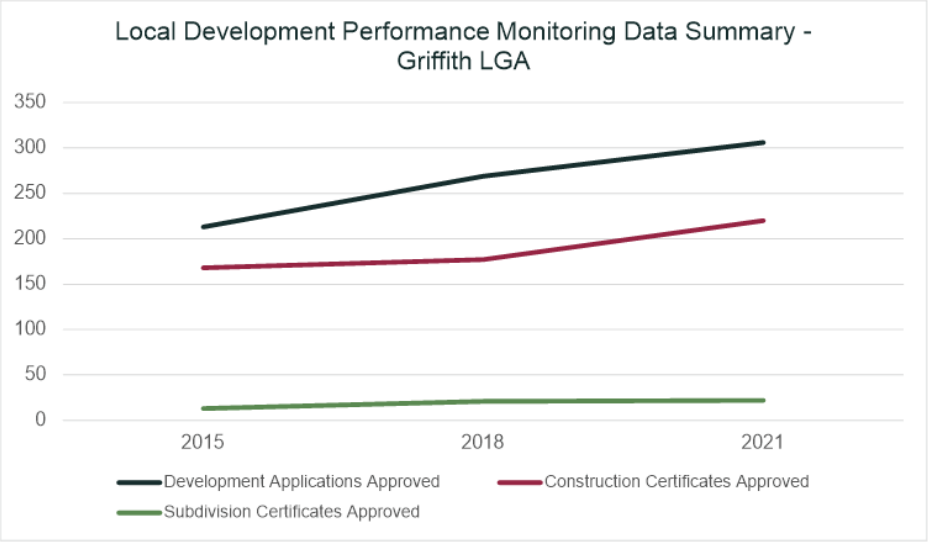


Figure 25: Summary of NSW Government LDPM data for Griffith
(Source: Gyde, informed by LDPM data)

This PP presents an opportunity to provide an opportunity for well-planned residential expansion in Hanwood. Through the rezoning of the land and therefore delivering contemporary, diverse, and affordable housing options within close commuting distance of Griffith, the rezoning will provide substantial public benefits and support sustainable regional growth.

7.1.1.1 Griffith Housing Strategy 2019 and draft Griffith Housing Strategy 2025

The *Griffith Housing Strategy* (GHS), commissioned by Council and adopted on 26 November 2019, was initiated in response to growing concerns regarding housing affordability and equity within the Griffith LGA. The GHS highlights a pressing issue being the large and increasing number of very low-income renting households in housing stress, coupled with the broader inability of the housing market to accommodate the needs of these households.

It highlights a significant shortage of smaller, well-located dwellings to meet future demand. Medium-density housing remains scarce in Griffith, emphasising the urgent need for smaller lot housing. Current construction trends continue to favour larger detached homes, with four-bedroom single-level houses accounting for over 80% of the housing stock.

As outlined in the Need and Demand Assessment (Appendix E) prepared by Remplan, the GHS acknowledges that Griffith requires 1,744 dwelling units up to 2036 to satisfy the expected growth pressures of a population increase of 0.73%. Since this study was done, the State government has revised their population growth projections to be 0.9%. Council's forecast (Forecast.id) is slightly lower at 0.6% however reinforces the understanding that population growth is expected to continue through to 2036 and beyond.

Remplan's sensitivity analysis indicates that household sizes in Griffith are continuing to shrink, meaning more dwellings will be needed to accommodate the same number of residents. While it may appear that Griffith has between 21.9 and 37.3 years of housing supply if all zoned land is developed, this is an unrealistic scenario. If only 50 percent of zoned land is delivered, a rate already higher than the NSW average (43.7%), effective housing supply falls to between 10.9 and 18.7 years. Under a medium conversion rate scenario, and without the delivery of the subject site development, Griffith could experience housing supply as little as six years. This highlights the critical need to promptly rezone the site, ready for development.

GYDE

An analysis of NSW DPHI implied dwelling demand shows Griffith had a potential undersupply of around 2,500 homes in 2021 — equivalent to a 26% shortfall of existing housing stock.

The *Draft Griffith Housing Strategy* 2025, on public exhibition at the time of lodgement of this PP, further emphasises this critical need to address the undersupply of housing, affordability, and the mismatch between existing housing stock and current demand. It highlights that although there is existing capacity for higher-density development, housing delivery is failing to keep pace with demand.

The Strategy notes the intent to build on the outstanding recommendations from the Griffith Housing Strategy 2019 with key priorities including as follows:

- expanding housing for essential, temporary and seasonal workers;
- identifying increased opportunities for higher-density housing;
- supporting ongoing CBD renewal;
- supporting the development of granny flats, tiny homes and caravan parks;
- encouraging manufactured homes;
- strengthening partnerships to deliver more affordable and social housing;
- addressing delays in developing zoned residential land;
- enabling timely infrastructure delivery; and
- improving planning processes.

To address these challenges, the draft Strategy recommends several key planning measures, such as unlocking development-ready land, encouraging a broader range of housing types, as well as short term plans to reduce minimum lot sizes for dual occupancies and multi-dwelling housing, consistent with the intent of this PP. It also proposes the application of an 'urban release area overlay', in which it is understood that Council would review the Staging Plan to permit the release of Stage 2 land if development applications for at least 80% of Stage 1 landholdings are not approved within five years (by 2030).

In this context, the PP directly aligns with and supports the strategic intent of the draft Strategy. It facilitates the timely release of development-ready land, broadens housing choice, and expedites the delivery of diverse housing types, including smaller and more affordable housing types such as dual occupancies, and medium-density forms. By enabling more flexible and responsive development beyond the constraints of the current staging framework, the PP advances Council's goals of affordability, diversity, and sustainable growth.

Despite the Stage 1 area being rezoned for residential purposes in 2014, development has remained stagnant. Two of the three farms continue to be used for agriculture, and subdivision has only partially progressed on the third.

Crucially, the approach of this PP offers a timely and practical response to the ongoing housing crisis. Nationally, only 173,000 dwellings were completed in 2023, well short of the estimated annual need of 244,000 (ABS, 2024). Locally, Griffith's extremely low vacancy rate of 0.6% underscores the urgency of delivering more diverse and affordable housing options.

As noted in the Griffith housing needs addendum report (Appendix F), while the LGA has enough land identified for thousands of homes, only 13% is classified as development-ready, creating a high risk that supply will continue to lag behind demand. Ongoing action will therefore be required from Council, working closely with the development industry and landowners, to accelerate delivery, unlock development-ready land, and support a more diverse housing mix. Without this coordinated effort, Griffith will remain in a state of housing crisis, with affordability and accessibility pressures intensifying across the community.

It is therefore evident that rezoning the subject site is a necessary and strategic step to address the growing housing demand and to ensure Griffith can meet its future housing needs. The proposed rezoning will facilitate the development of smaller, more affordable dwellings that align with the broader objectives of the GHS and support the social and economic growth of the area.

This approach will not only provide more attainable housing options but also contribute to a more diverse and resilient residential landscape, strengthening Griffith's long-term growth and liveability.

7.1.2 Is the Planning Proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

A PP is considered the best way of achieving the desired urban release and delivery of diverse housing outcomes on the subject site in a timely manner.

The project was considered by the Housing Delivery Authority (HDA) on 4 April 2025 (EOI Number 236846). It was determined the project did not meet the necessary criteria and objectives and was therefore not recommended to proceed as state significant development. It was noted in the HDA record of briefing dated 4 April 2025 that, in general, subdivisions where servicing is not fully available or resolved may still demonstrate merit. The HDA team considers that Council is best placed to progress these applications.

The current zoning of the site does not permit urban development; therefore, a rezoning is required to implement Griffith Council's strategic land release objective.

Griffith Council exhibited the *draft Hanwood Growth Area Masterplan* in June 2025, which included the majority of the subject site. It would therefore be conceivable that the site will ultimately be rezoned by Council, making this proponent-led rezoning superfluous. As is noted above, while the Masterplan does not include the western most portion of the site at Lot 150 DP 7510709, the inclusion of this land is considered appropriate, as it will deliver significant benefits by supporting the orderly development of the release area, providing additional housing capacity, and ensuring land use compatibility with the broader strategic vision for the locality.

However, there is currently no information in the public arena about the likely timeframe for a Council-led rezoning. Furthermore, the Council's Master Plan proposes single lot detached dwellings as stage 3 of any future land release. This does not align with the Proponent's vision.

7.2 Section B – Relationship to Strategic Planning Framework

7.2.1 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)?

Riverina Murray Regional Plan 2041

The *Riverina Murray Regional Plan 2041* (the regional plan) provides a long-term land use framework to guide sustainable growth and development across the region over the next two decades, with a targeted focus on implementation within the next five years. Recognising the significance of urban centers such as Albury, Wagga Wagga, and Griffith being home to over 50% of the regional population, the regional plan prioritises strategic growth in these key economic and social hubs.

As Griffith continues to expand, this PP directly supports the regional plan's strategic objectives, particularly in housing diversity, affordability, and urban expansion near existing infrastructure and services. The subject site, adjacent to Hanwood Village, is ideally positioned to deliver a well-planned, diverse, and sustainable residential community with minimal environmental impact.

This proposal aligns with Objective 5 of the regional plan; Ensure housing supply, diversity, affordability and resilience, by introducing a variety of housing typologies tailored to Griffith's evolving demographics. The provision of medium-density housing such as multi-dwelling, shop-top housing, etc., enhances housing diversity while supporting infill development in a strategically located area.

Supporting Objective 6; Support housing in regional cities and their sub-regions, the proposal promotes additional residential densities and supply near a commercial centre and integrates urban development within Hanwood, a growing community adjacent to Griffith. By transitioning land from

rural to residential zoning, as outlined in Strategy 6.1, the plan ensures efficient land use while preserving local character. Specifically, Strategy 6.1 outlines aims to:

- *Coordinate appropriate urban growth and development through structure and master planning, particularly in new urban release areas*
- *Increase infill and residential densities within or close to the CBD, in consultation with relevant government infrastructure and service providers (such as schools and transport), where appropriate.*
- *Where strategically justified, transition rural residential development to a standard residential product.*

This PP advances these priorities by facilitating higher-density housing near Griffith's CBD and strategically transitioning rural residential areas to residential zoning in alignment with regional growth objectives.

Furthermore, the proposal supports Objective 7; Provide for appropriate rural residential development. The introduction of smaller lot sizes (300m^2-700m^2) and medium-density housing creates a new market segment in Griffith, enhancing affordability and housing choice while mitigating urban sprawl.

With a population of 27,000 and a broader regional catchment of 50,000, Griffith serves as a key regional hub. Rising housing costs present an opportunity for areas like Hanwood to accommodate residential expansion. This proposal contributes to Griffith's growth by delivering diverse, well-connected, and affordable housing options, strengthening its role as a major urban centre.

Ultimately, this planning proposal aligns with the Riverina Murray Regional Plan 2041, reinforcing its vision for sustainable, well-managed urban expansion. By enabling a mix of housing types, increasing residential density, and integrating seamlessly with existing communities, the proposal supports Griffith's long-term growth trajectory while maintaining affordability and sustainability.

7.2.2 Is the Planning Proposal consistent with a council LSPS that has been endorsed by the Planning Secretary or GCC, or another endorsed local strategy or strategic plan?

Griffith Local Strategic Planning Statement 2020

The *Growing Griffith to 2045 Local Strategic Planning Statement 2020* (LSPS) sets out Council's vision for land use and development over the next 25 years. It highlights Griffith's unique character and establishes a framework to guide growth and change while preserving community values. The LSPS identifies key planning studies and strategies to ensure effective controls that support sustainable development.

The strategy is built around four key themes: A thriving economy, a sustainable community, linking Griffith to the world and a great place to live. These priorities align with the Riverina Murray Regional Plan (refer to Section 7.2.1) and focus on residential growth in Lake Wyangan, Griffith North, Hanwood, and Yenda, as well as expanding housing diversity in established urban areas. This strategic direction aligns closely with the proposal's objectives for sustainable and community-focused development.

The LSPS notes that Griffith's population is projected to grow by 24%, from 26,426 in 2016 to 32,776 in 2045. The most significant increase will be among parents and homebuyers aged 35-49, who will grow by 20%, while residents over 65 will increase by 18%, highlighting the need for diverse housing typologies to cater for the existing and future diverse community.

The LSPS identifies Hanwood as a key growth area with the structure plan highlighting Hanwood's role in city and Village expansion. This PP supports the future growth of Hanwood Village, in line with Council's masterplan. Notably, growth areas designated in the 2013 Griffith Land Use Strategy for development beyond 2023 remain undeveloped, as outlined in Section 7.1.1.1.

GYDE

Griffith Community Strategic Plan 2022-2032

The *Griffith Community Strategic Plan 2022-2032* integrates with all key Council strategic plans to outline key population and demographic trends. Notably, 41% of households include children, and 78.2% have more than two residents, again underscoring a strong need and demand for diverse housing choice (Figure 26).

A major challenge for the region, as highlighted in this plan is housing availability and the capacity for growth, supported by growth and expansion opportunity.

This proposal directly supports the strategic objectives of the plan through addressing housing demand and facilitating sustainable expansion through well-planned investment to service the community, positioning the site as a key opportunity for future development.

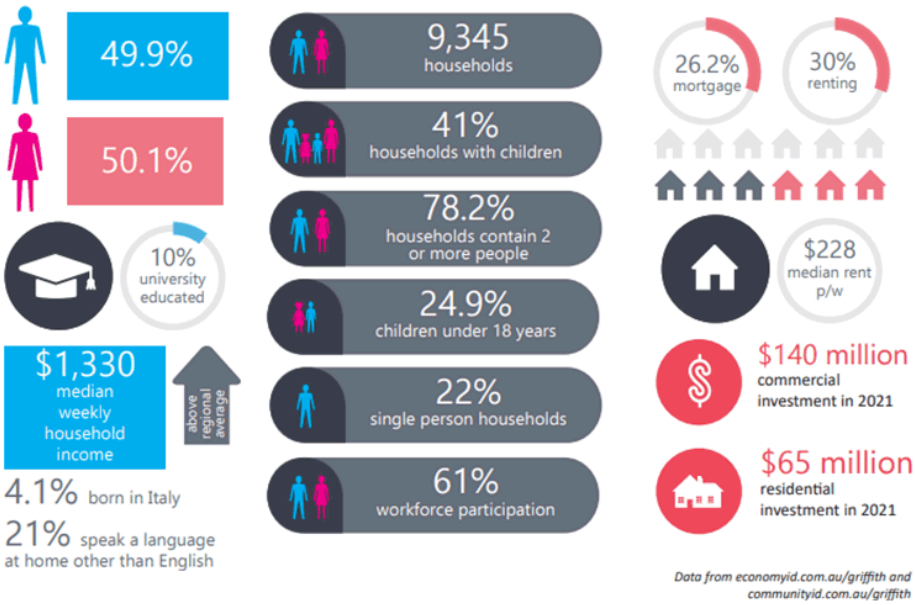


Figure 26: Griffith community overview
(Source: Griffith City Council)

Griffith Worker and Housing Shortage Taskforce

The *Griffith Worker and Housing Shortage Taskforce (Draft) Report on Strategies to Increase Housing Supply* (August 2024) is a joint initiative of the Griffith Business Chamber and Griffith City Council, which was formed in November 2023. The purpose of the Taskforce was to develop strategies to increase the supply of workers and housing within the Griffith LGA. As a preliminary focus, the Taskforce concentrated on the development of housing strategies to increase the supply of affordable housing and thereby improve the recruitment and retention of workers within the Griffith LGA.

The key recommendations of this report include consideration to increase the supply of medium-density housing, and encourage Council approach the NSW Government to advocate for a 'Land Zone Pipe Line', such that land which was zoned residential but not developed within two years be zoned as 'postponed residential land', to enable further sites to be zoned as residential and actively developed.

These recommendations align with the purpose of this PP in aiming to re-zone ready to develop land to support housing supply and affordability in the region.

GYDE

Griffith State of Our City Report

The *Griffith State of Our City Report* offers insights into the region's housing landscape, drawing attention to a persistently low residential vacancy rate of 0.8% in December 2021, with projections indicating a further decline to just 0.6% by June 2024. This underscores the pressing need for increased housing supply to accommodate rising demand.

Within the report, the Growing Our City theme highlights the necessity of diversifying housing options to better serve a broad spectrum of residents, from young families to seniors and key workers. This focus on expanding housing variety aligns closely with the objectives of the proposed development, reinforcing the need for a strategic, well-planned approach to growth. By prioritising a mix of housing types, the broader Griffith region and Hanwood in particular can more effectively meet the needs of its growing population while fostering long-term, sustainable urban development as supported by the objectives of this PP.

Evolve Griffith 2021-2025 Economic Development Strategy

'Evolve Griffith' is Council's five-year plan to support the vibrancy, diversity and sustainability of the City of Griffith, to 2025 and beyond. Building on its strategic location, its industry strengths and capabilities and its role as the service centre to the Western Riverina, the economic development strategy outlines that Griffith will be widely known for its vibrant and connected communities and as a location of choice in which to live, work, visit and invest. The strategy highlights Council's support for economic development through strategic planning, information sharing, advocacy and infrastructure delivery, to cultivate Griffith's appeal as a place to live, learn and prosper.

This PP aligns with the objectives of this strategy by promoting a resilient, high-quality, and liveable community. It achieves this through well-planned design that ensures access to employment, education, recreation, and green spaces. Additionally, it supports Hanwood's urban growth by facilitating diverse and affordable housing options within convenient commuting distance of Griffith.

7.2.3 Is the Planning Proposal consistent with any other applicable State and regional studies or strategies?

Regional Housing Taskforce

Australia is facing a severe housing supply shortage, with NSW experiencing an acute affordability crisis due to lagging approvals and delivery. Strong demand and limited supply have driven housing costs higher since early 2023, with national housing prices and rents increasing by 8% throughout the year (CoreLogic, 2024).

Housing supply is failing to keep pace with demand. Population growth in the year leading up to June 30, 2023, created the need for approximately 244,000 additional dwellings. However, only around 173,000 were completed—the lowest number in a decade (ABS, 2024b). Over the past 12 months, housing approvals have also declined, while project abandonments have risen, further limiting the pipeline of new dwellings needed to meet ongoing demand (Australian Government, 2024).

To address this shortage, the NSW Government is prioritising the construction of more diverse housing in well-located areas with access to transport, open spaces, schools, hospitals, and community facilities, places already equipped with the infrastructure to support a growing population.

In June 2021, the NSW Government established the Regional Housing Taskforce in response to growing pressures on the supply and affordability of housing across Regional NSW. The Taskforce delivered its Findings Report in September 2021 and its Recommendations Report in November 2021, outlining five key recommendations and 15 detailed actions.

The five main recommendations are as follows:

1. Support measures to bring forward a supply of 'development-ready' land.
2. Increase the availability of affordable and diverse housing across regional NSW.
3. Provide greater certainty regarding where, when, and what types of homes will be built.

4. Investigate planning levers to facilitate the delivery of housing that meets short-term needs.
5. Improve monitoring of housing and policy outcomes, as well as demand indicators.

In August 2022, the NSW Government adopted all of the Regional Housing Taskforce's recommendations as part of a comprehensive strategy to deliver 127,000 new homes to accommodate the growing regional population over the next decade.

The Findings Report highlights several crucial insights:

- Regional NSW experienced above average population movement during 2020/21.
- The projected population of Regional NSW is expected to increase by 400,000 by 2041, reaching a total of 3.5 million. This will require the construction of an additional 290,000 homes. Current trends suggest that the population growth will meet the high-end estimates within the next 5-10 years.
- Housing stock in regional areas is predominantly homogenous, with a heavy reliance on detached dwellings. Future housing development must address the needs of an ageing population, including smaller dwellings close to services. This is in contrast to the prevailing community preference for detached homes that offer more space and a rural lifestyle.
- Nearly half (48%) of households in Regional NSW have two or more spare bedrooms. However, pockets of overcrowding persist in areas such as Brewarrina, Central Darling, Bourke, Walgett, Griffith, and Coonamble, where more than 5% of dwellings are considered overcrowded.

This proposed development aligns with the Taskforce's strategic goals by delivering a diverse range of residential options in a strategically optimal regional location. It will not only enhance housing availability but also foster community well-being by integrating essential services and infrastructure. The site is well-positioned within proximity to an existing Village area, ensuring seamless connectivity to employment opportunities and critical amenities, which will address both short-term and long-term housing needs.

This PP represents a strategic response to the housing challenges faced by Regional NSW. By increasing the supply of affordable and diverse housing in a well-connected location, it will contribute to the broader goals of housing affordability, community resilience, and regional growth. This proposal will play a vital role in supporting the sustainable development of Regional NSW, ensuring that it is equipped to accommodate the needs of its growing and diverse population.

7.2.4 Is the Planning Proposal consistent with applicable SEPPs?

The table below provides an assessment of the PP against the relevant State Environmental Planning Policies (SEPPs) and confirms the proposal is consistent with the applicable SEPPs.

Table 5: Assessment of PP against relevant SEPPs

SEPP	Comment
State Environmental Planning Policy (Biodiversity and Conservation) 2021	As detailed in Section 2.6, The site is not identified on the Biodiversity Values Map. Kidman Way is identified as "Biodiversity" on the Terrestrial Biodiversity Map. The site and surrounds are classified as 'cleared' on Vegetation Classes of NSW map. A Flora and Fauna Assessment has been undertaken for this PP by Kingfisher Urban Ecology (Appendix K) which concludes that the proposal is not considered to have a significant impact on the flora and fauna of the site. Roadside vegetation is proposed to be impacted; however, clearing of vegetation will be minimised where possible whilst adhering to sightline requirements. Replanting of roadside vegetation will be undertaken to mitigate the loss of vegetation from the proposal. Various mitigation measures have been proposed to ensure flora and fauna are protected during the works.

GYDE

SEPP	Comment
State Environmental Planning Policy (Exempt and Complying Development Codes) 2008	Not directly relevant to this PP. May apply to future development on the site.
State Environmental Planning Policy (Planning Systems) 2021	Not directly relevant to this PP. May apply to future development on the site.
State Environmental Planning Policy (Housing) 2021	The indicative concept scheme has been designed in consideration of the requirements of the *State Environmental Planning Policy (Housing) 2021*. However, the final built form will be determined at a later, more detailed design stage. The concept scheme, demonstrates the potential to deliver a diverse range of housing options, including one-, two-, three- and four-bedroom houses and apartments in a well-located area, contributing to the housing supply and mix in the Hanwood and broader Griffith area.
State Environmental Planning Policy (Sustainable Buildings) 2022	Not directly relevant to this PP. May apply to future development on the site.
State Environmental Planning Policy (Transport and Infrastructure) 2021	It is noted that the proposed development constitutes traffic-generating development under Schedule 3 of the SEPP, as it involves residential accommodation comprising more than 75 dwellings on a site with access to a classified road or a road that connects to a classified road (Kidman Way). Accordingly, it is understood that this PP may be required to be referred to Transport for NSW.
State Environmental Planning Policy (Industry and Employment) 2021	Not directly relevant to this PP. May apply to future development on the site.
State Environmental Planning Policy (Resilience and Hazards) 2021	As detailed further in Section 2.7, a PSI has been undertaken for the subject site (Appendix J). The results of the investigation concluded that there is no gross contamination across the site from pesticide use, fuel storage, or machinery maintenance. However, additional sources of contamination were identified and will require further investigation and site management during development, which is outlined in the report. Nonetheless, the PSI outlines that the site is suitable for the proposed development given the asbestos and septic systems are appropriately managed during development in line with the recommendations outlined in the report and in Section 7.3.2.6. Subsequently, a Detailed Site Investigation (DSI) and Remediation Actional Plan (RAP) will be prepared as required, as part of future detailed DA stage. Please refer to Appendix J for further detail. Notwithstanding, any potential contamination issues will be further addressed appropriately at any future DA stage.

GYDE

7.2.5 Is the Planning Proposal consistent with the applicable Ministerial directions (s.9.1 directions) or key government priorities?

It is considered that the PP is consistent with the relevant Directions issued under Section 9.1 of the Act by the Minister to Councils, as demonstrated in the assessment of the following:

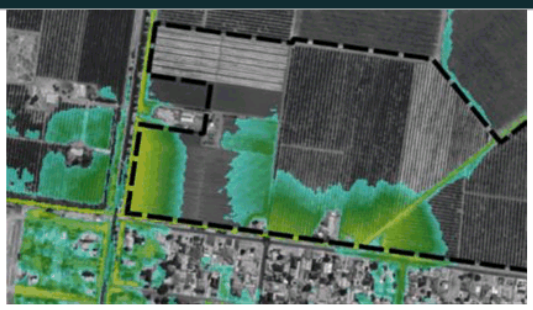
Table 6: Ministerial directions

Direction	Consistency	Comment
Focus Area 1: Planning Systems		
1.1 - Implementation of Regional Plans	✓	This PP is consistent with the Riverina Murray Regional Plan as outlined in Section 7.2.
1.2 - Development of Aboriginal Land Council land	Not applicable.	Not applicable. No tangible or intangible Aboriginal cultural values were identified by the site officer representing Griffith Local Aboriginal Land Council.
1.3 - Approval and Referral Requirements	✓	This PP does not: • include provisions that require the concurrence, consultation or referral of development applications to a Minister or public authority, and • identify development as designated development.
1.4 - Site Specific Provisions	✓	This PP seeks to rezone the site to an existing zone already in the environmental planning instrument (GLEP 2014) being RU5 Rural Village. Ultimately, it does not introduce any additional or unnecessarily restrictive site-specific controls i.e. height or FSR and supports a planning outcome that enables the site's optimal development potential.
Focus area 2: Design and Place		
[This Focus Area was blank when the Directions were made]		
Focus Area 3: Biodiversity and Conservation		
3.1 Conservation Zones	Not applicable.	The site is not identified as environmentally sensitive or on land within a conservation zone or environment conservation/protection purposes.
3.2 Heritage Conservation	Not applicable.	The site is not identified as a place of environmental heritage significance and indigenous heritage significance.
3.3 Sydney Drinking Water Catchments	Not applicable.	This direction does not apply to land in the Griffith Local Government Area.
3.4 Application of C2 and C3 Zones and Environmental Overlays in Far North Coast LEPs	Not applicable.	This direction does not apply to land in the Griffith Local Government Area, and the site is not zoned C2 or C3.
3.5 Recreation Vehicle Areas	Not applicable.	This PP does not involve land to be developed for the purpose of a recreation vehicle area.

GYDE

Direction	Consistency	Comment
3.6 Strategic Conservation Planning	Not applicable.	This direction does not apply to land that is identified as avoided land or a strategic conservation area.
3.7 Public Bushland	Not applicable.	This direction does not apply to land in the Griffith Local Government Area.
3.8 Willandra Lakes Region	Not applicable.	This direction does not apply to the site as it is not land identified as the Willandra Lakes World Heritage Property.
3.9 Sydney Harbour Foreshores and Waterways Area	Not applicable.	This PP does not involve land within the Foreshores and Waterways Area.
3.10 Water Catchment Protection	Not applicable.	This PP does not affect land within a regulated catchment.
Focus area 4: Resilience and Hazards		
4.1 Flooding	On merit.	As previously outlined, Torrent Consulting note that the far western side of the Site (part of Lot 150 DP 751709 behind the Kidman Way) is identified as being located within the floodplain. This report outlines that with the planning proposal being for the rezoning of rural land to residential use and most of the Site being located within the FPA, it is inconsistent with Ministerial Direction 4.1 Flooding. However, this flood assessment has demonstrated that this inconsistency results in only a minimal flood risk exposure and that potential off-site flood impacts can be readily mitigated through design. Refer to Appendix N for further detail. As is noted in the Infrastructure Report (Appendix H), from a stormwater perspective, the southwest corner of the lot is the lowest point of the site, therefore it is the natural position to place future wetlands area and OSD basins. Due to the site being the existing low point for the catchment north of the Hanwood Town Centre, almost half of lot 150 is inundated by flooding during the 1% AEP event, which makes it a suitable area to be used for a flood storage basin / wetlands area (refer to Figure 27).

GYDE

Direction	Consistency	Comment
		 **Figure 27: Subject site in the 1% AEP event** Should Lot 150 not be utilised, the wetlands and basins for the development would have to discharge into the Leonard Road drain near Ash Street, which would mean flows from Kidman Way will not be able to be directed into the Wetlands area and managed as part of the flood storage.
4.2 Coastal Management	Not applicable.	This PP does not involve land that is within the coastal zone, as defined under the Coastal Management Act 2016.
4.3 Planning for Bushfire Protection	Not applicable.	The site is not identified as bushfire prone land.
4.4 Remediation of Contaminated Land	✓	As detailed further in Section 2.7, a PSI has been undertaken for the subject site (Appendix J). The results of the investigation concluded that there is no gross contamination across the site from pesticide use, fuel storage, or machinery maintenance. However, additional sources of contamination were identified and will require further investigation and site management during development, which is outlined in the report. Nonetheless, the PSI outlines that the site is suitable for the proposed development given the asbestos and septic systems are appropriately managed during development in line with the recommendations provided in the report. Subsequently, a Detailed Site Investigation (DSI) and Remediation Actional Plan (RAP) will be prepared as required, as part of future detailed DA stage.
4.5 Acid Sulfate Soils	Not applicable.	This PP does not involve land containing acid sulfate soils.
4.6 Mine Subsidence and Unstable Land	Not applicable.	This PP does not involve and that is within a declared mine subsidence district.
Focus area 5: Transport and Infrastructure		
5.1 Integrating Land Use and Transport	✓	This PP aligns with the objectives of this direction as it aims to improve access to housing, jobs and services. The proposed development is strategically positioned near employment hubs, health services, and

GYDE

Direction	Consistency	Comment
		educational facilities, fostering opportunities for future generations to live and work in Hanwood. The Transport Impact Assessment (Appendix D) concludes the local and regional road network can accommodate the anticipated growth in vehicle movements generated by this PP.
5.2 Reserving Land for Public Purposes	Not applicable.	The PP does not apply to land that is reserved for public purposes.
5.3 Development Near Regulated Airports and Defence Airfields	Not applicable.	This PP does not involve land that will create, alter or remove a zone or a provision relating to land near a regulated airport.
5.4 Shooting Ranges	Not applicable.	This PP does not involve land relating to land adjacent to and/ or adjoining an existing shooting range.
5.5 High pressure dangerous goods pipeline	Not applicable.	This PP does not involve high pressure dangerous goods pipelines.
Focus area 6: Housing		
6.1 Residential Zones	✓	This PP aligns with the objectives of this direction as it broadens the choice of building types and locations available in the housing market. The proposed development is strategically positioned near employment hubs, health services, and educational facilities, fostering opportunities for future generations to live and work in Hanwood.
6.2 Caravan Parks and Manufactured Home Estates	Not applicable.	This PP does not involve future development for caravan parks and manufactures home estates.
Focus area 7: Industry and Employment		
7.1 Employment Zones	Not applicable.	This PP will not affect land within an existing or proposed Employment zone.
7.2 Reduction in non-hosted short-term rental accommodation period	Not applicable.	This direction does not apply to land in the Griffith Local Government Area.
7.3 Commercial and Retail Development along the Pacific Highway, North Coast	Not applicable.	This direction does not apply to land in the Griffith Local Government Area.
Focus area 8: Resources and Energy		
8.1 Mining, Petroleum Production and	Not applicable.	This PP does not relate to mining, petroleum productive or extractive industries.

GYDE

Direction	Consistency	Comment
Extractive Industries		
Focus area 9: Primary Production		
9.1 Rural Zones	On merit.	Direction (1)(a) - This PP seeks to rezone the site from a rural to village zone. As previously outlined, this approach is consistent with the *Griffith Land Use Strategy Beyond 2030* (2012), which promotes balanced urban expansion by extending development opportunities to Griffith and neighbouring villages such as Lake Wyangan, Hanwood and Yenda. The Strategy outlines a plan for staged land release on both the southern and northern sides of Leonard Road. The majority of the subject site falls within the Stage 2 land release earmarked for rezoning in 2022 – 2030. Griffith City Council's Local Housing Strategy workshops in June 2024 reaffirmed the site's role within the Hanwood release area. The large majority of the site is part of the *draft Hanwood Growth Area Master Plan*, adopted by Griffith Council on 27 May 2025 and on public exhibition at the time of submission of this PP. It is noted that the western most portion of the site (Lot 150 DP751709) is not identified in the Masterplan documentation. The inclusion of this land is considered appropriate for this Planning Proposal, as it will deliver significant benefits by supporting the orderly development of the release area for the following reasons; • This land has the potential to accommodate approximately 40 additional lots, supporting the expansion of the Hanwood Village. • The current permissible uses under the RU6 – Transition zone, such as freight transport facilities, general industries, highway service centres, roadside stalls, and storage premises, are not compatible with the urban release area. These uses would detract from the amenity and potential of the future neighbourhood village. • As such, the development of this land will be planned to avoid the creation of conflict zones. • By removing these conflicting uses, the PP will allow for a more cohesive and functional urban release area. • The primary purpose of this lot is to manage flood-prone areas while freeing up additional land for the Village purpose. As such, it is considered that the site in its entirely is suitable for the proposed rezoning. Direction (1)(b) - does not apply to land in the Griffith Local Government Area.
9.2 Rural Lands	On merit.	As outlined previously and above, this PP is largely consistent with the applicable strategic planning framework. The PP considers the significance of agriculture and primary production to the State and rural communities.

Direction	Consistency	Comment
		The proposal will not adversely affect the operation and viability of existing and future rural land uses and related enterprises, including supporting infrastructure and facilities that are essential to rural industries or supply chains. The Agricultural Land Assessment (Appendix G) concludes that the site represents just 0.03% of all RU1 Primary Production zoned land in the Griffith LGA, and its loss to commercial agriculture will have only a minor impact on the area's overall agricultural value. While the site contributes approximately 2% of the citrus gross value of production (GVP) in the Griffith LGA, which itself contributes around 3% to the Australian citrus industry's GVP, this shift in land use is not expected to significantly affect the broader agricultural economy. In summary, the loss of the project site to commercial agriculture is anticipated to have a minor impact on agricultural values.
9.3 Oyster Aquaculture	Not applicable.	This PP does not involve land in 'Priority Oyster Aquaculture Areas' and oyster aquaculture outside such an area.
9.4 Farmland of State and Regional Significance on the NSW Far North Coast	Not applicable.	This direction does not apply to land in the Griffith Local Government Area.

7.3 Section C – Environmental, Social and Economic Impact

7.3.1 Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

A Flora and Fauna Assessment has been undertaken as part of this PP by Kingfisher Urban Ecology (Appendix K).

The site and surrounds are classified as 'cleared' on Vegetation Classes of NSW map.

The site is not identified on the Biodiversity Values Map.

Figure 28: Terrestrial Biodiversity Map
(Source: GLEP 2014)

The assessment concludes that the proposal is not considered to have a significant impact on the flora and fauna of the site.

Replanting of roadside vegetation will be undertaken to mitigate the loss of vegetation from the proposal. The only impact on native vegetation would be the clearing of 20-25m of road reserve vegetation on Kidman Way to facilitate the joining of the proposed 1st Avenue to Kidman Way. The area of impact is approximately 450m^2. The remaining areas of vegetation along Kidman Way are to be retained. Replanting works should be undertaken within the road reserve to offset the loss of vegetation. Vegetation loss will be kept as minimal as possible. Various mitigation measures have been proposed to ensure flora and fauna are protected during the works.

In terms of threatened species, a search of the Bionet database from within 10 km radius of the site (the search area) returned records for 31 birds, 3 mammals and 1 flora species. Of these listed species, all are determined to be unlikely or low likelihood of the species occurring on the site.

It is noted that the assessment at Appendix K confirms that the site has been assessed as a flora and fauna assessment as the Biodiversity Offsets Scheme (BOS) under the NSW Biodiversity Conservation Act 2016 (BC Act) is not triggered, given:

- The proposed development does not trigger the area clearing threshold.
- The proposed development does not require the clearing of native vegetation or other biodiversity impacts prescribed by clause 6.1 of the Biodiversity Regulation 2017 on land identified on the Biodiversity Values (BV) Map and therefore, the BV Map threshold is not triggered.

The minimum lot size associated with each lot within the site is 1 ha to less than 40 ha for which the threshold for clearing, above which the Biodiversity Assessment Method (BAM) and BOS apply is 0.5 ha or more. The proposal does not require the clearing of more than 0.5 ha and thus does not trigger the area threshold.

GYDE

7.3.2 Are there any other likely environmental effects as a result of the Planning Proposal and how are they proposed to be managed?

Traffic

A Transport Impact Assessment (TIA) has been prepared by RSA to accompany this PP (Appendix D).

This assessment outlines that the proposed rezoning is anticipated to generate approximately 3,765 vehicle trips per day on a typical weekday, including 420 trips in a peak hour.

The concept master plan for the site includes three vehicular access intersections to the subdivision:

- An access intersection with Old Willbriggie Road, at the northeast corner of the site. This is anticipated to be a 'Give Way' controlled T-intersection with auxiliary right and left turn lanes in Old Willbriggie Road.
- Two access intersections with Leonard Road along the southern side of the site, which are anticipated to be 'Give Way' controlled local road T-intersections.

In addition, some lots may gain direct access from Leonard Road via individual crossovers

Vehicular access to the subdivision is proposed via a new intersection with Old Willbriggie Road at the northeast corner of the site and two intersections with Leonard Road along the south side of the site.

The proposed site access strategy is considered appropriate due to the following:

- Not providing direct access to Kidman Way minimises the number of access points to an arterial road.
- Providing an access intersection from the site to Old Willbriggie Road will minimise the impact of site-generated traffic on Leonard Road and the residential streets to the south of Leonard Road.
- Providing an access intersection from the site to Old Willbriggie Road will minimise travel distances, given that a significant percentage of the site-generated traffic is expected to travel to/from the north.
- Only providing one access intersection to Old Willbriggie Road maximises safety by minimising the number of potential conflict points.
- Additionally, the site access intersection to Old Willbriggie Road is proposed to be separated as far as possible from nearby existing intersections, which also maximises safety by minimising the potential for conflict.
- Given the flat topography and the straight alignment of Old Willbriggie Road, good sight distance is available at the proposed access intersection.
- Given the length of Leonard Road, there is sufficient opportunity to provide more than one site access intersection whilst providing adequate separation between the new intersections (and with the existing intersections on Leonard Road) to minimise the potential for conflict.

The TIA concludes that there will be adequate capacity for vehicles in the local and regional road network.

Aboriginal Cultural Heritage

An Archaeological Technical Report has been prepared to accompany this PP by OzArk Environment and Heritage (Appendix O).

A search of the Aboriginal Heritage Information Management System (AHIMS) indicated there are no previously recorded Aboriginal sites within or near the site area.

No Aboriginal archaeological sites were recorded within the subject site during the site survey. Further, no landforms within the study area were assessed to have potential for intact subsurface archaeological deposits. The lack of potential for subsurface archaeological deposits is attributed to

high levels of previous land disturbance, lack of topographic variation and distance to water. No tangible or intangible Aboriginal cultural values were identified by the site officer representing Griffith Local Aboriginal Land Council.

As no Aboriginal sites or specific cultural values were recorded during the current assessment, there are no known impacts to Aboriginal cultural heritage from the proposal.

Flooding

A Flood Analysis has been undertaken by Torrent Consulting to accompany this PP (Appendix N) which details that the far western side of the Site (part of Lot 150 DP 751709 behind the Kidman Way) is identified as being located within the floodplain.

This assessment has included development of a TUFLOW model for the local catchment and has simulated design flood conditions in accordance with the ARR 2019 guidelines, specifically the ensemble method for design flood hydrology. An allowance has been made for future climate change impacts through the application of a 20% increase in design rainfall intensities.

The analysis notes that given the sites location within the flood planning area, it may be considered inconsistent with ministerial direction 4.1 However, the assessment has demonstrated that this inconsistency results in only a minimal flood risk exposure and that potential off-site flood impacts can be readily mitigated through design.

To provide for future development that is compatible with the flood hazard of the land, consistent with the LEP and DCP requirements, any land below the 1% AEP flood level will need to be regraded to be at or above the flood level. With future dwellings having finished floor levels set at or above the FPL, the requirements for the management of flood risk to both property and life can be readily satisfied.

A relative flood impact assessment has been undertaken and identified that the proposed drainage modification to that of a constructed wetland, together with increased runoff volumes associated with impervious surfaces, result in a higher peak flow rate at the Kidman Way and therefore increased peak flood levels. However, the implementation of mitigation works in the form of earthen embankments and culvert cross-drainage structures serves to detain the runoff within the wetland and mitigates the potential off-site flood impacts.

The analysis concludes that the concept development design is compatible with the flood hazard of the land and can be rezoned with confidence that the flood risk at the Site can be managed through the subsequent design and approval stages.

Agriculture

An Agricultural Land Assessment has been prepared by AgEconPlus to accompany this PP (Appendix G).

The subject site currently consists of three farms, primarily used as a citrus orchard with a small area dedicated to vegetable seed production. Agriculture, manufacturing, and retail are the three most important industries in the Griffith LGA, which spans 151,130 hectares, with 92% of this land used for agricultural production. The region is home to 128 agricultural businesses, employing 1,268 people (Griffith City Council, 2020).

The site represents just 0.03% of all RU1 Primary Production zoned land in the Griffith LGA, and its loss to commercial agriculture will have only a minor impact on the area's overall agricultural value. While the site contributes approximately 2% of the citrus gross value of production (GVP) in the Griffith LGA, which Griffith LGA itself only contributes around 3% to the Australian citrus industry's GVP, this shift in land use is not expected to significantly affect the broader agricultural economy.

To compensate this potential loss, the concept master plan proposes to incorporate six substantial plots for Urban Market Gardens, which will encourage local food production, community engagement, and economic activity through the sale and distribution of fresh produce. Produce, including fruit and

vegetables, will be sold locally, with surplus goods gifted to residents. These gardens aim to enhance community development and stimulate local economic activity.

In summary, the analysis concludes that loss of the project site to commercial agriculture will have a minor impact on agricultural values.

Noise Impact

A Noise Impact Assessment has been prepared by Reverb Acoustics to support this PP (Appendix M). The Assessment considered the potential noise impact from passing road traffic on Kidman Way and existing/potential light industrial and commercial land uses within habitable spaces of future residences and tenancies. As such, a schedule of minimum glazing thicknesses and types, roof/ceiling and wall construction, etc., has been provided to ensure the acoustic amenity of future occupants is maintained.

The report outlines that given the difficulty in predicting the exact types of businesses that may be developed on the site, it is not possible to specify general acoustic controls that may apply to all land uses. For this reason, acoustic controls will need to be applied on a case-to-case basis and each business, which has the potential to create excessive noise, should submit a separate noise impact assessment to Council as part of the future DA process.

This assessment concludes that the site is suitable for the intended purpose subject to the recommendations or equivalent measures outlined in the report. If these recommendations are implemented, noise from passing road traffic and nearby industry will meet the requirements set by the EPA, AS/NZS 2107, and the DPE's guidelines. Reverb Acoustics concludes that there is no acoustic reason to deny the PP.

Contamination

As previously outlined, the PSI (Appendix J) prepared by McMahon Earth Science concludes that there is no gross contamination across the site from pesticide use, fuel storage, or machinery maintenance. Most of the site is assessed to be suitable for the proposed development. However, additional sources of contamination were identified and will require further investigation and site management during development, which are outlined as follows:

There are known occurrences of asbestos across the site, and these will require management during development. Management of these areas is required and should adhere to the following guidance:

- Griffith City Council (2020) Model Asbestos Policy.
- SafeWork NSW (2014) Managing asbestos in or on soil.
- Department of Health WA (2021) Guidelines for the assessment, remediation, and management of asbestos contaminated sites.

Management of the septic systems are required during development. Although septic systems are regulated by Council and present low health and environmental risk when regularly inspected and serviced, remediation of the systems is recommended for future residential land use. This is generally a standard development consent condition issued by Council when agricultural/horticultural land is developed into residential.

Although no filled gullies and dams were identified as part of the PSI, it is not uncommon to find these on agricultural/horticultural land. Care must be taken to identify and evaluate unexpected finds such as these during development under the unexpected findings protocol.

Nonetheless, the PSI concludes that the site is suitable for the proposed development given the asbestos and septic systems are appropriately managed during development in line with the recommendations noted above and in the report (Appendix J).

It is noted that a Detailed Site Investigation (DSI) and Remediation Actional Plan (RAP) will be prepared as required, as part of future detailed DA stage.

GYDE

Bushfire

As previously outlined, the site is not identified as bushfire prone land.

The site adjoins bushfire prone land at the north-eastern corner (vegetation buffer), limited to a grassland hazard only. Accordingly, a Bushfire Risk Assessment has been prepared to accompany the proposal (Appendix L). The report outlines that as per the *Planning for Bush Fire Protection (PBP) 2019 guidelines*, the vegetation on the site is considered low threat due to its nature as cultivated land and its minimal fuel condition, including orchards and market gardens. The proposed subdivision design includes a perimeter road which will provide a sufficient barrier against potential bushfire from the northeastern aspect.

BPAD conclude that there are no additional significant environmental features within the 140m study area that would influence their opinion of the assessed Bushfire Attack Level. An 11m asset protection zone (APZ) is required along the NE boundary of Lot 1623/-/DP257265, identified as 2nd Avenue on the Masterplan. It is expected the actual APZ provided will be in excess of 20m comprising of 2nd Avenue, the adjacent nature strips and the designated from boundary setbacks. The minimum APZ is 11m which is sufficient to achieve the nominated BAL-ratings and defendable space. Leonard Road provides a permanent APZ that can be relied upon in perpetuity and ensures the grass will not encroach closer to the subject site over time. Access to the site via the public road system is suitable for emergency response vehicles. RFS do not require vehicular site access. Reticulated water is available on Leonard Road. The subdivision will incorporate the provision of reticulated potable water mains that will have street fire hydrants that can be used for firefighting purposes.

Archaeology

A field survey was undertaken by OzArk Archaeologist (Appendix O) with the assistance of Cody Crisson representing the Griffith Local Aboriginal Land Council on 19 February 2025.

The study area was confirmed as an entirely flat landform which has undergone significant surface and subsurface disturbance from intensive agricultural practices over multiple decades. These agricultural practices primarily consist of cropping as well as the construction of irrigation infrastructure including sheds, pumps, reservoirs and channels.

All mature native vegetation has been cleared from the study area which now consists exclusively of exotic species, including an orchard which covers approximately 70% of the study area. The remaining 30% of the study area is currently used for vegetable crops, access roads and driveways.

At the conclusion of the field survey, it was determined that the entire study area has low archaeological potential due to the distance of the study area from permanent waterways (Mirrool Creek is the closest named waterway to the study area and is located approximately 5.5 kilometres southeast) and the high levels of disturbance which have occurred to the surface and subsurface of the study area including vegetation clearance and intensive agricultural practices.

7.3.3 Has the Planning Proposal adequately addressed any social and economic effects?

While social and economic impacts are expected to be assessed at the development application stage, the proposal is anticipated to generate several positive outcomes. The proposed land use mix is considered to deliver the most balanced planning outcome for this site and will have the following positive social and economic effects:

- Generation of employment (construction and ongoing) for the surrounding community
- Provision of essential amenities for residents and the wider community
- Enhancement of community well-being through housing supply and diversity in proximity to essential services and infrastructure
- Provision of additional housing choice and affordability in the region.

GYDE

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

7.4.1 Is there adequate public infrastructure for the planning proposal?

An Infrastructure report has been prepared by Triaxial Consulting to accompany this PP, and is provided at Appendix G.

The report outlines that the site would require stormwater, potable water and sewer infrastructure to facilitate the proposed development. The purpose of the report was to assess the existing infrastructure and services, determine the demand and requirements based on the Masterplan (Appendix A) and to specify how these requirements could be met through the augmentation of existing services or the provision of new infrastructure as part of the development.

The masterplan proposes a wetlands area of up to 3.48ha, which provides sufficient space to allow for on-site stormwater detention and water quality treatment for the proposed development. It also provides the opportunity for localised and regional flood storage, as shown by the Flood Impact Assessment Report (Appendix N).

With regards to the potable water and sewer, the Proponent has confirmed with Council that the demand for potable water and sewer can be met, but that it will require augmentation of existing potable water mains between Hanwood and Griffith, as well as the construction of new SPS's and rising mains to connect the sewerage flows to the existing Hanwood SPS HA1. These works will not only unlock the development of Stage 2, but it will also provide potable water for Stages 1 and 3, as well as potable water for up to 550 future lots between Hanwood and Griffith. The sewer infrastructure proposed provides GCC with an opportunity to plan for future developments and install critical infrastructure as part of the Stage 2 works that will not only unlock future developments but helps GCC reduce their asset management obligations by consolidating the need for individual SPS's for each future development. Please refer to Appendix G for further detail.

In addition, the proponent has indicated a willingness to undertake and/or contribute to these works as part of the Proposed Planning Agreement (Appendix P).

7.5 Section E – State and Commonwealth interests

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

Formal consultation with State and Commonwealth public authorities is to be undertaken post-Gateway.

GYDE

8. Part 4 – Draft LEP Maps

Draft LEP maps demonstrating the proposed LEP amendments for the site have been prepared and are provided below and at Appendix Q.

8.1 Land Use Zone Map

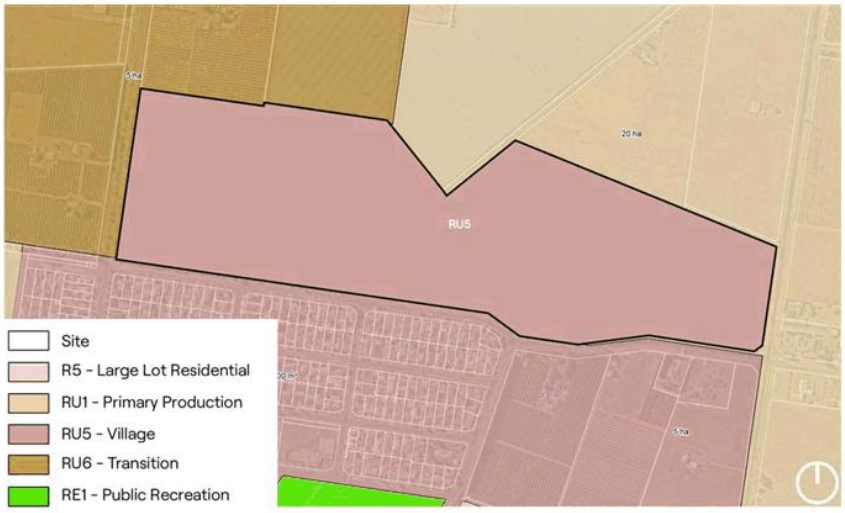


Figure 29: Proposed land use zone map
(Source: Gyde)

8.2 Minimum Lot Size Map

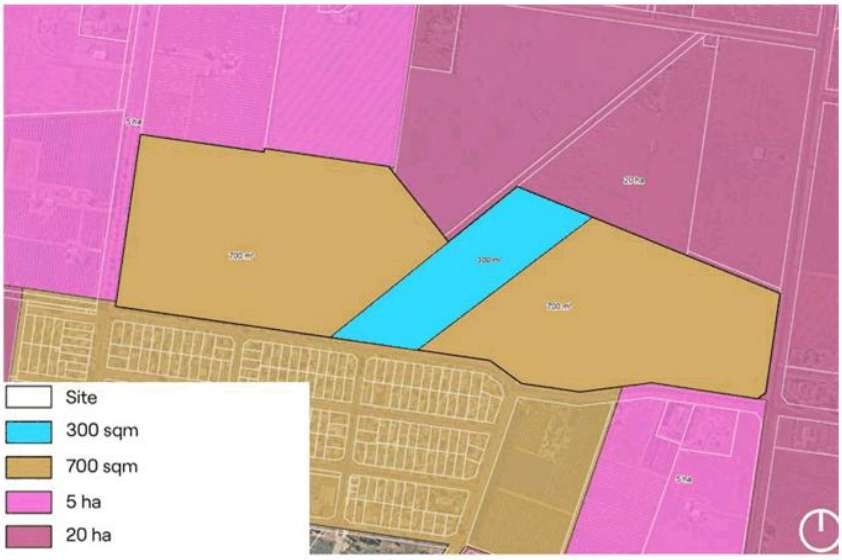


Figure 30: Proposed minimum lot size map
(Source: Gyde)

GYDE

8.3 Urban Release Area

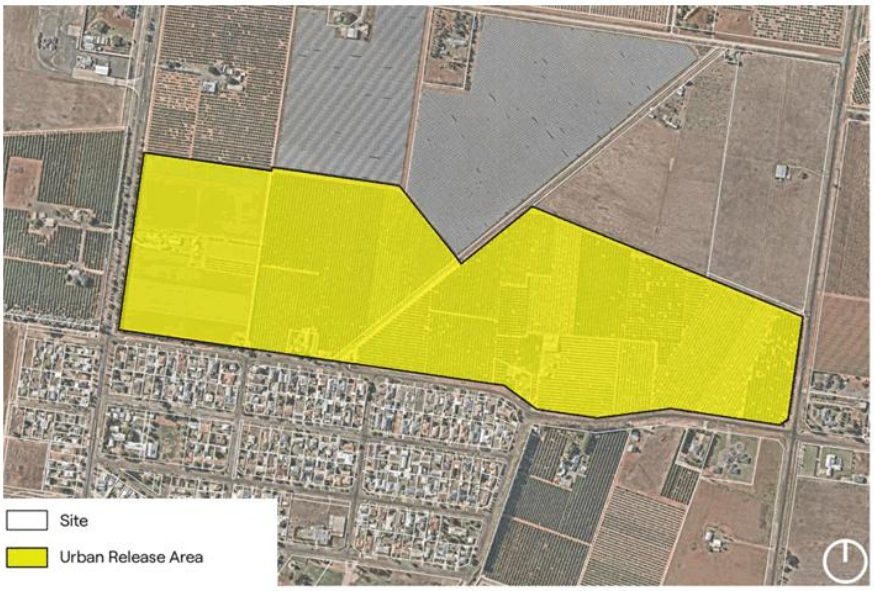


Figure 31: Proposed urban release area map
(Source: Gyde)

GYDE

9. Part 5 – Community Consultation

The DPHI's Local Environmental Plan Making Guideline notes that:

- The LEP making process does not require formal community consultation prior to a proponent submitting a rezoning request to council.
- The most appropriate time for community consultation for Planning Proposals is after a Gateway determination is issued and all relevant studies and reports have been completed. This ensures the community has clear and evidence-based information available to help them make informed comments on the proposal.

Nonetheless, Section 9.1 below details the substantial community consultation the Proponent has undertaken to date and an overview of the consultation to be completed post-lodgement.

9.1 Consultation completed prior to lodgement

9.1.1 Council Consultation

The Proponent has engaged with Griffith City Council Officers on a number of occasions throughout 2024. Initial contact sought baseline information relating to existing infrastructure capacity to inform augmentation requirements and associated project costs to hence feasibility analysis.

A formal scoping report was submitted to the Council in January 2024, and feedback was subsequently received. Notably, this PP has taken into consideration this feedback, in particular providing sufficient strategic justification to meet the Ministerial Directions' requirements for rezoning rural land for residential development. The additional feedback received has been carefully considered and incorporated into this PP.

As outlined in this PP, Council is concurrently preparing a Master Plan (applicable to two of the three subject lots). It is noted that the primary distinction between Council's Masterplan and this PP relates to the staging and sequencing of delivery.

This PP has since been amended to address key matters raised by Council in their preliminary response letter dated 26 August 2025.

9.1.2 Community Consultation

In August 2024 initial community consultation campaign was undertake including the distribution of a brochure to provide early information about the proposal to residents of the existing Hanwood community and inviting them to complete a survey about the project. We received 14 responses to the survey, which indicated community support for public green spaces, community gardens and community facilities such as sportsgrounds, childcare, and community markets. Residents had mixed views on the types of housing they would like to see in Hanwood, with some indicating a preference for larger blocks that complement the existing Hanwood village, while others would like to see more variety in new housing to address the ageing population and current housing shortages.

To summarise, the initial community consultation that has been undertaken to date includes:

- Community drop in sessions
- Community members were invites to provide feedback on the concept design for the development at meetings (28th, 29th and 30th August 2024).
- Project website with 'have your say' capability (https://hanwood.com.au)
- Distribution of an information brochure (Appendix S),
- Discussions with Griffith Council officers and elected representatives.

GYDE

9.2 Consultation to be completed post lodgement

9.2.1 Public consultation

Division 2.6 of the EP&A Act requires the relevant planning authority to consult with the community in accordance with the Gateway Determination. It is anticipated that the Planning Proposal will be categorised as Standard, which is recommended to be publicly exhibited for a maximum period of 30 working days in accordance with the LEP Making Guideline.

It is anticipated that the PP will be placed on exhibition for a minimum of 30 working days. The community will be notified of the commencement of the exhibition period via a notice in a local newspaper and via a notice on the Council's website.

The written notice will:

- Give a brief description of the objectives or intended outcomes of the PP;
- Indicate the land affected by the PP;
- State where and when the PP can be inspected;
- Give the name and address of the RPA for the receipt of any submissions; and
- Indicate the last date for submissions.

During the exhibition period, the following material will be made available for inspection:

- The PP, in the form approved for community consultation
- The Gateway determination; and
- Any studies relied upon by the PP

9.2.2 Agency consultation

The Gateway Determination may also identify the need for the PP to be referred to one or more public authorities. Further consultation with the relevant public authorities is expected post-gateway. Authorities and government agencies are afforded 30-40 working days to provide comments in accordance with the LEP Making Guideline.

GYDE

10. Part 6 – Project Timeline

Table 7: Project timeline, based on DPHI benchmark timeframes

Stage	Maximum benchmark timeframes	Anticipated timeframe
1. Lodgement	-	July 2025
2. Planning Proposal • Consideration by Council • Council decision	120 days	August-November 2025
3. Gateway determination	45 days	December-January 2026
4. Post-Gateway • Additional technical studies • Pre-exhibition consultation with authorities and government agencies	70 days	January-March 2026
5. Public exhibition and assessment • Commencement and completion of public exhibition period • Consideration of submissions • Post-exhibition review and (if required) additional studies • Submission to the Department (where applicable)	115 days	March-July 2026
6. Finalisation • Finalisation checks • Final GIS mapping • Legal drafting • Gazettal of LEP amendment	70 days	July-September 2026
Subtotal (Department Target)	300 working days	
Total (end-to end)	420 working days	

GYDE

11. Conclusion

This Planning Proposal (PP) has been prepared by Gyde Consulting on behalf of Hanwood Developments Pty Ltd (the Proponent) for proposed amendments to the Griffith Local Environmental Plan (GLEP) 2014.

The PP has been prepared in accordance with:

- Section 3.33 of the EP&A Act
- The DPHI's Local Environmental Plan Making Guidelines
- Relevant Section 9.1 Ministerial Directions.

As outlined in this report, this PP aims to:

- Introduce a contemporary, diverse, and affordable housing alternative within easy commuting distance of Griffith.
- Allow for a thoughtfully designed lot layout that aligns with community needs and aspirations ideally positioned adjacent to Hanwood Village.
- Support a resilient, high-quality, and liveable community by integrating well-planned design with access to employment, education, recreation, and green spaces.
- Facilitate Hanwood's urban growth through low-density residential development.

The current zoning of the site does not permit urban development; therefore, a rezoning is required to implement Griffith Council's strategic land release objective.

The large majority of the site has been identified by Council as a future expansion zone for Hanwood. In light of this, it is reasonable to expect that Council will ultimately rezone the site, rendering this proponent-led planning proposal effectively superfluous. While it is acknowledged that Council's strategic documentation does not include the western most portion of the site at Lot 150 DP 7510709, the inclusion of this land is considered appropriate, as it will deliver significant benefits by supporting the orderly development of the release area, providing additional housing capacity, and ensuring land use compatibility with the broader strategic vision for the locality.

The site offers significant advantages for a diverse range of residents, benefiting from its well-connected village location, proximity to employment hubs, and access to health and education services. By providing a diverse range of housing options and lot sizes, the Leonard Road Release Area supports housing affordability and choice through the delivery of more affordable dwellings on smaller lots, which are in short supply in Griffith.

The proposed amendments to the GLEP 2014 are considered to have both strategic and site-specific merit as justified in this report, being consistent with the applicable strategic planning framework, particularly the Leonard Road Release Area as identified for urban expansion in the *Griffith Land Use Strategy* (Beyond 2030) and the *draft Hanwood Growth Area Masterplan* 2025.

The proposed concept is consistent with State, Regional and Local planning policies and is largely consistent with the relevant Section 9.1 Ministerial Directions. In summary, there is a sound planning basis, strategic planning merit and site-specific merit to support the amendments to the LEP in relation to this site.

GENERAL NOTES
Morrison Design Partnership Pty. limited accept no responsibility for the usability, completeness or accuracy of data transferred electronically. Recipients should when necessary request a hard copy version for verification. This drawing shall be read in conjunction with all architectural and other consultants drawings, specifications and with such other written instructions as may be issued during the course of the contract. Figured dimensions shall be taken in preference to scaling. All level, datum points and dimensions on this drawing shall be verified by the builder on site. All discrepancies shall be referred to the architect for direction before proceeding with any works.

DO NOT SCALE THIS DRAWING.

MDP acknowledges the Cammeraygal people as the traditional custodians of this land

©Copyright
These drawings and designs and the copyright there of are the property of Morrison Design Partnership Pty. Ltd and must not be altered, used, retained, or copied wholly or in part without the written permission of Morrison Design Partnership Pty. Ltd. ACN 001 595 288.

SURVEY NOTES
Survey data included in this drawing is based on a survey drawing and is provided for preliminary design purposes only. As this drawing is based on information supplied by others, reference must be made to original survey drawings verifies against site conditions.

REV	DATE	AMENDMENT	INITIALS
L	08/09/2026	FOR PLANNING PROPOSAL	AS
M	05/09/2026	AMENDED TO COUNCIL'S COMMENTS	AS
N	08/08/2026	FINAL AMENDMENTS	AS

CLIENT
HANWOOD DEVELOPMENT PTY LTD

PROJECT
HANWOOD MASTER PLAN

Lot/Section/Plan no
150/-/DP751709
287/-/DP751709
1623/-/DP257265

DRAWING TITLE
CONCEPT MASTER PLAN

FOR PLANNING PROPOSAL

PROJECT NO.	DRAWING NO.	REVISION
3340	A5000	N

SCALE : 1:6000 @ A3
DRAWN : AS
DATE : 08/09/2026

www.mdpa.com.au NSW Nom Architect: Glen Ollerton #7621

mdp architecture


architecture
HANWOOD
URBAN DESIGN REPORT
FOR RESIDENTIAL CONCEPT MASTER PLAN
9 SEPTEMBER 2025

Title	**HANWOOD URBAN DESIGN REPORT FOR RESIDENTIAL CONCEPT MASTER PLAN**
Prepared for:	**Hanwood Developments Pty Ltd.**
Date:	**9 SEPTEMBER 2025**
Status:	**FINAL FOR PLANNING PROPOSAL**
Prepared by:	**MDP Architecture**
Approved by:	**GO**

MDP Architecture © 2024
Level 2, 2.02 Arthur Street
North Sydney NSW 2060
T: +612 9966 5566 www.mdpa.com.au

ACN 001 595 268 | ABN 44 001 595 268
NSW NOM ARB ARCHITECT, REG No. Glen Ollerton, 7621

content

Image source | Urban Farming: Revolutionising Our Cities, loavesandfishes.net.au | Cover | property.com.au/nsw/hanwood-2680/

acknowledgment of country

We acknowledge this sacred land, and honour all living beings that have graced this earth before us.

In the spirit of unity and respect, we pay homage to the indigenous peoples, and the Wiradjuri Nation who have stewarded this land for generations, their wisdom and traditions weaving a tapestry of knowledge that enriches our shared existence. We stand on the shoulders of those who have walked this path before us, their spirits guiding us as we navigate the complexities of the modern world.

We embrace the diversity of our human family, recognizing the contributions of people from all walks of life, past and present, with each individual bringing a unique perspective and a valuable voice to the conversation, enriching our collective understanding of the world we inhabit.

In this interconnected web of life, we are all bound together, united by our common humanity and our shared responsibility to care for our planet and each other.

Let us commit ourselves to fostering harmony and cooperation, to preserving the delicate balance of nature, and to building a future where all beings can thrive.

May we walk gently upon this earth, honouring the interconnectedness of all living things, and may our actions be guided by love, compassion, and a deep reverence for the world around us.

Together, let us embark on this journey of coexistence and stewardship, knowing that we are all one, and that our collective efforts hold the key to a brighter tomorrow.[L.Scobie, May 2024]

Image source | Woodland on Scenic Hill Griffith NSW by David Redfearn, lickr.com

01

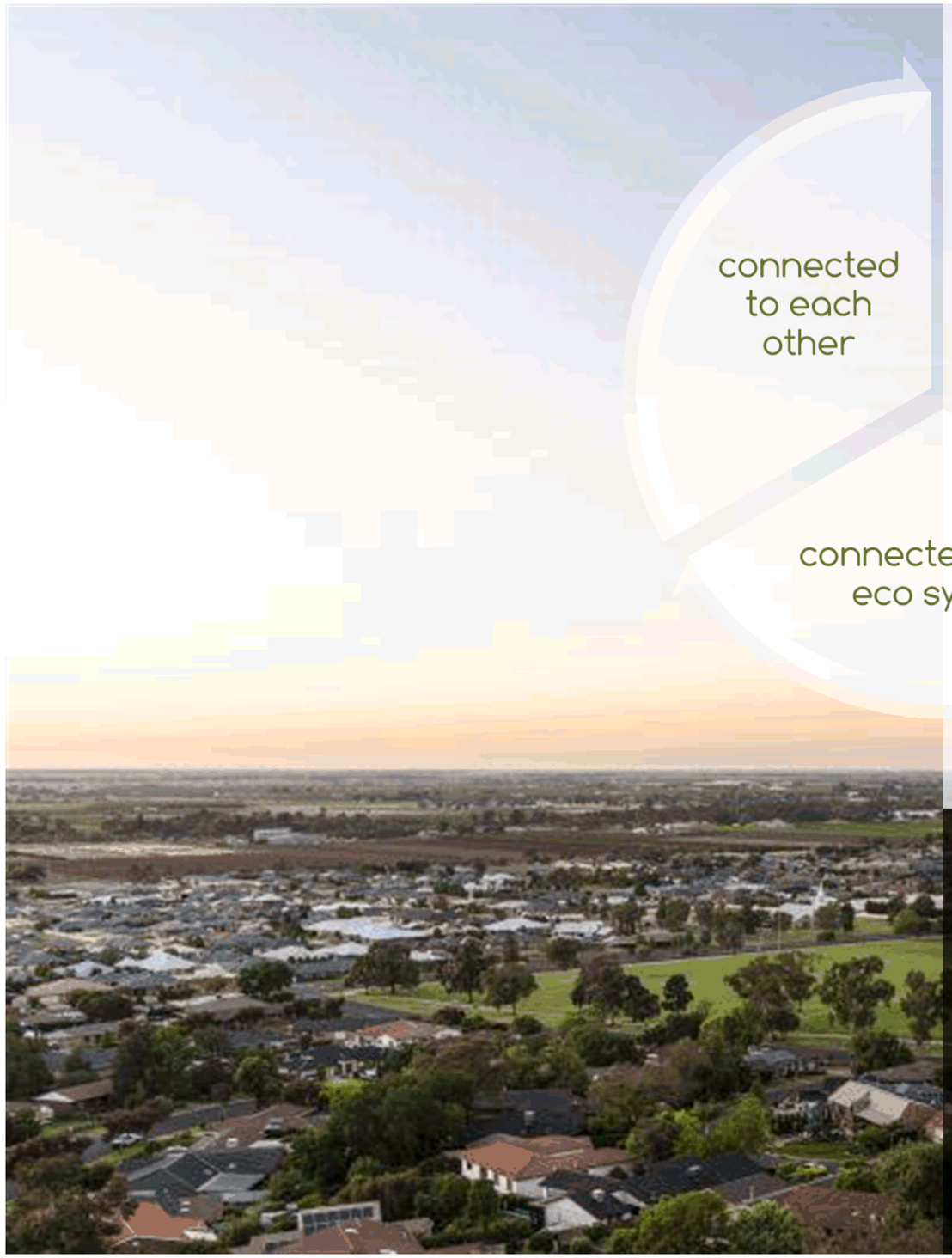
introduction

Image source |property.com.au/24-pid-12017704

This report has been prepared by MDP Architecture and on behalf of Hanwood Developments Pty Ltd to support a Planning Proposal for the select sites located to the north of Leonard Road, Hanwood NSW.

The Master plan is based on the analysis of the site's immediate and broader urban contexts, various land use typologies, new connections and urban structure, and best practice design principles.

Image source |domain.com.au/hanwood-nsw-2680



connected to each other

connected to earth

connected to our eco system

project overview

Commitment to community, environment, the historic use of the land for farming, and excellence in sustainability are the defining characteristics of the Hanwood project.

The Master Plan for the Site has been developed through an integrated approach whereby the existing village will naturally extend to provide much needed housing diversity, public amenities and recreational spaces, and public open spaces centred around the community's own urban market gardens and associated commercial hub forming the heart of this community and development.

Focusing on the model of farm to table, the urban community garden continues the tradition of farming on this land and provides a hands-on opportunity for the community to engage with their environment in a rewarding way.

The expanded town of Hanwood will:

- Be an innovative sustainable community of international significance
- Reflect best practice contemporary planning and design practice to create a 21st century settlement,
- Help to address housing demand in the Region
- Revitalise Hanwood and bring growth into the broader area
- Be a genuine sustainable development
- Provide a diverse range of housing and lot sizes to suit a wide range of budgets, buyers and lifestyles
- Provide opportunities for first homeowners
- Provide for housing affordability and diversity to ensure a diverse and socially sustainable community
- Incorporate all necessary infrastructure to support new residents as well as benefiting existing residents

Image source |domain.com.au/news/Griffith

the region

The Griffith LGA, is part of the Riverina Murray region of NSW.

Griffith, along with Wagga Wagga and Albury provide key metropolitan city jobs, housing, education and health care to those living within the region.

The Riverina region also consists of several small villages around Griffith including Lake Wyangan, Hanwood and Yenda.

Surrounding land uses include agriculture including farming of crops such as grapes, citrus fruits and vegetables, wine production, and food processing and water irrigation from the Murrumbidgee river.

Image source | countrychange.com.au/riverina

the context

Located approximately 5km south of the Griffith's Town Centre and central business district, the subject site, and here on in referred to as the Site, can be seen as a natural extension of existing residential areas of Hanwood, NSW 2680, to the north.

The Site presents great advantage for a wide range of demographics to reside in close proximity to employment nodes (e.g. Baiada Poultry Pty Ltd Hanwood), health and education providers.

The site is well located within short walking, cycling and driving distance of major education, employment, and health services. These include Charles Sturt University (Griffith), local schools (primary and secondary) and health care in Griffith as well as Hanwood Public School (prep-year 6) and sporting facilities, along with Griffith Public School, Griffith High School, Marian Catholic College, Griffith Base Hospital, multiple age care services and facilities, retirement villages.

Hanwood's strategic location offers unique advantages for workforce accommodation that extend beyond its permanent residents.

The proximity to Griffith—just a short 5-minute drive—positions Hanwood as an ideal residential base for the region's substantial seasonal agricultural workforce.

These transient workers, vital to the Riverina's farming operations during peak harvest periods, require accessible accommodation options that balance affordability with quality-of-life considerations.

Developing thoughtful housing solutions on the Site could address this regional workforce needs while providing economic stability to local businesses throughout seasonal fluctuations.

The Site

1km

Image source | nearmap 2024 ©

the location

Currently zoned RU1 for primary production, Hanwood stands at a pivotal development juncture. Its inclusion in the Griffith Land Use Strategy Beyond 2030 for potential rezoning between 2022-2030 acknowledges the evolving needs of the region and Hanwood's capacity to accommodate thoughtful growth.

This transition represents an opportunity to reimagine Hanwood's future while respecting its agricultural foundations—potentially incorporating residential development that complements existing industries rather than displacing them. By carefully balancing agricultural heritage with responsive housing development,

Hanwood can evolve to meet contemporary needs while preserving the distinctive character that has defined this Riverina community for over a century.

The Site

Image source | Willbriggie Road Hanwood, commercialrealestate.com.au

02

vision for hanwood

Image source | Jessup Farm Artisan Village, Fort Colins Colorado

The Vision is for an integrated community that extends beyond mere residential development to create a vibrant, sustainable neighbourhood ecosystem.

This transformative Vision for Hanwood North carefully balances growing housing needs with environmental stewardship and community wellbeing through diversified housing options accommodating residents across all life stages and economic circumstances.

The Vision for Hanwood transcends traditional development to create a distinctive community where housing diversity, walkable amenities, and environmental consciousness converge to establish a resilient, inclusive foundation for Hanwood's evolution and a sustainable model for future residential in the area.

Image source | nearmap 2024 ©

our values on community

The proposed community and residential master plan aims to shape and design communities, and not only consider the environmental impacts, but also the social well-being, economic vitality, sense of a healthy and connected community.

"Connectivity" has the higher purpose that transcends planning and design objectives. The intent is to be

- Connected to the earth
- Connected to our eco system
- Connected to each other

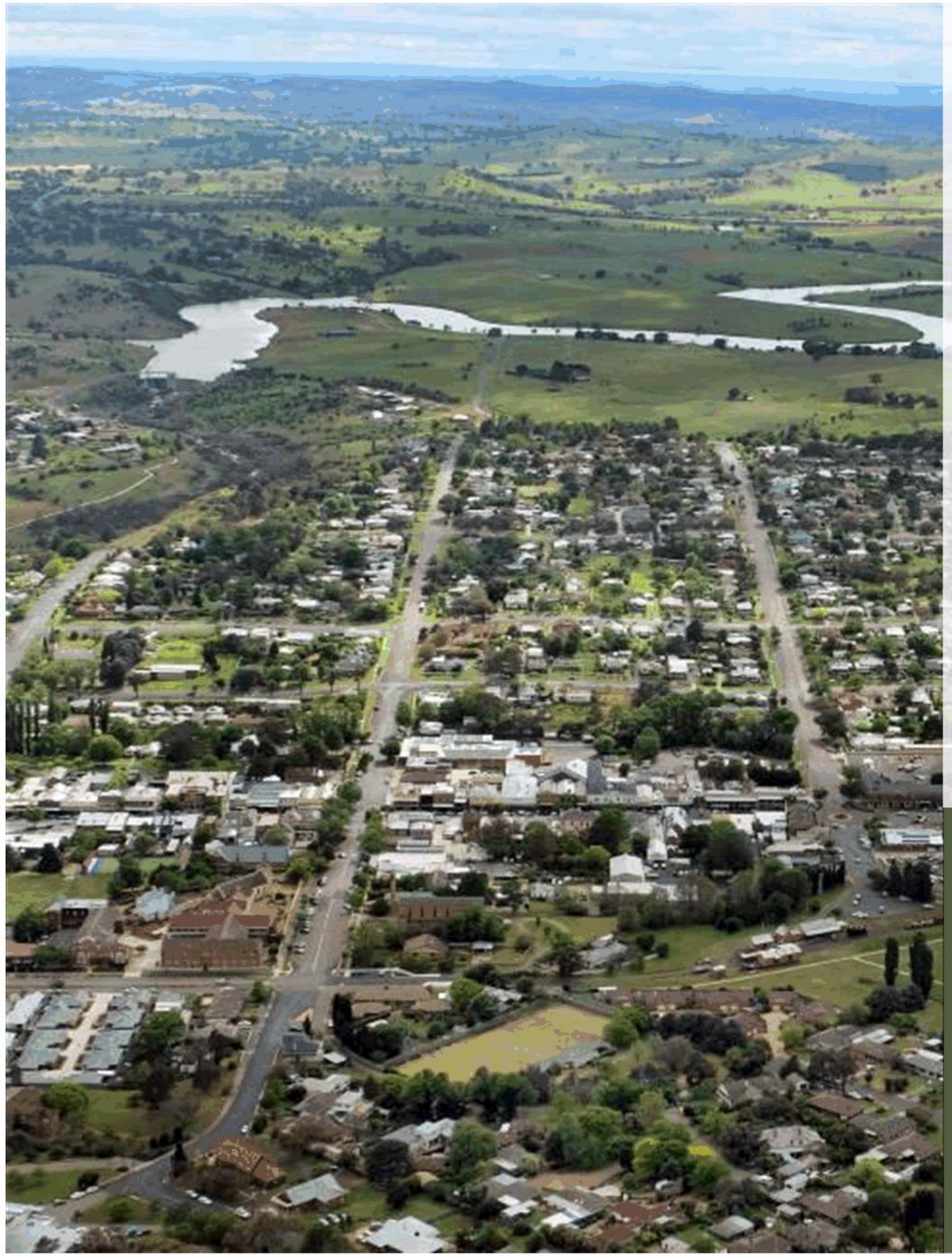
And the planning of the built and natural environment plays a vital role in delivering this key intent.

Image source | Plant a Seed & See What Grows Foundation, seewhatgrows.org

03

urban design principles

Image source | canberradaily.com.au/getaway Griffith NSW gem of the Riverina



Better fit
contextual, local and of its place

Better for people
safe, comfortable and liveable

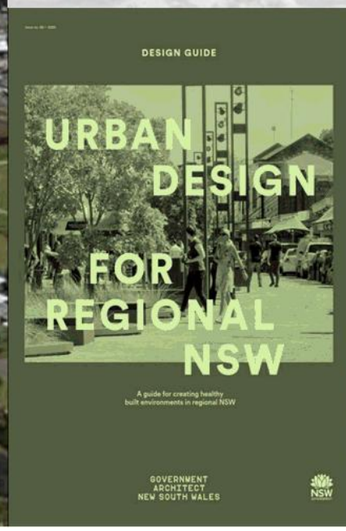
Better look and feel
engaging, inviting and attractive

Better performance
sustainable, adaptable and durable

Better working
functional, efficient and fit for purpose

Better for community
inclusive, connected and diverse

Better value
creating and adding value



The plan for Hanwood has been developed to aligns with the guiding principles of the Government Architects URBAN DESIGN GUIDE FOR REGIONAL NSW to create healthy built environments.

The Master Plan for Hanwood demonstrates how adherence to the Better Placed design principles can achieve development outcomes that are genuinely superior to conventional planning approaches.

Through integrated implementation of health-focused, environmentally responsive, community-centred design strategies, the plan establishes a new benchmark for regional development in New South Wales.

The resulting development will not only provide a diversity of housing typologies to house residents and accommodate economic activity, but will actively contribute to improved quality of life, environmental stewardship, and regional prosperity, bringing much needed variety of housing and complimentary land uses.

This approach is also in alignment with the Griffith Worker and Housing Shortage Task Force recommendation of 50% of lots in growth areas be reserved for medium density development.

Image source | Yass Valley Council = Design Guide URBAN DESIGN FOR REGIONAL NSW By Government Architects NSW

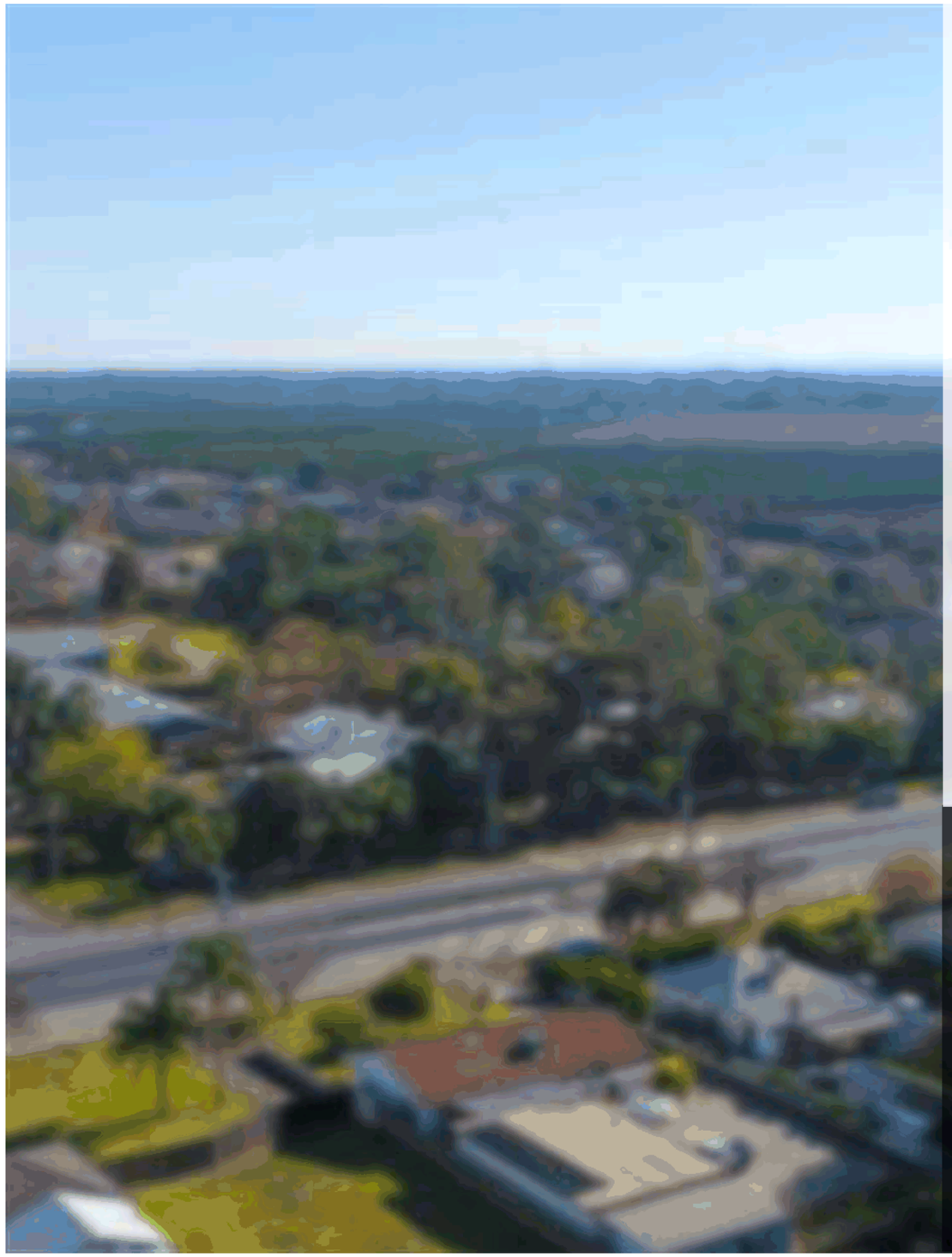
Better fit contextual, local and of its place

The Hanwood Master Plan exemplifies the "Better fit" design objective through its integration with the unique regional context of Griffith.

The plan celebrates the area's cultural heritage by incorporating design elements that honours the agricultural history. Historical irrigation channels and vegetation has been interpreted into the plan, creating meaningful links to Hanwood's past while providing functional green infrastructure.

The master plan's built form responds sensitively to local character with architectural guidelines that reference the area's rural vernacular. Street layouts follow the natural topography, allowing the landscape to inform the community's configuration.

This approach preserves view corridors to surrounding vineyards and agricultural lands, ensures natural drainage patterns are maintained, and creates a settlement pattern that feels organically connected to its place, establishing a community that is distinctly Hanwood rather than a generic development that could exist anywhere.



Better performance sustainable, adaptable and durable

The plan incorporates climate-responsive design strategies tailored to Hanwood's environment, utilising water-sensitive urban design principles that capture and reuse precious rainfall through bioswales, permeable pavements, and restored natural waterways.

Built environments are engineered for thermal efficiency with optimal solar orientation, deep eaves, and cross-ventilation, significantly reducing energy demands during extreme temperature fluctuations common to the region.

Infrastructure systems are designed for multi-functionality and future adaptability, with public spaces serving dual purposes as recreation areas and stormwater management during infrequent but intense rainfall events.

The on-site detention of stormwater and integrated smart systems for irrigation management, will ensure the development of the site and further increase in impermeable land does not adversely affect the overall irrigation and stormwater management for Griffith area, ensuring Hanwood will perform efficiently and remain resilient towards climate fluctuations, supporting regional sustainability.

By integrating landscaped public open spaces as part of this storm water and flood management, the plan moves away from the rigid engineering outcomes, creating a resilient environment that benefits and support the resident's passive recreation and active lifestyle and provides a natural habitats for native wildlife.

Better for people safe, comfortable and liveable

The Hanwood Master Plan exemplifies this design objective by creating a genuinely human-centered community where daily life is characterized by exceptional safety, comfort, and liveability.

Residential neighbourhoods are arranged using Safer by Design principles, with homes positioned to provide natural surveillance over parks and pathways, eliminating hidden corners and creating environments where children can play freely while elderly residents can move about with confidence throughout the day.

The master plan's defining feature is its green network providing not just visual relief but tangible health benefits by encouraging walking and cycling while simultaneously cooling the microclimate and supporting biodiversity.

The integration of natural systems with everyday life responds directly to resident aspirations for a community that maintains the relaxed, nature-connected lifestyle characteristic of regional NSW while providing the amenities and services essential for a community to thrive across all stages of life, ultimately creating a place where people genuinely want to live, not just reside.

Better look and feel engaging, inviting and attractive

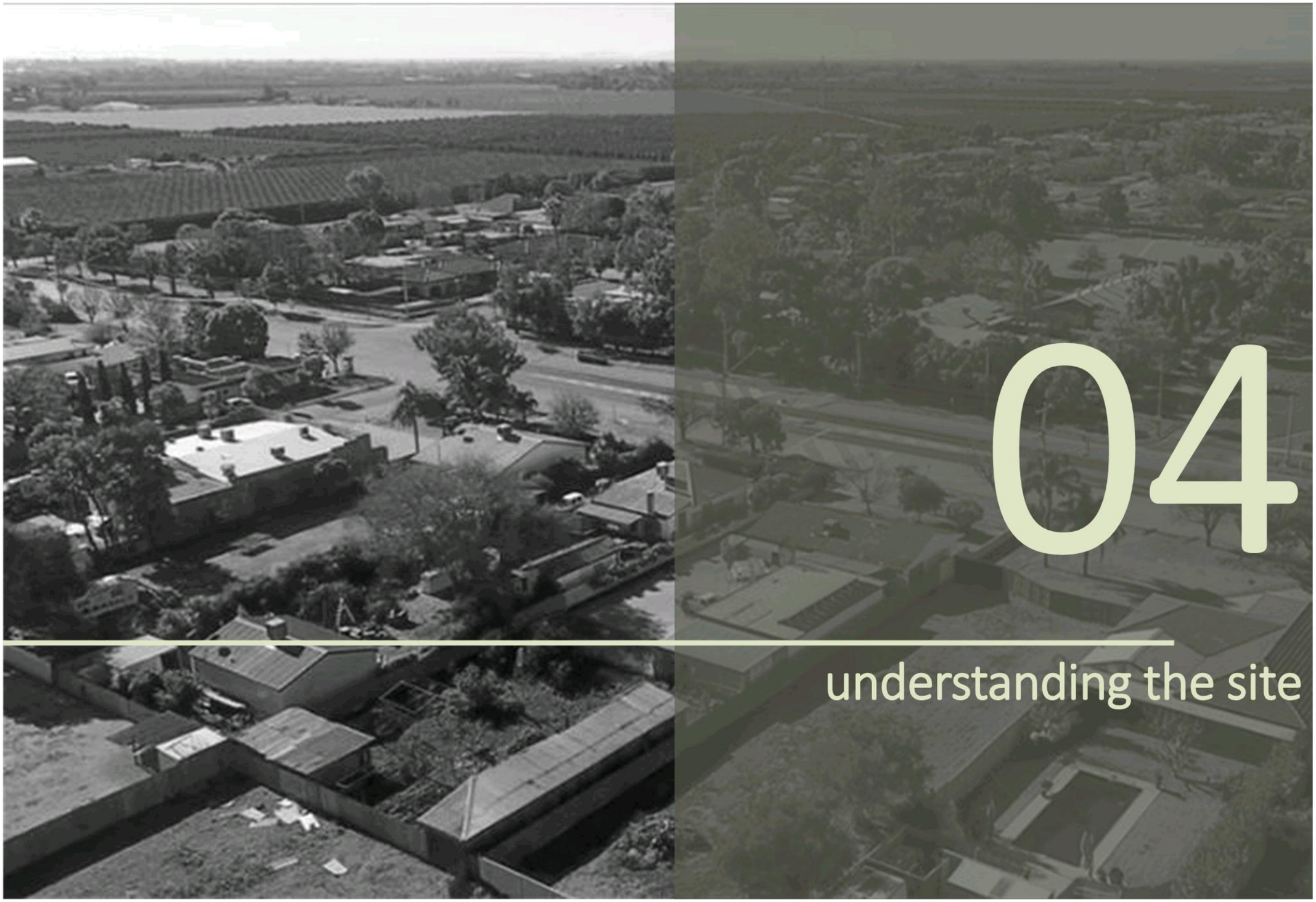
The Hanwood Master Plan delivers quality environments through its thoughtful approach to creating a visually rich and sensory environment that celebrates the unique character of regional New South Wales.

The plan establishes a sophisticated hierarchy of public spaces, each carefully proportioned to create a sense of comfort and enclosure—from intimate garden courtyards framed by native vegetation to the generously scaled main street where building heights and setbacks are calibrated to provide ideal sun penetration in winter while generating ample shade during summer months. This attention to spatial quality extends to the strategically placed vistas opening to surrounding agricultural landscapes that anchor the community within its broader context.

Material selections for the future buildings will reflect a commitment to authenticity and place, featuring locally sourced material, creating environments that become more characterful with age rather than deteriorating.

The plan's most distinctive feature is its neighbourhood centre and public open spaces that celebrate local narratives, vegetation and produce. Water features provide both cooling effects and a desirable environment that extends the hours of community enjoyment.

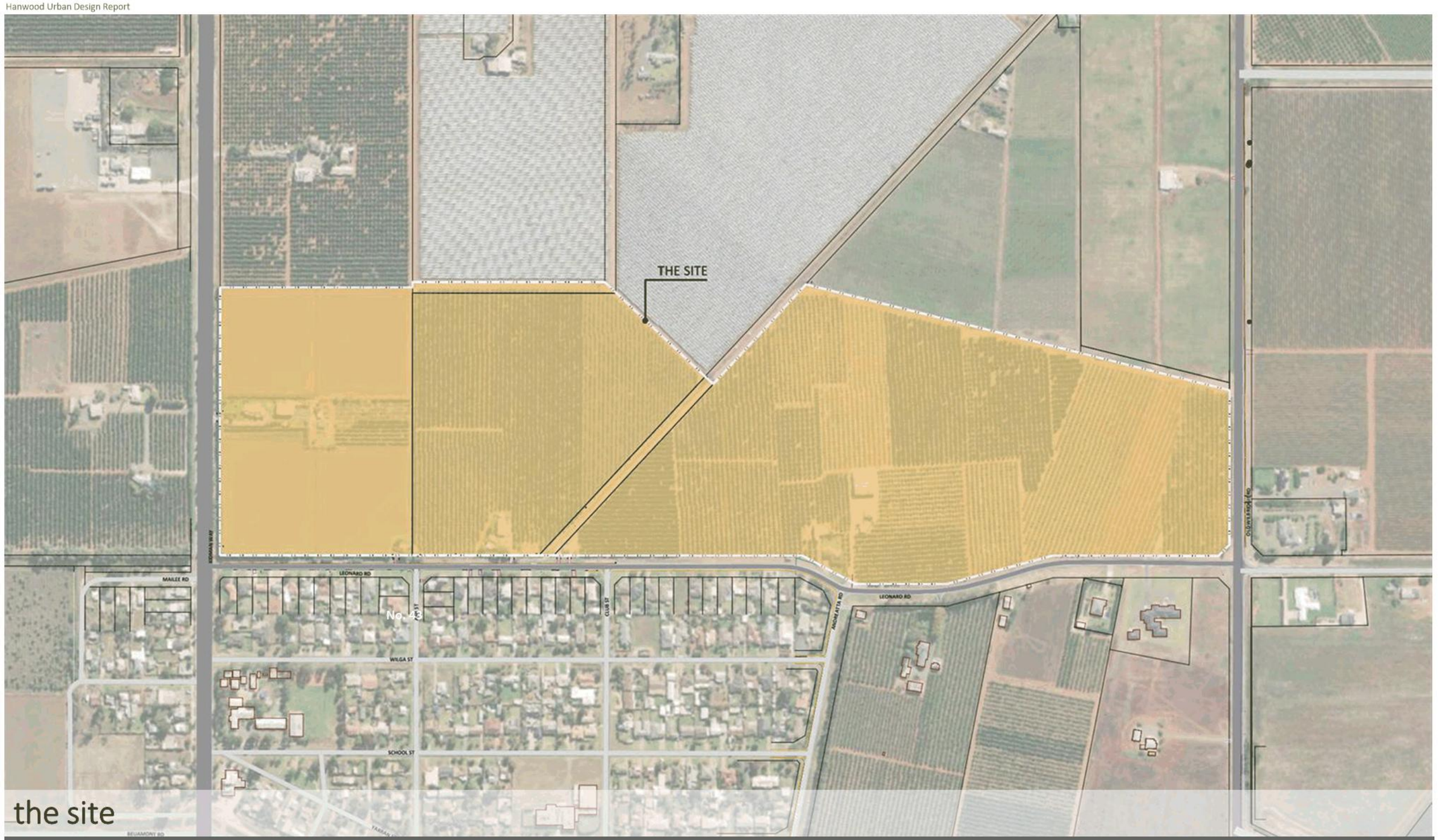
Together, these elements create a community with authentic visual richness and tactile qualities that engage all the senses, making Hanwood not just functional but a pleasurable space to experience.



04

understanding the site

Image source | canberradaily.com.au/getaway Griffith NSW gem of the Riverina



the site

Adjoining Leonard Road, to the north, the Site has an area of approximately 440,340m² (44.03ha), and expands three allotments:

- Lot/Section/Plan no: 150/-/DP751709, being 11300 Kidman Way
- Lot/Section/Plan no: 287/-/DP751709, being No. 43 Leonard Road, Hanwood
- Lot/Section/Plan no: 1623/-/DP257265, being No. 51 Leonard Road Hanwood

The Site 100m

Image source | nearmap 2024 ©

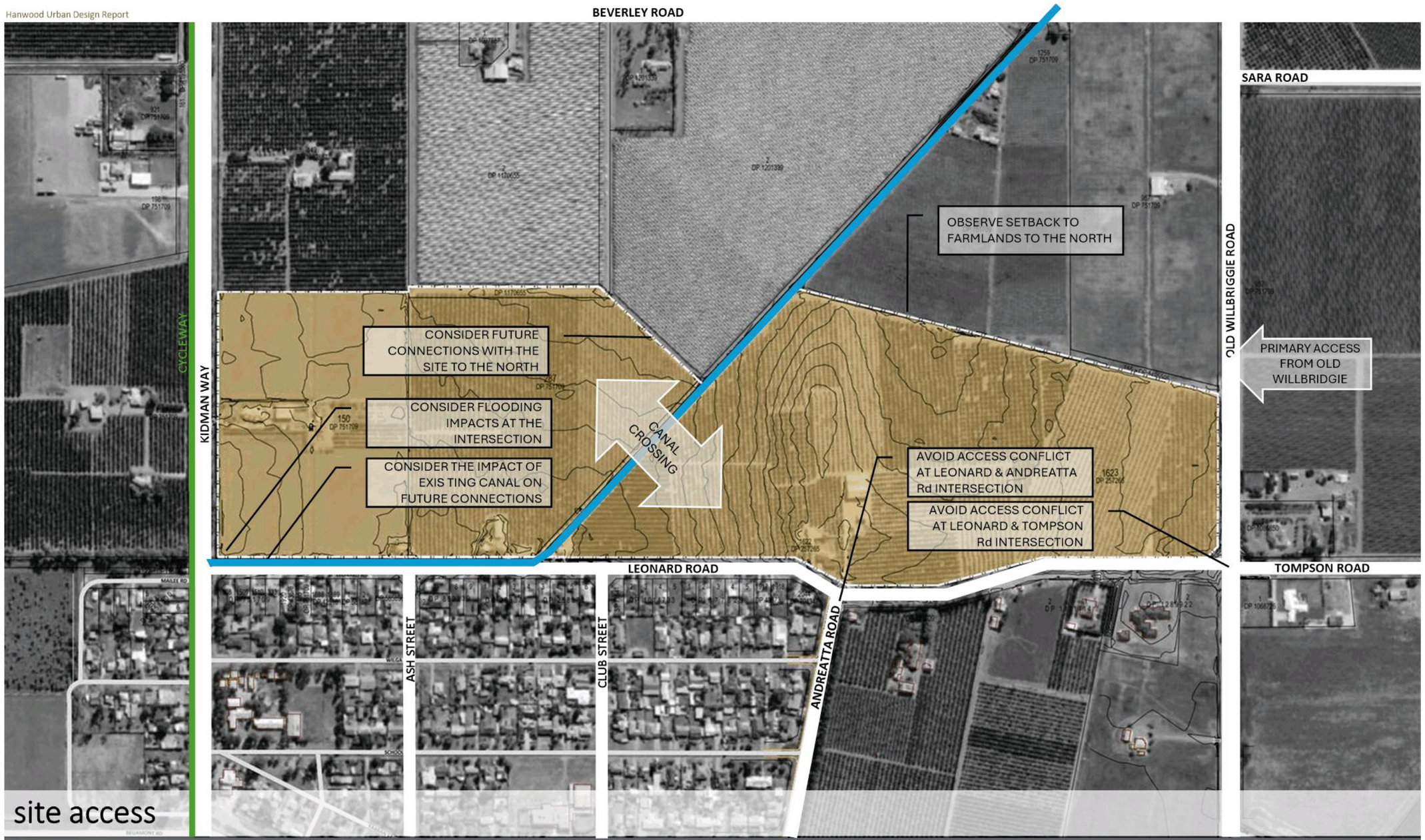
current land uses

The Site is a combination of Agricultural and Rural Residential (single residence) and farm buildings.

The proposed Master Plan includes rural residential located at

- 11300 Kidman Way, Hanwood,
- 43 Leonard Rd, Hanwood, and
- 85 Leonard Rd, Hanwood

site topography



ACCESS STRUCTURE
The proposed masterplan will seek to create a pedestrian friendly and publicly accessible environment.

The access structure shall therefore minimise the extent of new roadways by providing new landscaped shared ways.

The Master Plan shall:
- Locate new roadways away from the sensitive areas of the site, such as the central /landscaped areas;
- provide a road infrastructure which encourages active transport usage for bicycles and pedestrian connections to open space, public facilities and offerings.
- Maintain a northern boundary roadway to connect both neighbourhoods and provide possible future connections to the north;

The Site
100m

The concept master plan envisions a phased development approach that will gradually transition current farming areas into mixed-density residential neighbourhoods with supporting infrastructure and community amenities.

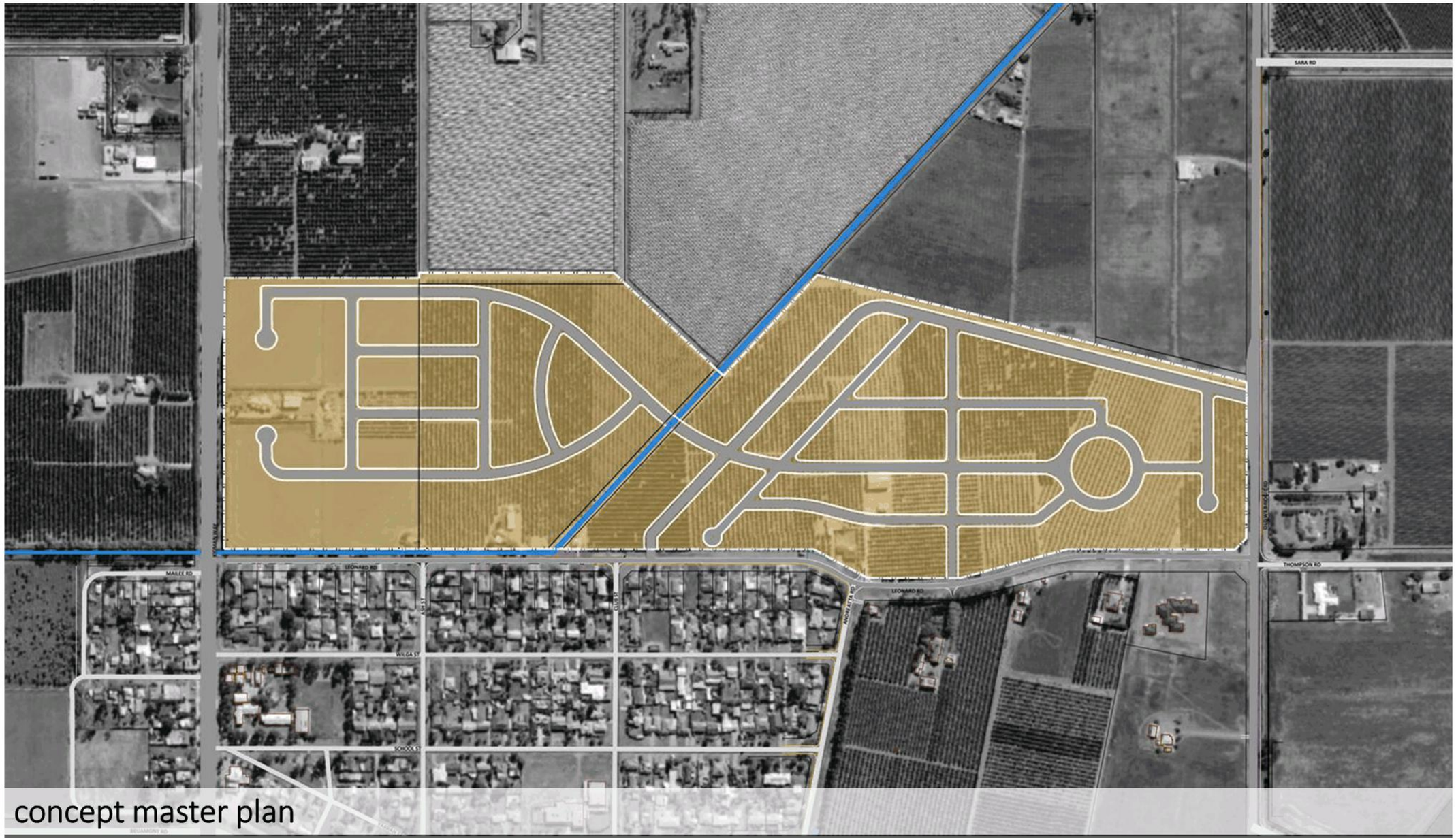
By incorporating sustainable design principles, the master plan aims to create walkable communities with diverse housing options ranging from traditional single-family homes to townhouses and select multi-family dwellings, catering to various demographics and income levels.

Central to the Hanwood Master Plan is the integration of green spaces and natural corridors that preserve ecological features while providing recreational opportunities for residents. The development includes provisions for neighbourhood parks, walking trails, and community gathering spaces that maintain connection to the region's agricultural roots.

Water-sensitive urban design elements will manage stormwater runoff and support environmental sustainability throughout the development.

The master plan also addresses critical infrastructure needs with allowances for upgraded road networks, water and sewer systems, and public transportation connections to Griffith's urban centre. Commercial nodes strategically placed within the development will provide convenient access to daily necessities while supporting economic growth and local employment opportunities, creating a self-sustaining community extension rather than merely a housing estate.

Image source |buildaustralia.com.au/medium density housing



concept master plan

The Hanwood Master Plan represents a transformative vision for site at Hanwood North that balances housing needs with community wellbeing and environmental sustainability.

By prioritising housing diversity through a carefully curated mix of single-family homes, townhouses, duplexes, the plan ensures Hanwood will accommodate residents across various life stages and socioeconomic backgrounds.

This inclusive approach not only addresses current housing demands but also establishes a framework for long-term community resilience and adaptability.

By avoiding disconnected "satellite" development, the plan encourages social interaction and strengthens community bonds across both new and established areas.

Sustainability forms the cornerstone of the Hanwood expansion, with careful consideration given to responsible land use, water conservation, and energy efficiency.

The master plan incorporates a variety of housing densities that minimize urban sprawl while providing diverse living options for residents at different life stages.

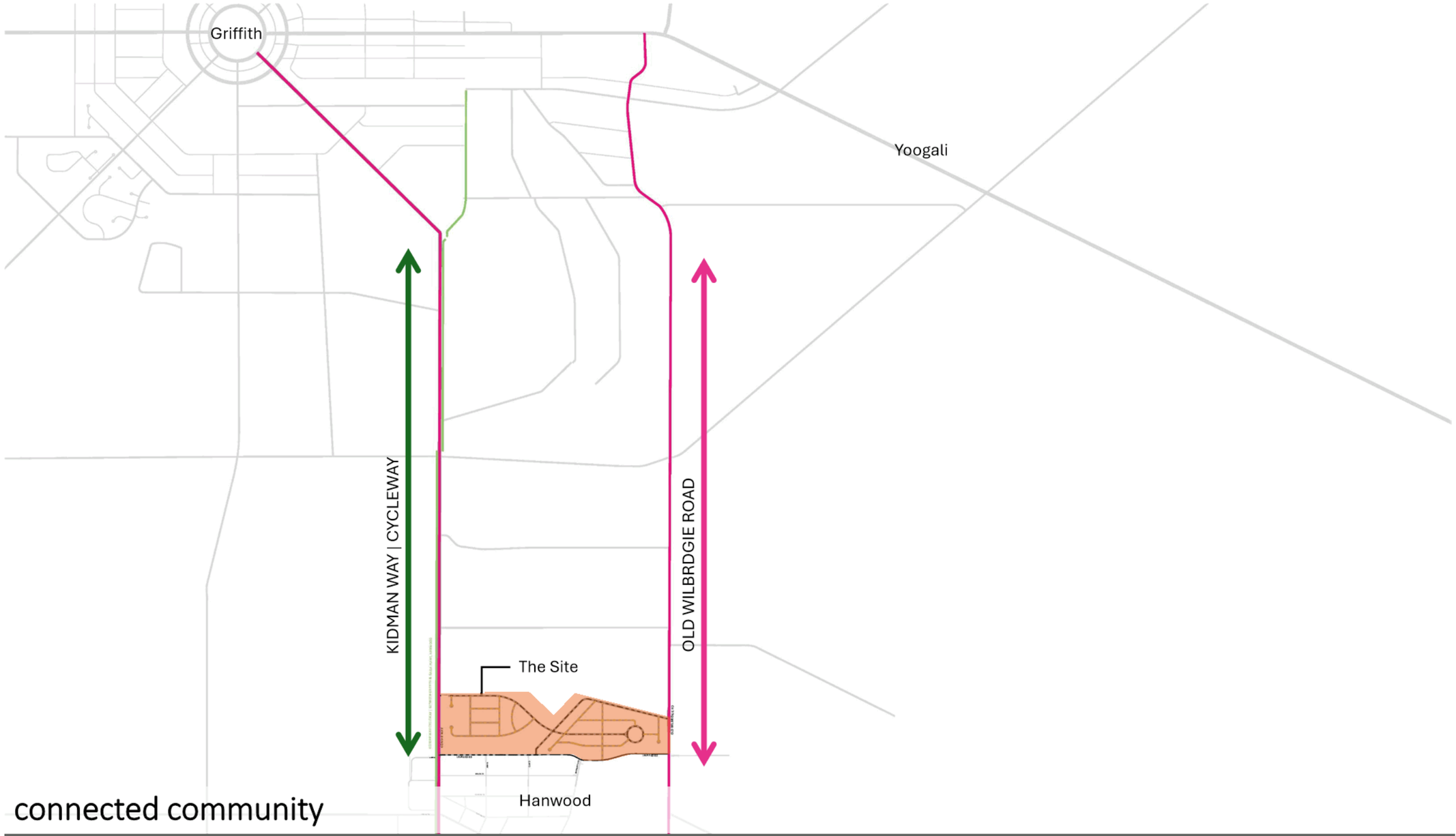
The Site

100m

structure plan

The structure plan is designed to deliver blocks comparable to the existing village of Hanwood, south of Leonard road.

The size of developable blocked are designed for a walkable, legible and easy to navigate urban space, supplemented with significant public open spaces, connected with tree-lined streets.



connected community

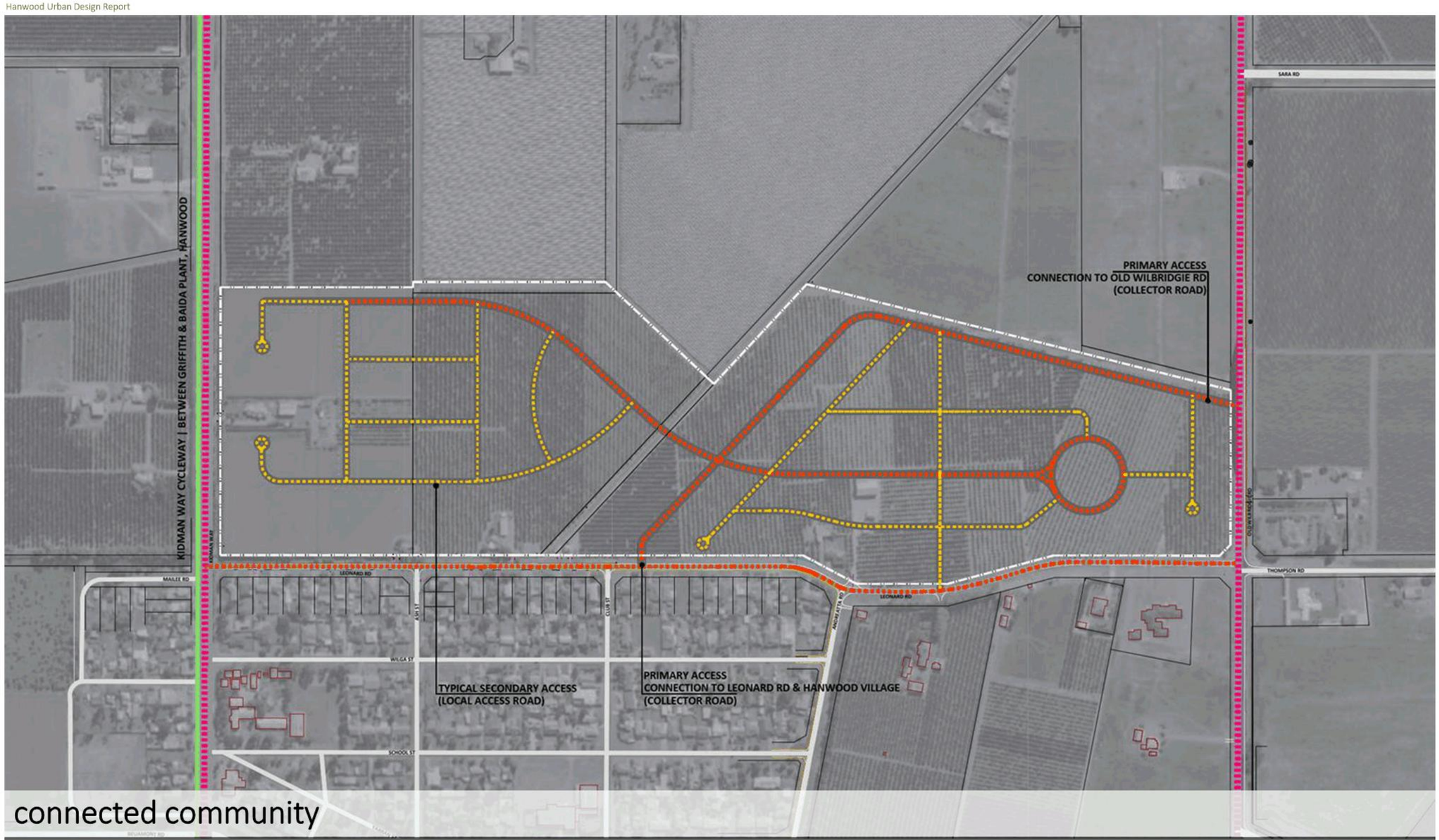
The concept master plan is designed to integrate and connect seamlessly with its immediate and greater context

Kidman way and Old Wilbridgie Road are the primary north-south orientated means of vehicular travel to the east and west of Hanwood.

The proposed internal street network ties into these for connection to the town of Griffith.

The alternative transport, such as cycleways are available along Kidman Way and it is anticipated for the master plan to connect to the existing infrastructure.

The Site



connected community

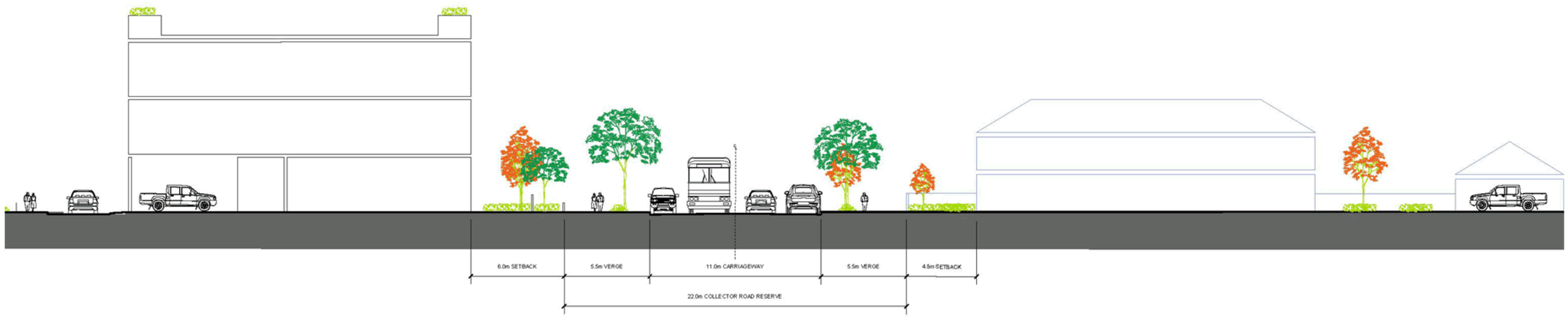
The Hanwood Concept Master Plan presents a thoughtful framework for expanding the existing township in a connected, cohesive manner that honours the established community while addressing future growth needs.

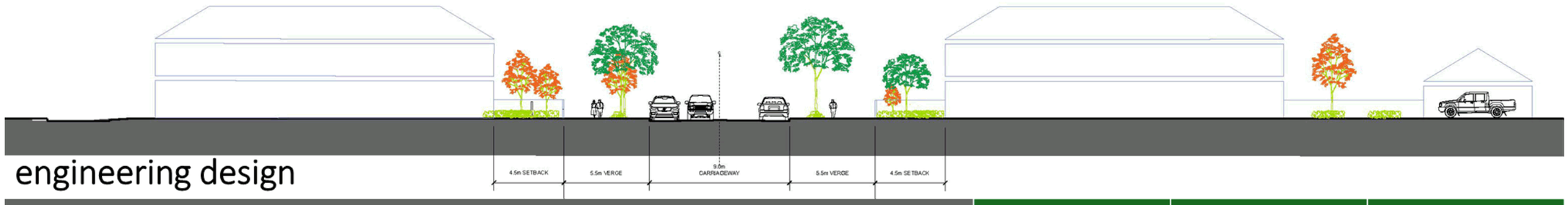
Rather than creating an isolated development, this plan prioritises seamless integration with the current Hanwood township, extending the community's footprint while maintaining its distinctive character and sense of place.

The master plan employs a network-based design approach that extends existing street patterns and creates logical connections between established neighbourhoods and new residential areas. This integrated circulation system promotes community cohesion through thoughtfully designed pedestrian and cycling pathways, ensuring that new residents feel connected to Hanwood's existing community nodes, schools, and recreational facilities.

The Site

100m

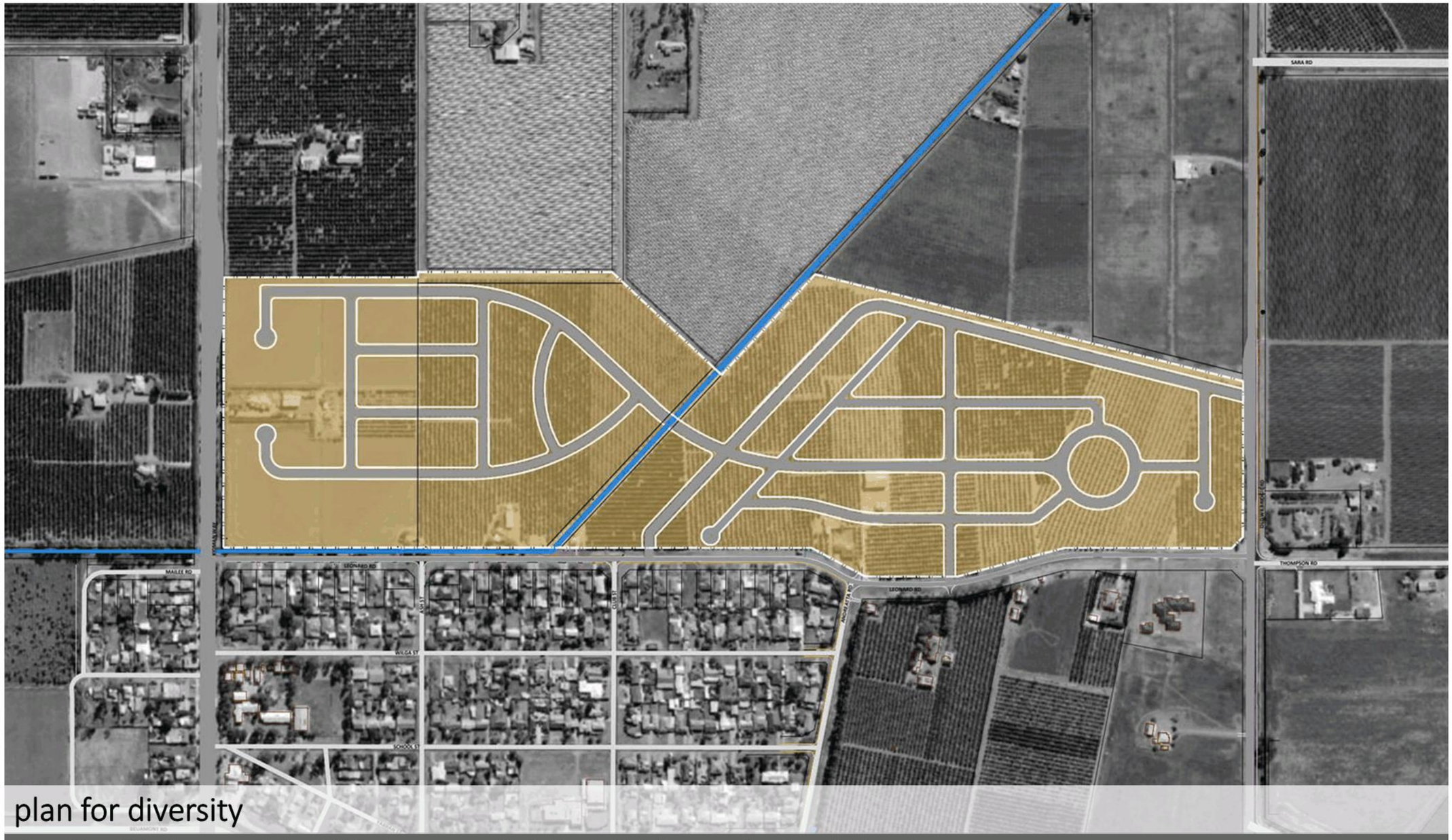




engineering design

Hanwood Master Plan will follow This section of the Engineering Guidelines for s and Developments outlined by Griffith council for the design of rural and urban roads, detailed in Engineering Guidelines – and Development Standards 2008. The intent is to deliver infrastructure that is in keeping with the standards for the area, reducing ambiguity and conflict for ease of application processing.

Classification of Road	Collector	Local Access
Carriageway Width (m)	11m	9m
Footway Width (m)	2 x 5.5m	2 x 5.5m
Road Reserve (m)	22m	20m
Lane Provision	2 Moving Intermittent Parking	2 Moving Intermittent Parking



plan for diversity

Hanwood Concept Master Plan stands as an innovative blueprint for residential development, distinguished by its core commitment to housing diversity as the foundation of community sustainability. Unlike conventional plans that often default to homogeneous housing typologies, this forward-thinking plan deliberately incorporates a rich spectrum of dwelling options designed to accommodate residents across different life stages, family configurations, and socioeconomic circumstances.

The Plan integrates detached homes of varying sizes alongside townhouses, and duplexes. This calculated diversity ensures housing accessibility for first-time buyers, growing families, downsizing seniors, and those seeking rental opportunities.

By enabling residents to transition between housing types without leaving the community, the plan creates conditions for genuine long-term social sustainability and multigenerational living.

The Site

100m

water sensitive urban design

Water Sensitive Urban Design (WSUD) integrates urban water cycle management with urban planning and design, with the aim of mimicking natural systems to minimise negative impacts on the natural water cycle and receiving waterways and bays.

It offers an alternative to the traditional conveyance approach to stormwater management by acting at the development scale (at the source) and thereby reducing the required size of the structural stormwater system.

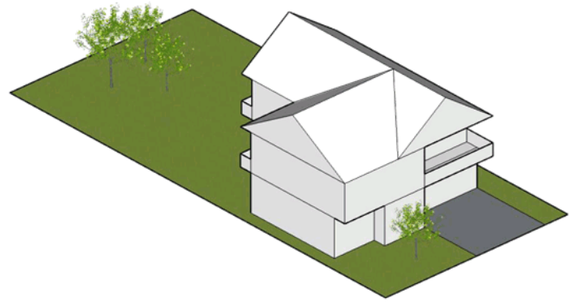
It seeks to minimise impervious surfaces, reuse water on site, incorporate retention basins to reduce peak flows, and incorporate treatment systems to remove pollutants.

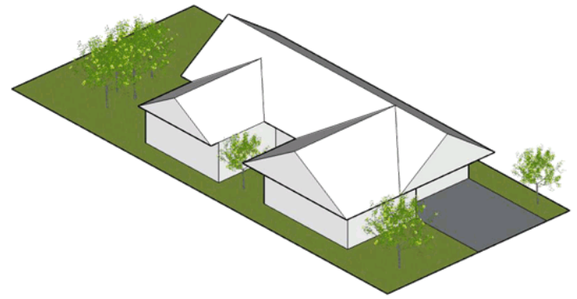
WSUD also provides the opportunity to achieve multiple benefits though sustainable urban water management.

06

housing models

Image source |density + diversity done well| arkhefield.com.au





housing diversity

TYPICAL DWELLING METRICS

boundary size:	12 –16m x 25 – 55m
site area:	350 – 800m²
frontage:	12 – 16m
building area:	155- 200m²
Include:	
	3-5 bedrooms
	2-3 bathrooms
	2 car garage
additional options:	
	1 study and sitting room
	1 rumpus

single dwelling

The Single Dwelling Housing Typology refers to housing designed to accommodate a single household. This form of housing is intended for lots with an area of 450sqm or more in the General Residential areas. There are often challenges with this housing typology such as higher land usage, contributing to urban sprawl, cost with higher construction, maintenance, and property costs compared to multi-family dwellings, Environmental Impact with larger footprint and reliance on car travel can increase the ecological impact. Some benefits of this housing typology include:

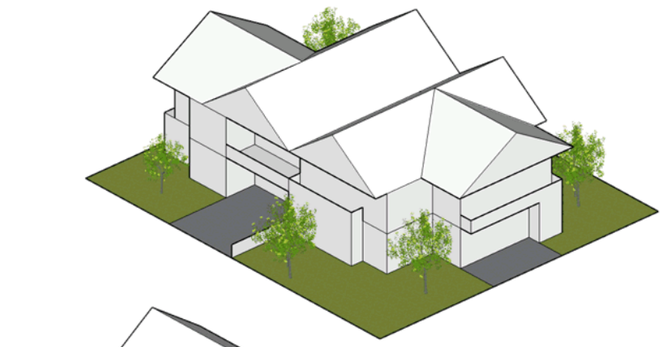
1. Privacy:
Provides physical and acoustic separation from neighbouring homes. Offers control over property boundaries and outdoor spaces.

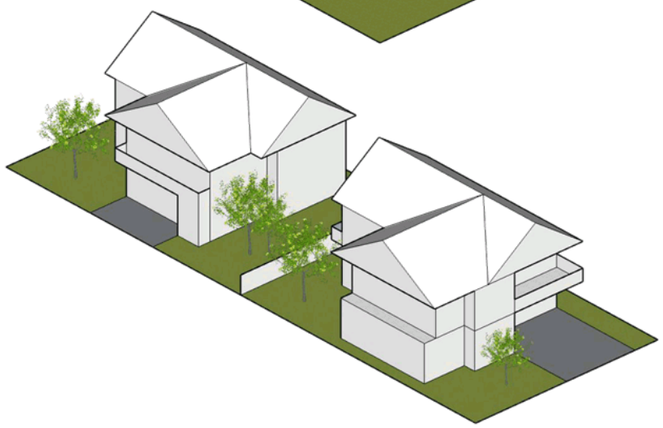
2. Customisation
Owners have the freedom to design, modify, and renovate their homes to suit personal preferences.

3. Outdoor Space:
Usually includes private gardens, patios, or lawns, enhancing recreational opportunities and enabling gardening or other outdoor activities.

4. Suitability
Ideal for families, retirees, or individuals seeking tranquillity and independence.

5. Long-Term Value
Often seen as a sound financial investment due to property appreciation.





housing diversity

TYPICAL DWELLING METRICS

boundary size:	16 – 24m x 24 – 35m
site area:	385 – 850m²
frontage:	16 – 35m
building area:	125- 135m²

Include:

3-4	bedrooms
2-3	bathrooms
2	car garage

dual occupancy (semi detached or detached)

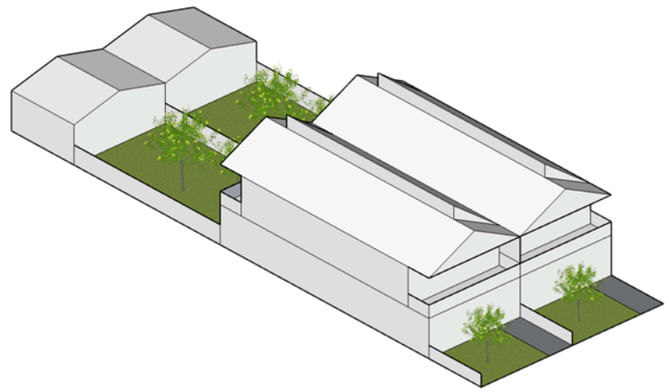
A semi-detached house is a residential building type where two homes are joined by a single common wall, creating a balanced and efficient housing option that bridges the gap between fully detached homes and denser typologies like townhouses.

1. Privacy:
Each dwelling has its own entrance, driveway, and garden or yard space, ensuring a sense of individuality and ownership. These elements create a hybrid living environment—more private than a townhouse but less sprawling than a fully detached home.

2. Moderate Density:
Semi-detached houses offer a smart compromise for urban areas where maximising housing density is crucial. They suit neighbourhoods aiming to balance community feel with sufficient housing stock.

3. Versatile Design:
Architecturally, semi-detached homes can range from traditional symmetrical designs to modern layouts that emphasize individuality. This flexibility allows them to fit into a wide variety of urban contexts while offering aesthetic diversity.

4. Cost-Effective Option:
Semi-detached homes are often more affordable than fully detached houses due to their smaller footprints and shared construction elements. They provide an appealing option for families seeking a private, multi-story living space with outdoor amenities within budget constraints.



housing diversity

TYPICAL DWELLING METRICS

boundary size:	16 – 24m x 24 – 35m
site area:	385 – 850m²
frontage:	16 – 35m
building area:	125- 135m²

Include:

3-5	bedrooms
2-3	bathrooms
2	car garage

row terrace housing

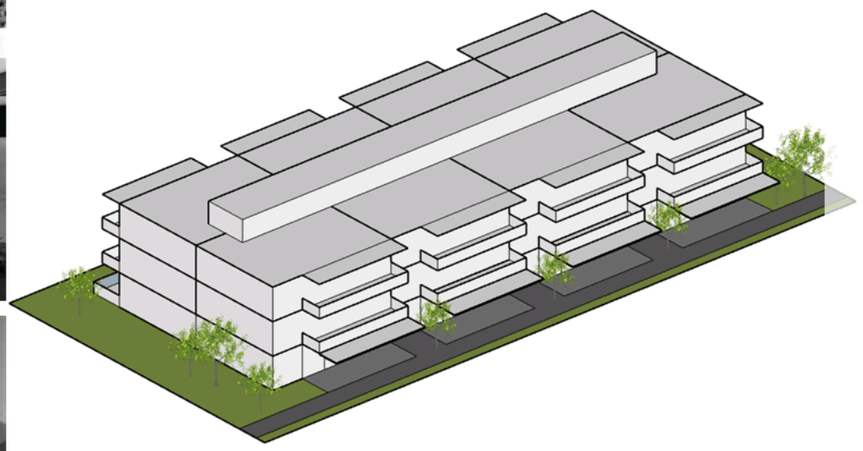
A townhouse as an inner residential housing typology on smaller lots is a compact, multi-story housing option that maximises land efficiency in urban and suburban areas. This typology is designed to provide private, single-family-style living within high-density developments, making it a popular choice for areas with limited space. Townhouses provide a high-density, yet private housing solution tailored to the needs of growing urban populations. The typology include:

1.Land use efficiencies
Townhouses are built on narrow, smaller lots, often arranged in rows, with each unit directly adjacent to its neighbours. This configuration optimises the use of available land, allowing more housing units to fit into a compact area without sacrificing liveability.

2. Design efficiencies
These homes are typically two to three stories, with a vertical layout that separates living spaces (kitchen, dining, and living room) from private areas (bedrooms and bathrooms).

3. Construction efficiencies
Townhouses share walls with neighbouring units on one or both sides, which reduces construction costs and promotes energy efficiency by minimizing heat loss through exterior walls.

4. Amenities
Despite being on smaller lots, townhouses feature private entrances, and many include small front or rear yards, balconies, or rooftop terraces, offering outdoor living spaces tailored to urban lifestyles. As part of inner residential neighbourhoods, townhouses are typically located near urban amenities such as shops, schools, parks, and public transportation, fostering walkability and reducing the reliance on cars.



housing diversity

shoptop housing

Shoptop housing is an ideal inner residential housing option delivering low scaled, multi-story buildings that maximises land efficiency in urban and suburban areas. This typology is designed to provide private accommodation for small families, couples or singles wanting to share, making it a popular choice for areas with limited space and lower budget. As part of inner residential neighbourhoods, apartment style accommodations are typically located near urban amenities such as shops, schools, parks, and public transportation, fostering walkability and reducing the reliance on cars. This typology include:

1.Land use efficiencies
Delivering higher density on an equivalent site, with each apartment benefiting from shared facilities, lessening the overall impact without sacrificing liveability.

2. Design efficiencies
Apartments offer compact living without compromising practicality .

3. Construction efficiencies
Apartments with typical and standardised layouts can be delivered with reduced construction costs

4. Amenities
Despite being on smaller dwellings, apartments feature private balconies, and often share common outdoor spaces tailored to urban lifestyles.

07

staging the delivery

Image source | nearmap.com.au

indicative staging plan

The staged delivery approach for the Hanwood Master Plan recognises that transformative community development requires strategic phasing to ensure sustainable growth, infrastructure readiness, and market responsiveness.

This methodical implementation strategy allows for the careful orchestration of infrastructure, residential, while maintaining the integrated vision that defines Hanwood's character.

Throughout all phases, environmental sustainability principles guide the delivery schedule, ensuring that natural systems are protected and enhanced as development progresses.

The staged approach allows for adaptive management of environmental features, incorporating lessons learned from earlier phases and responding to changing environmental conditions or community priorities.

This flexibility extends to the broader community development, with each phase providing opportunities to refine and enhance subsequent stages based on resident feedback, market conditions, and evolving best practices in sustainable community design. The result is a delivery strategy that maintains the integrity of the master plan vision while allowing for the organic growth and adaptation that characterizes thriving communities.

08

references

Image source | Bintaro Jaya West District Master Plan by 10 Design

Government Architect NSW
Urban Design For Regional NSW

NSW Government
Low Rise Medium Density Design Guide

Western Australian Planning Commission
Residential Design Codes Volume 1

Maribyrnong City Council
Medium Density Design Guide

Riverina Murray Regional Plan 2041

Griffith Council
Local Strategic Planning Statement 2020

Land Use Strategy Beyond 2030 Housing Strategy

Residential Development Control Plan (2020)
Amendment 1

DCP No. 1 - Non-urban development

DCP No. 11 - Urban

DCP No. 19 - Mixed development

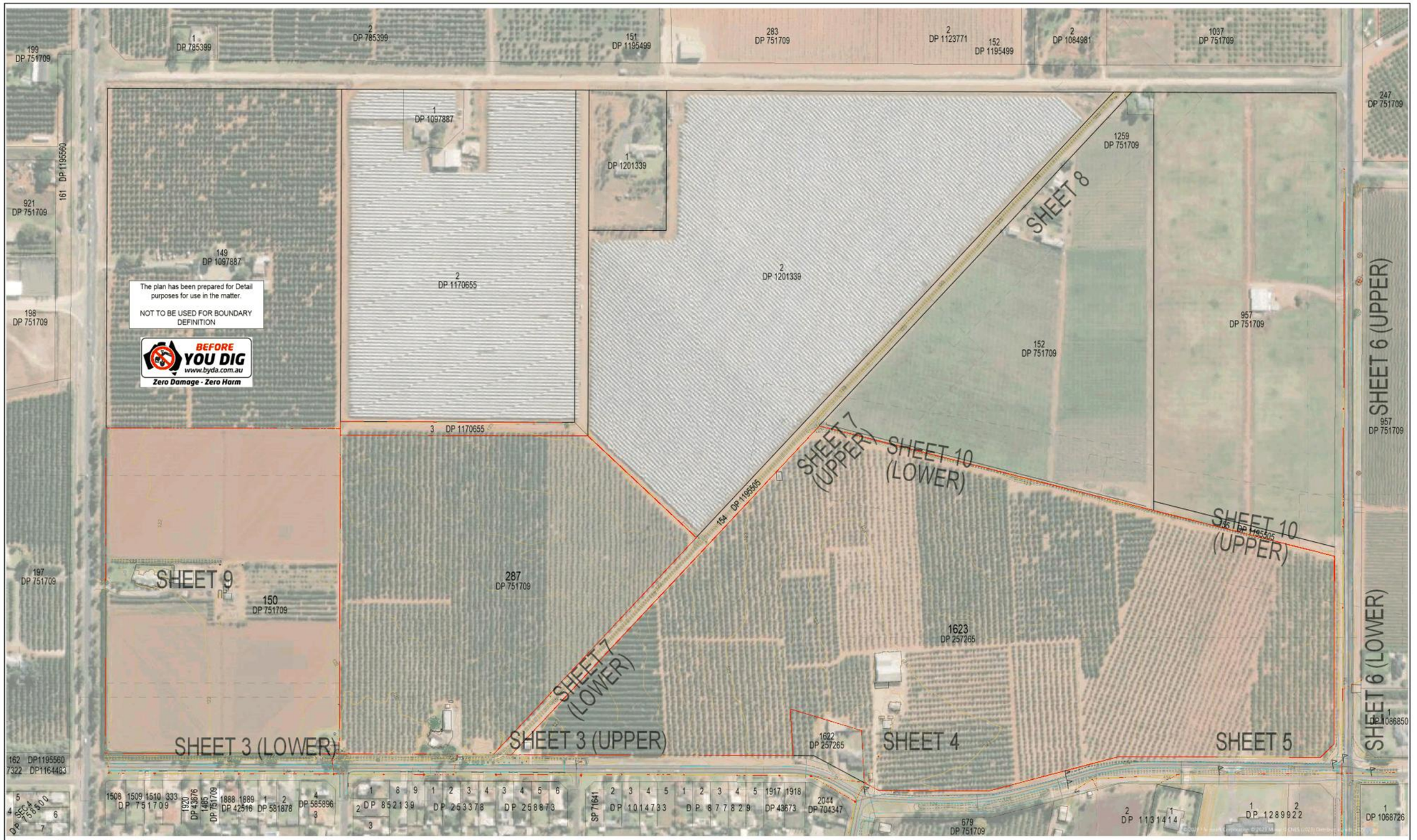
DCP No. 20 - Parking (2011)

Pedestrian & Bicycle Strategy

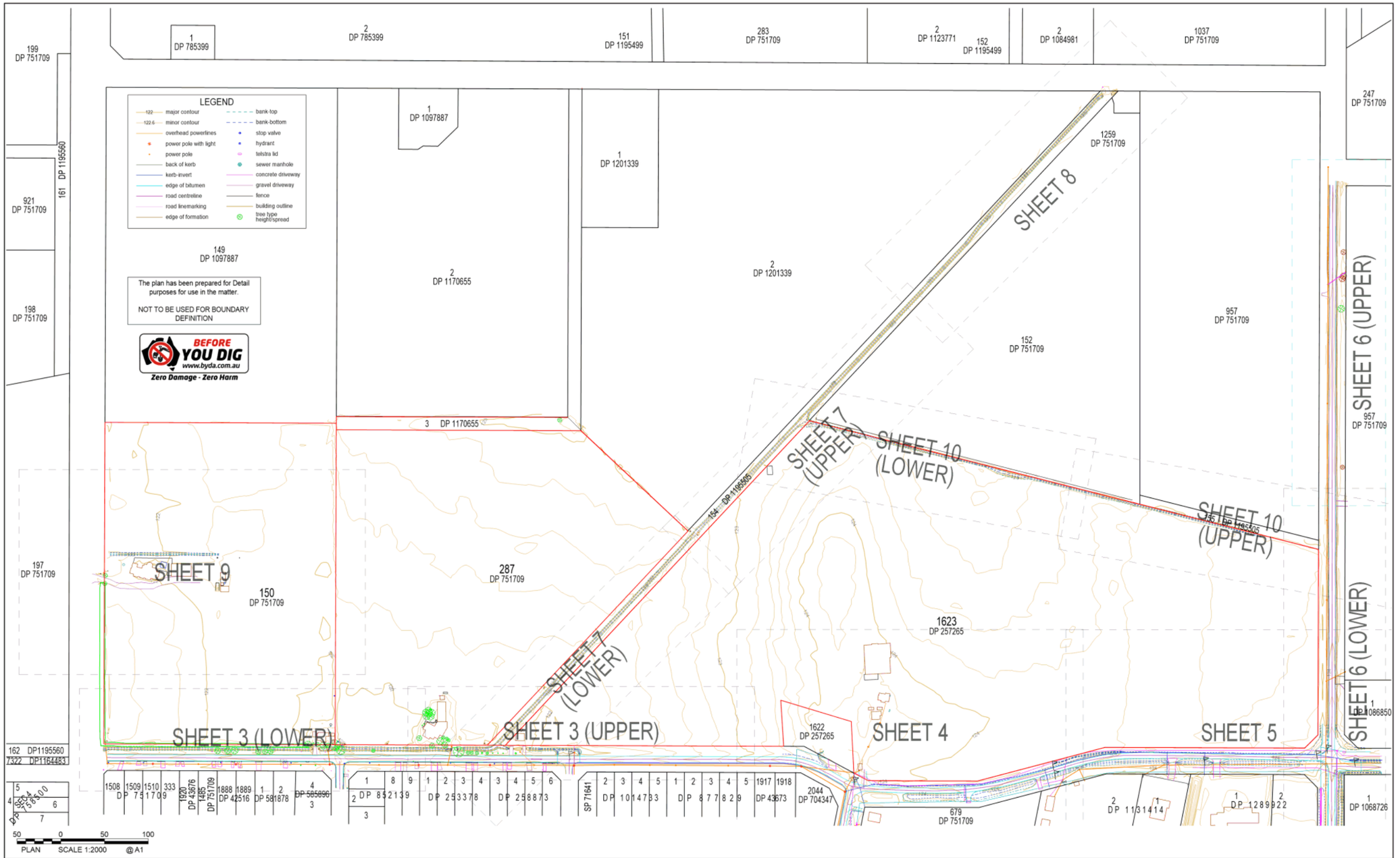
Engineering Guidelines
s and Development Standards

Image source | visitgriffith.com.au/maps and guides

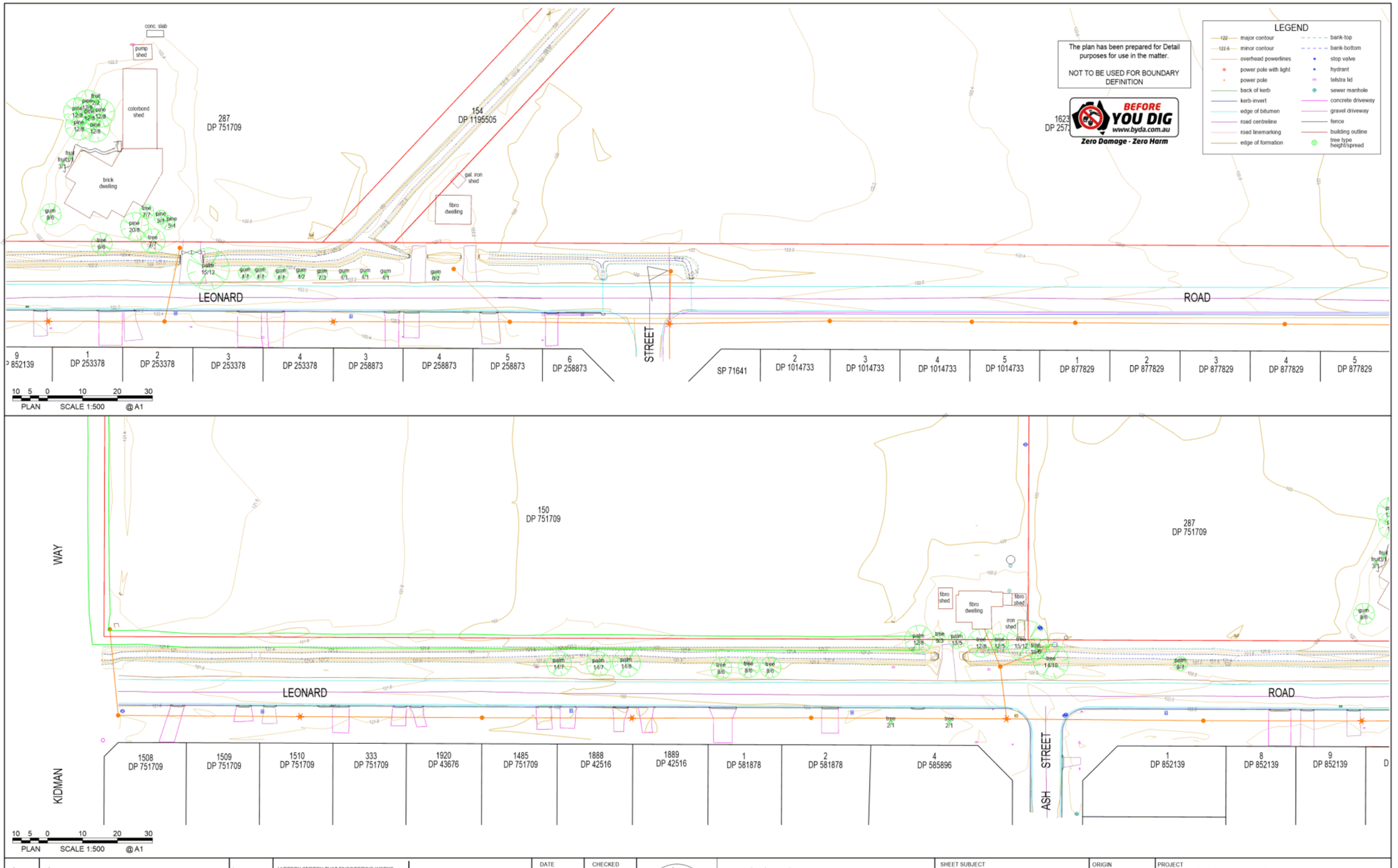

mdpa
architecture
mdpa.com.au



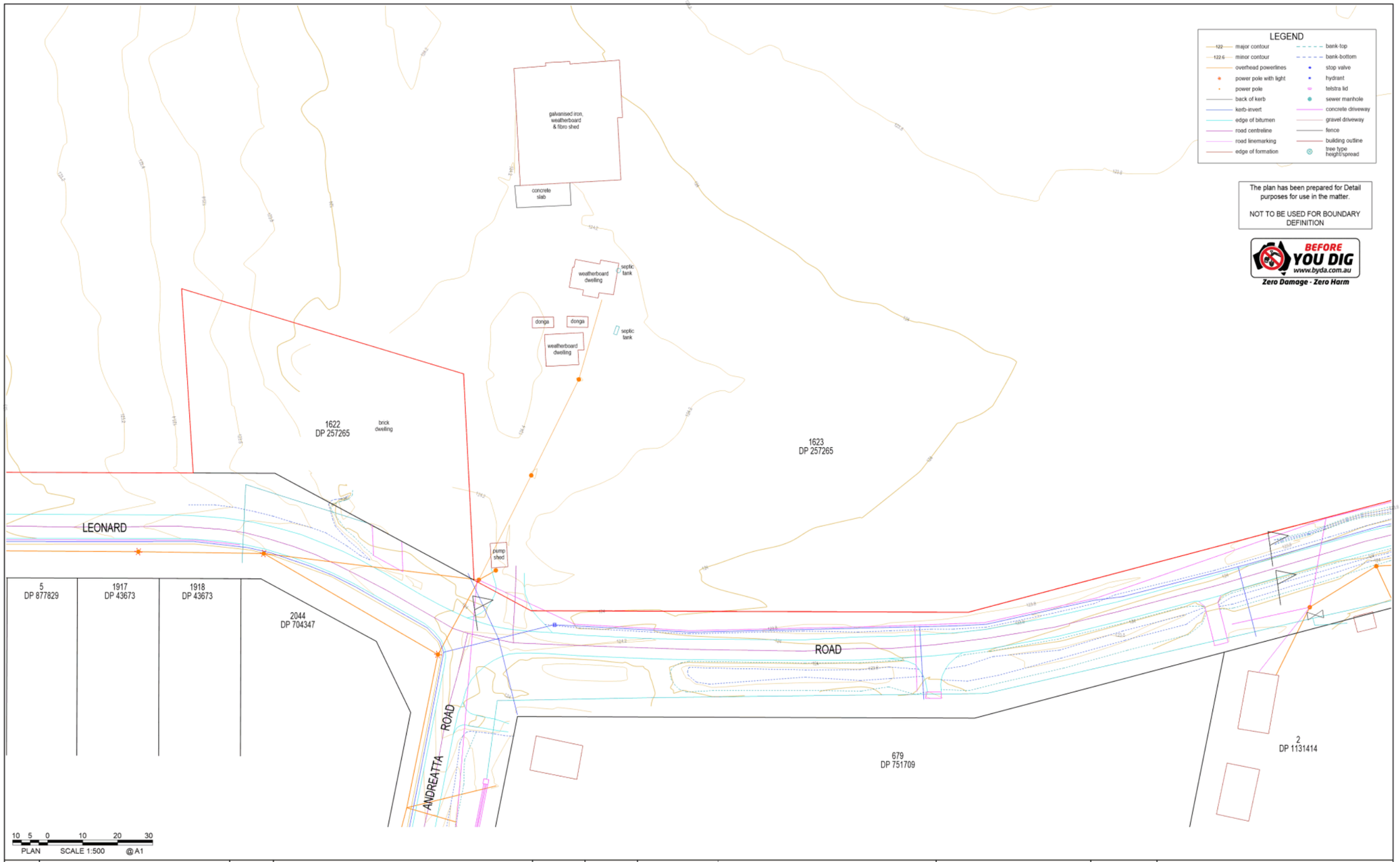
			I HEREBY CERTIFY THAT ENGINEERING WORKS SHOWN ON THIS PLAN ARE WORK-AS-EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR, IN ACCORDANCE WITH THE GENERAL REQUIREMENTS	DATE 31st Jan, 2024	CHECKED JRM	SRD LAND CONSULTING	SHEET SUBJECT SITE PLAN PLAN VIEW	ORIGIN PM 24250 (MGA2020) E: 412369.502 N: 6201001.054 RL: 122.084 (AHD)	PROJECT DETAIL SURVEY OVER LOTS 150 & 287 IN DP 751709, LOT 3 IN DP 1170655, LOT 154 IN DP 1195505 AND LOT 1623 IN DP 257265 LEONARD ROAD, HANWOOD
				DRAWN EK	APPROVED				
A	DETAIL SURVEY	31st Jan, 2024	COPYRIGHT THIS DRAWING IS NOT TO TO BE COPIED, OR TRANFERRED TO ANY THIRD PARTY, OR STORED ON ANY OTHER STORAGE MEDIUM WITHOUT THE WRITTEN PERMISSION OF SRD LAND CONSULTING PTY LTD	DESIGNED EK	SCALE 1:2000	GOULBURN: 4823 5100 I YOUNG: 6382 1501 THE LAND CONSULTANT SPECIALISTS WWW.SRDLAND.COM.AU	CLIENT Planningmatters Development Service	ISSUE A	PROJECT NO. 40156	SHEET NO. 2 of 10 SHEET A1
ISSUE	AMENDMENT	DATE			VERTICAL DATUM GDA2020 HORIZONTAL DATUM AHD				

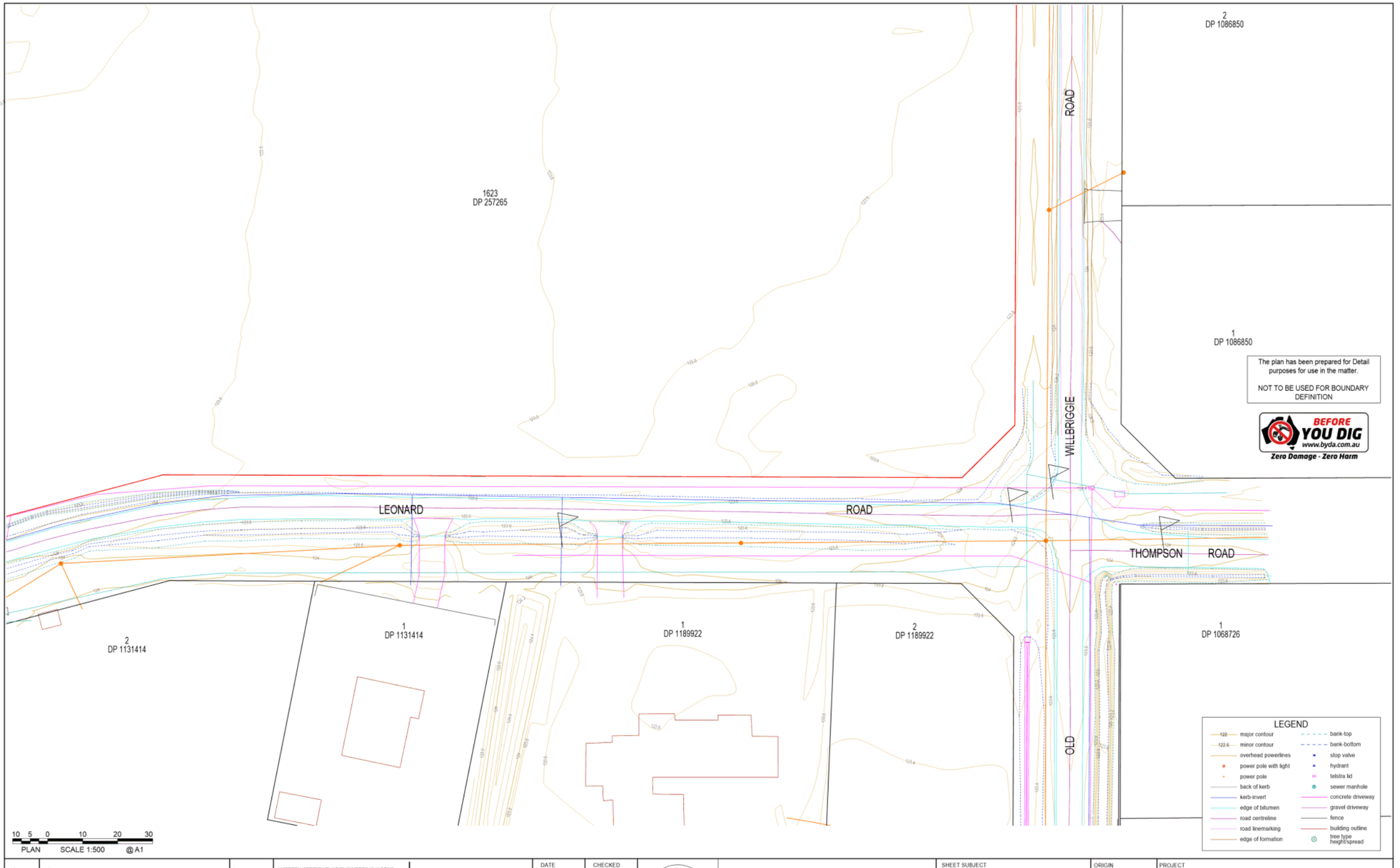


A	DETAIL SURVEY	31st Jan, 2024	I HEREBY CERTIFY THAT ENGINEERING WORKS SHOWN ON THIS PLAN ARE WORK-AS-EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR, IN ACCORDANCE WITH THE GENERAL REQUIREMENTS.	DATE 31st Jan, 2024	CHECKED JRM	SRD LAND CONSULTING	SHEET SUBJECT SITE PLAN PLAN VIEW	ORIGIN PM 24250 (MGA2020) E: 412369.502 N: 6201001.054 RL: 122.084 (AHD)	PROJECT DETAIL SURVEY OVER LOTS 150 & 287 IN DP 751709, LOT 3 IN DP 1170655, LOT 154 IN DP 1195505 AND LOT 1623 IN DP 257265 LEONARD ROAD, HANWOOD
ISSUE	AMENDMENT	DATE	COPYRIGHT THIS DRAWING IS NOT TO TO BE COPIED, OR TRANFERRED TO ANY THIRD PARTY, OR STORED ON ANY OTHER STORAGE MEDIUM WITHOUT THE WRITTEN PERMISSION OF SRD LAND CONSULTING PTY LTD	DRAWN EK	APPROVED	GOULBURN: 4823 5100 | YOUNG: 6382 1501 THE LAND CONSULTANT SPECIALISTS WWW.SRDLAND.COM.AU	CLIENT Planningmatters Development Service	ISSUE A	PROJECT NO. 40156	SHEET NO. 2 of 10	SHEET A1
				DESIGNED EK	SCALE 1:2000	VERTICAL DATUM GDA2020 HORIZONTAL DATUM AHD			

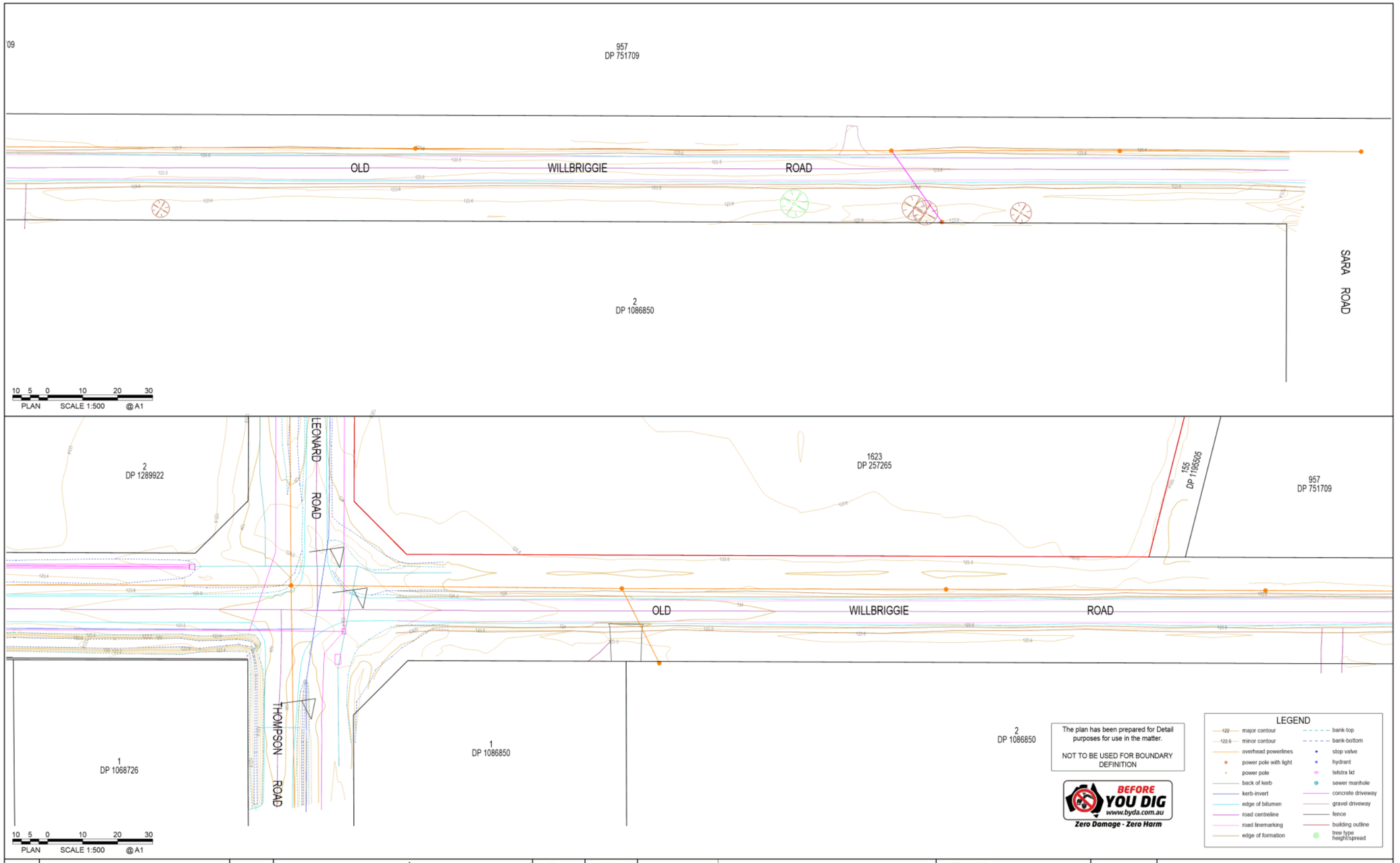


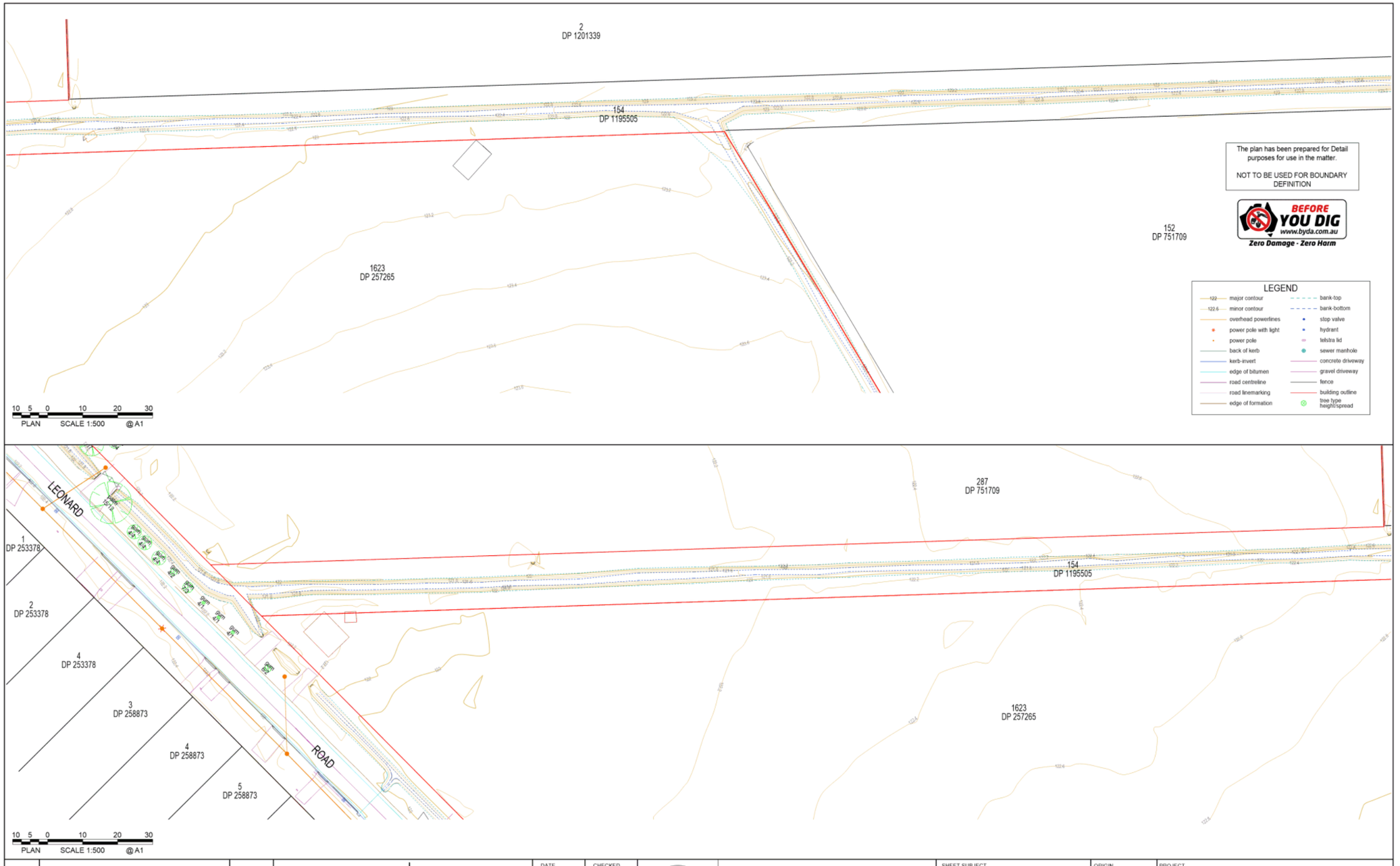
			I HEREBY CERTIFY THAT ENGINEERING WORKS SHOWN ON THIS PLAN ARE WORK-AS-EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR, IN ACCORDANCE WITH THE GENERAL REQUIREMENTS.	DATE 31st Jan, 2024	CHECKED JRM	SRD LAND CONSULTING GOULBURN: 4823 5100 I YOUNG: 6382 1501 THE LAND CONSULTANT SPECIALISTS WWW.SRDLAND.COM.AU	SHEET SUBJECT: SITE PLAN, DETAIL SECTION, LEONARD ROAD	ORIGIN: PM 24250 (MGA2020) E: 412369.502 N: 6201001.054 RL: 122.084 (AHD)	PROJECT: DETAIL SURVEY OVER LOTS 150 & 287 IN DP 751709, LOT 3 IN DP 1170655, LOT 154 IN DP 1195505 AND LOT 1623 IN DP 257265 LEONARD ROAD, HANWOOD
				DRAWN EK	APPROVED				
A	DETAIL SURVEY	31st Jan, 2024	COPYRIGHT THIS DRAWING IS NOT TO TO BE COPIED, OR TRANFERRED TO ANY THIRD PARTY, OR STORED ON ANY OTHER STORAGE MEDIUM WITHOUT THE WRITTEN PERMISSION OF SRD LAND CONSULTING PTY LTD	DESIGNED EK	SCALE 1:500	VERTICAL DATUM GDA2020 HORIZONTAL DATUM AHD	CLIENT: Planningmatters Development Service	ISSUE: A	PROJECT NO.: 40156	SHEET NO.: 3 of 10 SHEET: A1
ISSUE	AMENDMENT	DATE							


LEGEND
major contour
minor contour
overhead powerlines
power pole with light
power pole
back of kerb
kerb-invert
edge of bitumen
road centreline
road linemarking
edge of formation
bank-top
bank-bottom
stop valve
hydrant
telstra lid
sewer manhole
concrete driveway
gravel driveway
fence
building outline
tree type height/spread
The plan has been prepared for Detail purposes for use in the matter.
NOT TO BE USED FOR BOUNDARY DEFINITION
BEFORE YOU DIG www.byda.com.au Zero Damage - Zero Harm
galvanised iron, weatherboard & fibro shed
concrete slab
weatherboard dwelling
septic tank
donga
donga
weatherboard dwelling
septic tank
1622 DP 257265
brick dwelling
1623 DP 257265
LEONARD
pump shed
5 DP 877829
1917 DP 43673
1918 DP 43673
2044 DP 704347
ROAD
ANDREATTA ROAD
679 DP 751709
2 DP 1131414
10 5 0 10 20 30
PLAN SCALE 1:500 @A1
I HEREBY CERTIFY THAT ENGINEERING WORKS SHOWN ON THIS PLAN ARE WORK-AS-EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR, IN ACCORDANCE WITH THE GENERAL REQUIREMENTS.
COPYRIGHT
THIS DRAWING IS NOT TO TO BE COPIED, OR TRANFERRED TO ANY THIRD PARTY, OR STORED ON ANY OTHER STORAGE MEDIUM WITHOUT THE WRITTEN PERMISSION OF SRD LAND CONSULTING PTY LTD
A DETAIL SURVEY 31st Jan, 2024
ISSUE AMENDMENT DATE
DATE 31st Jan, 2024
CHECKED JRM
DRAWN EK
APPROVED
DESIGNED EK
SCALE 1:500
VERTICAL DATUM GDA2020
HORIZONTAL DATUM AHD
SRD LAND CONSULTING
GOULBURN: 4823 5100 | YOUNG: 6382 1501
THE LAND CONSULTANT SPECIALISTS
WWW.SRDLAND.COM.AU
SHEET SUBJECT
SITE PLAN
DETAIL SECTION
LEONARD ROAD
ORIGIN
PM 24250 (MGA2020)
E: 412369.502
N: 6201001.054
RL: 122.084 (AHD)
PROJECT
DETAIL SURVEY OVER LOTS 150 & 287 IN DP 751709, LOT 3 IN DP 1170655, LOT 154 IN DP 1195505 AND LOT 1623 IN DP 257265
LEONARD ROAD,
HANWOOD
CLIENT
Planningmatters Development Service
ISSUE A
PROJECT NO. 40156
SHEET NO. 4 of 10
SHEET A1



			I HEREBY CERTIFY THAT ENGINEERING WORKS SHOWN ON THIS PLAN ARE WORK-AS-EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR, IN ACCORDANCE WITH THE GENERAL REQUIREMENTS.	DATE 31st Jan, 2024	CHECKED JRM	SRD LAND CONSULTING GOULBURN: 4823 5100 I YOUNG: 6382 1501 THE LAND CONSULTANT SPECIALISTS WWW.SRDLAND.COM.AU	SHEET SUBJECT SITE PLAN DETAIL SECTION LEONARD ROAD/	ORIGIN PM 24250 (MGA2020) E: 412369.502 N: 6201001.054 RL: 122.084 (AHD)	PROJECT DETAIL SURVEY OVER LOTS 150 & 287 IN DP 751709, LOT 3 IN DP 1170655, LOT 154 IN DP 1195505 AND LOT 1623 IN DP 257265 LEONARD ROAD, HANWOOD
A	DETAIL SURVEY	31st Jan, 2024	COPYRIGHT THIS DRAWING IS NOT TO TO BE COPIED, OR TRANFERRED TO ANY THIRD PARTY, OR STORED ON ANY OTHER STORAGE MEDIUM WITHOUT THE WRITTEN PERMISSION OF SRD LAND CONSULTING PTY LTD	DRAWN EK	APPROVED				
ISSUE	AMENDMENT	DATE		DESIGNED EK	SCALE 1:500	VERTICAL DATUM GDA2020 HORIZONTAL DATUM AHD	CLIENT Planningmatters Development Service	ISSUE A	PROJECT NO. 40156	SHEET NO. 5 of 10	SHEET A1


09
957
DP 751709
OLD
WILLBRIGGIE
ROAD
SARA ROAD
2
DP 1086850
10 5 0 10 20 30
PLAN SCALE 1:500 @A1
2
DP 1289922
LEONARD ROAD
1623
DP 257265
155
DP 1195505
957
DP 751709
OLD
WILLBRIGGIE
ROAD
THOMPSON ROAD
1
DP 1068726
1
DP 1086850
2
DP 1086850
10 5 0 10 20 30
PLAN SCALE 1:500 @A1
The plan has been prepared for Detail purposes for use in the matter.
NOT TO BE USED FOR BOUNDARY DEFINITION
BEFORE YOU DIG www.byda.com.au
Zero Damage - Zero Harm
LEGEND
major contour
minor contour
overhead powerlines
power pole with light
power pole
back of kerb
kerb-invert
edge of bitumen
road centreline
road linemarking
edge of formation
bank-top
bank-bottom
stop valve
hydrant
telstra lid
sewer manhole
concrete driveway
gravel driveway
fence
building outline
tree type height/spread
I HEREBY CERTIFY THAT ENGINEERING WORKS SHOWN ON THIS PLAN ARE WORK-AS-EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR, IN ACCORDANCE WITH THE GENERAL REQUIREMENTS.
A DETAIL SURVEY 31st Jan, 2024
ISSUE AMENDMENT DATE
COPYRIGHT
THIS DRAWING IS NOT TO TO BE COPIED, OR TRANFERRED TO ANY THIRD PARTY, OR STORED ON ANY OTHER STORAGE MEDIUM WITHOUT THE WRITTEN PERMISSION OF SRD LAND CONSULTING PTY LTD
DATE 31st Jan, 2024
CHECKED JRM
DRAWN EK
APPROVED
DESIGNED EK
SCALE 1:500
VERTICAL DATUM GDA2020
HORIZONTAL DATUM AHD
SRD LAND CONSULTING
GOULBURN: 4823 5100 | YOUNG: 6382 1501
THE LAND CONSULTANT SPECIALISTS
WWW.SRDLAND.COM.AU
SHEET SUBJECT
SITE PLAN
DETAIL SECTION
LEONARD ROAD
ORIGIN
PM 24250 (MGA2020)
E: 412369.502
N: 6201001.054
RL: 122.084 (AHD)
PROJECT
DETAIL SURVEY OVER LOTS 150 & 287 IN DP 751709, LOT 3 IN DP 1170655, LOT 154 IN DP 1195505 AND LOT 1623 IN DP 257265
LEONARD ROAD,
HANWOOD
CLIENT
Planningmatters Development Service
ISSUE A
PROJECT NO. 40156
SHEET NO. 5 of 10
SHEET A1



.	.		I HEREBY CERTIFY THAT ENGINEERING WORKS SHOWN ON THIS PLAN ARE WORK-AS-EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR, IN ACCORDANCE WITH THE GENERAL REQUIREMENTS.	DATE 31st Jan, 2024	CHECKED JRM		SRD LAND CONSULTING GOULBURN: 4823 5100 I YOUNG: 6382 1501 THE LAND CONSULTANT SPECIALISTS WWW.SRDLAND.COM.AU	SHEET SUBJECT SITE PLAN DETAIL SECTION LEONARD ROAD	ORIGIN PM 24250 (MGA2020) E: 412369.502 N: 6201001.054 RL: 122.084 (AHD)	PROJECT DETAIL SURVEY OVER LOTS 150 & 287 IN DP 751709, LOT 3 IN DP 1170655, LOT 154 IN DP 1195505 AND LOT 1623 IN DP 257265 LEONARD ROAD, HANWOOD	
.	.			DRAWN EK	APPROVED						
.	.			DESIGNED EK	SCALE 1:500			CLIENT Planningmatters Development Service	ISSUE A	PROJECT NO. 40156	SHEET NO. 3 of 10 SHEET A1
A	DETAIL SURVEY	31st Jan, 2024	COPYRIGHT THIS DRAWING IS NOT TO TO BE COPIED, OR TRANFERRED TO ANY THIRD PARTY, OR STORED ON ANY OTHER STORAGE MEDIUM WITHOUT THE WRITTEN PERMISSION OF SRD LAND CONSULTING PTY LTD				VERTICAL DATUM GDA2020 HORIZONTAL DATUM AHD				
ISSUE	AMENDMENT	DATE									

The plan has been prepared for Detail purposes for use in the matter.

NOT TO BE USED FOR BOUNDARY DEFINITION

BEFORE YOU DIG www.byda.com.au Zero Damage - Zero Harm

LEGEND

122	major contour		bank-top
122.5	minor contour		bank-bottom
	overhead powerlines		stop valve
	power pole with light		hydrant
	power pole		telstra lid
	back of kerb		sewer manhole
	kerb-invert		concrete driveway
	edge of bitumen		gravel driveway
	road centreline		fence
	road linemarking		building outline
	edge of formation		tree type height/spread

2
DP 1084981

BEVERLEY ROAD

1037
DP 751709

2
DP 1201339

1259
DP 751709

152
DP 751709

957
DP 751709

10 5 0 10 20 30
PLAN SCALE 1:500 @A1

ISSUE	AMENDMENT	DATE
A	DETAIL SURVEY	31st Jan, 2024

I HEREBY CERTIFY THAT ENGINEERING WORKS SHOWN ON THIS PLAN ARE WORK-AS-EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR, IN ACCORDANCE WITH THE GENERAL REQUIREMENTS.

DATE	CHECKED
31st Jan, 2024	JRM
DRAWN	APPROVED
EK	
DESIGNED	SCALE
EK	1:500

VERTICAL DATUM GDA2020
HORIZONTAL DATUM AHD

SRD LAND CONSULTING
GOULBURN: 4823 5100 | YOUNG: 6382 1501
THE LAND CONSULTANT SPECIALISTS
WWW.SRDLAND.COM.AU

SHEET SUBJECT	SITE PLAN DETAIL SECTION LEONARD ROAD
ORIGIN	PM 24250 (MGA2020) E: 412369.502 N: 6201001.054 RL: 122.084 (AHD)
PROJECT	DETAIL SURVEY OVER LOTS 150 & 287 IN DP 751709, LOT 3 IN DP 1170655, LOT 154 IN DP 1195505 AND LOT 1623 IN DP 257265 LEONARD ROAD, HANWOOD
CLIENT	Planningmatters Development Service

ISSUE	PROJECT NO.	SHEET NO.	SHEET
A	40156	3 of 10	A1

The plan has been prepared for Detail purposes for use in the matter.

NOT TO BE USED FOR BOUNDARY DEFINITION

BEFORE YOU DIG www.byda.com.au
Zero Damage - Zero Harm

WAY

KIDMAN

197
DP 751709

150
DP 751709

287
DP 751709

septic tank
concrete water tank
brick dwelling
colorbond shed
pump shed
concrete slab
metal shed
concrete tank
greenhouse
coaring temp
gate 25/5
gate 22/5

LEGEND

major contour	bank-top
minor contour	bank-bottom
overhead powerlines	stop valve
power pole with light	hydrant
power pole	telstra lid
back of kerb	sewer manhole
kerb-invert	concrete driveway
edge of bitumen	gravel driveway
road centreline	fence
road linemarking	building outline
edge of formation	tree type height/spread

10 5 0 10 20 30
PLAN SCALE 1:500 @A1

ISSUE	AMENDMENT	DATE
A	DETAIL SURVEY	31st Jan, 2024

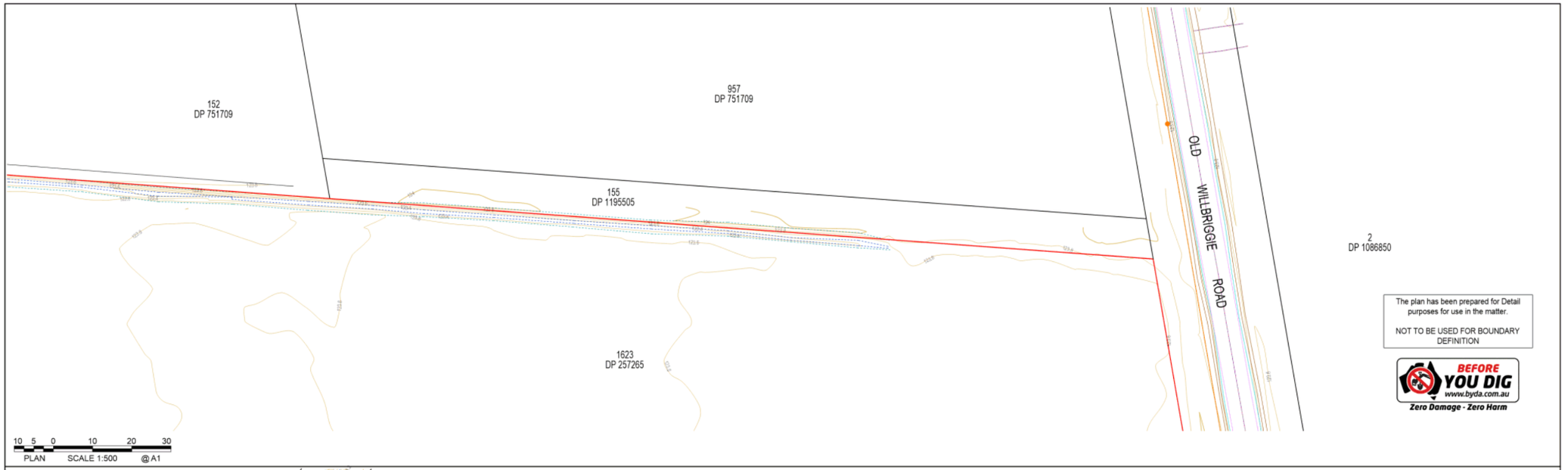
I HEREBY CERTIFY THAT ENGINEERING WORKS SHOWN ON THIS PLAN ARE WORK-AS-EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR, IN ACCORDANCE WITH THE GENERAL REQUIREMENTS.

DATE	CHECKED
31st Jan, 2024	JRM
DRAWN	APPROVED
EK	
DESIGNED	SCALE
EK	1:500

VERTICAL DATUM GDA2020
HORIZONTAL DATUM AHD

SRD LAND CONSULTING
GOULBURN: 4823 5100 | YOUNG: 6382 1501
THE LAND CONSULTANT SPECIALISTS
WWW.SRDLAND.COM.AU

SHEET SUBJECT	SITE PLAN DETAIL SECTION LEONARD ROAD
ORIGIN	PM 24250 (MGA2020) E: 412369.502 N: 6201001.054 RL: 122.084 (AHD)
PROJECT	DETAIL SURVEY OVER LOTS 150 & 287 IN DP 751709, LOT 3 IN DP 1170655, LOT 154 IN DP 1195505 AND LOT 1623 IN DP 257265 LEONARD ROAD, HANWOOD
CLIENT	Planningmatters Development Service
ISSUE	A
PROJECT NO.	40156
SHEET NO.	4 of 10
SHEET	A1



A	DETAIL SURVEY	31st Jan, 2024	I HEREBY CERTIFY THAT ENGINEERING WORKS SHOWN ON THIS PLAN ARE WORK-AS-EXECUTED AND HAVE BEEN CONSTRUCTED GENERALLY IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE DIRECTOR, IN ACCORDANCE WITH THE GENERAL REQUIREMENTS.
ISSUE	AMENDMENT	DATE	COPYRIGHT THIS DRAWING IS NOT TO TO BE COPIED, OR TRANFERRED TO ANY THIRD PARTY, OR STORED ON ANY OTHER STORAGE MEDIUM WITHOUT THE WRITTEN PERMISSION OF SRD LAND CONSULTING PTY LTD

DATE	31st Jan, 2024	CHECKED	JRM
DRAWN	EK	APPROVED	
DESIGNED	EK	SCALE	1:500

VERTICAL DATUM GDA2020
HORIZONTAL DATUM AHD

SRD LAND CONSULTING
GOULBURN: 4823 5100 I YOUNG: 6382 1501
THE LAND CONSULTANT SPECIALISTS
WWW.SRDLAND.COM.AU

SHEET SUBJECT	SITE PLAN DETAIL SECTION LEONARD ROAD	ORIGIN	PM 24250 (MGA2020) E: 412369.502 N: 6201001.054 RL: 122.084 (AHD)	PROJECT	DETAIL SURVEY OVER LOTS 150 & 287 IN DP 751709, LOT 3 IN DP 1170655, LOT 154 IN DP 1195505 AND LOT 1623 IN DP 257265 LEONARD ROAD, HANWOOD
CLIENT	Planningmatters Development Service	ISSUE	A	PROJECT NO.	40156
		SHEET NO.	4 of 10	SHEET	A1

ABN: 96 647 479 016

Date: 25 September 2025

Martin Ruggeri
Principal
Planningmatters Development Service
23 Noorilla Street Griffith NSW 2680

Leonard Road, Hanwood – Proposed Residential Subdivision
Transport Impact Assessment

Dear Martin,

1. Introduction

1.1 Background & Proposal

Approval is being sought to rezone land on the north side of Leonard Road, Hanwood, between Kidman Way and Old Willbriggie Road, for primarily residential uses. The area which is proposed to be rezoned is shown below in Figure 1.

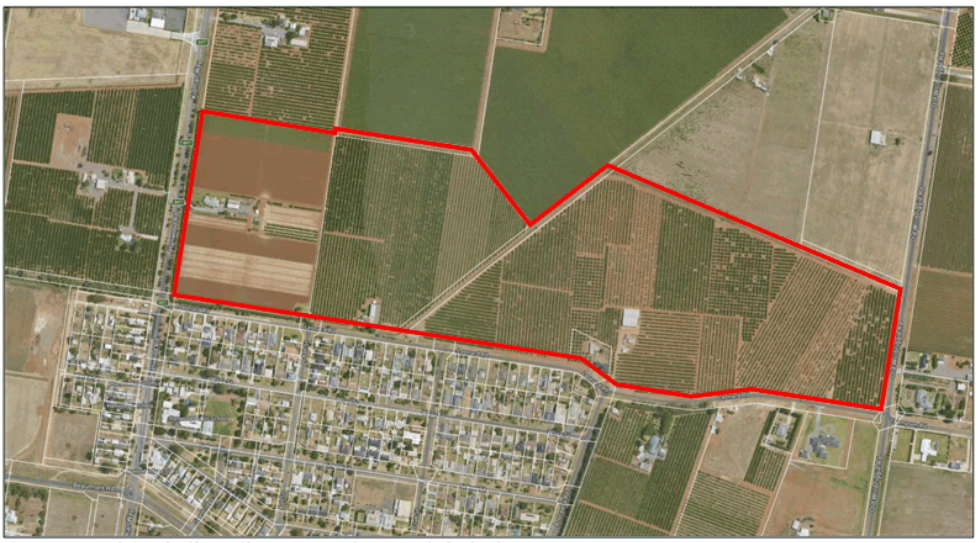


Figure 1: Subject Site & its Surrounds – Aerial Photo

The current concept master plan for the site anticipates that it will be subdivided into lots with approximately 500 single dwellings, multiple dwelling developments and ancillary support land uses.

Vehicular access to the subdivision is proposed via a new intersection with Old Willbriggie Road at the northeast corner of the site and two intersections with Leonard Road along the south side of the site.

rsaudits.com.au | info@rsaudits.com.au

1.2 Purpose of this Report

The report sets out an initial assessment of the anticipated traffic and transport implications of the proposed rezoning, including consideration of the:

- the expected traffic generation of the site following the rezoning and subdivision
- the adequacy of the proposed access arrangements to the site
- the adequacy of the proposed internal site layout

1.3 References

In preparing this report, reference has been made to the following:

- Concept master plan prepared by MDP Architecture, project no.3340, drawing no.A5000, revision N, dated 8 September 2025
- Extract from 'Housing Delivery Authority - Expression of Interest', prepared for Hanwood Developments Pty Ltd
- Griffith Local Environmental Plan (LEP) 2014
- Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management, edition 4.0, April 2020
- 'Guide to Transport Impact Assessment', prepared by TfNSW, version 1.1, 2024
- traffic count data obtained from Griffith City Council

2. Existing Conditions

2.1 Subject Site

The subject site is located on the north side of Leonard Road, Hanwood, between Kidman Way and Old Willbriggie Road. The western section of the site is located within a Transition Zone (RU6) and the remainder of the site is within a Primary Production Zone (RU1). Most of the site is currently used for agricultural purposes. There are also three existing residential dwellings on the site. The location of the subject site and surrounding environs is shown in Figure 2.

Figure 2: Subject Site & its Surrounds - Map

2.2 Road Network

Kidman Way

Kidman Way (Hanwood Road / B87) is an arterial road which is aligned in a north-south direction. In the vicinity of the site, it has an undivided carriageway with a single through lane in each direction. There is also a shared bicycle / pedestrian path in the verge along the western side of the road. Kidman Way carries in the order of 7,150 vehicles per day (two-way) and has a posted speed limit of 60km/h to the north of the site, which reduces to 50km/h from 100m north of Leonard Road.

Figure 3: Kidman Way

Old Willbriggie Road

Old Willbriggie Road is a local road which is aligned in a north-south direction. In the vicinity of the site, it has an undivided carriageway with a single through lane in each direction. There are no formal pedestrian or cyclist facilities. Old Willbriggie Road has a posted speed limit of 80km/h in the vicinity of the site.

Figure 4: Old Willbriggie Road

Leonard Road

Leonard Road is a local road which is aligned in an east-west direction. It has an undivided carriageway with a single through lane in each direction. There are no formal pedestrian or cyclist facilities. Leonard Road has a 50km/h speed limit.

2.3 Traffic Volumes

Traffic volume counts were undertaken by Griffith City Council on Kidman Way just north of the site (between Beverley Road and Pedley Road) in January and February 2025. These found that Kidman Way carried an average of ~7,150 vehicles per day (two-way) on weekdays during school term times. Volumes were less on weekends and during the holiday period.

2.4 Public Transport

Bus route #945 operates along Kidman Way past the site. There are three services in each direction on weekdays.

2.5 Pedestrians & Cyclists

There is a shared pedestrian / cycle path in the verge along the west side of Kidman Way. There are no formal footpaths on Old Willbriggie Road or Leonard Road. However, pedestrians can walk on the verge in these roads. Cyclists can ride on-road in the traffic lanes.

3. Site Access

The concept master plan for the site includes three vehicular access intersections to the subdivision:

- An access intersection with Old Willbriggie Road, at the northeast corner of the site. This is anticipated to be a 'Give Way' controlled T-intersection with auxiliary right and left turn lanes in Old Willbriggie Road.
- Two access intersections with Leonard Road along the southern side of the site, which are anticipated to be 'Give Way' controlled local road T-intersections.

In addition, some lots may gain direct access from Leonard Road via individual crossovers.

The proposed site access strategy is considered appropriate due to the following:

- Not providing direct access to Kidman Way minimises the number of access points to an arterial road.
- Providing an access intersection from the site to Old Willbriggie Road will minimise the impact of site-generated traffic on Leonard Road and the residential streets to the south of Leonard Road.
- Providing an access intersection from the site to Old Willbriggie Road will minimise travel distances, given that a significant percentage of the site-generated traffic is expected to travel to/from the north.
- Only providing one access intersection to Old Willbriggie Road maximises safety by minimising the number of potential conflict points.
- Additionally, the site access intersection to Old Willbriggie Road is proposed to be separated as far as possible from nearby existing intersections, which also maximises safety by minimising the potential for conflict.
- Given the flat topography and the straight alignment of Old Willbriggie Road, good sight distance is available at the proposed access intersection.
- Given the length of Leonard Road, there is sufficient opportunity to provide more than one site access intersection whilst providing adequate separation between the new intersections (and with the existing intersections on Leonard Road) to minimise the potential for conflict.

4. Traffic Impact

4.1 Traffic Generation

When rezoned, the site is expected to accommodate ~500 residential dwellings. Table 5.3 of TfNSW's 'Guide to Transport Impact Assessment' version 1.1 indicates that low density residential dwellings in regional areas generate an average of in the order of 7.53 daily vehicle trips per dwelling. This would equate to ~3,765 daily trips for the proposed development. The TfNSW Guide also indicates that low density residential dwellings in regional areas generate an average of 0.83 vehicle trips in a weekday AM peak hour and 0.84 vehicle trips in a weekday PM peak hour. Therefore, the site is expected to generate in the order of 415-420 vehicle trips per hour on a weekday peak hour.

In addition to the residential uses, the site is expected to accommodate some minor non-residential support land uses. However, these are expected to mostly be used by local residents and so generate minimal trips on the external road network.

4.2 Traffic Distribution

Traffic from the site is expected to mostly travel to/from the north to Griffith via either Old Willbriggie Road or Leonard Road then Kidman Way, or to/from the south to the Hanwood township via Leonard Road and then the local roads to the south of Leonard Road. Based on this, an initial estimate of the expected distribution of site-generated traffic is shown in Figure 5 below. The percentages in red are exit movements and the percentages in green are entry movements.

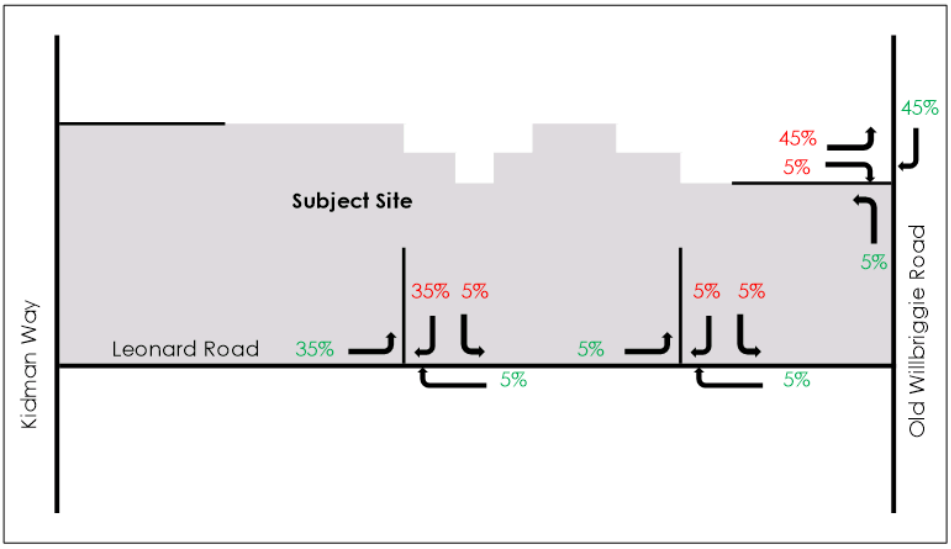


Figure 5: Estimated Traffic Distribution

Assuming a typical split of 20% entry / 80% exit movements in an AM peak hour for a residential subdivision, Figure 6 shows the estimated future site generated traffic during a weekday AM peak hour.

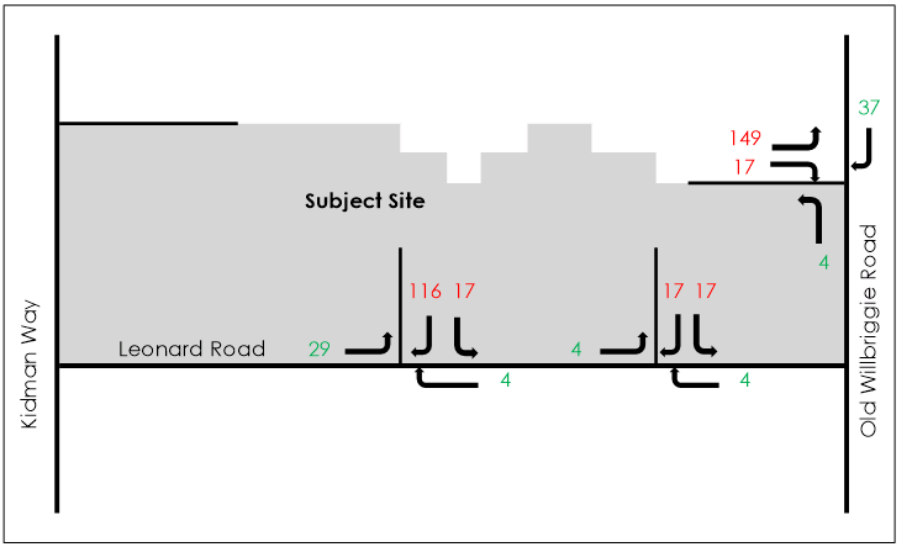


Figure 6: Estimated Future Site-Generated Traffic – Weekday AM Peak Hour

Similarly, assuming a typical split of 35% entry / 65% exit movements in a PM peak hour for a residential subdivision, Figure 7 shows the estimated future site generated traffic during a weekday PM peak hour.

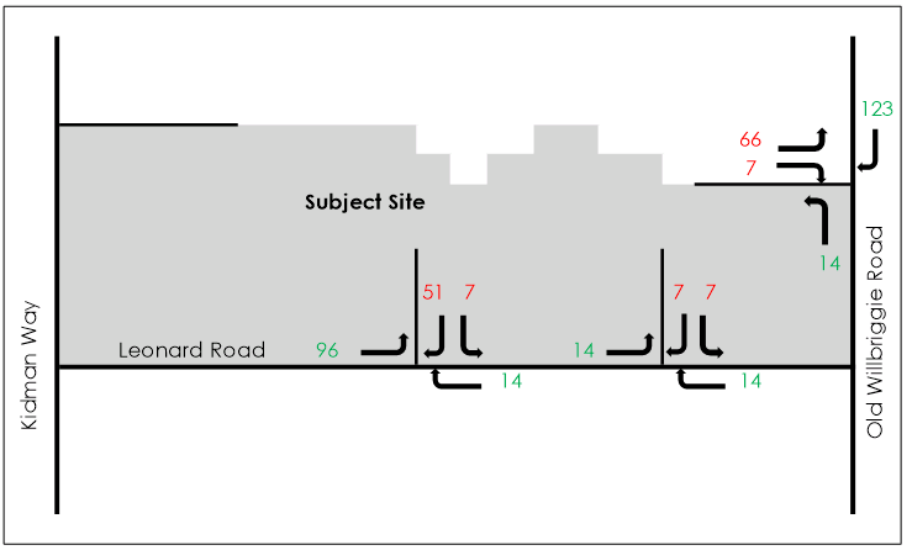


Figure 7: Estimated Future Site-Generated Traffic – Weekday PM Peak Hour

4.3 Intersection Capacity

It is anticipated that the site access intersection with Old Willbriggie Road will be a 'Give Way' controlled T-intersection with auxiliary right and left turn lanes in Old Willbriggie Road.

Whilst traffic volume data for Old Willbriggie Road is not available, it is anticipated that it currently carries no more than 500 vehicles per hour in a peak hour. Old Willbriggie Road has a speed limit of 80km/h in the vicinity of the proposed site access intersection. As shown in Figures 6 and 7, it is anticipated that there will be up to 123 right turn movements and 14 left turn movements into the site at the site access intersection in a peak hour.

Figure 3.25 of the Austroads Guide to Traffic Management Part 6 (AGTM6) outlines the warrants for turn treatments on major roads at unsignalised intersections. The above volumes have plotted on the relevant chart from AGTM6 in Figure 8, with the left turn volumes shown by the yellow star and the right turn volumes shown by the red star.

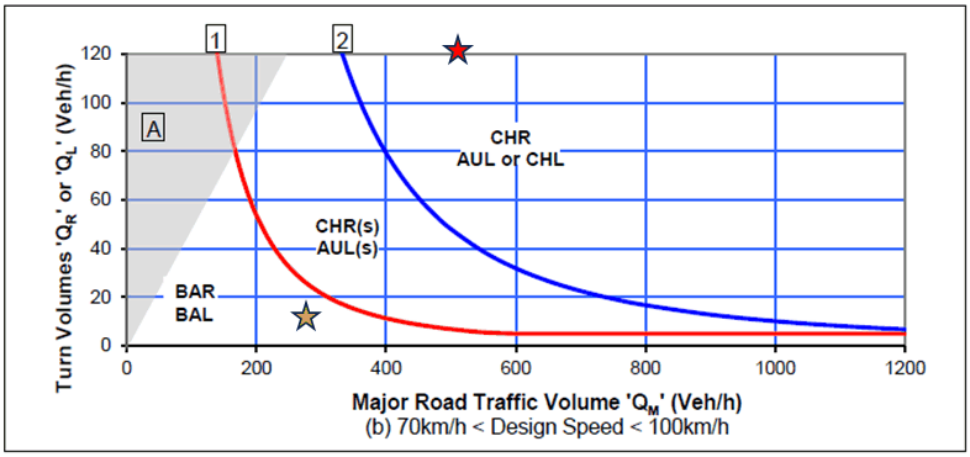


Figure 8: Turn Treatment Warrants – Old Willbriggie Road (extract from Figure 3.25 of AGTM6)

From Figure 8 we can see that there will be adequate capacity for vehicles to access the site if auxiliary left and right turn lanes are provided at the site access intersection from Old Willbriggie Road. Indeed, only a short lane (AUL(s)) is required for the left turn lane.

Given the moderately low traffic volumes entering and exiting the site on Leonard Road, the installation of standard priority controlled local road T-intersections is expected to be adequate to accommodate the future traffic volumes, other than at the western intersection, where an auxiliary left turn lane should be installed.

5. Internal Layout

The concept master plan anticipates an internal road network within the site which will consist of two higher-order streets running generally east-west, connecting with Old Willbriggie Road and Leonard Road, and a number of local streets connecting to the two higher-order streets.

This concept is considered to be generally appropriate. However, it is recommended that the following modifications be made as the master plan is further developed, to maximise the safety and efficiency of the internal road network:

- There are several cross-intersections shown on the concept master plan. The layout should be modified to minimise the number of cross-intersections, and to provide roundabouts at any locations where cross-intersections are retained.
- Some of the internal intersections are shown with the roads intersecting at an acute angle. The intersections should be re-aligned so that the roads intersect at as close to a 90-degree angle as possible, with minimal splays.

6. Summary and Conclusions

Based on the above, the following conclusions can be made:

- The proposal seeks to rezone land on the north side of Leonard Road, Hanwood, between Kidman Way and Old Willbriggie Road, for primarily residential uses.
- The current concept master plan for the site anticipates that it will be subdivided into lots with approximately 500 single dwellings, multiple dwelling developments and ancillary support land uses.
- Vehicular access to the subdivision is proposed via a new intersection with Old Willbriggie Road at the northeast corner of the site and two intersections with Leonard Road along the south side of the site. These access locations and arrangements are considered appropriate.
- The site is expected to generate in the order of 3,765 vehicle trips per day on a typical weekday, including 420 trips in a peak hour.
- There will be adequate capacity for vehicles to access the site if auxiliary left and right turn lanes are provided at the access intersection with Old Willbriggie Road, and an auxiliary left turn lane is provided at the western access intersection with Leonard Road.
- This internal road layout shown in the concept master plan is considered to be generally appropriate, subject to some recommended modifications including:
    - minimising the number of cross-intersections
    - installing roundabouts at any cross-intersections which are retained
    - realigning the angle of the internal roads intersections to be as close to 90-degrees as possible.

If you have any queries regarding the above, please contact me on 0403 242 034 or at davidg@rsaudits.com.au.

Regards

David Graham

Director – Traffic & Transport
Senior Road Safety Auditor (Level 3 NSW)
CPEng, NER, MIEAust, BE (Hons), BSc

Leonard Road Release Area, Hanwood

Need and Demand Assessment

Project undertaken for
Stimson Advisory

November 2024

Leonard Road Release Area, Hanwood

This project has been conducted by REMPLAN

Project Team:

Teresa Bullock-Smith
Director and Principal Economist

Andrew Brown
Senior Consultant

Briony Pearson
Consultant

November 2024

Disclaimer

All figures and data presented in this document are based on data sourced from the Australian Bureau of Statistics (ABS), and other government agencies. Using ABS datasets, the regional economic modelling software 'REMPLAN economy', has been applied to generate industrial economic data estimates. This document is provided in good faith with every effort made to provide accurate data and apply comprehensive knowledge. However, REMPLAN does not guarantee the accuracy of data nor the conclusions drawn from this information.

RESOURCES

All modelling has been undertaken using REMPLAN™ software that has been authored by Principal Research Fellow (ret.), Ian Pinge, at La Trobe University Bendigo.

Contact us:
REMPLAN
PO BOX 4880
ROBINA TOWN CENTRE,
QLD 4230
TEL: 07 5689 1499
Email: teresa@remplan.com.au

Contents

Executive Summary

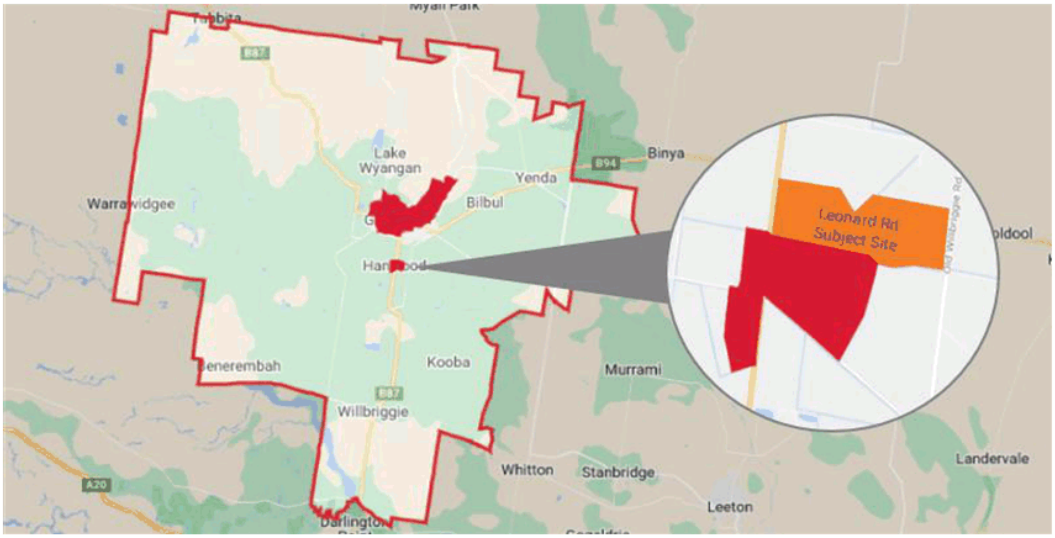
This report was commissioned by Stimpson Advisory in June 2024, to undertake a *Need and Demand Assessment* for the proposed residential development across three allotments, being 11300 Kidman Way; 43 Leonard Road; and 51 Leonard Road at Hanwood, Griffith.

Subject Site Overview

The proposed rezoning and residential development of the subject site, referred to as the Leonard Road Release Area, presents a strategic opportunity to address the growing demand for diverse, accessible, and affordable housing options in the region. The site is strategically located adjacent to Hanwood to its northern side as a natural extension to the village and is located approximately seven minutes' drive south of central Griffith. See *Figure 01*.

The subject site is proposed for approximately 455 dwellings, both detached and medium density, providing housing affordability and diversity of options. Currently, the site is zoned RU1 for primary production, however, it has been identified in the *Griffith Land Use Strategy Beyond 2030* for future rezoning between 2022-2030.

Figure 01 Hanwood Village and Subject Site



The site represents an opportunity for small and medium lots, designed to support the community's aspirations and needs and catering for a growing demand for affordable family homes and medium density living options, where such offerings are currently limited. The proposed development will ensure the availability of accessible, affordable and diverse housing options within Griffith LGA crucial to support the community and promote inclusive growth.

Strategic Planning Documents

The key policy document with implications for residential development is the *Griffith Land Use Strategy 'Beyond 2030'* (LUS), promoting a balanced urban expansion by extending development opportunities to Griffith and neighbouring villages like Lake Wyangan, Hanwood, and Yenda. Specific to Hanwood, the strategy outlines a plan for land release on the southern side of Leonard Road between Andreatta Road and Old Willbriggie Road (known as Hanwood Farms 1, 2 and 3) from 2013-2022. The subject site falls within land release from 2022 – 2030.

The *Griffith Housing Strategy 2019* (The Strategy) was commissioned by Council to address housing affordability and equity issues in the LGA. The Strategy identified medium density housing and smaller lot housing to be more affordable and offer more housing choice. Medium density housing is not prevalent in Griffith, consisting of less than 15% of all dwellings over the past ten years.

By providing a diverse range of lot sizes, the Leonard Road Release Area supports housing affordability and choice through the delivery of more affordable dwellings on smaller lots, which are in short supply in Griffith.

Population, Forecasts and Dwellings

The NSW Department of Planning and Environment (DPE) forecast the Griffith LGA population to be 31,641 by 2041, an increase of 4,568 residents from the 2021 population of 27,073. Over the five years from 2021-2026, DPE forecast the Griffith LGA increase by 0.43%, then more than doubling (0.9%) for each five-year period from 2026 to 2041. See *Figure 02*.

Council's independently modelled population and dwelling forecasts (Forecast.id) has the population increasing by 3,675 from 27,199 in 2021 to 30,874 by 2041. While these forecasts are 767 lower than DPE by 2041, they include high levels of growth from 2021 to 2026 (0.8%) with the rate of growth then slowing to around 0.5% between 2026 and 2041. These forecasts have the growth occurring in the short to medium term and slowing in the longer term, which is significantly different to the state projections. To support the upfront growth would require significant additional dwellings in the short to medium term.

In addition to this is the added complexity of seasonal itinerant workers, common to these regional areas where employment is offered for instance fruit picking and seasonal manufacturing. The population figures above relate to 'residential' population only, as such a large influx of seasonal workers can add to the demand for housing. Any such demand would be in addition to what has been identified as part of this report.

Figure 02 DPE and Forecast.id Population Projections

	2021	2026	2031	2036	2041	2021-41
DPE Projection	**27,073**	**27,647**	**28,908**	**30,260**	**31,641**	**4,568**
Growth		0.43%	0.90%	0.90%	0.90%	0.67%
Change		574	1,261	1,352	1,381	
Forecast.id	**27,199**	**28,266**	**29,284**	**30,147**	**30,874**	**3,675**
Growth		0.80%	0.70%	0.60%	0.50%	0.54%
Change		1,067	1,018	863	727	
DPE vs Forecast.id	**-126**	**-619**	**-376**	**113**	**767**	**893**

The age structure in Griffith LGA is forecast to change with aging in place, with an increase in older working and retirement age residents which is in part due to existing residents moving through the age cycle. In line with broader national trends, the average household size (number of persons per dwelling) is expected to decrease as the population ages, and an increasing number of lone-person households. This requires the provision of more housing with implications for supply, accessibility and affordability of dwellings as older residents tend to live in smaller low maintenance dwellings.

REMPLAN has also modelled population and dwelling forecasts, with the 2041 population being comparable to Forecast.id, *Figure 03*. By 2041 the forecast population is very similar - growth of around 3,670 residents, however the implied demand for dwellings to support this population is different: Forecast.id supporting 1,600 dwellings and REMPLAN modelling 1,946 dwellings. Average household size is key, as fewer persons per household will require more dwellings to support the same population.

Figure 03 Forecast.id and REMPLAN Population and Dwelling Projections

	2021	2026	2031	2036	2041	2021-41
Forecast.id						
Population	27,199	28,266	29,284	30,147	30,874	3,675
Dwellings	**10,803**	**11,240**	**11,661**	**12,049**	**12,403**	**1,600**
Avg Household Size	2.67	2.66	2.65	2.63	2.61	
REMPLAN						
Population	27,195	27,878	28,938	29,927	30,857	3,662
Dwellings	**10,797**	**11,232**	**11,739**	**12,243**	**12,743**	**1,946**
Avg Household Size	2.66	2.64	2.62	2.59	2.57	-

Market Overview

The *Griffith Housing Strategy 2019* underpins Council housing strategy, it promotes more affordable solutions to meet housing demand that is proximate to employment, services, affordability, amenity and lifestyle, including areas that are located to the southern part of Griffith. The urban growth area of Hanwood is within close proximity to both the existing and emerging industrial employment areas and more accessible to the existing growth areas situated to the north.

The *Land Use Strategy* identified plans for the release of land on the southern side of Leonard Road between 2013 and 2022. This land was zoned for R1 for general residential uses in 2014, however two of three lots in the site are still actively being farmed in 2024. Only the furthest lot, known as Farm 3, has been developed in the medium-term, with a development application approved for development of large rural residential lots on 40% of the site. Based on this, there has been no supply, or any likely future supply of small residential lots identified in Hanwood for development, providing a key opportunity for the Leonard Road Release Area to provide diverse land size and housing options for the market.

At present the only available land consists of a number of smaller land releases to the Central Griffith and to the east at Collina. Encouraging and facilitating residential development in Hanwood will encourage population growth, will provide affordable housing options in an area with a growing number of young workers and families, and support a sense of connectivity in the community.

Implications – Audit of available land supply

The latest population figures demonstrate that Griffith is expected to undergo steady population growth through to 2046, primarily driven by natural change (where births outnumber deaths almost two to one). Additionally, there is a projected increase in older working-age and retirement-age population, partly due to residents advancing through different life stages. It is critical to align the future supply of dwellings with the evolving demographic profile of the population to ensure that housing meets the needs of its residents effectively.

The *Griffith Housing Strategy and Housing Pipeline Audit* has an estimated 2,846 lots earmarked for residential development across Griffith LGA, comprising 1,752 in Griffiths' urban centre and an additional 1,094 in rural areas. The Leonard Road Release Area falls within the urban centre of the Land Supply Schedule Urban Centre – Griffith LGA July 2024. *Figure 04* summarises the total number of lots, including the proposed development of 454 lots on the subject site.

Figure 04– Land Supply Schedule Urban Centre – Griffith LGA July 2024

Griffith	Short	Medium	Long	Total
Central	26	13	153	**192**
South	84	507	48	**639**
Collina	356	110	-	**467**
Hanwood (Subject Site)	-	-	454	**454**
Total (Urban)	**466**	**631**	**655**	**1,752**
Lake Wyangan	185	-	763	**948**
Yoogali	55	-	84	**139**
Yenda	7	-	-	**7**
Total (Rural)	**247**	**0**	**847**	**1,094**

At face value there appears a generous supply of available land, however land identified or zoned for development does not always translate into residential development, within the proposed timeframe due to constraints such as overlay issues or challenges with owners' intent. The presence of long-standing undeveloped parcels identified in the *Griffith Housing Strategy* is the biggest challenge identified for Griffith around development sequencing, necessitating resolutions to meet housing demand.

Housing Affordability

Since 2015 housing affordability in Griffiths urban centre has consistently declined, from 81.3% of all dwellings, to only 29.2% in 2022. This has decreased even further for those on lower incomes to around 15%. In contrast, the proportion of affordable rentals has remained relatively consistent between 2015 and 2022. Conversely, this limits availability and turnover of rented dwellings.

There has been a 14% increase in the number of rented dwellings since 2016 as affordability continues to fall. This suggests a demand for affordable dwelling options with the rental vacancy rate now less than 1%. This figure has been consistent with the vacancy rate below 3% since 2010. This combined with lower housing stock has resulted in higher house prices.

Sensitivity Assessment

As a general guideline, a key planning objective of Councils across Australia is to maintain a land supply pipeline that supports 25-30 years of strategic planning and development. This includes having 5-10 years of land supply either ready for market or in the process of being approved, zoned, or identified as probable for development. Additionally, there should be an extra 10-15 years of land supply that is zoned, has a development application, or has proposed intent to develop.

Three scenarios with different annual lot take-up rates have been modelled below to estimate sensitivity of supply based on varying levels of demand in Griffith LGA.

- **Low Scenario:** 76 dwellings per year from 2021 to meet 12,711 dwellings by 2046 (Forecast.id)
- **Medium Scenario:** 98 dwellings per year from 2021 to meet 13,238 dwellings by 2046 (REMPLAN)
- **High Scenario:** 130 dwellings per year from 2021 to 14,160 dwellings by 2041 (NSW DPE)

The number of residential building approvals has fluctuated over the ten-year period, despite this it is evident that the overall trend of dwelling approvals is increasing steadily over time. Over the past 5 years, the average number of building approvals has been 121 per year, notably higher than the 10-year average of 94 dwelling per year.

Based on ABS dwelling approvals and building completions, the average conversion rate between 2013 and 2023 in Australia was 54.9% and 43.7% for NSW. This lower State average demonstrates an even more restricted dwelling supply.

Based on a conversion rate of 54.9%, the 5-year average of 121 approvals would equate to **66** additional dwellings being completed per year. This highlights the shortfall between approvals and completed dwellings, regardless of which of the dwelling demand scenarios is modelled, underlining the challenge of delivering actual housing supply in Griffith and emphasizing the need to meet housing demand effectively.

The *Griffith Housing Strategy* and *Housing Pipeline Audit* has identified significant supply of land parcels in the pipeline; however, Council has more recently acknowledged (in 2023) that not all lots identified in the supply estimates will be brought to the market due to land banking or the use of the land for other purposes including agriculture[1].

Based on the sensitivity assessment, including the subject site:

- If all parcels are developed and converted into dwellings, there is estimated to be between 21.9 and 37.3 years of supply across Griffith LGA. However, the likelihood of all parcels being developed unlikely.
- *If 80% of parcels are developed and converted into dwellings, there is between 17.5 and 29.9 years supply.*
- *If 50% of parcels are developed and converted into dwellings, there is between 10.9 and 18.7 years supply.*

If the Leonard Road Land Release is not developed using the **medium** scenario this results in **6 years supply**.

Conclusion

The actual level of growth that has been experienced over the last 10 years compared to what is projected for the next 25 years to 2046 has implications for Council being able to support a continued rate of growth into the future.

Population forecasts is relatively comparable across the State and Council's independent forecasts, however where it differs is an underestimate of actual dwellings, primarily relating to the level of dwelling conversions. This results in approximately **66** new dwellings per year, not the 121 dwellings approved on average over the past five years, resulting in **an under supply of dwellings** which results in a limited supply of housing.

The Griffith LGA has a demonstrated market and demographic driven demand for stock where 80% of sales have been on lots over 700 m^2 over the past ten years. A supply constrained market for product that is in demand by future residents can lead to supply and demand pressures, generally translating to increased prices and significantly impact of housing affordability. Over the past ten years affordability has dropped to less than 30% of all houses. While there is a large supply pipeline in Griffith, based on the lots greater than 700 m^2, the requirement to supply small to medium sized lots, which are more affordable is significantly limited.

This approach does not support a seamless supply of land to meet market demand for smaller more affordable lots and drives up prices and otherwise restricts available land. This has contributed to an evident lack of affordability and choice in the market demonstrated through the limited supply of housing choice and land currently on the market, particularly over the past five years.

Our professional view is Council should be aiming for solid growth of both housing choice through the provision of development fronts that can provide a choice of lot sizes, deliver appropriate housing product to suit future lifestyle and demographic needs. The release of new residential land, close to employment, education, open space and community services is now required to support further economic growth and promote housing affordability and choice.

[1] *Sourced from Griffith City Council Ordinary Meeting Business Paper 11 July 2023, pg.10*

Therefore, a change of zoning and sequencing of land is imperative to support future growth and provide both housing choice and more affordable housing options. The Leonard Road Release Area is considered appropriate to support the next wave of population growth and development in Griffith.

1 Project Overview

This report was commissioned by Stimson Advisory in July 2024, to undertake a needs and demand assessment to support the rezoning and residential development of the Leonard Road subject site located in Hanwood NSW. This report follows analysis from a previously commissioned opportunities assessment.

The needs and demand assessment provides an independent assessment of the supply and demand for residential land in Hanwood NSW, and more broadly Griffith LGA. The report includes:

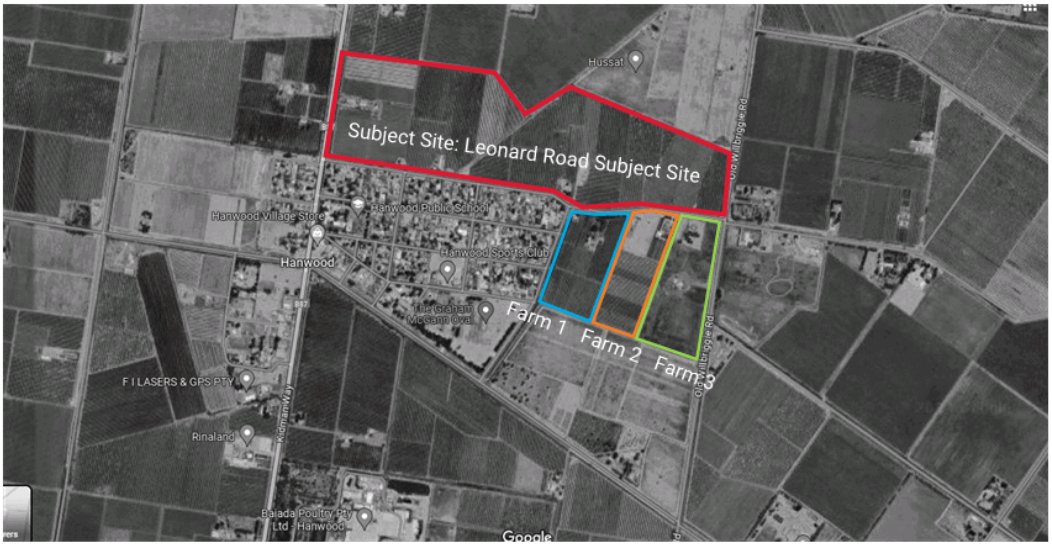
- **Demand assessment** – provides analysis of projected demand to support future population growth, market conditions which provide insights into how the residential market has been performing, and population and dwelling forecasts to 2046.
- **Supply assessment** – explores the size and depth of the residential market, identifying existing and potential land supply (existing, planned and proposed) for residential development.
- **Assessment of need** – provides an assessment of land supply, lot yields, demand and the need for the rezoning of the Leonard Road subject site to support population growth, and development of affordable and diverse housing in Hanwood and Griffith LGA.
- **Demographic overview** – provides an overview of demographics of Griffith LGA and the broader Riverina Murray region, and how this has changed between 2016 and 2021. This analysis can be found in Appendix A.

1.1 Project Background

Site Location

The subject area is referred to as the 'Leonard Road Subject Site' which adjoins the village of Hanwood on its northern side, see (Figure 1-1). The subject area incorporates three allotments including 11300 Kidman Way, 43 Leonard Road and 51 Leonard Road. Located just south of the Griffith central business district, the Leonard Road subject site is a natural extension of the existing residential area of Hanwood.

Figure 1-1 Leonard Road Subject Site



The Leonard Road subject site is located approximately 5 km (7-minute drive) south of the heart of Griffith's central business district which is home to key population serving businesses and infrastructure. The presence of the Charles Sturt University (Griffith), local schools (primary and secondary) and healthcare is critical to attract families and those in the retirement phase of life. In close proximity to the subject site Hanwood Public School (prep-year 6) and sporting facilities, along with Griffith Public School, Griffith High School, Marian Catholic College, Griffith Base Hospital, multiple age care services and facilities, retirement villages and early childcare centres just a short drive north in Griffith.

The subject site is proposed to contain a mix of small, medium and standard sized lots, medium density residential, local commercial shopping and a portion of larger commercial land. It will be landscaped to support local ecology, with the integration of flood mitigation. This report relates to the residential component of the project only.

Local Area and Surrounds

Griffith is a vibrant and culturally diverse city located approximately 570 kilometres west of Sydney and 360 kilometres north-west of Canberra. Griffith forms part of the Riverina Murray region in New South Wales along with nineteen other local government areas. The region is commonly referred to as the food bowl of Australia, comprising rich and productive agriculture land, with production of wine grapes, citrus fruits, and rice. Griffith is also located within the heart of the Murrumbidgee Irrigation Area (MIA), which is one of Australia's most productive agricultural regions. Griffith' role in the MIA is integral to the region's agricultural productivity, water management, research and innovation, and overall economic vitality.

In 2021, approximately 70.0% of residents in Griffith LGA lived in the central area of Griffith, while 2.4% resided in Hanwood just south of the Griffith central business district. The rest of the LGA is sparsely settled and includes several smaller townships that offer rural living and farming including Yenda, Yoogali, and Bilbul.

Griffith is a key population and employment centre for the surrounding region and is supported by industries such as manufacturing, agriculture, health care and construction. Griffith also boasts a dynamic multicultural landscape, characterised by prominent Italian, Sikh, Afghan, and Pacific Islander communities, making the municipality an attractive destination for migrants seeking a welcoming and inclusive environment.

Griffith is accessible via daily rail and coach services to Sydney and Canberra, via NSW Trainlink. Griffith is also connected to several highway networks, which play an important role in facilitating the movement of goods, services, and people to and from Griffith, enhancing its connectivity with neighbouring regions and contributing to the city's prosperity. These include Kidman Way, which connects Griffith to northern Victoria, the Newell Highway, which is a significant north-south route which is a major link between Queensland and Victoria, and Sturt Highway which crosses the Murray River, passes through Griffith, and connects to Wagga Wagga.

1.2 Proposed Development

The proposed development creates an alternative for the market, and brings contemporary, diverse and affordable housing product within short commuting distance of Griffith.

The site is ideally located adjacent to the village of Hanwood and benefits from a 'blank canvas' meaning that the lot layout will be designed in such a way to support the community's aspirations and needs. With agile workforce, changing population structures and climate condition, the creation of high quality, resilient and liveable communities are achievable through well thought through design that is well located to employment, education, sporting and green spaces.

The proposed approximate 415 lots bring a new mixture of lots less than 400m^2, between 400 m^2 and 700 m^2, with some larger traditional lots greater than 700 m^2. This is not currently offered in approved subdivisions in Griffith and unlikely to be retrofitted to existing staged development. To date the existing market has not been presented such choice to support housing diversity.

The mixture of lot sizes will be included in each stage of the development. Stages are expected to consist of 50 lots at a time, to meet market demand. It is expected that demand will be higher for the smaller lots, as they are not offered elsewhere, with 31 percent of lots being less than 400 m^2, 57 percent between 400 m^2 and 700 m^2 and 11 percent at approximately 700 m^2 or greater. The overall mixture will vary depending on the staging and market demand; however, it is important to note that within each stage there is expected to be a mixture of lot sizes to promote both housing choice and affordability.

The initial stage is expected to commence at Kidman Way and progress east towards Old Willbriggie Road. The rationale for this approach is that the existing infrastructure is concentrated along Kidman Way, minimising Council's need to fund any new infrastructure upgrades and trunk main extensions for water and sewer line. These costs would be borne by the developer and the extension of all necessary services thereby reducing potential financial strain on Council.

The design also takes into account the effective management of floodwaters and mitigates issues for the rest of Hanwood, with effective drainage management as an integral part of the design.

Overall, the proposed development creates a new market segment and presents an environmentally responsible, affordable housing option for the Griffith residential market

1.3 Implications

The Leonard Road Release Area is situated adjacent to the village of Hanwood and within close proximity to Griffith. It would provide easy access to employment, education, health facilities, sporting and open space. In addition to this, there are good transport links, both at a local level and further afield. The subject site would consist of approximately 415 lots or some 455 dwellings easily serviced with existing infrastructure and at no cost to Council.

To date there have been on average only 7% of small lots (< 400 m^2) created in the Griffith LGA, creating less choice in smaller more affordable and accessible housing. The Leonard Road Release Area offers a range of small and medium lots, with 31% or approximately 130 lots with a land size of less than 400 m^2, 57% or approximately 238 lots with sizes varying between 400 m^2 and 700 m^2 with the balance of approximately 47 lots with an area over 700 m^2.

The provision of smaller lots will provide much needed small and medium sized lots to address the need for more affordable housing options, particularly benefiting first home buyers and older persons. Additionally, it will cater to the growing number of smaller households as the population ages, providing suitable choices for 'empty nesters' and those looking to downsize. This is necessary to address demand for the changing population with a diverse range of lot sizes to meet the community's evolving needs.

There is existing strategic and Development Assessment policy, both at a state and local government level, supporting good planning and the provision of both infrastructure and housing, it is just not being implemented on the ground. Land which has been approved, in some cases to the subdivisional level, that dates back to the early 1990s is still being actively farmed. This indicates a failure in the application of planning policy, it reflects the intention of existing landowners.

Further to this is the time lag of developing approval land into 'on the ground' lots that can be sold and built on. Traditionally the time it takes to create new lots to bring to the market land, already with approval, can range in the vicinity of 18 months. This creates a 'lag' in the development pipeline, impacts on housing choice and affordability. Sometimes this is intentional and deliberately releasing land haphazardly can manipulate the market in the favour of the developer and increase prices.

The Leonard Road Land Release is expected to be stages at around 50 lots, with a mix of lot sizes offered to the market at each stage. The benefit of this approach leads to delivery of land in a seamless manner and creates a delivery pipeline that can react to market demand in a timely manner.

The master planned community can be seamlessly integrated with Hanwood and central Griffith and offers lots that are an innovative design and meet a missing market segment. This will enable Council to fulfill the *Griffith Housing Strategy* in relation to housing choice and affordability. This is explored further in the next section.

2 Planning and Strategic Documents

2.1 Griffith Housing Strategy

This study was commission by Council and adopted on 26 November 2019 as a result of Council's initiative to deal with both housing affordability and equity issues in the Griffith local government area. It is partly in response to work undertaken at a regional level and mostly in response to the evident decline in affordable housing choice.

The *Griffith Housing Strategy* is predicated on *"the biggest housing affordability issue facing Griffith in the large and increasing number of very low-income renting households in housing stress, and the general inability of the housing market to provide for such households"*.

The challenge that is clearly identified is ensuring there is sufficient supply of smaller, well-located dwellings to meet the projected need. Griffith's housing market is dominated by a static number of medium density housing, made up of flats and units and it are those types of dwellings that primarily could cater for the less advantage and lower income workers and pensioners.

The *Griffith Housing Strategy* concludes that there is a real need for smaller lot housing, based on continuing trends in housing construction in Griffith. This policy perspective by Council seeks to address both intervention and non-intervention of the housing market yet concludes that a 'market driven' approach (that is approval of smaller lots) is all that can reasonably be relied upon given the current policy regime available to Council.

It acknowledged that Griffith required 1,744 dwelling units to 2036 to satisfy the expected growth pressures of a population increase of 0.73%. Since this study was done the State government has revised their population growth projections to be 0.9%. This is now higher than this and even with the consideration of Council's own forecast by Forecast id sitting below the state government's figure at 0.6% more population is expected by 2036 and beyond. This report demonstrates that the realistic land supply under delivers and may not meet the 1,744 dwellings originally determined in the *Griffith Housing Strategy* and beyond.

The challenge that has clearly been identified here is ensuring there is sufficient supply of smaller, well-located dwellings to meet the projected need. Griffith's housing market has traditionally been larger detached houses, not a mixture of flats and smaller unit complexes, such as town houses that only form a static number of medium density housing. It is these types of dwellings that could primarily cater for the less advantaged and lower income workers and pensioners. There has been little growth in this segment of housing as the single level four-bedroom detached house dominates the housing industry with greater than 80% of all dwellings year on year making up the housing stock.

The Strategy based on a projected growth rate of around 0.7%, equates to approximately 1,744 new dwellings by 2036. Based on the projected demographic trends outlined by the Strategy, an increase in retirees and young professionals would result in 929 dwellings required for smaller households (one and two people) and 585 dwellings for larger family households. This expected demand for such housing mix has not changed and is supported throughout this report.

2.2 Riverina Murray Regional Plan 2041

This plan is the outcome of NSW Government work with councils, stakeholders and the community to achieve priority actions. This plan updates the *Riverina Murray Regional Plan 2036*, which provided the NSW Government's vision for land uses in the Riverina Murray region.

Figure 2-1 Riverina Murray Regional LGAs

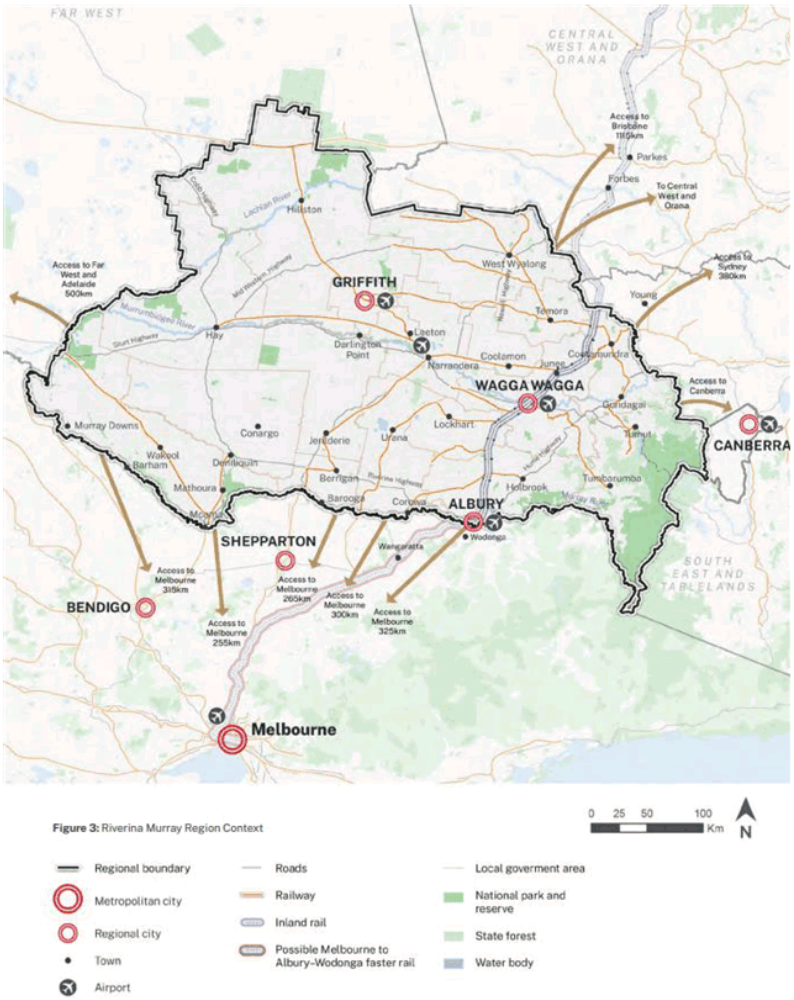
The updated regional plan is a 20-year land use plan, with a targeted delivery focus on the next 5 years. It was prepared under the *Environmental Planning and Assessment Act 1979* and applies to the 20 LGAs that make up the region, of which Griffith is one. Since the release of this plan, amendments to planning legislation have elevated the importance of strategic planning at a regional level and local level in managing population growth and change.

The plan covers all facets of land use planning, including the natural environment, future hazards, housing and related infrastructure, industry, employment areas and town centres.

The vision for the region to 2041 will be implemented through objectives, strategies and actions for the three sections of the plan consisting of the environment, communities and places and the economy.

The subject site meets all aspects of the plan, in that it is located adjacent to the township of Hanwood, with minimal environmental impact, creates a sense of place and therefore community whilst providing affordable housing for a growing population. With more than 50% of the region's population spread between Albury, Wagga Wagga and Grifith, a growing population requires not just more housing, but a greater choice in housing to accommodate older people, smaller households, seasonal and temporary workers and tourists. Griffith is expected to continue to accommodate a larger proportion of the regional growth over the next 20 years.

Figure 2-2 Three key growth areas Riverina Murray Region



2.3 Griffith Local Strategic Planning Statement 2020

The *Griffith Local Strategic Planning Statement* (LSPS) September 2020 provides the land use planning vision for Griffith over the next 25 years. It highlights the characteristics that make Griffith special and outlines how the growth and change will be managed into the future.

The LSPS identifies the strategic planning work, the studies, strategies and plans which need to be completed to inform robust planning controls to ensure they protect and enhance the values and characteristics of the community. There are four themes which the LSPS adopts consisting of:

- Growing our city
- Valuing our environment
- Connectivity
- Love the lifestyle

Importantly these align closely with the *Riverina Murray Regional Plan* goals covered in the above section.

The principles behind the LSPS are:

Trust – we will ensure decisions are based on clear evidence and information. Through this process Council will be answerable to the communities and the people of Griffith.

Liveable – we will take care that our community's growth is ecologically sustainable to provide for future generations.

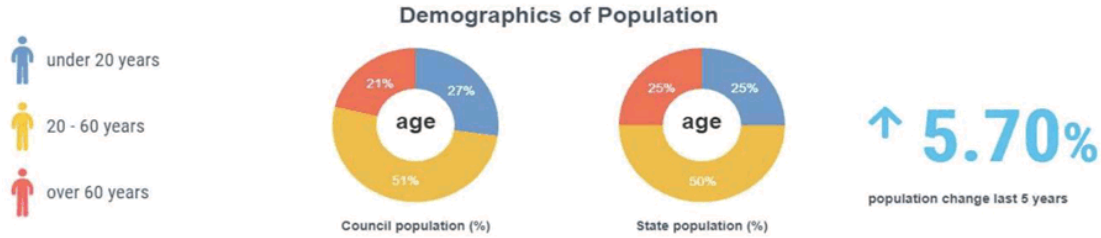
Fairness – we will ensure that services delivered to our community are appropriate, relevant and accessible.

Collaborative – we will actively involvement the people of Griffith to contribute to the planning the suture of Griffith.

Partnership – we will work together with the community and other partners in business and government to achieve our vision for Griffith.

The LSPS identifies Griffith as the regional centre of Western Riverina. This is supported by sound transport infrastructure and a diverse skills base drawn from a population that continues to grow. The demographics support a youthful and culturally diverse population which in turn supports a healthy retail and service sector.

Figure 2-3 Extract of Demographic Griffith Local Strategic Planning Strategy



The LSPS sits within a framework of strategic and other plans and is mainly informed by the *Community Services Plan* and the *Riverina Murray Regional Plan*.

Griffith is identified as a regional centre in the Regional Plan. As a regional centre, the Regional Plan suggests Griffith will accommodate growth over the next 20 years and that *"investment in major services, facilities and industrial activity will distribute the benefits of growth across all centres in the region"*

Griffith serves as the focal point for population and housing growth on the west of the region. It provides higher-order services including for business, office and retail uses, arts, culture, and recreation and entertainment.

Griffith has been identified with several priorities:

- Development of freight hubs
- Establishment of health precincts
- Promotion of education precincts
- Protection of the airport from encroachment of incompatible development
- To play a significant role in catering for housing demand, including providing for higher-density development to take advantage of existing services

Development of the subject site at Hanwood is in accordance with the plan's policy.

2.4 *Griffith Land Use Strategy* 'Beyond 2030' (LUS)

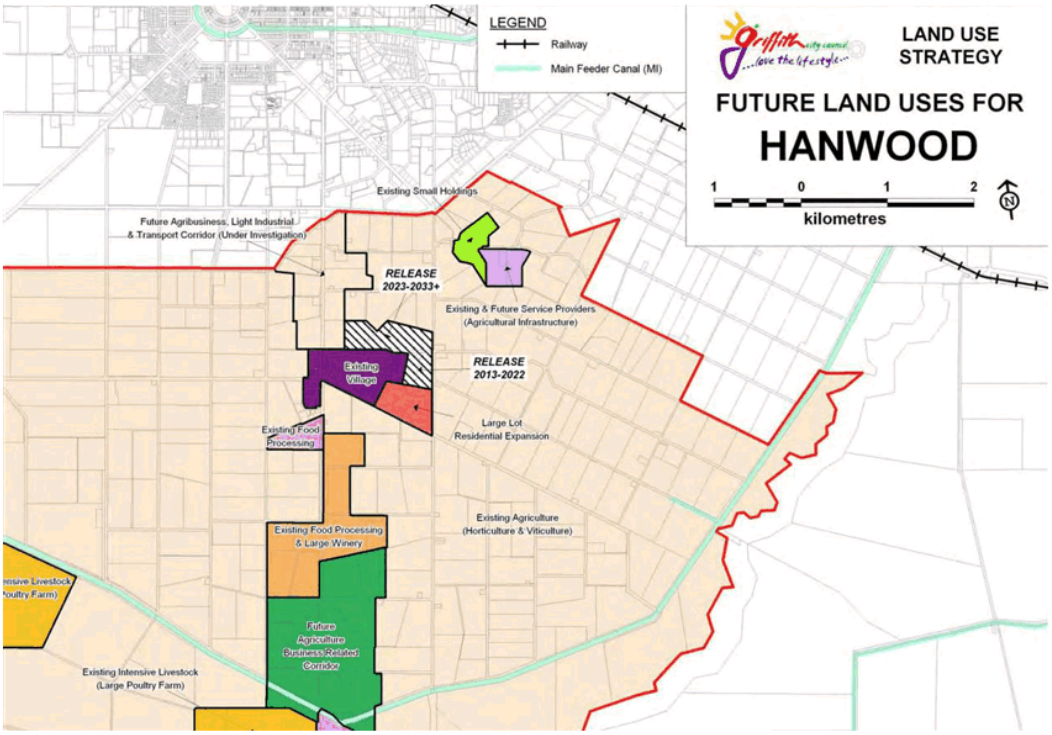
Commencing in 2007 Griffith Council embarked on a corporate process to establish a clear framework of achievable goals. The themes that encapsulated this vision was captured in 'Growing Griffith Beyond 2030'. One outcome was an Integrated Development Strategy. The Griffith Land Use Strategy incorporated information from sources such as GIS, ABS statistical data, field investigations.

The aspects investigated were

- Overview of Griffith and beyond
- Demographic Profile
- Population Growth Estimates
- Development Trends
- Subdivision
- Development Value
- Transport Networks
- Infrastructure
- Community Facilities
- Economy

The timeline for this strategy was in excess of 20 years. Figure 2.4 below shows Hanwood Village and identifies the subject site to the north as a land release area from 2023-2033.

Figure 2-4 Griffith Land Use Strategy - Hanwood



The Strategy was comprehensive in that it investigated the following:

- Flood prone land
- Fragmented urban form and land use interface
- Infrastructure limitations
- Environmental lands
- Bushfire prone land
- Topography
- Other constraints such as irrigation channels, salinity etc.

At the time there were two average lot sizes determined to be suitable for development. Urban lots (including villages) at around 750 m^2 and larger lots, commonly known as 'rural residential' at 3,000 m^2.

The Strategy provided balanced opportunities for the urban expansion, not just limited to urban Griffith, but also at the three villages of Lake Wyangan, Hanwood and Yenda. These were deemed suitable for future growth.

The village of Hanwood had a consistent land use pattern and with increased economic activity at wineries and food processing activities it was expected that demand would shift to this area. Any future growth was limited to the sites identified, of which the subject site forms part of, being north of the village. The sequencing of this was from 2023 onwards. To date the land identified as to be developed between 2013 – 2022 has only been developed in part, thereby not fulfilling the outcomes sought by this Strategy.

2.5 Implications

The Leonard Road Release Area has been identified for urban expansion in the *Griffith Land Use Strategy (Beyond 2030)* since 2012, when Council embarked on a process to establish a clear framework to achieve their goals through an Integrated Development Strategy. The subject site was identified as a release area for residential development between 2023 – 2033. This was to be preceded by land immediately adjacent and to the south of Hanwood, with an identified release timeframe between 2013 – 2022. The development of that area, known as 'Farms 1,2 & 3' has not eventuated as planned, with some large-scale residential lots at the far perimeter, with the remainer under agricultural production.

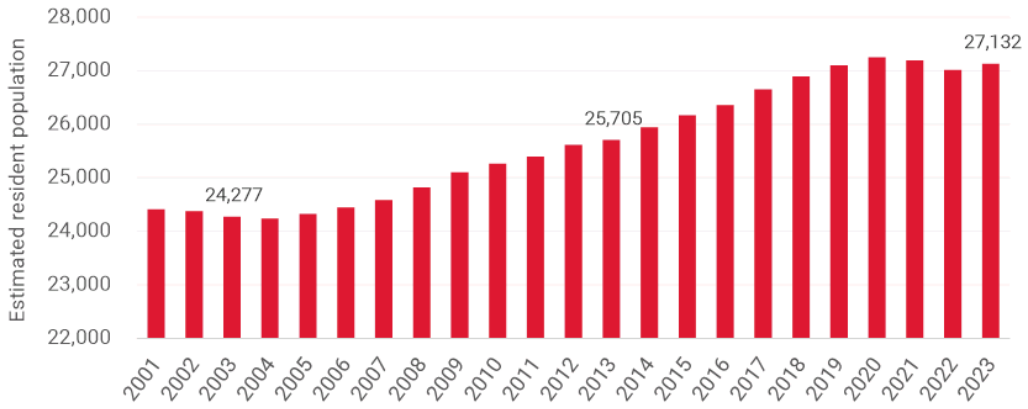
Council's strategic frame supports the development of the subject site and has embarked on developing a master plan of the Hanwood area which is yet to be released. It is understood that the subject site forms the third and last part of this master plan. The subject site already being identified for residential land release in the near future and the non-residential uses that prevail on 'stages 1 & 2' warrants a closer look at how the Council's master plan can be sequenced in the Hanwood area.

3 Population Overview and Forecasts

3.1 Population

In 2023, the Estimated Resident Population (ERP) of Griffith LGA was 27,132. This was an increase of approximately 0.5% (117 residents) on the previous year (27,015) and an uplift of the population decline over the past two years following the peak in 2020 of 27,249 residents.

Figure 3-1 Estimated Resident Population, Griffith LGA, 2001 - 2023



Source: ABS regional population

Figure 3-1 illustrates annual population estimates since 2001. During this period, the population of Griffith LGA increased by 2,720 residents, representing an average annual growth rate of 0.5%.

Strong population growth in Griffith LGA between 2013 and 2020 was primarily driven by a higher natural increase, with more births than deaths. However, by 2020-21 and 2021-22, the region saw a slight population decline due to reduced net migration caused by COVID border closures and restrictions. More recently, in 2022-23, the population grew by 117 residents, driven primarily by a natural increase (+172), despite net migration loss (-55).

Figure 3-2 Components of population change, 2018 to 2023

Year	Natural Increase	Net Internal Migration	Net Overseas Migration	ERP	Change
2018	220	-305	314	26,896	-
2019	193	-286	289	27,102	206
2020	190	-225	198	27,249	147
2021	200	-321	118	27,195	-54
2022	213	-616	223	27,015	-180
2023	172	-465	410	27,132	117

3.2 Population Forecasts

State Population Projections (NSW Department of Planning and Environment)

The New South Wales Department of Planning and Environment (NSW DPE) released their latest population projections in 2022:

- The Griffith LGA population is forecast to reach 31,641 residents by 2041.
- An increase of 4,568 residents is expected between 2021 and 2041 (compared to an increase of 2,720 residents between 2001 and 2023).
- Griffith LGA is projected to experience greater annual population growth through to 2041 compared to the last 20 years (0.8% compared to 0.5%).
- The median age of residents in Griffith is projected to increase from 36.4 years in 2021 to 38.7 in 2041, with a 46% increase (+2,111) in residents over 65 years.

Figure 3-3 NSW DPE population and dwelling projections

	2021	2026	2031	2036	2041	2021-41
Population Projection	**27,073**	**27,647**	**28,908**	**30,260**	**31,641**	**4,568**
Population Growth		0.43%	0.90%	0.90%	0.90%	0.67%
Population Change		574	1,261	1,352	1,381	-
Dwellings	**11,559**	**11,994**	**12,713**	**13,456**	**14,160**	**2,600**
Dwelling Growth		0.74%	1.17%	1.14%	1.03%	4.90%
Dwelling Change		435	719	743	704	-
Average Household Size	**2.56**	**2.52**	**2.49**	**2.46**	**2.44**	**-0.12**

To support population growth of an additional 4,568 residents between 2021 and 2041, NSW DPE expects Griffith LGA will require an additional 2,600 dwellings by 2041. This equates to approximately 130 dwellings per year. Concurrently, the average household size in Griffith LGA is projected to fall slightly, which is reflective of an ageing population where there are a higher number of lone person households and couple families with no children.

It's important to note that the NSW DPE projections do not necessarily reflect local market churn, which although difficult to predict, is when households move from one dwelling to another to meet their needs. A common example of this in regional areas is for residents to 'downsize' from a larger dwelling to a smaller low maintenance dwelling, which is common amongst regions with a proportion of residents ageing in place.

Council Independent Population Forecast (Forecast.id)

Analysis of Forecast.id population forecasts (2024) for the Griffith LGA provide further insight into the projected rate of population growth in the region through to 2046. See Figure 3-4.

By 2041, Forecast.id has forecast that the population in Griffith LGA will reach 30,874 residents, which is 767 residents lower than the NSW DPE projection of 31,641 by 2041. The population forecast by Forecast.id follows a trend of decreasing annual growth over the next 20 years, with annual population growth decreasing from 0.80% in 2021 to 0.50% by 2041.

Figure 3-4 Forecast.id population forecast

Population	2021	2026	2031	2036	2041	Change 2021-41	2046
DPE Projection	**27,073**	**27,647**	**28,908**	**30,260**	**31,641**	**4,568**	-
Growth		0.43%	0.90%	0.90%	0.90%	0.67%	-
Change		574	1,261	1,352	1,381	-	-
Forecast.id Forecast	**27,199**	**28,266**	**29,284**	**30,147**	**30,874**	**3,675**	**31,420**
Growth		0.80%	0.70%	0.60%	0.50%	0.54%	0.40%
Change		1,067	1,018	863	727	-	546
Difference DPE vs Forecast.id	**-126**	**-619**	**-376**	**113**	**767**	**893**	

The following highlights the differences between NSW DPE population projections and Forecast.id population forecasts for Griffith LGA:

- The Forecast.id forecasts are conservative, projecting an annual growth rate of 0.54% between 2021 and 2041, lower than the 0.67% estimated by NSW DPE.
- Between 2001 and 2021, the population of Griffith LGA increased by **2,783** residents.
- Forecast.id forecasts Griffith's population will increase by **3,675** between 2021 and 2041.
- NSW DPE project Griffith's population will increase by **4,568** between 2021 and 2041.

When analysing the Forecast.id population forecast through to 2046, Griffith's population is expected to reach 31,420 residents, of which 75.4% are expected to reside in Griffith's urban centre. To support population growth of 4,221 residents, Forecast.id estimate an additional **1,906 dwellings** will be required to support the growing population by 2046.

It is important to note that Forecast.id forecasts an increase of just 23 residents in the Hanwood – Tharbogang & District area between 2021 and 2046, equating to a 1.0% population increase over the 20-year period. Additionally, Forecast.id did not identify any development potential within the Hanwood area not taking into account Council's current work on master plans for Hanwood including stage 1 and 2 (knowns as Farms 1,2 & 3), plus the subject site (stage 3).

This projection by Forecast.id does not align with future growth expectations, given that Hanwood has several residential development sites identified in the ***Griffith Land Use Strategy 'Beyond 2030'*** (LUS). Future residential development would result in additional population in Hanwood.

The Griffith LUS, drafted in 2012, promotes balanced urban expansion by extending development to neighbouring villages, including Lake Wyangan, Hanwood and Yenda. For Hanwood, the strategy outlines a plan for land release on the southern side of Leonard Road, known as Hanwood farms 1, 2 and 3, to be developed between 2013 and 2022. The subject site falls within land release planned for 2022-2030.

Figure 3-5 Forecast id dwelling projections by small area

	2021		2046		Change 2021 -46	
Area	**Number**	**%**	**Number**	**%**	**Number**	**%**
Griffith (Central - South)	2,087	19.3	3,328	26.2	1,241	59.5
Griffith (East) - Collina	2,756	25.5	3,260	25.6	504	18.3
Griffith (North)	1,998	18.5	2,048	16.1	50	2.5
Griffith (West)	1,020	9.4	1,076	8.5	55	5.4
Hanwood - Tharbogang & District	**880**	**8.1**	**895**	**7.0**	**15**	**1.7**
Lake Wyangan - Nericon	429	4.0	436	3.4	7	1.6
Yenda - Beelbangera - Myall Park	854	7.9	869	6.8	14	1.7
Yoogali - Bilbul - Widgelli	779	7.2	799	6.3	20	2.6
Griffith City	**10,803**	**100**	**12,711**	**100**	**1,906**	**17.6**

Figure 3-5 highlights the variation in the number of dwellings projected by small area to support population growth. Notably, only an additional 15 dwellings are projected for the Hanwood-Tharbogang & District area, despite the identification of multiple development sites in the Griffith LUS. This discrepancy highlights that the projected dwelling increase does not fully capture the area's development potential as outlined in the Griffith LUS, which includes several residential sites earmarked for future growth.

REMPLAN Population Forecast

REMPLAN's population forecasts estimate growth of 4,610 residents in Griffith LGA by 2046. To accommodate this increase, an estimated 2,441 dwellings are required. While REMPLAN's population forecast is relatively aligned with that of Forecast.id, it is noteworthy that REMPLAN projects the need for 533 more dwellings than Forecast.id does. This discrepancy highlights REMPLAN's consideration for future household formation and age structure changes.

Figure 3-6 REMPLAN forecast vs. Forecast.id forecast, 2021 to 2046

	2021	2026	2031	2036	2041	2046	2021-46
REMPLAN							
Population	27,195	27,878	28,938	29,927	30,857	31,805	4,610
Dwellings	**10,797**	**11,232**	**11,739**	**12,243**	**12,743**	**13,238**	**2,441**
Avg Household Size	2.66	2.64	2.62	2.59	2.57	2.54	-
Forecast.id							
Population	27,199	28,266	29,284	30,147	30,874	31,420	4,221
Dwellings	**10,803**	**11,240**	**11,661**	**12,049**	**12,403**	**12,711**	**1,908**
Avg Household Size	2.67	2.66	2.65	2.63	2.61	2.59	-

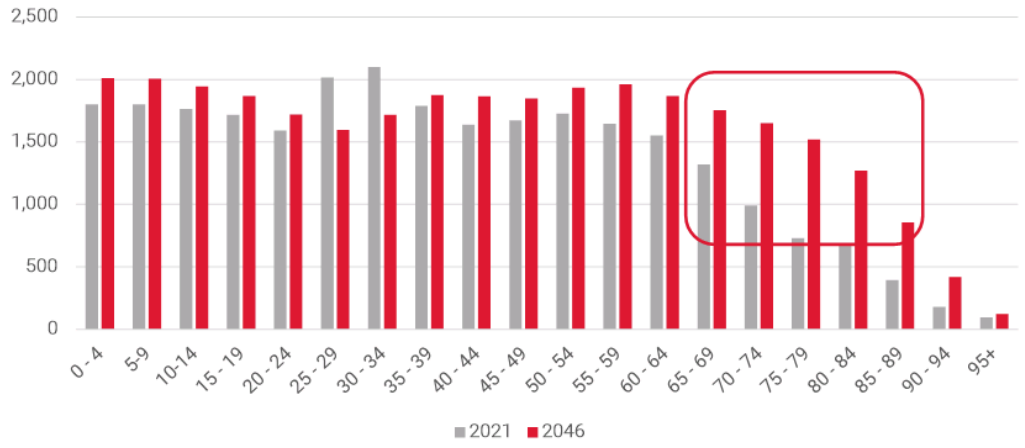
Relative to Forecast.id, REMPLAN's dwelling projections are higher and accounts for several key factors. Firstly, it anticipates smaller household sizes due to an ageing population, with more lone-person and couple-only households, increasing the overall demand for dwellings. Secondly, REMPLAN's analysis incorporates the impact of an ageing population on housing preferences, recognising a higher demand for smaller, low-maintenance homes suitable for older residents.

Additionally, REMPLAN considers the potential for greater market churn, where existing residents may more frequently to accommodate evolving needs, further driving the need for diverse housing options in Griffith LGA. This equates to demand for smaller household sizes in the future and would correspond with increased demand for housing from an ageing population. Understanding these nuances is crucial for projecting the number of dwellings required to house the future population in Griffith LGA. This is crucial for accurately projecting the number of dwellings required to support Griffith's future population growth and ensuring that housing meets the community's evolving needs.

The following chart illustrates the age structure of the population in Griffith LGA in 2021 and the forecasted age structure in 2046. Griffiths' population is expected to age, with the proportion of residents aged 70 years and over increasing from 11.3% of the total population in 2021 to an estimated 18.4% in 2046. This significant change is driven by residents moving through the life cycle and older individuals relocating to Griffith LGA from surrounding rural areas.

Given the ageing population in Griffith LGA, REMPLAN estimates the average household size will decrease from 2.66 persons per household in 2021 to 2.54 by 2046, therefore requiring more dwellings to support a similar population.

Figure 3-7 REMPLAN forecast by age



The forecasted age structure in Griffith is shaped by the current population ageing, births, deaths, and migration patterns, influenced by factors such as location, existing housing stock, and new residential developments. The proportion of young and school-aged children is expected to remain stable, maintaining the demand for housing near early years services and schools. Consequently, there will be an increased demand for affordable, family-suitable housing and low-maintenance dwellings for the ageing population, particularly in Griffith's urban centre.

3.3 Implications

Demographic shifts in the population of Griffith LGA play a pivotal role in shaping current and future housing demand as new and existing residents' needs and preferences evolve. Understanding these dynamics is essential for effective strategic planning and ensuring diverse housing requirements are met in Griffith LGA.

Griffith LGA's housing demand is unique compared to other regional cities, driven by its young working population, including many families with children and highly skilled young professionals. This has led to a lower median age, higher educational attainment, and increased median incomes, for some and at the same time a large influx of unskilled labourers. The region has also seen significant growth in residents over 65 years. Despite the increased median incomes for some, a considerable portion of the population still earn modest incomes, making them sensitive to housing costs and the rising cost of living. Ensuring accessible, affordable,

and diverse housing options is essential to support these cohorts and promote inclusive growth in Griffith LGA. Explore more demographic insights in *Appendix A - Demographic Overview*.

The differing population and housing projections by NSW DPE, Foecast.id and REMPLAN have significant implications for urban planning and infrastructure development in Griffith LGA. NSW DPE's projection of a 4,568-resident increase by 2041 necessitates an additional 2,600 dwellings, which equates to 130 dwellings per year. This substantial demand emphasises the need for proactive strategic planning to ensure sufficient housing and infrastructure are available to meet the needs of the growing population. REMPLAN's forecast of 4,610 new residents by 2046 and the requirement of 2,441 additional dwellings is conservative compared to the State projections but underscores the impact of an ageing population and market churn on housing demand, highlighting the need for smaller, low-maintenance and diverse housing options. Council's independent forecast by Forecast.id has identified a slightly lower population increase with an increase of 3,675 persons but much lower prediction of 1,600 dwellings.

Figure 3-8 NSW DPE projections, REMPLAN and Forecast.id forecast

	2021	2026	2031	2036	2041	2021-41	2046
DPE							
Population	27,073	27,647	28,908	30,260	31,641	4,568	-
Dwellings	**11,559**	**11,994**	**12,713**	**13,456**	**14,160**	**2,600**	-
Avg Household Size	2.56	2.56	2.56	2.56	2.56	-	-
REMPLAN							
Population	27,195	27,878	28,938	29,927	30,857	3,662	31,805
Dwellings	**10,797**	**11,232**	**11,739**	**12,243**	**12,743**	**1,946**	**13,238**
Avg Household Size	2.66	2.64	2.62	2.59	2.57	-	2.54
Forecast.id							
Population	27,199	28,266	29,284	30,147	30,874	3,675	31,420
Dwellings	**10,803**	**11,240**	**11,661**	**12,049**	**12,403**	**1,600**	**12,711**
Avg Household Size	2.67	2.66	2.65	2.63	2.61	-	2.59

REMPLAN's higher dwelling projection, accounting for 533 more dwellings than Forecast.id, emphasises the importance of considering demographic changes such as smaller household sizes (increased lone person and couple households) and increased demand from an ageing population. As the number of residents over 65 increases by 46% (NSW DPE), there will be heightened need for age-specific services and suitable housing options not currently being brought to the market.

4 Demand Assessment

4.1 Residential Market Analysis

The following section assesses residential market trends, and dwelling forecasts and the implications for residential demand for the region.

Sales and Median Price

House sales account for approximately 75% of total sales within the Griffith LGA, peaking at 396 sales in 2021. Since 2012, the market in Griffith has generally exhibited an upward trend, with slight contractions observed in 2019 (312 sales) and, more recently, in 2022 (314 sales).

Over the ten-year period, there has been minimal activity in unit and land sales across Griffith LGA, largely due to the limited availability of both compact dwellings and residential land in the region.

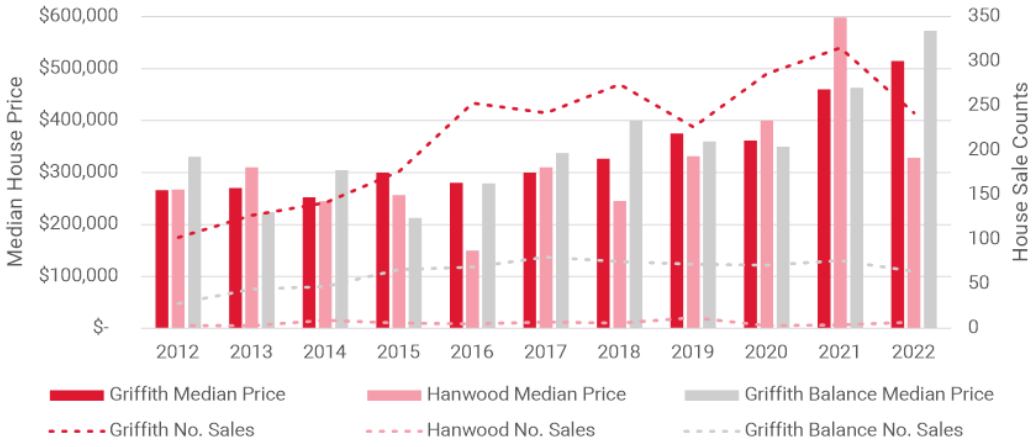
Figure 4-1 Median price by property type and sale counts, Griffith LGA, 2012 to 2022

In 2022, the median house price in Griffith LGA was $521,000, marking a 13% increase compared to the previous year. The median unit price also reached a ten-year peak of $403,500, nearly double the median price of $232,500 recorded in 2012. Both houses and units saw an average annual increase of 7.0% since 2012, reflecting growing demand for all types of housing in the region.

Land prices in Griffith LGA have increased since 2012, with the median price increasing from $98,000 in 2012 to $271,500 in 2022, representing an almost 180% increase in the median price of land in Griffith LGA. Land sales reached a peak of 87 in 2020 which was likely fuelled by the implementation of the NSW HomeBuilder grant which was introduced to support confidence in the construction sector and encourage construction of new homes, substantially renovate or purchase off-the-plan homes.

Sales in Griffith urban centre typically accounts for around 76% of total sales, while sales in Hanwood account for an average of 4% of total sales in the region. This is influenced by limited availability of land and dwellings, resulting in low annual turnover. Figure 4-2 below illustrates median prices and sale counts for separate houses in Griffith (urban centre), Hanwood village and Griffith Balance.

Figure 4-2 Median house prices and sale counts, Griffith, Hanwood and Griffith Balance, 2012 to 2022



Dwelling Sales by Lot Size

Between 2018 and 2022, the most common lot size sold in Griffith LGA 600-999m^2, accounting for around 56% of all sales. Dwellings sold on smaller lots (<600m^2) made up for less than 10% of total sales, primarily due to a limited supply of compact residential lots in the area. The proposed development of the subject site includes lots sized 200m^2-700m^2, combined with medium density dwellings, aligning with the categories that account for around 65% of market demand.

The *Griffith Housing Strategy* has been a policy document of Council since 2019, it promotes medium density development as the more affordable solution to meeting housing demand, yet there has been little to no increase in the type of medium density housing to support this policy.

The primary reason for this can been seen as two-fold, firstly the market had not supplied this type of medium density housing and secondly there has not been any significant provision of smaller lots which traditionally you can construct smaller more affordable housing. The provision of small lot housing, both less than 400 m^2 and between 400 m^2 and up to 700 m^2 introduces a whole new market segment, thereby assisting both housing choice and affordability. It is unlikely that there would be a significant increase in medium density development as historically it has remained subdued and from a financial aspect generally is not as common outside of larger urban environments.

Figure 4-3 Dwelling sales by lot size, Griffith LGA, 2018 to 2022

	2022		2021		2020		2019		2018	
	No.	% of sales	No.	% of sales	No.	% of sales	No.	% of sales	No.	% of sales
<600m2	19	6.1%	39	9.8%	34	9.4%	20	6.4%	24	6.7%
600-999m2	178	56.7%	222	56.1%	214	59.1%	179	57.4%	199	55.9%
1,000+m2	117	37.3%	135	34.1%	114	31.5%	113	36.2%	133	37.4%
Total	**314**	**100%**	**396**	**100%**	**362**	**100%**	**312**	**100%**	**356**	**100%**

4.2 Dwelling Demand

Dwelling Demand

To support REMPLAN's forecast population growth of 4,610 additional residents between 2021 and 2046, an additional 2,441 dwellings will be required within the Griffith LGA. This equates to approximately 98 dwelling per annum.

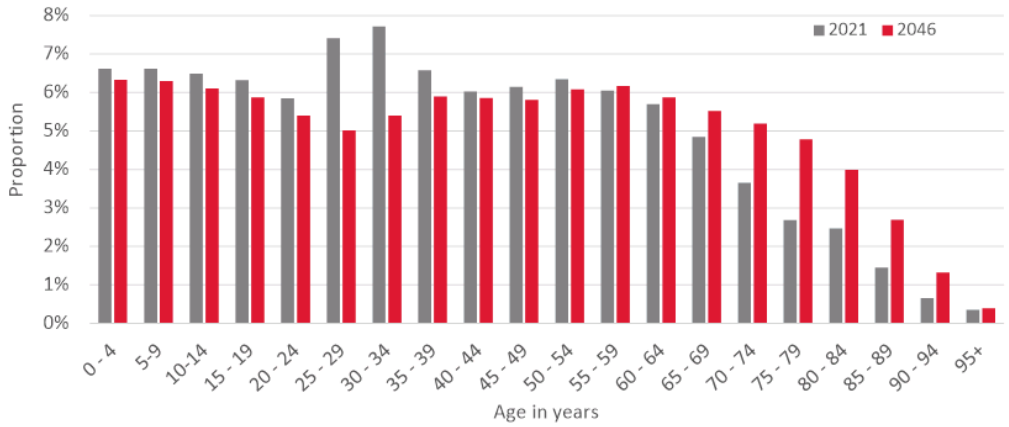
Figure 4-4 Population and dwelling forecast, Forecast.id and REMPLAN

	2021	2026	2031	2036	2041	2046	Change
Forecast.id Population	27,199	28,266	29,284	30,147	30,874	31,420	4,221
Forecast.id Dwellings	**10,803**	**11,240**	**11,661**	**12,049**	**12,403**	**12,711**	**1,908**
Forecast.id Avg Household Size	2.67	2.66	2.65	2.63	2.61	2.59	-
REMPLAN Population	27,195	27,878	28,938	29,927	30,857	31,805	4,610
REMPLAN Dwellings	**10,797**	**11,232**	**11,739**	**12,243**	**12,743**	**13,238**	**2,441**
REMPLAN Avg Household Size	2.66	2.64	2.62	2.59	2.57	2.54	-

Population and age structure

Figure 4-5 below shows the age structure of Griffith LGA at 2021, and the forecast age structure at 2046. The major change is the aging in place with the addition to the large increase in the proportion of persons aged 65 years and over. Between 2021 and 2031 the age structure forecast for Griffith indicates a 13.8% increase in population under working age, a 47.7% increase in population of retirement age and a 4.2% decrease in population of working age.

Figure 4-5 Forecast Age Structure Forecast.id



The demand for housing typologies as families move through the lifecycle will be reinforced by the demand of older residents who typically downsize to match their preferences. As a result, this will impact housing demand. This is because older persons typically reside in smaller households e.g., lone person, couple only households. They may prefer smaller dwellings which are maintenance free.

The forecast age groups of Griffith are a function of the current age of population (people aging each year, being born and dying) as well as the age of people migrating into and out of the area. This in turn is driven by location (fringe, city centre, regional and rural) the existing housing stock (separate dwelling, medium or high density), the amount and type of new residential development (wither existing stock or diversifying) and if an area in in a cycle of change.

Of note is the proportion of young and school age children remaining relatively stable over the forecast period which will impact the demand for housing proximate to early years services as well as primary and high schools. From a housing perspective, this should translate into increased demand for affordable and proximate housing that is suitable for family households. Similarly, the aging of the population will drive demand for more affordable and low maintenance dwelling, situated close to the centre.

Projected dwelling approvals

Between 2012-12 and 2022-23 here was an average of 94 dwelling approvals per year. The total number of dwelling approvals fluctuated over this period, reaching a peak of 164 in 2021-22 and a low of 16 in 2012-13.

There were 110 dwelling approvals in 2022-23, comprising 79 new houses and 31 'other' dwellings, which decreased by 54 approvals from the year prior. This is likely reflective of rising interest rates and decreasing affordability.

Dwelling approvals don't always result in new dwellings, and it is important to note that the average of 94 dwelling approvals per year falls short of the forecasted 98 dwellings needed annually to accommodate an increase of 4,610 new residents by 2046. This may raise concerns that, if current trends continue, the number of new dwellings will not adequately support future population growth.

Figure 4-6 Dwelling approvals, Griffith LGA, 2012-13 to 2022-23

	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
New Houses	13	57	78	76	82	62	102	87	95	123	79
New Other Residential	3	0	4	16	20	19	27	6	12	41	31
Total	16	57	82	92	102	81	129	93	107	164	110

4.3 Implications

Over the ten-year period, there has been minimal activity in unit and land sales across Griffith LGA, largely due to limited availability of both compact dwellings and residential land for the region. Taking a closer look at the existing Griffith housing market, there has been an average annual increase of 7.0% since 2012, reflecting growing demand for all types of housing in the region. Of significant note is the median price increase of land from $98,000 in 2012 to $271,500 in 2022, representing an almost 180% increase in the median price in Griffith LGA. The most common size of lots sold in Griffith falls within 600-999 m^2, accounting for around 56% of all sales, with dwellings sold on less than 600 m^2 making on average less than 6%, year on year.

Population forecast and dwelling demand are linked, with population expected to grow around 0.6% per annum, to a population of 31,420 according to Council's id Forecast, 31,805 for REMPLAN or 33,169 according to the NSW DPE projections by 2046. The difference in dwelling demand is highlighted best between the Forecast.id and REMPLAN's forecast relating to not population projections, which are roughly in accordance with each other, rather the number of dwellings required to meet the needs of the additional population.

The main difference is that which has been identified between Forefcast.id and REMPLAN, with additional dwellings required estimated at either 1,908 or 2,441 respectively, a difference of 533 dwellings.

At present with an annual approval rate over a 10-year period with an average of 94 dwellings, there is need for further review of the supply. Considering the difference identified above, this has further implications for supply, and this is examined in the next section of the report.

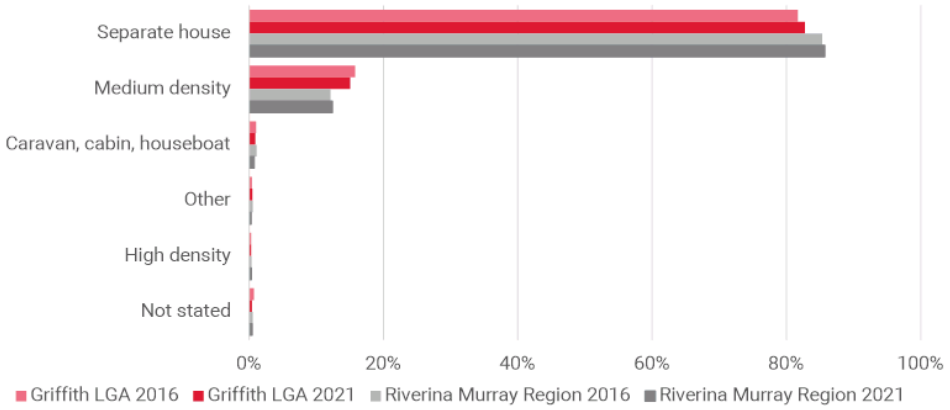
5 Supply Assessment

5.1 Historic Dwelling Analysis

Dwelling Structure

In 2021 there were 10,797 dwellings in Griffith LGA. The majority of dwellings (82.8%) were separate houses and medium density dwellings (15.1%) which includes semi-detached, flats, and townhouses. Compared to the broader Riverina Murray region, Griffith LGA has a higher proportion of medium density dwellings which are concentrated in the main population centre of Griffith (particularly along Wakaden Street and Couch Road).

Figure 5-1 Dwelling structure, Griffith LGA and Riverina Murray region, 2021



As at the 2021 Census, Giffith LGA had a population of 27,086 persons. This represents 9.6% of the Riverina Murray region's 283,060 residents and an increase of 1,451 residents (or 5.7%) since 2016. Reflective of this increase in population, there has been an increase in the total number of dwellings in the Griffith LGA, from 10,283 in 2016 to 10,797 in 2021, an increase of 514 dwellings.

Figure 5-2 Dwelling structure, Griffith LGA and Riverina Murray region, 2016 and 2021

	2021		2016		Change	
	Dwellings	%	Dwellings	%	Dwellings	%
Separate house	8,935	82.8%	8,400	81.7%	535	6.4%
Medium density	1,627	15.1%	1,623	15.8%	4	0.2%
Caravan, cabin, houseboat	102	0.9%	106	1.0%	-4	-3.8%
Other	56	0.5%	43	0.4%	13	30.2%
High density	33	0.3%	34	0.3%	-1	-2.9%
Not stated	44	0.4%	77	0.8%	-33	-42.9%
Total	**10,797**	**100.0%**	**10,283**	**100.0%**	**514**	**5.0%**

The total numbers of dwellings in Griffith increased by 5.0% over the five years to 2021, averaging an increase of around 103 dwellings per year.

Growth of separate dwellings in Griffith increased by 535 (6.4%) between 2016 and 2021, while the number of medium density dwellings remained relatively unchanged (+4 or 0.2% increase).

Most dwellings in Griffith are owned outright (31.3%), rented (30.5%) or owned with a mortgage (27.0%). Between 2016 and 2021, there was a notable increase in the number of rented dwellings in Griffith LGA, from 2,679 to 3,062 (+382 dwellings or 14.3% increase). This suggests there is growing demand for affordable housing options for low- and middle-income families who may struggle to find suitable accommodation in the rental market.

Three-bedroom dwellings are the most common housing type in Griffith, comprising 40.1% of all dwellings. While three-bedroom dwellings increased between 2016 and 2021, the most substantial increase was in the number of four-bedroom dwellings, which rose by 412 dwellings during this timeframe. This trend echoes a pattern observed across Australia, with supply of newly constructed dwellings typically consisting of 4 or more bedrooms.

Building and Dwelling Approvals

Building approvals are a key indicator of market demand and depth of activity within the region. However, it's important to note that not all building approvals materialise into actual construction as market forces, changes in circumstances and contracts may fall through from time-to-time. Additionally, there is usually a significant lag between approvals and construction.

Figure 5-3 Number and value of building approvals, Griffith LGA, 2012 to 2022

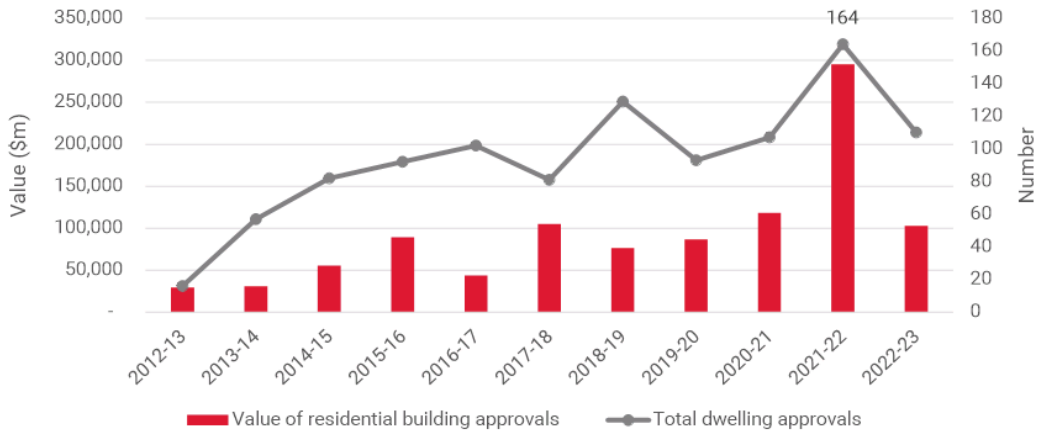


Figure 5-3 illustrates the number and value of residential building approvals in Griffith LGA. The number of approvals has fluctuated over the ten-year period and reached a peak of 164 approvals in 2021-22 representing a total value of $295.03 million. This peak of activity coincided with the introduction of NSW Government HomeBuilder Grant which provided an incentive that stimulated approvals and construction activity. Following this has been a contraction in the market in 2022-23, returning to historic levels and reporting 110 approvals worth $102.69 million.

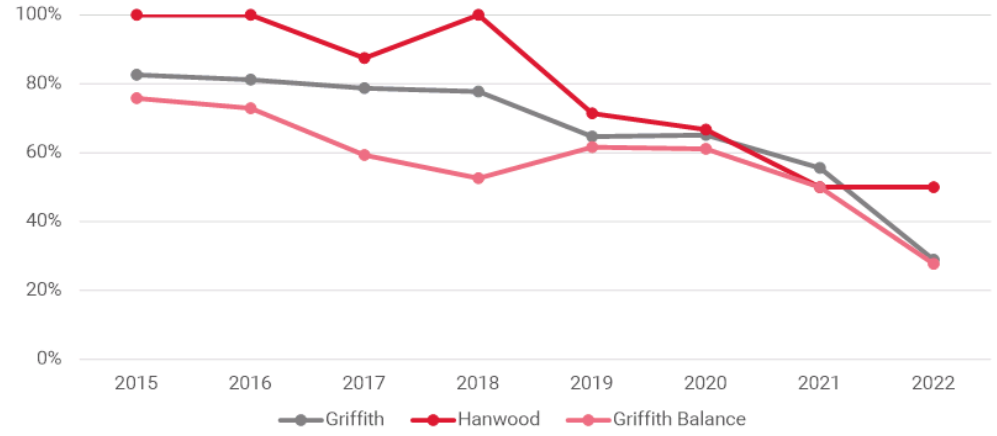
Despite the recent contraction in building approval activity, it is evident that the overall trend of dwelling approvals is increasing steadily over time. Over the last 5 years, the average number of building approvals has been **121 per year**, notably higher than the 10-year average of 94 dwellings per year. This highlights strong demand for dwellings in Griffith over recent years despite monumental periods of economic downturn as a result of COVID, and drought and floods across the wider region.

5.2 Affordability

The term 'housing affordability' refers to the relationship between expenditure on housing (prices, mortgage repayments or rents) and household incomes. REMPLAN applies a 30% of household income principle to determine housing affordability, which highlights trends in terms of the cost of renting or buying a home, and the relative level of affordability.

In 2022, housing affordability in Griffiths' urban centre reached a low point, with only 29.2% of dwellings sold considered affordable, equivalent to just 3 out of 10 dwellings sold meeting affordability criteria. Since 2015, housing affordability in central Griffith has consistently declined, from 81.3% of dwellings sold being considered affordable in that year. Figure 5-4 illustrates the trends in housing affordability between 2015 and 2022. Both Hanwood and Griffith Balance have experienced similar declines in housing affordability over the same period.

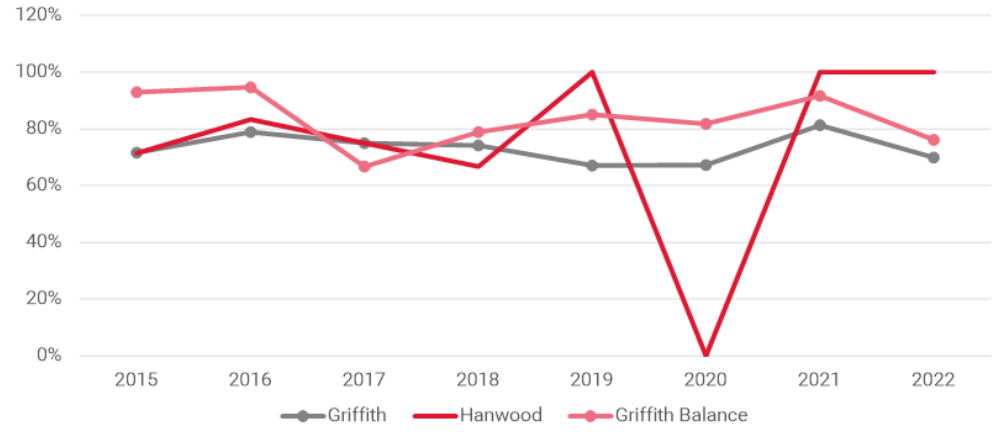
Figure 5-4 Affordable dwellings (sold), Griffith, Hanwood and Griffith Balance, 2015 to 2022



REMPLAN Housing

In contrast to affordable sold dwellings, the proportion of affordable rentals has remained relatively consistent in Griffiths' urban centre and Griffith Balance between 2015 and 2022. Conversely, the limited availability and turnover of rented dwellings in Hanwood is reflected in Figure 5-5.

Figure 5-5 Affordable dwellings (rentals), Griffith, Hanwood and Griffith Balance, 2015 to 2022

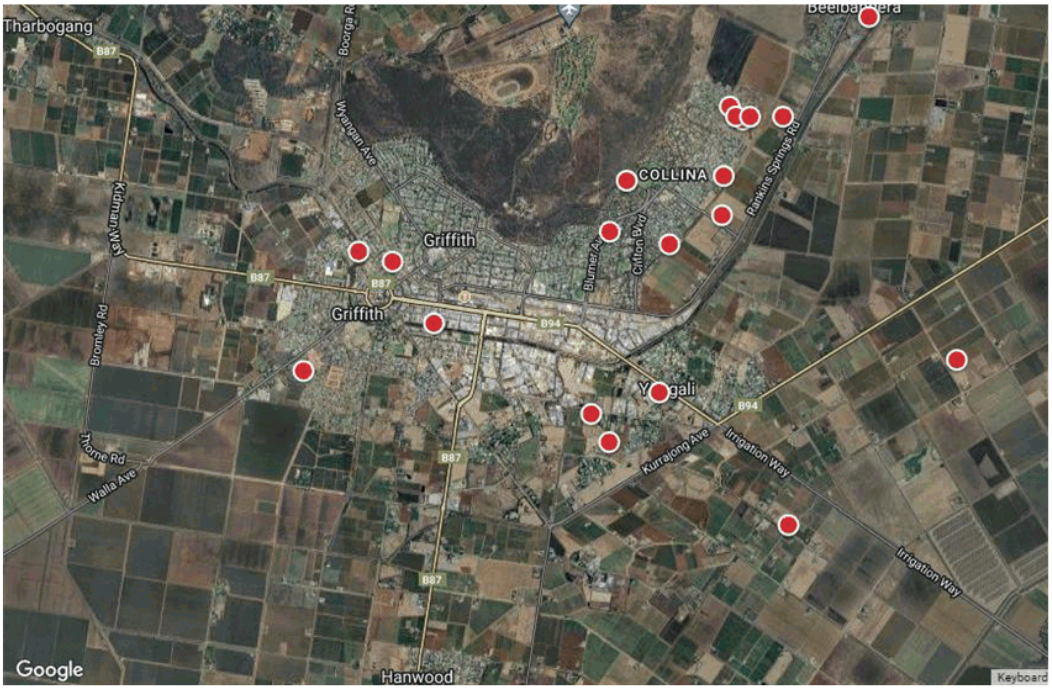


5.3 Supply Assessment

As explored in section 3.2, the REMPLAN population and dwelling forecasts for Griffith indicate growth of 4,610 persons over the 25 years from 2021 to 2046, requiring an estimated additional 2,441 dwellings to support the growing population. This equates to 98 new dwellings per year. Over the last five years building approval activity in Griffith averaged 121 approvals per year. However, it is important to note that not all building approvals eventuate into a new dwelling. To support an increase of 98 dwellings per year, considerations need to be made regarding future land supply to ensure the market will avoid becoming constrained and experience upwards pressures on prices.

Along with the provision of new dwellings, there is also significant turnover in residential areas due to existing homes being bought and sold. While this doesn't create new housing, it shows demand for residential property in the area. Figure 4-1 shows the number of residential property sales in Griffith LGA between 2012 and 2023. As of April 2024, realestate.com.au listed 23 properties for sale in Griffith, including 11 land listings. Figure 5-6 illustrates the locations of active sales. Most land listings are part of land releases in Collina, with others are small subdivisions and rural residential lots.

Figure 5-6 Current dwellings and land for sale, Griffith LGA, April 2024



Land Supply

There are two main sources of residential land supply – vacant greenfield land planned for new housing estates and opportunities within existing urban areas for redevelopment, like replacing an older property with higher density housing such as units or townhouses. There are two residential markets in Griffith, one for standard residential development and another for rural residential development on the outskirts of the city.

The *Griffith Housing Strategy* utilised independent population forecasts by Forecast.id to identify that Griffith requires 1,744 dwelling units through to 2036 to satisfy the expected growth pressures of a population increase

of 0.73%. This equates to an average of 102 additional dwellings per year by 2036. Since the strategy was produced in 2018, actual population in Griffith has increased by 0.88%, which exceeds the initial projection and impacts the number of dwellings required to accommodate future growth.

Council has identified that some large land parcels included in the *Griffith Housing Strategy* have remained undeveloped for decades[2]. Despite being earmarked for residential development, these parcels have not seen any progress, creating gaps in the anticipated housing supply. The prolonged inactivity raises concerns about the effectiveness of the current development sequencing and the need for alternate solutions. Addressing these constrained parcels is crucial to meet the community's housing needs.

A desktop analysis completed for this report indicates that Griffith has sufficient residential land for future needs. However, there are major concerns about sequencing, as some development sites have failed to be brought to the market within the timeframe set by the *Griffith Housing Strategy*. Taking this into account, the land supply estimate has been discounted to exclude sites with significant constraints such as flood overlays, ownership issues, land banking, and vegetation buffers.

Figure 5-7 Land Supply Schedule, Griffith LGA, July 2024

Griffith	Short	Medium	Long	Total
Central Griffith	26	13	153	**192**
South Griffith	84	507	48	**639**
Collina	356	110	-	**467**
Hanwood (Subject Site)	-	-	454	**454**
Total (Urban)	**466**	**631**	**655**	**1,752**
Lake Wyangan	185	-	763	**948**
Yoogali	55	-	84	**139**
Yenda	7	-	-	**7**
Total (Rural)	**247**	**0**	**847**	**1,094**

There is an estimated 2,846 lots earmarked for residential development across Griffith LGA, comprising 1,752 in Griffiths' urban centre, and an additional 1,094 in rural areas. The subject site is projected to supply around 415 lots for residential development, with a diverse mix of lot sizes, from medium density dwellings on less than 400 m^2 to traditional residential lots around 700 m^2.

5.4 Implications

As a general guideline, a key planning objective of Council is to have a 25–30-year planning horizon of land supply to cater for demand, with 5-10 years supply identified, zoned and ready to be brought to the market. This is a common approach adopted by Councils to support population growth and market churn.

The *Griffith Housing Strategy* suggests Griffith requires an additional **1,744 dwelling** through to 2036 to satisfy the expected growth pressures of a population increase of 0.73%. This translates to 22.9 years supply at 76 lots per year, however if demand increased to 121 lots per year, supply reduces to just 15.5 years.

Land identified or zoned for development in housing strategies does not always translate into residential development within the proposed timeframe due to constraints such as overlay issues or challenges with owners' intent. The presence of long-standing undeveloped parcels identified in the *Griffith Housing Strategy* is the challenges around development sequencing, necessitating resolutions to meet housing demand.

[2] *Sourced from Griffith City Council Ordinary Meeting Business Paper 11 July 2023, pg.10*

Griffith City Council obtained an independent population and dwelling forecast from Forecast.id which estimates population growth and dwelling demand through to 2046. Forecasts by Forecast.id estimate an increase of 4,221 residents between 2021 and 2046, requiring an additional **1,908 dwellings** (or 76 dwellings per year).

REMPLAN also have provided a separate population and dwelling forecast which estimates population growth and dwelling demand through to 2046. REMPLAN estimate an increase of 4,610 residents between 2021 and 2046, requiring an additional **2,441 dwellings** (or 98 dwellings per year).

A desktop analysis of land supply in Griffith identifies an estimate of 2,846 lots across Griffith LGA, comprising 1,752 lots in Griffith urban centre and 1,094 in rural areas (including Lake Wyangan, Yoogali and Yenda). This indicates there is sufficient supply for future needs but concerns about sequencing and constraints require consideration to ensure effective land use and housing provision.

This shortage has created a crisis in affordable and suitable housing, a concern highlighted originally by the *Griffith Housing Strategy*. The strategy emphasizes the importance of *ensuring there is sufficient supply of smaller, well-located dwellings to meet projected need*.

This Report has identified a pipeline of available land, up to 1,752 lots, however based on existing land sales, there is a scarcity of smaller developments offering affordable and accessible housing options in Griffith's urban centre. Encouraging and supporting additional residential development in Griffith is now required to support population growth and associated demand for services and will address affordability issues in the region. This is reflected in Building Approvals over the last 5-years, which has averaged 121 per year, notably higher than the 10-year average of 94 approvals. This indicates residential market demand in Griffith is strong and may continue to increase given the increase in migration and changing demands of existing residents which contribute to market churn.

The Leonard Road Release Area provides a unique market offering, seeking to provide affordable and accessible dwellings which are currently not available to the market in Griffith. Rezoning of the site to allow for residential development will assist in meeting short- and medium-term supply targets and provide a diverse mix of residential product that is affordable and most importantly accessible.

6 Assessment of Need

Lot to Dwelling Conversion

As a general guideline, a key planning objective of Councils across Australia is to maintain a land supply pipeline that supports 25-30 years of strategic planning and development. This includes having 5-10 years of land supply either ready for market or in the process of being approved, zoned, or identified as probable for development. Additionally, there should be an extra 10-15 years of land supply that is zoned, has a development application, or has proposed intent to develop.

It's important to note that not all identified lots in Griffith will be converted into dwellings. Based on ABS dwelling approvals and building completions, the average conversion rate between 2013 and 2023 in Australia was 54.9%. In other words, only 54.9% of dwelling approvals were successfully converted into a dwelling.

Of all states, New South Wales has one of the lowest conversion rates, with typically less than 50% of approvals being completed and resulting in a new dwelling. Due to the time lag between approvals and completions, some active approvals may still be in the process of being converted into dwellings and therefore absent from official statistics. This suggests that the 'true' conversion rate may be slightly higher than reported, but it nonetheless indicates that not all identified lots in Griffith will result in a new dwelling.

Over the last five years building approval activity in Griffith averaged 121 approvals per year. Given the historically low conversion rates in New South Wales, even if Griffith were to match the national average conversion rate of 54.9%, this would still result in only approximately 66 additional dwellings being completed per year. This highlights the shortfall between approvals and completed dwellings, underlining the challenge of delivering actual housing supply in Griffith and emphasizing the need to meet housing demand effectively.

Figure 6-1 Lot to Dwelling Conversion Rates, 2013-2023

Year	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUS
					Completions				
2013	19,596	28,350	19,953	6,658	17,973	1,567	835	1,762	**96,694**
2014	21,415	30,281	19,585	7,802	20,558	1,705	869	1,538	**103,753**
2015	25,371	31,688	23,843	8,236	25,141	2,320	893	1,465	**118,957**
2016	25,525	33,755	23,685	7,107	20,333	2,061	863	1,025	**114,354**
2017	28,608	35,011	24,184	7,352	14,112	1,639	673	1,007	**112,586**
2018	30,453	38,835	25,834	8,029	13,630	2,229	648	1,182	**120,840**
2019	28,557	37,268	21,340	7,370	11,203	2,388	483	1,245	**109,854**
2020	23,308	38,535	19,614	7,733	10,559	2,806	419	1,321	**104,295**
2021	24,471	38,628	22,586	7,930	11,884	3,034	503	1,124	**110,160**
2022	25,969	36,842	24,727	9,701	12,572	3,072	445	1,391	**114,719**
2023	26,679	34,694	24,030	8,848	15,337	2,838	449	1,493	**114,368**
Year					Approvals				
2013	49,175	49,833	35,932	10,652	28,690	1,898	2,294	4,801	**183,275**
2014	55,584	60,895	40,173	11,778	33,088	2,551	2,000	3,938	**210,007**
2015	71,532	68,669	50,856	11,370	28,660	2,793	1,666	4,189	**239,735**
2016	74,699	68,756	47,781	12,113	21,913	2,171	1,278	6,158	**234,869**
2017	72,210	70,368	42,354	12,262	19,566	2,690	813	4,346	**224,609**
2018	64,968	67,981	39,903	11,828	15,897	3,074	728	7,160	**211,539**
2019	51,762	58,200	31,106	11,615	15,195	3,178	559	4,996	**176,611**
2020	51,268	63,497	33,425	11,465	18,504	3,531	698	4,977	**187,365**
2021	62,578	71,422	43,109	14,770	25,578	4,000	638	5,601	**227,696**
2022	54,199	62,189	36,669	12,730	16,438	3,329	666	5,563	**191,783**
2023	45,334	51,480	33,550	11,628	13,957	2,734	450	4,449	**163,582**
Year					Conversion Rate				
2013	39.8%	56.9%	55.5%	62.5%	62.6%	82.6%	36.4%	36.7%	**52.8%**
2014	38.5%	49.7%	48.8%	66.2%	62.1%	66.8%	43.5%	39.1%	**49.4%**
2015	35.5%	46.1%	46.9%	72.4%	87.7%	83.1%	53.6%	35.0%	**49.6%**
2016	34.2%	49.1%	49.6%	58.7%	92.8%	94.9%	67.5%	16.6%	**48.7%**
2017	39.6%	49.8%	57.1%	60.0%	72.1%	60.9%	82.8%	23.2%	**50.1%**
2018	46.9%	57.1%	64.7%	67.9%	85.7%	72.5%	89.0%	16.5%	**57.1%**
2019	55.2%	64.0%	68.6%	63.5%	73.7%	75.1%	86.4%	24.9%	**62.2%**
2020	45.5%	60.7%	58.7%	67.4%	57.1%	79.5%	60.0%	26.5%	**55.7%**
2021	39.1%	54.1%	52.4%	53.7%	46.5%	75.9%	78.8%	20.1%	**48.4%**
2022	47.9%	59.2%	67.4%	76.2%	76.5%	92.3%	66.8%	25.0%	**59.8%**
2023	58.8%	67.4%	71.6%	76.1%	109.9%	103.8%	99.8%	33.6%	**69.9%**
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	AUS
Average	43.7%	55.8%	58.3%	65.9%	75.2%	80.7%	69.5%	27.0%	**54.9%**

6.1 Supply and Demand Comparison

As detailed above by the conversion rates, land that is identified in land use and urban development strategies or is zoned for development by planning authorities does not always translate directly into residential development (housing construction) as planned within the proposed timeline.

As a general guideline, a key planning objective of Council is to have a 25–30-year planning horizon of land supply to cater for demand. This includes:

- 5-10 years of supply identified, zoned and ready to be brought to the market,
- An additional 10-15 years of supply zoned,
- An additional 10 years of supply of strategically identified land.

Griffith LGA Supply Scenarios

The following table summarises the sensitivity assessments for low, medium and high supply scenarios. The *Griffith Housing Strategy* and *Housing Pipeline Audit* have identified significant supply of land parcels in the pipeline; however, Council has more recently acknowledged (in 2023) that not all lots identified in the supply estimates will be brought to the market due to land banking or the use of the land for other purposes including agriculture[3].

Three scenarios with different annual lot take-up rates have been modelled below to estimate sensitivity of supply based on varying levels of demand in Griffith LGA.

- **Low Scenario:** reflective of Forecast.id annual dwelling demand through to 2046 (e.g.76 dwellings per year from 2021 to meet 12,711 dwellings by 2046)
- **Medium Scenario:** reflective of REMPLAN forecast annual dwelling demand through to 2046 (e.g. 98 dwellings per year from 2021 to meet 13,238 dwellings by 2046)
- **High Scenario:** reflective of NSW DPE projected dwelling demand through to 2041 (e.g. 130 dwellings per year from 2021 to 14,160 dwellings by 2041).

[3] *Sourced from Griffith City Council Ordinary Meeting Business Paper 11 July 2023, pg.10*

Griffith LGA Sensitivity

It is estimated that the land parcels identified by Griffith City Council in the *Housing Pipeline Audit Mapping* yield 2,846 lots across the local government area. The land supply estimate for Griffith has been discounted to exclude sites with significant constraints such as flood overlays, ownership issues, land banking, and vegetation buffers.

Figure 6-2 Griffith LGA Supply Scenarios

	Low	Medium	High
Annual Lot Take-up	76	98	130
Available Lots	2,846	2,846	2,846
Years of Supply	**37.3**	**29.0**	**21.9**
80% Conversion	2,276	2,276	2,276
Years of Supply	**29.9**	**23.2**	**17.5**
50% Conversion	1,423	1,423	1,423
Years of Supply	**18.7**	**14.5**	**10.9**

Based on the sensitivity assessment in Figure 6-2, there is potentially sufficient land supply if all identified supply is developed and brought to the market. If all parcels are developed and converted into dwellings, there is estimated to be between 21.9 and 37.3 years of supply across Griffith LGA.

This scenario (that all parcels will be developed) is considered unlikely. Sensitivity analysis suggests:

- *If 80% of parcels are developed and converted into dwellings, there is between 17.5 and 29.9 years supply.*
- *If 50% of parcels are developed and concerted into dwellings, there is between 10.9 and 18.7 years supply.*

The conversion rate reflects the proportion of land supply converted into dwellings with some parcels removed from the market for a variety of reasons such as zoning, transfer issues, owners' intent and other market or logistical constraints. The portion not converted represents lots approved but never built or sold.

With a 50% conversion rate (higher than the NSW average conversion rate of 43.7%), there is between 10.9 and 18.7 years supply, which is **insufficient** to meet market demand unless under the 'low' scenario.

Griffith Urban Centre Sensitivity

The above three scenarios are now applied to only model sensitivity in supply for lots in Griffiths' **urban centre** which includes Hanwood village. It is estimated that land parcels identified by Griffith City Council in the *Housing Pipeline Audit Mapping* yield 1,752 lots. If **all** lots are converted into dwellings, supply is estimated between 13.5 and 23.0 years.

As outlined in Figure 4-2, approximately 76% of total sales in Griffith LGA are situated in Griffith's urban centre, indicating there is a strong preference for properties within the more developed, central areas compared to the rural locations.

The sequencing challenges in Griffith's urban centre is likely to cause issues not only for existing residents seeking new property but for attracting new residents, as delays in development sites brought to the market can lead to a shortage in housing, particularly affordable housing. This can hinder the area's growth and appeal, making it less attractive compared to regions with more streamlined development processes.

Figure 6-3 Griffith Urban Centre (including Hanwood) Supply Scenarios

	Low	Medium	High
Annual Lot Take-up	76	98	130
Available Lots	1,752	1,752	1,752
Years of Supply	**23.0**	**17.9**	**13.5**
80% Conversion	1,401	1,401	1,401
Years of Supply	**18.4**	**14.3**	**10.8**
50% Conversion	876	876	876
Years of Supply	**11.5**	**8.9**	**6.7**

It is unlikely that all parcels in Griffiths' urban centre will be developed. Sensitivity analysis suggests:

- *If 80% of parcels are developed and converted into dwellings, there is between 10.8 and 18.4 years supply.*
- *If 50% of parcels are developed and concerted into dwellings, there is between 6.7 and 11.5 years supply.*

It's important to note that the subject site represents approximately 26% of the total future land supply in Griffiths' urban centre and is integral for providing housing proximate to services, infrastructure, and employment. The proposed development seeks to offer smaller lots for affordable and accessible housing in Griffith, aligning with the *Griffith Housing Strategy* objectives of addressing housing affordability issues and supporting very low-income households experiencing housing stress.

Griffith Urban Centre (without Leonard Rd subject site) Sensitivity

The proposed development of the subject site is well placed to be brought forward in supply sequencing to provide affordable and accessible housing to the market in the short term.

Removing this site from the land supply estimates for Griffiths' urban centre, if all parcels are developed and converted into dwellings, there is estimated to be as low as **5 years supply**.

Given the complexities around land development, it is unrealistic that all parcels will be brought to the market, particularly given the challenges related to zoning, owners' intent, infrastructure limitations and market conditions.

Sensitivity analysis suggests:

- *Without the Leonard Road subject site, if 80% of parcels are developed and converted into dwellings, there is between 8.0 and 13.6 years supply.*
- *Without the Leonard Road subject site, if 50% of parcels are developed and converted into dwellings, there is between 5.0 and 8.5 years supply.*

Figure 6-4 Griffith Urban Centre (excluding Leonard Rd Subject Site) Supply Scenarios

	Low	Medium	High
Annual Lot Take-up	76	98	130
Available Lots	1,297	1,297	1,297
Years of Supply	**17.0**	**13.2**	**10.0**
80% Conversion	1,038	1,038	1,038
Years of Supply	**13.6**	**10.6**	**8.0**
50% Conversion	649	649	649
Years of Supply	**8.5**	**6.6**	**5.0**

Notably, other development sites in Griffiths' urban centre including Collina and sites in South Griffith along Stafford Road are not earmarked to provide smaller, more compact homes and are less aligned with Council's priority of *ensuring there is sufficient supply of smaller, well-located dwellings to meet projected need*[4].

The Griffith Housing Strategy also highlights there is a significant under supply of smaller dwellings in the region. The Leonard Road subject site seeks to fill this market gap by providing smaller, more compact homes. This development will enhance diversity of housing supply in Griffiths' urban centre addressing the pressing need for affordable and accessible housing options. This initiative is crucial for meeting the varied housing needs of the community and supporting population growth in the region.

[4] *Griffith Housing Strategy, pg.3*

7 Summary and Implications

Griffith's land supply policy and strategies are based on the *Griffith Housing Strategy* envisioned strategic land planning aimed at fostering balanced opportunities for urban expansion in central Griffith and surrounding villages, including the village of Hanwood. Regarding Hanwood specifically, the strategy identified plans for the release of land on the southern side of Leonard Road between 2013 and 2022. This land was zoned for R1 for General Residential uses in 2014, however two of the three lots in the site are still being actively farmed. Only one of these farms is likely to be developed for low density residential, not the intended outcome of the *Griffith Housing Strategy*.

Griffith as a whole is well supplied with available lots; the evidence however suggests that many land releases have failed to come to the market. This has led to a significant change in the housing market, with less than 15% of all housing now considered affordable.

Griffith is expected to undergo steady population growth through to 2046, primarily driven by natural change (where births outnumber deaths almost two to one). Additionally, there's a projected increase in older-working age and retirement-age population. It is critical to therefore align the future supply of dwellings with the evolving demographic profile of the population to ensure that housing meets the needs of its residents effectively. This entails considering factors such as housing preferences, accessibility, and sustainability for various age groups and lifestyles to suitably support the evolving population of Griffith. There is also a wide range of incomes, with a distinct lower socio-economic workers attracted by Griffith's agricultural and manufacturing industries.

In addition to this REMPLAN has over the next 25-years, forecasts that Griffith will have a reduction in the average household size (the number of persons per dwelling), decreasing from 2.66 to 2.54 residents per dwelling by 2046. This equates to an increased number of dwellings to accommodate the current population as well as new residents through to 2046. This is predominantly due to the aging of the population.

Griffith's existing land supply policy and strategies are based on projections that Griffith's population is expected to require an additional 3,675 persons with a dwelling demand of 1,600 according to Council's independent forecast by Forecast.id by 2041. The NSW DPE projected Griffith's population to increase by 4,568 persons between 2021 and 2041, with a dwelling demand of 2,600, a difference of 893 persons and 1,000 dwellings. REMPLAN's population forecast is similar to Forecast.id to 2041 with a population increase of 3,662, however REMPLAN's dwelling estimate is 1,946, a difference of 346 dwellings. Further to this REMPLAN's Forecast to 2046 when compared to Forecast.id results in a difference of 533 dwellings.

The need for new dwelling supply is essential to meet development within Griffith. Council's *Housing Pipeline Audit* identified 1,752 lots available in the Griffith Urban area for the LGA's needs. If all lots are converted into dwellings, supply is estimated between 14.5 and 23 years. REMPLAN's sensitivity analysis, sets out three different scenarios based on population growth, this reflects Council's annual dwelling demand of 76 dwellings per annum, REMPLAN's estimate of 98 dwellings per annum and the State government's 130 dwellings per annum. Council's average dwelling approval rate of 121 dwellings per annum is utilised for these calculations.

It is also important to note that not all dwellings are ever likely to be constructed. At a 50% conversion rate of available land supply (this being considered conservative) for housing demand at 98 dwellings per annum (medium demand) the available lot supply has been reduced to 8.9 years, below the industry accepted 10 to 15 years of supply thought necessary to provide an acceptable development pipeline for local government. The estimated dwellings likely to be actually constructed are now reduced to 66 per annum, not the 121 which have been approved. If the subject site is not developed as part of that Urban area there is only a 5-year supply.

Griffith is an area popular with young families with children and persons of working age and the need for new detached properties can be considered essential to meeting the region's population projections and demand for dwellings. However, dwelling construction has been lower than the number of dwellings required to meet the expected dwelling demand and is likely to continue based on REMPLAN's sensitivity analysis.

The doubling of house and land prices over the past ten years has affected housing choice and affordability has also continued to decline. Detached housing available on the market in 2015 comprised of 85% of affordable to everyone except those on very low and low incomes. The level of affordability for houses available to purchase has decreased to only 15% of the market.

Further to this, consideration must be given to whether there is sufficient land within the different communities of Griffith. In particular, land supply in the southern Precinct area which includes the subject site area, has significantly less land supply available in future allotments.

The Leonard Road Release Area will add to the available pool of housing lots as a competitive product located adjacent to Hanwood. The project will provide a competitive product extending available land supply within the region, by providing a comparable mix of small and medium lots suitable for a variety of family and household types.

The rezoning of the Leonard Road Release Area is needed to meet Griffith's future land development. The site's proximity to the existing settlement of Hanwood fulfills Council's planning and housing policies of development that meets the housing needs of Griffith's residents through the provision of both housing choice and affordable housing. The site has good transport links with access to local employment and educational facilities. It is attractive to working families who from the site have broad access to local employment nodes and recreational facilities. Overall, the sub-division of land creates more affordable plots in an area with lower incomes whilst providing good access to local and regional employment.

There is a clear demand and need for the rezoning of the subject site to support the next wave of population growth and development in Griffith.

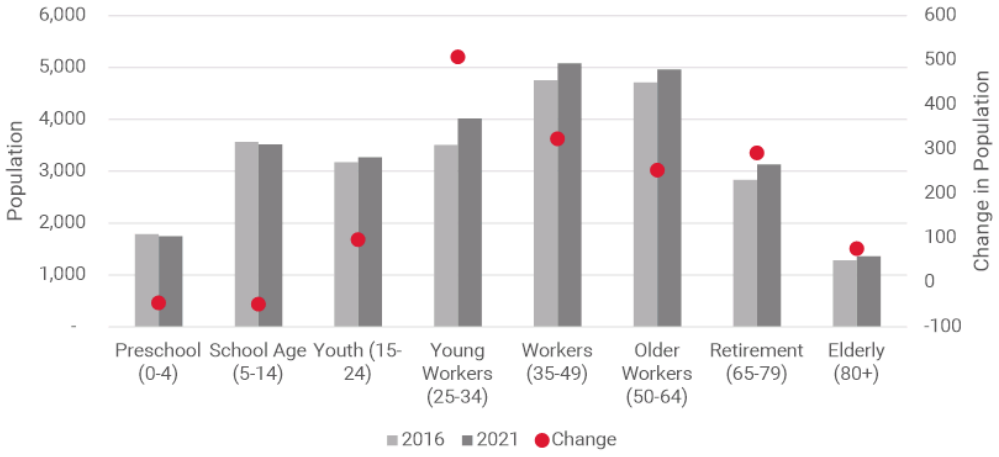
8 Appendix A - Demographic Overview

Age

The median age of residents in Griffith LGA is 37 years, which notably lower than both the wider Riverina Murray region of 41 years, and the New South Wales (NSW) median of 39 years. The distribution of population by life stage in Griffith LGA, as illustrated in Figure 8-1, highlights the significant increase in the young workers cohort (25-34 years) and the workers cohort (35 to 49 years) between 2016 and 2021. This demographic trend reflects Griffith's growing appeal to families with older children as well as workers, influenced not only by the region's inherent attractions but also by the impacts of COVID. Many residents, after periods spent elsewhere, are now opting to return to the region, drawn by its blend of affordability, cultural diversity, access to amenity and a wide range of job opportunities spanning agriculture, health care and education. This trend is mirrored across numerous regions in Australia, where young people are gravitating back to their hometowns due to the emergence of flexible working arrangements, the capacity of remote learning, and the mounting pressures of urban living costs.

Like many regional municipalities across Australia, Griffith LGA has a high number of older workers (50-64 years) and retired residents (65-79 years). In 2021, 29.9% of residents in Griffith LGA were in these cohorts which is relatively consistent with 2016 (29.5%).

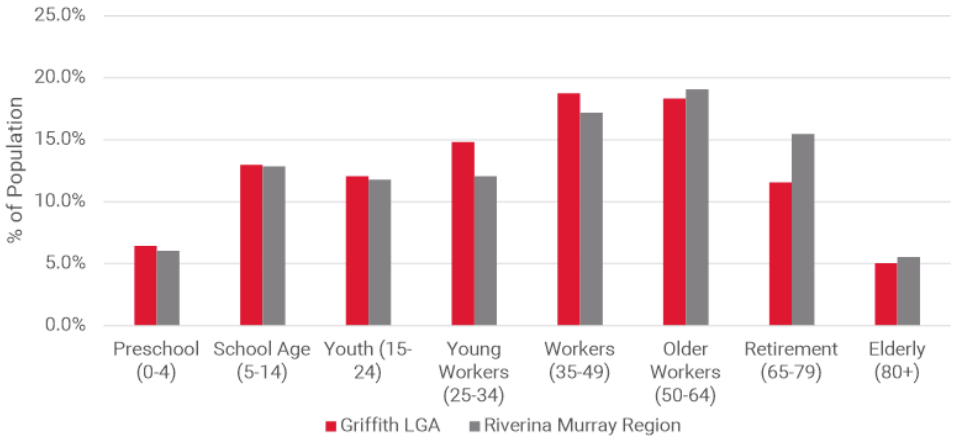
Figure 8-1 Population and change in population by life stage, Griffith LGA, 2016 and 2021



Source: REMPLAN Community

Figure 8-2 show the Griffith LGA has a higher proportion working age residents (25-49 years) in comparison to the broader Riverina Murray region, of 33.6% and 29.2% respectively. Conversely, the wider region has a notably higher proportion of residents in the retirement age cohort (65-79 years) compared to the Griffith LGA (15.5% and 11.6% respectively). This indicates that relative to other LGAs in the Riverina Murray region, Griffith LGA has a younger population profile.

Figure 8-2 Proportion of population by life stage, Griffith LGA and Riverina Murray region, 2021

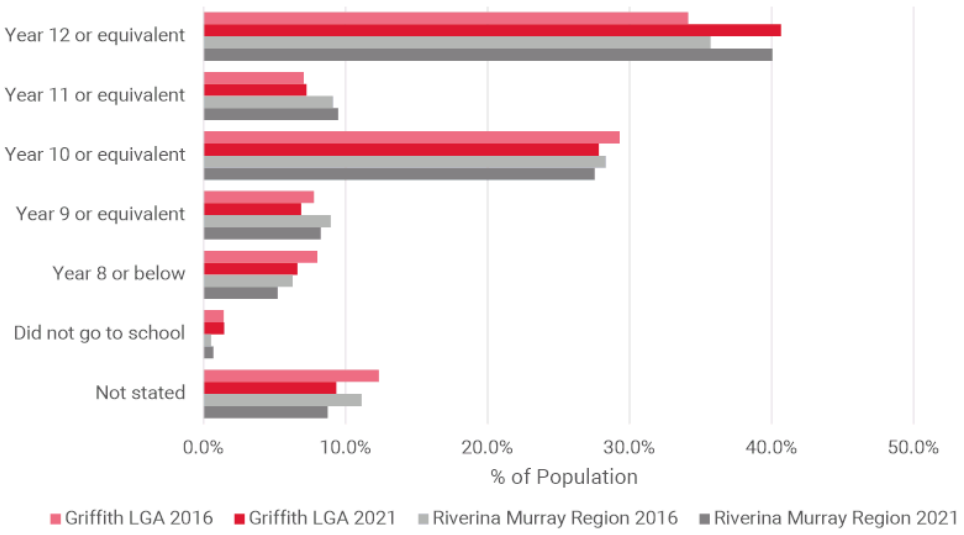


Source: REMPLAN Community

Education

In 2021, 75.7% of the population in Griffith LGA completed a level of education of year 10 or above, slightly lower than the corresponding figure of 77.1% for the Riverina Murray region.

Figure 8-3 Level of education, Griffith LGA and Riverina Murray region, 2016 and 2021



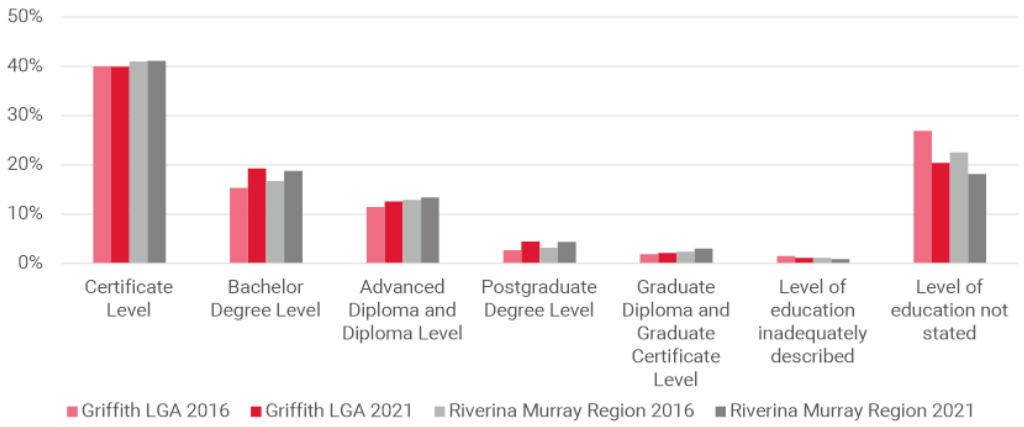
Source: REMPLAN Community

Figure 8-3 reveals the level of education in Griffith LGA in comparison to the Riverina Murray region. The data highlights that the highest educational attainment in Griffith LGA was at the year 12 level, followed by year 10 or equivalent. This indicates a strong emphasis on secondary education within the region, with noticeable changes in attainment levels over time. Specifically, there was a decrease in year 10 attainment between 2016 and 2021, which was offset by a subsequent increase in year 12 attainment in 2021. This trend mirrors the educational trends observed across the Riverina Murray region.

Qualifications

In 2021, 40.1% of residents aged 15 years and over in Griffith LGA held a formal post-school qualification. *Figure* 8-4 indicates that the most prevalent form of qualification attained was at the certificate level (39.9%), followed by bachelor's degrees (19.3%). These proportions mirror those of the Riverina Murray region. These figures not only further highlight the commitment to education within Griffith LGA but also supports the diverse educational pathways pursued by residents.

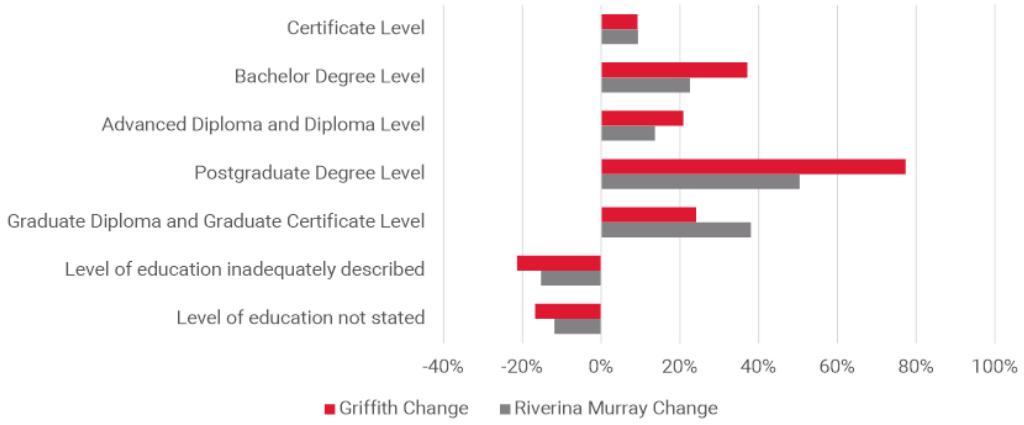
Figure 8-4 Level of post-school qualifications, Griffith LGA and Riverina Murray region, 2016 and 2021



Source: REMPLAN Community

Between 2016 and 2021, there was a notable surge of 20.1% in residents aged 15 years and over possessing post-school qualifications. *Figure* 8-5 illustrates this trend, highlighting Griffith LGA as experiencing the most significant proportional rise in residents holding postgraduate qualifications, marking an increase of 77.3%.

Figure 8-5 Change in level of post-school qualifications, Griffith LGA and Riverina Murray region, 2016 and 2021



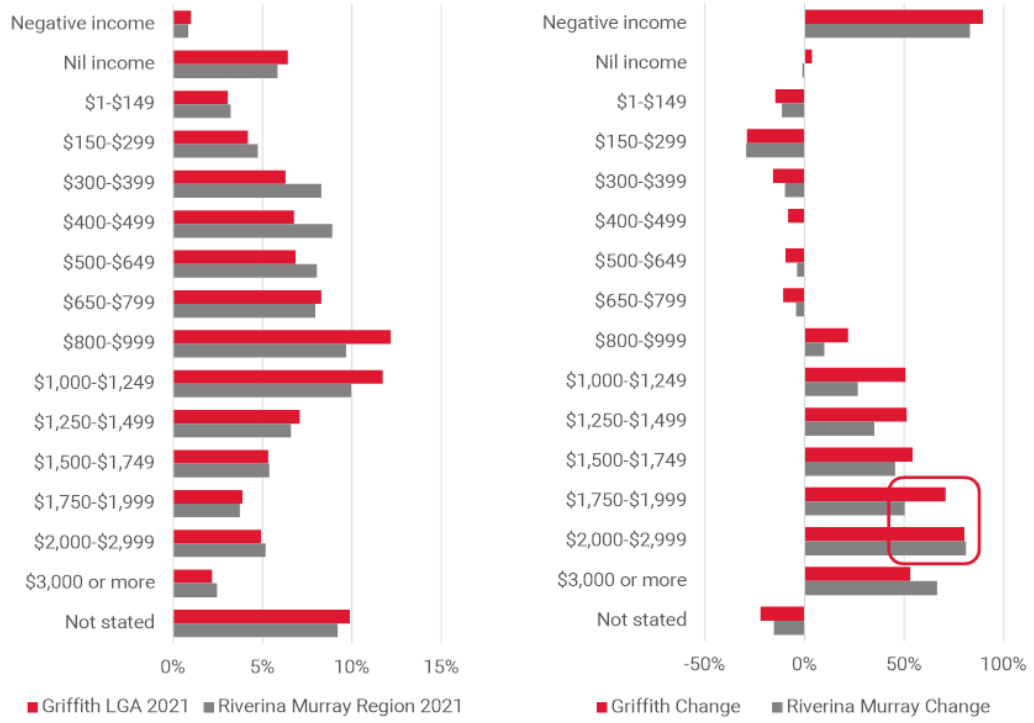
Source: REMPLAN Community

Conversely, individuals attaining bachelor's degrees saw the highest numerical rise, with an increase of 606 individuals. This trend reflects the increasing demands of the workforce in Griffith LGA for highly skilled labour as industries continue to innovate and diversify.

Income

The median personal weekly income for Griffith LGA residents was $836, comparatively higher than $754 in the broader Riverina Murray region. Median income is reflective of the types of occupations and industries of employment within Griffith LGA. *Figure* 8-6 illustrates how residents' weekly income is spread across all income brackets. Approximately 30.8% of residents in Griffith earn less than $500 per week, while 7.9% of residents earn over $2,000 per week.

Figure 8-6 Weekly personal income and change in income, Griffith LGA and Riverina Murray Region, 2021 and 2016 to 2021



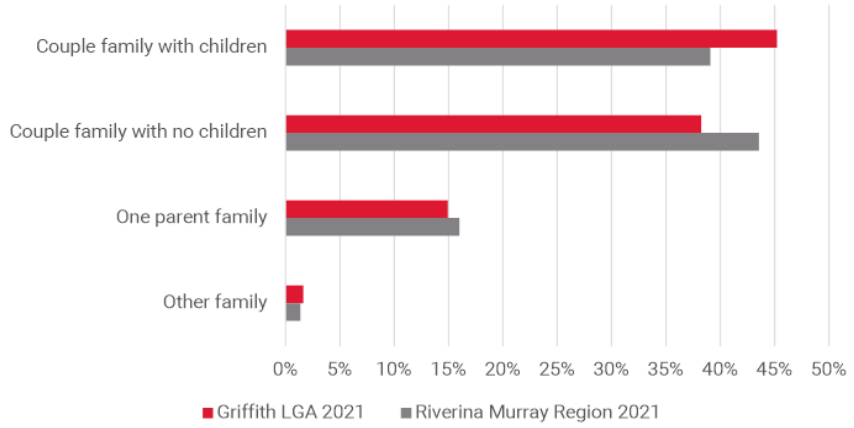
Source: REMPLAN Community

Between 2016 and 2021, Griffith LGA experienced a positive increase in the number of residents that possessed post-graduated and bachelor's degree qualifications, as previously mentioned in section 3.3.3. This increase coincides with a large proportionate increase in residents earning higher incomes (between $1,750-$2,999 per week). Despite this, a large portion of the population in Griffith earn relatively modest incomes ranging from $800 to $1,249 per week. This underscores the ongoing demand for affordable housing in the region and emphasizes the critical need to ensure the availability of such housing.

Household Composition

In 2021, Griffith housed 6,963 families. The majority of these families consist of couples with children (45.2%) and couples with no children (38.3%). In contrast, the wider broader Riverina Murray region exhibits a lower percentage of couple families with children (39.8%) compared to Griffith LGA. This disparity is balanced by a higher proportion of couples without children (43.6%).

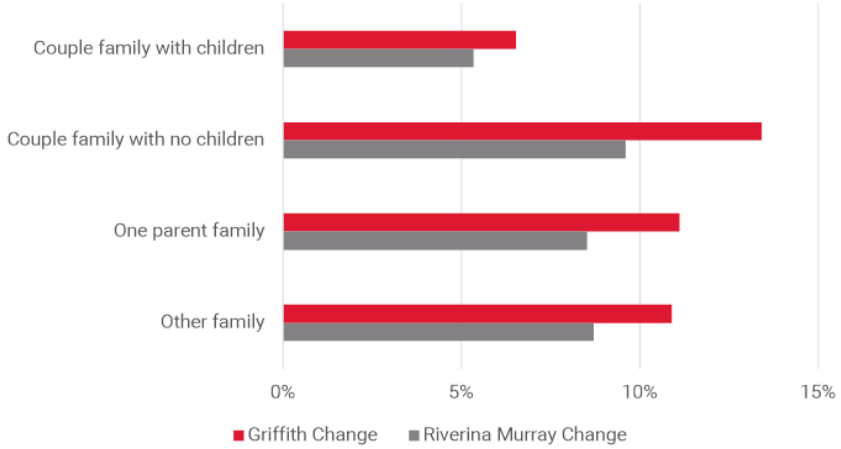
Figure 8-7 Family composition, Griffith LGA and Riverina Murray region, 2021



Source: REMPLAN Community

Between 2016 and 2021, Griffith LGA saw a large increase in the number of couple families with no children (13.4%), marking the most substantial increase among family types in the region. This demographic shift encompasses both young couples and retired couples whose children have left the household. This change highlights evolving household dynamics and preferences in Griffith LGA, with demand increasing for smaller dwellings suitable for smaller families in diverse stages of life and family structure.

Figure 8-8 Change in family composition, Griffith LGA and Riverina Murray region, 2016 to 2021

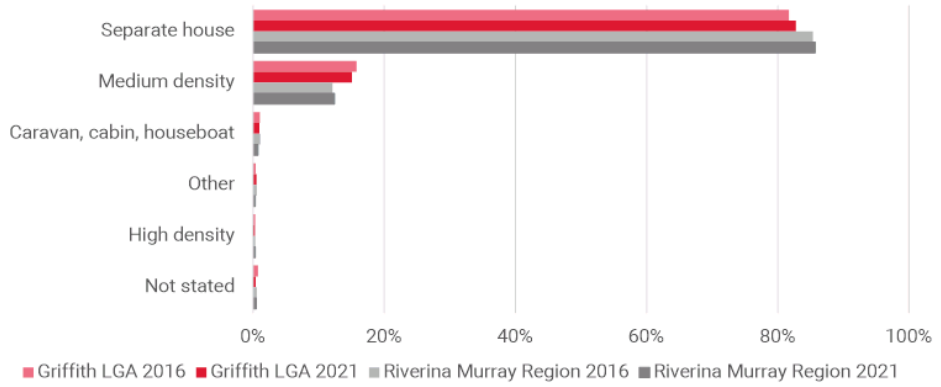


Source: REMPLAN Community

Dwelling Structure

In 2021 there were 10,797 dwellings in Griffith LGA. The majority of dwellings (82.8%) were separate houses and medium density dwellings (15.1%) which includes semi-detached, flats, and townhouses. Compared to the broader Riverina Murray region, Griffith LGA has a higher proportion of medium density dwellings which are concentrated in the main population centre of Griffith (particularly along Wakaden Street and Couch Road).

Figure 8-9 Dwelling structure, Griffith LGA and Riverina Murray region, 2021



Source: REMPLAN Community

Reflective of the growing population in the region, the number of dwellings in Griffith increased by 547, from 10,753 in 2016 to 10,283 in 2021. This equates to an average of 109 new dwellings constructed per year. Separate dwellings accounted for majority of new dwellings in the region (535 new dwellings). Much of this development occurred in the Collina North, which is a key growth area in Griffith LGA. Separate dwellings appear to continue to be a defining attribute of dwellings in the region which mirrors the Riverina Murray region as illustrated in *Figure* 5-1.

Number of Bedrooms

In Griffith LGA, three-bedroom dwellings are the most prevalent housing type, comprising 40.1% of all dwellings in the region. *Figure* 8-10 provides a breakdown of dwellings by the number of bedrooms and their changes over a 5-year period. While the number of three-bedroom dwellings did experience growth between 2016 and 2021, the most substantial increase occurred in the number of four-bedroom dwellings, which rose by 412 dwellings during this timeframe. This trend echoes a pattern observed across Australia, driven by the renovation of older dwellings to accommodate additional bedrooms, as well as the construction of new dwellings with four or more bedrooms.

The rise in the number of four-bedroom dwellings reflects the growing demand for this type of housing in the Griffith region, which reflects evolving preferences and lifestyle needs of residents. This trend supports a shift towards larger homes capable of accommodating expanding families or providing additional space for various purposes such as home offices or guest rooms.

Figure 8-10 Number of bedrooms in occupied private dwellings, Griffith LGA, 2016 and 2021

Bedrooms	2016		2021		Change	
	Dwellings	%	Dwellings	%	No.	%
None (includes bedsitters)	42	0.5%	27	0.3%	-15	-35.7%
1	297	3.2%	342	3.4%	45	15.2%
2	1,218	13.0%	1,345	13.4%	127	10.4%
3	3,747	40.1%	3,952	39.4%	205	5.5%
4	2,616	28.0%	3,028	30.2%	412	15.8%
5 or more	371	4.0%	506	5.0%	135	36.4%
Not stated	1,041	11.2%	841	8.4%	-209	-19.9%
Total	**9,342**	**100.0%**	**10,041**	**100.0%**	**700**	**7.5%**

Source: REMPLAN Community

Dwelling Tenure

Tenure type remained relatively consistent between 2016 and 2021. In 2021, more than half (58.3%) of the dwellings in Griffith LGA were owned, either outright or with a mortgage. Additionally, 28.7% of dwellings in Griffith LGA were rented, with over half (54.5%) rented through real estate agents, 15.9% rented through another person (private landlord) and an additional 9.0% rented through the NSW housing authority.

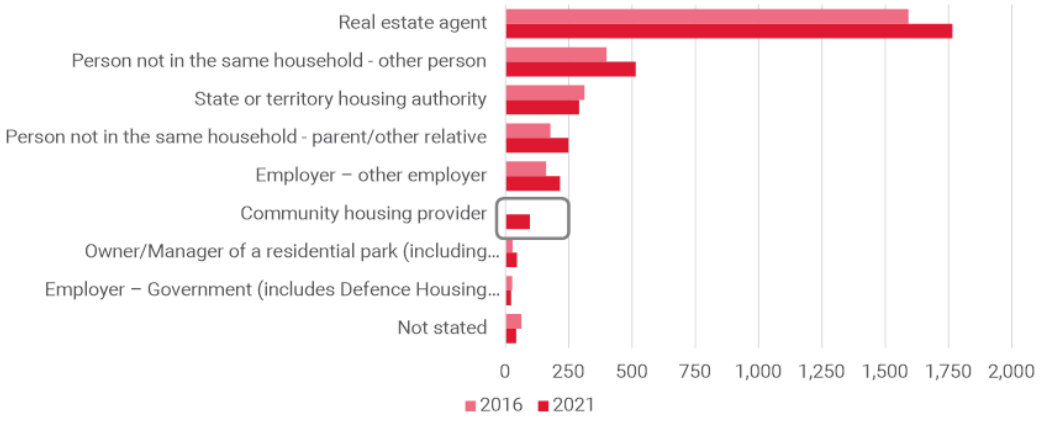
Figure 8-11 Tenure type, Griffith LGA, 2016 and 2021

Tenure Type	2016		2021		Change	
	Dwellings	%	Dwellings	%	No.	%
Owned outright	2,938	31.5%	3,142	31.3%	204	6.9%
Rented	2,679	28.7%	3,062	30.5%	383	14.3%
Owned with a mortgage	2,448	26.2%	2,707	27.0%	259	10.6%
Being occupied rent-free	125	1.3%	176	1.8%	51	40.8%
Being occupied under a life tenure scheme	31	0.3%	74	0.7%	43	138.7%
Other tenure type	33	0.4%	17	0.2%	-16	-48.5%
Being purchased under a rent/buy scheme	4	0.0%	12	0.1%	8	200.0%
Not stated	1,084	11.6%	851	8.5%	-232	-21.4%
Total	**9,342**	**100.0%**	**10,041**	**100.0%**	**700**	**7.5%**

Source: REMPLAN Community

Between 2016 and 2021 there was a notable increase in the number of rented dwellings in Griffith LGA, from 2,679 in 2016 to 3,062 in 2021 (+383 dwellings or +14.3%). This is the largest increase in tenure type in the region, followed by dwellings owned with a mortgage. Over the same period, the region saw the greatest increase in dwellings rented through real estate agents as well as through community housing which increased from zero to 96 dwellings. This suggests there is growing demand for affordable housing options for low-income individuals and families who may struggle to find suitable accommodation in the private rental market.

Figure 8-12 Landlord type of rented dwellings, Griffith LGA, 2016 and 2021



Source: REMPLAN Community

Occupation

In 2021, the most common occupation of working residents in Griffith was labourers (19.0%) followed by managers (15.5%) and technicians and trades workers (13.4%). The region saw the largest increase in the number of residents working as labourers (+496 residents) and managers (+339 residents) between 2016 and 2021. This occupation landscape varies slightly from the broader Riverina Murray region, where the most common occupation is professionals (16.3%).

Figure 8-13 Occupation (employed residents), Griffith LGA and Riverina Murray region, 2016 and 2021

Source: REMPLAN Community

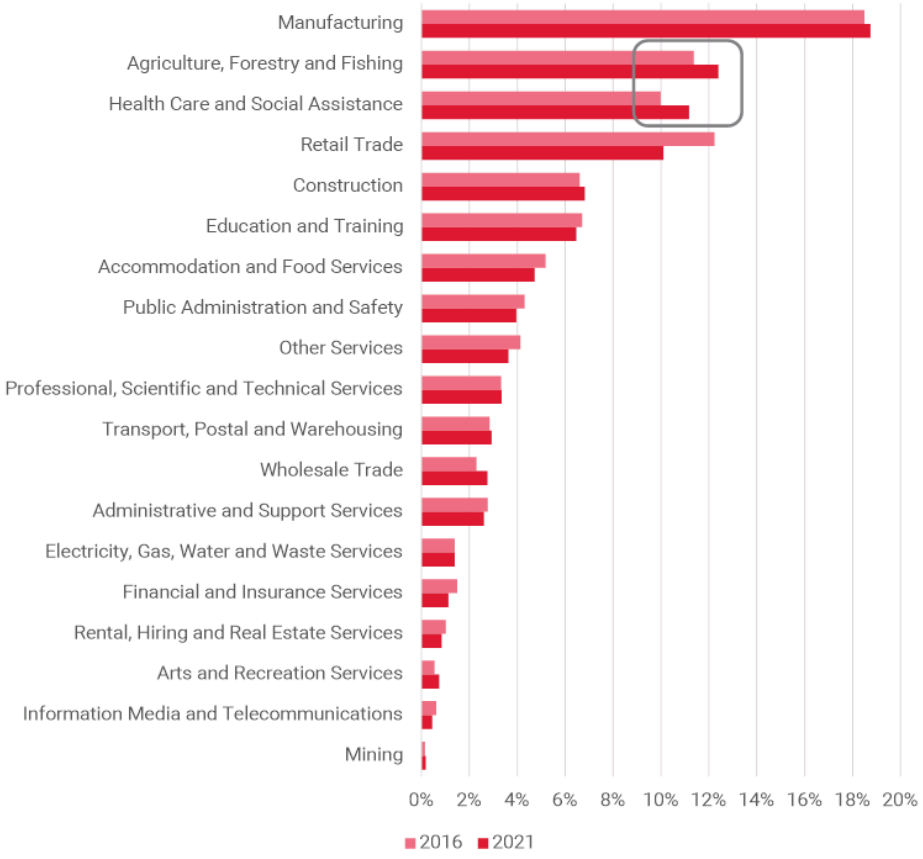
Out of the 2,603 residents employed as labourers, nearly half (45.4%) are engaged as factory process workers. This workforce is likely supported by wineries, vineyards, citrus packing houses, canneries, poultry processing plants and dairy processing facilities from across the region and surrounds. This highlights the important role of the agriculture and manufacturing sectors in providing employment opportunities within the local community.

Industry

There are 13,692 employed residents in Griffith LGA, regardless of place of work. The most common industries of employment are Manufacturing (2,567 or 18.8%), Agriculture, Forestry and Fishing (1,698 or 12.4%) and Health Care and Social Assistance (1,529 or 11.2%).

Between 2016 and 2021, Griffith LGA saw a large increase in the number of residents working in Manufacturing (+416), followed by the Agriculture, Forestry, and Fishing sector (+376) and the Health Care and Social Assistance (+367) sectors. Conversely, there was a noticeable decline in residents employed in the Retail Trade and Financial and Insurance Services sectors throughout this timeframe (-38 and -18, respectively).

Figure 8-14 Employment by industry (employed residents), Griffith LGA, 2016 and 2021



Source: REMPLAN Community

Summary

Demographic shifts within the Griffith LGA play a pivotal role in shaping both current and future housing demand, reflecting the evolving needs and preferences of its residents. Understanding these demographic dynamics is essential for effective strategic planning and ensuring diverse housing requirements are met within the region.

Historically the population of Griffith LGA has increased, between 2006 and 2011 the population increased by 565 persons, from 2011 to 2016 there was a further increase of 1,272 persons and 1,451 persons from 2016 to 2021.

The unique nature of housing demand in Griffith LGA varies from other regional cities and stems from several factors. The municipality is characterised by its young working population moving to the area, encompassing a substantial number of families with children. In contrast to both the broader Riverina Murray region and the State, Griffith has a comparatively lower median age, supported by the municipality experiencing an influx of highly skilled young professionals between 2016 and 2021. This is supported by an increase in the number of residents holding bachelor's and postgraduate degrees and a notable increase in median income within Griffith LGA, shifting from $776 to $836 over the five-year period. However, in contrast there is a considerable portion

of residents who still earn relatively modest incomes, highlighting certain segments of the community that are particularly sensitive to housing prices and the overall cost of living. Ensuring the availability of accessible, affordable and diverse housing options within Griffith LGA is crucial to support these demographic cohorts and promote inclusive growth.

The Leonard Road Release Area has a strategic location, being adjacent to Hanwood village on its northern side providing an extension of the existing residential development zones. This site offers an ideal location for the introduction of new, smaller lot residential properties, strategically situated in close proximity to key employment nodes, community services, and infrastructure within Griffith's central activity centre.

The proposed development aims to meet the growing demand for affordable family homes and medium-density living options providing more affordable products in an area where such offerings are currently limited. By providing a diverse range of housing choices, the development endeavors to address the issues or both housing affordability and choice identified in the Griffith Housing Strategy to meet the needs of a broad spectrum of residents while contributing to the overall vibrancy of the Hanwood village and community.

9 Appendix B – Other Sources

The following sources were reviewed as part of the analysis and land supply estimates.

A. Australian Bureau of Statistics (ABS) Census, 2011, 2016 and 2021 accessed via REMPLAN Community
B. Griffith Housing Strategy 2019
C. Griffith Housing Strategy 2019 – Summary of Strategies
D. Large Lot Residential – Supply and Demand Analysis and Strategy
E. Griffith City Council – Lake Wyangan Masterplan
F. Griffith Housing Forum 2024
G. Griffith Housing Supply Pipeline Audit
H. Grifith Ordinary Meeting Business Paper MM01, MM02
I. Griffith Land Use Strategy 'Beyond 2030' 2012
J. SQM Research – Residential Vacancy Rates

Griffith Housing Needs Addendum report

Leonard Road, Hanwood

Submitted to Hanwood Developments Pty Ltd

22 September 2025

GYDE

gyde.com.au

GYDE

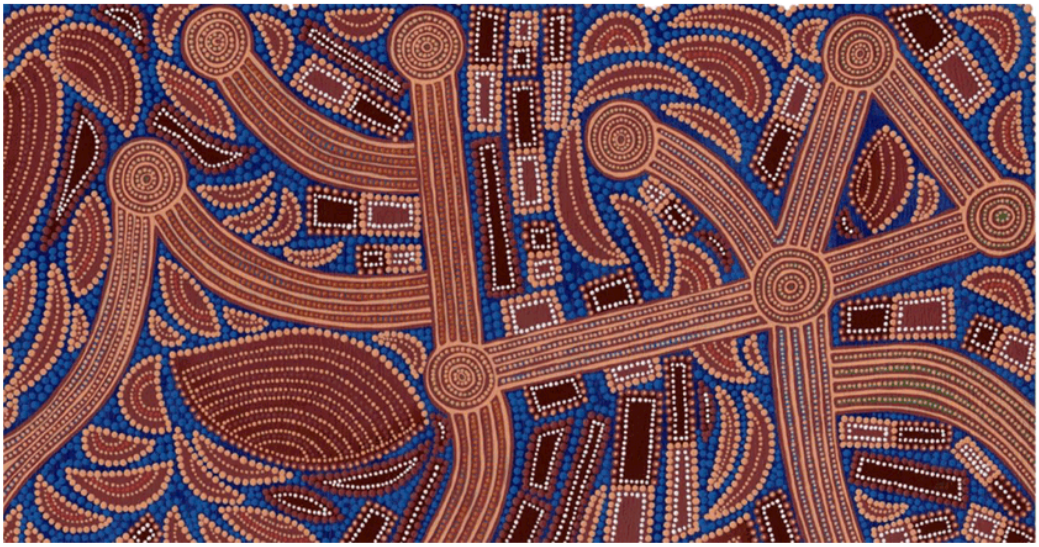
Gyde Consulting PTY LTD

P-24471

Acknowledgment of Country

Gyde Consulting acknowledges and pays respect to Aboriginal and Torres Strait Islander peoples past, present, Traditional Custodians and Elders of this nation and the cultural, spiritual and educational practices of Aboriginal and Torres Strait Islander people. We recognise the deep and ongoing connections to Country – the land, water and sky – and the memories, knowledge and diverse values of past and contemporary Aboriginal and Torres Strait communities.

Gyde is committed to learning from Aboriginal and Torres Strait Islander people in the work we do across the country.



Towards Harmony by Aboriginal Artist Adam Laws

This report was prepared by:

Approver:	Chris O'Dell
Author:	Chris O'Dell – Director
Project:	Leonard Road, Hanwood
Report Version:	Final

GYDE

Gyde Consulting PTY LTD

P-24471

Contents

GYDE

Purpose

The purpose of this addendum report is to provide key updates in regard to the housing need and demand for Griffith, building on the REMPLAN Need and Demand Assessment, November 2024 (NDA). The addendum report is designed to supplement the original REMPLAN Need and Demand Assessment, not replace it.

The addendum report incorporates the most recent revised forecasts of population growth and housing demand from the Draft Griffith Housing Strategy 2025 and updated ABS and NSW Government population and housing data. The Draft Griffith Housing Strategy 2025 also includes as appendices the 2019 Griffith Housing Strategy and the 2025 Socio-Economic and housing demand analysis report, which have also been used in the addendum report.

By aligning the earlier findings with the latest demographic, economic, and housing market trends, this addendum ensures Council and stakeholders have an up-to-date evidence base on the housing needs of Griffith LGA.

Population update

Population forecasts for Griffith show a clear upward revision over time. Figure 1 illustrates the different projections and the changes.

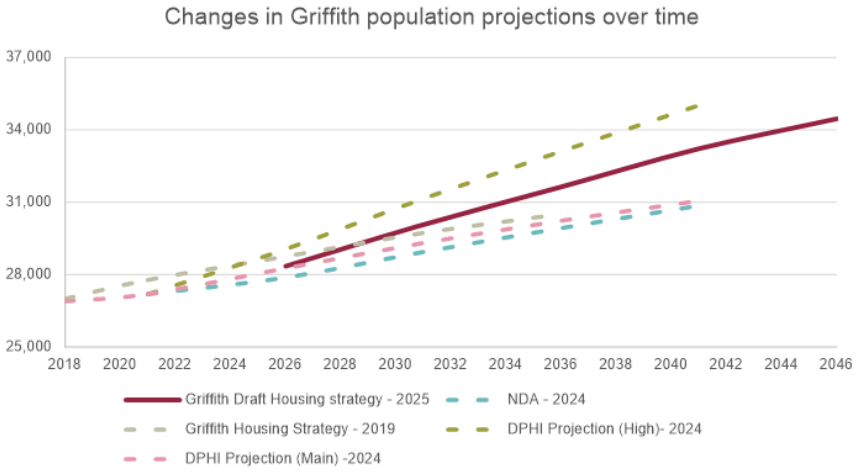


Figure 1 **Changes in population projections**

GYDE

The 2019 Housing Strategy projected modest growth of around 0.73% per year, with the population reaching approximately 30,500 by 2036. The NDA (2024) incorporated both the 2022 NSW DPE and Forecast.id projections, estimating a 2041 population between 30,874 and 31,641, with growth rates ranging from 0.5% to 0.9% annually.

The latest NSW DPHI main series, 2024, which at the time of publishing was the most likely scenario estimates a 2041 population of 31,059. The high series, which models a potential increase in migration, projects by 2041 a total population of 35,015.

The Draft Griffith Housing Strategy 2025 has projected a higher long-term population growth when compared to the historic projections, with the population expected to rise from 27,641 in 2023 to about 34,500 by 2046 – an increase of more than 7,300 people, or about 1% growth per year. Table 1 illustrates the differences in population projections when compared to the Draft Griffith Housing Strategy 2025.

By 2041, the Draft Griffith Housing Strategy 2025 has projected at least over 2,000 additional people when compared to the NDA and the DPHI main projection. To put that in context, 2,000 additional people is around 7% of the current total population of Griffith LGA, a significant increase. The Draft Griffith Housing Strategy 2025, is still below the High DPHI series, indicating that there is still some potential for a higher number by 2041.

Table 1 **Changes in population projections when comparing historic projections to the Draft Griffith Housing Strategy 2025**

	2036	2041
NDA – 2024	1,707	2,360
Griffith Housing Strategy – 2019	1,127	-
DPHI Projection (Main) – 2024	1,401	2,158
DPHI Projection (High) – 2024	-1,472	-1,798

GYDE

Housing needs update

The increase in population projection has been reflected in the updated future housing needs. Figure 2 illustrates the changes over time.

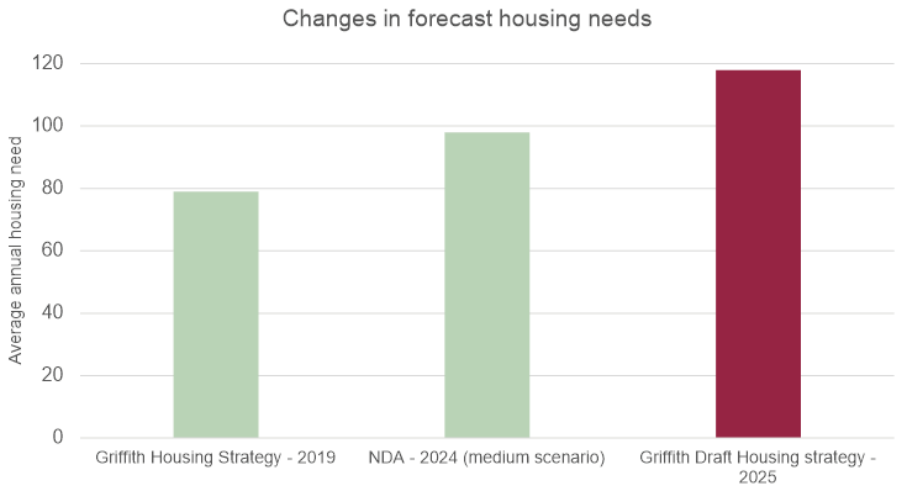


Figure 2 **Changes forecast housing needs**

The 2019 Housing Strategy estimated demand for about 1,744 additional dwellings by 2036, averaging roughly 79 homes per year. The 2024 NDA highlights even higher potential requirements for new housing depending on growth scenarios. It reported the need of between 76 and 130 dwellings annually.

By contrast, the Draft Griffith Housing Strategy 2025 has projected that between 2023 and 2046 the LGA will require around 2,725 new homes, or about 118 per year. The Draft Griffith Housing Strategy 2025 acknowledges that "*housing delivery is not keeping pace with demand"* highlighting how difficult it has been to deliver the homes needed for the growing population.

Between 2019 and 2025 strategies, the number of homes needed to accommodate the projected population increase has increased by 50%. In only 1 year, when comparing the NDA to the Draft Griffith Housing Strategy the housing need has increased by 24%.

GYDE

Is the current supply meeting the needs of the LGA?

The Draft Griffith Housing Strategy reports on availability of zoned land and housing approvals as a measure of supply. However, it does not report on the number of completed homes that have been built in the LGA or forecast the likely delivery of completed homes. There is also a absence of publicly available data that gives an accurate report on the number of homes that have been built.

Since the publication of the Draft Griffith Housing Strategy, the ABS has reported on the number of approvals for 2024/25. The latest approval data shows that there was a peak of approvals in 2023/24 of 221. The 138 approvals recorded in 2024/25 has returned back to the 5-year average of around 144 per year.

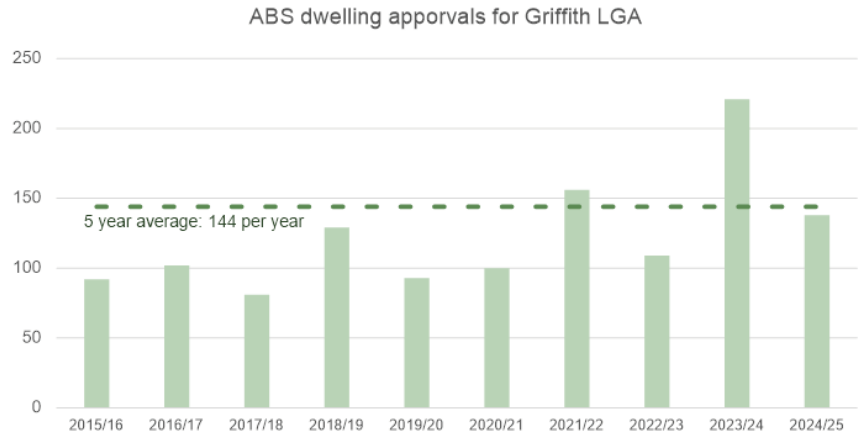


Figure 3 **ABS approval data for the Griffith LGA**

Conversion of approvals to completed homes

Understanding the number of approvals that turn into a completed home is needed to help assess if there is going to be an adequate supply of completed homes. The NSW Local Housing Strategy Guidelines 2018 – does not provide a specific guidance on the conversion rate that should be used.

However, the 2018 NSW Local Housing Strategy Guidelines, the 2025 Draft Griffith Housing Strategy and the 2024 and NDA all acknowledgement that dwelling approvals do not always translate directly into completed housing. In the absence of available data on housing completions, the NDA used conversion modelling based on NSW and Australian examples with a calculated conversion rate of 55% nationally and 44% in NSW.

Without completion data it is challenging to estimate Griffith's conversion rate. However, we can model the conversion rates of historic approvals to provide a guide on how likely the current housing pipeline will deliver on future housing supply. Table 2 illustrates the different scenarios of how many approvals are needed at different conversion rates to achieve 118 homes completed each year.

GYDE

Table 2 Number of approvals needed to meet different conversion rates

Conversion rate of approvals to completions	Estimated number of approvals needed	
90%	131	
80%	148	Equals the current 5 year approval average
55%	215	
44%	268	

In order for Griffith LGA to meet its housing needs of around 118 new homes each year, it would need to convert 80% of all of its approvals to a completed home or increase the number of approvals to account for a lower conversion rate. If the conversion rate was to align closer to the NSW conversion rates calculated in the NDA, then approvals would need to increase to 215 each year.

The 2025 Draft Housing Strategy states that "*housing delivery is not keeping pace with demand," citing delays in construction, high development costs, infrastructure constraints, and inefficiencies in the NSW planning system*". The strategy also notes that "*Griffith has enough zoned land for thousands of homes, the issue is the pace of delivery—many approvals don't translate quickly into built dwellings".*

These variables that do impact conversion rates are predominantly outside of Council's control. What Council can control is the release of development-ready land that has motivated landowners ready to go from approval to a completed home quickly.

Current supply is at a high risk of not delivering on the housing needs of the LGA

As highlighted earlier in this report, the 2025 Draft Griffith Housing Strategy does not indicate what the current and future supply of homes will be. It only reports on the availability of zoned or strategically identified land for future rezoning.

A breakdown of the total land and its status as reported in the 2025 Draft Griffith Housing Strategy is illustrated in figure 4.

In total, there are approximately 800 lots identified as development ready. Only 13% of the total land identified in the strategy. Conversely, 43% of land identified for future residential use is classified as strategic land, with a likely delivery time of at least 10-20 years depending on the management of a number of land constraints.

The analysis on the likely supply of completed housing from the identified development ready land has not been completed. If around 80% of approved dwellings in development ready land is constructed in the next 5 years, then supply will likely reach the housing need of 118 per annum. However, given the identified delivery challenges identified in the Draft Housing Strategy, relying on only the identified development land puts the LGA at a very high risk of not being able to meet its existing and future housing needs.

If one or two of the identified areas delay the deliver of homes, or do not build any homes then the LGA will not be able to meet its housing needs. There is no land identified as awaiting development consent, which indicates that there is not immediate future housing ready to be approved in the pipeline.

To give the LGA the best chance of meeting its future housing needs and provide a buffer to the know delays in housing construction, there are 2 actions that can be taken below:

1. Move more of the land classified as 1C to 4 to development ready by working with landowners to encourage development

GYDE

2. Find and work with motivated landowners in appropriately serviced and well located land that has the capacity to deliver new homes in the short to medium term.

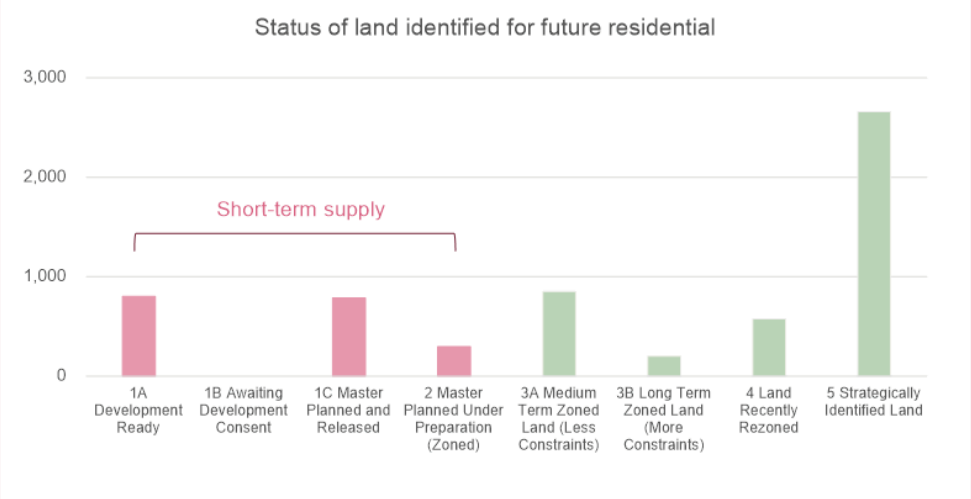


Figure 4 **Status of land identified for future residential from the 2025 Draft Griffith Housing Strategy**

Understanding undersupply and unmet demand

The 2025 Draft Housing Strategy indicates that there is strong evidence of unmet demand, or that the existing housing stock is not meeting the current population needs. The Draft Housing Strategy states that

"*Griffith is in a housing crisis: demand for affordable, diverse, and accessible rental opportunities is at an all-time high*"

This is reflected in key insights highlighted in both the 2025 Draft Housing Strategy and the 2024 NDA.

The 2025 Draft Housing Strategy states that Griffith has had a consistently tight rental market for the past decade, with vacancy rates never exceeding 2% between 2014 and 2024, and falling further since COVID-19. Vacancy rates have been at or below 1% since 2022. The 2024 NDA reaches similar conclusion reporting that Griffith's rental vacancy rate has been below 3% since 2010 and below 1% in recent years.

The 2025 Draft Housing Strategy does not report on an estimate on the unmet demand or likely under supply. The assumption in the 2025 Draft Housing Strategy is that in 2023, Griffith existing housing stock was meeting the populations needs. Or, the LGA is in a balanced market. Given that the strategy has declared that the LGA was in a housing crisis – this is clearly not the case.

To calculate an estimate of unmet demand and undersupply, the DPHI 2024 NSW population and housing projections implied dwelling demand can be used.

The "implied dwelling demand" is the estimated number of private dwellings that will be needed house the projected population based on how people live. How people live is defined by census data on number of

GYDE

people per household, separation, single-person households, couples, etc. The calculation factors in a rate of unoccupied dwellings.

The calculation is an estimate and provides a guide to if the current housing stock is meeting the needs of the existing population. Table 3 shows the implied dwelling need for Griffith in 2021 and surrounding LGAs and compares this to the number of occupied private homes counted in the 2021 census.

Table 3 Implied dwelling need compared to existing dwellings

	2021 Implied dwelling demand	2021 census count of dwellings	Difference	
			Number	%
Griffith	11,731	9,266	2,465	21%
Wagga Wagga	29,394	24,776	4,618	16%
Leeton	4,976	3,961	1,015	20%
Murrumbidgee	1,770	1,291	479	27%
Narrandera	2,831	2,141	690	24%
Temora	2,986	2,393	593	20%

Griffith in 2021 has a potential undersupply of around 2,500 homes when derived from the NSW DPHI implied dwelling demand. When compared to other LGAs surrounding Griffith, has a similar undersupply than its neighbours.

Based on this preliminary analysis, if Griffith LGAs population was to stay stable and build on its Draft Housing Strategy target of 118 homes each year, it would take over 20 years to reach its implied dwelling need.

Conclusion

This addendum report confirms that Griffith is facing a significant and growing housing challenge. Or as stated in the 2025 Draft Housing Strategy – the LGA is facing a housing crisis.

Population forecasts have been progressively revised upwards, with the 2019 Housing Strategy projecting around 30,500 residents by 2036 and 1,744 new dwellings (about 79 per year), and the 2024 REMPLAN Need and Demand Assessment (NDA) increasing this to between 30,874 and 31,641 people by 2041, requiring 76–130 dwellings per year.

The Draft Griffith Housing Strategy 2025 projects even stronger growth, with the population reaching around 34,500 by 2046 and requiring about 2,725 new dwellings (118 per year). This represents a 50% increase in projected housing need compared with the 2019 Strategy and a 24% rise compared with the NDA prepared just one year earlier.

Despite these revised forecasts, housing delivery is not keeping pace with demand. Vacancy rates have remained below 2% for a decade and below 1% since 2020, highlighting severe unmet demand.

An analysis of NSW DPHI implied dwelling demand shows Griffith had a potential undersupply of around 2,500 homes in 2021 — equivalent to a 26% shortfall of existing housing stock.

While the LGA has enough land identified for thousands of homes, only 13% is classified as development-ready, creating a high risk that supply will continue to lag behind demand. Ongoing action will therefore be

GYDE

required from Council, working closely with the development industry and landowners, to accelerate delivery, unlock development-ready land, and support a more diverse housing mix. Without this coordinated effort, Griffith will remain in a state of housing crisis, with affordability and accessibility pressures intensifying across the community.

Sources

- **Griffith Housing Strategy 2019** – Judith Stubbs & Associates, prepared for Griffith City Council.
- **Draft Griffith Housing Strategy 2025** – Griffith City Council.
- **REMPLAN Need and Demand Assessment (November 2024)** – Prepared by REMPLAN for Stimson Advisory.
- **Australian Bureau of Statistics (ABS)** – Regional Population Estimates (2001–2023); Census (2016, 2021); Building Approvals and Completions data (2015–2024).
- **NSW Department of Planning, Housing and Infrastructure (DPHI)** – NSW Population and Housing Projections 2024 (Main and High Series, Implied Dwelling Demand).
- **Forecast.id** – Griffith population and dwelling forecasts, commissioned by Council.
- **NSW Local Housing Strategy Guidelines 2018** – Department of Planning and Environment.

TRIAXIAL
CONSULTING

COMPLEX PROBLEMS
RESOLVED SIMPLY

Suite 12, Level 14, 327 Pitt St
Sydney NSW 2000
triaxial.com.au
1300 874 294

HANWOOD ESTATE
43 & 51 LEONARD ROAD AND 11300 KIDMAN WAY, HANWOOD, NSW, 2680

INFRASTRUCTURE REPORT – POTABLE WATER, SEWER & STORMWATER

Prepared for: **Cite Group Pty Ltd**
Suit 2, Level 14, 99 Bathurst Street
Sydney, NSW, 2000

Prepared by: **Triaxial Consulting Pty Ltd**
Suit 12, Level 14, 327 Pitt Street
Sydney, NSW, 2000

24 JUNE 2025

Document Control

Client	Cite Group Pty Ltd		
Prepared By:	Triaxial Consulting Pty Ltd		
Report Author	Guill de Swardt		
File Reference:	TX18130.00-RPT-01-GU.DS		
Report Date:	24 June 2025		
Current Revision:	1		
Revision History:	**Report Author**	**Reviewed By**	**Report Date**
0	GU.DS	BE.W	11/04/2025
1	GU.DS	BE.W	24/06/2025

TABLE OF CONTENTS

1. INTRODUCTION

1.1. PROJECT BACKGROUND

Triaxial consulting have been engaged by Cite Group to prepare an Infrastructure servicing report as part of a Planning Proposal for a new residential development at 11300 Kidman Way, 43 Leonard Road and 51 Leonard Road, Hanwood.

The proposed development site (the Site) forms part of a three stage Griffith City Council (GCC) masterplan prepared for the Hanwood Growth Area by Stantec in 2024. The Site was labelled as Stage 2 in GCC Masterplan, as shown in Figure 1 below, and consisted of 280 residential lots and two stormwater basins.

Refer to Appendix A for the GCC Masterplan.

Figure 1: Stantec Masterplan for the Hanwood Growth Area

Cite Group engaged MDP Architecture (MDP) to develop a revised masterplan for the Stage 2 site, consisting of a variety of land uses, including residential lots, medium density lots, commercial lots, open space areas, sporting courts / fields and a large wetlands area. Refer to Figure 2 below and Appendix B for the proposed MDP masterplan (June 2025) for Stage 2.

Cite Group is in the process of preparing a planning proposal for submission to Griffith City Council and the New South Wales Department of Planning and Environment (DPE). The planning proposal will aim to rezone the existing site from RU1 Primary Production and RU6 Transition to a variety of land uses as mentioned above. This will allow for the development of

the MDP Stage 2 masterplan to provide housing and critical infrastructure to the area, which will also unlock future residential developments near the Hanwood and Griffith town centres.

Figure 2: Proposed Stage 2 Masterplan

1.2. EXISTING SITE

The Site consist of three allotments located at 11300 Kidman Way, 43 Leonard Road and 51 Leonard Road, Hanwood and has a total size of 46.24. The Site is bounded by Leonard Road to the South, Old Willbriggie Road to the East and Kidman Way to the West.

As mentioned above, the existing land use for the site is primarily agricultural and consists of three farms with residential dwellings on each. There is also an existing Murrumbidgee Irrigation (MI) channel that flows through the centre of the site, from where it continues to drain along Leonard Road to the West and crosses under the Kidman Way at the Southwest corner of the site.

1.3. PURPOSE OF THIS REPORT

The purpose of this report is to provide a summary of the proposed servicing strategy for the new development at 11300 Kidman Way, 43 Leonard Road and 51 Leonard Road, Hanwood, to accompany the planning proposal for the rezoning of the existing site.

The report will provide details of the stormwater, potable water and sewer infrastructure upgrades required to service the new development based on the proposed masterplan prepared by MDP (June 2025). The report will consider the existing site and its services, the proposed development and its servicing requirements and will provide a detailed summary of the infrastructure and services upgrades required to meet the demand requirements for the Stage 2 MDP masterplan.

The report will also discuss the opportunities and benefits that the proposed development provides for the Hanwood and Griffith Areas, specifically providing critical infrastructure such as a new potable water line from Hanwood to Griffith that will provide connection points for multiple other developments along Old Willbriggie Road.

2. INFRASTRUCTURE AND UTILITIES

2.1. STORMWATER

2.1.1. EXISTING SITE AND INFRASTRUCTURE

The Site currently consist of three large properties at 11300 Kidman Way, 43 Leonard Road and 51 Leonard Road, Hanwood and is bound by agricultural land to the North, Old Willbriggie Road to the East, Leonard Road to the South and Kidman Way to the West.

The Site is largely undeveloped, consisting primarily of agricultural land with small residential and farm buildings spread across the site. The site falls away from the intersection of Leonard Road and Andreatta Road towards Kidman Way to the West at a grade of approximately 0.3% and across the northern boundary of 51 Leonard Road towards 43 Leonard Road at a grade of approximately 0.5%. There is a catchment to the eastern side of the site which falls towards Old Willbriggie Road at a grade of approximately 0.3%. The overall grade of the site from Old Willbriggie Road at the Eastern end of the site to Kidman Way on the Western side is approximately 0.15%.

There is an existing Murrumbidgee Irrigation (MI) drainage channel that runs from North to South through the middle of the site, carrying runoff from upstream catchment as well as a portion of the site. The MI channel discharges into an open drainage channel which runs within the road corridor along Leonard Road towards the West, where it discharges under Kidman way via a culvert crossing.

There is also an open drainage channel that runs along the Western frontage of the site along Kidman Way, which captures runoff from the site and upstream catchments to the North and drains to the South where it intersects with the Leonard Road channel before it crosses Kidman Way. It is noted that the open drainage channel along Leonard Road also appears to capture flows from the South of Leonard Road via headwalls at multiple locations.

To the West of the intersection of Kidman Way and Leonard Road, there seems to be a pump and piped drainage system that pumps stormwater to the Southwest, where it ultimately connects to the wider network of Murrumbidgee Irrigation channels.

It's assumed that tile drainage within the existing agricultural portions of the site forms part of the existing site drainage system, draining into the MI channel.

The subject site is prone to flooding during large rain events, therefore a Flood Impact and Risk Assessment for the subject site has been prepared by Torrent Consulting (29/01/2025) (ref: DJW: L.T2411.002.docx) and should be read in conjunction with this report.

Refer to Figure 3 below and Appendix C for a summary of the existing site conditions.

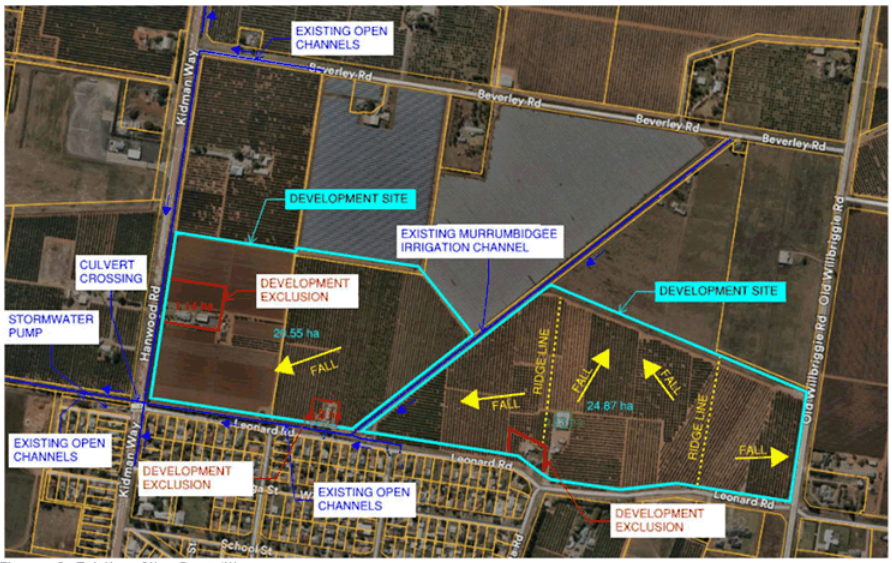


Figure 3: Existing Site Conditions

2.1.2. PROPOSED DEVELOPMENT AND REQUIREMENTS

The proposed development is part of the Hanwood Growth Area masterplan developed by Stantec in 2024 for Griffith City Council and was noted as Stage 2 in the masterplan as shown by Figure 1. The proposed Stage 2 masterplan, developed by MDP in June 2025, was used to form the basis of the proposed stormwater management strategy for the site.

The development proposes to change the land use from what is currently primarily agricultural, to a mixture of residential and commercial uses. This would result in the 46.25 ha site being split into the following areas:

- Open Space – 3.29 ha
- Wetland Drainage – 3.48 ha
- Low Density Residential – 20.68 ha
- Commercial, Industrial & Medium to High Density Residential – 4.32
- Road Reserve – 12.48
- Existing use to be retained – 2 ha (Excluded from Table 1)

Refer to Figure 4 below and Appendix D for a layout of the proposed areas.

In accordance with GCC's Onsite Stormwater Detention (OSD) Policy, an OSD is required for all subdivision developments with the primary aim of ensuring new developments do not increase the volume or peak discharge runoff within a catchment or modify temporal

distribution of stormwater discharge whereby flood impacts are adversely affected at sites situated downstream during critical storm events up to and including the 1% AEP event.

Furthermore, OSD solutions should create a sustainable solution for stormwater flow management, which complements Water Sensitive Urban Design (WSUD) aspects of the development. There should neither be an increase in site discharge to the downstream drainage system nor a reduction in the volume of storage provided within a development.

For catchments south of the main branch channel (Griffith City), as in this case, it is understood that developments will be assessed on a case-by-case basis with the requirement of limiting post-development flows to pre-development flows within the village of Hanwood. It is noted in GCC's Onsite Stormwater Detention Policy that in some instances, release of stormwater earlier on in a rainfall event may be more beneficial when considering the overall impacts on flooding.

2.1.3. PROPOSED STORMWATER MANAGEMENT STRATEGY

The stormwater management strategy for the proposed development is based on GCC's requirement to reduce the post-development flows to pre-development flows during critical storm events up to and including the 1% AEP event, as well as managing water quality prior to discharging flows from the site in line with WSUD best practices.

A summary of the proposed OSD and WSUD management measures for the development has been provided in section 2.1.3.1 and 2.1.3.2 below.

2.1.3.1. ON-SITE STORMWATER DETENTION (OSD)

A preliminary catchment and hydrological analysis have been carried out using DRAINS to obtain preliminary OSD volumes to limit maximum post-development flows to maximum pre-development flows during critical storm events up to and including the 1% AEP event.

The stormwater system has been modelled using the extended rational method in accordance with Australian Rainfall and Runoff (ARR – Engineers Australia). A summary of the DRAINS catchment parameters has been provided in Table 1 below. Catchment areas have been calculated as shown in Figure 4, with fractions impervious assumed based on section 4.14 of GCC's Engineering Guidelines for Subdivisions. Where fractions impervious where not provided, these were obtained from the Queensland Urban Drainage Manual (QUDM). Pipe flow times and standard inlet times have been estimated from parameters outlined in QUDM.

Table 1: Drains Catchment Parameters

CATCHMENT	AREA (HA)	FRACTION IMPERVIOUS	AREA IMPERVIOUS (HA)	PIPE FLOW TIME (MINUTES)	IMPERVIOUS INLET TIME (MINUTES)	TOC IMPERVIOUS (MINUTES)	AREA PERVIOUS (HA)	PERVIOUS INLET TIME (MINUTES)	TOC PERVIOUS (MINUTES)
PRE DEV	44.25	0.00	0.00	13	5	18	44.25	20	20
POST DEV UNMITIGATED	44.25	0.53	23.53	13	10	23	20.72	15	28
OPEN SPACE	3.29	0.00	0.00	13	5	18	3.29	15	28
WETLAND DRAINAGE	3.48	0.00	0.00	13	5	18	3.48	15	28
NORMAL HOUSE BLOCKS	20.68	0.42	8.69	13	5	18	11.99	15	28
ROAD RESERVE	12.48	0.85	10.61	13	5	18	1.87	15	28
COMMERCIAL, INDUSTRIAL AND MEDIUM TO HIGH DENSITY RESIDENTIAL	4.32	0.98	4.23	13	10	23	0.09	15	28

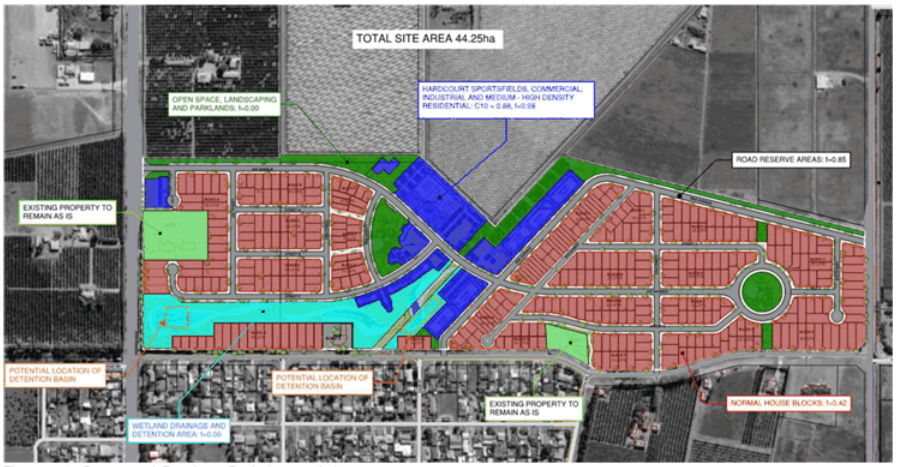


Figure 4: Concept Design Catchment Areas

The OSD basin have been modelled with an area of 5200m² and a total depth of 1.75m with a DN900mm outlet pipe and no orifice plate. The overflow weir was set at a depth of 1.4m. For the purposes of this preliminary investigation. Catchments were modelled directly to the OSD basin as shown in the schematic DRAINS layout in Figure 5 below.

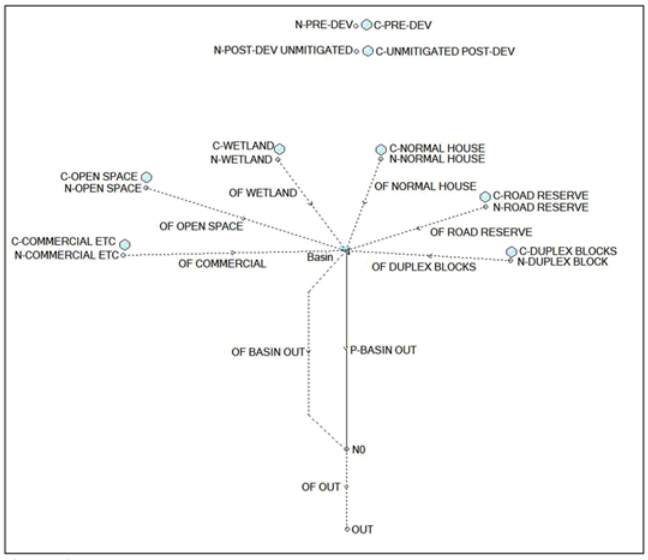


Figure 5: Drains Layout

Table 2 provides a summary of the maximum pre- and post-development flows from the site. None of the maximum pre-development flows calculated are exceeded by the maximum post-development flows. Pending any input from Council, it can be concluded that it will be possible to achieve Council's quantitative requirements under this concept proposal given the overall footprint of the wetlands area.

Table 2: Summary of Drains Results

SUMMARY OF DRAINS RESULTS		
STORM EVENT (% AEP)	PRE-DEVELOPMENT DISCHARGE (m^3/S)	POST-DEVELOPMENT DISCHARGE (m^3/S)
20	0.81	0.80
10	1.03	1.03
5	1.28	1.23
2	1.69	1.48
1	2.09	1.80

2.1.3.2. WATER SENSITIVE URBAN DESIGN (WSUD)

As per the GCC engineering guidelines for subdivisions, stormwater drainage design is to include the principals of Water Sensitive Urban Design (WSUD) as part of the subdivision works. GCC's guidelines state that stormwater designs are to look at integrating the management of the water cycle with the planning and design of the development. To inform these designs,

Council's guidelines provide reference to multiple documents for guidelines on WSUD design, specifically:

- Water Sensitive Urban Design, Melbourne Water, 2005, WSUD Engineering Procedures, CSIRO Publishing
- Urban Stormwater, Best Practices, Environmental Guidelines, Victorian Stormwater Committee, 1999
- Managing Urban Stormwater – Series of Documents, Department of Environment and Conservation, NSW, 2006-2008
- Australian Runoff Quality, a Guide to Water Sensitive Urban Design

Based on these references, the development will look at incorporating WSUD Best Planning Practices (BPP) and Best Management Practices (BMP) for all areas of the water cycle, including public open spaces, housing layouts, road layouts and streetscaping. This means that water quality will be managed at all levels of the development, including at a lot level, street level, precinct level and regional level.

The WSUD strategy for the development will look at incorporating the following primary, secondary and tertiary treatment measures into the design to achieve the BPP and BMP's mentioned above.

- Primary Treatment
  - Gross Pollutant Traps (GPT's)
  - Trash Racks
  - Sediment Traps
  - Oil Collectors
- Secondary Treatment
  - Grassed Swales and Rain Gardens
  - Vegetated Buffer Strips along waterways
  - Detention Basins and Bio-filtration Basins
- Tertiary Treatment
  - Wetlands
  - Ponds

2.1.3.3. STORMWATER MANAGEMENT SUMMARY

The proposed stormwater management strategy discussed in section 2.1.3.1 and 2.1.3.2 above can be summarised as follows:

- Provision of 7280m3 (total) of detention basin storage. Due to the site layout two (2) separate detention basins are proposed to the east of the existing open channel drain running through the middle of the site and within the wetlands area in the Southwestern corner of the site. The basin to the east of the existing open channel drain running through the middle of the site will discharge to the existing open channel drain running through the middle of the site just upstream of the connection point to the existing open channel drain running along part of the southern property frontage along Leonard Road via an outlet

pipe to headwall and overflow swale to future design. The basin within the wetlands area in the Southwestern corner of the site will discharge to the open drainage channel running along part of the Southern site frontage along Leonard Road just before crossing under Kidman way via an outlet pipe to headwall and overflow swale to future design.

- Maximum water depth of 1.75m during the 1% AEP storm event, plus 150mm freeboard at each detention basin.
- Provision of kerb & gutter, pits, manholes and channel drains to future design to convey hardstand run-off to an underground stormwater drainage system and ultimately the detention basins.
- Provision of an underground stormwater drainage system to future design to convey future lot runoff to detention basins.
- Provision of a series of primary, secondary and tertiary stormwater treatment measures to achieve Gross Pollutant, TSS, Nitrogen and Phosphorus reduction targets.

2.1.4. BENEFITS AND OPPORTUNITIES

Given the overall footprint of the proposed wetlands area in the MDP masterplan, and the relative size of the on-site stormwater detention required for the Stage 2 development, there are significant benefits and opportunities available in utilising the wetlands area for both flood storage and as a regional basin.

As per the Torrent Consulting FIA Report (January 2025), if the proposed wetlands are designed and constructed to detain stormwater flows from upstream catchments and the development, the flood levels and flood footprint across the Hanwood area could be significantly reduced.

In addition to providing flood storage for the existing upstream catchments and the proposed Stage 2 development, there could also be an opportunity to allow for additional storage within the wetlands to cater for Stage 1 and 3 of the GCC masterplan or for other upstream developments that is currently draining into the Murrumbidgee Irrigation channel that runs through the site.

2.2. POTABLE WATER

2.2.1. EXISTING SITE AND INFRASTRUCTURE

The existing potable water supply to the Site is located along Kidman Way, Leonard Road and Old Willbriggie Road as per the Before You Dig Australia (BYDA) information available.

As part of the initial consultation between Cite Group and GCC, GCC confirmed that potable water supply is available to the proposed development, however it will require the augmentation of the existing trunk water mains between Hanwood and Griffith to meet the future demands. Refer to Appendix E for the correspondence between GCC and Cite Group.

2.2.2. PROPOSED DEVELOPMENT AND POTABLE WATER DEMAND

The proposed development is discussed in detail in Sections 1 and 2 above. Based on the proposed masterplan for Stage 2, water demand calculations were undertaken and have been provided in Appendix F. Water demand for the adjacent development stages 1 and 3 from the GCC masterplan were also calculated and included in Appendix F.

The potable water demand calculations were based on demand rates from Hunter Water version of WSA03 for residential house at Maitland / Cessnock LGA. The general WSA03 code requires the design engineer to refer to the Water Agency (GCC) for their typical peak hour demand rates. These demand rates were not available at the time of preparing this report. The Hunter Water version provides typical demand rates that can be used for planning purposes. The Maitland / Cessnock area is considered consistent with the development type in Griffith.

Based on the water demand calculations, it was confirmed that a DN250 water main along Leonard Road and Old Willbriggie Road would be sufficient to service the proposed lots for all three stages of the development assuming Stages 1 and 3 is developed as per the Council masterplan and Stage 2 is developed as per the MDP masterplan.

Therefore, as described above, augmentation of the existing trunk mains would be required from Overs Road, along Old Willbriggie Road, and into Hanwood to cater for all three stages of the future Hanwood development, as well as 550 additional lots along Old Willbriggie Road, Watkins Ave and Overs Road. *Figure* 6 below shows the extent of the potable water main upgrades required for the proposed development, as well as Stages 1 & 3 of the Council masterplan and future developments between Hanwood and Griffith.

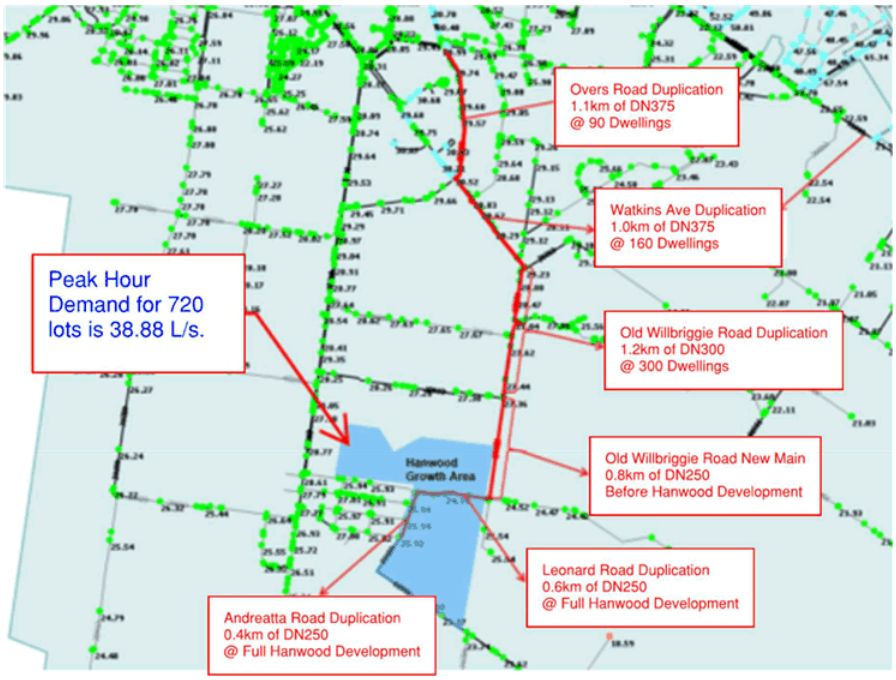


Figure 6: Required Potable Water Main Augmentation

The potable water demand calculations for Stages 1, 2 and 3 of the Hanwood Growth Area has been based off the following and is summarised in *Table 3* below:

- Demand Assumptions Taken from WSA03-HWC Version for Cessnock / Maitland Table HW 2.4
- Diversity factor has been calculated for residential & medium density lots
- Stage 1 and 3 from the GCC Masterplan
- Stage 2 from the MDP Masterplan
- Total number of lots for Stages 1-3 = 720

Table 3: Water Demand Summary

Average Daily Flow Rate (L/s/ET)	6.51 L/s
Peak Day Demand (L/s/ET)	19.25 L/s
Peak Hour Demand PHD (L/s)	38.88 L/s
Extreme Day Demand (L/s)	498.69 L/s
95th Peak Hour Demand 95 PHD (L/s)	700.77 L/s

2.2.3. BENEFITS AND OPPORTUNITIES

The augmentation works described in section 2.2.2 above as part of the Stage 2 works will provide security of supply for the future Stage 1 and Stage 3 developments, as well as the 550 additional lots planned along Old Willbriggie Road, Watkins Ave and Overs Road as shown in *Figure* 6 above.

2.3. SEWER

2.3.1.EXISTING SITE AND INFRASTRUCTURE

Based on BYDA information, the site currently has one sewer connection at 43 Leonard Road, with another connection within the road reserve near 85 Leonard Road. From these connections the existing sewer drains via a series of sewer pump stations (SPS) through Hanwood to the main SPS (HA1) on School Street. Refer to *Figure 7* below from the GCC Development Servicing Plan for Sewerage (HydroScience, 2012) which shows the HA1 SPS, as well as other existing SPS's within the Hanwood Area. PSHA7 shown in *Figure 7* was noted as a future SPS within the report and it was shown to be located within the Stage 1 area of the GCC masterplan. There is no information available to confirm whether SPS PSHA7 has been constructed since the development of this servicing plan.

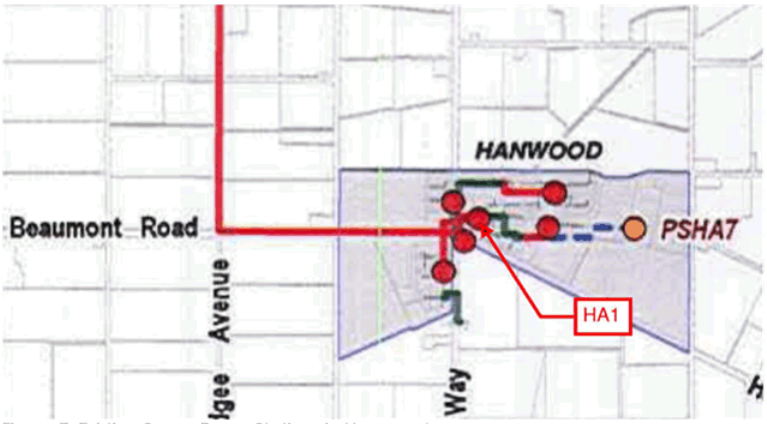


Figure 7: Existing Sewer Pump Stations in Hanwood

2.3.2.PROPOSED DEVELOPMENT AND REQUIREMENTS

As per the initial consultation between Cite Group and GCC, attached in Appendix E, the proposed Stage 2 development will only have to provide its own SPS's to pump sewerage from the Stage 2 development to the Hanwood HA1 SPS on School Street, from where the existing SPS HA1 will pump the sewerage towards Griffith. A summary of the proposed development yield and design flows is provided in *Table 4* below. Refer Appendix G for the Stage 2 and adjacent stages 1 and 3 sewer design flow calculations. No information was available on the HA1 pump duty and rising main diameter at this stage. It is assumed that the existing SPS HA1 has sufficient capacity to service the proposed site and also adjacent stages 1 and 3.

2.3.3.PROPOSED SEWER MANAGEMENT STRATEGY AND DESIGN FLOWS

As agreed with GCC, the proposed Lots will be drained via a gravity sewer network to strategically placed sewage pumps stations (SPS), from where it will discharge into GCC's SPS HA1 on School Street.

The design flows for future SPS for Stages 1, 2, & 3 has been calculated in accordance with the Sewage Code of Australia WSA02, which states that the design flow should be calculated using a theoretical loading for Average Dry Weather Flow of 0.0021L/s/EP, with the design flows summarised in Table 4 below.

The sewerage flows were calculated for Stage 1 and 3 using the GCC masterplan prepared by Stantec, with the Stage 2 flows calculated for the proposed development masterplan prepared by MDP as shown in Appendix B.

For Stage 2, it was assumed that two SPS's will be required for the proposed development, with one located to the East and another to the West of the proposed wetlands area. The Sewerage design flows in *Table 4* and the Emergency Storage in Section 2.3.4 below have therefore been split into flows and volumes for the Eastern and Western SPS's.

Table 4: Sewerage Design Flow

Catchment	EP	ADWF (L/s)	PDWF (L/s)	PWWF (L/s)
Stage 1	438	0.919	3.10	8.50
Stage 2 - East	1237	2.598	8.45	18.1
Stage 2 - West	615	1.292	4.51	10.6
Stage 3	193	0.404	1.28	5.40
Design Flow				**42.6**

2.3.4.EMERGENCY STORAGE

The approximate emergency storage volume associated with the design flow at each of the three stages have been listed below. The emergency storage volumes have been calculated for 4 hours of Average Dry Weather Flow (ADWF), with the ADWF summarised for each SPS below.

- SPS 1 ADWF = 0.919L/s
  4 hours ADWF volume for SPS 1 catchment = **13.2m³**.
- SPS 2 - East ADWF = 2.598L/s
  4 hours ADWF volume for SPS 2 East catchment = **37.4m³**.
- SPS 2 - West ADWF = 1.292L/s
  4 hours ADWF volume for SPS 2 West catchment = **18.6m³**.
- SPS 3 ADWF = 0.404L/s
  4 hours ADWF volume for SPS 3 catchment = **5.8m³**.

2.3.5. BENEFITS AND OPPORTUNITIES

There is an opportunity for future planning and consolidation of the sewerage system for all three development stages. SPS's could be suitably sized and located to minimise the number of pump stations that GCC would ultimately have to own, operate and maintain. GCC could

maximise the size and extent of the gravity sewerage system as this would simplify construction for future stages and reduce GCC's asset management obligations.

Examples of this includes the allowance for sufficient capacity within the Stage 2 Eastern SPS rising main and emergency storage to cater for the Stage 1 and 2 developments to drain via a gravity line to the SPS, from where it can be pumped to the Hanwood HA1 SPS.

Another opportunity associated with the proposed Stage 2 development includes the provision of lead-in lines or future connection points for developments to the North of the Stage 2 site. Allowance could be made within the sewer main and Stage 2 Western SPS to cater for sewerage design flows from sites to the North. The development of Stage 2 provides GCC with an opportunity to undertake a holistic review of the future Hanwood Growth Area and strategically locate and design SPS's as part of the Stage 2 development to cater for current and future design flows.

3. CONCLUSION

Triaxial consulting were engaged by Cite Group to prepare an Infrastructure servicing report as part of a Planning Proposal for a new residential development at 11300 Kidman Way, 43 Leonard Road and 51 Leonard Road, Hanwood.

The proposed development site forms part of a three stage GCC masterplan prepared for the Hanwood Growth Area by Stantec in 2024. The development site was labelled as Stage 2 in Council's Masterplan, as shown in Appendix A.

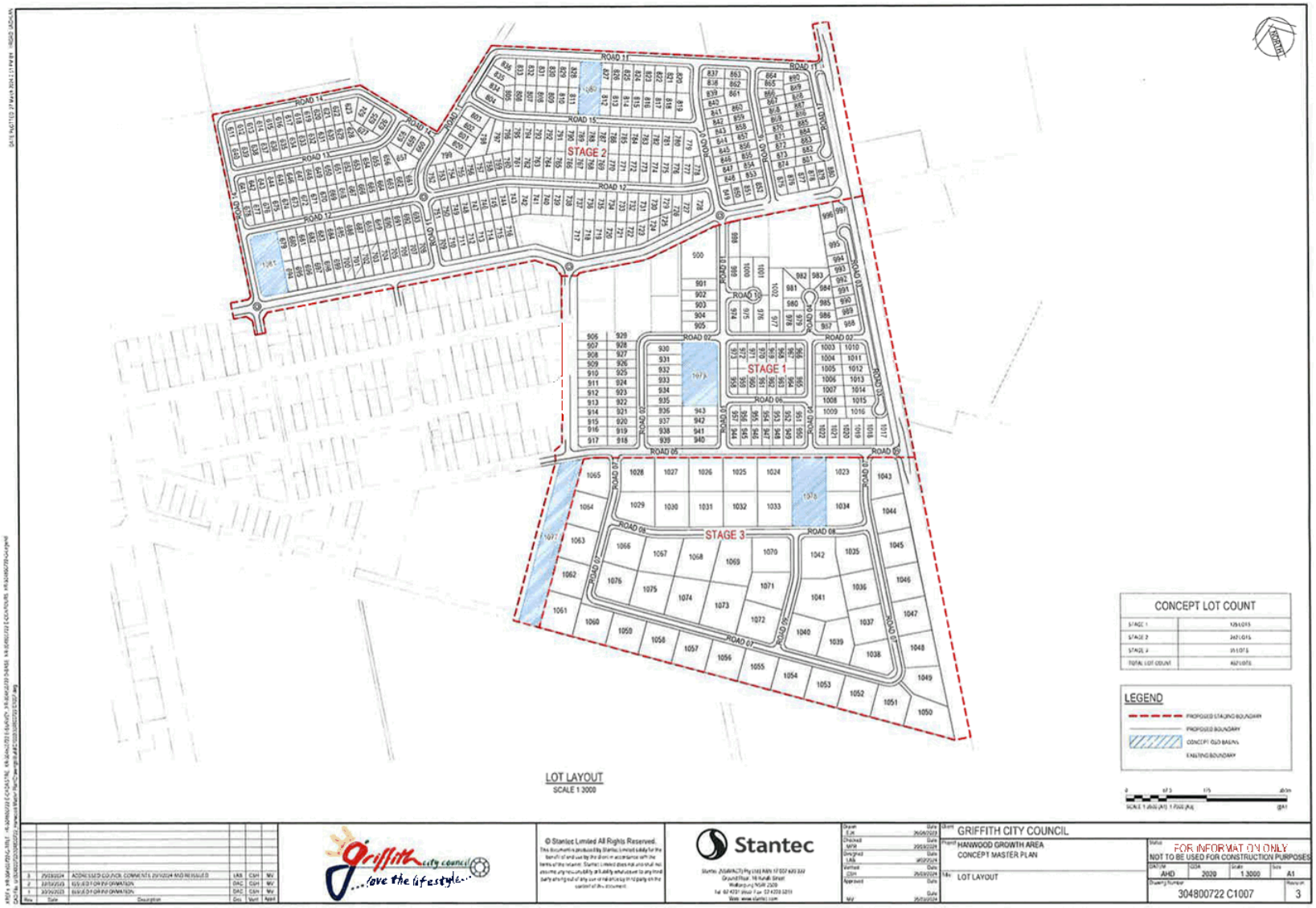
The proposed development for Stage 2, as shown in Appendix B, consist of a variety of land uses and would provide up to 720 new residential lots, as well as open spaces, commercial spaces and wetland areas.

As discussed in section 2 of this report, the site will require stormwater, potable water and sewer infrastructure to facilitate the development. The purpose of this report was therefore to assess the existing infrastructure and services, determine the demand and requirements based on the MDP Masterplan (June 2025) and to specify how these requirements could be met through the augmentation of existing services or the provision of new infrastructure as part of the Stage 2 development.

The MDP masterplan for Stage 2 proposes a wetlands area of up to 3.48ha, which provides sufficient space to allow for on-site stormwater detention and water quality treatment for the proposed development. It also provides the opportunity for localised and regional flood storage, as shown by the Torrent Consulting Flood Impact Assessment Report (29/01/2025).

With regards to the potable water and sewer, the client has confirmed with GCC that the demand for potable water and sewer can be met, but that it will require augmentation of existing potable water mains between Hanwood and Griffith, as well as the construction of new SPS's and rising mains to connect the sewerage flows to the existing Hanwood SPS HA1. These works will not only unlock the development of Stage 2, but it will also provide potable water for Stages 1 and 3, as well as potable water for up to 550 future lots between Hanwood and Griffith. The sewer infrastructure proposed provides GCC with an opportunity to plan for future developments and install critical infrastructure as part of the Stage 2 works that will not only unlock future developments but helps GCC reduce their asset management obligations by consolidating the need for individual SPS's for each future development.

APPENDIX A – COUNCIL MASTERPLAN


STAGE 1
STAGE 2
STAGE 3
LOT LAYOUT
SCALE 1:3000
CONCEPT LOT COUNT
LEGEND
GRIFFITH CITY COUNCIL
HANWOOD GROWTH AREA
CONCEPT MASTER PLAN
LOT LAYOUT
FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
304800722 C1007
Stantec
© Stantec Limited All Rights Reserved.

APPENDIX B – MDP ARCHITECTURE MASTERPLAN

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

GENERAL NOTES
Morrison Design Partnership Pty. limited accept no responsibility for the usability, completeness or accuracy of data transferred electronically. Recipients should when necessary request a hard copy version for verification. This drawing shall be read in conjunction with all architectural and other consultants drawings, specifications and with such other written instructions as may be issued during the course of the contract. Figured dimensions shall be taken in preference to scaling. All level, datum points and dimensions on this drawing shall be verified by the builder on site. All discrepancies shall be referred to the architect for direction before proceeding with any works.

DO NOT SCALE THIS DRAWING.

MDP acknowledges the Cammeraygal people as the traditional custodians of this land

©Copyright
These drawings and designs and the copyright there of are the property of **Morrison Design Partnership Pty. Ltd** and must not be altered, used, retained, or copies wholly or in part without the written permission of Morrison Design Partnership Pty. Ltd. ACN 001 595 288.

SURVEY NOTES
Survey data included in this drawing is based on a survey drawing and is provided for preliminary design purposes only. As this drawing is based on information supplied by others, reference must be made to original survey drawings verifies against site conditions.

REV	DATE	AMENDMENT	INITIALS
L	08/08/2026	FOR PLANNING PROPOSAL	AS

CLIENT
HANWOOD DEVELOPMENT PTY LTD

PROJECT
HANWOOD MASTER PLAN

Lot/Section/Plan no
150/-/DP751709
287/-/DP751709
1623/-/DP257265

DRAWING TITLE
CONCEPT MASTER PLAN

FOR PLANNING PROPOSAL

PROJECT NO.	DRAWING NO.	REVISION
3340	A5000	L
SCALE	: 1:6000 @ A3	
DRAWN	: AS	
DATE	: 08/08/2025	

www.mdpa.com.au NSW Nom Architect: Glen Ollerton #7621

mdp architecture

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

APPENDIX C – EXISTING SITE PLAN

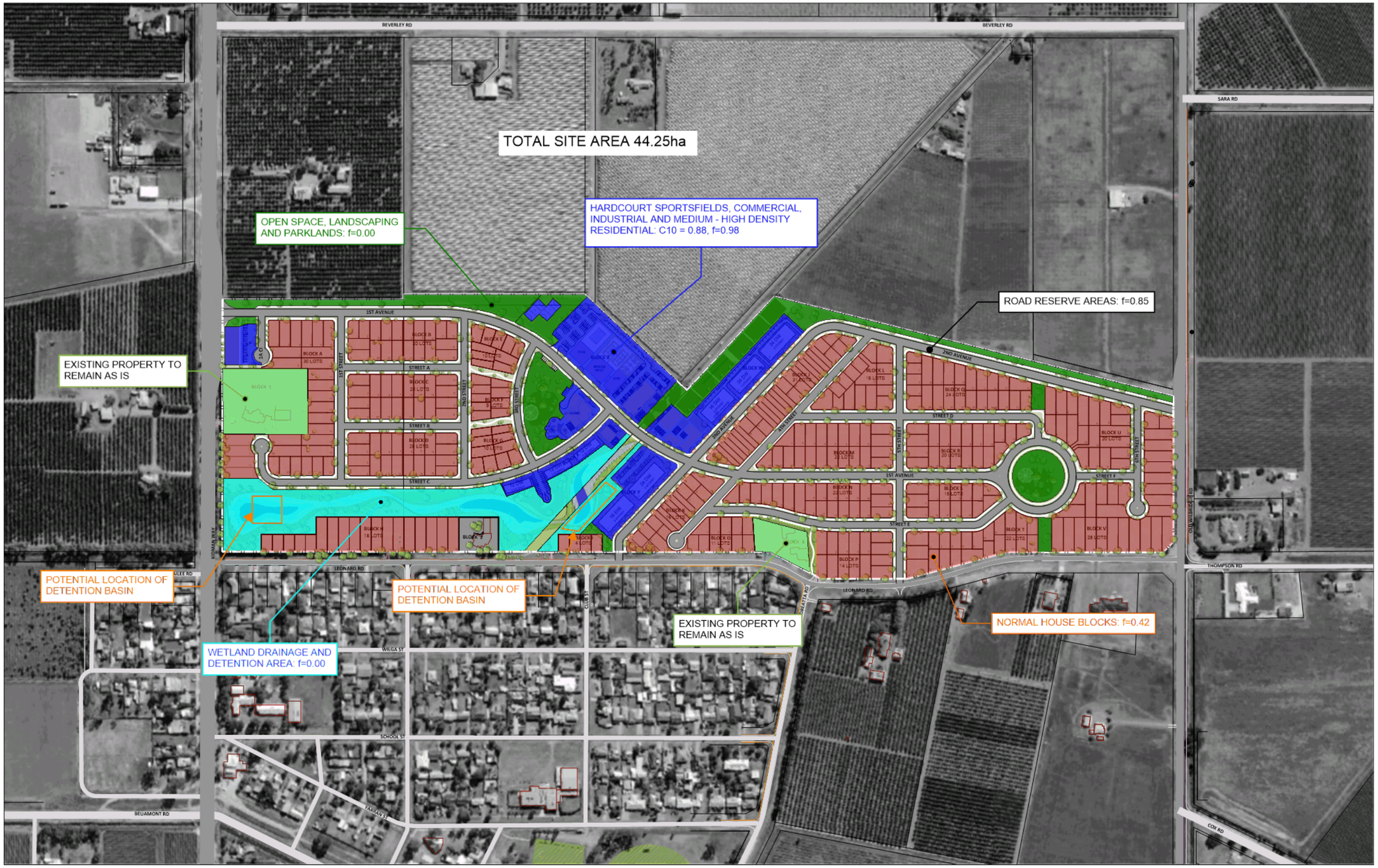
{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}


EXISTING OPEN CHANNELS
Beverley Rd
Kidman Way
DEVELOPMENT SITE
EXISTING MURRUMBIDGEE IRRIGATION CHANNEL
CULVERT CROSSING
DEVELOPMENT EXCLUSION
1.14 ha
STORMWATER PUMP
20.55 ha
FALL
RIDGE LINE
24.87 ha
0.3 ha
DEVELOPMENT SITE
Sara Rd
Old Willbriggie Rd
EXISTING OPEN CHANNELS
DEVELOPMENT EXCLUSION
Leonard Rd
EXISTING OPEN CHANNELS
DEVELOPMENT EXCLUSION
School St
Yarran St
Stanbridge St
Andreatta Rd
Thompson Rd

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

APPENDIX D – STORMWATER PROPOSED SITE PLAN

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}



GENERAL NOTES
Morrison Design Partnership Pty. limited accept no responsibility for the usability, completeness or accuracy of data transferred electronically. Recipients should when necessary request a hard copy version for verification. This drawing shall be read in conjunction with All architectural and other consultants drawings, specifications and with such other written instructions as may be issued during the course of the contract. Figured dimensions shall be taken in preference to scaling. All level, datum points and dimensions on this drawing shall be verified by the builder on site. All discrepancies shall be referred to the architect for direction before proceeding with any works.

DO NOT SCALE THIS DRAWING.

MDP acknowledges the Commeraygal people as the traditional custodians of this land

©Copyright
These drawings and designs and the copyright there of are the property of **Morrison Design Partnership Pty. Ltd** and must not be altered, used, retained, or copied wholly or in part without the written permission of Morrison Design Partnership Pty. Ltd. ACN 001 599 288.

SURVEY NOTES
Survey data included in this drawing is based on a survey drawing and is provided for preliminary design purposes only. As this drawing is based on information supplied by others, reference must be made to original survey drawings verified against site conditions.

REV	DATE	AMENDMENT	INITIALS
L	06/08/2026	FOR PLANNING PROPO SAL	AS

CLIENT
HANWOOD DEVELOPMENT PTY LTD

PROJECT
HANWOOD MASTER PLAN

Lot/Section/Plan no
150/-/DP751709
287/-/DP751709
1623/-/DP257265

DRAWING TITLE
CONCEPT MASTER PLAN

FOR PLANNING PROPOSAL

PROJECT NO.	DRAWING NO.	REVISION
3340	A5000	L

SCALE	: 1:6000 @ A3
DRAWN	: AS
DATE	: 06/08/2026

www.mdpa.com.au NSW Nom Architect: Glen Ollerton #7621

mdp architecture

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

APPENDIX E – COUNCIL CORRESPONDENCE

From: Joe Rizzo <
Sent: Tuesday, 24 September 2024 5:26 PM
To:
Cc: Brett Stonestreet <>; Graham Gordon <>; Carel Potgieter <>; Kelly McNicol <>; Martin Ruggeri <>; Development Engineers <>; Durgananda Chaudhary <>
Subject: FW: Hanwood - Proposal Unzoned Land

Hi Luke,

Regarding your request below for the availability and capacity of essential services and infrastructure for the Hanwood precinct. Please be advised that Council cannot provide any information relating to essential services other than for water and sewer infrastructure.

In relation to water infrastructure, please see attached document, Hanwood Growth Area Water Analysis Results document. The outcome of this modelling confirms that drinking water supply is available to your proposed site, however does require the amplification of trunk water mains from Overs Road, along Old Wilbriggie Road, and into Hanwood at various stages of lots being created. This is specified in the attached document.

In relation to sewer infrastructure, connection to the existing Hanwood sewerage infrastructure is permissible and new pump stations within your proposed site will need to be designed, constructed and connected to the existing Hanwood (HA1) sewer pump station located in School Street.

Regards,

Joe Rizzo
Director Sustainable Development
p | m

Griffith City Council
a 1 Benerembah Street Griffith NSW 268
p PO Box 485 Griffith NSW 2680

From:
Sent: Wednesday, 4 September 2024 6:21 PM
To: Joe Rizzo <
Cc: Brett Stonestreet <; Carel Potgieter <; Kelly McNicol <; 'Martin Ruggeri | Planningmatters Development Service' <; Personal Assistant to the GM & Mayor <>; Cr Doug Curran <dcurran@griffith.com.au>; Cr Glen Andreazza <gandreazza@griffith.com.au>; Cr Shari Blumer <sblumer@griffith.com.au>; Cr Simon Croce <scroce@griffith.com.au>; Cr Jenny Ellis <jellis@griffith.com.au>; Cr Manjit Singh Lally <mlally@griffith.com.au>; Cr Melissa Marin <mmarin@griffith.com.au>; Cr Anne Napoli <anapoli@griffith.com.au>; Cr Christine Stead <cstead@griffith.com.au>; Cr Chris Sutton <csutton@griffith.com.au>; Cr Laurie Testoni <ltestoni@griffith.com.au>; Cr Dino Zappacosta <dzappacosta@griffith.com.au>
Subject: FW: Hanwood - Proposal Unzoned Land

Dear Joe,

Congratulations on your new appointment.

We appreciate Council's efforts to pursue a strategic planning agenda to benefit the local community, and acknowledge Council has limited resources to respond to landowner initiated proposals. We also acknowledge Council's ongoing position that we have not yet provided a detailed strategic justification for our proposal to rezone land on the northern side of Leonard Road at Hanwood. Please be assured that any Planning Proposal we submit will clearly and succinctly address all strategic and statutory matters to assist in Council's consideration.

Our intention when submitting the scoping report was to essentially notify Council of our intention to submit a Planning Proposal and to request from Council information relating to the existing availability and capacity of essential services and infrastructure, which will inform our Planning Proposal.

The purpose of this email is to again respectfully request that Council provide us with the information that we have requested on a number of occasions relating to the availability and capacity of essential services and infrastructure for the Hanwood precinct, which you indicated Council now has. This information is vital for us to finalise our Planning Proposal for the land located on the northern side of Leonard Road. Without this information our ability to prepare a comprehensive Planning Proposal that addresses the necessary Ministerial Directions will be significantly impeded.

We do not agree with Council's position that there is currently a sufficient amount of land zoned for residential purposes that is available for activation in Griffith, let alone Hanwood, as detailed in Section 1.3 of our Scoping Report. During last week's meeting at Council's office with Stantec and two of the three landowners of land on the southern side of Leonard Road that is in Stage 1 of Council's masterplan, it appeared uncertain that these two landowners were willing to activate/develop their sites when permitted to do so. If these two landowners aren't willing to activate their land it means that Council's masterplan is banking on the landowner of the farm at the far eastern end of the expansion area to activate their land. As I also mentioned at the Hanwood COG Meeting, I believe that it is irresponsible for Council to be preparing a masterplan that will require a considerable amount of infrastructure to be extended through Hanwood and then past or through the central and western farms in Stage 1 to service just the eastern farm, especially when there is no guarantee that the owners of the eastern farm in Stage 1 will even develop their site when permitted. For this reason, I believe that Council should take the opportunity to support our proposal to re-zone land on the northern side of Leonard Road and to require development along Leonard Road to occur in a West to East direction starting from Kidman Way, so that services can be extended as each farm is developed. As Council's engineering staff have previously mentioned the practice of extending just the infrastructure that is needed for each farm worked well at Collina and we believe would be the cheapest way of servicing new land releases at Hanwood.

I would also like to draw your attention to Section 5.2 of our Scoping Report, whereby we confirmed that we had engaged Remplan to analyse the current situation with regard to existing housing supply and amount of land zoned for residential purposes in Griffith. Remplan's report comprises a needs and demand analysis to provide strategic justification for rezoning land on the northern side of Leonard Road. We are pleased to inform you that we have now received Remplan's report, and its findings highlight the significant shortage of housing supply in Griffith, especially if the land located on the northern side of Leonard Road is not rezoned. Remplan's report will be submitted in conjunction with our Planning Proposal.

We are committed to working collaboratively with Council to ensure that our proposal meets all strategic requirements and most importantly benefits the communities of Hanwood and Griffith. That being said, we need

Council, as the water and sewer authority, to supply the current information to underpin a robust and Planning Proposal.

Kind regards,

Luke Scobie
0437 161 531

APPENDIX F – POTABLE WATER DEMAND CALCULATIONS

TRIAXIAL CONSULTING

Project Name: Hanwood Estate

Project Number: TX18130.00C

Client: Cite Group

Hanwood Development Demand Calculation Summary

		Stage 1	Stage 2 (Residential)	Stage 2 (Medium Density)	Stage 3	Total
	Lots	125	415	125	55	**720**
Average Day Demand	Average Annual Demand (kL/yr/ET)	285	285	285	285	285
	Average Daily Flow Rate (kL/day/ET)	781	781	781	781	781
	Average Daily Flow Rate (L/s/ET)	0.0090	0.0090	0.0090	0.0090	0.0090
Peak Day Demand	Peak Day Factor (PDF from Table HW2.4)	2.25	2.25	2.25	2.25	2.25
	Peak Day Diversity Factor (DF)	1.31	1.31	1.31	1.31	1.31
	Peak Day Demand (L/day/ET)	2,310	2,310	2,310	2,310	2,310
	Peak Day Demand (L/s/ET)	0.0267	0.0267	0.0267	0.0267	0.0267
	Total Peak Day Demand (L/s)	3.34	11.10	3.34	1.47	19.25
	Total Peak Day Demand (KL/D)	288.74	958.61	288.74	127.04	1,663.13
Peak Hour Demand	Peak Hour Factor (from Table HW2.4)	2.02	2.02	2.02	2.02	2.02
	Peak Hour Demand PHD (kL/day)	4,666	4,666	4,666	4,666	4,666
	Peak Hour Demand PHD (L/s/ET)	0.0540	0.0540	0.0540	0.0540	0.0540
	Total Peak Hour Demand (L/s)	6.7506	22.4120	6.7506	2.9703	38.8834
Extreme Day Demand	Extreme Day Factor (EDF)	1.15	1.15	1.15	1.15	1.15
	Extreme Day Demand (kL/day)	2,656	2,656	2,656	2,656	2,656
	Extreme Day Demand (L/s/ET)	0.0307	0.0307	0.0307	0.0307	0.0307
	Total Extreme Day Demand (L/s)	3.84	12.76	3.84	1.69	22.14
	Total Extreme Day Demand (KL/D)	332.05	1,102.40	332.05	146.10	1,912.60
95th Percentile (Fire Flows)	95thp Factor 95F	1.8	1.8	1.8	1.8	1.8
	95thp Peak Day Demand 95PDD (kL/day)	1,848	1,848	1,848	1,848	1,848
	95thp Peak Hour Demand 95PHD (kL/day)	3,733	3,733	3,733	3,733	3,733
	95thp Peak Hour Demand 95PHD (L/s/ET)	0.0432	0.0432	0.0432	0.0432	0.0432
	Total 95th Percentile Peak Hour Demand Day Demand (L/s)	5.40	17.93	5.40	2.38	31.11
	Total Extreme Day Demand (KL/D)	230.99	766.89	230.99	101.64	1330.51

* Demand Assumptions Taken from WSA03-HWC Version For Cessnock / Maitland
* Diversity factor has been calculated for residential lots total and medium density lots total

Legend

28 Data value from concept plan for Hanwood Development

1.8 Parameter taken or derived from WSA03-HWC Version

APPENDIX G – SEWER PUMP STATION DESIGN FLOWS

TRIAXIAL CONSULTING

Project Name:	Hanwood Estate
Project Number:	TX18130.00C
Client:	Cite Group

SPS DESIGN FLOW STAGE 1	**8.5**	**(PWWF)**

Catchment Area	23.0	ha (NearMap)	d	3.37
Equivalent Tenements (ET)	-	(Lots)		
Equivalent Population (EP)	438			
ADWF	0.919	L/s		
PDWF	**3.10**	L/s		
GWI	**0.14**	L/s		
RDI	**5.29**	L/s		
4 Hour Storage Volume (ADWF)	**13230**	L		

$Portion_{wet}$	0.25	
Density	19.02	
A_{eff}	8.19	
C	1.00	Leakage Severity (Table B1)
I	23.06	
$I_{1,2}$	16.60	mm/hr (1 hr, 2 yr)
$Factor_{size}$	1.07	
$Factor_{containm}$	1.30	Table B3 - ARI 5 Years

Equivalent Population (EP) (WSA02 Table A1)

	EP per Unit	EP per Ha	Number	Area	
Residential Lots	3.5		125		437.50
Medium Density					0.00
Commerical					0.00
		Total EP			**437.50**

TRIAXIAL CONSULTING

Project Name:	Hanwood Estate
Project Number:	TX18130.00C
Client:	Cite Group

SPS DESIGN FLOW STAGE 2 (EAST)	**18.1**	**(PWWF)**

Catchment Area	27.0	ha (NearMap)	d	3.25	
Equivalent Tenements (ET)	-	(Lots)			
Equivalent Population (EP)	1237				
ADWF	2.598	L/s			
PDWF	**8.45**	L/s			
GWI	**0.17**	L/s			
RDI	**9.45**	L/s	$Portion_{wet}$	0.25	
			Density	45.81	
			A_{eff}	14.92	
			C	1.00	Leakage Severity (Table B1)
			I	22.62	
4 Hour Storage Volume (ADWF)	**37407**	L	$I_{1,2}$	16.60	mm/hr (1 hr, 2 yr)
			$Factor_{size}$	1.05	
			$Factor_{containment}$	1.30	Table B3 - ARI 5 Years

Equivalent Population (EP) (WSA02 Table A1)

	EP per Unit	EP per Ha	Number	Area	
Residential Lots	3.5		278		973.00
Medium Density	3		88		264.00
Commercial		75			0.00
		Total EP			**1237.00**

TRIAXIAL CONSULTING

Project Name:	Hanwood Estate
Project Number:	TX18130.00C
Client:	Cite Group

SPS DESIGN FLOW STAGE 2 (WEST)	**10.6**	**(PWWF)**

Catchment Area	20.0	ha (NearMap)	d	3.49	
Equivalent Tenements (ET)	-	(Lots)			
Equivalent Population (EP)	615				
ADWF	1.292	L/s			
PDWF	**4.51**	L/s			
GWI	**0.13**	L/s			
			$Portion_{wet}$	0.25	
RDI	**5.95**	L/s	Density	30.76	
			A_{eff}	9.06	
			C	1.00	Leakage Severity (Table B1)
			I	23.45	
4 Hour Storage Volume (ADWF)	**18606**	L	$I_{1,2}$	16.60	mm/hr (1 hr, 2 yr)
			$Factor_{size}$	1.09	
			$Factor_{containment}$	1.30	Table B3 - ARI 5 Years

Equivalent Population (EP) (WSA02 Table A1)

	EP per Unit	EP per Ha	Number	Area	
Residential Lots	3.5		137		479.50
Medium Density	3		36		108.00
Commercial		75		0.3705	27.79
		Total EP			**615.29**

TRIAXIAL CONSULTING

Project Name:	Hanwood Estate
Project Number:	TX18130.00C
Client:	Cite Group

SPS DESIGN FLOW STAGE 3	**5.4**	**(PWWF)**

Catchment Area	30.0	ha (NearMap)	d	3.18	
Equivalent Tenements (ET)	-	(Lots)			
Equivalent Population (EP)	193				
ADWF	0.404	L/s			
PDWF	**1.28**	L/s			
GWI	**0.19**	L/s			
RDI	**3.88**	L/s	$Portion_{wet}$	0.25	
			Density	6.42	
			A_{eff}	6.20	
			C	1.00	Leakage Severity (Table B1)
			I	22.34	
4 Hour Storage Volume (ADWF)	**5821**	L	$I_{1,2}$	16.60	mm/hr (1 hr, 2 yr)
			$Factor_{size}$	1.04	
			$Factor_{containment}$	1.30	Table B3 - ARI 5 Years

Equivalent Population (EP) (WSA02 Table A1)

	EP per Unit	EP per Ha	Number	Area	
Residential Lots	3.5		55		192.50
Medium Density					0.00
Commercial					0.00
		Total EP			**192.50**

TRIAXIAL
CONSULTING

COMPLEX PROBLEMS
RESOLVED SIMPLY

Suite 12, Level 14, 327 Pitt St
Sydney NSW 2000
triaxial.com.au
1300 874 294

HANWOOD ESTATE
43 & 51 LEONARD ROAD AND 11300 KIDMAN WAY, HANWOOD, NSW, 2680

INFRASTRUCTURE REPORT – POTABLE WATER, SEWER & STORMWATER

Prepared for: **Cite Group Pty Ltd**
Suit 2, Level 14, 99 Bathurst Street
Sydney, NSW, 2000

Prepared by: **Triaxial Consulting Pty Ltd**
Suit 12, Level 14, 327 Pitt Street
Sydney, NSW, 2000

19 SEPTEMBER 2025

Document Control

Client	Cite Group Pty Ltd		
Prepared By:	Triaxial Consulting Pty Ltd		
Report Author	Guill de Swardt		
File Reference:	TX18130.00-RPT-02-GU.DS		
Report Date:	19 September 2025		
Current Revision:	2		
Revision History:	**Report Author**	**Reviewed By**	**Report Date**
0	GU.DS	BE.W	11/04/2025
1	GU.DS	BE.W	24/06/2025
2	GU.DS	BE.W	19/09/2025

TABLE OF CONTENTS

1. INTRODUCTION

1.1. PROJECT BACKGROUND

Triaxial consulting have been engaged by Cite Group to prepare an Infrastructure servicing report as part of a Planning Proposal for a new residential development at 11300 Kidman Way, 43 Leonard Road and 51 Leonard Road, Hanwood.

The proposed development site (the Site) forms part of a three stage Griffith City Council (GCC) masterplan prepared for the Hanwood Growth Area by Stantec in 2024. The Site was labelled as Stage 2 in GCC Masterplan, as shown in Figure 1 below, and consisted of 280 residential lots and two stormwater basins.

Refer to Appendix A for the GCC Masterplan.

Figure 1: Stantec Masterplan for the Hanwood Growth Area

Cite Group engaged MDP Architecture (MDP) to develop a revised masterplan for the Stage 2 site, which will ultimately consist of a variety of land uses, including residential lots, medium density lots, commercial lots, open space areas, sporting courts / fields and a large wetlands area. Refer to Figure 2 below and Appendix B for the proposed MDP masterplan (September 2025), which only shows the proposed road layout and land areas to be rezoned as part of this application.

Cite Group is in the process of preparing a planning proposal for submission to Griffith City Council and the New South Wales Department of Planning and Environment (DPE). The planning proposal will aim to rezone the existing site from RU1 Primary Production and RU6

Transition to a variety of land uses as mentioned above. This will allow for the development of the MDP Stage 2 masterplan to provide housing and critical infrastructure to the area, which will also unlock future residential developments near the Hanwood and Griffith town centres.

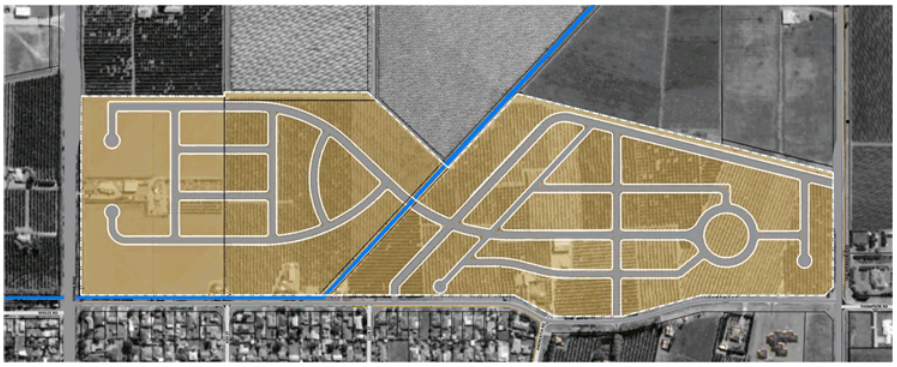


Figure 2: Proposed Stage 2 Masterplan

1.2. EXISTING SITE

The Site consist of three allotments located at 11300 Kidman Way (Lot 150 DP751709), 43 Leonard Road and 51 Leonard Road, Hanwood and has a total size of 46.24. The Site is bounded by Leonard Road to the South, Old Willbriggie Road to the East and Kidman Way to the West.

As mentioned above, the existing land use for the site is primarily agricultural and consists of three farms with residential dwellings on each. There is also an existing Murrumbidgee Irrigation (MI) channel that flows through the centre of the site, from where it continues to drain along Leonard Road to the West and crosses under the Kidman Way at the Southwest corner of the site.

1.3. PURPOSE OF THIS REPORT

The purpose of this report is to provide a summary of the proposed servicing strategy for the new development at 11300 Kidman Way, 43 Leonard Road and 51 Leonard Road, Hanwood, to accompany the planning proposal for the rezoning of the existing site.

The report will provide details of the stormwater, potable water and sewer infrastructure upgrades required to service the new development based on the proposed masterplan prepared by MDP (September 2025). The report will consider the existing site and its services, the proposed development and its servicing requirements and will provide a summary of the infrastructure and services upgrades required to meet the demand requirements for the Stage 2 MDP masterplan.

The report will also discuss the opportunities and benefits that the proposed development provides for the Hanwood and Griffith Areas, specifically providing critical infrastructure such

as a new potable water line from Hanwood to Griffith that will provide connection points for multiple other developments along Old Willbriggie Road.

2. INFRASTRUCTURE AND UTILITIES

2.1. STORMWATER

2.1.1. EXISTING SITE AND INFRASTRUCTURE

The Site currently consist of three large properties at 11300 Kidman Way (Lot 150 DP751709), 43 Leonard Road and 51 Leonard Road, Hanwood and is bound by agricultural land to the North, Old Willbriggie Road to the East, Leonard Road to the South and Kidman Way to the West.

The Site is largely undeveloped, consisting primarily of agricultural land with small residential and farm buildings spread across the site. The site falls away from the intersection of Leonard Road and Andreatta Road towards Kidman Way to the West at a grade of approximately 0.3% and across the northern boundary of 51 Leonard Road towards 43 Leonard Road at a grade of approximately 0.5%. There is a catchment to the eastern side of the site which falls towards Old Willbriggie Road at a grade of approximately 0.3%. The overall grade of the site from Old Willbriggie Road at the Eastern end of the site to Kidman Way on the Western side is approximately 0.15%.

There is an existing Murrumbidgee Irrigation (MI) drainage channel that runs from North to South through the middle of the site, carrying runoff from upstream catchment as well as a portion of the site. The MI channel discharges into an open drainage channel which runs within the road corridor along Leonard Road towards the West, where it discharges under Kidman way via a culvert crossing.

There is also an open drainage channel that runs along the Western frontage of the site along Kidman Way, which captures runoff from the site and upstream catchments to the North and drains to the South where it intersects with the Leonard Road channel before it crosses Kidman Way. It is noted that the open drainage channel along Leonard Road also appears to capture flows from the South of Leonard Road via headwalls at multiple locations.

To the West of the intersection of Kidman Way and Leonard Road, there seems to be a pump and piped drainage system that pumps stormwater to the Southwest, where it ultimately connects to the wider network of Murrumbidgee Irrigation channels.

It's assumed that tile drainage within the existing agricultural portions of the site forms part of the existing site drainage system, draining into the MI channel.

The subject site is prone to flooding during large rain events, therefore a Flood Impact and Risk Assessment for the subject site has been prepared by Torrent Consulting (September 2025) and should be read in conjunction with this report.

Refer to Figure 3 below and Appendix C for a summary of the existing site conditions.

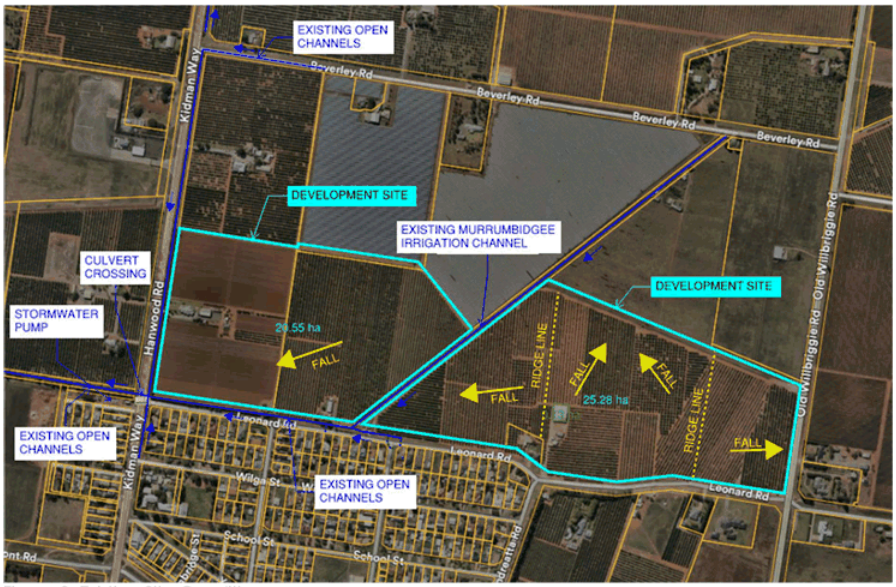


Figure 3: Existing Site Conditions

2.1.2. PROPOSED DEVELOPMENT AND REQUIREMENTS

The proposed development is part of the Hanwood Growth Area masterplan developed by Stantec in 2024 for Griffith City Council and was noted as Stage 2 in the masterplan as shown by Figure 1. The proposed Stage 2 masterplan, developed by MDP in September 2025, was used to form the basis of the proposed stormwater management strategy for the site.

The development proposes to change the land use from what is currently primarily agricultural, to a mixture of land uses to be confirmed at DA stage.

In accordance with GCC's Onsite Stormwater Detention (OSD) Policy, an OSD is required for all subdivision developments with the primary aim of ensuring new developments do not increase the volume or peak discharge runoff within a catchment or modify temporal distribution of stormwater discharge whereby flood impacts are adversely affected at sites situated downstream during critical storm events up to and including the 1% AEP event.

Furthermore, OSD solutions should create a sustainable solution for stormwater flow management, which complements Water Sensitive Urban Design (WSUD) aspects of the development. There should neither be an increase in site discharge to the downstream drainage system nor a reduction in the volume of storage provided within a development.

For catchments south of the main branch channel (Griffith City), as in this case, it is understood that developments will be assessed on a case-by-case basis with the requirement of limiting post-development flows to pre-development flows within the village of Hanwood. It is noted in

GCC's Onsite Stormwater Detention Policy that in some instances, release of stormwater earlier on in a rainfall event may be more beneficial when considering the overall impacts on flooding.

2.1.3. PROPOSED STORMWATER MANAGEMENT STRATEGY

The stormwater management strategy for the proposed development is based on GCC's requirement to reduce the post-development flows to pre-development flows during critical storm events up to and including the 1% AEP event, as well as managing water quality prior to discharging flows from the site in line with WSUD best practices.

A summary of the proposed OSD and WSUD management measures for the development has been provided in section 2.1.3.1 and 2.1.3.2 below.

2.1.3.1. ON-SITE STORMWATER DETENTION (OSD)

Preliminary catchment and hydrological analyses have been carried out using DRAINS modelling software to determine the approximate storage volume required within the proposed wetlands area to limit post-development flows to pre-development flows during critical storm events up to and including the 1% AEP event.

The stormwater system has been modelled using the extended rational method in accordance with Australian Rainfall and Runoff (ARR – Engineers Australia). A summary of the DRAINS catchment parameters has been provided in Table 1 below. The post development catchment area has been calculated as shown in Figure 4, with the fraction impervious assumed to be 0.6 across the entire site in line with recent subdivision developments within the Griffith City Council Area.

Table 1: Drains Catchment Parameters

DRAINS CATCHMENT PARAMETERS									
CATCHMENT	AREA (HA)	FRACTION IMPERVIOUS	AREA IMPERVIOUS (HA)	PIPE FLOW TIME (MINUTES)	IMPERVIOUS INLET TIME (MINUTES)	TOC IMPERVIOUS (MINUTES)	AREA PERVIOUS (HA)	PERVIOUS INLET TIME (MINUTES)	TOC PERVIOUS (MINUTES)
PRE DEV	46.69	0.00	0.00	13	5	18	46.69	20	20
POST DEV	46.69	0.60	28.01	13	10	23	18.68	15	28

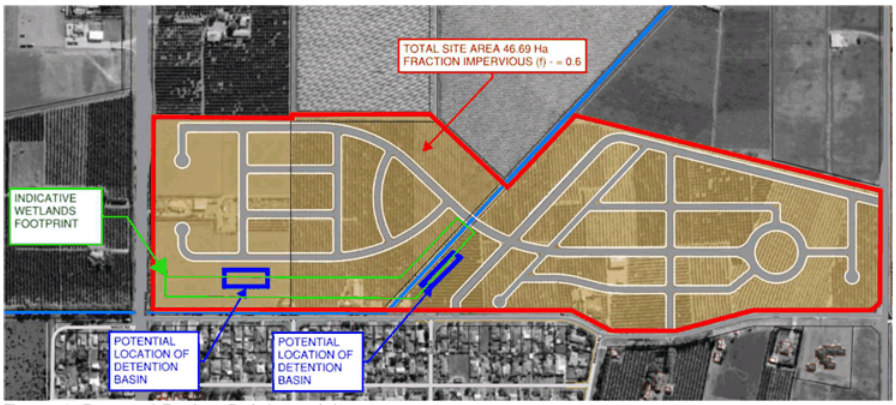


Figure 4: Concept Design Catchment Areas

Based on the preliminary DRAINS analysis, it was found that a total OSD volume required to limit post-development flows to pre-development flows for the development for all storms up to and including the 1% AEP event, would be approximately 8,680m3. Based on the indicative alignment and location of the proposed wetlands area shown in Figure 4 above, if the wetlands area has an average width of 40m, it would cover approximately 25,000m² in area. Therefore, if the wetlands were only constructed to be 500mm deep, it would provide approximately 12,500m³ of storage. The actual area and depth of the wetlands area will be confirmed during DA stage, but as per the Torrent flood mapping, the depth for the wetlands area will exceed 2m in some instances to manage the 1% AEP flood event, therefore there will be more than sufficient area and volume within the wetlands area to provide OSD stage for the development.

The wetlands area is expected to be aerated and treated to provide a habitat for flora and fauna. The proposal will look to combine OSD storage, WSUD principals and flood storage to manage stormwater quantity and quality before it leaves the site. Depending on the depth and final layout of the wetlands area, discharge to the downstream channel can be managed by overflows, low-flow outlets and/or a stormwater pump station which is common practice in the area.

Flows from the upstream catchment entering the site from the North via the Murrumbidgee irrigation channel were also considered as part of this assessment. Hydrograph data provided by Torrent Consulting for the 1% and 5% AEP storm events for both pre- and post-development scenarios were also included in the assessment. These flows are not impacted by the development, as they are the same for both the pre- and post-development scenarios, and therefore is technically able to bypass the OSD storage areas but will have to be considered in the wetlands sizing for flood storage purposes.

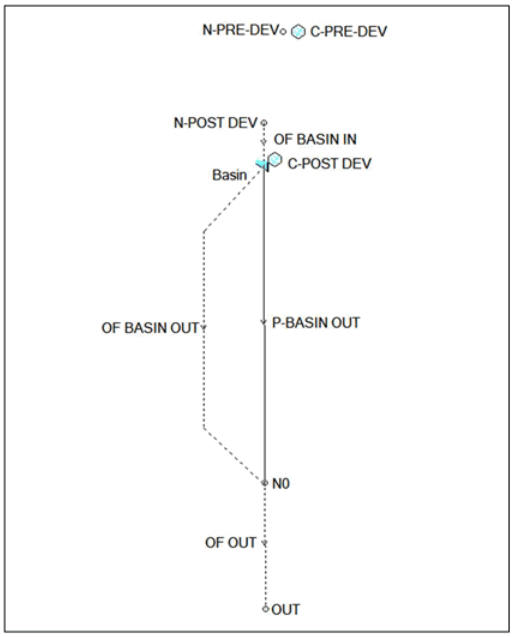
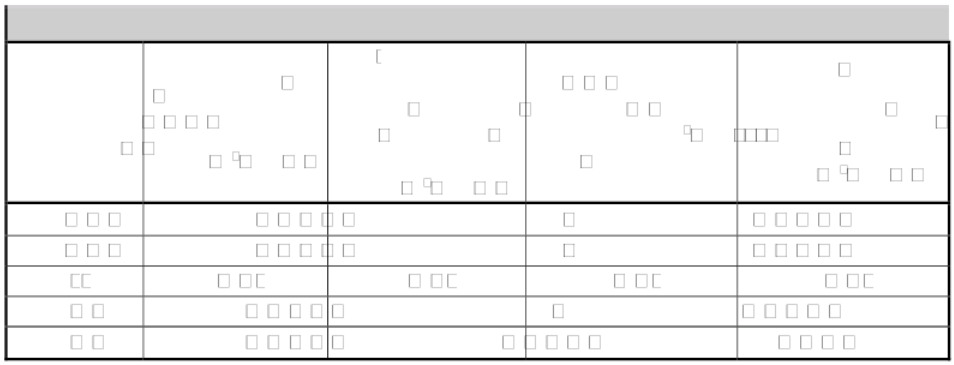


Figure 5: Drains Layout

Table 2 provides a summary of the maximum pre- and post-development flows from the site. None of the maximum pre-development flows calculated are exceeded by the maximum post-development flows. Pending any input from Council, it can be concluded that it will be possible to achieve Council's quantitative requirements under this concept proposal given the overall footprint of the wetlands area.

Table 2: Summary of Drains Results

SUMMARY OF DRAINS RESULTS				
STORM EVENT (% AEP)	PRE-DEVELOPMENT DISCHARGE (m3/S)	PRE-DEVELOPMENT DISCHARGE UPSTREAM FLOWS FROM HYDROGRAPH (m3/S)	POST-DEVELOPMENT DISCHARGE (m3/S)	POST-DEVELOPMENT DISCHARGE UPSTREAM FLOWS FROM HYDROGRAPH (m3/S)
20	0.86	NA	0.81	NA
10	1.09	NA	1.04	NA
5	1.35	1.35	1.26	1.26
2	1.79	NA	1.58	NA
1	2.21	2.21	1.98	1.98



2.1.3.2. WATER SENSITIVE URBAN DESIGN (WSUD)

As per the GCC engineering guidelines for subdivisions, stormwater drainage design is to include the principals of Water Sensitive Urban Design (WSUD) as part of the subdivision works. GCC's guidelines state that stormwater designs are to look at integrating the management of the water cycle with the planning and design of the development. To inform these designs, Council's guidelines provide reference to multiple documents for guidelines on WSUD design, specifically:

- Water Sensitive Urban Design, Melbourne Water, 2005, WSUD Engineering Procedures, CSIRO Publishing
- Urban Stormwater, Best Practices, Environmental Guidelines, Victorian Stormwater Committee, 1999
- Managing Urban Stormwater – Series of Documents, Department of Environment and Conservation, NSW, 2006-2008
- Australian Runoff Quality, a Guide to Water Sensitive Urban Design

Based on these references, the development will look at incorporating WSUD Best Planning Practices (BPP) and Best Management Practices (BMP) for all areas of the water cycle, including public open spaces, housing layouts, road layouts and streetscaping. This means that water quality will be managed at all levels of the development, including at a lot level, street level, precinct level and regional level.

The WSUD strategy for the development will look at incorporating the following primary, secondary and tertiary treatment measures into the design to achieve the BPP and BMP's mentioned above.

- Primary Treatment
  - Gross Pollutant Traps (GPT's)
  - Trash Racks
  - Sediment Traps
  - Oil Collectors

- Secondary Treatment
  - Grassed Swales and Rain Gardens
  - Vegetated Buffer Strips along waterways
  - Detention Basins and Bio-filtration Basins
- Tertiary Treatment
  - Wetlands
  - Ponds

2.1.3.3. STORMWATER MANAGEMENT SUMMARY

The proposed stormwater management strategy for the development as discussed in section 2.1.3.1 and 2.1.3.2 above can be summarised as follows:

- Provision of 8680m³ (total) of detention basin storage incorporated into the wetland's areas. The layout and design of the OSD shall be determined at a later stage. Water levels and discharge to the downstream channel can be managed by low-flow outlets, high flow outlets and/or a stormwater pump station.
- Provision of kerb & gutter, pits, manholes and channel drains to future design to convey hardstand run-off to an underground stormwater drainage system and ultimately the detention basins.
- Provision of an underground stormwater drainage system to convey future lot runoff to detention basins.
- Provision of a series of primary, secondary and tertiary stormwater treatment measures to achieve Gross Pollutant, TSS, Nitrogen and Phosphorus reduction targets in the form of rain gardens, bio-basins, etc.

2.1.4. BENEFITS AND OPPORTUNITIES

Given the overall footprint of the proposed wetlands area in the MDP masterplan, and the relative size of the on-site stormwater detention required for the Stage 2 development, there are significant benefits and opportunities available in utilising the wetlands area for both flood storage and as a regional basin.

As per the Torrent Consulting FIA Report (September 2025), if the proposed wetlands are designed and constructed to detain stormwater flows from upstream catchments and the development, the flood levels and flood footprint across the Hanwood area could be significantly reduced. Furthermore, effective control of flows into and out of the wetlands could reduce downstream impacts and capacity issues downstream of the development, specifically along Leaonard Road.

In addition to providing flood storage for the existing upstream catchments and the proposed Stage 2 development, there could also be an opportunity to allow for additional storage within the wetlands to cater for Stage 1 and 3 of the GCC masterplan or for other upstream

developments that is currently draining into the Murrumbidgee Irrigation channel that runs through the site or along Kidman Way.

The use of Lot 150 DP751709 as part of the wetlands area is critical to the benefits listed above. The Southwest corner of the lot is the lowest point of the site, therefore it is the most natural position to place the wetlands area and OSD basins. This is clear considering almost half of lot 150 DP751709 is inundated by flooding during the 1% AEP event as shown by the flood mapping provided by Torrent Consulting.

Most importantly, if Lot 150 is not utilised, the wetlands and basins for the development would have to discharge into the Leonard Road drain near Ash Street, which means flows from Kidman Way will not be able to be directed into the Wetlands area and managed as part of the flood storage proposal. As shown by the Flood Impact Assessment, there are significant flows that run North to South along Kidman Way, which means the likelihood of flooding occurring at the intersection of Leonard Road and Kidman Way is very likely if Lot 150 DP751709 is not included as part of the development and utilised for flood management.

2.2. POTABLE WATER

2.2.1. EXISTING SITE AND INFRASTRUCTURE

The existing potable water supply to the Site is located along Kidman Way, Leonard Road and Old Willbriggie Road as per the Before You Dig Australia (BYDA) information available.

As part of the initial consultation between Cite Group and GCC, GCC confirmed that potable water supply is available to the proposed development, however it will require the augmentation of the existing trunk water mains between Hanwood and Griffith to meet the future demands. Refer to Appendix E for the correspondence between GCC and Cite Group.

2.2.2. PROPOSED DEVELOPMENT AND POTABLE WATER DEMAND

The proposed development is discussed in detail in Sections 1 and 2 above. Based on the proposed masterplan for Stage 2, water demand calculations were undertaken and have been provided in Appendix F. Water demand for the adjacent development stages 1 and 3 from the GCC masterplan were also calculated and included in Appendix F.

The potable water demand calculations were based on demand rates from Hunter Water version of WSA03 for residential house at Maitland / Cessnock LGA. The general WSA03 code requires the design engineer to refer to the Water Agency (GCC) for their typical peak hour demand rates. These demand rates were not available at the time of preparing this report. The Hunter Water version provides typical demand rates that can be used for planning purposes. The Maitland / Cessnock area is considered consistent with the development type in Griffith.

Based on the water demand calculations, it was confirmed that a DN250 water main along Leonard Road and Old Willbriggie Road would be sufficient to service the proposed lots for all three stages of the development assuming Stages 1 and 3 is developed as per the Council masterplan and Stage 2 is developed as per the MDP masterplan.

Therefore, as described above, augmentation of the existing trunk mains would be required from Overs Road, along Old Willbriggie Road, and into Hanwood to cater for all three stages of the future Hanwood development, as well as 550 additional lots along Old Willbriggie Road, Watkins Ave and Overs Road. Figure 6 below shows the extent of the potable water main upgrades required for the proposed development, as well as Stages 1 & 3 of the Council masterplan and future developments between Hanwood and Griffith.

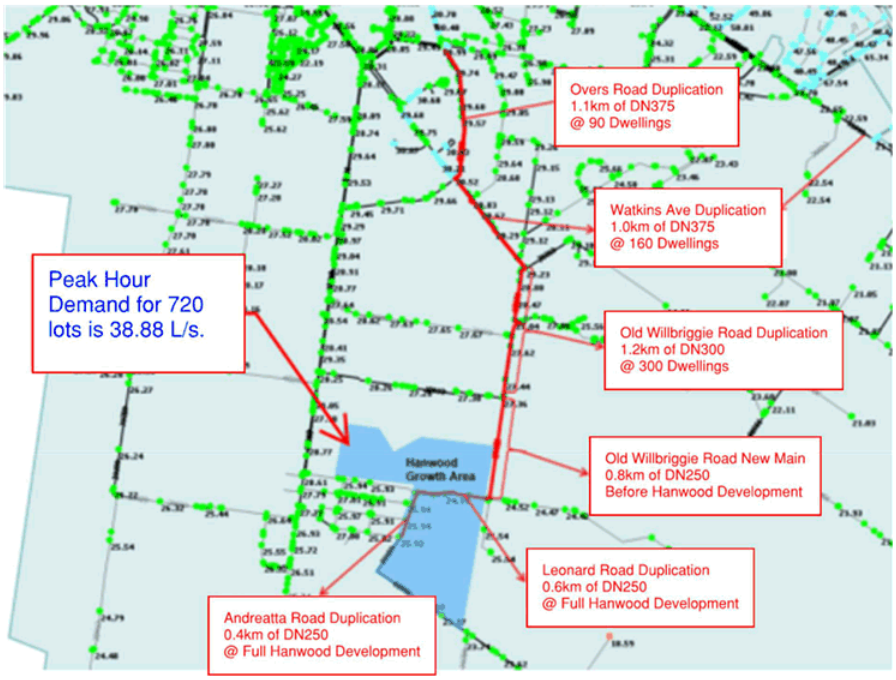


Figure 6: Required Potable Water Main Augmentation

The potable water demand calculations for Stages 1, 2 and 3 of the Hanwood Growth Area has been based off the following and is summarised in Table 3 below:

- Demand Assumptions Taken from WSA03-HWC Version for Cessnock / Maitland Table HW 2.4
- Diversity factor has been calculated for residential & medium density lots
- Stage 1 and 3 from the GCC Masterplan
- Stage 2 from the MDP Masterplan
- Total number of lots for Stages 1-3 = 720

Table 3: Water Demand Summary

Average Daily Flow Rate (L/s/ET)	6.51 L/s
Peak Day Demand (L/s/ET)	19.25 L/s
Peak Hour Demand PHD (L/s)	38.88 L/s
Extreme Day Demand (L/s)	498.69 L/s
95th Peak Hour Demand 95 PHD (L/s)	700.77 L/s

2.2.3. BENEFITS AND OPPORTUNITIES

The augmentation works described in section 2.2.2 above as part of the Stage 2 works will provide security of supply for the future Stage 1 and Stage 3 developments, as well as the 550 additional lots planned along Old Willbriggie Road, Watkins Ave and Overs Road as shown in Figure 6 above.

2.3. SEWER

2.3.1.EXISTING SITE AND INFRASTRUCTURE

Based on BYDA information, the site currently has one sewer connection at 43 Leonard Road, with another connection within the road reserve near 85 Leonard Road. From these connections the existing sewer drains via a series of sewer pump stations (SPS) through Hanwood to the main SPS (HA1) on School Street. Refer to Figure 7 below from the GCC Development Servicing Plan for Sewerage (HydroScience, 2012) which shows the HA1 SPS, as well as other existing SPS's within the Hanwood Area. PSHA7 shown in Figure 7 was noted as a future SPS within the report and it was shown to be located within the Stage 1 area of the GCC masterplan. There is no information available to confirm whether SPS PSHA7 has been constructed since the development of this servicing plan.

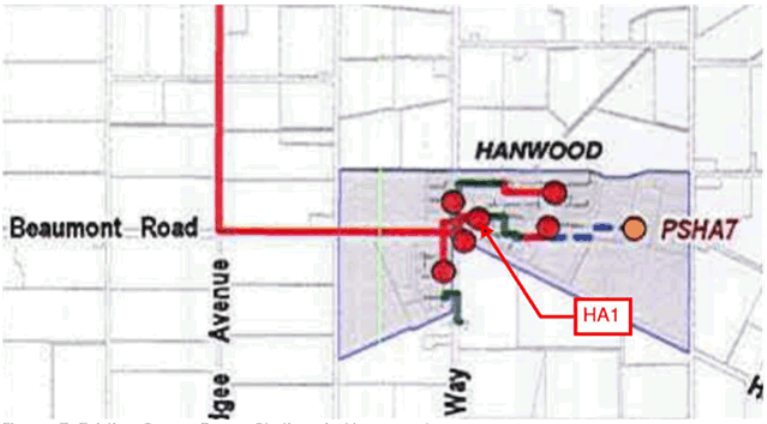


Figure 7: Existing Sewer Pump Stations in Hanwood

2.3.2.PROPOSED DEVELOPMENT AND REQUIREMENTS

As per the initial consultation between Cite Group and GCC, attached in Appendix E, the proposed Stage 2 development will only have to provide its own SPS's to pump sewerage from the Stage 2 development to the Hanwood HA1 SPS on School Street, from where the existing SPS HA1 will pump the sewerage towards Griffith. A summary of the proposed development yield and design flows is provided in Table 4 below. Refer Appendix G for the Stage 2 and adjacent stages 1 and 3 sewer design flow calculations. No information was available on the HA1 pump duty and rising main diameter at this stage. It is assumed that the existing SPS HA1 has sufficient capacity to service the proposed site and also adjacent stages 1 and 3.

2.3.3.PROPOSED SEWER MANAGEMENT STRATEGY AND DESIGN FLOWS

As agreed with GCC, the proposed Lots will be drained via a gravity sewer network to strategically placed sewage pumps stations (SPS), from where it will discharge into GCC's SPS HA1 on School Street.

The design flows for future SPS for Stages 1, 2, & 3 has been calculated in accordance with the Sewage Code of Australia WSA02, which states that the design flow should be calculated using a theoretical loading for Average Dry Weather Flow of 0.0021L/s/EP, with the design flows summarised in Table 4 below.

The sewerage flows were calculated for Stage 1 and 3 using the GCC masterplan prepared by Stantec, with the Stage 2 flows calculated for the proposed development masterplan prepared by MDP as shown in Appendix B.

For Stage 2, it was assumed that two SPS's will be required for the proposed development, with one located to the East and another to the West of the proposed wetlands area. The Sewerage design flows in Table 4 and the Emergency Storage in Section 2.3.4 below have therefore been split into flows and volumes for the Eastern and Western SPS's.

Table 4: Sewerage Design Flow

Catchment	EP	ADWF (L/s)	PDWF (L/s)	PWWF (L/s)
Stage 1	438	0.919	3.10	8.50
Stage 2 - East	1237	2.598	8.45	18.1
Stage 2 - West	615	1.292	4.51	10.6
Stage 3	193	0.404	1.28	5.40
Design Flow				**42.6**

2.3.4.EMERGENCY STORAGE

The approximate emergency storage volume associated with the design flow at each of the three stages have been listed below. The emergency storage volumes have been calculated for 4 hours of Average Dry Weather Flow (ADWF), with the ADWF summarised for each SPS below.

- SPS 1 ADWF = 0.919L/s
  4 hours ADWF volume for SPS 1 catchment = **13.2m³**.
- SPS 2 - East ADWF = 2.598L/s
  4 hours ADWF volume for SPS 2 East catchment = **37.4m³**.
- SPS 2 - West ADWF = 1.292L/s
  4 hours ADWF volume for SPS 2 West catchment = **18.6m³**.
- SPS 3 ADWF = 0.404L/s
  4 hours ADWF volume for SPS 3 catchment = **5.8m³**.

2.3.5. BENEFITS AND OPPORTUNITIES

There is an opportunity for future planning and consolidation of the sewerage system for all three development stages. SPS's could be suitably sized and located to minimise the number of pump stations that GCC would ultimately have to own, operate and maintain. GCC could

maximise the size and extent of the gravity sewerage system as this would simplify construction for future stages and reduce GCC's asset management obligations.

Examples of this includes the allowance for sufficient capacity within the Stage 2 Eastern SPS rising main and emergency storage to cater for the Stage 1 and 2 developments to drain via a gravity line to the SPS, from where it can be pumped to the Hanwood HA1 SPS.

Another opportunity associated with the proposed Stage 2 development includes the provision of lead-in lines or future connection points for developments to the North of the Stage 2 site. Allowance could be made within the sewer main and Stage 2 Western SPS to cater for sewerage design flows from sites to the North. The development of Stage 2 provides GCC with an opportunity to undertake a holistic review of the future Hanwood Growth Area and strategically locate and design SPS's as part of the Stage 2 development to cater for current and future design flows.

3. CONCLUSION

Triaxial consulting were engaged by Cite Group to prepare an Infrastructure servicing report as part of a Planning Proposal for a new residential development at 11300 Kidman Way, 43 Leonard Road and 51 Leonard Road, Hanwood.

The proposed development site forms part of a three stage GCC masterplan prepared for the Hanwood Growth Area by Stantec in 2024. The development site was labelled as Stage 2 in Council's Masterplan, as shown in Appendix A.

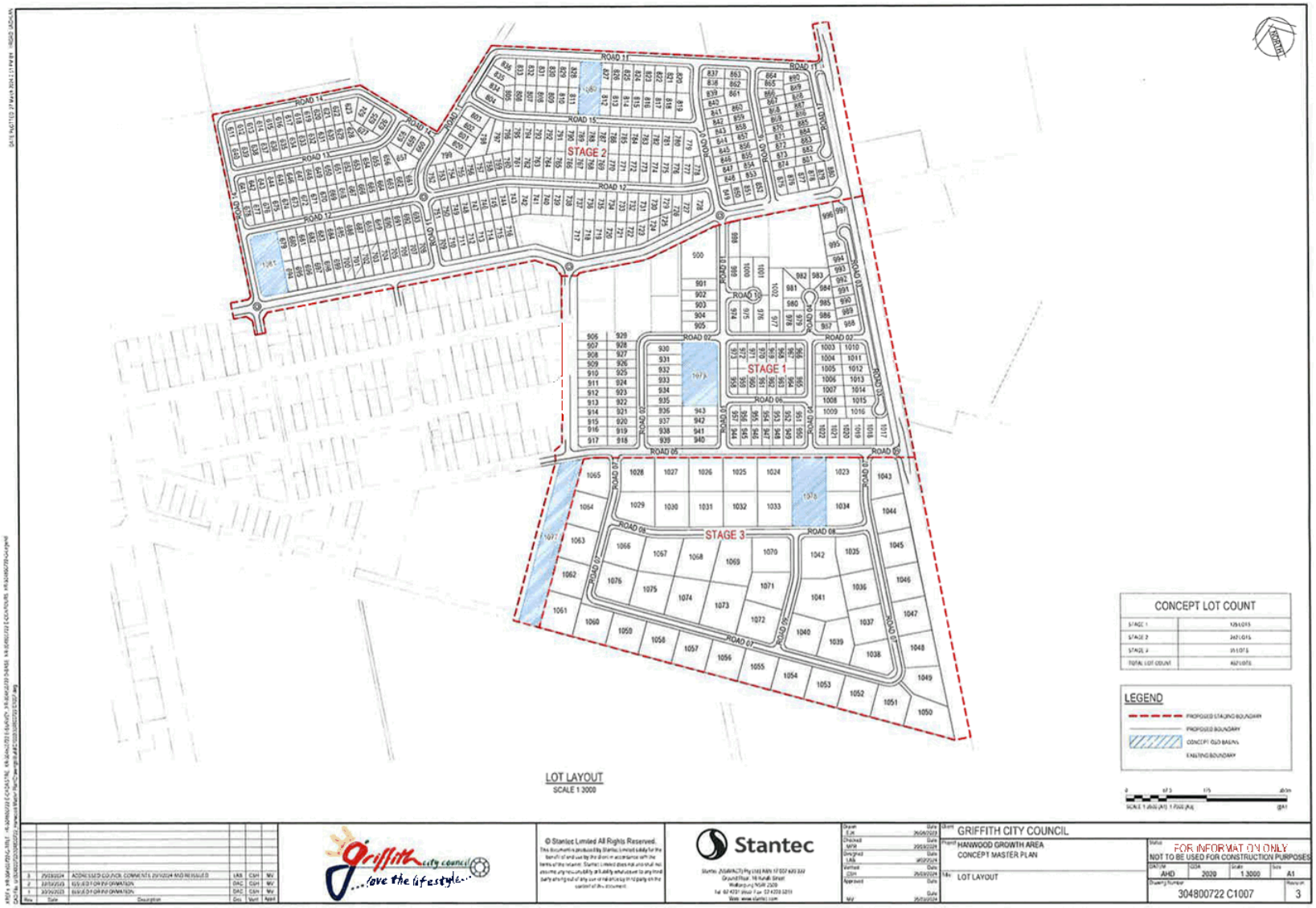
The proposed development for Stage 2, as shown in Appendix B, consist of a variety of land uses and would provide up to 720 new residential lots, as well as open spaces, commercial spaces and wetland areas.

As discussed in section 2 of this report, the site will require stormwater, potable water and sewer infrastructure to facilitate the development. The purpose of this report was therefore to assess the existing infrastructure and services, determine the demand and requirements based on the MDP Masterplan (September 2025) and to specify how these requirements could be met through the augmentation of existing services or the provision of new infrastructure as part of the Stage 2 development.

The MDP masterplan for Stage 2 proposes a wetlands area which provides sufficient space to allow for on-site stormwater detention and water quality treatment for the proposed development. It also provides the opportunity for localised and regional flood storage, as shown by the Torrent Consulting Flood Impact Assessment Report (September 2025).

With regards to the potable water and sewer, the client has confirmed with GCC that the demand for potable water and sewer can be met, but that it will require augmentation of existing potable water mains between Hanwood and Griffith, as well as the construction of new SPS's and rising mains to connect the sewerage flows to the existing Hanwood SPS HA1. These works will not only unlock the development of Stage 2, but it will also provide potable water for Stages 1 and 3, as well as potable water for up to 550 future lots between Hanwood and Griffith. The sewer infrastructure proposed provides GCC with an opportunity to plan for future developments and install critical infrastructure as part of the Stage 2 works that will not only unlock future developments but helps GCC reduce their asset management obligations by consolidating the need for individual SPS's for each future development.

APPENDIX A – COUNCIL MASTERPLAN


STAGE 1
STAGE 2
STAGE 3
LOT LAYOUT
SCALE 1:3000
CONCEPT LOT COUNT
LEGEND
GRIFFITH CITY COUNCIL
HANWOOD GROWTH AREA
CONCEPT MASTER PLAN
LOT LAYOUT
FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES
304800722 C1007
Stantec
© Stantec Limited All Rights Reserved.

APPENDIX B – MDP ARCHITECTURE MASTERPLAN

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

GENERAL NOTES
Morrison Design Partnership Pty. limited accept no responsibility for the usability, completeness or accuracy of data transferred electronically. Recipients should when necessary request a hard copy version for verification. This drawing shall be read in conjunction with all architectural and other consultants drawings, specifications and with such other written instructions as may be issued during the course of the contract. Figured dimensions shall be taken in preference to scaling. All level, datum points and dimensions on this drawing shall be verified by the builder on site. All discrepancies shall be referred to the architect for direction before proceeding with any works.

DO NOT SCALE THIS DRAWING.

MDP acknowledges the Cammeraygal people as the traditional custodians of this land

©Copyright
These drawings and designs and the copyright there of are the property of Morrison Design Partnership Pty. Ltd and must not be altered, used, retained, or copied wholly or in part without the written permission of Morrison Design Partnership Pty. Ltd. ACN 001 595 288.

SURVEY NOTES
Survey data included in this drawing is based on a survey drawing and is provided for preliminary design purposes only. As this drawing is based on information supplied by others, reference must be made to original survey drawings verifies against site conditions.

REV	DATE	AMENDMENT	INITIALS
L	06/09/2026	FOR PLANNING PROPOSAL	AS
M	06/09/2026	AMENDED TO COUNCIL'S COMMENTS	AS
N	08/09/2026	FINAL AMENDMENTS	AS

CLIENT
HANWOOD DEVELOPMENT PTY LTD

PROJECT
HANWOOD MASTER PLAN

Lot/Section/Plan no
150/-/DP751709
287/-/DP751709
1623/-/DP257265

DRAWING TITLE
CONCEPT MASTER PLAN

FOR PLANNING PROPOSAL

PROJECT NO.	DRAWING NO.	REVISION
3340	A5000	N
SCALE	: 1:6000 @ A3	
DRAWN	: AS	
DATE	: 08/09/2026	

www.mdpa.com.au NSW Nom Architect: Glen Ollerton #7621

mdp architecture

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

APPENDIX C – EXISTING SITE PLAN

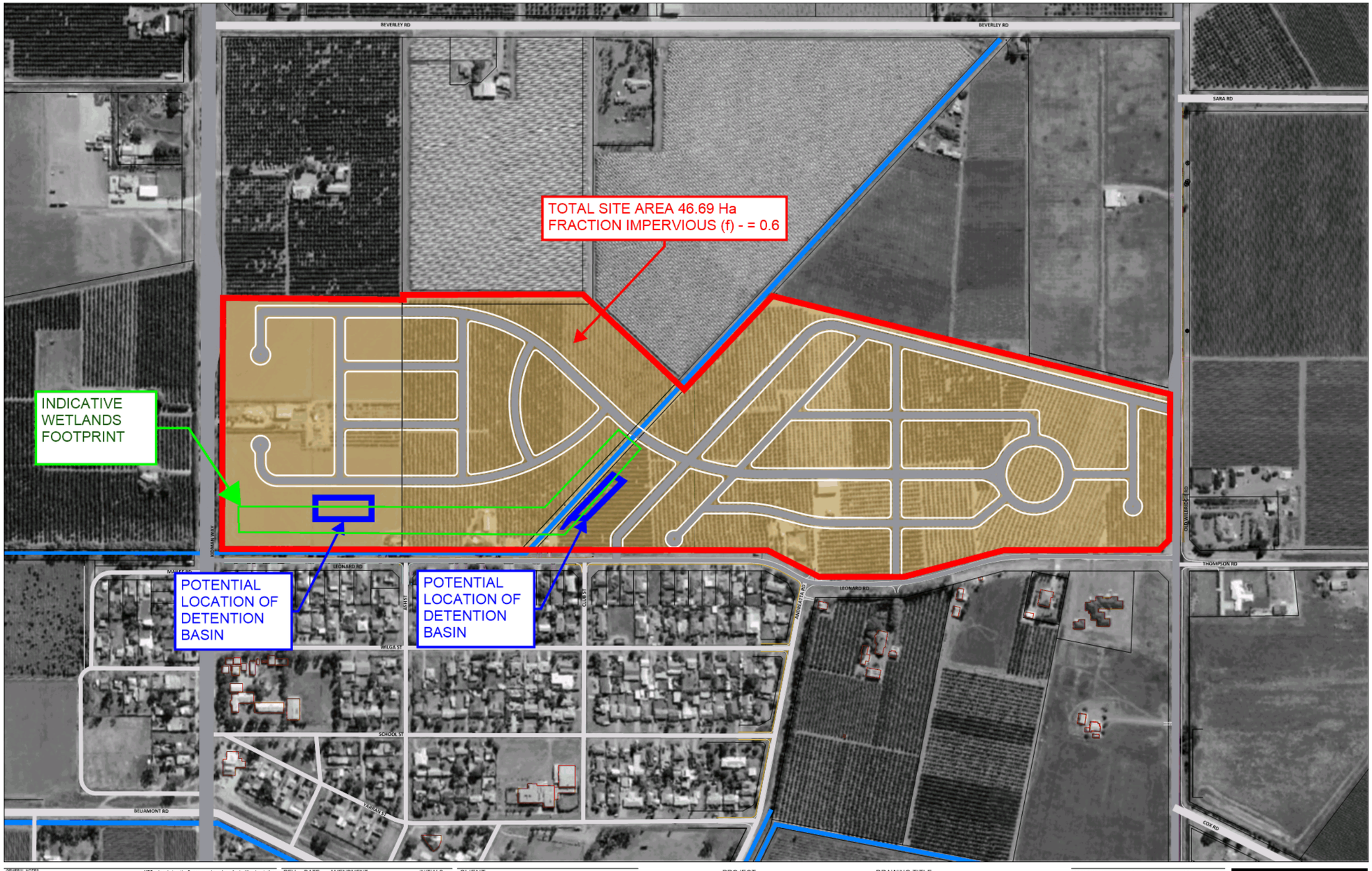
{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}


EXISTING OPEN CHANNELS
Beverley Rd
Kidman Way
DEVELOPMENT SITE
EXISTING MURRUMBIDGEE IRRIGATION CHANNEL
CULVERT CROSSING
DEVELOPMENT EXCLUSION
1.14 ha
STORMWATER PUMP
20.55 ha
FALL
RIDGE LINE
24.87 ha
0.3 ha
Sara Rd
Old Willbriggie Rd
EXISTING OPEN CHANNELS
DEVELOPMENT EXCLUSION
Leonard Rd
School St
Yarran St
Stanbridge St
Andreatta Rd
Thompson Rd

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

APPENDIX D – STORMWATER PROPOSED SITE PLAN

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}



GENERAL NOTES
Morrison Design Partnership Pty. limited accept no responsibility for the usability, completeness or accuracy of data transferred electronically. Recipients should when necessary request a hard copy version for verification. This drawing shall be read in conjunction with all architectural and other consultants drawings, specifications and with such other written instructions as may be issued during the course of the contract. Figured dimensions shall be taken in preference to scaling. All level, datum points and dimensions on this drawing shall be verified by the builder on site. All discrepancies shall be referred to the architect for direction before proceeding with any works.

DO NOT SCALE THIS DRAWING.

MDP acknowledges the Cammeraygal people as the traditional custodians of this land

©Copyright
These drawings and designs and the copyright there of are the property of Morrison Design Partnership Pty. Ltd and must not be altered, used, retained, or copied wholly or in part without the written permission of Morrison Design Partnership Pty. Ltd. ACN 001 595 288.

SURVEY NOTES
Survey data included in this drawing is based on a survey drawing and is provided for preliminary design purposes only. As this drawing is based on information supplied by others, reference must be made to original survey drawings verified against site conditions.

REV	DATE	AMENDMENT	INITIALS
L	06/08/2026	FOR PLANNING PROPOSAL	AS
M	06/09/2026	AMENDED TO COUNCIL'S COMMENTS	AS
N	08/09/2026	FINAL AMENDMENTS	AS

CLIENT
HANWOOD DEVELOPMENT PTY LTD

PROJECT
HANWOOD MASTER PLAN

Lot/Section/Plan no
150/-/DP751709
287/-/DP751709
1623/-/DP257265

DRAWING TITLE
CONCEPT MASTER PLAN

FOR PLANNING PROPOSAL

PROJECT NO.	DRAWING NO.	REVISION
3340	A5000	N
SCALE	: 1:6000 @ A3	
DRAWN	: AS	
DATE	: 08/09/2026	

www.mdpa.com.au NSW Nom Architect: Glen Ollerton #7621

mdp architecture

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

APPENDIX E – COUNCIL CORRESPONDENCE

From: Joe Rizzo <
Sent: Tuesday, 24 September 2024 5:26 PM
To:
Cc: Brett Stonestreet <; Graham Gordon <;
Carel Potgieter <; Kelly McNicol <; Martin
Ruggeri <; Development Engineers <;
Durgananda Chaudhary <>
Subject: FW: Hanwood - Proposal Unzoned Land

Hi Luke,

Regarding your request below for the availability and capacity of essential services and infrastructure for the Hanwood precinct. Please be advised that Council cannot provide any information relating to essential services other than for water and sewer infrastructure.

In relation to water infrastructure, please see attached document, Hanwood Growth Area Water Analysis Results document. The outcome of this modelling confirms that drinking water supply is available to your proposed site, however does require the amplification of trunk water mains from Overs Road, along Old Wilbriggie Road, and into Hanwood at various stages of lots being created. This is specified in the attached document.

In relation to sewer infrastructure, connection to the existing Hanwood sewerage infrastructure is permissible and new pump stations within your proposed site will need to be designed, constructed and connected to the existing Hanwood (HA1) sewer pump station located in School Street.

Regards,

Joe Rizzo
Director Sustainable Development
p | m

Griffith City Council
a 1 Benerembah Street Griffith NSW 2680
p PO Box 485 Griffith NSW 2680

Griffith City Council acknowledges and respects the Wiradjuri people as the traditional custodians and ancestors of the land and waters where we work.

There is no expectation for you to read or respond to this email outside of your normal working hours

From:
Sent: Wednesday, 4 September 2024 6:21 PM
To: Joe Rizzo <[redacted]>
Cc: Brett Stonestreet <[redacted]>; Carel Potgieter <[redacted]>; Kelly McNicol <[redacted]>; 'Martin Ruggeri | Planningmatters Development Service' <[redacted]>; Personal Assistant to the GM & Mayor <[redacted]>; Cr Doug Curran <dcurran@griffith.com.au>; Cr Glen Andreazza <gandreazza@griffith.com.au>; Cr Shari Blumer <sblumer@griffith.com.au>; Cr Simon Croce <scroce@griffith.com.au>; Cr Jenny Ellis <jellis@griffith.com.au>; Cr Manjit Singh Lally <mlally@griffith.com.au>; Cr Melissa Marin <mmarin@griffith.com.au>; Cr Anne Napoli <anapoli@griffith.com.au>; Cr Christine Stead <cstead@griffith.com.au>; Cr Chris Sutton <csutton@griffith.com.au>; Cr Laurie Testoni <ltestoni@griffith.com.au>; Cr Dino Zappacosta <dzappacosta@griffith.com.au>
Subject: FW: Hanwood - Proposal Unzoned Land

Dear Joe,

Congratulations on your new appointment.

We appreciate Council's efforts to pursue a strategic planning agenda to benefit the local community, and acknowledge Council has limited resources to respond to landowner initiated proposals. We also acknowledge Council's ongoing position that we have not yet provided a detailed strategic justification for our proposal to rezone land on the northern side of Leonard Road at Hanwood. Please be assured that any Planning Proposal we submit will clearly and succinctly address all strategic and statutory matters to assist in Council's consideration.

Our intention when submitting the scoping report was to essentially notify Council of our intention to submit a Planning Proposal and to request from Council information relating to the existing availability and capacity of essential services and infrastructure, which will inform our Planning Proposal.

The purpose of this email is to again respectfully request that Council provide us with the information that we have requested on a number of occasions relating to the availability and capacity of essential services and infrastructure for the Hanwood precinct, which you indicated Council now has. This information is vital for us to finalise our Planning Proposal for the land located on the northern side of Leonard Road. Without this information our ability to prepare a comprehensive Planning Proposal that addresses the necessary Ministerial Directions will be significantly impeded.

We do not agree with Council's position that there is currently a sufficient amount of land zoned for residential purposes that is available for activation in Griffith, let alone Hanwood, as detailed in Section 1.3 of our Scoping Report. During last week's meeting at Council's office with Stantec and two of the three landowners of land on the southern side of Leonard Road that is in Stage 1 of Council's masterplan, it appeared uncertain that these two landowners were willing to activate/develop their sites when permitted to do so. If these two landowners aren't willing to activate their land it means that Council's masterplan is banking on the landowner of the farm at the far eastern end of the expansion area to activate their land. As I also mentioned at the Hanwood COG Meeting, I believe that it is irresponsible for Council to be preparing a masterplan that will require a considerable amount of infrastructure to be extended through Hanwood and then past or through the central and western farms in Stage 1 to service just the eastern farm, especially when there is no guarantee that the owners of the eastern farm in Stage 1 will even develop their site when permitted. For this reason, I believe that Council should take the opportunity to support our proposal to re-zone land on the northern side of Leonard Road and to require development along Leonard Road to occur in a West to East direction starting from Kidman Way, so that services can be extended as each farm is developed. As Council's engineering staff have previously mentioned the practice of extending just the infrastructure that is needed for each farm worked well at Collina and we believe would be the cheapest way of servicing new land releases at Hanwood.

I would also like to draw your attention to Section 5.2 of our Scoping Report, whereby we confirmed that we had engaged Remplan to analyse the current situation with regard to existing housing supply and amount of land zoned for residential purposes in Griffith. Remplan's report comprises a needs and demand analysis to provide strategic justification for rezoning land on the northern side of Leonard Road. We are pleased to inform you that we have now received Remplan's report, and its findings highlight the significant shortage of housing supply in Griffith, especially if the land located on the northern side of Leonard Road is not rezoned. Remplan's report will be submitted in conjunction with our Planning Proposal.

We are committed to working collaboratively with Council to ensure that our proposal meets all strategic requirements and most importantly benefits the communities of Hanwood and Griffith. That being said, we need

Council, as the water and sewer authority, to supply the current information to underpin a robust and Planning Proposal.

Kind regards,

Luke Scobie

APPENDIX F – POTABLE WATER DEMAND CALCULATIONS

TRIAXIAL CONSULTING

Project Name: Hanwood Estate

Project Number: TX18130.00C

Client: Cite Group

Hanwood Development Demand Calculation Summary

			Stage 1	Stage 2 (Residential)	Stage 2 (Medium Density)	Stage 3	Total
		Lots	125	415	125	55	**720**
Average Day Demand	Average Annual Demand (kL/yr/ET)		285	285	285	285	285
	Average Daily Flow Rate (kL/day/ET)		781	781	781	781	781
	Average Daily Flow Rate (L/s/ET)		0.0090	0.0090	0.0090	0.0090	0.0090
Peak Day Demand	Peak Day Factor (PDF from Table HW2.4)		2.25	2.25	2.25	2.25	2.25
	Peak Day Diversity Factor (DF)		1.31	1.31	1.31	1.31	1.31
	Peak Day Demand (L/day/ET)		2,310	2,310	2,310	2,310	2,310
	Peak Day Demand (L/s/ET)		0.0267	0.0267	0.0267	0.0267	0.0267
	Total Peak Day Demand (L/s)		3.34	11.10	3.34	1.47	19.25
	Total Peak Day Demand (KL/D)		288.74	958.61	288.74	127.04	1,663.13
Peak Hour Demand	Peak Hour Factor (from Table HW2.4)		2.02	2.02	2.02	2.02	2.02
	Peak Hour Demand PHD (kL/day)		4,666	4,666	4,666	4,666	4,666
	Peak Hour Demand PHD (L/s/ET)		0.0540	0.0540	0.0540	0.0540	0.0540
	Total Peak Hour Demand (L/s)		6.7506	22.4120	6.7506	2.9703	38.8834
Extreme Day Demand	Extreme Day Factor (EDF)		1.15	1.15	1.15	1.15	1.15
	Extreme Day Demand (kL/day)		2,656	2,656	2,656	2,656	2,656
	Extreme Day Demand (L/s/ET)		0.0307	0.0307	0.0307	0.0307	0.0307
	Total Extreme Day Demand (L/s)		3.84	12.76	3.84	1.69	22.14
	Total Extreme Day Demand (KL/D)		332.05	1,102.40	332.05	146.10	1,912.60
95th Percentile (Fire Flows)	95thp Factor 95F		1.8	1.8	1.8	1.8	1.8
	95thp Peak Day Demand 95PDD (kL/day)		1,848	1,848	1,848	1,848	1,848
	95thp Peak Hour Demand 95PHD (kL/day)		3,733	3,733	3,733	3,733	3,733
	95thp Peak Hour Demand 95PHD (L/s/ET)		0.0432	0.0432	0.0432	0.0432	0.0432
	Total 95th Percentile Peak Hour Demand Day Demand (L/s)		5.40	17.93	5.40	2.38	31.11
	Total Extreme Day Demand (KL/D)		230.99	766.89	230.99	101.64	1330.51

* Demand Assumptions Taken from WSA03-HWC Version For Cessnock / Maitland
* Diversity factor has been calculated for residential lots total and medium density lots total

Legend

28 Data value from concept plan for Hanwood Development

1.8 Parameter taken or derived from WSA03-HWC Version

APPENDIX G – SEWER PUMP STATION DESIGN FLOWS

TRIAXIAL CONSULTING

Project Name:	Hanwood Estate
Project Number:	TX18130.00C
Client:	Cite Group

SPS DESIGN FLOW STAGE 1	**8.5**	**(PWWF)**

Catchment Area	23.0	ha (NearMap)	d	3.37
Equivalent Tenements (ET)	-	(Lots)		
Equivalent Population (EP)	438			
ADWF	0.919	L/s		
PDWF	**3.10**	L/s		
GWI	**0.14**	L/s		
RDI	**5.29**	L/s		
4 Hour Storage Volume (ADWF)	**13230**	L		

$Portion_{wet}$	0.25	
Density	19.02	
A_{eff}	8.19	
C	1.00	Leakage Severity (Table B1)
I	23.06	
$I_{1,2}$	16.60	mm/hr (1 hr, 2 yr)
$Factor_{size}$	1.07	
$Factor_{containm}$	1.30	Table B3 - ARI 5 Years

Equivalent Population (EP) (WSA02 Table A1)

	EP per Unit	EP per Ha	Number	Area	
Residential Lots	3.5		125		437.50
Medium Density					0.00
Commerical					0.00
		Total EP			**437.50**

TRIAXIAL CONSULTING

Project Name:	Hanwood Estate
Project Number:	TX18130.00C
Client:	Cite Group

SPS DESIGN FLOW STAGE 2 (EAST)	**18.1**	**(PWWF)**

Catchment Area	27.0	ha (NearMap)
Equivalent Tenements (ET)	-	(Lots)
Equivalent Population (EP)	1237	
ADWF	2.598	L/s
PDWF	**8.45**	L/s
GWI	**0.17**	L/s
RDI	**9.45**	L/s
4 Hour Storage Volume (ADWF)	**37407**	L

d	3.25	
$Portion_{wet}$	0.25	
Density	45.81	
A_{eff}	14.92	
C	1.00	Leakage Severity (Table B1)
I	22.62	
$I_{1,2}$	16.60	mm/hr (1 hr, 2 yr)
$Factor_{size}$	1.05	
$Factor_{containment}$	1.30	Table B3 - ARI 5 Years

Equivalent Population (EP) (WSA02 Table A1)

	EP per Unit	EP per Ha	Number	Area	
Residential Lots	3.5		278		973.00
Medium Density	3		88		264.00
Commercial		75			0.00
		Total EP			**1237.00**

TRIAXIAL CONSULTING

Project Name:	Hanwood Estate
Project Number:	TX18130.00C
Client:	Cite Group

SPS DESIGN FLOW STAGE 2 (WEST)	**10.6**	**(PWWF)**

Catchment Area	20.0	ha (NearMap)	d	3.49	
Equivalent Tenements (ET)	-	(Lots)			
Equivalent Population (EP)	615				
ADWF	1.292	L/s			
PDWF	**4.51**	L/s			
GWI	**0.13**	L/s			
			$Portion_{wet}$	0.25	
RDI	**5.95**	L/s	Density	30.76	
			A_{eff}	9.06	
			C	1.00	Leakage Severity (Table B1)
			I	23.45	
4 Hour Storage Volume (ADWF)	**18606**	L	$I_{1,2}$	16.60	mm/hr (1 hr, 2 yr)
			$Factor_{size}$	1.09	
			$Factor_{containment}$	1.30	Table B3 - ARI 5 Years

Equivalent Population (EP) (WSA02 Table A1)

	EP per Unit	EP per Ha	Number	Area	
Residential Lots	3.5		137		479.50
Medium Density	3		36		108.00
Commercial		75		0.3705	27.79
		Total EP			**615.29**

TRIAXIAL CONSULTING

Project Name:	Hanwood Estate
Project Number:	TX18130.00C
Client:	Cite Group

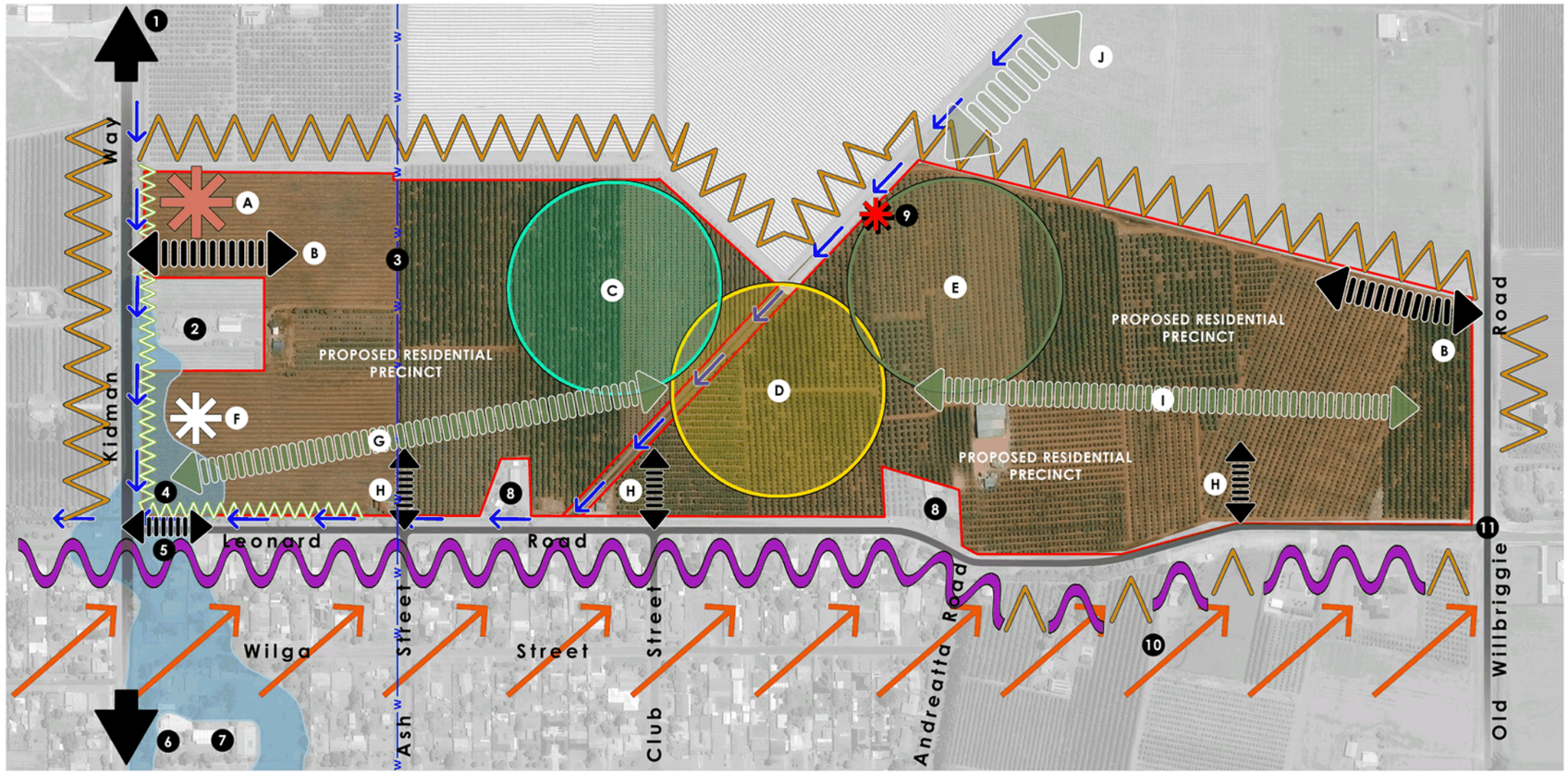
SPS DESIGN FLOW STAGE 3	**5.4**	**(PWWF)**

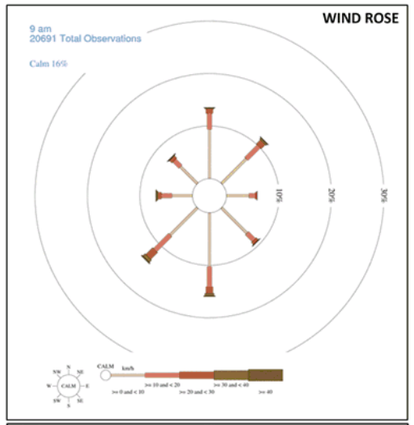
Catchment Area	30.0	ha (NearMap)	d	3.18	
Equivalent Tenements (ET)	-	(Lots)			
Equivalent Population (EP)	193				
ADWF	0.404	L/s			
PDWF	**1.28**	L/s			
GWI	**0.19**	L/s			
RDI	**3.88**	L/s	$Portion_{wet}$	0.25	
			Density	6.42	
			A_{eff}	6.20	
			C	1.00	Leakage Severity (Table B1)
			I	22.34	
4 Hour Storage Volume (ADWF)	**5821**	L	$I_{1,2}$	16.60	mm/hr (1 hr, 2 yr)
			$Factor_{size}$	1.04	
			$Factor_{containment}$	1.30	Table B3 - ARI 5 Years

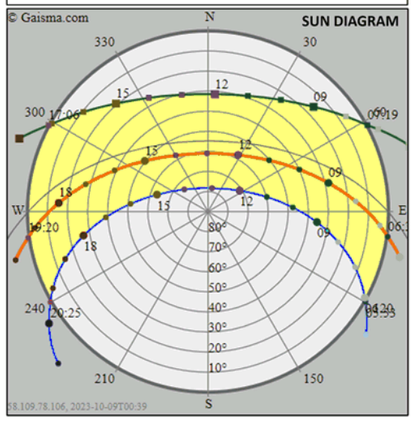
Equivalent Population (EP) (WSA02 Table A1)

	EP per Unit	EP per Ha	Number	Area	
Residential Lots	3.5		55		192.50
Medium Density					0.00
Commercial					0.00
		Total EP			**192.50**

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}







PLAN LEGEND

Site extents (red line), with the current internal landscape shown as a coloured aerial photograph.

Existing working agricultural lands adjoining the site.

Existing residential land adjoining the site.

Existing open drainage channels that flow towards the south-west.

Existing informal, semi-mature Cypress hedging.

Approximate extent of flood modeling.

Direction of hot, dry and dusty winds.

Potential vehicle access into the site.

Potential public open space corridor.

NUMBER LEGEND

1 Primary traffic flow to and from Griffith CBD along Kidman Way.

2 Existing residence fronting Kidman Way, associated with the surrounding orange orchard to be retained with the new development continuing around a predetermined lot size.

3 Alignment of existing raw water main to be confirmed.

4 Point where the two drainage channels merge and continue in a westerly direction via culverts under the Kidman Way. The merging of the two drains causes localised flooding due to the volume of water flowing into a squeeze point.

5 Current intersection may require improvements or redesign if primary access for the proposed development is to be accessed off Leonard Road.

6 Primary traffic flow to and from Hanwood, and further to on Melbourne.

7 Hanwood Public School.

8 Existing residence fronting Leonard Road to be retained with the new development continuing around a predetermined lot size.

9 Existing mobile phone tower to be retained or potentialy relocated.

10 Adjoining orchard currently approved for future residential development.

11 Access off Old Willdbriggie Road not viable to due the current constraints of road widths, drainage channels, gas mains, and overhead power lines.

A Potential future light industrial / commercial precinct with access directly off Kidman Way, or via the primary site access point.

B Potential primary access points into the site with the inclusion of a left-turn slip-lane for south bound traffic, and a right-turn slip-lane for north bound traffic. The internal roadways leading to Kidman Way and Old Willbriggie Road intersections may include a central median to separate traffic flows in and out of the site.

C Potential education precinct where the existing Hanwood public school could be relocated, as well as off-campus study facilities for high schools, TAFE and/or Universities. The education precinct will ideally overlap with the Agri-hood hub, and link directly to the community sports facilities. Note, if relocating school is not viable, this area will be revert residential lots.

D Central Market Place for the Agri-hood hub including community facilities, shops, restaurants, childcare, market gardens, community orchard, and productive lake.

E Potential for the relocation of the Hanwood cricket club oval and soccer club field and associated facilities. The community sports precinct will ideally overlap with the Agri-hood hub, and link directly to the community sports facilities. Note, if relocating the sport facilities is not viable, this area will be revert residential lots.

F Potential location for retirement living with a visual frontage to Kidman Way, vehicular access from within the development, and pedestrian access to the Central Market Place via the linear POS corridor.

G Significant opportunity for a lineal POS corridor that directly connects the central education, Agri-hood, and Sports precincts with Hanwoods main street (Kidman Way). The corridor will also allow adjoining residents to walk to Hanwood or the central precincts.

H Ideal secondary access points with round-abouts onto Leonards road, providing alternative routes in and out of the site.

I Opportunity for a lineal POS corridor that directly connects the central education, Agri-hood, and Sports precincts with the proposed residential precinct to the east of the site. The corridor would ideally provide open space access for the future residential communities south of Leonard Road.

J Significant opportunity for a future strategic level POS corridor to link Hanwood with Griffith. The corridor could provide a green belt,

PROPOSED RESIDENTIAL ESTATE

Leonard Road Hanwood New South Wales

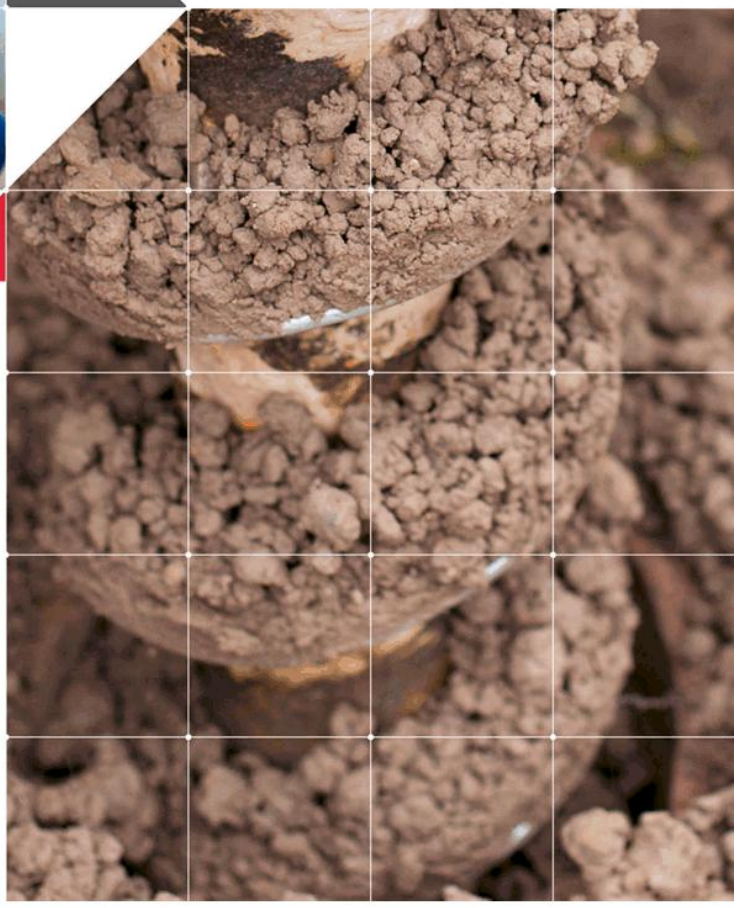
Site Investigation Plan

0 50 100 150 200m

31 October 2023
Issue D

LANGE design landscape architecture

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}



LEONARD ROAD
HANWOOD NSW 2680

PRELIMINARY SITE INVESTIGATION

FOR A PROPOSED SMALL LOT RESIDENTIAL SUBDIVSION

DECEMBER 2023

REPORT NO: 9729

DM McMahon Pty Ltd
6 Jones St (PO Box 6118)
Wagga Wagga NSW 2650
t (02) **6931 0510** www.dmmcmahon.com.au

Report type

Preliminary Site Investigation

For a proposed small lot residential subdivision

Site address

27, 43, 51 Leonard Road

Hanwood NSW 2680

Report number

9729

Prepared for

Martin Ruggeri

Planningmatters Development Service

23 Noorilla Street

Griffith NSW 2680

Tel: 0427 844 374

Email: mruggeri@planningmatters.net.au

Prepared by

DM McMahon Pty Ltd

6 Jones Street (PO Box 6118)

Wagga Wagga NSW 2650

Tel: 0269 310 510

Email: admin@dmmcmahon.com.au

Document control

Role	Name	Signed	Date	Revision
Prepared by	**David McMahon** CEnvP SC BAppSc SA GradDip WRM MEnvMgmt MALGA MEIANZ MSSA		14/12/2023	0

Contents

1.0 Executive summary

DM McMahon Pty Ltd (McMahon) conducted this Preliminary Site Investigation (PSI) at the request of Martin Ruggeri of Planningmatters Development Service on behalf of Hanwood Developments Pty Ltd for a proposed small lot residential subdivision of land at 27, 43 and 51 Leonard Road Griffith NSW. The 46ha development area (the site) has a historical irrigated horticultural land use and consists of a three-lot land parcel (Lots 150 & 289 DP 751709, and Lot 1623 DP 257263). A map of the site can be seen in **Attachment A**. No development plans were made available at the time of investigation and reporting.

The issue of potential contamination is required to be considered whenever a planning proposal is presented to a planning authority where the new use may increase risk from contamination if it is present. Therefore, the purpose of this investigation is to provide Planningmatters Development Service, Hanwood Developments Pty Ltd and the planning authority with a statement of site suitability for the proposed land use and an appropriate risk assessment framework for the management of the site during development.

The scope of work includes:

- A desktop study used to collect basic site information and identify the site characteristics.
- A detailed site inspection to complement the findings of the desktop study and site history and to identify any additional relevant site information.
- Conduct limited sampling for potential chemical contamination using data quality objectives to assess the need for further investigation.
- From the information collected, develop a conceptual site model detailing the potential contamination source-pathway-receptor linkages.
- Conduct a risk assessment for site suitability regarding potential contamination and the proposed development.
- Provide a statement of site suitability for the proposed land use and recommendations for further investigation, assessment, and site management if required.

Findings of the investigation include:

- The desktop study found that the site has been used for irrigated horticulture since the Murrumbidgee Irrigation Area was developed in the early 1900s. Improvements have been on the site since at least the 1950s.
- The site inspection found the site is currently occupied by a citrus orchard and vegetable and herb plantations. Improvements at 27 Leonard Road include two dwellings, a machinery shed, greenhouse, two pump sheds and a chemical shed. Improvements at 43 Leonard Road include one dwelling with attached machinery shed and one pump and chemical shed. Improvements at 53 Leonard Road include three cottages, two demountable buildings used for living quarters, one machinery shed with attached office and one pump shed. It is assumed that the proposed subdivision will involve the demolition and removal of some of the existing dwellings, farm infrastructure, and horticulture.

- From the desktop study and site inspection the following contamination sources were identified:
    - Persistent pesticides in the citrus orchard and vegetable and herb plantations.
    - Fuel and oil storage, and machinery maintenance.
    - Asbestos:
        - On the existing dwellings.
        - In underground services in the form of asbestos piping.
    - Septic systems.
    - Rubbish.
- Soil sampling was conducted for chemicals associated with pesticide use in the citrus orchard and vegetable and herb plantations, and for chemicals associated with fuel and oil storage, machinery maintenance and pesticides around the sheds, and returned results below the criteria for residential land use.
- If elevated concentrations of chemical contaminants were identified then they could present potential health risks to construction workers or future site occupants (through dermal contact, ingestion, or inhalation of contaminated soils and/or vapours), if not adequately managed during development. The conceptual site model has found that based on the past uses and the sampling undertaken, it is assessed that widespread chemical contamination from the identified sources is not present at the site. However, the asbestos contamination can present a risk to constructions workers during development and residents during occupation if asbestos containing material is disturbed, and fibres are released and inhaled.
- The proposed development presents a low risk to construction workers and residents if appropriate site management around the asbestos and septic systems is undertaken.
- In summary, the site is suitable for the proposed development given the asbestos and septic systems are appropriately managed during development in line with the recommendations in **Section 10.0**.

This executive summary and the findings of this PSI are subject to limitations as stated in **Section 11.0**. A protocol for unexpected finds as outlined in **Section 12.0** has also been developed as part of this risk assessment framework if additional potential contamination sources are identified during planning or development.

2.0 Objectives

The objective of this investigation is to:

- Provide information regarding potential contamination on site.
- Provide a factual record of the works completed and results.
- Undertaking a risk assessment for health risk to future site users and the environment.
- Provide a statement of site suitability or recommendations for further investigation and/or site management.
- To prepare the PSI in general accordance with the relevant guidelines and legislation, namely:
    - NSW EPA, Consultants Reporting on Contaminated Land: Contaminated Land Guidelines, (2020).
    - State Environmental Planning Policy (Resilience and Hazards) 2021.
    - National Environment Protection (Assessment of Site Contamination) Measure (NEPM), (2013).

3.0 Scope of work

The scope of work includes the following:

- Review the available information regarding historical, current, and proposed land use of the site and surrounds.
- Review the environmental setting of the site and surrounds.
- Assess the potential contamination sources and contaminants of potential concern.
- Undertake limited surface sampling for persistent horticultural chemicals in the orchard to assess the requirement for further investigation of these areas.
- Undertake detailed surface and subsurface sampling for fuel, oil, and pesticides around the sheds to assess the requirement for further investigation of these areas.
- Assess the potential contamination source-pathway-receptor linkages from the contaminants of potential concern, environmental setting, and land use.
- Develop a conceptual site model to assess potential contamination risk from the source-pathway-receptor linkages.
- Provide a preliminary assessment of site contamination and contaminants of potential concern.
- Identify data gaps in the data for the assessment of site contamination.
- Provide a clear statement on site suitability for the present and future land use and recommendations for further investigation and/or site management.

4.0 Site identification

The site identification and details are as follows.

- Address and real property description:
  - 27 Leonard Road: Lot 150 DP 751709.
  - 43 Leonard Road: Lot 287 DP 751709.
  - 51 Leonard Road: Lot 1623 DP 257265.
- Development area centre co-ordinate: 412485E 6201137N MGA GDA z55.
- Property size: 46ha.
- Owners:
  - 27 Leonard Road: Wayne Andrew Andreatta.
  - 43 Leonard Road: Luigi Giuseppe Sartor and Patricia Joy Sartor.
  - 51 Leonard Road: A.C. Violi Farms Pty Ltd.
- Local Government Area: Griffith City Council.
- Current zoning:
  - 27 Leonard Road: RU6 Transition.
  - 43 Leonard Road: RU1 Primary Production.
  - 51 Leonard Road: RU1 Primary Production.
- Present use: Irrigated horticulture.
- Proposed use: Small lot residential subdivision.
- Development Application reference: Not known.

5.0 Site history

From research of the available resources, the following site history is offered.

Historical owners and occupiers

As follows are the registered owners and occupiers:

27 Leonard Road - Lot 150 DP 751709 (Farm 111).

- Set apart for Irrigation Farm in December 1913. Known as Portion 150.
- Owned by Richard Nicholas O'Brien.
- Other owners unknown until it was purchased from Edone Luciano Borgnolio by Wayne Andrew Andreatta in 1994.

43 Leonard Road - Lot 287 DP 751709 (Farm 112).

- Set apart for Irrigation Farm in December 1913. Known as Portion 287.
- Owned by George Frederick Moseley (farmer).
- Other owners unknown.
- 1986 owned by Giulio Sartor and Luigi Giuseppe Sartor.
- 1999 owned by Luigi Giuseppe Sartor and Patricia Joy Sartor.
- 2014 leased to Giulio Sartor (main dwelling house). Expires 31 August 2024.

51 Leonard Road - Lot 1623 DP 257265 (Farm 1590).

Set apart for Irrigation Farm in June 1918. Known as Portion 153.

- Owned by James Kennedy Hillam.
- Other owners unknown.
- Currently owned by A.C. Violi Farms Pty Ltd.

Council records

Section 10.7 Planning Certificates (Certificate No: 7944/2023, 7945/2023 and 7946/2023) were obtained from Council on 29 November 2023 and the certificates state that the site has not been declared significantly contaminated within the meaning of the Contaminated Land Management Act 1997.

The following Council records were received on 30 November 2023:

27 Leonard Road

- DA207/1999 (1999) by applicant Mr WA Andreatta for the purposes of constructing a rural dwelling.

43 Leonard Road

DA312/2006 (2006) by applicant Mr LG and Mrs PJ Sartor for a two lot Torrens Title subdivision. Modification received 2017.

- Removal of existing septic tank – once connection to Council's reticulated sewer is complete, the existing septic tank is to have its contents removed, filled with soil and topped with garden lime.
- Disconnection of the tile drainage system – prior to the issue of the subdivision certificate, documentation shall be submitted to Council confirming Murrumbidgee Irrigation's requirements for the existing tile drainage system to either remain or be removed or isolated.

51 Leonard Road

- DA157/2017 (2017) by applicant Mr. A C Violi for the demolition of existing dwelling.

EPA records

There are no records on the Contaminated Land Record Database for the site or adjacent properties pertaining to Preliminary Investigation Orders, Declaration of Significantly Contaminated Land, Approved Voluntary Management Plans, Management Orders, Ongoing Maintenance Orders, Repeal Revocation or Variation Notice, Site Audit Statement, or Notice of Completion or Withdrawal of Approved VMP. The site or adjacent properties have not been "notified" to the EPA on the list of NSW Contaminated sites as of November 2023.

Internet search

- The Murrumbidgee Irrigator (Leeton) July 1921 – For sale. Pure bred black Orpington egg setting. Juson strain 7/6 per setting; also a few pullets – G. F Moseley, 112 Griffith.
- Government Gazette of the State of NSW (Sydney) *Registration of Brands of Horses and Cattle 1921* Issue 184 December 1921 – James Kennedy Hillam, Farm 1590 Hanwood via Griffith.
- soulpropertyagents.com.au – 43 Leonard Road. Rented. Outlook over orange orchards toward the city lights of Griffith only 5km away. Covered alfresco and 6m x 3m inground pool, 2 bedrooms with built in cupboards, evaporative cooling, wood heater and split system, 2 space carport, electric cooktop and oven.

Aerial photographs and satellite images

McMahon observed the following from a review of the available aerial photography.

27 Leonard Road

1958 – Most of the site has been cultivated as an orchard. A house can be seen along the western boundary, with access from Kidman Way. A small yard is to the east of the house with no vegetation growing. The surrounding land has been mostly developed as orchards with some houses having been established in the village of Hanwood established to the south of the site.

1965 – A large machinery shed can be seen to the east of the existing house. Another house has been built in the south east corner of the site with access from Leonard Road.

1977 – A small shed has been built in the approximate centre of the site, east of the existing shed. A detached carport has been built to the west of the second house in the south east corner.

1993 – No change from 1977.

1997 – A rectangular area has been cleared of vegetation around the large shed.

2003 – The original house along the western boundary has been demolished and a larger house has been built in its place. A concrete pad can be seen to the north east of the house. The front yard of the house has been extended and a garden bed has been built around the septic tank in the front yard. The orchard trees have been removed from this area. The driveway from Kidman Way to the rear of the house has been gravelled. Another small shed with outbuilding and tank has been built to the south of the existing small shed in the approximate centre of the site. Farm materials, tyres and machinery can be seen around the sheds.

2007 – A septic tank can be seen to the north west of the second house in the south east corner of the site.

2011 – No change from 2003.

2012 – No change from 2003.

2013 – More of the front yard of the larger house has been extended, now reaching to the western boundary along Kidman Way. The orchard trees have been removed from this area. Some orchard trees have also been removed to the south of the large machinery shed.

2014 – No change from 2013.

2015 – The rear of the large machinery shed has been gravelled. A large, uncovered structure can be seen to the east of the small sheds. Remnants of a bonfire can be seen south of this structure.

2016 – The large, uncovered structure has been removed. White ash can be seen on the bonfire.

2018 – No change from 2016.

2019 – An enclosed dog run with large kennel have been built to the south of the large machinery shed.

2020 – No change from 2019.

2021 – No change from 2019.

2022 – The remnants of the bonfire have been removed.

2023 – No change from 2022.

43 Leonard Road

1958 – The whole site has been cultivated as an orchard. An access track runs north south from Leonard Road to the south through the approximate centre of the site. The irrigation channel can be seen along the eastern and southern boundary.

1965 – A large building has been built in the approximate centre of the site. The remaining site is still cultivated as an orchard.

1977 – The large building has been removed and a house with an attached large rectangular shed has been built near the southern boundary, adjacent to the access point from Leonard Road. The access track is barely visible. The area where the building was removed has been planted with orchard trees.

1993 – The access track through the centre of the site has been planted over. Some landscaping has been completed at the rear of the house.

1997 – A covered alfresco area and pool have been built on the south west side of the house.

2003 – A small shed has been built to the north of the house and the area around the house and shed appear to be gravelled. A small garden has been built to the west of the small shed.

2007 – Some farm materials/rubbish can be seen around the small shed.

2011 – No change from 2007.

2012 – No change from 2007.

2013 – No change from 2007.

2014 – No change from 2007.

2015 – No change from 2007.

2016 – No change from 2007.

2018 – No change from 2007.

2019 – No change from 2007.

2020 – No change from 2007.

2021 – No change from 2007.

2022 – No change from 2007.

2023 – No change from 2007.

51 Leonard Road

1958 – Most of the site has been cultivated as an orchard. Some sheds can be seen in the approximate centre of the site and a house has been built in the south west corner.

1965 – A large packing shed appears to have replaced the sheds in the centre of the site

1977 – The large packing shed has been extended. A second house has been built to the south of the packing shed. Some trees have been removed around the original house in the south west corner.

1993 – A small shed has been built in the centre of the site. The original house in the south west corner has been extended and the yard around the original house has been landscaped. A detached carport has been built to the west of the original house. A garden shed has been built to the north of the original house. Leonard Road to the south and Old Willbriggie Road to the east of the site appear to have been asphalted.

1997 – Another smaller shed has been built in the centre of the site. There are currently three sheds in the centre of the site, in addition to the house. The original house, carport and garden shed still remain in the south west corner.

2003 – No change from 1997.

2007 – No change from 1997.

2011 – No change from 1997.

2012 – The driveway to the house and sheds in the approximate centre of the site appears to have been gravelled. A small pump shed has been built along the southern boundary, at the entrance from Leonard Road.

2013 – The smaller shed in the centre of the site has been removed. A lean-to has been built on the west side of the other small shed in the centre of the site.

2014 – The driveway to the house and sheds in the centre of the site has been graded.

2015 – The lean-to on the west side of the small shed has been removed. A mobile phone tower has been built in the north corner of the site.

2016 – Three demountable buildings can be seen around the small shed in the centre of the site.

2018 – A fourth demountable building can be seen. The carport has been removed from original house in the south west corner. A stockpile of soil can be seen to the east of the original house.

2019 – No change from 2018.

2020 – Two of the demountable buildings have been removed in the centre of the site. The stockpile to the east of the original house in the south west corner has been removed and the land around the original house has been cleared of vegetation.

2021 – No change from 2020.

2022 – No change from 2020.

2023 – No change from 2020.

The aerial photographs and satellite images can be seen in **Attachment B**.

6.0 Site condition and surrounding environment

McMahon notes the following observations of the site condition as part of this PSI.

- The site is located on the northern fringe of the village of Hanwood, approximately 5km south of Griffith.
- The surrounding land is largely horticultural and agricultural to the north, east and west. Residential lies to the south, with the Hanwood poultry processing plant and Hanwood winery further south.
- The site consists of three separate land parcels with existing dwellings located across all of land parcels and multiple sheds across the site.

27 Leonard Road

- The farm is fallow with some vegetable and herb plantings (basil and onion).
- Sub surface drip irrigation is used throughout.
- Tile drainage is used across the farm with concrete pits and asbestos rises visible.
- Improvements include:
- A brick veneer single storey house built in the 2000s with a septic tank to the west of the house in the front yard. Irrigation is likely via drip irrigation to the surrounding gardens.
- A gravel driveway from Kidman Way leads to a large slab on grade and dirt floor shed. The shed is used for storing farm machinery. No staining was noted on the site surface around the machinery.
- A 1,000L-2,000L above ground diesel tank is located to the north of the machinery shed. The tank appears to be disused and there was no major staining noted on the site surface.
- Laydown areas are located to the north and south of the machinery shed. The laydown areas generally contain old machinery, spare pipes, and bricks. The laydown areas have been kept neat and tidy.
- A slab on grade pump shed and a slab on grade chemical shed are located to the east of the machinery shed. Another laydown area of machinery parts, old pipes and wooden pallets can be seen around the pump shed. Some asbestos risers and pipes from old tile drainage were seen in the laydown area but they are intact, and no fragments observed.
- A boom spray fill area between pump and chemical sheds, located on a concrete pad.
- An old concrete tank likely used for fertigation is located next to the chemical shed.
- A greenhouse covered in shade cloth is located to the south of the chemical shed. A piece of partially broken fibrous sheeting was observed next to the trellis, to the south of the green house.
- A loading ramp can be seen to the south of the greenhouse.
- A fenced dog run with large kennel is to the south of the machinery shed.
- A small house on stumps built in the 1960s with detached slab on grade garage and separate laundry is located in the south east corner of the lot. A small garden shed is located to the east of the house. The house, garage and shed are all clad with potential asbestos containing material (ACM). The septic system is to the north east of the house, in the rear yard.

- A small round brick pump shed can be seen in the south west corner of the lot. Possibly used for the tile drainage system.

43 Leonard Road

- The farm is planted to citrus.
- Surface drip irrigation is used throughout.
- Tile drainage is used across the farm with concrete pits and asbestos rises visible. Council information from 2017 recommended the tile drainage system to remain, be removed or be disconnected for subdivision as per Murrumbidgee Irrigation's requirements. It is not known whether this has been completed.
- Improvements include:
- A brick veneer single storey slab on grade house with tile roof built in the 1960s/1970s. The house includes a pool and covered alfresco area built in the 1990s. The pool was empty at the time of investigation. The concrete septic tank is to the west of the house, in the front lawn. Council records from 2006 recommended the septic tank be decommissioned once the house was connected to the town sewerage system. It is not known whether this has been completed.
- A slab on grade steel machinery shed is attached to the house to the north.
- An above ground fuel tank is located inside the shed, but it is empty and disused. No staining was noted on the concrete below.
- A second above ground 1,500L-2,000L diesel tank is located to the north of the machinery shed. Some minor fuel surface staining was observed.
- A steel slab on grade pump and chemical shed is located to the north of the machinery shed.
- A gravel driveway from Leonard Way leads to a hard stand in front of the machinery shed. The driveway and hardstand are in neat and tidy condition.
- A tile drain pump is located in the south west corner of the lot.

51 Leonard Road

- The farm is planted to citrus.
- Surface drip irrigation is used throughout.
- Tile drainage is used across the farm with concrete pits and asbestos rises visible.
- Improvements include:
- A small stumped cottage built prior to 1958 clad with asbestos is located in the south west corner of the lot. A detached slab on grade tin laundry is located to the north of the house and is lined with asbestos containing material.
- Two stumped asbestos clad cottages built in the 1960s/1970s are located in the approximate centre of the site. Both cottages have septic systems however one appears to be malfunctioning.
- Two small demountable buildings are located near the cottages which appear to be used for living quarters. These demountables were placed on site between 2016 and 2018.
- A large slab on grade tin packing shed is located to the north of the cottages. Some machinery was parked around the packing shed.

- An asbestos clad office is attached to the packing shed to the north. Broken ACM was observed on the site surface. No fibres were noted.
- A partially gravelled driveway leads from Leonard Road to a hard stand around the packing shed.
- A pump shed is located on the southern boundary, at the entrance from Leonard Road.
- A mobile phone tower is located in the north corner of the lot, built sometime between 2014 and 2015.
- A rubbish pile consisting of pallets, branches and plastic is located on the northern boundary near the mobile phone tower. Broken ACM sheeting and piping fragments were observed on the site surface. No fibres were noted.
- Remnants of a concrete slab, bricks and fill were observed in the south east of the lot, along the southern boundary. No ACM was noted. The area could have possibly been an old shed that has since been removed but available aerial photographs cannot confirm this.

Maps of the site features can be seen in **Attachment C**.

Site photographs can be seen in **Attachment D**.

A summary of the site environmental setting is as follows.

Topography

The site lies on a northwest trending level plain of the broader Mirrool Creek floodplain with an elevation range from 123 mAHD to 126 mAHD.

Vegetation

27 Leonard Road is fallow with some annual plantings of herbs and vegetables. 43 and 51 Leonard Road are currently planted to citrus. Managed lawns and non-native trees exist around the existing houses. The site surface surrounding the sheds across the site is mostly devoid of vegetation.

Natural Resources Sensitivity

A search of the Griffith Local Environment Plan (2014) found the site is not mapped as being in a natural resource sensitivity area for terrestrial biodiversity, riparian lands and waterways or groundwater vulnerability. The western boundary of 27 Leonard Road adjoins a natural resource sensitivity area for terrestrial biodiversity.

Weather

The average rainfall for Griffith is approximately 390 mm per annum, with the wettest months being March, August, and October. Griffith is characterised by cool winters and hot summers.

Hydrology

An irrigation channel runs along the east, west and most of the southern boundary of the site and along the boundary between 43 and 51 Leonard Road. The channel drains north to Main Drain J which discharges to Mirrool Creek 15km to the west of Griffith. The tile drain pump in the south west corner of 43 Leonard Road pumps water into the channel from the site. Irrigation supply and drainage infrastructure has modified the natural drainage. Flooding in Hanwood occurs when elevated levels in Main Drain J reduce the effectiveness of the Hanwood drainage system. The existing capacity of Main Drain J is of the order of 1% annual exceedance probability (AEP) capacity.

Soil

Natural soils are brown, brown yellow and yellow alluvial clays and yellow alluvial sandy clays.

Geology

The regional geology is Cenozoic alluvial plains associated with Mirrool Creek. More recent windblown sand, silt and clay additions to alluvial profiles are likely and, in some places, dominate the overlying.

Hydrogeology

Groundwater resides in the underlying fractured rock in low yielding aquifers. There is one registered bore within 1km of the site. The groundwater bore is approximately 750m south of the site and is used for monitoring. It was drilled into clay to a depth of 95m with a water bearing zone from 78m to 84m. Local groundwater monitoring and water table mapping data was obtained from the Murrumbidgee Irrigation Annual Compliance Report 2022 and indicates groundwater at an expected depth of 4 to 6m below ground level. Shallow groundwater was encountered at 3.3m in BH01.

7.0 Sampling and analysis quality plan and sampling methodology

The Data Quality Objectives (DQOs) of the site assessment have been developed to define the type and quality of data to meet the project objectives. The DQOs have been developed generally in accordance with the seven step DQO process as outlined in AS 4482.1 (2005) and the USA EPA Guidance on Systematic Planning Using the Data Quality Objectives Process (2006a). These DQOs are as follows:

1. **The problem**
2. **The goal of the study**
3. **Information inputs**
4. **Study boundaries**
5. **The analytical approach**
6. **Performance and acceptance criteria**
7. **Obtaining data**

These objectives have been further outlined in the following sections.

DQO 1 - The problem

Potential contamination from previous land use may be present across the site and insufficient data relating to this source is available to determine land use suitability and the need for further investigation with the necessary level of confidence.

DQO 2 - The goal of the study

Goals of the study include:

- Undertake limited investigations, based on the data gaps to determine if there is chemical contamination within the soil associated with the identified contamination sources.
- Determine if any contamination, should it be identified, poses a risk to current and/or future receptors at the site or within potential exposure pathways from the site, and if further investigation is required.
- Determining whether the site is currently, or can be made, suitable for the proposed development regarding contamination.

DQO 3 - Information inputs

- Desktop data including site inspections, site condition, history, geology, hydrogeology, and laboratory analysis to characterise the site.
- Observational data including visual and olfactory conditions obtained from the sampling.
- Analytical data relative to the assessment criteria.

DQO 4 - Study boundaries

- Intrusive investigation across the site.
- Temporal boundaries are limited to the fieldwork timeframes in the fourth quarter of the year 2023.

DQO 5 - The analytical approach

Samples across the wider site will be tested for heavy metals and organochlorine and organophosphate pesticides that may be persistent in the soil from historical pesticide use. Samples from around the sheds will be tested for hydrocarbons, solvents, phenols, polychlorinated biphenyls, heavy metals, and pesticides that may be persistent in the soil from fuel storage, machinery maintenance, and pesticide storage and use.

DQO 6 - Performance and acceptance criteria

Specific limits for the investigation are in accordance with the appropriate guidance made or endorsed by state and national regulations, appropriate data quality indicators, and industry standard procedures for field sampling and handling. To assess the validity of data for decision making, the data is assessed against a set of data quality indicators, the following predetermined data quality indicators have been adopted.

The key decision rules for the investigation are:

1) Has the analytical data been collected as part of the testing and met the data quality indicators? If they have then the data can be used to answer the decision rule/s and the decision statements developed in Step 2 of the DQOs. If not, then the need to collect additional data may be required.
2) Do contaminant concentrations exceed the investigation and screening criteria? If not, then the potential contamination does not pose an above low level of risk. Where results exceed the investigation and screening criteria, this may indicate an unacceptable level of risk. Further risk assessment and investigations may be warranted to determine the potential for impacts.

The key decision errors for the investigation are:

i. deciding that the site is contaminated when it truly is not.
ii. deciding that the site is not contaminated when it truly is.

The true state of nature for decision error (i) is that the site is not contaminated.
The true state of nature for decision error (ii) is that the site is contaminated.

The site assessment criteria were specifically derived and incorporate the following:

- The samples are not composited so the direct reading of contaminant levels will be found from each sample point on which an appropriate decision can be based off.
- The duplicate sample should have a Relative Percentage Difference (RPD) of <30%.
- The rinsate sample should return negligible concentrations for all parameters tested to ensure an appropriate sampling and decontamination procedure.
- If contaminant levels exceed the Tier 1 and statistical assessment criteria further investigation, assessment and management may be required.

Specific Tier 1 assessment criteria can be seen below, **Table 1**.

Table 1: *Assessment criteria*

Material	Analytes	Criteria
Soil	Hydrocarbons Solvents Phenols Polychlorinated biphenyls Heavy metals Pesticides	**Health Investigation Levels (HILs)** -Residential A NEPM (2013) -Table 1A(1) Heavy metals, phenols, and pesticides -Soils within 3m of surface **Health Screening Levels (HSLs)** -Residential A NEPM (2013) and CRC Care (2011) -Table 1A(3) Hydrocarbons and solvents (vapour intrusion) -Table B4 Hydrocarbons and solvents (direct contact) -Clay soils within 2m of the surface **Added Contaminants Limits (ACLs)** -Residential A NEPM (2013) -Table 1B(1-4) Heavy metals -Soils within 2m of surface -pH of 6.0 ($CaCl_2$) and CEC of 10 assumed from local knowledge **Environmental Investigation Levels (EILs)** -Residential A NEPM (2013) -Table 1B(5) Arsenic, DDT, and naphthalene -Soils within 2m of surface **Ecological Screening Levels (ESLs)** -Residential A NEPM (2013) -Table 1B(6) Hydrocarbons, solvents, and benzo(a)pyrene -Clay soils within 2m of surface

The Tier 1 assessment criteria are used as an initial screening of the data to determine whether further assessment is required. Where above criteria exceedance indicates a risk to human health or the environment, site specific risk assessment, statistical analysis, management, or remediation will be undertaken or recommended as appropriate.

DQO 7 - Obtaining data

The sampling pattern and strategy identifies the occurrence of potential contamination for suitable site characterisation. The sampling pattern and strategy has been devised based on site history, land uses, aerial imagery, site inspections, previous investigations and the NEPM (2013). The sampling pattern has been described in more detail below.

Sampling strategy and pattern

A loose systematic and judgemental sampling pattern has been chosen based on potential contamination sources, previous land use, and requirements to delineate potential contamination. The adopted sampling pattern is suitable to make a quantitative statement about the level of confidence regarding the quality and accuracy of results. McMahon assesses that the sampling pattern is suitable to be used for decision making and site characterisation.

Key features of the sampling pattern include:

- 20 loose systematic soil sample locations taken across the orchard, vegetable and herb plantation. Samples were analysed for heavy metals and pesticides (organochlorines and organophosphates).
- 16 judgemental sample locations taken around the existing sheds. Samples were analysed for hydrocarbons, solvents, phenols, polychlorinated biphenyls, heavy metals, and pesticides (organochlorines and organophosphates).
- Two soil duplicate samples.
- Two rinsate samples.

By reference to the DQOs, maps of the investigation locations can be seen in **Attachment E**.

Sampling design justification

- Samples 1 - 20: to assess the near surface soil contamination from potential persistent pesticides from diffuse application in the orchards.
- Sample 21: to assess the near surface soil contamination from potential leaks and spills from machinery maintenance and storage at 27 Leonard Road.
- Sample 22: to assess the near surface contamination from potential leaks and spills from the above ground fuel storage at 27 Leonard Road.
- Sample 23-27: to assess the near surface soil contamination from pesticide use, potential leaks and spills from fuel storage and chemical storage and uses around the sheds at 27 Leonard Road.
- Sample 28: to assess the near surface contamination from potential leaks and spills from the above ground fuel storage at 43 Leonard Road.
- Sample 29: to assess the near surface soil contamination from potential leaks and spills from machinery maintenance and storage at 43 Leonard Road.
- Sample 30-36: to assess the near surface soil contamination from pesticide use, potential leaks and spills from fuel storage and chemical storage and uses around the sheds at 51 Leonard Road.

Failure to meet objectives procedure

If the procedures undertaken do not satisfy the expected data quality objectives, a review of the sampling plan will be conducted prior to any further works.

Sampling and analysis methodology

The sampling officer wore unused disposable nitrile gloves to extract samples directly from the excavated pit to place into appropriately preserved sample receptacles. Collected sample containers were placed into a chilled esky for preservation prior to analysis. All in-field observations and any relevant comments are detailed in the field sheets and a Chain of Custody form was produced to accompany the samples to the laboratory.

Sampling standards

Sampling was undertaken by reference to:

- AS 4482.1:2005 - Guide to the investigation and sampling of sites with potentially contaminated soil Part 1: Non-volatile and semi-volatile compounds (Withdrawn).
- AS 4482.2:1999 - Guide to the sampling and investigation of potentially contaminated soil Part 2: Volatile substances (Withdrawn).

Although the 4482 series Australian Standards have recently been withdrawn, they have been used in the absence of other relevant Australian publications.

8.0 Results

The site inspection and sampling for this PSI was conducted over one day on 4 December 2023. The weather was sunny with light winds. A summary of the field observations and sample analytical results are as follows.

Soil and site surface

- Soils on site are high to moderately structured clay loams and moderate to weakly structured light clays.
- Some bonded ACM fragments were visually observed on the surface at 27 Leonard Road and on the surface around the sheds and the rubbish pile at 51 Leonard Road. The bonded ACM fragments were in sound condition with no evidence of material breakdown, decay, or fibre release. No ACM was observed in the underlying natural subsoil.
- There were no visual or olfactory indicators of gross chemical contamination on the site surface other than some minor fuel and oil stains.

Soil analysis

- Hydrocarbons are below the Limits of Reporting (LORs) and the adopted criteria.
- Solvents are below LORs and/or the adopted criteria.
- Phenols are below LORs and the adopted criteria.
- Heavy metals are below LORs and/or the adopted criteria.
- Pesticides are below LORs and/or the adopted criteria.

Quality control and quality assurance results

- The duplicate samples (20 and 21) returned relative percent differences of <30%.
- The rinsate samples returned results below the laboratory limit of reporting.
- There were no laboratory outliers.
- Based on the above the laboratory quality control and quality assurance is of a suitable quality to rely on the results.

Tabulated results can be seen in **Attachment F**.

Laboratory reports can be seen in **Attachment G**.

9.0 Conceptual site model

A conceptual site model is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors and is presented and follows.

Summary

The site has been used for agriculture and irrigated horticulture as far as records can ascertain. Chemicals associated with pesticide use, fuel and oil storage and machinery maintenance may have accumulated in the soil. Minor surface staining was observed on the site surface under the aboveground diesel fuel tank at 43 Leonard Road. Chemical storage was also noted in multiple sheds across the site. Hazardous building materials were observed on most of the existing houses and some bonded ACM fragments were observed on the soil surface at 27 Leonard Road and on the soil around the shed and rubbish pile at 51 Leonard Road. More asbestos finds are possible. Tile drainage is used across the site with asbestos risers visible in the ground and on the surface of the laydown area at 27 Leonard Road. Septic systems are used for all of the existing houses. A rubbish pile consisting of pallets, branches and plastic was seen on the northern boundary of 51 Leonard Road. Off-site contamination sources include the Hanwood poultry processing plant and the Hanwood winery to the south of the site. Receptors include future construction workers, site users, and the environment. Pathways are from soil disturbance during development and occupation and from the disturbance of asbestos during potential demolition of the sheds. Short to medium-term soil contact is likely for future construction workers, and long-term soil contact is possible for future occupants.

Potential and known sources of contamination

- Persistent pesticides in the orchard.
- Fuel and oil storage, and machinery maintenance.
- Asbestos
    - On the existing dwellings.
    - In underground services and tile drains in the form of asbestos piping.
- Septic systems.
- Rubbish.

List of contaminants of potential concern

From the potential contamination sources, the contaminants of potential concern are as follows:

- Hydrocarbons.
- Solvents.
- Phenols.
- Heavy metals.
- Pesticides.
- Asbestos.

Mechanism of contamination

The mechanism of contamination is predominantly top-down vertical and lateral migration into soil. The mechanism of asbestos contamination is from the release of fibres from asbestos containing material during disturbance.

Potentially affected environmental media

- Soil.
- Surface water.
- Groundwater.

Consideration of spatial and temporal variations

Spatial and temporal variation of persistent pesticides and heavy metals in the soil is likely. Temporal variation of asbestos is unlikely unless the asbestos is disturbed, and fibres are released.

Actual or potential exposure pathways

- Direct skin contact with soil for future construction workers, and future on-site occupants.
- Inhalation and/or ingestion of soil, vapour, dust and fibres.
- Direct surface water contact.
- Groundwater ingestion, however, the site is connected to town water.

Human and ecological receptors

- Future on-site users.
- Construction workers.
- Domestic groundwater users. No domestic groundwater bores currently exist on site.
- Down gradient ecological receptors.
- Future landscaping and ecological receptors.

Frequency of exposure

- Construction workers are assessed to be a short-term exposure risk.
- Future on-site users are assessed to have a long-term exposure risk.
- Future groundwater users are a medium to long-term exposure risk.
- Ecological receptors are assessed to be a medium to long-term exposure risk.

Source pathway receptor linkage assessment

- There is low risk of pesticide and heavy metal contamination as the sampling returned low results.
- There is low risk of contamination from fuel and oil leaks and spills as the sources were located on or near the slab on grade sheds and any potential spills or leaks are considered to be surficial and localised. The sampling returned results below the adopted criteria, particularly Samples 22 and 28 which were taken downgradient of the above ground fuel tanks.

- There is a risk of inhalation of asbestos fibres and contact with potentially contaminated soil if the existing houses and tile drains are proposed to be removed. The asbestos containing material including fragments observed on the site surface are to be removed in line with standard industry practice.
- There is low risk of contamination from the septic systems when regularly inspected and services as they are regulated by Council however it is recommended that they be decommissioned for future residential land use.
- There is low risk of contamination from the rubbish pile if handled as waste in line with NSW EPA guidelines.
- There is low risk from the off-site sources of potential contamination. The Hanwood poultry processing facility and the Hanwood winery are assessed to be of low significance owing to their distance and relative incline to the site. However, groundwater contamination is possible.

Discussion of multiple lines of evidence

A multiple lines of evidence approach is the process for evaluating and integrating information from different sources of data and uses best professional judgement to assess the consistency and plausibility of the conclusions which can be drawn, NEPM (2013). Definitive information concerning the sources of potential contamination on site is satisfactory therefore the risk assessment relies heavily on the information provided by this PSI and is supplemented by the data collected during sampling.

10.0 Conclusions and recommendations

This investigation met the objective of investigating and assessing potential contamination and providing a statement of site suitability for the proposed land use and an appropriate risk assessment framework for the management of the site during development.

The results of the investigation conclude that there is no gross contamination across the site from pesticide use, fuel storage, or machinery maintenance. Most of the site is assessed to be suitable for the proposed development. However, additional sources of contamination were identified and will require further investigation and site management during development, which are outlined as follows.

There are known occurrences of asbestos across the site, and these will require management during development. Management of these areas is required and should adhere to the following guidance:

- Griffith City Council (2020) Model Asbestos Policy.
- SafeWork NSW (2014*)* Managing asbestos in or on soil.
- Department of Health WA (2021) Guidelines for the assessment, remediation, and management of asbestos contaminated sites.

Management of the septic systems are required during development. Although septic systems are regulated by Council and present low health and environmental risk when regularly inspected and serviced, remediation of the systems is recommended for future residential land use. This is generally a standard development consent condition issued by Council when agricultural/horticultural land is developed into residential.

Although no filled gullies and dams were identified as part of this PSI, it is not uncommon to find these on agricultural/horticultural land. Care must be taken to identify and evaluate unexpected finds such as these during development under the unexpected findings protocol in **Section 12.0**.

This executive summary and the findings of this PSI are subject to the limitations as stated in **Section 11.0**.

11.0 Limitations and disclaimer

DM McMahon Pty Ltd has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Planningmatters Development Service and Hanwood Developments Pty Ltd and only those third parties who have been authorised by DM McMahon Pty Ltd to rely on this report.

The information contained in this report has been extracted from field and laboratory sources believed to be reliable and accurate. DM McMahon Pty Ltd does not assume any responsibility for the misinterpretation of information supplied in this report. The accuracy and reliability of recommendations identified in this report need to be evaluated with due care according to individual circumstances. It should be noted that the recommendations and findings in this report are based solely upon the said site location and conditions at the time of assessment. The results of the said investigations undertaken are an overall representation of the conditions encountered. The properties of the soil, vapour and groundwater within the location may change due to variations in ground conditions outside of the assessed area. The author has no control or liability over site variability that may warrant further investigation that may lead to significant design and land use changes.

12.0 Unexpected findings

If any unconsolidated, odorous, stained, or deleterious soils, or suspect bonded/friable/fibrous asbestos containing material, fuel tanks, or septic systems are encountered during any further excavation, suspected historical contaminating activities are encountered, or conditions that are not alike the above descriptions, the site supervisor should be informed, the work stopped, and this office be contacted immediately for further evaluation by an appropriately qualified environmental consultant. The unexpected findings may trigger the need for more investigation and assessment dependant on the scope and context of the unexpected finding.

13.0 Notice of Copyright

14.0 Attachments

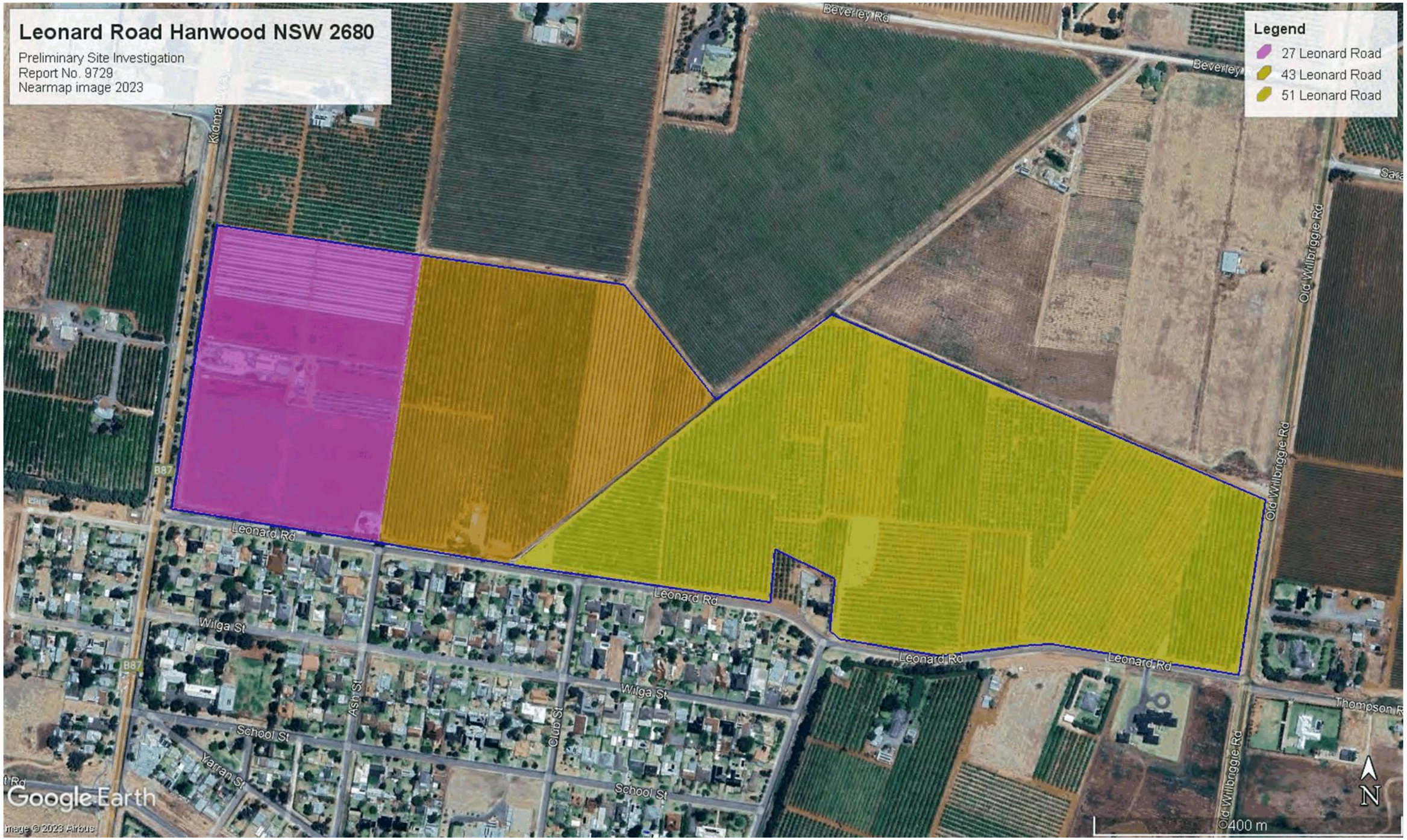
A. Location and site map	2 pages
B. Aerial photographs and satellite images	19 pages
C. Site features	4 pages
D. Site photographs	21 pages
E. Sampling map	3 page
F. Tabulated results	2 pages
G. Laboratory reports	41 pages

Attachment A : *Location and site map*

DM McMahon Pty Ltd 6 Jones Street (PO BOX 6118) Wagga Wagga NSW 2650 t (02) 6931 0510 w www.dmmcmahon.com.au

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

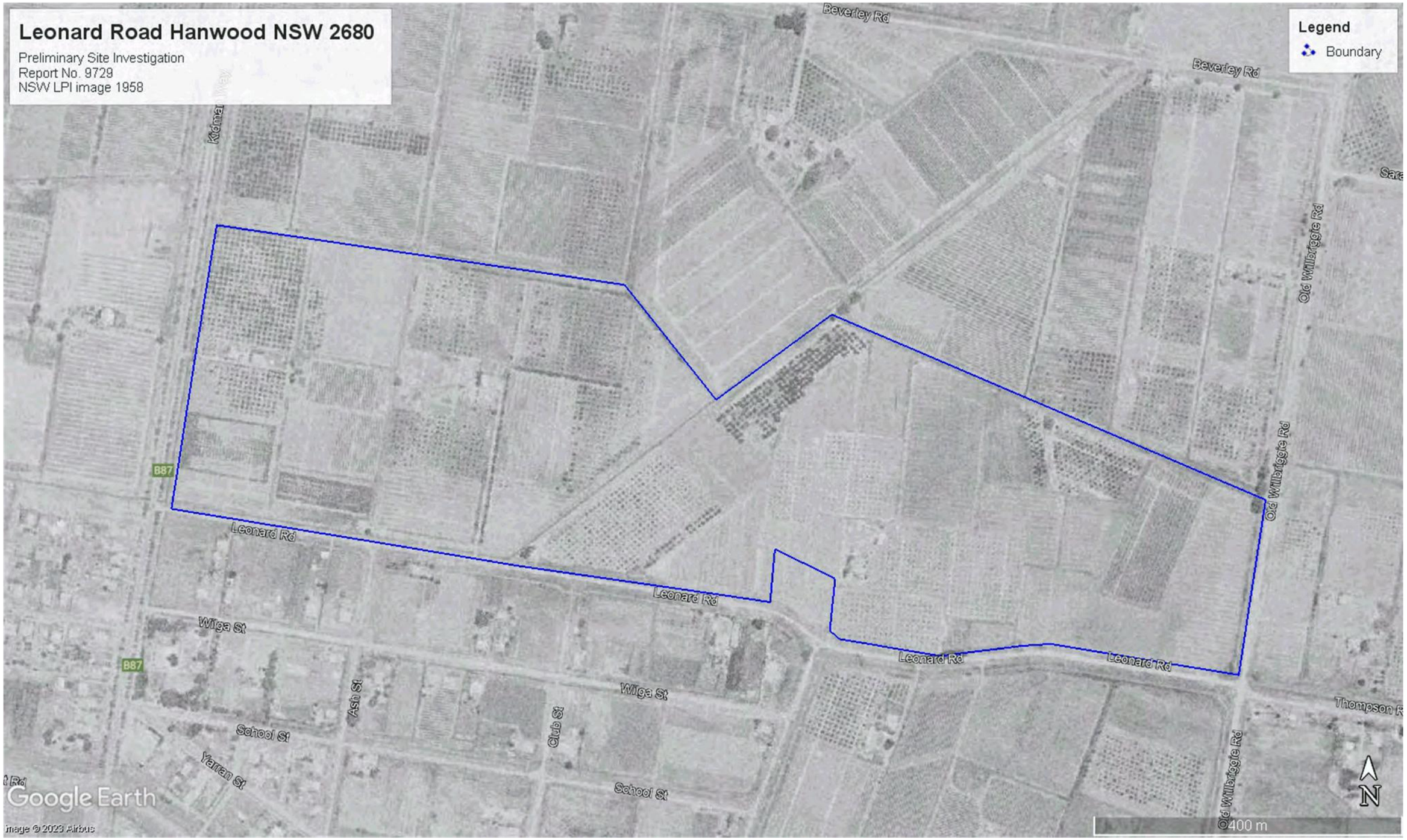

Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2023
Legend
Boundary
Griffith
Mac Arthur St
Blumer Ave
Clifton Blvd
Rankins
Nakaden St
Brogden Rd
Bromley Rd
B87
B94
Yoogali
Walla Ave
Kurrajong Ave
Irrigation Way
Hanwood
Old Willbriggie Rd
Google Earth
Image © 2023 Airbus
N
3 km

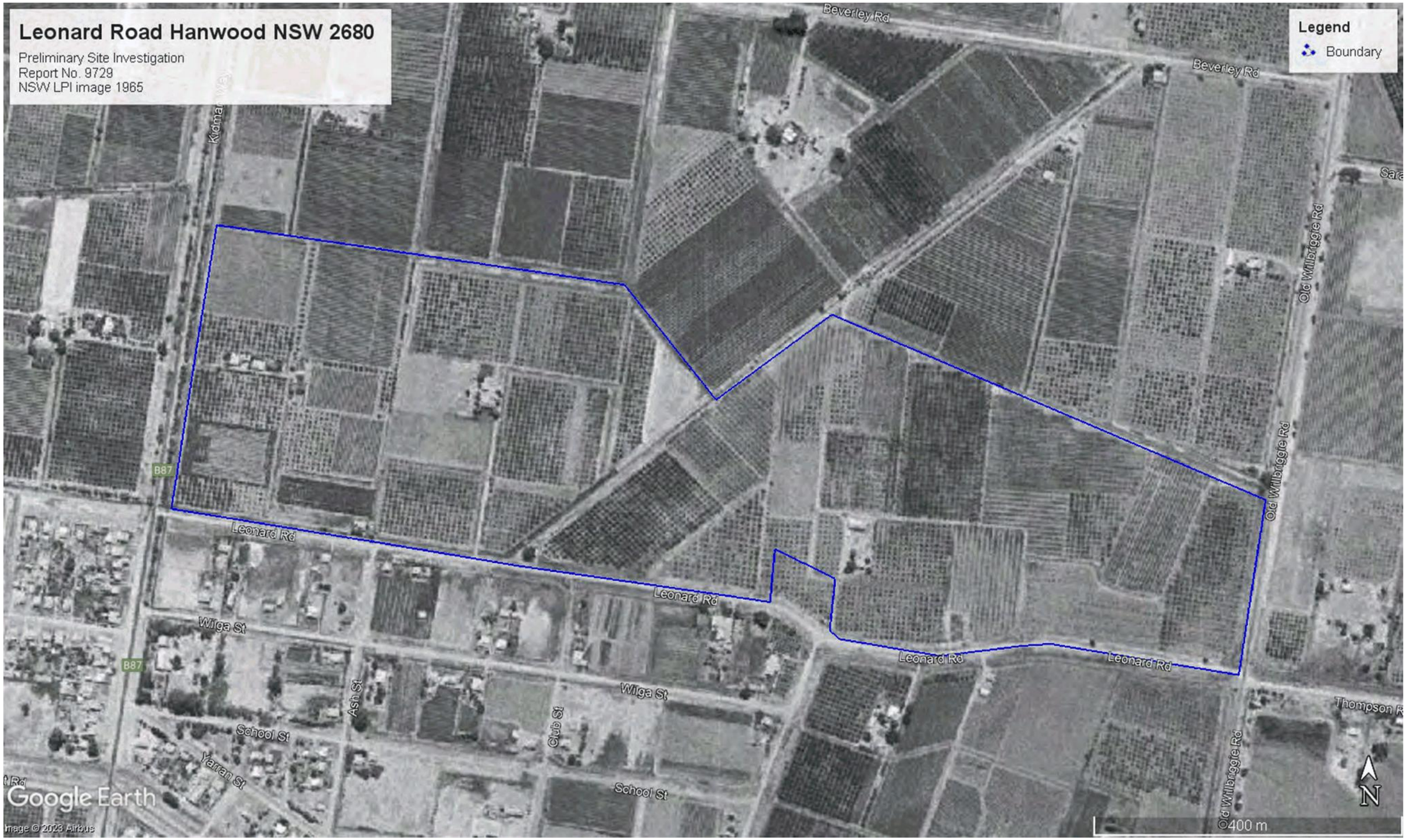

Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Nearmap image 2023
Legend
27 Leonard Road
43 Leonard Road
51 Leonard Road
Beverley Rd
Old Wilbriggie Rd
B87
Leonard Rd
Wilga St
Ash St
Club St
School St
Yarran St
Thompson R
Google Earth
image © 2023 Airbus
400 m
N

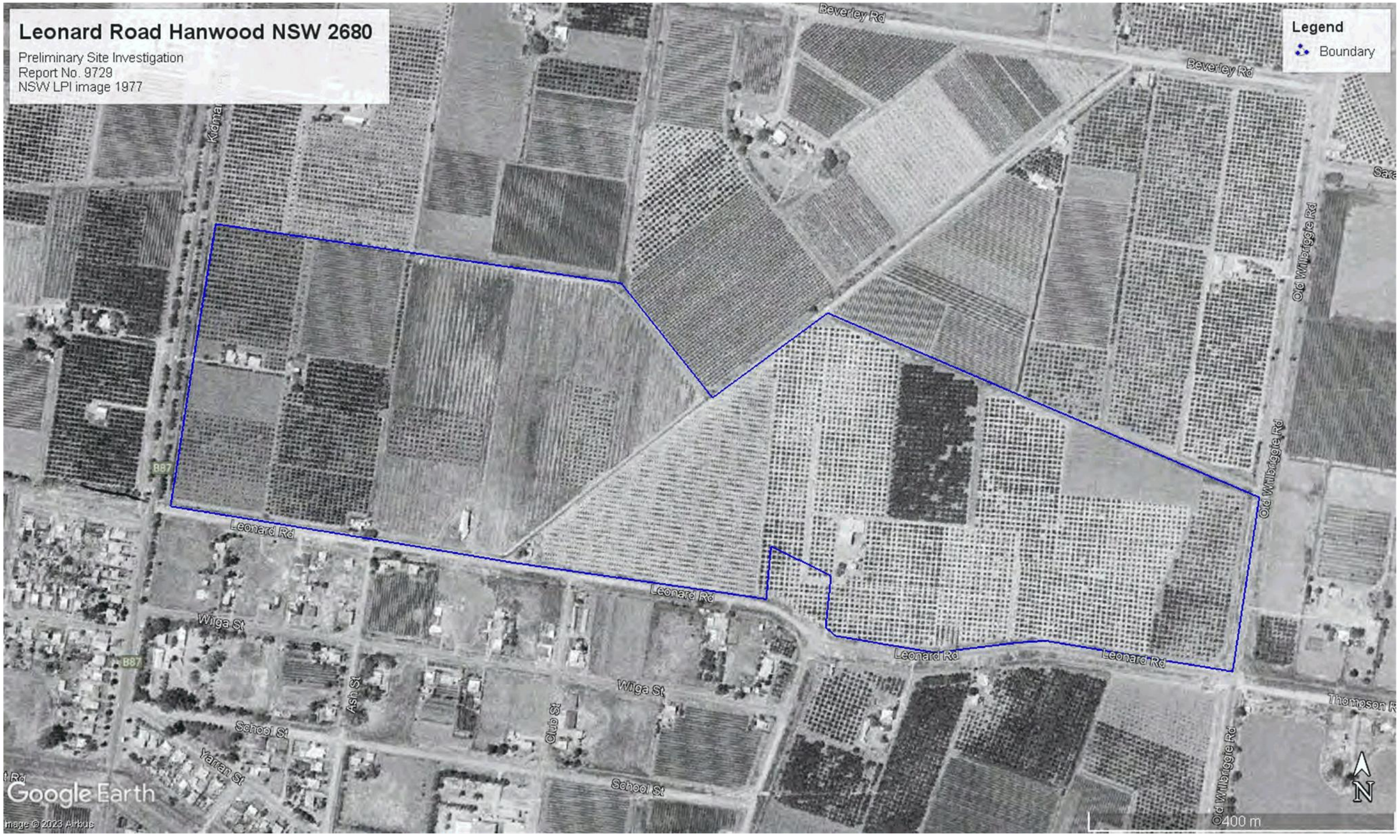
Attachment B : *Aerial photographs and satellite images*

DM McMahon Pty Ltd 6 Jones Street (PO BOX 6118) Wagga Wagga NSW 2650 t (02) 6931 0510 w www.dmmcmahon.com.au

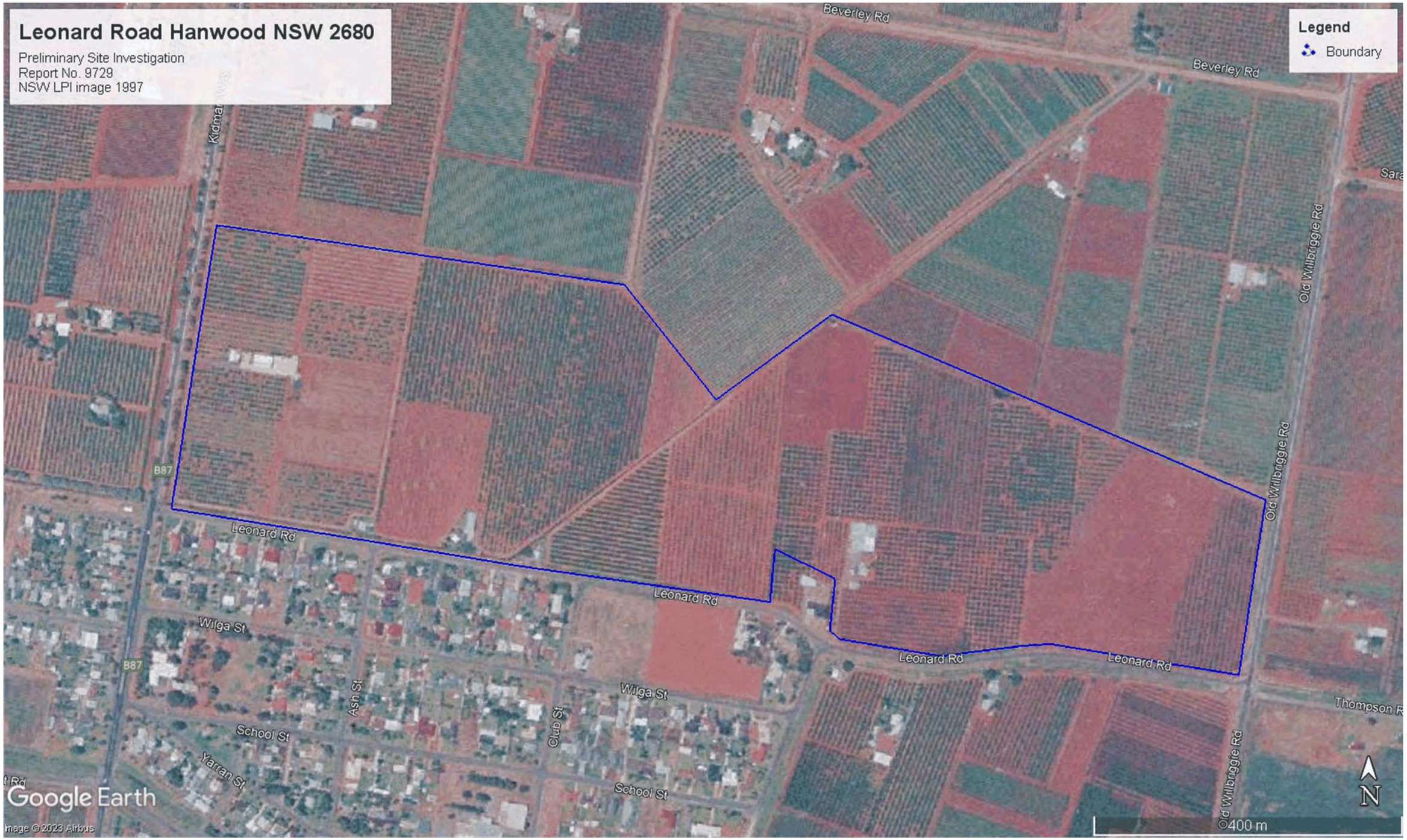
{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
NSW LPI image 1958
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Old Willbriggie Rd
B87
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wiga St
Wiga St
Ash St
Club St
School St
School St
Yarran St
Thompson R
Google Earth
400 m
N


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
NSW LPI image 1965
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wiga St
Wiga St
B87
B87
Ash St
Club St
School St
School St
Yarran St
Old Willbriggie Rd
Google Earth
Image © 2023 Airbus
400 m
N

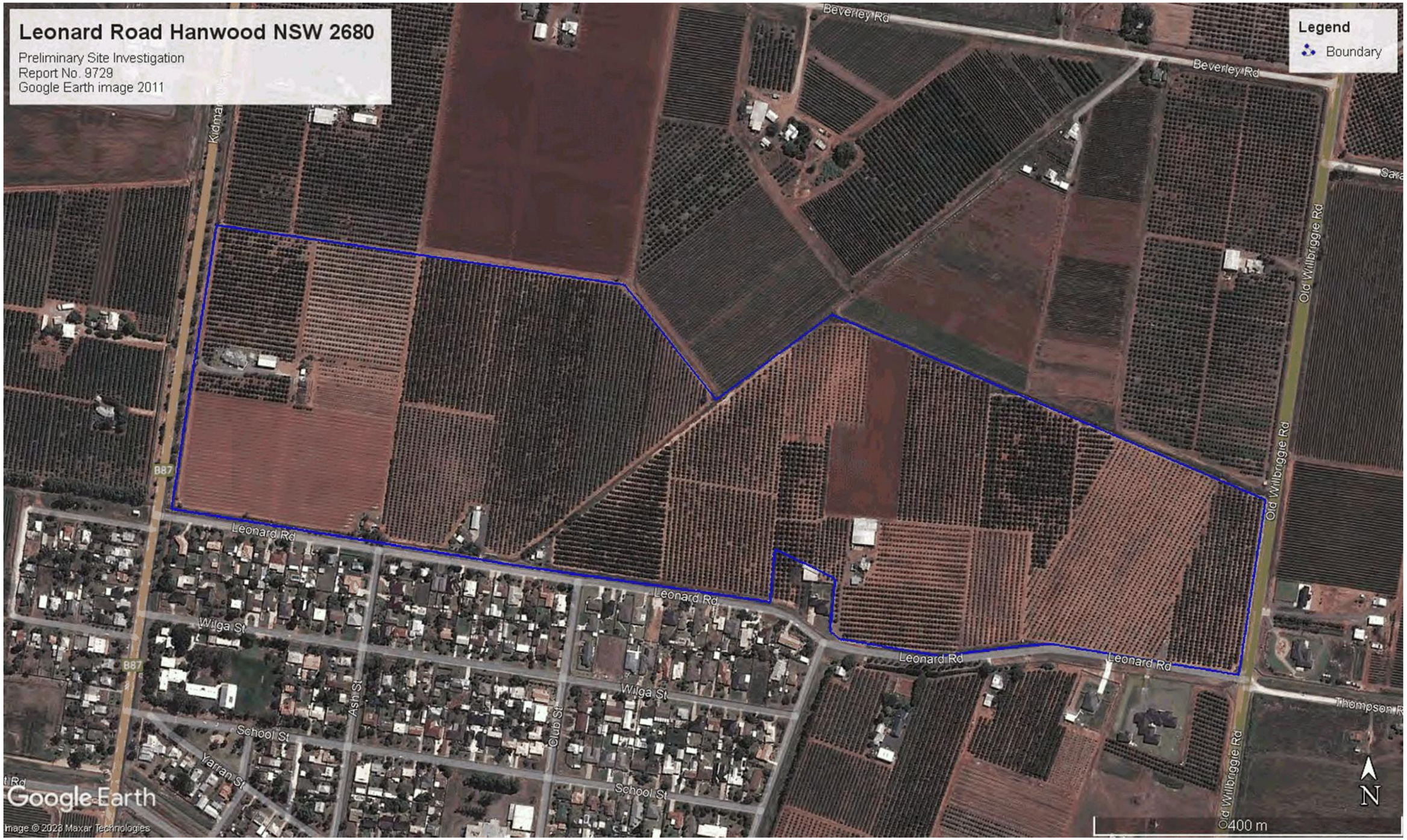

Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
NSW LPI image 1977
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wiga St
Wiga St
Ash St
Club St
School St
School St
Yarran St
B87
B87
Old Willbriggie Rd
Old Willbriggie Rd
Thompson R
Google Earth
Image © 2023 Airbus
400 m
N

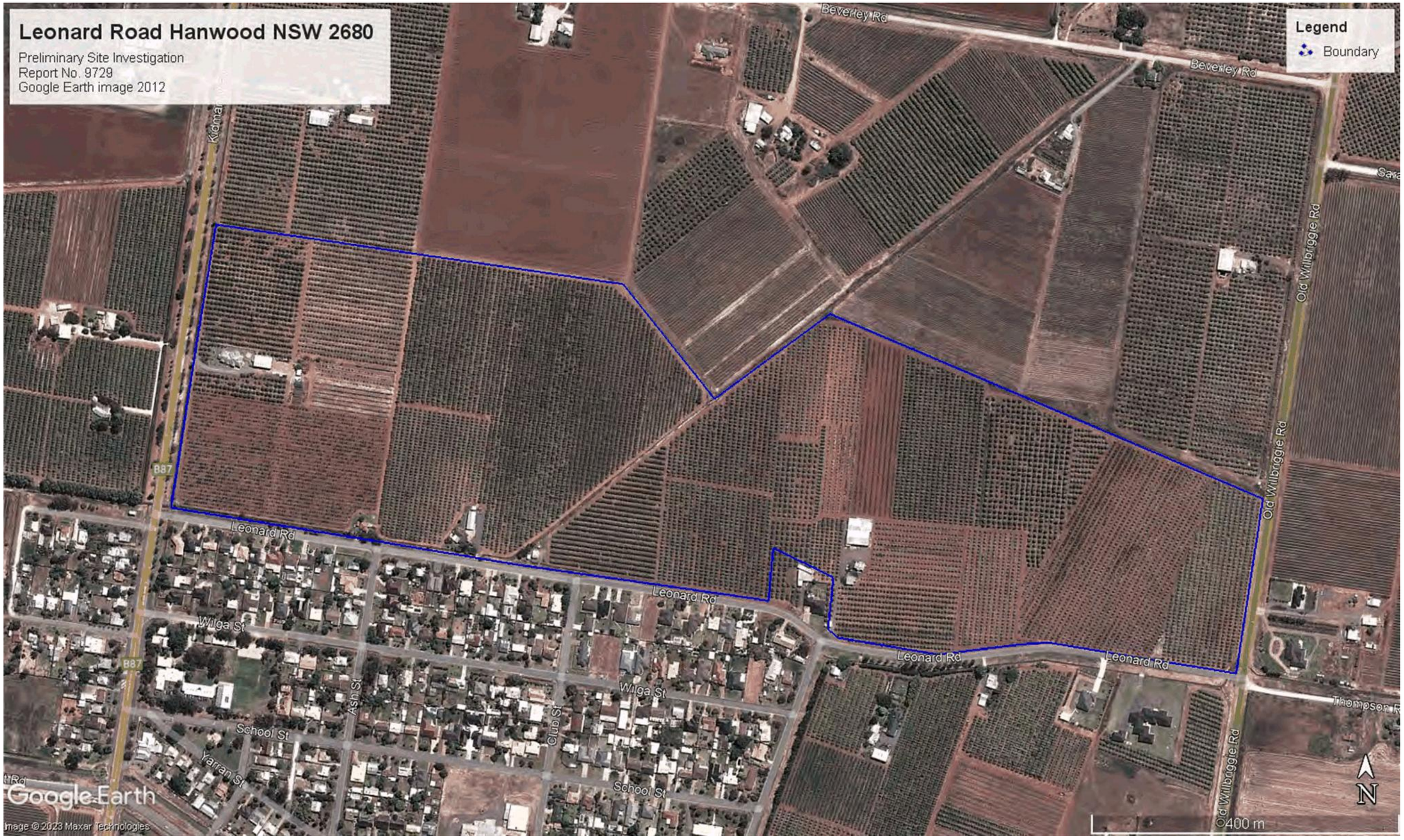

Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
NSW LPI image 1993
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Old Willbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
B87
B87
Ash St
Club St
School St
School St
Yarran St
Thompson R
Google Earth
Image © 2023 Airbus
400 m
N

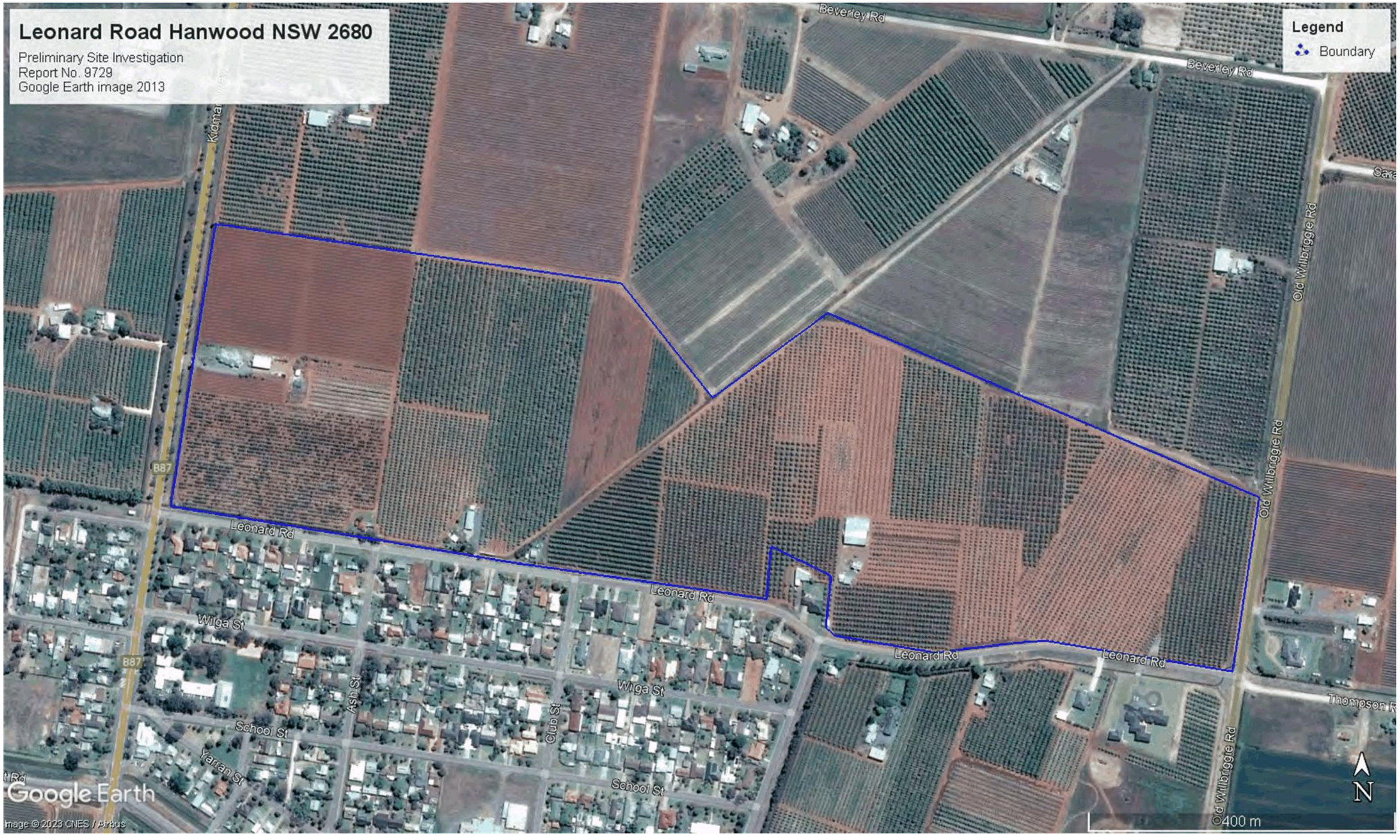

Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
NSW LPI image 1997
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Old Willbriggie Rd
Old Willbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
B87
B87
Ash St
Club St
School St
School St
Yarran St
Thompson R
Google Earth
Image © 2023 Airbus
400 m
N


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2003
Legend
Boundary
Beverley Rd
Beverley Rd
Old Wilbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
School St
School St
Ash St
Club St
Yarran St
B87
B87
Old Wilbriggie Rd
Thompson R
Google Earth
Image © 2023 Maxar Technologies
400 m
N


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2007
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Old Willbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yarran St
B87
Thompson R
Google Earth
Image © 2023 Maxar Technologies
400 m
N


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2011
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Old Willbriggie Rd
B87
B87
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yarran St
Thompson R
Google Earth
Image © 2023 Maxar Technologies
N
400 m

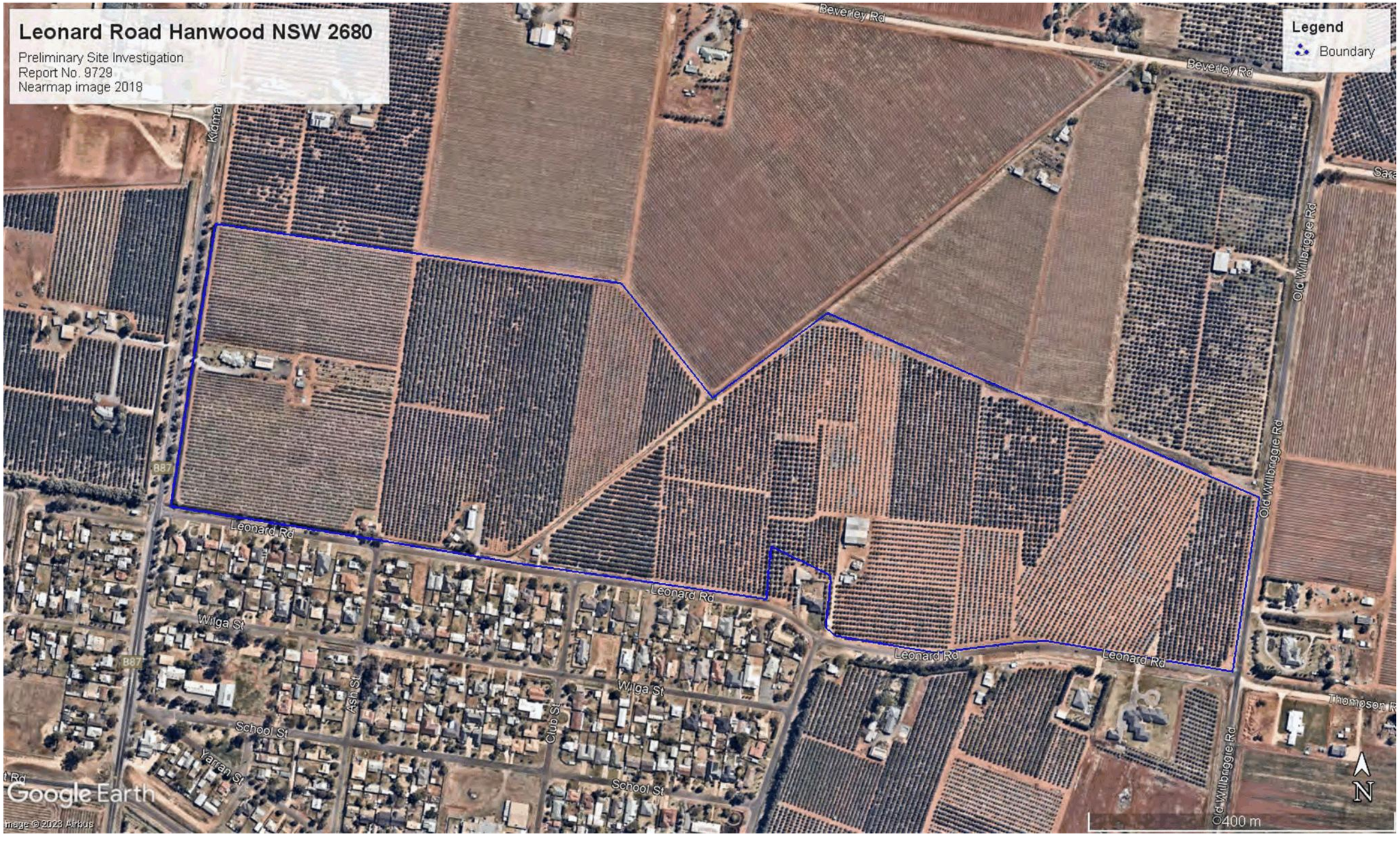

Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2012
Legend
Boundary
Beverley Rd
Beverley Rd
Old Wilbriggie Rd
Old Wilbriggie Rd
B87
B87
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yarran St
Thomson R
Google Earth
Image © 2023 Maxar Technologies
400 m
N


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2013
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wiga St
Wiga St
Ash St
Club St
School St
School St
Yarran St
B87
B87
Old Willbriggie Rd
Thompson R
N
400 m
Google Earth
Image © 2023 CNES / Airbus


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Nearmap image 2014
Legend
Boundary
Beverley Rd
Beverley Rd
Old Wilbriggie Rd
Old Wilbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yaran St
B87
B87
Thompson R
Google Earth
Image © 2023 Airbus
N
400 m

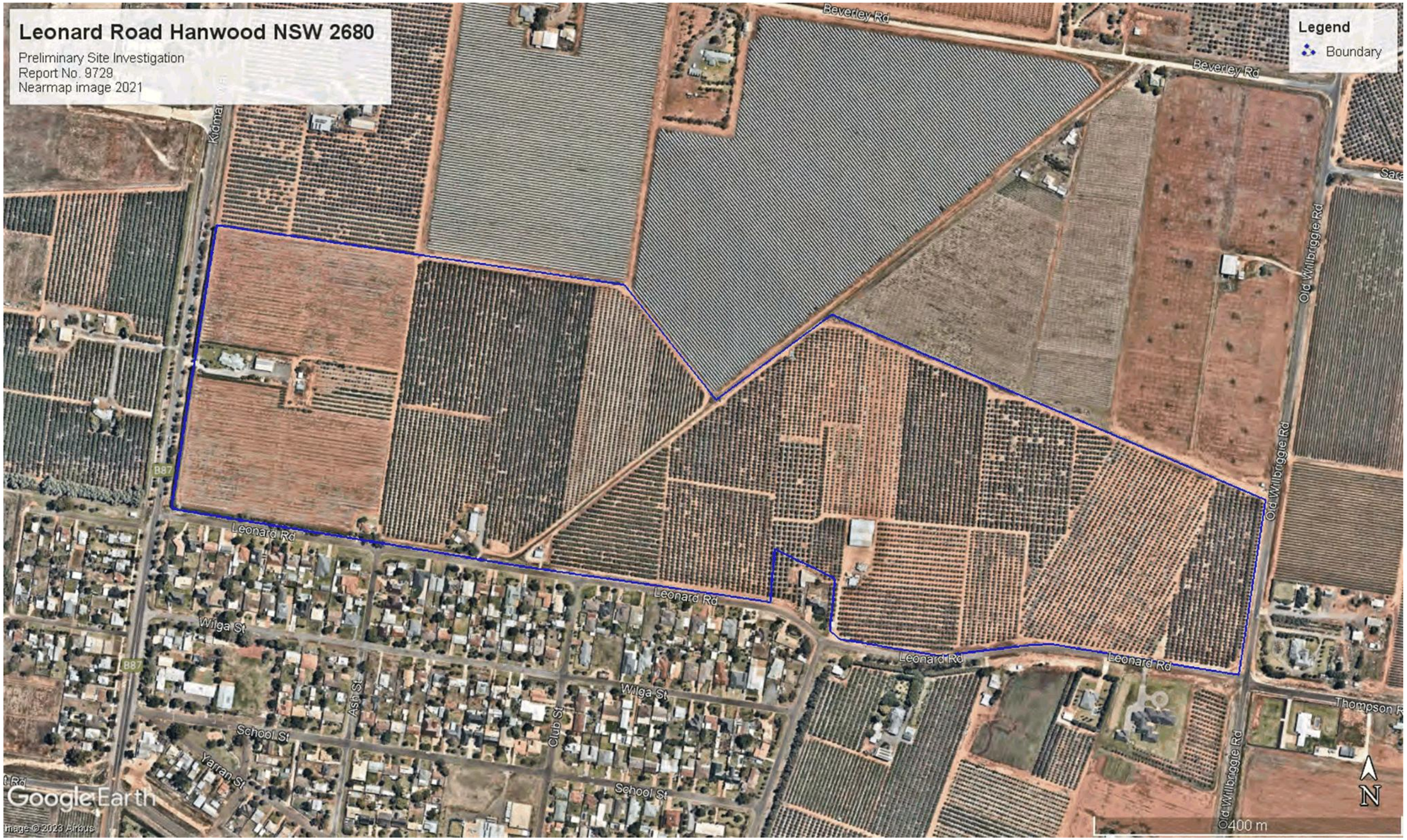

Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Nearmap image 2015
Legend
Boundary
Beverley Rd
Beverley Rd
Old Wilbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yarran St
B87
B87
Thompson R
Old Wilbriggie Rd
Old Wilbriggie Rd
Google Earth
Image © 2023 Airbus
400 m
N


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Nearmap image 2016
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yarran St
B87
B87
Old Willbriggie Rd
Thompson
Google Earth
Image © 2023 Airbus
400 m
N


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Nearmap image 2018
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Old Willbriggie Rd
B87
B87
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yarran St
Thompson R
Google Earth
Image © 2023 Airbus
400 m
N


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Nearmap image 2019
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yarran St
B87
B87
Thompson R
Old Willbriggie Rd
Google Earth
Image © 2023 Airbus
400 m
N


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Nearmap image 2020
Legend
Boundary
Beverley Rd
Beverley Rd
Old Wilbriggie Rd
Old Wilbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yarran St
B87
B87
Thompson R
N
400 m
Google Earth
Image © 2023 Airbus


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Nearmap image 2021
Legend
Boundary
Beverley Rd
Beverley Rd
Old Willbriggie Rd
Old Willbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
School St
School St
Ash St
Club St
Yarran St
B87
B87
Thompson R
Old Willbriggie Rd
N
400 m
Google Earth
Image © 2023 Airbus


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Nearmap image 2022
Legend
Boundary
Beverley Rd
Beverley Rd
Old Wilbriggie Rd
Old Wilbriggie Rd
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yarran St
B87
B87
Thompson R
Old Wilbriggie Rd
Google Earth
Image © 2023 Airbus
400 m
N


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Nearmap image 2023
Legend
Boundary
Beverley Rd
Beverley Rd
Old Wilbriggie Rd
Old Wilbriggie Rd
B87
B87
Leonard Rd
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Wilga St
Ash St
Club St
School St
School St
Yarran St
Thompson R
Google Earth
Image © 2023 Airbus
400 m
N

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

Attachment C : *Site features*

DM McMahon Pty Ltd 6 Jones Street (PO BOX 6118) Wagga Wagga NSW 2650 t (02) 6931 0510 w www.dmmcmahon.com.au

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2023
Legend
Boundary
Irrigation channel
Beverley Rd
Kiora
B87
Leonard Rd
Wilga St
Ash St
Club St
School St
Yarran St
Old Willbriggie Rd
Thompson R
Google Earth
image © 2023 Airbus
400 m
N


27 Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2023
Legend
Boom spray fill area
Chemical shed
Dog run
Greenhouse
House
Laydown area
Pump shed
Shed
Septic tank
Above ground diesel tank
Fertigation tank
Loading ramp
Kidman Way
B87
Leonard Rd
Septic tank
Google Earth
Image © 2023 Airbus
100 m
N


43 Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2023
Legend
House
Pump shed
Shed
Above ground diesel tank
Above ground fuel tank (disused)
Septic tank
Tile drain pump
Leonard Rd
Leonard Rd
Google Earth
Image © 2023 Airbus
N
100 m


51 Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2023
Legend
Demountable building
House
Pump shed
Shed
Rubbish pile
Mobile phone tower
Old Wilbriggie Rd
Septic tank
Septic tank
Leonard Rd
Remants of concrete slab
Leonard Rd
Leonard Rd
Wilga St
Cl St
Google Earth
200 m
N

Attachment D : *Site photographs*

DM McMahon Pty Ltd 6 Jones Street (PO BOX 6118) Wagga Wagga NSW 2650 t (02) 6931 0510 w www.dmmcmahon.com.au

Site photographs
27 Leonard Road Hanwood NSW
Report No. 9729

27 Leonard Road

Photograph 1: The farm is fallow with some annual plantings visible in the background.

Photograph 2: Tile drainage with asbestos riser.

Site photographs
27 Leonard Road Hanwood NSW
Report No. 9729

Photograph 3: Brick veneer single storey home built in the 2000s, facing north west.

Photograph 4: Slab on grade and dirt floor machinery shed, facing north west.

Site photographs
27 Leonard Road Hanwood NSW
Report No. 9729

Photograph 5: Above ground diesel fuel tank, facing north west.

Photograph 6: Laydown area to the north of the shed, facing north.

Photograph 7: Laydown area to the south of the shed, facing south.

Photograph 8: Asbestos risers and pipes in the laydown area around the pump shed, facing south.

Site photographs
27 Leonard Road Hanwood NSW
Report No. 9729

Photograph 9: Slab on grade pump shed on the right, facing west. The concrete fertigation tank can be seen on the left. The boom sprayer fill area can be seen between the two.

Photograph 10: Slab on grade chemical shed, facing east. The concrete fertigation tank can be seen behind the shed.

Site photographs
27 Leonard Road Hanwood NSW
Report No. 9729

Photograph 11: Underneath the fertigation tank.

Photograph 12: Greenhouse covered in shade cloth, facing south east.

Site photographs
27 Leonard Road Hanwood NSW
Report No. 9729

Photograph 13: Broken fibrous sheeting to the south of the greenhouse, facing north east.

Photograph 14: Loading ramp to the south of the greenhouse, facing north west.

Site photographs
27 Leonard Road Hanwood NSW
Report No. 9729

Photograph 15: Fenced dog run, facing south west.

Photograph 16: Potential ACM clad single storey home built in the 1960s located in the south east corner of the lot, facing north.

Site photographs
27 Leonard Road Hanwood NSW
Report No. 9729

Photograph 17: Septic system in the rear yard, facing east.

Photograph 18: Round brick pump shed in the south west corner of the lot.

Site photographs
43 Leonard Road Hanwood NSW
Report No. 9729
43 Leonard Road

Photograph 1: Farm planted to citrus, facing north. The irrigation channel can be seen in the midground. The attached slab on grade shed is on the left.

Photograph 2: Rear of the brick veneer single storey home built in the 1960s/1970s, facing south.

Site photographs
43 Leonard Road Hanwood NSW
Report No. 9729

Photograph 3: Septic system to the north west of the home, facing east.

Photograph 4: Attached slab on grade and dirt floor machinery shed, facing north west.

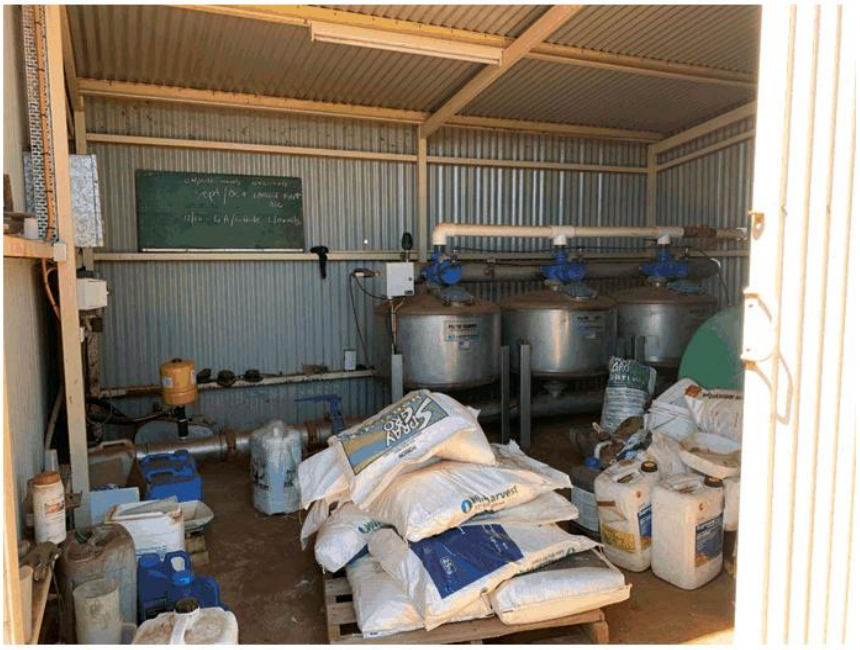
Site photographs
43 Leonard Road Hanwood NSW
Report No. 9729

Photograph 5: Above ground disused fuel tank inside the machinery shed.

Photograph 6: Above ground diesel fuel tank to the north of the machinery shed, facing north west.

Site photographs
43 Leonard Road Hanwood NSW
Report No. 9729

Photograph 7: Minor surface staining beneath the above ground fuel tank.



Photograph 8: Slab on grade pump and chemical shed, facing west.

Site photographs
43 Leonard Road Hanwood NSW
Report No. 9729

Photograph 9: Hard stand in front of machinery shed, facing north west.

Photograph 10: Tile drain pump, facing west.

Site photographs
51 Leonard Road Hanwood NSW
Report No. 9729

51 Leonard Road

Photograph 1: Farm planted to citrus.

Photograph 2: Tile drainage pipe at the rear of the packing shed.

Site photographs
51 Leonard Road Hanwood NSW
Report No. 9729

Photograph 3: Asbestos clad cottage built prior to 1958 located in the south west corner of the lot, facing north.

Photograph 4: Detached slab on grade asbestos lined tin laundry, facing east.

Site photographs
51 Leonard Road Hanwood NSW
Report No. 9729

Photograph 5: Asbestos clad cottage in the approximate centre of the site, facing west. One of the demountable buildings used as living quarters can be seen on the left.

Photograph 6: Second asbestos clad cottage in the approximate centre of the site, facing north west.

Site photographs
51 Leonard Road Hanwood NSW
Report No. 9729

Photograph 7: Demountable building used as living quarters on the left, facing west.

Photograph 8: Machinery parked in the approximate centre of the site, facing west.

Site photographs
51 Leonard Road Hanwood NSW
Report No. 9729

Photograph 9: Slab on grade packing shed, facing south east. The asbestos clad office can be seen on the left.

Photograph 10: Asbestos clad office attached to the packing shed, facing south. Broken ACM can be seen.

Site photographs
51 Leonard Road Hanwood NSW
Report No. 9729

Photograph 11: Pump shed located on the southern boundary, at the entrance from Leonard Road, facing north.

Photograph 12: Mobile phone tower in the north corner of the lot, facing south.

Site photographs
51 Leonard Road Hanwood NSW
Report No. 9729

Photograph 13: Rubbish pile on the northern boundary, facing north west.

Photograph 14: Area of concrete slab remnants in the south east corner of the lot, facing south.

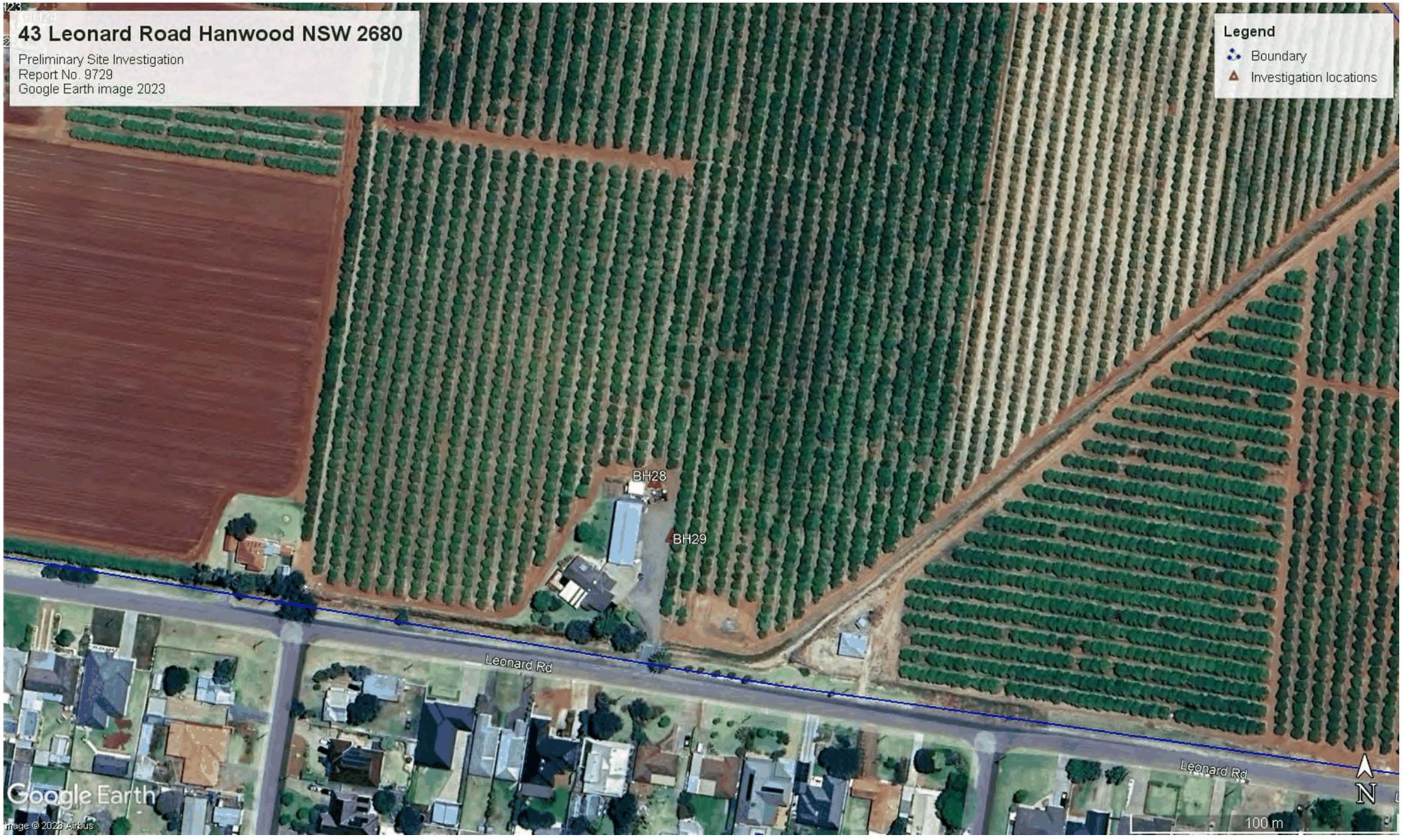
Attachment E : *Sampling map*

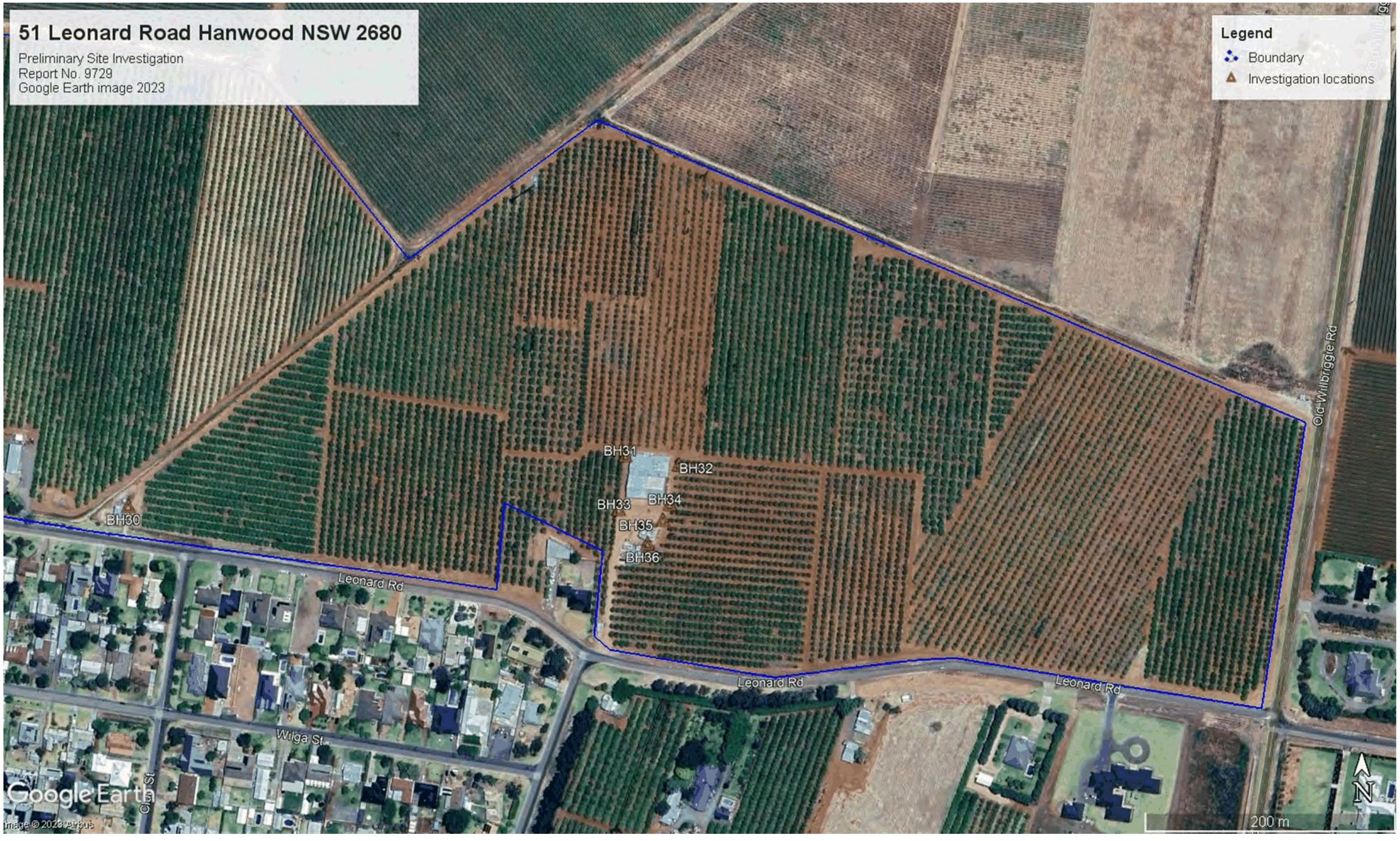
DM McMahon Pty Ltd 6 Jones Street (PO BOX 6118) Wagga Wagga NSW 2650 t (02) 6931 0510 w www.dmmcmahon.com.au

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}


Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2023
Legend
Boundary
Investigation locations (orchards)
Beverley Rd
Old Wilbriggie Rd
BH01
BH02
BH03
BH04
BH05
BH06
BH07
BH08
BH09
BH10
BH11
BH12
BH13
BH14
BH15
BH16
BH17
BH18
BH19
BH20
Leonard Rd
Wilga St
School St
Ash St
Club St
Yaran St
B87
Thompson R
Google Earth
Image © 2023 Airbus
400 m
N


27 Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2023
Legend
Boundary
Investigation locations
BH22
BH21
BH23
BH24
BH25
BH26
BH27
Kidman Way
B87
Leonard Rd
Google Earth
Image © 2023 Airbus
100 m
N


43 Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2023
Legend
Boundary
Investigation locations
BH28
BH29
Leonard Rd
Leonard Rd
N
Google Earth
100 m


51 Leonard Road Hanwood NSW 2680
Preliminary Site Investigation
Report No. 9729
Google Earth image 2023
Legend
Boundary
Investigation locations
BH30
BH31
BH32
BH33
BH34
BH35
BH36
Leonard Rd
Leonard Rd
Leonard Rd
Wilga St
Old Wilbriggie Rd
Google Earth
200 m
N

Attachment F : *Tabulated results*

DM McMahon Pty Ltd 6 Jones Street (PO BOX 6118) Wagga Wagga NSW 2650 t (02) 6931 0510 w www.dmmcmahon.com.au

Page: 1 of 3
Job number: 9729
Project: Leonard Road Hanwood NSW 2680

			Sample date	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23		Residential A Criteria			
			Sample location	Paddock	Paddock	Paddock	Paddock	Paddock	Paddock	Paddock	Paddock	Paddock	Paddock	Paddock	Paddock					
			Sample ID	1	2	3	4	5	6	7	8	9	10	11	12					
			Sample depth (m)	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3					
Compound	**LOR**	**Unit**		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	**HILs**	**HSLs**	**ACLs**	**EILs**	**ESLs**
Arsenic	5	mg/kg		6	5	5	8	6	5	10	12	6	7	<5	<5	100	-	-	100	-
Cadmium	1	mg/kg		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	20	-	-	-	-
Chromium	2	mg/kg		29	32	30	29	30	28	26	29	31	32	29	26	-	-	400	-	-
Copper	5	mg/kg		42	37	45	76	51	65	70	66	85	76	28	33	6000	-	190	-	-
Lead	5	mg/kg		14	15	20	16	16	18	43	40	14	19	14	11	300	-	1100	-	-
Nickel	2	mg/kg		16	16	17	17	17	16	14	15	20	19	17	13	400	-	170	-	-
Zinc	5	mg/kg		40	45	65	66	53	54	98	61	122	103	38	39	7400	-	400	-	-
Mercury	0.1	mg/kg		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	40	-	-	-	-
PCBs	0.1	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
HCB	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10	-	-	-	-
Heptachlor	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	6	-	-	-	-
Chlordane	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	50	-	-	-	-
Endrin	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10	-	-	-	-
Endosulfan	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	270	-	-	-	-
Aldrin+dieldrin	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	6	-	-	-	-
DDT+DDE+DDD	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05	0.10	0.10	0.20	<0.05	<0.05	<0.05	<0.05	240	-	-	-	-
Chlorpyrifos	0.05	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	160	-	-	-	-
Phenols	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	3000	-	-	-	-
PAHs	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	300	-	-	-	-
Benzo(a)pyrene	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-				0.7
Benzo(a)pyrene TEQ (half LOR)	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TRH C6-C10 minux BTEX (F1)	10	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	50/4400	-	-	180
TRH C10-C16 minus napthalene (F2)	50	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	280/3300	-	-	120
TRH C16-C34 (F3)	100	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	-/4500	-	-	1300
TRH C34-C40 (F4)	100	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	-/6300	-	-	5600
Benzene	0.2	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	0.7	-	-	65
Toluene	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	480	-	-	105
Ethylbenzene	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	125
Xylenes	0.5	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	110	-	-	45
Napthalene	1	mg/kg		-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	170	-

Page: 2 of 3
Job number: 9729
Project: Leonard Road Hanwood NSW 2680

		Sample date	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23					
		Sample location	Orchard	Orchard	Orchard	Orchard	Orchard	Orchard	Orchard	Orchard	Shed	Shed	Shed	Shed		Residential A Criteria			
		Sample ID	13	14	15	16	17	18	19	20	21	22	23	24					
		Sample depth (m)	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0-0.3	0.2-0.3	0-0.3	0.1-0.3	0-0.3					
Compound	**LOR**	**Unit**	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	**HILs**	**HSLs**	**ACLs**	**EILs**	**ESLs**
Arsenic	5	mg/kg	<5	<5	<5	<5	<5	<5	<5	<5	5	6	5	6	100	-	-	100	-
Cadmium	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	20	-	-	-	-
Chromium	2	mg/kg	28	29	28	28	29	28	27	30	28	34	34	33	-	-	400	-	-
Copper	5	mg/kg	49	32	51	44	58	58	34	46	38	14	14	17	6000	-	190	-	-
Lead	5	mg/kg	13	12	14	13	14	13	11	14	85	12	15	13	300	-	1100	-	-
Nickel	2	mg/kg	13	13	16	14	17	13	13	17	16	19	19	23	400	-	170	-	-
Zinc	5	mg/kg	42	33	45	52	36	45	32	35	83	26	36	36	7400	-	400	-	-
Mercury	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	40	-	-	-	-
PCBs	0.1	mg/kg	-	-	-	-	-	-	-	-	<0.1	<0.1	<0.1	<0.1	1	-	-	-	-
HCB	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10	-	-	-	-
Heptachlor	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	6	-	-	-	-
Chlordane	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	50	-	-	-	-
Endrin	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10	-	-	-	-
Endosulfan	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	270	-	-	-	-
Aldrin+dieldrin	0.05	mg/kg	<0.05	<0.05	<0.05	0.10	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	6	-	-	-	-
DDT+DDE+DDD	0.05	mg/kg	<0.05	0.14	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	240	-	-	-	-
Chlorpyrifos	0.05	mg/kg	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	160	-	-	-	-
Phenols	0.5	mg/kg	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	3000	-	-	-	-
PAHs	0.5	mg/kg	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	300	-	-	-	-
Benzo(a)pyrene	0.5	mg/kg	-	-	-	-	-	-	-	-	<0.05	<0.05	<0.05	<0.05	-	-	-	-	0.7
Benzo(a)pyrene TEQ (half LOR)	0.5	mg/kg	-	-	-	-	-	-	-	-	0.6	0.6	0.6	0.6	-	-	-	-	-
TRH C6-C10 minux BTEX (F1)	10	mg/kg	-	-	-	-	-	-	-	-	<10	<10	<10	<10	-	50/4400	-	-	180
TRH C10-C16 minus napthalene (F2)	50	mg/kg	-	-	-	-	-	-	-	-	<50	<50	<50	<50	-	280/3300	-	-	120
TRH C16-C34 (F3)	100	mg/kg	-	-	-	-	-	-	-	-	<100	<100	<100	<100	-	-/4500	-	-	1300
TRH C34-C40 (F4)	100	mg/kg	-	-	-	-	-	-	-	-	<100	<100	<100	<100	-	-/6300	-	-	5600
Benzene	0.2	mg/kg	-	-	-	-	-	-	-	-	<0.2	<0.2	<0.2	<0.2	-	0.7	-	-	65
Toluene	0.5	mg/kg	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	480	-	-	105
Ethylbenzene	0.5	mg/kg	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	-	-	-	125
Xylenes	0.5	mg/kg	-	-	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5	-	110	-	-	45
Napthalene	1	mg/kg	-	-	-	-	-	-	-	-	<1	<1	<1	<1	-	5	-	170	-

Page: 3 of 3
Job number: 9729
Project: Leonard Road Hanwood NSW 2680

																Residential A Criteria			
Sample date			4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23	4/12/23					
Sample location			Shed	Shed	Shed	Shed	Shed	Shed	Shed	Shed	Shed	Shed	Shed	Shed					
Sample ID			25	26	27	28	29	30	31	32	33	34	35	36					
Sample depth (m)			0-0.3	0-0.3	0.1-0.3	0-0.3	0-0.3	0.1-0.3	0-0.3	0-0.3	0-0.3	0.3-0.4	0-0.3	0-0.3					
Compound	**LOR**	**Unit**	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	**HILs**	**HSLs**	**ACLs**	**EILs**	**ESLs**
Arsenic	5	mg/kg	14	<5	5	6	9	<5	<5	<5	<5	5	<5	<5	100	-	-	100	-
Cadmium	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	20	-	-	-	-
Chromium	2	mg/kg	27	28	30	33	32	29	30	34	29	34	35	30	-	-	400	-	-
Copper	5	mg/kg	37	40	42	16	31	25	11	15	11	17	17	12	6000	-	190	-	-
Lead	5	mg/kg	35	21	21	12	24	25	11	12	9	14	86	11	300	-	1100	-	-
Nickel	2	mg/kg	19	14	15	23	21	19	12	24	8	22	19	16	400	-	170	-	-
Zinc	5	mg/kg	40	45	50	29	76	31	16	28	16	49	34	21	7400	-	400	-	-
Mercury	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	40	-	-	-	-
PCBs	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	-	-
HCB	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10	-	-	-	-
Heptachlor	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	6	-	-	-	-
Chlordane	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	50	-	-	-	-
Endrin	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	10	-	-	-	-
Endosulfan	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	270	-	-	-	-
Aldrin+dieldrin	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	6	-	-	-	-
DDT+DDE+DDD	0.05	mg/kg	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	240	-	-	-	-
Chlorpyrifos	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	160	-	-	-	-
Phenols	0.5	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	3000	-	-	-	-
PAHs	0.5	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	300	-	-	-	-
Benzo(a)pyrene	0.5	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	-	-	0.7
Benzo(a)pyrene TEQ (half LOR)	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	-	-	-	-	-
TRH C6-C10 minux BTEX (F1)	10	mg/kg	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	-	50/4400	-	-	180
TRH C10-C16 minus napthalene (F2)	50	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	-	280/3300	-	-	120
TRH C16-C34 (F3)	100	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	-	-/4500	-	-	1300
TRH C34-C40 (F4)	100	mg/kg	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	-	-/6300	-	-	5600
Benzene	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	0.7	-	-	65
Toluene	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	480	-	-	105
Ethylbenzene	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	125
Xylenes	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	110	-	-	45
Napthalene	1	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	5	-	170	-

Attachment G : *Laboratory reports*

DM McMahon Pty Ltd 6 Jones Street (PO BOX 6118) Wagga Wagga NSW 2650 t (02) 6931 0510 w www.dmmcmahon.com.au

CERTIFICATE OF ANALYSIS

Work Order	: **ES2342022**	Page	: 1 of 40
Client	: **DM MCMAHON PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MR DAVID MCMAHON	Contact	: Danae Hambly
Address	: 6 JONES ST Wagga Wagga NSW, AUSTRALIA 2650	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 6931 0510	Telephone	: +61-2-8784 8555
Project	: LEONARD ROAD HANWOOD	Date Samples Received	: 05-Dec-2023 12:00
Order number	: 9729	Date Analysis Commenced	: 09-Dec-2023
C-O-C number	: ----	Issue Date	: 12-Dec-2023 16:37
Sampler	: ----		
Site	: ----		
Quote number	: EN/111		
No. of samples received	: 40		
No. of samples analysed	: 40		

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, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract 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.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total OCP is the sum of the reported concentrations of all Organochlorine Pesticides at or above LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EP071: Results of sample 35 have been confirmed by re-extraction and re-analysis.

Page : 3 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	1	2	3	4	5
			Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342022-001	ES2342022-002	ES2342022-003	ES2342022-004	ES2342022-005
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	12.3	13.3	13.3	11.7	16.2
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	6	5	5	8	6
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	29	32	30	29	30
Copper	7440-50-8	5	mg/kg	42	37	45	76	51
Lead	7439-92-1	5	mg/kg	14	15	20	16	16
Nickel	7440-02-0	2	mg/kg	16	16	17	17	17
Zinc	7440-66-6	5	mg/kg	40	45	65	66	53
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Page : 4 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	1	2	3	4	5
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-001	ES2342022-002	ES2342022-003	ES2342022-004	ES2342022-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	1	2	3	4	5
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-001	ES2342022-002	ES2342022-003	ES2342022-004	ES2342022-005
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		82.6	112	114	95.0	107
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		100	107	93.4	76.0	89.2

Page : 6 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	6	7	8	9	10
			Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342022-006	ES2342022-007	ES2342022-008	ES2342022-009	ES2342022-010
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	8.6	8.2	10.5	18.6	13.6
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	5	10	12	6	7
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	28	26	29	31	32
Copper	7440-50-8	5	mg/kg	65	70	66	85	76
Lead	7439-92-1	5	mg/kg	18	43	40	14	19
Nickel	7440-02-0	2	mg/kg	16	14	15	20	19
Zinc	7440-66-6	5	mg/kg	54	98	61	122	103
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	0.10	0.10	0.20	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	6	7	8	9	10
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-006	ES2342022-007	ES2342022-008	ES2342022-009	ES2342022-010
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		**0.10**	**0.10**	**0.20**	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	6	7	8	9	10
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-006	ES2342022-007	ES2342022-008	ES2342022-009	ES2342022-010
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		99.9	129	128	113	108
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		98.3	111	115	100	102

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	11	12	13	14	15
			Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342022-011	ES2342022-012	ES2342022-013	ES2342022-014	ES2342022-015
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	9.0	9.5	9.4	8.2	9.7
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	29	26	28	29	28
Copper	7440-50-8	5	mg/kg	28	33	49	32	51
Lead	7439-92-1	5	mg/kg	14	11	13	12	14
Nickel	7440-02-0	2	mg/kg	17	13	13	13	16
Zinc	7440-66-6	5	mg/kg	38	39	42	33	45
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	<0.05	<0.05	<0.05	0.14	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Page : 10 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	11	12	13	14	15
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-011	ES2342022-012	ES2342022-013	ES2342022-014	ES2342022-015
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	0.14	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	11	12	13	14	15
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-011	ES2342022-012	ES2342022-013	ES2342022-014	ES2342022-015
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		116	115	114	122	112
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		108	104	98.0	107	90.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	16	17	18	19	20
			Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342022-016	ES2342022-017	ES2342022-018	ES2342022-019	ES2342022-020
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.2	10.7	5.1	7.9	12.0
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	28	29	28	27	30
Copper	7440-50-8	5	mg/kg	44	58	58	34	46
Lead	7439-92-1	5	mg/kg	13	14	13	11	14
Nickel	7440-02-0	2	mg/kg	14	17	13	13	17
Zinc	7440-66-6	5	mg/kg	52	36	45	32	35
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	0.10	0.06	<0.05	<0.05	<0.05
4.4`-DDE	72-55-9	0.05	mg/kg	0.07	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	16	17	18	19	20
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-016	ES2342022-017	ES2342022-018	ES2342022-019	ES2342022-020
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		**0.10**	**0.06**	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		**0.07**	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	16	17	18	19	20
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-016	ES2342022-017	ES2342022-018	ES2342022-019	ES2342022-020
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		116	120	110	106	88.7
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		60.6	84.0	94.8	88.2	83.3

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	21	22	23	24	25
			Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342022-021	ES2342022-022	ES2342022-023	ES2342022-024	ES2342022-025
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	11.3	24.8	20.6	20.9	20.8
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	5	6	5	5	14
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	28	34	34	33	27
Copper	7440-50-8	5	mg/kg	38	14	14	17	37
Lead	7439-92-1	5	mg/kg	85	12	15	13	35
Nickel	7440-02-0	2	mg/kg	16	19	19	23	19
Zinc	7440-66-6	5	mg/kg	83	26	36	36	40
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	21	22	23	24	25
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-021	ES2342022-022	ES2342022-023	ES2342022-024	ES2342022-025
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	**0.22**
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	**0.22**
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	21	22	23	24	25
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-021	ES2342022-022	ES2342022-023	ES2342022-024	ES2342022-025
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	21	22	23	24	25
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-021	ES2342022-022	ES2342022-023	ES2342022-024	ES2342022-025
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	21	22	23	24	25
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-021	ES2342022-022	ES2342022-023	ES2342022-024	ES2342022-025
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		113	104	124	124	121
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		116	102	92.2	91.8	132
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		64.4	73.8	60.0	60.0	66.3
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		79.7	77.1	78.2	77.8	72.9
2-Chlorophenol-D4	93951-73-6	0.5	%		88.9	86.4	87.7	86.9	85.1
2.4.6-Tribromophenol	118-79-6	0.5	%		70.7	69.7	72.9	76.8	67.1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		101	95.7	97.6	103	95.5
Anthracene-d10	1719-06-8	0.5	%		110	104	106	111	104
4-Terphenyl-d14	1718-51-0	0.5	%		105	99.8	103	108	101
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		69.2	66.9	70.1	67.1	64.3
Toluene-D8	2037-26-5	0.2	%		90.8	84.6	88.9	87.1	81.9

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	21	22	23	24	25
			Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342022-021	ES2342022-022	ES2342022-023	ES2342022-024	ES2342022-025
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.2	%	104	98.6	105	102	98.7

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	26	27	28	29	30
			Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342022-026	ES2342022-027	ES2342022-028	ES2342022-029	ES2342022-030
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	13.0	13.8	23.2	16.6	21.8
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	5	6	9	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	28	30	33	32	29
Copper	7440-50-8	5	mg/kg	40	42	16	31	15
Lead	7439-92-1	5	mg/kg	21	21	12	24	15
Nickel	7440-02-0	2	mg/kg	14	15	23	21	19
Zinc	7440-66-6	5	mg/kg	45	50	29	76	31
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Page : 22 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	26	27	28	29	30
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-026	ES2342022-027	ES2342022-028	ES2342022-029	ES2342022-030
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	**0.07**	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	**0.07**	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	26	27	28	29	30
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-026	ES2342022-027	ES2342022-028	ES2342022-029	ES2342022-030
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Page : 24 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	26	27	28	29	30
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-026	ES2342022-027	ES2342022-028	ES2342022-029	ES2342022-030
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	26	27	28	29	30
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-026	ES2342022-027	ES2342022-028	ES2342022-029	ES2342022-030
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		123	120	121	116	126
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		124	85.5	81.2	99.4	100
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		74.7	93.3	52.7	85.5	52.3
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		70.1	72.8	85.7	71.8	71.2
2-Chlorophenol-D4	93951-73-6	0.5	%		78.5	83.9	96.9	80.9	83.5
2.4.6-Tribromophenol	118-79-6	0.5	%		63.5	70.1	77.7	65.2	64.1
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		90.2	94.5	107	89.2	92.0
Anthracene-d10	1719-06-8	0.5	%		98.8	104	118	99.0	102
4-Terphenyl-d14	1718-51-0	0.5	%		95.8	98.8	113	94.4	98.8
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		69.2	78.7	66.3	68.1	66.3
Toluene-D8	2037-26-5	0.2	%		90.6	105	89.4	88.5	84.6

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	26	27	28	29	30
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-026	ES2342022-027	ES2342022-028	ES2342022-029	ES2342022-030
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		104	121	102	101	100

Page : 27 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	31	32	33	34	35
			Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit	ES2342022-031	ES2342022-032	ES2342022-033	ES2342022-034	ES2342022-035
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	13.9	19.0	8.8	27.4	18.4
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	30	34	29	34	35
Copper	7440-50-8	5	mg/kg	11	15	11	17	17
Lead	7439-92-1	5	mg/kg	11	12	9	14	86
Nickel	7440-02-0	2	mg/kg	12	24	8	22	19
Zinc	7440-66-6	5	mg/kg	16	28	16	49	34
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	319-85-7	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	319-86-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	76-44-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Aldrin	309-00-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	60-57-1	0.05	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05

Page : 28 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	31	32	33	34	35
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-031	ES2342022-032	ES2342022-033	ES2342022-034	ES2342022-035
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	72-20-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Dimethoate	60-51-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Diazinon	333-41-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Malathion	121-75-5	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenthion	55-38-9	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Parathion	56-38-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05

Page : 29 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	31	32	33	34	35
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-031	ES2342022-032	ES2342022-033	ES2342022-034	ES2342022-035
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Ethion	563-12-2	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	<0.05	<0.05	<0.05	<0.05
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	<1	<1	<1	<1
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Pentachlorophenol	87-86-5	2	mg/kg		<2	<2	<2	<2	<2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	31	32	33	34	35
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-031	ES2342022-032	ES2342022-033	ES2342022-034	ES2342022-035
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Pyrene	129-00-0	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	<10	<10
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	230
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	230
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	230
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	170
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	400

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	31	32	33	34	35
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-031	ES2342022-032	ES2342022-033	ES2342022-034	ES2342022-035
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		117	115	126	125	112
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		137	107	93.5	83.1	70.8
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		92.1	51.4	54.6	54.9	63.0
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		74.3	74.7	73.9	75.9	77.7
2-Chlorophenol-D4	93951-73-6	0.5	%		83.2	86.7	80.8	86.4	86.2
2.4.6-Tribromophenol	118-79-6	0.5	%		62.8	67.2	60.5	63.7	73.5
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		92.1	94.9	93.4	95.0	94.4
Anthracene-d10	1719-06-8	0.5	%		99.8	104	99.9	104	104
4-Terphenyl-d14	1718-51-0	0.5	%		96.2	101	95.3	99.9	98.9
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		70.4	67.2	73.0	68.7	69.2
Toluene-D8	2037-26-5	0.2	%		92.5	88.1	96.7	88.1	91.2

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	31	32	33	34	35
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00
Compound	CAS Number	LOR	Unit		ES2342022-031	ES2342022-032	ES2342022-033	ES2342022-034	ES2342022-035
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		108	103	110	103	103

Page : 33 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	36	Duplicate 1	Duplicate 2	----	----
			Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2342022-036	ES2342022-037	ES2342022-038	--------	--------
				Result	Result	Result	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**15.2**	**11.4**	**13.4**	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	**30**	**29**	**27**	----	----
Copper	7440-50-8	5	mg/kg	**12**	**55**	**36**	----	----
Lead	7439-92-1	5	mg/kg	**11**	**13**	**96**	----	----
Nickel	7440-02-0	2	mg/kg	**16**	**16**	**14**	----	----
Zinc	7440-66-6	5	mg/kg	**21**	**34**	**76**	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	----	----
EP066: Polychlorinated Biphenyls (PCB)								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.05	mg/kg	<0.05	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg	<0.05	----	----	----	----
beta-BHC	319-85-7	0.05	mg/kg	<0.05	----	----	----	----
gamma-BHC	58-89-9	0.05	mg/kg	<0.05	----	----	----	----
delta-BHC	319-86-8	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor	76-44-8	0.05	mg/kg	<0.05	----	----	----	----
Aldrin	309-00-2	0.05	mg/kg	<0.05	----	----	----	----
Heptachlor epoxide	1024-57-3	0.05	mg/kg	<0.05	----	----	----	----
^ Total Chlordane (sum)	----	0.05	mg/kg	<0.05	----	----	----	----
trans-Chlordane	5103-74-2	0.05	mg/kg	<0.05	----	----	----	----
alpha-Endosulfan	959-98-8	0.05	mg/kg	<0.05	----	----	----	----
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05	----	----	----	----
Dieldrin	60-57-1	0.05	mg/kg	<0.05	----	----	----	----

Page : 34 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	36	Duplicate 1	Duplicate 2	----	----
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2342022-036	ES2342022-037	ES2342022-038	--------	--------
					Result	Result	Result	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
4.4`-DDE	72-55-9	0.05	mg/kg		<0.05	----	----	----	----
Endrin	72-20-8	0.05	mg/kg		<0.05	----	----	----	----
beta-Endosulfan	33213-65-9	0.05	mg/kg		<0.05	----	----	----	----
^ Endosulfan (sum)	115-29-7	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDD	72-54-8	0.05	mg/kg		<0.05	----	----	----	----
Endrin aldehyde	7421-93-4	0.05	mg/kg		<0.05	----	----	----	----
Endosulfan sulfate	1031-07-8	0.05	mg/kg		<0.05	----	----	----	----
4.4`-DDT	50-29-3	0.2	mg/kg		<0.2	----	----	----	----
Endrin ketone	53494-70-5	0.05	mg/kg		<0.05	----	----	----	----
Methoxychlor	72-43-5	0.2	mg/kg		<0.2	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.05	mg/kg		<0.05	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.05	mg/kg		<0.05	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.05	mg/kg		<0.05	----	----	----	----
Demeton-S-methyl	919-86-8	0.05	mg/kg		<0.05	----	----	----	----
Monocrotophos	6923-22-4	0.2	mg/kg		<0.2	----	----	----	----
Dimethoate	60-51-5	0.05	mg/kg		<0.05	----	----	----	----
Diazinon	333-41-5	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.05	mg/kg		<0.05	----	----	----	----
Parathion-methyl	298-00-0	0.2	mg/kg		<0.2	----	----	----	----
Malathion	121-75-5	0.05	mg/kg		<0.05	----	----	----	----
Fenthion	55-38-9	0.05	mg/kg		<0.05	----	----	----	----
Chlorpyrifos	2921-88-2	0.05	mg/kg		<0.05	----	----	----	----
Parathion	56-38-2	0.2	mg/kg		<0.2	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.05	mg/kg		<0.05	----	----	----	----
Chlorfenvinphos	470-90-6	0.05	mg/kg		<0.05	----	----	----	----

Page : 35 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	36	Duplicate 1	Duplicate 2	----	----
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2342022-036	ES2342022-037	ES2342022-038	----------	----------
					Result	Result	Result	----	----
EP068B: Organophosphorus Pesticides (OP) - Continued									
Bromophos-ethyl	4824-78-6	0.05	mg/kg		<0.05	----	----	----	----
Fenamiphos	22224-92-6	0.05	mg/kg		<0.05	----	----	----	----
Prothiofos	34643-46-4	0.05	mg/kg		<0.05	----	----	----	----
Ethion	563-12-2	0.05	mg/kg		<0.05	----	----	----	----
Carbophenothion	786-19-6	0.05	mg/kg		<0.05	----	----	----	----
Azinphos Methyl	86-50-0	0.05	mg/kg		<0.05	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	0.5	mg/kg		<0.5	----	----	----	----
2-Chlorophenol	95-57-8	0.5	mg/kg		<0.5	----	----	----	----
2-Methylphenol	95-48-7	0.5	mg/kg		<0.5	----	----	----	----
3- & 4-Methylphenol	1319-77-3	1	mg/kg		<1	----	----	----	----
2-Nitrophenol	88-75-5	0.5	mg/kg		<0.5	----	----	----	----
2.4-Dimethylphenol	105-67-9	0.5	mg/kg		<0.5	----	----	----	----
2.4-Dichlorophenol	120-83-2	0.5	mg/kg		<0.5	----	----	----	----
2.6-Dichlorophenol	87-65-0	0.5	mg/kg		<0.5	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	0.5	mg/kg		<0.5	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	0.5	mg/kg		<0.5	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	0.5	mg/kg		<0.5	----	----	----	----
Pentachlorophenol	87-86-5	2	mg/kg		<2	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----

Page : 36 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	36	Duplicate 1	Duplicate 2	----	----
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2342022-036	ES2342022-037	ES2342022-038	--------	--------
					Result	Result	Result	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----

Page : 37 of 40
Work Order : ES2342022
Client : DM MCMAHON PTY LTD
Project : LEONARD ROAD HANWOOD

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	36	Duplicate 1	Duplicate 2	----	----
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2342022-036	ES2342022-037	ES2342022-038	--------	--------
					Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.1	%		109	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.05	%		82.4	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.05	%		56.4	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		82.7	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		87.4	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		70.8	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		94.6	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		104	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		99.3	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		72.6	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		98.4	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	36	Duplicate 1	Duplicate 2	----	----
			Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	04-Dec-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2342022-036	ES2342022-037	ES2342022-038	--------	--------
				Result	Result	Result	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.2	%	113	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Rinsate 1	Rinsate 2	----	----	----
				Sampling date / time	04-Dec-2023 00:00	04-Dec-2023 00:00	----	----	----
Compound	CAS Number	LOR	Unit		ES2342022-039	ES2342022-040	--------	--------	--------
					Result	Result	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L		<0.001	<0.001	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L		<0.005	<0.005	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	----	----	----

Surrogate Control Limits

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	39	149
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	49	147
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	35	143
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	63	125
Toluene-D8	2037-26-5	67	124
4-Bromofluorobenzene	460-00-4	66	131

Chain of Custody

DM McMahon Pty Ltd
6 Jones Street
PO Box 6118, Wagga Wagga NSW 2650
Ph: (02) 69 310 510

Relinquished by: D McMahon
Date: 4/12/23
Signature:

Received by: Zac
Date: 5/12/23
Signature:

Relinquished by:
Date:
Signature:

Received by:
Date:
Signature:

Turnaround Requirements: ☑ Standard TAT ☐ Non Standard or Urgent TAT (List Due Date):

Analysing Laboratory: ALS Environmental - Sydney
Project: Leonard Road Hanwood
Order No.: 9729
Project Manager: David McMahon
Contact Ph: (02) 69 310 510
Sampling Officer: David McMahon
Report Format: Default
Email Reports to: admin@dmmcmahon.com.au
Email Invoice to: accounts@dmmcmahon.com.au

Lab Comments:

For Laboratory Use Only (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice/ Frozen ice bricks present upon sample	Yes	No	N/A
Random sample temp on receipt:			°C
Other comments:			

QUOTE NO.: EN/111/23

COC SEQUENCE NUMBER

COC:	1	2	3	4	5	6	7	8
OF:	1	2	3	4	5	6	7	8

LAB USE	SAMPLE DETAILS			CONTAINER INFORMATION	ANALYSIS REQUIRED Including suites (where metals are required, specify Total or Dissolved)				Additional Information
LAB ID	SAMPLE ID	DATE/TIME	MATRIX (ref below)	TYPE & PRESERVATIVE (see codes below)	TOTAL CONTAINERS	S2 & S12 (metals & OCP/OPP)	S-19	S-2 (Metals)	W-2 (Metals)	
1	1 to 20	4/12/2023	S	Unpreserved Glass Jar	20	✓				Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
2	21-36	4/12/2023	S	Unpreserved Glass Jar	16		✓			
3	Duplicate 1 and 2	4/12/2023	W	Unpreserved Glass Jar	2			✓		
4	Rinsate 1 and 2	4/12/2023	W	N	2				✓	
				TOTAL	40					

Environmental Division
Sydney
Work Order Reference
ES2342022

Telephone : +61-2-8784 8555

Matrix

W- Water; S - Soil; Sed - Sediment; Sl - Sludge; A - Air; D - Dust.

Container Codes:

P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic; V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag

Flora and Fauna Assessment

43 and 51 Leonard Rd & 11300 Kidman Way, Hanwood NSW 2680

Prepared by Ecological Consultants Australia Pty Ltd
TA Kingfisher Urban Ecology and Wetlands

7 July 2025

Ecological Consultants Australia Pty Ltd.
Sydney, Melbourne, Brisbane Ph: 0488 481 929, ABN: 15 166 535 039

About this document

Statement of Authorship

This study and report were undertaken by Ecological Consultants Australia for the client. The author of the report is Geraldene Dalby-Ball with qualifications BSc majoring in Ecology and Botany with over 25 years' experience in this field and Brooke Thompson with qualifications BSc majoring in Conservation Biology.

Limitations Statement

Information presented in this report is based on an objective study undertaken in response to the brief provided by the client. Any opinions expressed in this report are the professional, objective opinions of the authors and are not intended to advocate any particular proposal or pre-determined position.

Document Control Sheet	
Title:	Flora and Fauna Assessment 43 and 51 Leonard Rd & 11300 Kidman Way, Hanwood NSW 2680
Version:	Final
Author:	Elaway Dalby-Ball and Brooke Thompson
Date:	7 July 2025
File location:	C:/Kingfisher/Kingfisher Urban Ecology and Wetlands/ECA 4 Projects/2 Projects/2023-2024/Flora Fauna BAM BDAR/Flora and Fauna/Hanwood
Distribution:	Luke Scobie 0437 161 531 luke@theharvestgarden.com.au

Signed: Geraldene Dalby-Ball – Director of Ecological Consultants Australia Pty Ltd

Ecological Consultants Australia Pty Ltd.
Sydney, Melbourne, Brisbane Ph: 0488 481 929, ABN: 15 166 535 039

Contents

Figures

Tables

1 Introduction

1.1 Purpose of report

Ecological Consultants Australia Pty Ltd (ECA) trading as Kingfisher Urban Ecology and Wetlands has been engaged by Luke Scobie to undertake a **Flora and Fauna Assessment** (FFA) a proposal at 43 and 51 Leonard Rd & 11300 Kidman Way, Hanwood NSW 2680.

The site has been assessed as a FFA as the Biodiversity Offsets Scheme (BOS) under the NSW *Biodiversity Conservation Act 2016* (BC Act) is not triggered, given:

1. The proposed development does not trigger the area clearing threshold.
2. The proposed development does not require the clearing of native vegetation or other biodiversity impacts prescribed by clause 6.1 of the Biodiversity Regulation 2017 on land identified on the Biodiversity Values (BV) Map and therefore, the BV Map threshold is not triggered.

This FFA assesses the potential impacts of the proposed development, including direct and indirect impacts on threatened species, populations, ecological communities and their habitats, according to Section 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Where applicable, the 'test of significance' has been undertaken to determine whether the proposed development is likely to significantly affect threatened species or ecological communities, or their habitats.

The test of significance is set out in Section 7.3 of the BC Act.

1.2 Site description

The site which is the subject of this report includes 43 and 51 Leonard Rd & 11300 Kidman Way, Hanwood NSW 2680 (the 'study area') (Figure 1.1).

Table 1.1. Property Details.

Title	Lot 150 DP 751709	Lot 287 DP 751709 Lot 3 DP 1170655	Lot 1623 DP 257265
Address	11300 Kidman Way HANWOOD NSW 2680	43 Leonard Rd HANWOOD NSW 2680	51 Leonard Rd HANWOOD NSW 2680
Area	9.45 ha	11.14 ha	24.81 ha
Land Zoning	RU6 – Transition	RU1 – Primary Production	RU1 – Primary Production
Minimum Lot Size	5 ha	20 ha	20 ha
Council	Griffith City Council		

1.3 Proposed development

The proposal is for the re-zoning and masterplan of land located on the northern side of Leonard Road, Hanwood NSW. The rezoning, would see a change in the use of the affected land from primarily rural to urban. The proposal is being brought forward as part of a broader planning process to enable future urban development aligned with regional growth objectives. The development has been structured to support a connected, liveable environment with a focus on pedestrian access and green space integration.

The key components of the proposed development include:

- **Residential housing** comprising a mix of detached dwellings and two to three-storey homes.
- **Health-related facilities** including medical consultation, dental services, counselling, and radiology.
- **Childcare centre** to support local families and future residents.
- **Indoor sports facility** development to accommodate recreational needs.
- **Mixed-use zone** to integrate local services and support small-scale economic activity.
- **Stormwater detention and drainage areas**, consistent with the site's existing contours and drainage lines.
- **Internal road network** providing access and connectivity across the site, with multiple entry points from Leonard Road.

This layout provides a clear framework for future rezoning and planning stages, supporting the transition from rural to urban land use. See Figure 1.2.

Figure 1.1. Study area.
Source: Nearmap.

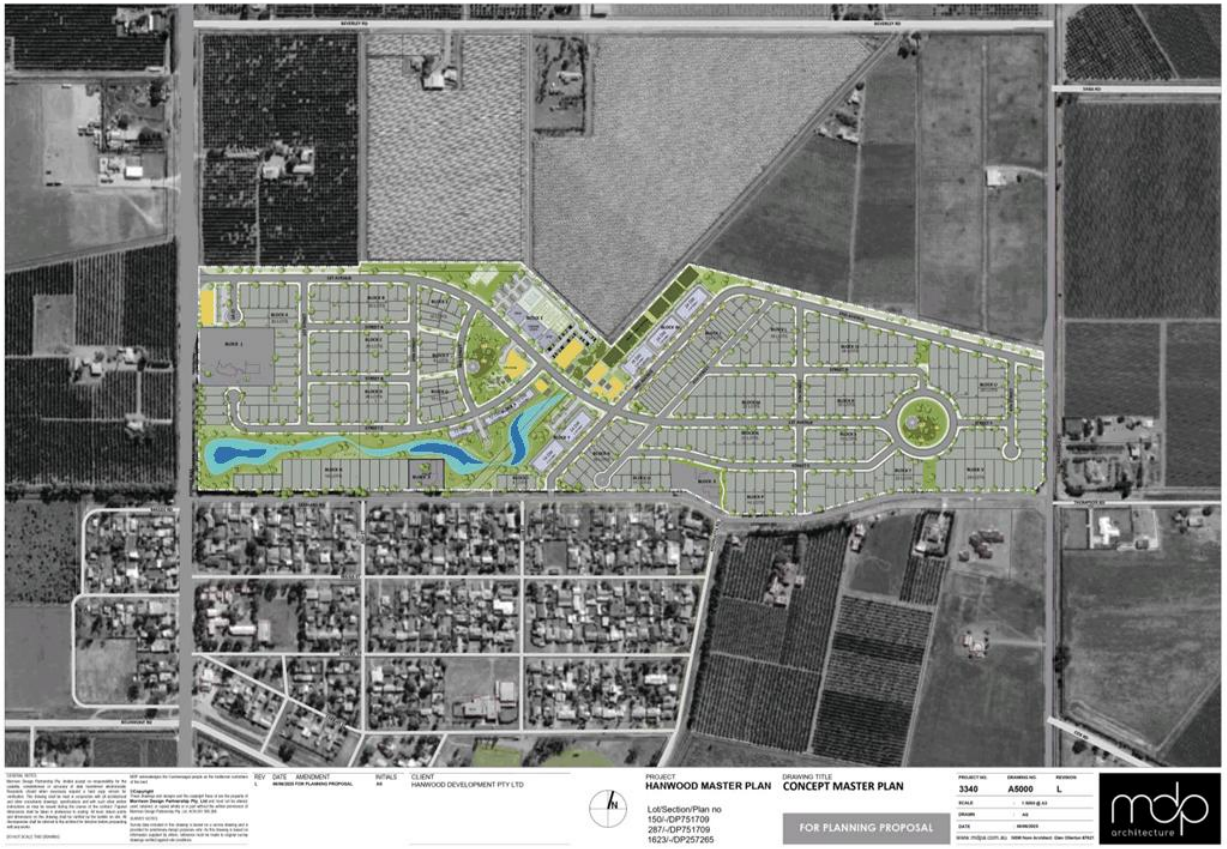


Figure 1.2. Concept Master Plan.
Source: MDP Architecture. Rev L. 06/06/2025.

1.4 Legislative and planning requirements

Commonwealth and State legislation and policies, and local policies apply to the assessment, planning and management of the environment within the study area.

1.4.1 Commonwealth Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is Australia's main national environmental legislation, which provides for the protection and management of nationally and internationally important plants, animals, habitats and places. The EPBC Act refers to the living things (including plants and animals), habitats and places that need protecting as 'matters of national environmental significance' (MNES). MNES include:

- World Heritage areas
- Commonwealth Heritage places
- wetlands of international importance (listed under the Ramsar Convention)
- listed threatened species and listed ecological communities
- listed migratory species (protected under international agreements)
- Commonwealth marine areas
- Great Barrier Reef Marine Park
- nuclear actions (including uranium mines)

Under the EPBC Act an action will require approval from the minister if the action has, will have, or is likely to have, a significant impact on any of the above listed MNES. The proposal is not expected to impact any MNES.

1.4.2 NSW Environmental Planning and Assessment Act 1979 and Environmental Planning and Assessment Regulation 2000

The NSW EP&A Act and the Environmental Planning and Assessment Regulation 2000 (EP&A Reg.) institutes and sets out a system for environmental planning and assessment in NSW and includes Part 4 which deals with development applications on private land and state significant development.

This proposal falls under a Part 4 development and requires development consent and associated environmental assessment.

1.4.3 NSW Biosecurity Act 2015

Under the Act, all landholders have a general biosecurity duty to manage any biosecurity risk posed or likely to be posed by priority weeds. Any person who deals with a plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevent, eliminated or minimised.

1.4.4 NSW Biodiversity Conservation Act 2016 and Biodiversity Conservation Regulation 2017

The BC Act is the key legislation that enables the conservation of biodiversity within the state of NSW. The BC Act facilitates the assessment and on-going protection of flora and fauna, including threatened species and ecological communities. The BC Act outlines assessment and offsetting requirements for activities with the potential to impact threatened species and ecological communities in NSW, and the clearing of native vegetation.

The *Biodiversity Conservation Regulation 2017* (BC Reg.) sets out the threshold level for when the Biodiversity Offsets Scheme (BOS) will be triggered. The threshold has two elements:

1. **Whether the amount of native vegetation being cleared exceeds an area threshold**

The minimum lot size associated with each lot within the site is **1 ha to less than 40 ha** for which the threshold for clearing, above which the Biodiversity Assessment Method (BAM) and BOS apply is **0.5 ha or more**. The proposal does not require the clearing of more than 0.5 ha and thus does not trigger the area threshold.

2. **Whether the impacts occur on an area mapped on the Biodiversity Values Map published by the Environment Agency Head**

The BV Map identifies land of high biodiversity value, as defined by clause 7.3(3) of the BC Reg. The BOS applies to the clearing of native vegetation and other biodiversity impacts prescribed by clause 6.1 of the BC Reg. on land identified on the BV Map.

The site is not located on the BV Map and thus does not trigger the BV Map threshold (see Figure 1.3).

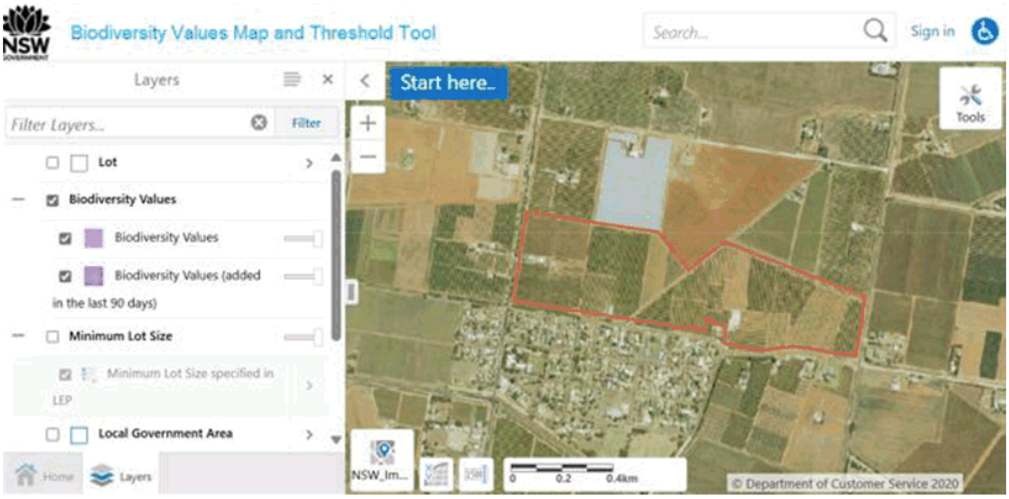


Figure 1.3. Biodiversity Values Map.

Source: Biodiversity Values Map and Threshold Tool (accessed: 11/06/2024).

1.4.5 Griffith Local Environmental Plan 2014

The Griffith Local Environmental Plan 2014 is the environmental planning instrument affecting land use in the Griffith LGA. The proposal must comply with land uses set out in the zoning provisions of the LEP. The site is zoned RU1 Primary Production and RU6 Transition.

Kidman Way is identified as "Biodiversity" on the Terrestrial Biodiversity Map (see Figure 1.4) and thus Clause 7.3 of the Griffith LEP applies to the proposal.

The objective of this clause is to maintain terrestrial biodiversity by:

(a) protecting native fauna and flora, and

(b) protecting the ecological process necessary for their continued existence, and

(c) encouraging the conservation and recovery of native fauna and flora and their habitats.

The proposal will retain native roadside vegetation on Kidman Way with the exception of 20-25m of road reserve requiring clearing for the connection of a proposed road to Kidman Way on the northwest corner of the site.

Figure 1.4. Terrestrial Biodiversity Map.
Source: Griffith Terrestrial Biodiversity Map. Map Sheet ID number 3450_COM_BIO_004_080_20140310.

1.5 Information sources

Databases reviewed in the assessment:

- BioNet Vegetation Classification
- BioNet Threatened Biodiversity Data Collection
- NSW BioNet Atlas
- Directory of Important Wetlands in Australia
- Biodiversity Values Map and Threshold tool
- Protected Matters Search Tool
- NSW Planning Portal Spatial Viewer
- SEED
- eSPADE v2.2
- Nearmap

Reports and plans related to the proposal:

- Concept Master Plan. Source: MDP Architecture. Rev D. 22/05/2024.

2 Methods

This report included a site-specific desktop study of the site, which included the following sources:

- Threatened species databases
    - NSW DPE Bionet database 10km search for threatened species https://atlas.bionet.nsw.gov.au/
    - NSW DCCEEW Protected Matters Search Tool 10km search radius for Matters of National Environmental Significance (MNES) https://pmst.awe.gov.au/
- Vegetation mapping
    - SEED https://geo.seed.nsw.gov.au/
        - NSW DPE State Vegetation Type Map (2023)
        - Vegetation Classes of NSW (DPE 2017)
- Applied Ecology (2019) on behalf of Griffith City Council undertook a comprehensive survey of all roadside reserve vegetation communities and their condition along 1,348km of roadside reserves which was reviewed in this assessment. The document Roadside Reserves Vegetation Management Guide (Applied Ecology 2019) included an assessment of vegetation on Kidman Way and Old Willbriggie Road which is referenced in this report.
- Hydroline mapping
    - Water Management (General) Regulation 2018 Hydro Line spatial data https://www.dpie.nsw.gov.au/water/licensing-and-trade/controlled-activity-approvals/waterfront-land-e-tool/hydro-line-spatial-data
- Historical imagery
- Google Maps
- Local government legislation
    - Griffith Local Environmental Plan 2014

3 Native Vegetation

3.1 Plant community types

A search of the NSW State Vegetation Type Map (SVTM) (DPE 2022) plant community type (PCT) mapping showed no classified PCT within the vicinity of the site (Figure 3.1).

Figure 3.1. PCT mapping.
Source: SEED NSW State Vegetation Type Map (DPE). Date accessed: 29/02/2024.

3.2 Vegetation class

The site and surrounds are classified as 'cleared' on Vegetation Classes of NSW map (Figure 3.2).

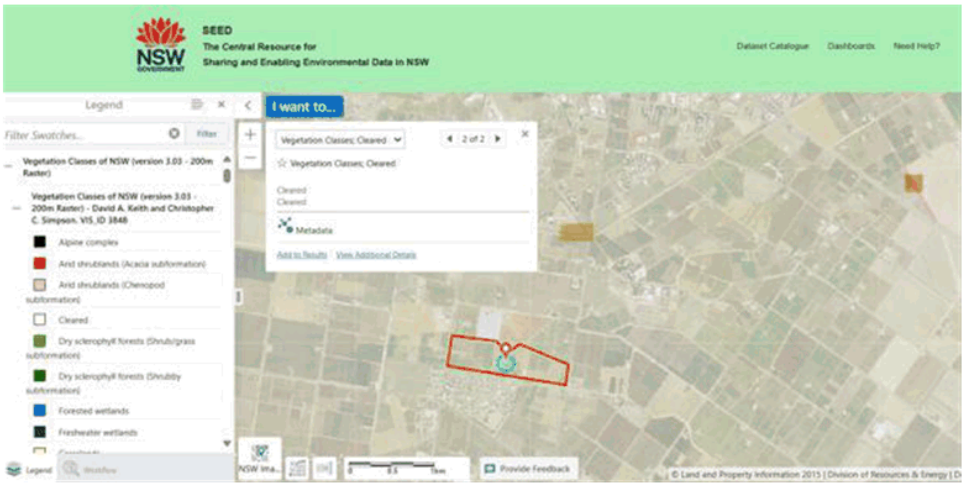


Figure 3.2. Vegetation classes.
Source: SEED Vegetation Classes of NSW. Date accessed: 29/02/2024.

3.3 Griffith Roadside Reserves

The Roadside Reserves Vegetation Management Guide prepared by Applied Ecology (2019) was reviewed. The document reported the following which is relevant to the site:

- Roadside vegetation along Kidman Way is classified as low conservation value.
- Roadside vegetation along Leonard Way was not assessed in the document.
- Roadside vegetation along Old Willbriggie Road is identified as Sandhill Pine Woodland EEC.

3.4 Google Imagery Search

Google Maps Street View was used to review the types of vegetation present, specifically if the Sandhill Pine Woodland EEC was present along Old Willbriggie Road next to the site.

Kidman Way

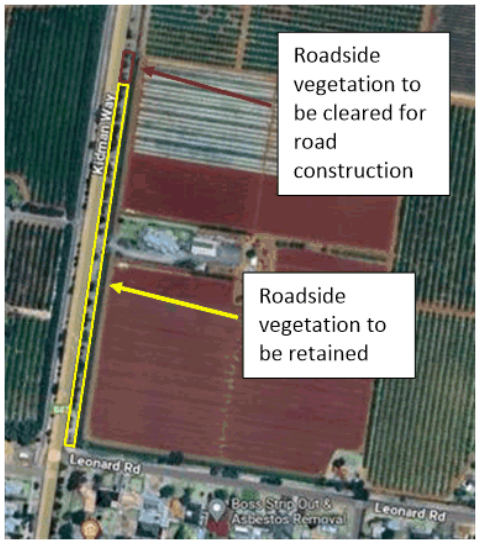


Photo 1. Locality diagram.

Photo 2. Roadside vegetation to be cleared for the construction of new road.

Photo 3. Roadside vegetation on Kidman Way to be retained.

Photo 4. Roadside vegetation on Kidman Way to be retained.

Photo 5. Roadside vegetation on Kidman Way to be retained.

Photo 6. Native *Livistona australis* (Cabbage tree palm) at driveway entrance to 11300 Kidman Way which would require removal.

Photo 7. Roadside vegetation on Kidman Way to be retained.

Photo 8. Roadside vegetation on Kidman Way to be retained.

Corner of Kidman Way and Leonard Road

Photo 9. Corner of Kidman Way and Leonard Road. Roadside vegetation to be retained.

Photo 10. Existing drainage line to be retained.

Leonard Road

Photo 11. Existing drainage line on Leonard Road proposed for retention.

Photo 12. Exotic palms.

Photo 13. Roadside vegetation to be retained.

Photo 14. Existing dwelling at 27 Leonard Road to be demolished.

Photo 15. Existing agricultural land to be developed.

Photo 16. Existing dwelling at 43 Leonard Road to be retained.

Photo 17. Existing dwelling at 85 Leonard Rd to be retained.

Photo 18. Agricultural land surrounding existing dwellings.

Corner of Leonard Road and Old Willbriggie Road

Photo 19. Corner of Leonard Rd and Old Willbriggie Rd.

Photo 20. Existing agricultural land on Old Willbriggie Rd.

Old Willbriggie Road

Google imagery review focused on searches for as Sandhill Pine Woodland EEC as identified by the Roadside Reserves Vegetation Management Guide (Applied Ecology 2019).

Photo 21. Roadside on Old Willbriggie Rd adjacent to the site mostly cleared.

Photo 22. Roadside on Old Willbriggie Rd adjacent to the site mostly cleared.

Photo 23. Roadside on Old Willbriggie Rd adjacent to the site mostly cleared.

Old Willbriggie Road (north of the site)

Photo 24. Corner of Pedley Rd and Old Willbriggie Road (north of site) showing areas of Sandhill Pine Woodland EEC. The proposal would not impact these areas.

Photo 25. Old Willbriggie Road (north of site) showing areas of Sandhill Pine Woodland EEC. The proposal would not impact these areas.

Photo 26. Corner of Beverly Rd and Old Willbriggie Road (north of site) which has been cleared. No Sandhill Pine Woodland EEC visible on western side of Old Willbriggie Road.

Photo 27. Corner of the site where roadside vegetation is absent. No Sandhill Pine Woodland EEC visible. Red-brown loamy sands are present which would have likely supported community prior to the land being transformed into agricultural land.

4 Threatened Species

A search of the Bionet database from within 10 km radius of the site (the search area) returned records for 31 birds, 3 mammals and 1 flora species (refer to Table 4.1). These species are currently listed as vulnerable, endangered or critically endangered under the NSW and/or Commonwealth legislation.

Appendix I provides an assessment of the likelihood of the species occurring on the site.

Table 4.1. Bionet records and likelihood of occurrence.

Class	Scientific Name	Common Name	NSW status	Comm. status	Records
Aves	*Anseranas semipalmata*	Magpie Goose	V,P		24
Aves	*Oxyura australis*	Blue-billed Duck	V,P		70
Aves	*Stictonetta naevosa*	Freckled Duck	V,P		48
Aves	*Hirundapus caudacutus*	White-throated Needletail	V,P	V,M	1
Aves	*Ephippiorhynchus asiaticus*	Black-necked Stork	E,P		1
Aves	*Botaurus poiciloptilus*	Australasian Bittern	E,P	E	13
Aves	*Circus assimilis*	Spotted Harrier	V,P		3
Aves	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P		5
Aves	*Hieraaetus morphnoides*	Little Eagle	V,P		24
Aves	*Pandion cristatus*	Eastern Osprey	V,P		1
Aves	*Falco hypoleucos*	Grey Falcon	V,P	V	1
Aves	*Falco subniger*	Black Falcon	V,P		6
Aves	*Burhinus grallarius*	Bush Stone-curlew	E,P		1
Aves	*Rostratula australis*	Australian Painted Snipe	E,P	E	2
Aves	*Calidris ferruginea*	Curlew Sandpiper	E,P	CE,M	3
Aves	*Lophochroa leadbeateri*	Pink Cockatoo	V,P		67
Aves	*Lathamus discolor*	Swift Parrot	E,P	CE	1
Aves	*Neophema chrysostoma*	Blue-winged Parrot	V,P	V	1
Aves	*Polytelis swainsonii*	Superb Parrot	V,P	V	9
Aves	*Ninox connivens*	Barking Owl	V,P		3
Aves	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P	V	18
Aves	*Aphelocephala leucopsis*	Southern Whiteface	V,P	V	26
Aves	*Chthonicola sagittata*	Speckled Warbler	V,P		1
Aves	*Certhionyx variegatus*	Pied Honeyeater	V,P		9
Aves	*Epthianura albifrons*	White-fronted Chat	V,P		19

Class	Scientific Name	Common Name	NSW status	Comm. status	Records
Aves	*Grantiella picta*	Painted Honeyeater	V,P	V	16
Aves	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		31
Aves	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		3
Aves	*Melanodryas cucullata cucullata*	South-eastern Hooded Robin	E,P	E	11
Aves	*Petroica phoenicea*	Flame Robin	V,P		1
Aves	*Stagonopleura guttata*	Diamond Firetail	V,P	V	1
Mammalia	*Chalinolobus picatus*	Little Pied Bat	V,P		2
Mammalia	*Myotis macropus*	Southern Myotis	V,P		3
Mammalia	*Vespadelus baverstocki*	Inland Forest Bat	V,P		1
Flora	*Grevillea ilicifolia subsp. ilicifolia*	Holly-leaf Grevillea	CE		1

CE = Critically Endangered, E = Endangered, V = Vulnerable, P = Protected, M = Migratory

No threatened species have been previously recorded on-site as shown in Figure 4.1.

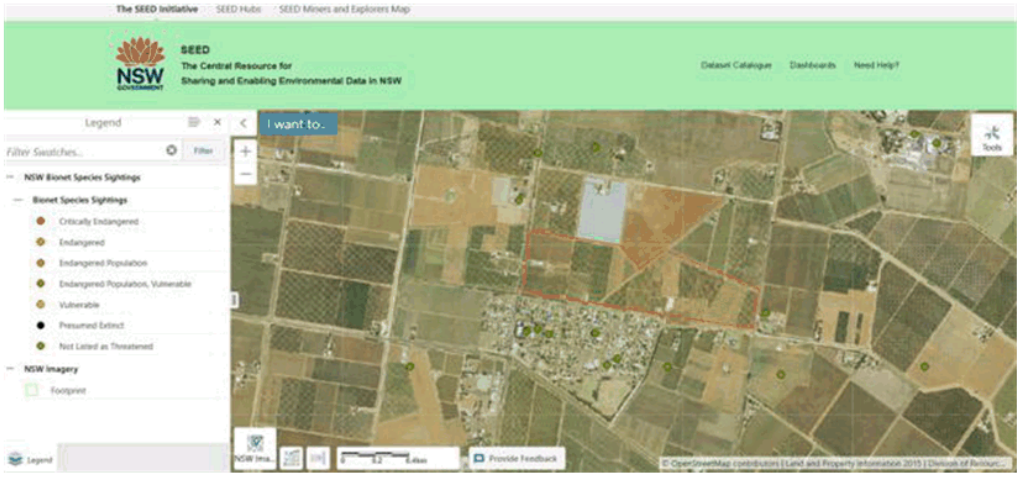


Figure 4.1. Bionet threatened species records.

Source: SEED NSW Bionet Species Sightings (accessed: 11/06/2024).

5 Impact assessment

This section outlines the anticipated direct and indirect impacts of the proposal on flora and fauna.

5.1 Direct impacts

The proposal would require the clearing of the existing orchards.

The only impact on native vegetation would be the clearing of 20-25m of road reserve vegetation on Kidman Way to facilitate the joining of the proposed 1st Avenue to Kidman Way (refer to Photos 1 and 2). The area of impact is approximately 450 m^2 (refer to Figure 5.1). Vegetation loss will be kept as minimal as possible.

The remaining areas of vegetation along Kidman Way are to be retained. Replanting works should be undertaken within the road reserve to offset the loss of vegetation.

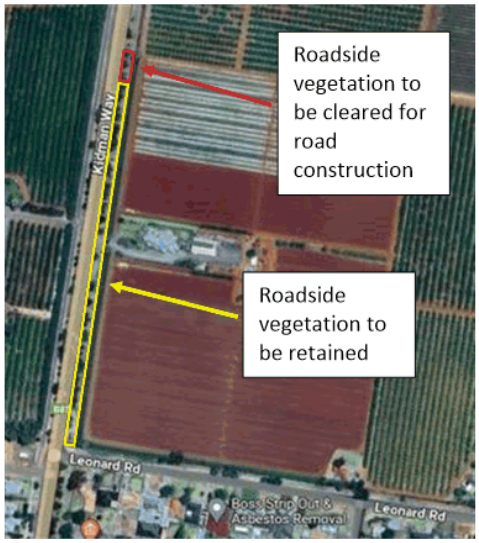


Photo 1. Locality diagram.

Photo 2. Roadside vegetation to be cleared for the construction of new road.

Figure 5.1. Area of road reserve to be impacted on Kidman Way (northwest corner of the site).
Source: Nearmap.

5.2 Indirect impacts

The proposal may result in a range of minor indirect impacts affecting species and communities.

5.2.1 Weeds

The works may introduce weeds to the site and should be continually managed before and during works by avoiding seed spread on machinery, tools, equipment, and clothing (e.g., boots). After weeds are eradicated around the perimeter of the proposed works, there must be continuous maintenance of the weeds on the subject site to avoid exacerbated weed growth or colonisation. Weeds colonise and pioneer on cleared ground and therefore must be managed throughout the project.

Weeds in the street scape include Phoenix Palms. These can be removed and replaces with native species.

5.2.2 Pathogens

Spread of pathogens can be minimised by ensuring all machinery, tools, equipment, and clothing (e.g., boots) are cleaned prior to entering the site. Pathogens to be aware of include Myrtle Rust (*Puccinia psidii*) (a fungal disease) and Phytophthora (*Phytophthora cinnamomi*) (a root-rot fungus). Bushland Hygiene Protocols should be followed and are provided in Appendix III.

5.2.3 Soil

Soil compaction can occur from the use of machinery. It is recommended that soil compaction on non-built areas be avoided i.e., roadside vegetated areas.

It is recommended to fence of any areas of vegetation to be retained. Woody debris and the covering of organic matter on cleared areas can prevent erosion and is recommended.

5.2.4 Runoff

The proposed works may cause the transport of sediment from the site to areas downstream due to increased stormwater runoff. Erosion and sediment controls are to be implemented to ensure runoff does not impact adjacent vegetation or the canal.

5.2.5 Landscaping

Landscaping can result in the spread of weed seed from the site, changes in microhabitats (already changed in the orchard area) and excessive loads of stormwater infrastructure where deciduous trees are used.

Deciduous trees can be used in key areas to enable sun in winter however they need to be used sparingly and not where leaf letter is able to collect in stormwater pits (roads).

The Griffith area is naturally highly aesthetic and appropriate plants that can be mixed with low water and salt tolerant flowering exotics to create a balanced and beautiful landscape.

6 Conclusions and Recommendations

The proposal is not considered to have a significant impact on the flora and fauna of the site. Roadside vegetation is proposed to be impacted; however, clearing of vegetation will be minimised where possible whilst adhering to sightline requirements. Replanting of roadside vegetation will be undertaken to mitigate the loss of vegetation from the proposal. The following mitigation measures are proposed to ensure flora and fauna are protected during the works.

6.1 Mitigation measures

6.1.1 Delineation of work areas and retention of native roadside vegetation

During the development, impacts to the site and the vegetation to be retained should be minimised by the delineation of work areas. Access to the site would be best restricted to the development footprint only. An exclusion zone will be established for the roadside vegetation outside the approved work areas.

6.1.2 Native species included in landscaping

A description from Griffith Local Council and the State Government about planting and landscaping with native species has been provided below in italics. A native species list from the Griffith area has been provided in the Appendix II of this report and can be used to inform landscaping.

> *Local native plants are plants that naturally grow in the local area. These plants have evolved to cope with the soils, temperatures and rainfall patterns in your area. As a result, they will grow and thrive in our gardens with minimal watering once established. A light prune, small amounts of fertiliser (suitable for natives) and limited supplementary watering can result in plants that are bushy and healthy.*
>
> *Hop bushes with their highly decorative fruit capsules ranging in colour from green to shades of pink, red and purple will* provide colour for many months.
>
> *Senna or Punty Bush, with its mass of vibrant yellow flowers will give a lift to the waning days of winter. Nodding blue lilies with their almost iridescent blue and yellow flowers are a focal point in late spring. By planting local native, we also provide shelter, food, nesting and breeding sites for native birds, insects and animals. Reduce the risk of weed invasion in local bushland. Provide connections between areas of bush so naïve species can move between patches.*

6.1.3 Replanting roadside vegetation

Flora could be replanted in the road reserve and includes the following.

Table 6.1 Indicative native species suitable for replanting within roadside vegetation zones.

Scientific Name	Common Name	Growth
Acacia brachybotra	Grey Wattle	Shrub
Acacia deanei	Deanes Wattle	Shrub or tree
Acacia homalophyila	Yarran	Shrub or tree
Acacia lineate	Streaked Wattle	Shrub
Acacia oswaldii	Miljee	Shrub or tree
Acacia pendula	Boree	Tree
Acacia salicina	Native Willow/Cooba	Tree

Scientific Name	Common Name	Growth
Acacia stenophylla	River Cooba	Tree
Atriplex semibaccata	Creeping Saltbush	Perennial
Brachychiton populeum	Kurrajong	Tree
Callitris glaucophylla	White Cypress Pine	Tree
Einadia nutans subsp. *nutans*	Climbing Saltbrush	Perennial
Enchylaena tomentose	Ruby Saltbush	Shrub
Eremophila longifolia	Emubush	Shrub or tree
Eremophila maculate	Spotted Fucia	Shrub
Eucalyptus largiflorens	Black Box	Tree
Eucalyptus populnea	Bimble Box	Tree
Hakea leucoptera	Needlewood	Shrub
Melaleuca uncinata	Broombush	Shrub
Pittosporum phylliraeoides	Butterbush	Shrub or tree
Rhagodia spinescens	Thorny	Shrub
Senna artemisiodes	Punty bush	Shrub

6.1.4 Erosion and sediment control

Where required, erosion and sediment control measures are to be implemented. These include, but are not limited to, sediment fencing, jute mating, crushed sandstone, or coir logs. Erosion and sediment controls measures are to be revised during site inspections and/or after significant rainfall (more than 10mm in 24 hours resulting in site runoff). Control measures must ensure that no settlement of sediment or silt occurs within areas of vegetation to be retained. Sediment fencing should be retained for a long as practicable. If removed, then monitoring is required to ensure flows do not concentrate and cause further erosion. If concentrated flows do occur and/or erosion gullies develop then coir log baffles are required.

6.1.5 Preservation of habitat features

The project should salvage and reuse any existing logs within the road reserve. Tree trunks in the vegetation removal area can be reused and placed on the ground in bushland edge.

If the project is not able to reuse all suitable hollow and tree trunks, a condition of consent is included that the landholder consults with the local community restoration and rehabilitation groups, Landcare group or other relevant authorities including local councils or Greater Sydney Local Land Services prior to clearing to determine if the trees removed can be reused by others for habitat enhancement and rehabilitation works. Any consultation with community groups and their responses should be documented.

6.1.6 Removal of weeds in road reserve

Weeds in the road reserves can be removed to assist with sight line matters. It is important to ensure no weeds establish or spread during works. Environmental weeds are harmful to the bush as they upset the balance by favouring some species, for example some local species may be unable to regenerate. Other environmental weeds will hybridise with local plants which causes genetic pollution by breeding out local natives.

Common environmental weeds in this area include:

- African Boxthorn (*Lyvium ferocissimum*)
- Olive (*Olea* sp)
- Prickly Pear (*Opuntia* spp)
- Pepper Tree (*Schinus areira*)
- Bridal Creeper (*Asparagus asaragoides*)
- White Cedar (*Melia azedarach*)
- Evening Primrose (*Oenothera stricta*)
- Soursob (*Oxalis pes-capre*)

All bush regeneration activities requiring the use of chemicals must be performed in accordance with the NSW *Pesticides Act* 1999. Herbicides must not be applied whilst exotic plants are setting seed. The weed removal program aims to be broad in approach and sustained in application to provide the best possible conditions for natural regeneration and to control weeds within the site.

6.1.7 Pathogen prevention

To prevent the introduction of pathogens, Hygiene Protocols should be followed. The site is considered to be an area that may promote the spread of *Phytophthora* (a group of fungus-like diseases affecting plants).

7 Appendices

7.1 Appendix I – Likelihood of Occurrence

The following assessment identifies the list of threatened flora and fauna species recorded within a 10 km radius of the subject site and compares the habitat, ecology and distribution of these species with the habitats identified on the subject site to assess the likelihood of the species occurring on the subject site using the following criteria:

- Unlikely
  - species highly restricted to certain geographical areas not within the proposal footprint
  - species that have specific habitat requirements that are not present on the subject site
- Low
  - have not been recorded previously on the subject site/surrounds and for which the study area is beyond the current distribution range
  - use specific habitats or resources are not present on the subject site
  - are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded
- Moderate
  - have infrequently been recorded previously on the subject site/surrounds
  - use specific habitats or resources present on the subject site but in a poor or modified condition
  - area unlikely to maintain sedentary populations, however may seasonally use resources within the subject site opportunistically or during migration
  - are cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded
- High
  - have frequently been recorded previously on the subject site/surrounds
  - use habitat types or resources that are present on the subject site that are abundant and/or in good condition
  - are known or likely to maintain resident populations surrounding the subject site
  - are known or likely to visit the site during regular seasonal movements or migration

Table 7.1. Likelihood of occurrence.

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
Anseranas semipalmata	Magpie Goose	Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. Often seen in trios or flocks on shallow wetlands, dry ephemeral swamps, wet grasslands and floodplains; roosts in tall vegetation.	Unlikely
Oxyura australis	Blue-billed Duck	The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached. Blue-billed Ducks will feed by day far from the shore, particularly if dense cover is available in the central parts of the wetland. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies. Blue-billed Ducks are partly migratory, with short-distance movements between breeding swamps and overwintering lakes with some long-distance dispersal to breed during spring and early summer. Blue-billed Ducks usually nest solitarily in Cumbungi over deep water between September and February. They will also nest in trampled vegetation in Lignum, sedges or Spike-rushes, where a bowl-shaped nest is constructed. The most common clutch size is five or six. Males take no part in nest-building or incubation.	Unlikely

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		Young birds disperse in April-May from their breeding swamps in inland NSW to non-breeding areas on the Murray River system and coastal lakes.	
Stictonetta naevosa	Freckled Duck	Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Generally rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. Nesting usually occurs between October and December but can take place at other times when conditions are favourable. Nests are usually located in dense vegetation at or near water level.	Unlikely
Hirundapus caudacutus	White-throated Needletail	Migratory and usually seen in eastern Australia from October to April. Breeds in forests in south-eastern Siberia, Mongolia, the Korean Penninsula and northern Japan June-August. Most often seen in eastern Australia before storms, low pressure troughs and approaching cold fronts and occasionally bushfire. These conditions are often used by insects to swarm (eg termites and ants) or tend to lift insects away from the surface which favours sighting of White-throated Needletails as they feed. More common in coastal areas, less so inland.	Unlikely
Ephippiorhynchus asiaticus	Black-necked Stork	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries. Storks usually forage in water 5-30cm deep for vertebrate and invertebrate prey. Eels regularly contribute the greatest biomass to their diet, but they	Low

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		feed on a wide variety of animals, including other fish, frogs and invertebrates (such as beetles, grasshoppers, crickets and crayfish). Black-necked Storks build large nests high in tall trees close to water. Trees usually provide clear observation of the surroundings and are at low elevation (reflecting the floodplain habitat).	
Botaurus poiciloptilus	Australasian Bittern	Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.). Hides during the day amongst dense reeds or rushes and feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird; platforms are often littered with prey remains. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	Unlikely
Circus assimilis	Spotted Harrier	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months. Preys on terrestrial mammals (eg bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion.	Low
Haliaeetus leucogaster	White-bellied Sea-Eagle	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea.	Unlikely

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest). Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. Hunts its prey from a perch or whilst in flight (by circling slowly, or by sailing along 10–20 m above the shore). Prey is usually carried to a feeding platform or (if small) consumed in flight, but some items are eaten on the ground.	
Hieraaetus morphnoides	Little Eagle	Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. Lays two or three eggs during spring, and young fledge in early summer. Preys on birds, reptiles and mammals, occasionally adding large insects and carrion.	Unlikely
Pandion cristatus	Eastern Osprey	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water.	Unlikely

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea. . Incubation of 2-3 eggs, usually by the female, is about 40 days. Female remains with young almost until they fly, usually after about nine weeks in the nest.	
Falco hypoleucos	Grey Falcon	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid.	Unlikely
Falco subniger	Black Falcon	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be referable to the Brown Falcon. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres (Marchant & Higgins 1993). The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring.	Low
Burhinus grallarius	Bush Stone-curlew	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber. Feed on insects and small vertebrates, such as frogs, lizards and snakes. Nest on the ground in a scrape or small bare patch.	Low

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
Rostratula australis	Australian Painted Snipe	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally occurs from September to December. Incubation and care of young is all undertaken by the male only. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.	Unlikely
Calidris ferruginea	Curlew Sandpiper	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds. Birds breed at 2 years of age and the oldest recorded bird is 19 years old. Most birds caught in Australia are between 3 and 5 years old.	Unlikely
Lophochroa leadbeateri	Pink Cockatoo	Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water.	Low

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles and cypress pines. Normally found in pairs or small groups, though flocks of hundreds may be found where food is abundant. Nesting, in tree hollows, occurs throughout the second half of the year; nests are at least 1 km apart, with no more than one pair every 30 square kilometres.	
Lathamus discolor	Swift Parrot	Migrates to the Australian south-east mainland between February and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as *Eucalyptus robusta*, *Corymbia maculata*, *C. gummifera*, *E. tereticornis*, *E. sideroxylon*, and *E. albens*. Commonly used lerp infested trees include Inland *E. microcarpa*, *E. moluccana*, *E. pilularis*, and *E. melliodora*. Following winter they return to Tasmania where they breed from September to January, nesting in old trees with hollows and feeding in forests dominated by Tasmanian Blue Gum Eucalyptus globulus.	Unlikely
Neophema chrysostoma	Blue-winged Parrot	The Blue-winged Parrot inhabits a range of habitats from coastal, sub-coastal and inland areas, right through to semi-arid zones. Throughout their range, they favour grasslands and grassy woodlands. They are often found near wetlands both near the coast and in semi-arid zones. Blue-winged Parrots can also be seen in altered environments such as airfields, golf courses and paddocks.	Unlikely

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
Polytelis swainsonii	Superb Parrot	Inhabit Box-Gum, Box-Cypress-pine and Boree woodlands and River Red Gum forest. In the Riverina superb parrots nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum forest or woodland. On the South West Slopes and Southern Tablelands nest trees can be in open Box-Gum woodland or isolated living or dead paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. Superb Parrots nest in tree hollows with an entrance diameter of 6 cm or wider, and that are at least 3.5 m above the ground Nest in small colonies, often with more than one nest in a single tree. Feed in trees and understorey shrubs and on the ground and their diet consists mainly of grass seeds and herbaceous plants. Also eaten are fruits, berries, nectar, buds, flowers, insects and grain.	Unlikely
Ninox connivens	Barking Owl	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g. western NSW) due to the higher density of prey found on these fertile riparian soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. Preferentially hunts small arboreal mammals such as Squirrel Gliders and Common Ringtail Possums, but when loss of tree hollows decreases these prey populations the owl becomes more reliant on birds, invertebrates and terrestrial mammals such as rodents and rabbits. Can catch bats and moths on the wing, but typically hunts by sallying from a tall perch.	Unlikely

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		Requires very large permanent territories in most habitats due to sparse prey densities. Monogamous pairs hunt over as much as 6000 hectares, with 2000 hectares being more typical in NSW habitats.	
Climacteris picumnus victoriae	Brown Treecreeper (eastern subspecies)	Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	Unlikely
Aphelocephala leucopsis	Southern Whiteface	Habitat critical to the survival of the Southern Whiteface includes areas of relatively undisturbed open woodlands and shrublands with an understorey of grasses or shrubs, or both; habitat with low tree densities and an herbaceous understory litter cover which provides essential foraging habitat; and living and dead trees with hollows and crevices which are essential for roosting and nesting.	Unlikely
Chthonicola sagittata	Speckled Warbler	The Speckled Warbler lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The diet consists of seeds and insects, with most foraging taking place on the ground around tussocks and under bushes and trees.	Unlikely

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		The rounded, domed, roughly built nest of dry grass and strips of bark is located in a slight hollow in the ground or the base of a low dense plant, often among fallen branches and other litter. A side entrance allows the bird to walk directly inside.	
Certhionyx variegatus	Pied Honeyeater	Inhabits wattle shrub, primarily Mulga (*Acacia aneura*), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering; feeds on nectar, predominantly from various species of emu-bushes (*Eremophila* spp.); also from mistletoes and various other shrubs (e.g. *Grevillea* spp.); also eats saltbush fruit, berries, seed, flowers and insects. Highly nomadic, following the erratic flowering of shrubs; can be locally common at times. Constructs a relatively large cup-shaped nest, usually robust, although occasionally loose, constructed of grasses and fine twigs, bound with spider webs, in the fork of a shrub or tree up to 5 m above the ground.	Unlikely
Epthianura albifrons	White-fronted Chat	Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. Have been observed breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests in the Sydney region have also been seen in low isolated mangroves. Nests are usually built about 23 cm above the ground (but have been found up to 2.5 m above the ground). Two to three eggs are laid in each clutch, and the complete nesting cycle from nest-building to independent young is approximately 50 days Birds can breed at one year of age and are estimated to live for five years.	Unlikely
Grantiella picta	Painted Honeyeater	Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests.	

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	
Pomatostomus temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. Build and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. Nests are maintained year round, and old nests are often dismantled to build new ones.	Unlikely
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland. Primarily eats invertebrates, mainly insects, which are captured whilst hovering or sallying above the canopy or over water. Also frequently hovers, sallies and pounces under the canopy, primarily over leaf litter and dead timber. Also occasionally take nectar, fruit and seed.	Unlikely

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		Depending on location and local climatic conditions (primarily temperature and rainfall), the dusky woodswallow can be resident year round or migratory. In NSW, after breeding, birds migrate to the north of the state and to southeastern Queensland, while Tasmanian birds migrate to southeastern NSW after breeding. Migrants generally depart between March and May, heading south to breed again in spring. There is some evidence of site fidelity for breeding. Although dusky woodswallows generally breed as solitary pairs or occasionally in small flocks, large flocks may form around abundant food sources in winter. Large flocks may also form before migration, which is often undertaken with other species. Nest is an open, cup-shape, made of twigs, grass, fibrous rootlets and occasionally casuarina needles, and may be lined with grass, rootlets or infrequently horsehair, occasionally unlined. Nest sites vary greatly, but generally occur in shrubs or low trees, living or dead, horizontal or upright forks in branches, spouts, hollow stumps or logs, behind loose bark or in a hollow in the top of a wooden fence post. Nest sites may be exposed or well concealed by foliage.	
Melanodryas cucullata cucullata	South-eastern Hooded Robin	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. Often perches on low dead stumps and fallen timber or on low-hanging branches, using a perch-and-pounce method of hunting insect prey. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season. May breed any time between July and November, often rearing several broods.	Unlikely

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		The nest is a small, neat cup of bark and grasses bound with webs, in a tree fork or crevice, from less than 1 m to 5 m above the ground. The nest is defended by both sexes with displays of injury-feigning, tumbling across the ground. A clutch of two to three is laid and incubated for fourteen days by the female. Two females often cooperate in brooding.	
Petroica phoenicea	Flame Robin	Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys. The groundlayer of the breeding habitat is dominated by native grasses and the shrub layer may be either sparse or dense. Occasionally occurs in temperate rainforest, and also in herbfields, heathlands, shrublands and sedgelands at high altitudes. In winter, birds migrate to drier more open habitats in the lowlands (i.e. valleys below the ranges, and to the western slopes and plains). Often occurs in recently burnt areas; however, habitat becomes unsuitable as vegetation closes up following regeneration. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees. In winter, occasionally seen in heathland or other shrublands in coastal areas. Birds forage from low perches, from which they sally or pounce onto small invertebrates which they take from the ground or off tree trunks, logs and other coarse woody debris. Flying insects are often taken in the air and sometimes gleans for invertebrates from foliage and bark.	Unlikely

Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		In their autumn and winter habitats, birds often sally from fence-posts or thistles and other prominent perches in open habitats. Occur singly, in pairs, or in flocks of up to 40 birds or more; in the non-breeding season they will join up with other insectivorous birds in mixed feeding flocks. Breeds in spring to late summer. Nests are often near the ground and are built in sheltered sites, such as shallow cavities in trees, stumps or banks. Builds an open cup nest made of plant materials and spider webs. Eggs are oval in shape and are pale bluish- or greenish-white and marked with brownish blotches; clutch size is three or four eggs.	
Stagonopleura guttata	Diamond Firetail	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Usually encountered in flocks of between 5 to 40 birds, occasionally more. Groups separate into small colonies to breed, between August and January. Nests are globular structures built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting.	Low

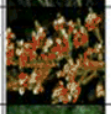
Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		Appears to be sedentary, though some populations move locally, especially those in the south. Has been recorded in some towns and near farm houses.	
Chalinolobus picatus	Little Pied Bat	Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Can tolerate high temperatures and dryness but need access to nearby open water. Feeds on moths and possibly other flying invertebrates.	Low
Myotis macropus	Southern Myotis	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, wharves, bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface. In NSW females have one young each year usually in November or December.	Low
Vespadelus baverstocki	Inland Forest Bat	Roosts in tree hollows and abandoned buildings. Known to roost in very small hollows in stunted trees only a few metres high. The habitat requirements of this species are poorly known but it has been recorded from a variety of woodland formations, including Mallee, Mulga and River Red Gum. Most records are from drier woodland habitats with riparian areas inhabited by the Little Forest Bat. However, other habitats may be used for foraging and/or drinking.	Low

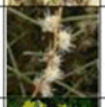
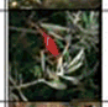
Scientific Name	Common Name	Habitat Requirements	Likelihood of Occurrence
		Colony size ranges from a few individuals to more than sixty. Females congregate to raise young in November and December, with young carried for the first week following birth. Young are independent by January. These bats fly rapidly and cover an extensive foraging area and are presumed to feed on flying insects.	
Grevillea ilicifolia subsp. ilicifolia	Holly-leaf Grevillea	In New South Wales, the Holly-leaf grevillea occurs, or has occurred, at highly disjunct localities in the central west and central south of the State. The only population confirmed as extant occurs at Round Hill Nature Reserve north-west of Lake Cargelligo. It was previously known from the Griffith area but that population is now thought to be extinct. In New South Wales *Grevillea ilicifolia* subsp. *ilicifolia* has been recorded from shrubby mallee communities. At Nericon near Griffith, Weare (1988) reports it as having occurred in 'dense mallee' in the early 1950s; the sole known plant of this population surviving in recent decades was growing in sandy loam soil in a disturbed remnant association of mallee eucalypts (*Eucalyptus gracilis, E. socialis* and *E. dumosa),* with *Callitris glaucophylla, Acacia brachybotrya* and *Olearia pimeleoides* (NSW Herbarium specimen data, Makinson 1307, 1993).	Unlikely

7.2 Appendix II – Species recommended to include in landscape plan

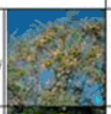
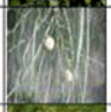
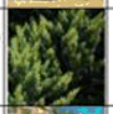
Species recommended for landscaping (included below)
Source: file:///C:/Users/ecolo/Downloads/Waterwise_and_Salt_Tolerant_Plant_Book_red.pdf

See the vegetation communities of the Riverina LLS area at
https://www.lls.nsw.gov.au/__data/assets/pdf_file/0007/1200877/20-Riverina-TSR-Veg-guide-web.pdf

Common Name / Botanical Name		Height (m)	Spread (m)	Salt Tolerant	Waterwise	Frost Tolerant	Other
Snow-in-Summer *Melaleuca linariifolia*		4-8	2-5	Yes	Yes	Yes	
Broad Leaved Paperbark *Melaleuca quinquenervia*		10	3-5	Yes	Yes	Moderate	
Prickly Paperbark *Melaleuca stypheloides*		8-20	5-10	Yes	Yes	Yes	
Broombush *Melaleuca uncinata*		2	2	Yes	Yes	Yes	
Fringed Heath-myrtle *Micromyrtus ciliata*		1	3	Yes	Yes	Yes	
Western Boobialla *Myoprum montanum*		4	2	No	Yes	Yes	
Sugerwood *Myoprum platycarpum*		10	6	Yes	Yes	Yes	
Butterbush *Pittosporum angustifolium*		2-8	2-4	Yes	Yes	No	
Quandong *Santalum acuminatum*		6	1.5-4	Yes	Yes	Moderate	

Common Name / Botanical Name		Height (m)	Spread (m)	Salt Tolerant	Waterwise	Frost Tolerant	Other
Australian Indigo *Indigofera australis*		2	2	No	Yes	Yes	
Pyramid Tree *Lagunaria patersonii*		6-12	4-6	Yes	Yes	Yes	
Tea-tree *Leptospermum divaricatum*		1-4	1.5	Yes	Yes	Yes	
Eastern Cottonbush *Maireana microphylla*		1	1	Yes	Yes	No	
Pink Honey Myrtle *Melaleuca erubescens*		2	2-3	No	Yes	Yes	
Swamp Paperbark *Melaleuca halmaturorum*		2-10	2.5-8	Yes	Yes	Yes	
Moonah *Melaleuca lanceolata*		3	2	Yes	No	No	
Pincushion Hakea *Hakea laurina*		4-6	5	No	Yes	Yes	
Needlewood *Hakea leucoptera*		2-6	3-4	Yes	Yes	Yes	
Hooked needlewood *Hakea tephrosperma*		2-6	2-3	No	Yes	Yes	
Grey Guinea-flower *Hibbertia obtusifolia*		1	0.5	No	Yes	Moderate	
Narrow-leaf Hop-bush *Dodonaea viscosa ssp. Angustissima*		4	2-3	Yes	Yes	Yes	
Wedge-leaf Hop-bush *Dodonaea viscosa ssp.cuneata*		4	1-3	Yes	Yes	Yes	
Tar Bush *Eremophila glabra*		1.5	1.5	No	Yes	Moderate	
Emu bush *Eremophila longifolia*		0.3-3	0.3-2	Yes	Yes	Yes	

Common Name / Botanical Name		Height (m)	Spread (m)	Salt Tolerant	Waterwise	Frost Tolerant	Other
Bookleaf Mallee *Eucalyptus kruseana*		2-4	3-4	Yes	Yes	Yes	
Bushy Yate *Eucalyptus lehmannii*		8-10	6-8	Yes	Yes	Yes	
Red Flowering Gum *Eucalyptus leucoxylon ssp Megalocarpa*		5-10	5	Yes	Yes	Yes	
Long-Flowered Marlock *Eucalyptus macrandra*		3-8	4-10	Yes	Yes	Yes	
Wallangarra White Gum *Eucalyptus scoparia*		12	5	No	Yes	Moderate	
Swamp Mallee *Eucalyptus spathulata*		6-10	6-8	Yes	Yes	Yes	
Coral Gum *Eucalyptus torquata*		5-10	4-8	Yes	Yes	Yes	
Green Fuchia Bush *Eremophila serrulata*		1.5	1.5	Yes	Yes	Yes	
Long-leaf Wax-flower *Philotheca myoporoides*		2	2	Yes	Yes	Yes	
Gungurru *Eucalyptus caesia*		8-10	3-5	Yes	Yes	Yes	
Silver-Topped Gimlet *Eucalyptus campaspe*		5-11	4-7	Yes	Yes	Yes	
Tall Sand Mallee *Eucalyptus eremophila*		4-8	4-6	Yes	Yes	Yes	
Red-Flowered Mallee *Eucalyptus erythronema*		4-9	4-7	Yes	Yes	Yes	
Fuchsia Gum *Eucalyptus forrestiana*		3-7	3-5	Yes	Yes	Moderate	

Common Name / Botanical Name		Height (m)	Spread (m)	Salt Tolerant	Waterwise	Frost Tolerant	Other
Miljee *Acacia oswaldii*		2-6	2-7	Yes	Yes	Yes	
Kangaroo Thorn *Acacia paradoxa*		2-4	3-4	Yes	Yes	Moderate	
Myall or Boree *Acacia pendula*		5-10	4	Yes	Yes	Yes	
Needle Wattle *Acacia rigens*		3	3	Yes	Yes	Yes	
Cooba *Acacia salicina*		5-6	3	Yes	Yes	Yes	
River Cooba *Acacia stenophylla*		5-15	3-8	Yes	Yes	Yes	
Varnish Wattle *Acacia vernicifiua*		4	1-3	Yes	Yes	Yes	
Kurrajong *Brachychiton populneus*		12	10	Yes	Yes	Yes	
Black Cypress Pine *Callitris endlicheri*		8-12	8	No	Yes	Yes	
White Cypress Pine *Callitris glaucophylla*		6-15	7	No	Yes	Yes	

7.3 Appendix III – Key Weed Removal Methods

Technique	Method	Equipment
Hand Removal 	Seedlings and smaller weed species where appropriate will be pulled out by hand, without risk of injury to workers. The size that this can occur varies throughout the treatment area. Generally, it ranges from post seed to approximately 300mm in height. Rolling and raking is suitable for larger infestations of Wandering Jew. The weed can be raked and stems and plants parts rolled. The clump of weed material can then be bagged and removed from site.	Tools: Gloves, Rakes, Knife and Weed Bags
Crowning 	Plants that possess rhizomes or bulbs might not respond to various removal techniques and may need to be treated with crowning. A knife, mattock or trowel is to be driven into the soil surrounding the bulb or rhizome at an angle of approximately 45 degrees with surrounding soil, so as to cut any roots that may be running off. This is to occur in 360 degrees around the bulb/rhizome. The rhizome or bulb is to be bagged and removed from the site and disposed of at an appropriate waste recycling facility Soil disturbance is to be kept to a minimum when using this technique.	Tools: Knife, mattock, trowel, impervious gloves, and all other required P.P.E.
Cut and Paint Stems 	Weed species deemed unsuitable for hand removal shall be cut. Those that have persistent of vigorous growth will be cut and painted with Roundup® Biactive Herbicide or equivalent. Juvenile and smaller weed species will be cut with secateurs at base of plant, and herbicide applied via applicator bottle. Stem to be cut horizontally as close to the ground as possible, using secateurs, loppers or a pruning saw. Horizontal cuts to be made on top of stem to prevent the herbicide running off the stump. Apply herbicide to the cut stem immediately, within 10-20 seconds, before the plant cells close and the translocation of the herbicide is limited. Herbicide is not to reach sediment or surrounding non-targeting plants.	Tools: loppers, secateurs, pruning saw, herbicide applicator/sprayer, impervious gloves, Roundup® Biactive Herbicide and all other required P.P.E.

Scrape and Painting 	More resilient weed species, where other techniques are less reliable are to be scraped with a knife or chisel and painted with undiluted Roundup® Biactive Herbicide. Works to be carried out by a contractor with a current herbicide license. Weed species will be scraped with a knife or chisel up the length of the trunk, and herbicide applied via applicator bottle. Scrape the trunk from as close to the ground as possible to approximately ¾ of the plant height. Where trunk diameters exceed approximately 5 cm a second scrape shall be made on the other side of the trunk. Apply undiluted herbicide to the cut trunk immediately, within 10-20 seconds, before the plant cells close and the translocation of the herbicide is limited. All care must be taken by the contractor not to spill herbicide onto sediment or surrounding non-targeting plants. Follow up treatment may be required. If plants resprout, scrape and paint the shoots using the same method after sufficient regrowth has occurred.	Tools: knife, chisel, protective clothing, safety glasses herbicide applicator/sprayer, impervious gloves, Roundup® Biactive Herbicide, and all other required P.P.E.
Cut with a Chainsaw and Paint 	Larger size weed species, too large for cutting with hand tools, shall be cut with a chainsaw and painted with undiluted Roundup® Biactive Herbicide. Works to be carried out by a contractor with a current chainsaw and herbicide license. Larger weed species will be cut with a chainsaw at base of plant, and herbicide applied via applicator bottle. Cut the stem horizontally as close to the ground as possible, using the chainsaw. Remove upper branches to reduce bulk of plant. If cutting at the base is impractical, cut higher to get rid of the bulk of the weed, then cut again at the base and apply herbicide. Make cuts horizontal to prevent the herbicide running off the stump. Apply undiluted herbicide to the cut trunk immediately, within 10-20 seconds, before the plant cells close and the translocation of the herbicide is limited. Ensure there is no runoff of poison. All care must be taken by the contractor not to spill herbicide into water, onto sediment, or surrounding non-targeting plants. Follow up treatment will be required. If plants resprout, cut and paint the shoots using the same method.	Tools: chainsaw, ear muffs, protective clothing, safety glasses herbicide applicator/sprayer, impervious gloves, Roundup® Biactive Herbicide, and all other required P.P.E.

Spot Spraying	Spot spraying involves spraying non-seeding annuals and grasses, and for regrowth of weeds once an area has been cleared or brushcut. Works to be carried out by a contractor with a current herbicide license. Herbicide will be mixed up according to the manufacturer's directions for the particular weed species being targeted. Mixed herbicide shall be applied to the targeted weed species with a backpack sprayer. All care must be taken by the contractor not to spill herbicide onto sediment or surrounding non-targeting plants.	Tools: protective clothing, safety glasses, herbicide sprayer, impervious gloves, Herbicide, and all other required P.P.E.

Flame Weeding

Thermal (flame) weeding is a method where high temperatures are applied to weeds, causing the plant to die. Thermal weeding is particularly useful in situations where conservation or health considerations are high and weed density is low such as waterways where herbicide use is not permitted.

While flame weeding is not suited to most streetscapes due to the fire hazard nor can it be used on materials such as soft fall and similar playground equipment it is noted that 'flame' weeding in waterways allows weed management in areas where herbicides are not permitted.

Also for native vegetation areas thermal weeding, with a flame weeder, has been shown to stimulate germination of native plants while killing the seeds of annual weeds such as Devils Pitchfork, *Bidens pilosa*. Flame weeding is also effective in killing persistent weeds like Mother of Millions.

Best results are obtained when follow up weed control is undertaken 4-6 weeks after treatment. In addition, weed control should be conducted periodically after that for example to control weeds over a period of a year it is likely that between 3-5 applications will be necessary, depending on rainfall and the extent of the weed seed bank. This method is most effective on young annual weeds and least effective on older perennial weeds. In some cases, control of perennial weeds will be ineffective however this depends on the species present and its age.

Images provided by Dragonfly Environmental

Flame weeding should be undertaken outside of the fire seasons. Flame weeding allows for the mimicking of a burn in areas where a control burn could not be undertaken. See native plants regenerating after flame weeding.

7.4 Appendix IV – Bushland Hygiene Protocols for Phytophthora

- Before you move onto the site spray the bottom of your shoes with 70 % metho. Bleach solution (1% strength) or household/commercial disinfectant (as per label) are also suitable.
- Check all tools and equipment that comes in contact with soil are clean before entering the area (they should have been cleaned on site at the end of the previous work session). If there is any dirt on them, spray them with 70% metho.
- Clean all tools at the end of each work session while still on site ensuring this is done away from drainage lines and adjacent work areas. Knock or brush off encrusted dirt and completely spray with 70 % metho. Replace in storage/transport containers.
- Minimise activities wherever possible when the soil is very wet.

Kit should contain: 1 bucket, 1 scrubbing brush, 1 spray bottle (metho 70% solution), 1 bottle tap water, 1 bottle methylated spirits.

Facts about Phytophthora

Phytophthora cinnamomi (Phytophthora) is a microscopic, soil borne, water-mould that has been implicated in the death of remnant trees and other plants in Australian bushland. Phytophthora is not native to Australia. It is believed to have been introduced sometime after European settlement. Phytophthora is a national problem and is listed as a key threatening process under the Commonwealth's Environmental Protection and Biodiversity Conservation Act 1999.

Symptoms including Dieback

"Dieback" simply means dying or dead plants. There are many causes of dieback; Phytophthora is just one of them. Often dieback is the result of a combination of factors such as changed drainage patterns and nutrient loads (e.g.: increased stormwater run-off) or changed soil conditions (e.g.: dumped fill or excavation of/near root zone). Plants that are stressed are more vulnerable to Phytophthora.
Initial symptoms of Phytophthora include wilting, yellowing and retention of dried foliage, loss of canopy and dieback. Infected roots blacken and rot and are therefore unable to take-up water and nutrients. Severely infected plants will eventually die. Symptoms can be more obvious in summer when plants may be stressed by drought. If you suspect that Phytophthora is on your site, please contact the Bushcare team to collect a soil sample to be lab tested. This is usually done in the warmer months where conditions are optimum for the disease.

Infection

There is no way of visually telling if Phytophthora is present in the soil as its structures and spores are microscopic (invisible to the naked eye). Phytophthora requires moist soil conditions and warm temperatures for infection, growth, and reproduction. Spores travel through moist soil and attach to plant roots. Once Phytophthora has infected a host plant it can grow inside plant root tissue independent of external soil moisture conditions. After infection, Phytophthora grows through the root destroying the tissue which is then unable to absorb water and nutrients.

8 Expertise of authors

Brooke is a passionate and dedicated ecologist with valuable on ground experience working on bush regeneration projects throughout the Sydney Region. She has worked with various stakeholders across both public and private sectors to deliver sustainable and achievable environmental outcomes. She has worked on major construction contractors as well as smaller contractors to deliver tailored environmental solutions on time and within budget.

Brooke completed her Bachelor of Science at the University of Wollongong and is currently expanding her skills and knowledge undertaking Cert III in Conservation and Ecosystem Management at TAFE.

Brooke has experience conducting fieldwork and preparing a range of reports including the Flora and Fauna Assessment, Vegetation Management Plan (VMP), Biodiversity Development Assessment Report (BDAR), Certification Certification, Construction Environmental Management Plan (CEMP), Review of Environmental Factors (REF), and Environmental Impact Assessment (EIA).

Brooke has exceptional communication and customer service skills and can deliver professional ecological assessments.

Key Projects:

- Threatened species surveys.
- Flora and fauna surveys.
- Fauna spotter and handler.
- Aquatic fauna relocation.

Brooke Thompson
ECOLOGIST

SPECIALISATIONS

- GIS mapping
- Fauna spotting
- Aquatic fauna relocation and handling
- Habitat tree assessment, marking and mapping
- Floristic plot surveys
- Flora and fauna field surveys

CAREER SUMMARY

- **Ecologist**, Ecological Consultants Australia. June 2022-*present*
- **Natural Area Specialist**, Dragonfly Environmental. January 2022-*present*
- **Volunteer**, Microplastic Surveying, University of Wollongong 2021
- **Volunteer**, Frog Surveying, Chad Beranek B EnvSc (Hons) UTS 2016

QUALIFICATIONS AND MEMBERSHIPS

- **BSc Conservation Biology**, University of Wollongong.
- Currently undertaking Cert III Conservation and Ecosystem Management.
- WHS General Induction of Construction Industry NSW White Card.

Ecological Consultants Australia Pty Ltd.
Sydney, Melbourne, Brisbane Ph: 0488 481 929, ABN: 15 166 535 039

With over 25 years wetland and urban ecology experience, a great passion for what she does, and extensive technical and on-ground knowledge make Geraldene a valuable contribution to any project.

Geraldene has over 8 years local government experience as manager of environment and education for Pittwater Council. Geraldene presented papers on the topic at the NSW Coastal Conference, Sydney CMA and Hawkesbury Nepean forums. Geraldene is a Technical Advisor Sydney Olympic Park Wetland Education and Training (WET) panel.

Geraldene has up to date knowledge of environmental policies and frequently provides input to such works. Geraldene was a key contributor to the recent set of Guidelines commissioned by Southeast Queensland Healthy Waterways Water Sensitive Urban Design Guidelines. Geraldene's role included significant contributions and review of the Guideline for Maintaining WSUD Assets and the Guideline for Rectifying WSUD Assets.

Geraldene is a frequent contributor to many community and professional workshops on ecological matters particularly relating to environmental management. She is an excellent Project Manager.

Geraldene is a joint author on the popular book Burnum Burnum's Wildthings published by Sainty and Associates. Author of the Saltmarsh Restoration Chapter Estuary Plants of East Coast Australia published by Sainty and Associates (2013). Geraldene's early work included 5 years with Wetland Expert Geoff Sainty of Sainty and Associates. Geraldene is an expert in creating and enhancing urban biodiversity habitat and linking People with Place.

Geraldene Dalby-Ball
DIRECTOR

SPECIALISATIONS

- Urban Ecology – and habitat rehabilitation and re-creation.
- Urban waterway management – assessing, designing and supervising rehabilitation works
- Saltmarsh and Wetland re-creation and restoration – assessment, design and monitoring
- Engaging others in the area of environmental care and connection
- Technical Advisor – environmental design, guidelines and policies
- Sound knowledge and practical application of experimental design and statistics
- Project management and supervision
- Grant writing and grant assessment
- Budget estimates and tender selection
- Expert witness in the Land and Environment Court

CAREER SUMMARY

- **Director and Ecologist**, Ecological Consultants Australia. 2014-*present*
- **Director and Ecologist**, Dragonfly Environmental. 1998-*present*
- **Manager** Natural Resources and Education, Pittwater Council 2002-2010
- **Wetland Ecologist** Sainty and Associates 1995-2002

QUALIFICATIONS AND MEMBERSHIPS

- **Bachelor of Science with 1st Class Honors**, Sydney University
- WorkCover WHS General Induction of Construction Industry NSW White Card.
- Senior First Aid Certificate.
- **Practicing member and vice president** Ecological Consultants Association of NSW

Date: 30/06/2025

Our Ref: BR-2025-00181-B

BUSHFIRE PLANNING & DESIGN

BUSH FIRE ASSESSMENT

Leonard Road Hanwood 2680

Lots 150/-/DP751709, 2/-/DP1309816 & 1623/-/DP257265

Project Description: Proposed Subdivision

REPORT NUMBER
BR-2025-00181-B

DOCUMENT TRACKING

Issue Date	Issued to	Description	Version
20/02/2025	Planningmatters	Draft Issued for Comment	A (Draft-1)
26/03/2025	Planningmatters	Issued for DA	A
30/06/2025	Planningmatters	Revised Plan	B

DISCLAIMER and TERMS OF USE

"*It should be borne in mind that the measures contained in this Standard cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the degree of vegetation management, the unpredictable nature of behaviour of fire, and extreme weather conditions*." (AS3959 2018).

Bushfire Planning & Design cannot be held liable for the loss of life or property caused by a bushfire event. This report has considered the relevant planning instruments, bushfire constructions codes and practices applicable at the time of writing. Should additional information be provided after this report has been issued, we reserve the right to review and if necessary modify our report. Bushfire Planning and Design has no control over workmanship, buildings degrade over time and vegetation if not managed will regrow. In addition legislation and construction standards are subject to change. Due to significant variance of bushfire behaviour, we do not guarantee that the dwelling will withstand the passage of bushfire even if this development is constructed to the prescribed standards.

This report has been based on our interpretation of Planning for Bushfire Protection (2019), AS3959 (2018) and the methodology for site specific bushfire assessment. As a consultant, our view can be subjective. Our opinions may differ from the opinions provided by you the Client (or Client Representative), the Council, the RFS or another bushfire consultant. The Rural Fire Service (RFS) has a higher authority and can upon their review, increase a nominated BAL-rating or entirely reject a development proposal. Any such recommendations made by the RFS take precedence. Our role is intermediary between our Client (or Client Representative) and the consenting authority. We apply our knowledge of the relevant bushfire protection standards to provide the best possible outcome for our Client (or Client Representative), both from a bushfire safety and financial perspective. Should the RFS modify our recommendations or reject the proposal to which this report relates to we will not be held liable for any financial losses as a result. By using this document, you the Client (or Client Representative) agree to and acknowledge the above statements

Bushfire Planning and Design accepts no liability or responsibility for any use or reliance upon this report and its supporting material by any unauthorized third party. The validity of this report is nullified if used for any other purpose than for which it was commissioned. Unauthorized use of this report in any form is deemed an infringement of our intellectual property. By using this document to support your development you the Client (or Client representative) agree to these terms.

TABLE OF CONTENTS

GLOSSARY

The abbreviations that are commonly used are explained below. Not all are present in this report.

APZ	Asset Protection Zone
AS3959	Australian Standard for the Construction of a Building in a Bushfire Prone Area
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BFPL	Bush Fire Prone Land
BFPLM	Map Bush Fire Prone Land Map
BFDB	Bush Fire Design Brief
BPM	Bush Fire Protection Measure
DA	Development Application
DCP	Development Control Plan
DPIE	Department Of Planning, Industry And Environment
DTS	Deemed to Satisfy
EPA ACT	Environmental Planning And Assessment Act 1979
FDI	Fire Danger Index
FFDI	Forest Fire Danger Index
GFDI	Grassland Fire Danger Index
IPA	Inner Protection Area
LEP	Local Environmental Plan
NASH	National Association of Steel Framed Housing
NCC	National Construction Code
OPA	Outer Protection Area
PBP	Planning for Bush Fire Protection
RF ACT	Rural Fires Act
RF REG	Rural Fires Regulation
NSW RFS	New South Wales Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SFR	Short Fire Run
SSD	State Significant Development

PART A - BACKGROUND AND BRIEFING NOTES

ASSESSMENT DETAILS

Client		Planningmatters Development Service on behalf of Hanwood Developments	
Location		Leonard Road Hanwood 2680	
Title reference		Lots 150/-/DP751709, 2/-/DP1309816 & 1623/-/DP257265	
LGA		Griffith	
Zoning		RU1 Primary Production and RU6 Transition	
Development Type		Subdivision	
PBP (2019) Assessment Type		Subdivision (Chapter 5)	
Bushfire Consultancy		Bushfire Planning and Design - Director Matthew Noone - Accreditation number BPAD-25584 (Level 3)	
Report no.	Date of Issue	BR-2025-00181-B	30/06/2025

SCOPE

The first intended audience for our report is our Client and the design team. The recommendations in this report should be adopted integral to design development and prior to the DA being lodged. Additionally our recommendations are be included in the DA consent and should be confirmed prior to the release of the Construction Certificate. Whereas our report will be used to support the development application to which this report relates, our report is not necessarily written for RFS or Council and the information within is to be considered in the same context as a set of specifications that if employed will achieve compliance with PBP.

Our report provides an assessment of the Bushfire Attack Level (BAL) and outlines the Bushfire Protection Measures (BPM's) that must be incorporated into the development design to ensure compliance with AS3959 (2018) Construction of Buildings in Bushfire Prone Areas and the New South Wales Rural Fire Service document Planning for Bushfire Protection (PBP 2019).

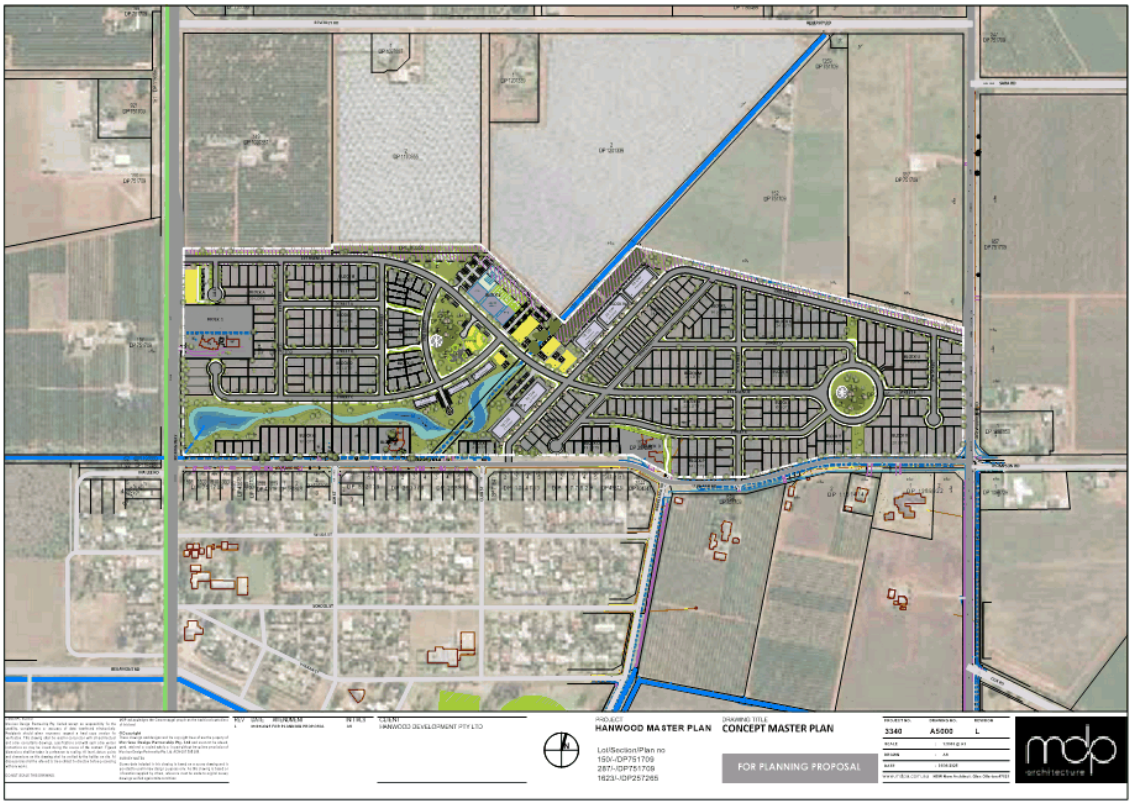
A.01 BUSHFIRE PRONE LAND

The subject site whether in whole or part is recorded as bushfire affected on a relevant map certified under Section 10.3 (2) of the Environmental Planning and Assessment Act 1979 (refer to Figure A.01). As per Figure A.01, only the north east corner of Lot 1623/-/DP257265 is mapped as being bushfire prone. This is also limited to a grassland hazard only.

FIGURE A.01 BUSHFIRE PRONE LAND MAP	Plot date:27/06/2025	Project CRS: EPSG:7855	A.01
Buffer 0 / Category 1 / Category 2 / Category 3; Subject Site	0 100 200 300 400 m Meters		
	BUSHFIRE PLANNING & DESIGN bpad.matthew.noone@gmail.com / 0406077222		

A.02 DEVELOPMENT PROPOSAL

The development relates to the subdivision of Lots 150/-/DP751709, 2/-/DP1309816 and 1623/-/DP257265. The proposal relates to the re-zoning and future subdivision of the subject allotments for the purpose of residential & commercial development. Potential future development comprises a mixture of single & multiple storey residential dwellings & units, commercial operations, child care & aged care facilities, recreation facilities and open space areas.



Concept Drawing depicting potential lot & road layout

A.03 REGULATORY FRAME WORK

The relevant legislative instruments applicable to the subject development are outlined below.

PRE-DEVELOPMENT CONSENT

- 10.3 (2) of the Environmental Planning and Assessment Act 1979.
- 100B Rural Fire Act 1997
- Cl.45 Rural Fire Regulation 2022
- Planning for Bush Fire Protection (2019).

POST-DEVELOPMENT CONSENT

- National Construction Code (2022).
- AS3959 (2018) Construction of Buildings in Bush Fire Prone Areas.

A.04 SITE LOCATION, DESCRIPTION AND POTENTIAL BUSHFIRE THREATS

The subject site, located on the northern side of Hanwood 2680, consists of three parcels of land: Lots 150/-/DP751709, 2/-/DP1309816 & 1623/-/DP257265. The land is proposed to be re-zoned and subsequently subdivided/developed for a variety of residential & commercial land uses.

The site is bordered by Leonard Road to the south, Kidman Way to the west, and Old Willbridge Road to the east. Historically, the land has been utilized for agricultural purposes, primarily for growing citrus and other crops. As per the Planning for Bush Fire Protection (PBP) 2019 guidelines, the vegetation on the site is considered low-threat due to its nature as cultivated land and its minimal fuel condition, including orchards and market gardens.

The land to the north of the site, Leonard Road and along both the Kidman Way & Old Willbriggie Road continues to be primarily used for citrus farming, while to the south lies residential land. To the west of Old Willbridge Road, additional crop farming occurs, further reducing the bushfire risk in the area.

The bushfire-prone land map identifies only a small portion of the site, specifically the northeast quadrant of Lot 1623/-/DP257265, as grassland. The proposed subdivision design includes a perimeter road which will provide a sufficient barrier against potential bushfire from the north eastern aspect.

FIGURE A.04 LOCATION DRAWING	Plot date:27/06/2025	Project CRS: EPSG:7855	A.04
Subject Site	0 40 80 120 160 m Meters		
	BUSHFIRE PLANNING & DESIGN bpad.matthew.noone@gmail.com / 0406077222		

A.05 LAND USE, ZONING AND PERMISSIBILITY

The subject site is currently zoned RU1 Primary Production and RU6 Transition. Land to the south is zoned RU5 Village.

LAND ZONING LEGEND

RU1 Primary Production

RU6 Transition

RU5 Village

RE1 Public Recreation

A.06 SIGNIFICANT ENVIRONMENTAL FEATURES

Our BAL-assessment in Part-B of this report has considered the environmental features that are relevant to our assessment. There are no additional significant environmental features within the 140m study area that would influence our opinion of the assessed Bushfire Attack Level.

A.07 DETAILS OF ABORIGINAL HERITAGE

To our knowledge the site is not associated with any items of Aboriginal heritage. A separate Aboriginal assessment report will be prepared.

A.08 THREATENED SPECIES, COMMUNITIES AND CRITICAL HABITATS

The subject site is not mapped by the Department of Planning, Industry and Environment (DPIE) under Part 7 of the Biodiversity Conservation Act 2016 (BC Act) as having Biodiversity Values (BV). A separate ecological assessment report will be prepared.

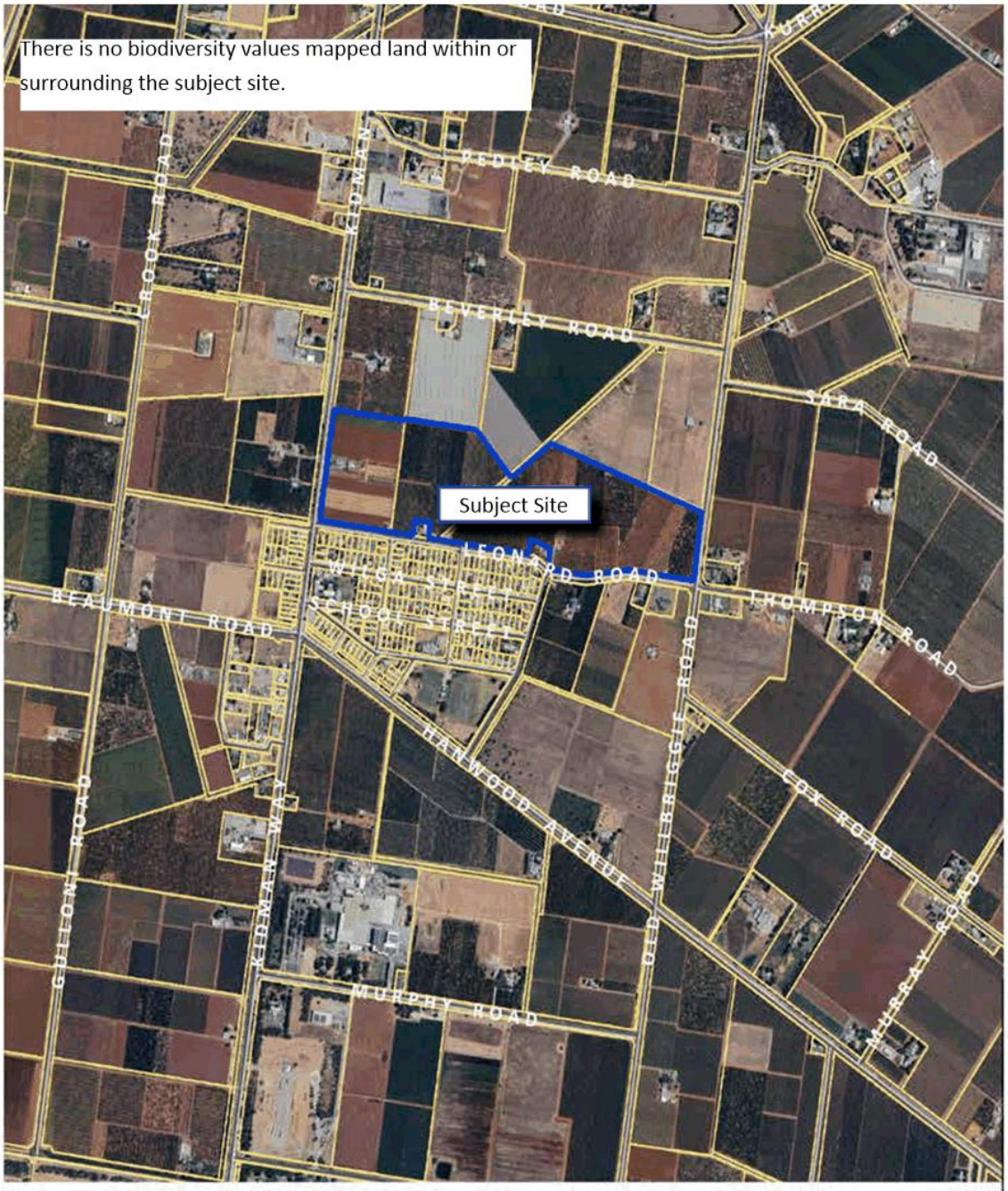


FIGURE A.09 BIODIVERSITY	Plot date:27/06/2025	CRS: EPSG:7855	A.09
BIODIVERSITY VALUES Subject Site Biodiversity Values Biodiversity Values added in the last 90 days The BV Map has been prepared by the Department of Planning, Industry and Environment (DPIE) under Part 7 of the Biodiversity Conservation Act 2016 (BC Act).	0 150 m Meters		
	BUSHFIRE PLANNING & DESIGN bpad.matthew.noone@gmail.com / 0406077222		

A.09 REPORT LIMITATIONS

This bushfire assessment is developed based on the current accepted standards. The severity of bushfire attack is reliant on many variables. Due to these variables the bushfire attack on any given day could be higher due to the limitations outline below. The bushfire protection measures contained in this document does not guarantee that loss of life, injury or property damage will not occur during a bush fire event.

Fire Danger Index

It may be possible that days of higher Fire Danger Index (FDI) may be experienced than the FDI levels used for assessment. This may result in fire situations where conditions challenge survivability of buildings and their occupants.

Fuel Load

The fuel loads and vegetation classes used in our assessment are based on the State Vegetation Mapping and Comprehensive Fuel Loads based on The University of Wollongong's (UoW) Fuels Modelling Project. Fuel loads in some areas may be higher than those used in this document. This can influence bush fire behaviour and the potential impact on property. The DTS APZs in PBP (2019) are based on the UoW fuel loads and are therefore suitable for design purposes.

Climate change

Climate change has led to longer, more intense fire seasons and an increase in the average number of elevated fire weather days, as measured by the Forest Fire Danger Index (FFDI). Last year saw the highest annual accumulated FFDI on record. Australia was the first country in the world to report the impact of climate change on bushfires through CSIRO's work to model the increase in high fire danger days.

Legislative Standards

Recommendations relating to development of bushfire prone land are a directive through the legislative standards applicable at the time of writing. Legislative standards change over time. All recommendations made are based on the current standards. We cannot guarantee that the current standards will be suitable in comparison to future standards.

Maintenance

After the issuance of an Occupancy Certificate (OC) it is imperative that the bushfire protection recommendations are carried out for the life of the development. Failure to maintain a property in accordance with the RFS standards for Asset Protection Zones could lead to the failure of the building, property and life. We have no control over the extent of how well a property will be maintained post OC.

PART B - BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT

B.01 INTRODUCTION

For the purpose of this bushfire assessment, the vegetation is required to be described to a distance of 140m from the boundary and the slope to 100m from boundary. Vegetation type and slope under vegetation are the factors that will significantly affect bushfire behaviour.

'Research has shown that 85% of houses are lost in the first 100m from bushland and that ember attack is a significant form of attack on properties' (RFS 2006).

B.02 SLOPE DETERMINATION

The effective slope has been assessed for a distance of at least 100m from the proposed development. The slope data has been calculated from a 1m LiDAR Digital Elevation Model (DEM). The source data sets have been captured to standards that are generally consistent with the Australian ICSM LiDAR Acquisition Specifications with require a fundamental vertical accuracy of at least 0.30m (95% confidence) and horizontal accuracy of at least 0.80m (95% confidence). The slope arrows indicated in figure A represent the slope calculated across the length of the arrow direct from the digital elevation model.

B.03 HOW THE VEGETATION COVER IS MEASURED

The distance to vegetation is measured from the extent of vegetation cover interpolated from high resolution aerial imagery. For the areas beyond the line of sight we have defaulted to interpreting the extent of vegetation cover high resolution aerial image.

B.04 PREDOMINANT VEGETATION FORMATIONS

This assessment considers the vegetation within the site and if relevant, vegetation external to the site boundaries. Where mixes of vegetation formations are located together, the vegetation formation providing the greater hazard (highest radiant heat load) shall be used to determine the BAL and APZ. The combination of vegetation and slope that yields the worst case scenario shall be used (A1.2 PBP 2019). The vegetation mapping provides an overview of the types of vegetation proximal to the site. As per Figure B.04 the subject site and surrounding allotments are void of native vegetation. A grassland is located to the north / north east of 51 Leonard Road. Grasslands are not typically shown on the vegetation maps.

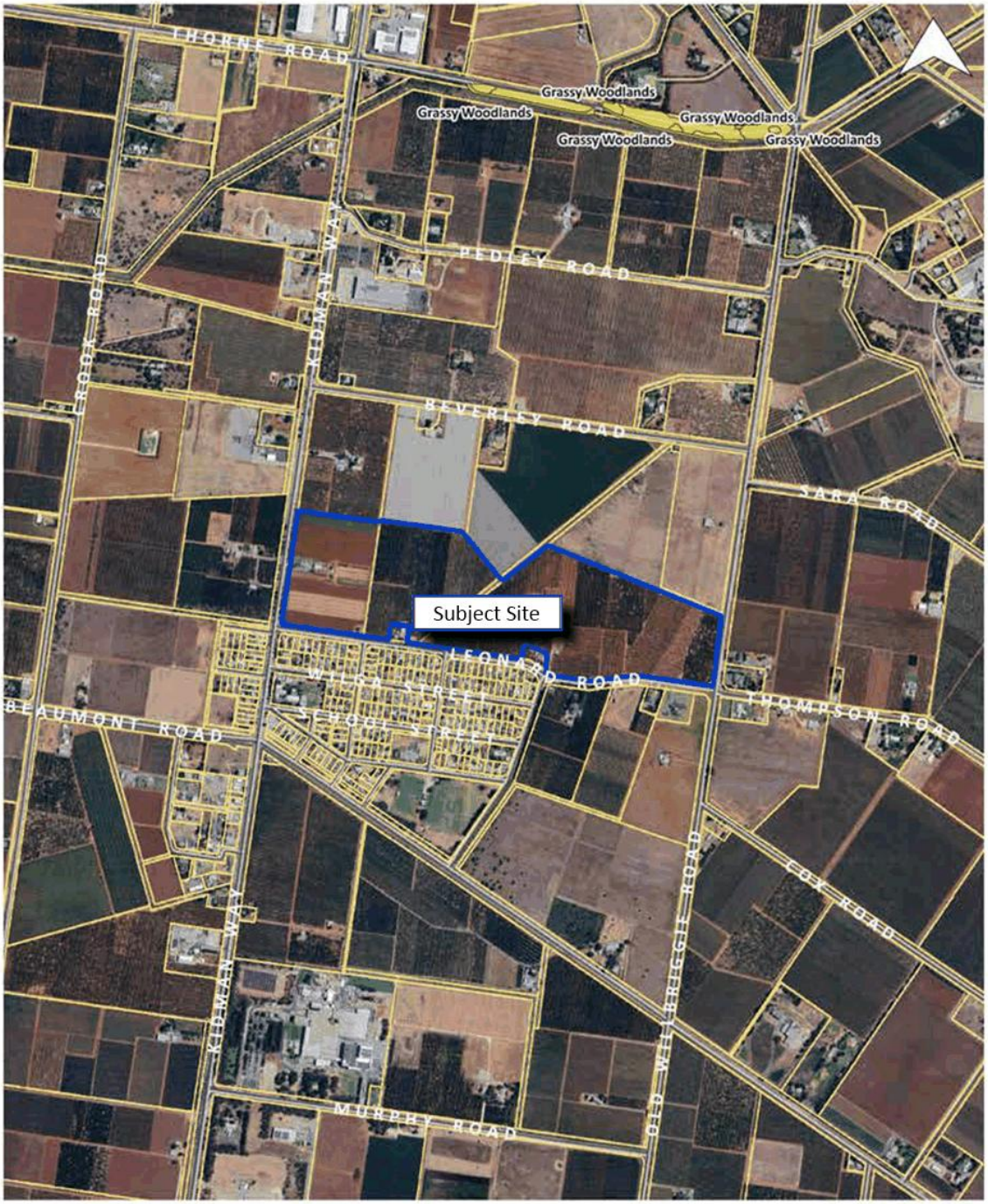


FIGURE B.04 VEGETATION FORMATIONS

Subject Site Grassy Woodlands

CRS: EPSG:7855 Plot date:27/06/2025	0 Meters 1,000 m	**BUSHFIRE PLANNING & DESIGN** projects@bpad-nsw.com / 0406077222

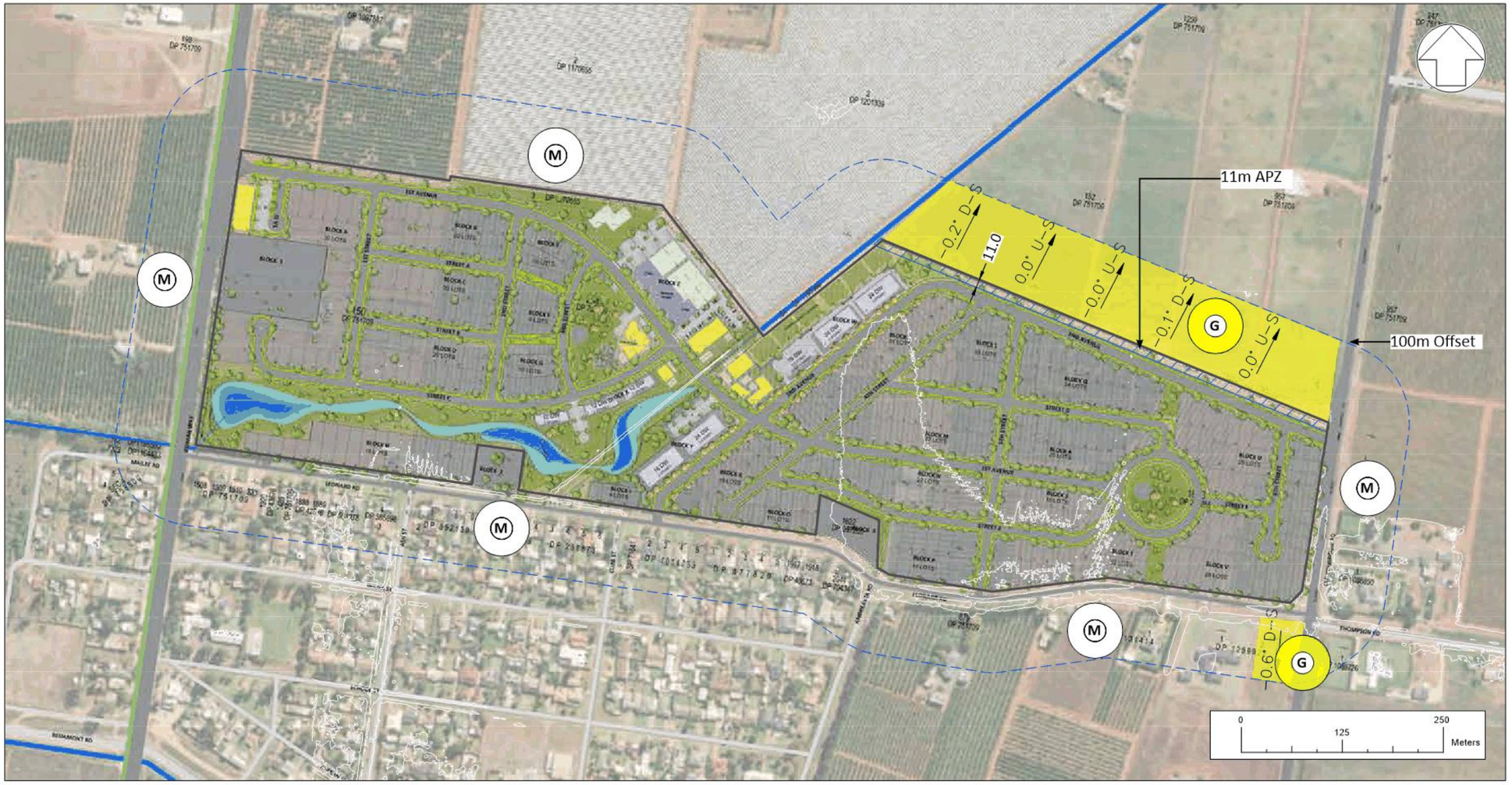
B.05 BUSHFIRE ATTACK LEVEL (BAL) ASSESSMENT

Grassland is located to the south and north/north east of 51 Leonard Road. The effective is slope to the north and north east is less than 1 degrees (essentially flat). For conservatism, we have based our APZ design on an effective slope of 0-5^0 downslope. Based on PBP (2019) Table A1.12.6 and the parameters shown in Table 1 below, an 11m APZ is required to the north/north east to achieve the required BAL-29 threshold for residential subdivision. Existing Leonard Road separates the site from the grassland to the south east.

TABLE 1 - To be read in conjunction with Figure A.					
LGA = Griffith Council				Forest Fire Danger Index = 80	
ASPECT [1]	Vegetation Formation [2]	Max Effective Slope [3]	Required APZ [5]	DTV [5]	Max Radiant Heat
N / NE	Grassland	0-5^0 D-S	11m	> 11m	< 29 kW/m^2
SE	Grassland	0-5^0 D-S	11m	> 11m	< 29 kW/m^2

Footnotes:

1	*Cardinal direction from each proposed building facade based on grid north.*
2	*Vegetation Classifications are as described in PBP (2019) A1.2.*
3	*Site slope is calculated from 1m LiDAR contours.*
4	*Minimum APZ required stated as Acceptable Solutions within Table 1.12.3 PBP (2019).*
5	*Distance to Vegetation (DTV) Actual dimensional setback from the face of the building to the assessed vegetation. Achieved Asset Protection Zone (APZ) or extent of managed land (EML).*
8	*Deeming provisions for grassland s.7.9 PBP (2019).*



VEGETATION KEY (solid)

G Grassland

M Managed Land

DRAWING LEGEND

Site Boundary

Asset Protection Zone

BUSHFIRE PLANNING & DESIGN

projects@bpad-nsw.com

0406077222

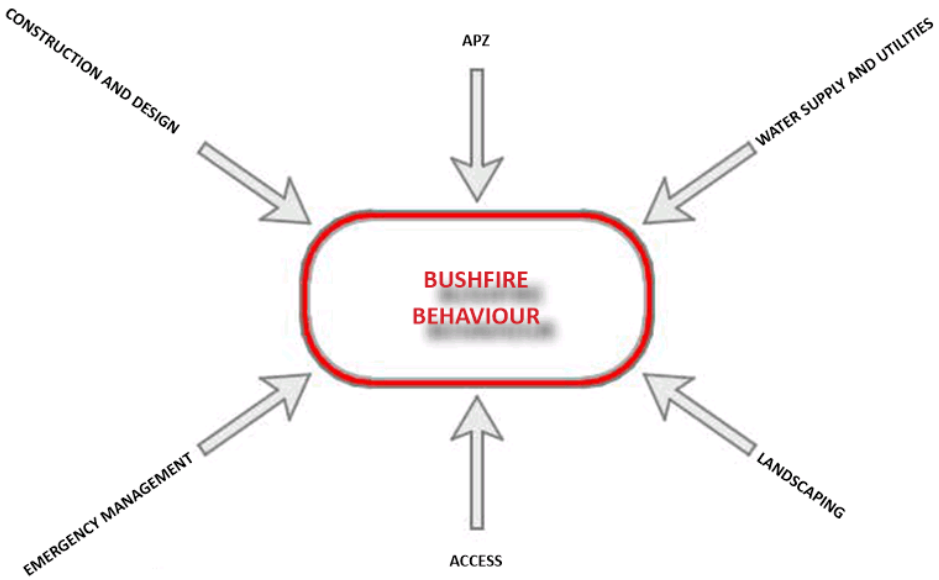
Figure: **A**

Leonard Road Hanwood 2680

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

PART C BUSHFIRE PROTECTION MEASURES / RECOMMENDATIONS

BPMs can mitigate the impact of bush fire attack on people and assets. The types of protection measures include APZs, access, landscaping, water supply, building design and construction and emergency management arrangements. These measures assist building survival during a bush fire. They also contribute to the safety of firefighters and members of the community occupying buildings during the passage of a bush fire front. There are a range of different BPMs which should be applied in combination based upon the development type and the level of bush fire risk. All requirements for BPMs that relate to the development must be provided, as required by this document.



C.01 ASSET PROTECTION ZONES (APZs)

An 11m asset protection zone (APZ) is required along the NE boundary of Lot 1623/-/DP257265, identified as 2nd Avenue on the Masterplan. It is expected the actual APZ provided will be in excess of 20m comprising of 2nd Avenue, the adjacent nature strips and the designated from boundary setbacks. The minimum APZ is 11m which is sufficient to achieve the nominated BAL-ratings and defendable space. Leonard Road provides a permanent APZ that can be relied upon in perpetuity and ensures the grass will not encroach closer to the subject site over time. Any proposed planting or re-vegetation within the site is to comply with PBP (2019) Appendix 4.

The guidelines are provided below of clarity.

TREE CANOPY TREATMENT

- Inner APZ tree canopy cover should be less than 15% at maturity;
- Inner APZ trees at maturity should not touch or overhang the building;
- Inner APZ lower limbs should be removed up to a height of 2m above the ground;
- Outer APZ tree canopy cover should be less than 30% at maturity;
- tree canopies should be separated by 2 to 5m; and
- preference should be given to smooth barked and evergreen trees.

SHRUBS

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
- shrubs should not be located under trees;
- shrubs in the Inner APZ should not form more than 10% groundcover; and
- shrubs in the Outer APZ should not form more than 20% groundcover; and
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

GRASS

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed.

VEGETATION IMPACT STATEMENT

No tree removal is required to comply with PBP (2019) Appendix 4.

C.02 WATER

The subdivision will incorporate the provision of reticulated potable water mains that will have street fire hydrants that can be used for fire fighting purposes. All new water services are to comply with PBP (2019) Chapter 5.

PERFORMANCE CRITERIA (P)	ACCEPTABLE SOLUTIONS (A)	P / A	SPEC.
adequate water supplies is provided for firefighting purposes.	reticulated water is to be provided to the development where available;	A	Y TBS
	a static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed; and	A	N/A
	static water supplies shall comply with Table 5.3d	A	N/A
water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations.	fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005;	A	Y
	hydrants are not located within any road carriageway; and	A	Y
	reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	A	N/A
flows and pressure are appropriate.	fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2005.	A	Y
the integrity of the water supply is maintained.	all above-ground water service pipes are metal, including and up to any taps; and	A	Y TBS
	above-ground water storage tanks shall be of concrete or metal.	A	N/A

A - Acceptable solution P - Performance solution

Y - Yes N - No N/A - Not Applicable TBS - To be specified

C.03 ACCESS

ACCESS - PUBLIC ROADS

The public road system consists of two-lane roads, with a nominal carriage width of 8 meters kerb to kerb, providing sufficient capacity for emergency vehicles and evacuations. The subdivision has been designed to provide connecting roads from Kidman Way to the west to Old Wilbriggie Drive to the east. The proposed road network also connects to Leonard Road to the south. Proposed 1st and 2nd Avenue also provides a perimeter road separating the residential land from the potential grassland hazard to the north east. The public road system is deemed to be adequate for emergency services appliances.

ACCESS - PERIMETER ROADS AND INTERNAL ROADS

Perimeter access roads are designed to facilitate safe entry and exit for firefighting vehicles while residents evacuate, ensuring a secure operational environment for emergency personnel during firefighting and emergency response at the interface.

ACCESS - PERIMETER ROADS

PERFORMANCE CRITERIA (P)	ACCEPTABLE SOLUTIONS (A)	TYPE	SPEC.
access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.	are two-way sealed roads;	A	Y TBS
	minimum 8m carriageway width kerb to kerb;	A	Y TBS
	parking is provided outside of the carriageway width;	A	Y TBS
	hydrants are located clear of parking areas;	A	Y TBS
	are through roads, and these are linked to the internal road system at an interval of no greater than 500m;	A	Y
	curves of roads have a minimum inner radius of 6m;	A	Y TBS
	the maximum grade road is 15 degrees and average grade of not more than 10 degrees;	A	Y TBS
	the road crossfall does not exceed 3 degrees; and	A	Y TBS
	a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	A	Y TBS

ACCESS - NON PERIMETER ROADS

PERFORMANCE CRITERIA (P)	ACCEPTABLE SOLUTIONS (A)	TYPE	SPEC.
access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	minimum 5.5m carriageway width kerb to kerb;	A	Y TBS
	parking is provided outside of the carriageway width;	A	Y TBS
	hydrants are located clear of parking areas;	A	Y TBS
	roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m;	A	Y TBS
	curves of roads have a minimum inner radius of 6m;	A	Y TBS
	the road crossfall does not exceed 3 degrees; and	A	Y TBS
	a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	A	Y TBS

PROPERTY ACCESS

There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. The hydraulic design is to ensure the rear of each allotment is within 70m of a hydrant.

C.04 EMERGENCY MANAGEMENT

To comply with PBP (2019) for residential subdivision, the preparation of an emergency management plan is not required. Should the applicant wish to do so, a Bush Fire Emergency Management and Evacuation Plan can be prepared. The NSW RFS template: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan can be used.

C.05 CONSTRUCTION

Our assessment of the Bushfire Attack Level indicates a building footprint can be placed on proposed lots within Lots 150/-/DP751709, 2/-/DP1309816 & 1623/-/DP257265 and will not experience radiant heat loads greater than 29 kW/m^2 if exposed to bushfire (based on the Acceptable Solutions and Table A1.12.3 (PBP (2019)). This application relates to the subdivision of the land only. No new building works are proposed at this stage. All future development is required to provide a site specific bushfire report or BAL-Certificate to ascertain the required Bushfire Attack Level. This report should not be used to support future infill development.

C.06 SPRINKLER SYSTEMS

To our knowledge, there are no existing or proposed sprinkler systems.

C.07 ELECTRICITY & GAS

Any new electricity or gas services are to be designed and located such that they will not lead to the ignition of surrounding bushland or the fabric of buildings. Any future gas or electrical services that are proposed for Lots 150/-/DP751709, 2/-/DP1309816 & 1623/-/DP257265 are to comply with the following.

PERFORMANCE CRITERIA (P)	ACCEPTABLE SOLUTIONS (A)	P / A	SPEC.
location of electricity services limits the possibility of ignition of surrounding bush land or the fabric of buildings.	where practicable, electrical transmission lines are underground;	A	Y TBS
	where overhead, electrical transmission lines are proposed as follows:	-	N/A
	lines are installed with short pole spacing of 30m, unless crossing gullies, gorges or riparian areas; and	-	N/A
	no part of a tree is closer to a power line than the distance set out in ISSC3 Guideline for Managing Vegetation Near Power Lines.	-	N/A
location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings.	reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 - The storage and handling of LP Gas, the requirements of relevant authorities, and metal piping is used;	A	Y TBS
	all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side;	A	Y TBS
	connections to and from gas cylinders are metal;	A	Y TBS
	polymer-sheathed flexible gas supply lines are not used; and	A	Y TBS
	above-ground gas service pipes are metal, including and up to any outlets.	A	Y TBS

A - Acceptable solution P - Performance solution

Y - Yes N - No N/A - Not Applicable TBS - To be specified

PART D ASSESSMENT AGAINST PBP (2019) SUBDIVISION s.5.2 OBJECTIVES

PBP Objectives for Existing SFPP Development	BPAD Comments	Compliance
minimise perimeters of the subdivision exposed to the bush fire hazard (hourglass shapes, which maximise perimeters and create bottlenecks should be avoided);	Proposed 1st and 2nd Avenue provides a perimeter road separating the residential land from the potential grassland hazard to the north east. No hour glass shapes or bottlenecks.	Yes
minimise vegetated corridors that permit the passage of bush fire towards buildings;	An APZ compliant with Table A1.12.3 is provided.	Yes
provide for the siting of future dwellings away from ridge-tops and steep slopes, within saddles and narrow ridge crests;	No ridges or saddles.	Yes
ensure that APZs between a bush fire hazard and future dwellings are effectively designed to address the relevant bush fire attack mechanisms;	An APZ compliant with Table A1.12.3 is provided. The recommended APZ is to enforced via an suitably worded 88b positive covenant.	Yes
ensure the ongoing maintenance of APZs;	As per above.	Yes
provide adequate access from all properties to the wider road network for residents and emergency services;	Suitable site access is provided from Kidman Way, Old Wilbriggie Drive and Leonard Road. RFS do not require vehicular site access.	Yes
provide access to hazard vegetation to facilitate bush fire mitigation works and fire suppression; and	Proposed 1st and 2nd Avenue provides a perimeter road accessible to the grassland to the north east.	Yes
ensure the provision of an adequate supply of water and other services to facilitate effective firefighting.	Reticulated water is provided on Leonard Road. The subdivision will incorporate the provision of reticulated potable water mains that will have street fire hydrants that can be used for fire fighting purposes.	Yes

PART E RURAL FIRE REGULATION CLAUSE 45 (G) REVIEW

CLAUSE 45 ASSESSMENT REQUIREMENTS / ITEMS TO BE ADDRESSED			REFER
2(a)		*a description, including the address, of the property on which the development the subject of the application is proposed to be carried*	A.04
2(b)		*a classification of the vegetation on and surrounding the property, out to a distance of 140 metres from the boundaries of the property, in accordance with the system for classification of vegetation contained in Planning for Bush Fire Protection,*	B.05
2(c)		*an assessment of the slope of the land on and surrounding the property, out to a distance of 100 metres from the boundaries of the property,*	B.05
2(d)		*identification of significant environmental features on the property,*	A.06
2(e)		*the details of a threatened species or threatened ecological community under the Biodiversity Conservation Act 2016 that the applicant knows to exist on the property,*	A.08 A.09
2(f)		*the details and location of an Aboriginal object or place, within the meaning of the National Parks and Wildlife Act 1974, that the applicant knows to be situated on the property,*	A.07
2(g)		*a bush fire assessment for the proposed development, including the methodology used in the assessment, that addresses the following matters—*	
	(i)	*the extent to which the development is to provide for setbacks, including asset protection zones,*	B.05 C.01
	(ii)	*the siting and adequacy of water supplies for fire fighting,*	C.02
	(iii)	*the capacity of nearby public roads to handle increased volumes of traffic when a bush fire emergency occurs,*	C.03
	(iv)	*whether or not nearby public roads that link with the fire trail network have two-way access,*	C.03
	(v)	*the adequacy of arrangements for access to and egress from the development site for the purposes of an emergency response,*	C.03
	(vi)	*the adequacy of bush fire maintenance plans and fire emergency procedures for the development site,*	C.04
	(vii)	*the construction standards to be used for building elements in the development,*	C.05
	(viii)	*the adequacy of sprinkler systems and other fire protection measures to be incorporated into the development,*	C.06
	(ix)	*registered fire trails on the property,*	C.03

PART D SUMMARY

The development relates to the subdivision of Lots 150/-/DP751709, 2/-/DP1309816 and 1623/-/DP257265. The proposal relates to the re-zoning and future subdivision of the subject allotments for the purpose of residential & commercial development. Potential future development comprises a mixture of single & multiple storey residential dwellings & units, commercial operations, child care & aged care facilities, recreation facilities and open space areas.

For the purpose of bushfire assessment and pursuant of clause 4.46 of the EP&A Act 1979 and 100B of the Rural Fire Act 1997, this proposed subdivision will be integrated development and is required to be referred to the RFS for their approval and issuance of a Bushfire Safety Authority (BFSA).

The site is bordered by Leonard Road to the south, Kidman Way to the west, and Old Willbridge Road to the east. Historically, the land has been utilized for agricultural purposes, primarily for growing citrus and other crops. As per the Planning for Bush Fire Protection (PBP) 2019 guidelines, the vegetation on the site is considered low-threat due to its nature as cultivated land and its minimal fuel condition, including orchards and market gardens.

The land to the north of the site, Leonard Road and along both the Kidman Way & Old Willbriggie Road continues to be primarily used for citrus farming, while to the south lies residential land. To the west of Old Willbridge Road, additional crop farming occurs, further reducing the bushfire risk in the area.

The bushfire-prone land map identifies only a small portion of the site, specifically the northeast quadrant of Lot 1623/-/DP257265, as grassland. The proposed subdivision design includes a perimeter road which will provide a sufficient barrier against potential bushfire from the north eastern aspect.

An 11m asset protection zone (APZ) is required along the NE boundary of Lot 1623/-/DP257265, identified as 2nd Avenue on the Masterplan. It is expected the actual APZ provided will be in excess of 20m comprising of 2nd Avenue, the adjacent nature strips and the designated from boundary setbacks. The minimum APZ is 11m which is sufficient to achieve the nominated BAL-ratings and defendable space. Leonard Road provides a permanent APZ that can be relied upon in perpetuity and ensures the grass will not encroach closer to the subject site over time. Any proposed planting or re-vegetation within the site is to comply with PBP (2019) Appendix 4.

Access to the site via the public road system is suitable for emergency response vehicles. RFS do not require vehicular site access. Reticulated water is available on Leonard Road. The subdivision will incorporate the provision of reticulated potable water mains that will have street fire hydrants that can be used for fire fighting purposes.

Should you have any questions in relation this report please get in contact.

Report prepared by:	**Bushfire Planning and Design** Matthew Noone	BPAD Bushfire Planning & Design Accredited Practitioner Level 3

D.01 REFERENCES

AS3959 (2018)	Australian Standard, Construction of buildings in bushfire-prone areas, AS 3959, Third edition 2018 Standards Australia International Ltd, Sydney.
BCA (2019)	Building Code of Australia 2019, Building Code of Australia, Australian Building Codes Board, Canberra 2019.
EPA Act (1979)	Environmental Planning and Assessment Act 1979, NSW Government, NSW, legislation found at www.legislation.nsw.gov.au
Keith (2004)	Keith, D.A. (2004), Ocean shores to desert dunes: The Native Vegetation of New South Wales and the ACT. NSW Department of Environment and Conservation (2004).
PBP (2019)	Planning for Bushfire Protection, a Guide for Councils,Planners, Fire Authorities, Developers and Home Owners. Rural Fire Service 2019, Australian Government Publishing Service, Canberra.
RFS (2015)	Rural Fire Service, Guide For Bush Fire Prone Land Mapping, Version 5b.

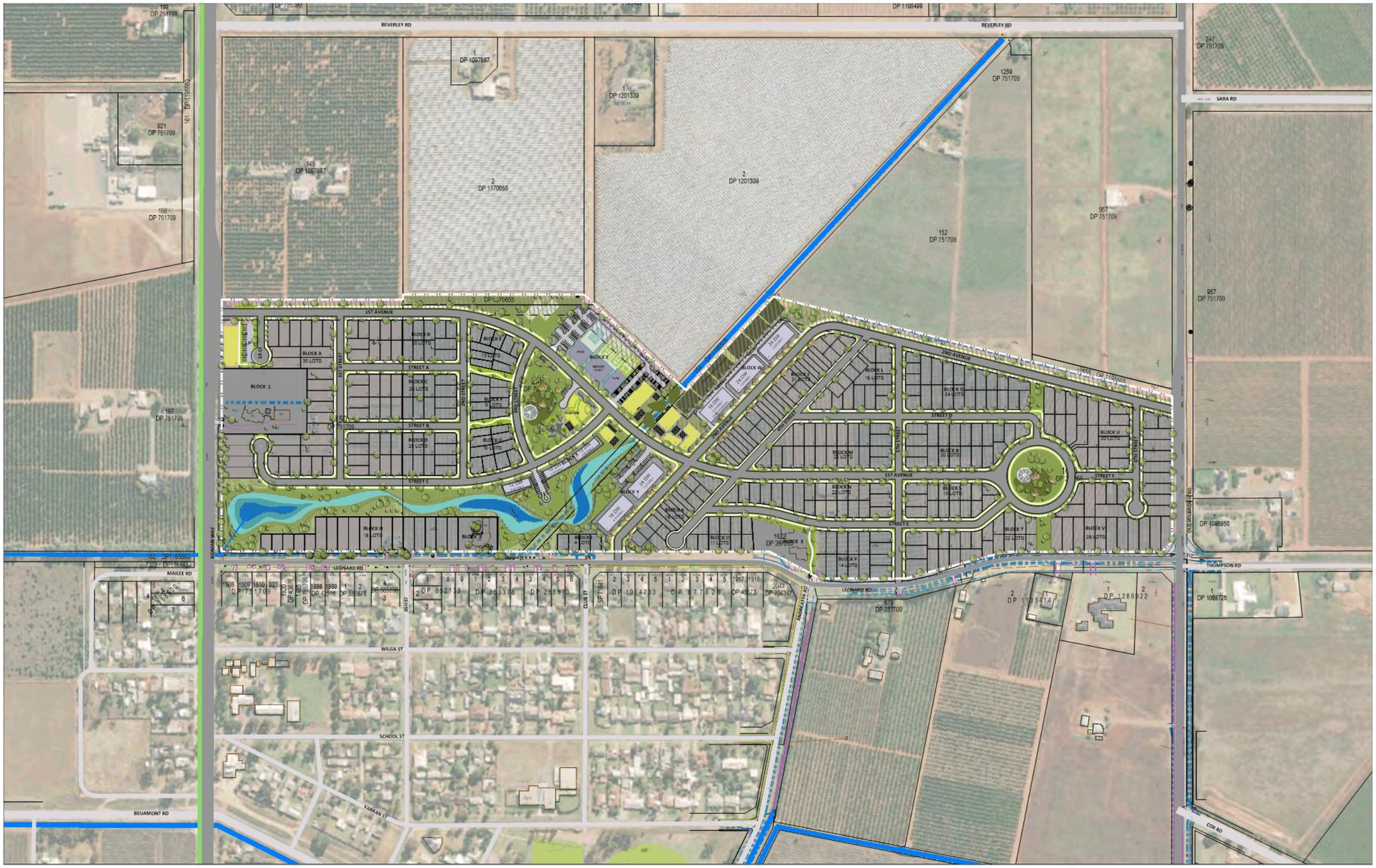
D.02 APPENDICES

Appendix A - Client Supplied Drawings.

APPENDIX A -

CLIENT SUPPLIED DRAWINGS

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}



GENERAL NOTES

Morrison Design Partnership Pty. limited accept no responsibility for the usability, completeness or accuracy of data transferred electronically. Recipients should when necessary request a hard copy version for verification. This drawing shall be read in conjunction with all architectural and other consultants drawings, specifications and with such other written instructions as may be issued during the course of the contract. Figured dimensions shall be taken in preference to scaling. All level, datum points and dimensions on this drawing shall be verified by the builder on site. All discrepancies shall be referred to the architect for direction before proceeding with any works.

DO NOT SCALE THIS DRAWING.

MDP Acknowledges the Cammeraygal people as the traditional custodians of this land

©Copyright

These drawings and designs and the copyright there of are the property of Morrison Design Partnership Pty. Ltd and must not be altered, used, retained, or copied wholly or in part without the written permission of Morrison Design Partnership Pty. Ltd. ACN 001 993 288.

SURVEY NOTES

Survey data included in this drawing is based on a survey drawing and is provided for preliminary design purposes only. As this drawing is based on information supplied by others, reference must be made to original survey drawings verified against site conditions.

REV	DATE	AMENDMENT	INITIALS
L	08/08/2025	FOR PLANNING PROPOSAL	AS

CLIENT
HANWOOD DEVELOPMENT PTY LTD

PROJECT
HANWOOD MASTER PLAN

Lot/Section/Plan no
150/-/DP751709
287/-/DP751709
1623/-/DP257265

DRAWING TITLE
CONCEPT MASTER PLAN

FOR PLANNING PROPOSAL

PROJECT NO.	DRAWING NO.	REVISION
3340	A5000	L
SCALE : 1:6000 @ A3		
DRAWN : AS		
DATE : 08/08/2025		

www.mdpa.com.au NSW Nom Architect: Glen Ollerton #7621

mdp architecture

Leonard Road Hanwood 2680

31 of 31

{THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK}

REVERB ACOUSTICS
Noise and Vibration Consultants

Noise Impact Assessment
Proposed Subdivision
Lots 150 & 287 DP.751709 &
Lot 12623 DP.257263
Leonard Road
Hanwood NSW

July 2025

Prepared for Planningmatters Development Service
Report No. 24-2982-R2

Building Acoustics-Council/EPA Submissions-Modelling-Compliance-Certification

REVERB ACOUSTICS PTY LTD
ABN 26 142 127 768 ACN 142 127 768
PO Box 252 BELMONT NSW 2280
Telephone: (02) 4947 9980
email: sbradyreverb@gmail.com

1 INTRODUCTION

Reverb Acoustics has been commissioned to conduct a noise impact assessment for a proposed subdivision at Lots 150 and 287 DP.751709 and Lot 12623 DP.257263, Leonard Road, Hanwood. The purpose of the assessment is to theoretically determine the noise impact from passing road traffic on Kidman Way and existing/potential light industrial and commercial land uses within habitable spaces of future residences and tenancies, and to recommend acoustic modifications that must be incorporated into the design. This noise impact assessment has been conducted with reference to Department of Planning and Environment's (DPE's) Guideline, *Development near Rail Corridors and Busy Roads – Interim Guidelines* and the NSW Environment Protection Authority's (EPA's) Noise Policy for Industry (NPfI).

DPE will also require the following acoustic matters to be addressed:

Urban Design & Built Form
Controls to manage interaction between potential internal land-use conflicts, such as where a childcare centre is located adjacent to industrial uses.
Noise
The subdivision application should include a Noise Management Plan for the site which:
(a) identifies noise limits for industrial developments during operation;
(b) criteria that onsite sensitive receivers must meet;
(c) measures to mitigate and manage potential noise sources; and
(d) measures to manage potential land use conflicts within the site.

In respect to the above, further assessment has been carried out to determine the noise impact from future businesses within the proposed subdivision on sensitive land uses.

The Assessment was requested by Planningmatters Development Service on behalf of Hanwood Developments Pty Ltd to accompany and in support of the Development at the request of Griffith City Council (GCC), and to ensure that noise levels comply with the requirements of the NSW Environment Protection Authority (EPA), DPE and GCC.

2 TECHNICAL REFERENCE / DOCUMENTS

AS/NZS 2107-2016 *"Acoustics-Recommended Design Sound Levels and Reverberation Times for Building Interiors"*.

Department of Planning (2008). *"Development near Rail Corridors and Busy Roads - Interim Guidelines"*.

NSW Environment Protection Authority (2017). Noise Policy for Industry

Concept Masterplan supplied by MDP Architecture Pty Ltd, Rev E, dated 27 May 2024. Note that variations from the design supplied to us, may affect the acoustic recommendations.

A Glossary of commonly used acoustical terms is presented in Appendix A to aid the reader in understanding the Report.

3 EXISTING ACOUSTIC ENVIRONMENT

A background noise level survey was conducted in December 2020 for another client. A Class 1, Svan 977 environmental noise logging monitor was installed on the north side of Leonard Street, approximately 60 metres from the Andreatta Street intersection. The selected location is representative of the acoustic environment in the receiver area and considered an acceptable location for determination of the background noise in accordance with Appendix B of the NSW Environment Protection Authority's (EPA's) – Noise Policy for Industry (NPfI).

Noise levels were continuously monitored in December 2020, to determine the existing background and ambient noise levels for the area. The instrument was programmed to accumulate environmental noise data continuously and store results in internal memory. The data were then analysed to determine 15 minute Leq and statistical noise levels using dedicated software supplied with the instrument. The instrument was calibrated with a Brüel and Kjaer 4230 sound level calibrator producing 94dB at 1kHz before and after the monitoring period, as part of the instrument's programming and downloading procedure, and showed an error less than 0.5dB.

Table 1 shows a summary of our noise survey, including the Rating Background Level (RBL) which has been calculated, according to the procedures described in the EPA's NPfI and by following the procedures and guidelines detailed in Australian Standard AS1055-1997, "Acoustics - Description and Measurement of Environmental Noise, Part 1 General Procedures". A complete set of logger results is not shown, but available on request.

Table 1: Summary of Noise Logger Results, dB(A)

Time Period	Background L90			Ambient Leq		
	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am	Day 7am-6pm	Evening 6pm-10pm	Night 10pm-7am
RBL	34	34	32	--	--	--
LAeq	--	--	--	67	60	44

Site, weather and measuring conditions were all satisfactory during the noise survey. We therefore see no serious reason to modify the results because of influencing factors related to the site, weather or our measuring techniques.

Additional road traffic noise level measurements were conducted during peak day and night periods, approximately 8 metres from the near lane of traffic on Kidman Way. Results of this survey are presented below:

Time Period	*Measured Road Traffic Noise level, dB(A),Leq*
DAY	65.6
NIGHT	60.7

4 CRITERIA

4.1 Road Traffic Noise (Impact on Future Residences)

State Environmental Planning Policy (Transport and Infrastructure) 2021 states the following:

2.120 Impact of road noise or vibration on non-road development
(1) This section applies to development for any of the following purposes that is on land in or adjacent to a road corridor for a freeway, a tollway or a transitway or any other road with an annual average daily traffic volume of more than 20,000 vehicles (based on the traffic volume data published on the website of the TfNSW) and that the consent authority considers is likely to be adversely affected by road noise or vibration—

(a) residential accommodation,
(b) a place of public worship,
(c) a hospital,
(d) an educational establishment or centre-based child care facility.

(2) Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Planning Secretary for the purposes of this clause and published in the Gazette.

(3) If the development is for the purposes of a building for residential accommodation, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:

(a) in any bedroom in the building - 35dB(A) at any time between 10.00 pm and 7.00 am,
(b) anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway) - 40dB(A) at any time.

(4) In this clause, freeway, tollway and transitway have the same meanings as they have in the *Roads Act 1993*.

Cognate performance requirements for residential developments can be sourced from DPE's *"Development near Rail Corridors and Busy Roads - Interim Guidelines*" (released in December 2008). Limits specified within the Policy, which are identical to SEPP (Transport and Infrastructure) 2021 will be used for the purpose of this assessment, are shown below:

Type of Occupancy	*Noise Level in dB(A)*	*Applicable Time Period*
Sleeping areas (bedroom)	35	Night 10pm to 7am
Other habitable rooms (excluding garages, kitchens bathrooms & hallways)	40	At any time

If criteria are exceeded by more than 10dB(A) with windows open, mechanical ventilation should be incorporated into the design of affected rooms.

Criteria for the assessment of quasi-steady-state noise sources, such as continuous road traffic and mechanical services, are sourced from AS/NZS 2107-2016 *"Acoustics-Recommended Design Sound Levels and Reverberation Times for Building Interiors"* and are detailed below.

Room Type	dBA
RESIDENTIAL BUILDINGS	
Houses and apartments near major roads	
Living areas	35 – 45
Sleeping areas	35 – 40
Common areas (foyer, lobby)	45 – 50

Section C10 of the Roads and Maritime Services (RMS') NSW Road Noise Policy (RNP) also recommends that the DPE's Guideline should be used for assessment of road traffic noise on residential developments. Table 2 summarises satisfactory internal noise levels for residences, used for the basis of this assessment.

Table 2: Internal Traffic Noise Level Criteria (Residential)

Location	Criteria – dB(A),Leq		Remarks
	Day	Night	
Sleeping areas	-	35	Windows closed
	-	40	Windows open
Other habitable rooms	40	-	Windows closed
	45	-	Windows open

Note: Provision for air conditioning will be available, therefore windows open criteria do not apply in this case.

Note that limits specified in the EPA documents are in agreement with those contained in AS/NZS 2107-2016 and DPE's Guideline. Therefore, the aim of the assessment is to ensure that the allowable noise levels shown above and in Table 1 are not (theoretically) exceeded within any habitable room due to road traffic noise. Transmission paths considered in the assessment are windows and doors with allowances made for shielding by balconies, intervening acoustic barriers, buildings/terraces, etc.

We consider assessment of traffic noise impacting on future land uses near the Kidman Way necessary. However, assessment of traffic noise impacting on future land uses from traffic passing on Old Willbriggie Road is not required, given the lower number of cars and heavy vehicles using this road now and in the future.

4.2 Nearby Industry (Impact on Future Residences)

Noise from industrial noise sources scheduled under the Protection of Environment Operations Act is assessed using the EPA's NPfI. However, local Councils and Government Departments may also apply the criteria for land use planning, compliance and complaints management. The NPfI specifies two separate criteria designed to ensure existing and future developments meet environmental noise objectives. The first limits intrusive noise to 5dB(A) above the background noise level and the other is based on the total industrial noise in an area in relation to the noise levels from the development to be assessed. Project Noise Trigger Levels are established for new developments by applying both criteria to the situation and adopting the more stringent.

The existing L(A)eq for the receiver areas is dominated by traffic on nearby roads, and commercial activity during the day, evening and night. Reference to Table 2.2 of the NPfI shows that the area is classified as urban. The Project Amenity Level is derived by subtracting 5dB(A) from the recommended amenity level shown in Table 2.2. A further +3dB(A) adjustment is required to standardise the time periods to LAeq,15 minute. The adjustments are carried out as follows:

Recommended Amenity Noise Level (Table 2.2) – 5dB(A) +3dB(A)

Table 3 below specifies the applicable project intrusiveness and amenity noise trigger levels for the proposed redevelopment.

Table 3: - Intrusiveness and Amenity Noise levels

Period	Intrusiveness Criteria	Amenity Criteria
Day	40 (35+5)	58 (60-5+3)
Evening	39 (34+5)	48 (50-5+3)
Night	37 (32+5)	43 (45-5+3)
Receiver Type: Urban (See EPA's NPfI - Table 2.1)		

Project Noise Trigger Levels, determined as the more stringent of the intrusiveness criteria and the amenity / high traffic criteria, are as follows:

Day	**40dB LAeq,15 Minute**	7am to 6pm Mon to Sat or 8am to 6pm Sun and Pub Hol.
Evening	**39dB LAeq,15 Minute**	6pm to 10pm
Night	**37dB LAeq,15 Minute**	10pm to 7am Mon to Sat or 10pm to 8am Sun and Pub Hol.

4.3 Industrial Site Activities (Impact from Industrial Subdivision Onsite Child Care centre)

Section 5 of the Association of Australian Acoustic Consultant's (AAAC's) document, *Guideline for Child Care Centre Acoustic Assessment. Version 3*, states the following:

For proposals that are located within 60 metres of an arterial road, railway line, industry or in close proximity to an airport, a noise intrusion assessment should be submitted with the development application.

- The LAeq,1hr from road, rail traffic or industry at any location within the outdoor play or activity area during the hours when the Centre is operating shall not exceed **55dB(A)**.
- The LAeq,1hr from road, rail traffic or industry at any location within the indoor play or sleeping areas during the hours when the Centre is operating shall be capable (i.e. with doors and/or windows closed) of achieving **40dB(A)** within indoor activity areas and **35dB(A)** in sleeping areas.

4.4 Industrial Site Activities/Mechanical Plant (Impact from Industrial Subdivision Onsite Sensitive Receivers)

Appropriate criteria for assessment of industrial noise impacting on sensitive receivers within the proposed subdivision, other than residences and child care centres, are taken from Table 2.2 of the NPfI and AS/NZS2107-2016, reproduced below:

Receiver	*Time of Day*	*Recommended Amenity Noise Level dB(A),Leq*
- Residence, Caretakers quarters	Day	65
	Evening	55
	Night	50
- Place of Worship (internal)	When in use	40
- Commercial Premises	When in use	65
- Industrial Premises	When in use	70
- Restaurants & Cafeterias	When in use	40-50
- Health Buildings		
Consulting Rooms	When in use	40-50
Treatment Rooms	When in use	40-45
Office Areas	When in use	35-45

5 METHODOLOGY AND ANALYSIS

5.1 Road Traffic Noise (Impact on Future Residences)

Measured road traffic noise levels at a distance of 8 metres from the near lane of traffic on the Kidman Way are as follows:

Day	65.6dB(A), Leq,15 hour	7am-10pm
Night	60.7dB(A), Leq,9 hour	10pm-7am

Applicable noise level metrics, namely, Leq (day peak) and Leq (night) are those calculated above, following the methodology outlined in the EPA's RNP. A +2.5dB(A) facade adjustment must be applied, since road traffic noise levels have been calculated under free-field conditions.

Calculated noise level (2023) + facade correction = received noise (2023)

Applying the above formula gives:

Day	65.6dB(A) + 2.5dB(A) = **68.1dB(A) Leq, 15hr**	7am – 10pm
Night	60.7dB(A) + 2.5dB(A) = **63.2dB(A) Leq, 9hr**	10pm – 7am

Shown below is sample calculations detailing the procedure followed in order to calculate required glazing for a typical Living/Lounge room in a future residence at the western end of the subdivision facing the Kidman Way. The traffic noise level at the outer face of the glazing is calculated as follows:

Table 4: Sample Calculation - Traffic Impact at Living/Dining Room

		Octave band Sound Pressure Levels, dB(A)							
Propagation calculation	**dB(A)**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Facade traffic noise, Leq[1]	68	48	54	55	59	61	58	52	39
Architectural shielding[2]		0	0	0	0	0	0	0	0
Directivity/distance Correction[3]		-3	-3	-3	-3	-3	-3	-3	-3
Traffic noise at window	65	45	51	52	56	58	55	49	36

1. Measured noise level. 2. Intervening structures. 3. A minimum setback of 20m has been assumed.

As the criterion for the Living/Dining rooms is 40dB(A), see Section 3.1, the required traffic noise reduction is *TNR* = 68-40 = 28dB(A). The traffic noise attenuation, *TNA*, required of the glazing is calculated according to the equation given in Clause 3.4.2.6 of AS 3671,

$$TNA = TNR + 10\log_{10}[(S/S_f) \times 3/h \times 2T_{60} \times C] \qquad \textit{equation 1}$$

where
S = Surface area of glazing = $2.5m^2$
S_f = Surface area of floor = $10.5m^2$
h = Ceiling height, assumed to be 2.5m
T_{60} = Reverberation time, s
C = No. of components = 3 (glazing, walls, roof)

Assuming that the room is acoustically average (neither too 'live' nor too 'dead') equation 9.26 in *Noise and Vibration Control*, L.L. Beranek, 1971, gives a reverberation time of 0.76s. Consequently, the value of 0.8s was used in equation 1.

Using the values listed above gives
TNA = 27dB(A) for the glazing

Substituting this value into the equation given in Clause 3.4.3.1 of AS3671 gives
Rw = *TNA* + 6 ≈ 33

As can be seen by the above results, the glazing must have a tested Rw33 rating. Published sound insulation performance in terms of Rw or STC ratings relate to partitions tested in ideal laboratory conditions or opinions based on such measurements. Field conditions (eg. flanking paths, penetrations, air leaks etc) caused by lack of supervision of workmanship or inadequate attention to detail at design/specification stage can reduce the Rw rating. For this reason, we recommend selecting partition systems with a laboratory Rw rating 1-2dB higher than required on site. Therefore, the window/door in the Living Room must have a tested Rw35 rating. Based on typical laboratory performance data the glazing would consist of Vlam Hush glass fitted with acoustic seals at sliders or a double-glaze system. Similar calculations to those above have been performed for windows and doors on affected facades. From these calculations, a glazing schedule has been compiled. See Section 6.

5.2 Ventilation Requirements

DPE's Guideline states that if road traffic noise criteria cannot be met with windows open then they must be shut, if desired, while also meeting the ventilation requirements of the Building Code of Australia (BCA). This does not preclude the use of operable windows, although, the National Construction Code (NCC) states that when the minimum criteria cannot be met, mechanical ventilation is required (ref: Section 3.1.2 ABCB Indoor Air Quality, 2016). However, the DPE's Apartment Design Guide Objective 4B-1 specifies all habitable rooms should be naturally ventilated in apartment complexes.

Noise and Pollution, Apartment Design Guide Section 4J, provides solutions to provide natural ventilation when windows are open, while satisfying internal traffic noise criteria. These include operable facades, winter gardens, partially shielded and insulated balconies, apartment setbacks, judicious building design and selection of acoustic materials and products to be incorporated into the building design.

Recent studies have conclusively proven that a typical open window will reduce noise by 10-15dB(A) or more when contained within a masonry structure with no exposed flooring.

Table 5 shows road traffic design criteria at exposed facades and the predicted internal noise levels with windows open, to determine compliance.

Table 5: Internal Noise Assessment – Windows Open

Time Period	Predicted Traffic Noise level L(A)eq		Internal Criteria L(A)eq	Compliant YES/NO
	External	Internal		
Day	64	49-53	50	NO
Night	58	44-49	45	NO

Results in the above Table predict that internal traffic noise levels will be above specified limits, however, Part 10.6 of the ABCB Housing Provisions allows natural ventilation to be provided by an adjoining room that satisfies the internal traffic noise criteria, providing the adjoining room is not a sanitary compartment. Adjoining rooms will satisfy the above requirements if constructed with this in mind. Therefore, artificial means of natural ventilation will be not mandatory.

The entire Development Area has been assessed to determine the road traffic impact, and divided into various zones, with varying degrees of noise control modifications required for each zone to comply with the criteria. See Appendix B for Zoning.

6 RECOMMENDED NOISE CONTROL – ROAD TRAFFIC

Shown below are details for the required construction of future residences in the proposed subdivision. See Section 6 for required construction for other sensitive land uses within the subdivision

6.1 Zone 1

The glazing systems sighted in the following Tables are presented as a guide for the supplier:

Glazing Systems: Type A: Standard glazing. No acoustic requirement.
Type B: Single-glaze 5-8mm clear float glass.
Type C: Single glaze laminated or Vlam Hush glass.

Note: The typical glazing shown in the following Table should be used as a guide only. The supplier of the window/door must be able to provide evidence that the complete system will achieve the specified Rw performance, i.e. do not simply install our recommended glass in a standard window frame.

Table 6: Recommended Construction – Zone 1

Element	Facade	Room	Required Rw Must achieve for Compliance	Typical Construction Not for Specification
Windows/ Sliding Doors	West	Bedroom	**35**	Type C
		Liv/Din/Kitch	**35**	Type C
		Bath/WC/Lndry	**29**	Type B or C
	North/South	Bedroom	**32**	Type C
		Liv/Din/Kitch	**32**	Type B or C
		Bath/WC/Lndry	**26**	Type B
	East	Bedroom	**29**	Type B or C
		Liv/Din/Kitch	**27**	Type B
		Bath/WC/Lndry	**-**	No acoustic requirement
Roof		All		See Note 2
Walls		All		See Note 3

Note 1: All external swinging doors are to be 30-40mm solid core with the vertical sides and top of the door frames fitting neatly to provide close contact when doors are closed. Proprietary acoustic seals are to be fitted at the perimeter of doors, i.e. Raven RP10 or Lorient/Kilargo equivalent. All glazed sections must be minimum 6mm safety glass.

Note 2: Roof construction should consist of sisalation or wire mesh laid down on roof trusses. This is to be completely covered with a 30-40mm foil faced building blanket or similar (in situations where trusses are at centres close enough to avoid excessive sagging of the blanket, the sisalation/wire mesh may be omitted), followed by Colorbond roof sheets. If Terra Cotta or concrete roof tiles are preferred, the building blanket may be omitted. All upper level ceilings are to consist of an impervious ceiling of 1 sheet taped and set 10mm Sound Rated plasterboard or 1 sheet 13mm Fire Rated plasterboard. To further assist in low frequency attenuation, all ceiling voids should contain a layer of fibreglass or rockwool insulation. The insulation is to be installed in addition to, not in lieu of the building blanket. Specialised acoustic insulation is preferred, however dense thermal insulation (eg, R3 batts) will suffice and is much less expensive ($15/m^2 for Rockwool and $6/m^2 for R3 batts). Generally, Councils now require new dwellings to achieve an adequate energy rating, which will usually only be achieved if thermal insulation is installed in the ceiling void, therefore, builders would be obliged to install insulation in any case.

Note 3: We strongly recommend brick veneer or cavity-brick construction. These high-mass building elements will provide attenuation of the lower frequencies, typically around 125 to 500Hz, typically generated by road traffic. All internal lining for brick veneer to be minimum 1 sheet 13mm plasterboard. All lightweight cladding on the west, north and south facades (i.e. vinyl weatherboards, Colorbond, Weathertex, etc) is to be backed with either 6mm fibre cement sheeting (Villaboard, Hardiflex) or 10mm construction plywood. If upper level lightweight construction is preferred (i.e. Hebel Powerpanel, weatherboard, etc) modification to the south, east and west facades will be required consisting of cavity infill of R2/S2 insulation, together with internal lining 1 sheet 13mm fire rated plasterboard.

6.2 Zone 2

Table 7: Recommended Construction – Zone 2

Element	Facade	Room	Required Rw Must achieve for Compliance	Typical Construction Not for Specification
Windows/ Sliding Doors	West	Bedroom	**30**	Type B or C
		Liv/Din/Kitch	**28**	Type B
		Bath/WC/Lndry	**24**	Type B
	North/South	Bedroom	**27**	Type B
		Liv/Din/Kitch	**25**	Type B
		Bath/WC/Lndry	-	No acoustic requirement
	East	Bedroom	-	No acoustic requirement
		Liv/Din/Kitch	-	No acoustic requirement
		Bath/WC/Lndry	-	No acoustic requirement
Roof		All		See Note 2
Walls		All		See Note 3

Note 1: All external swinging doors, i.e. ground and first floor, are to be 30-40mm solid core with the vertical sides and top of the door frames fitting neatly to provide close contact when doors are closed. All glazed sections must be minimum 5-6mm safety glass.

Note 2: Roof construction should consist of sisalation or wire mesh laid down on roof trusses. This is to be completely covered with a 30-40mm foil faced building blanket or similar (in situations where trusses are at centres close enough to avoid excessive sagging of the blanket, the sisalation/wire mesh may be omitted) followed by Colorbond roof sheets. If Terra Cotta or concrete roof tiles are preferred, the building blanket may be omitted. All upper level ceilings are to consist of an impervious ceiling of 1 sheet taped and set 10mm plasterboard. To further assist in low frequency attenuation, all ceiling voids should contain a layer of fibreglass or rockwool insulation. The insulation is to be installed in addition to, not in lieu of the building blanket. Specialised acoustic insulation is preferred, however dense thermal insulation (eg, R3 batts) will suffice.

Note 3: We strongly recommend brick veneer or cavity-brick construction. These high-mass building elements will provide attenuation of the lower frequencies, typically around 125 to 500Hz, typically generated by road traffic. All internal lining for brick veneer to be minimum 1 sheet 13mm plasterboard. If upper level lightweight construction is preferred (i.e. Hebel Powerpanel, weatherboard, etc) modification to the west, north and south facades will be required consisting of cavity infill of R2/S2 insulation, together with internal lining 1 sheet 13mm plasterboard.

6.3 Zone 3

NO ACOUSTIC REQUIREMENT.

7 RECOMMENDED NOISE CONTROL – VARIOUS LAND USES

7.1 Business Type Checklist

7.1.1 Given the difficulty in predicting the exact types of businesses that may be developed on the site, it is not possible to specify general acoustic controls that may apply to all land uses. For this reason, acoustic controls will need to be applied on a case-to-case basis. For example, a mechanical workshop would need to address noise emission from machinery and exhaust equipment, while no significant noise is expected from a computer repair outlet. In addition, the tenure of small business is usually dynamic dependent upon the success or otherwise of the occupant. For this reason, each business, which has the potential to create excessive noise, should submit a separate noise impact assessment to Council as part of the Development Application process.

Table 8: Business Type Checklist

Business Type	Day Operation	Evening/Night Operation	Comments
	Acoustic Report Required Yes/No	Acoustic Report Required Yes/No	
Mechanical W'shop. Sheetmetal W'shop. Tyre W'shop.	Yes	Yes	Also See Sections 7.2, 7.3, 7.4 7.5
Timber Joinery. Smash Repairs	Yes	Yes	Also See Sections 7.2, 7.3, 7.4 7.5
Self-Storage	No	N/A	See Sections 7.2, 7.3, 7.4
Place of Assembly. Place of Public Worship.	Yes	Yes	Also See Sections 7.2, 7.3, 7.6
Retail Outlet. Showroom. (computer, office supplies, etc)	No	N/A	Also See Sections 7.2, 7.3, 7.4
Residence, Unit	Yes	Yes	Also See Section 7.7
Veterinary Surgery. Pet Shop.	Yes	Yes	Also See Sections 7.2, 7.3, 7.4, 7.11
Office	No	No	Also See Sections 7.2, 7.3, 7.4
Child Care Centre	Yes	Yes	Also See Sections 7.2, 7.3, 7.4, 7.8
Liquor Outlet	No	Yes	Also See Sections 7.2, 7.3, 7.4
Car Detailing	No	Yes	Also See Sections 7.2, 7.3, 7.4, 7.9
Take Away Outlet	Yes	Yes	Also See Sections 7.2, 7.3, 7.4, 7.10
Health & Fitness Centre	Yes	Yes	Also See Sections 7.2, 7.3, 7.4, 7.12
Bulky Goods.	No	N/A	Also See Sections 7.2, 7.3, 7.4

NOTE: Council may at their discretion request preparation of an acoustic assessment for any noise generating business not noted in the Table.

7.2 Mechanical Plant

7.2.1 Items of mechanical plant that produce noise in excess of limits specified in Section 4 will require acoustic modifications to be incorporated into the design. Typical noise control options include acoustic barriers or enclosures (adjacent to roof-top plant), in duct acoustic silencers, and location of equipment in shielded locations away from the residential area. Advice should be sought from an accredited acoustic consultant during the design stages.

7.2.2 Where plant intended to be installed on the site produces noise in excess of specified levels, noise control will be required to ensure satisfactory noise emissions. The contractor responsible for supplying and installing the plant should be asked to supply evidence that installed plant meets this noise emission limit, or that noise control included with the plant is effective in reducing the sound level to the specified limit.

7.2.3 Attention is drawn to the fact that mechanical plant may be near sensitive receivers and it is vitally important that units are free from specifically annoying characteristics (eg. tones, squeaks, pulsations etc). Careful selection of plant, equipment, piping and ducting systems is recommended to ensure quiet and vibration free operation in compliance with the specified noise criteria. Replacement and/or modification will be necessary to all systems causing undue noise or vibration exceeding the specified criteria.

7.3 Loading Docks / Deliveries

It is likely that the following restrictions will need to be applied:

7.3.1 All loading docks may operate during the day (7am-6pm).

7.3.2 Deliveries are not recommended during the evening (6pm-10pm) or night (10pm-7am), unless the business owner provides an acoustic assessment to Council detailing modifications to the dock area demonstrating compliance with the criteria.

7.3.3 Signs are to be erected in conspicuous locations in the loading areas instructing drivers to turn off their engines once in place.

7.3.4 Waste disposal bins are to be located in shielded areas, ideally behind walls or buildings, to reduce impacts during collection. We strongly recommend that waste collection be restricted to weekdays 7.00am to 6.00pm.

7.4 Customers and Staff

7.4.1 Trading hours to the public should be restricted to the day for all businesses, i.e. 7am to 6pm. Businesses wishing to trade outside these hours must provide an acoustic assessment to Council demonstrating compliance with the criteria.

7.4.2 For both staff and customers, some form of education campaign is suggested to ensure satisfactory noise levels at nearby residences. For staff, the education can be part of in-service training, while for visitors reminders may be included in promotional material and reinforced with erection of appropriate signage.

7.5 Workshops

7.5.1 Workshops will require a detailed acoustic assessment to be submitted to Council for approval. It is likely that this type of land use would have the following restrictions applied:

- All external doors would need to be closed at 6pm and remain shut until 7am.
- Interior workshop walls would need to be lined with 6-9mm fibre cement sheeting or 10-15 construction plywood. Larger gaps at wall/roof junctions sealed with materials of equivalent mass to wall construction, while smaller penetrations sealed with a non-setting sealant, bituminous compound, eaves filler strips, or similar.
- Clear roof sheeting, i.e. alsanite, makralon, or similar, should be used sparingly, i.e. typically no more than 2m² for each 40m² roof area.
- Any air vents that are located high on the walls or the roof must be designed to minimise noise leakage. The most cost-effective exhaust air vents are ideally located at opposite ends of the workshop to allow cross ventilation, although they should be positioned so other parts of the structure interrupt the line of sight between the source and the receiver. A total vent area up to 0.6m² into a shielded area and up to 0.2m² direct to the exterior can typically be included without specific acoustic design.
- Compressors should ideally be located in plant rooms or shielded locations away from the residential area. External doors to plant rooms must remain closed at all times. Acoustic louvres in preference to standard louvres should be used to provide ventilation to equipment. Appropriate signage must be erected to remind employees to shut the door.

7.6 Place of Assembly / Place of Public Worship

7.6.1 Council's standard Conditions of Consent are generally in accordance with the requirements of the EPA's NPfI, which is applicable for site noise, however, to ensure the impact from amplified music is adequately addressed we recommend applying the EPA's LA10 criteria, as detailed below. It should be noted that compliance with these criteria will also ensure compliance with those outlined by the EPA.

"The LA10 noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz - 8kHz inclusive) by more than 5dB between 07:00 am and 12:00 midnight at the boundary of any affected residence.

The LA10 noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz - 8kHz inclusive) between 12:00 midnight and 07:00 am 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 07:00 am."

Note that noise emissions from entertainment will also need to satisfy the Project Amenity Noise levels detailed in Section 4.2.

7.6.2 We generally do not recommend approval of a Place of Assembly or Place of Public Worship in close proximity to a residential area unless a detailed acoustic assessment is carried out to demonstrate satisfactory noise emissions. It is likely that this type of land use would have the following restrictions applied:

- All external doors would need to be closed during performances.
- Thicker and heavier laminated glass, and possibly double glazing would be required for all windows.
- Proprietary acoustic seals would need to be fitted to all doors and operable windows.
- All doors solid core or heavy laminated glass, with an air lock leading from main entry.
- Roof/ceiling construction typically to consist of sisalation or wire mesh laid down on roof trusses. This is to be completely covered with a 75mm foil faced building blanket hard under the roof sheeting (in situations where purlins/battens are at centres close enough to avoid excessive sagging of the blanket, the sisalation/wire mesh may be omitted). Install a suspended fire rated plasterboard (multiple layers). Provide R3/S3 fibreglass or polyester insulation. The insulation is to be installed in addition to, not in lieu of the building blanket. Downlights and tray type fluorescents downgrade acoustic performance, therefore either use surface mounted lighting, downlight covers or acoustically rated downlights.
- The ceiling void is commonly used as a return air plenum in licensed premises. If this is the case, conventional grills will need to be replaced by Air Relief Silencers. Air Relief Silencers are designed to be used where air must be transferred from one area to another without the transfer of speech/music and mechanical services noise. Silencers are available in a wide variety of profiles, allowing them to be installed in ceilings, walls, ventilation shafts, etc. We recommend using Nap Silentflo ST series.
- Strict management controls would need to be applied at completion of services to ensure noise from patrons in the carpark is kept to a minimum.

7.7 Caretakers Residence

7.7.1 Future caretaker's residence associated with future commercial or industrial developments may be in close proximity to noise generating businesses. A detailed noise impact assessment should accompany the Council Application detailing acoustic measures incorporated into the design of the premises to ensure satisfactory noise levels for future occupants. Internal noise levels should satisfy the criteria detailed in Section 4.4.

7.8 Child Care Centres

7.8.1 Noise from child care centres typically originates from outside the building, i.e. play areas. Careful consideration should be given during the design stages to ensure noise generating activities are in shielded locations or acoustic barriers/fences should be placed accordingly. These businesses should only operate during the day (7am-6pm) unless compliance with the criteria can be demonstrated to Council.

7.8.2 Acoustic fences typically 1200-1850mm above FGL would be required at the perimeter of outdoor play areas to reduce noise intrusion to an acceptable level for children. A detailed assessment in support of the DA will determine acoustic fence heights based on actual external noise impacts.

7.8.3 Based on the external noise impacting the site, acoustic windows may be required for sensitive areas such as indoor play rooms, cot rooms, etc. This can be determined at DA stage.

7.9 Car Detailing

7.9.1 Noise from these businesses typically originates from outside the building, i.e. vacuums, car wash, etc. Careful consideration should be given during the design stages for this type of business to ensure noise generating activities are in shielded locations or acoustic barriers/fences should be placed accordingly. These businesses should only operate during the day (7am-6pm) unless compliance with the criteria can be demonstrated to Council.

7.10 Take Away Outlets

7.10.1 Noise from customers in outdoor dining areas of cafés/take away shops has the potential to produce unacceptable noise at nearby residences. Due to the location of the site, younger, "rowdier" patrons are not expected to frequent the business, rather employees from nearby businesses would be more typical. The amount of people using an outdoor area will vary from day to day, however, a worst-case situation would be expected of an evening.

Assessment of noise impacts from patrons and exhaust plant would be required for this business type.

7.11 Veterinary Surgeries

7.11.1 Noise from veterinary surgeries comes primarily from barking dogs. Generally, only one dog will be in the treatment area at any one time and dogs in wards will typically be heavily sedated awaiting surgery, consequently these areas will be quiet for the majority of the time. As a general rule, dogs are typically kept in fibreglass enclosures in wards and cannot see each, which discourages barking. Even with the above measures in place, dogs may still disturb nearby residents, particularly at night, requiring an acoustic assessment if dogs are kept on the premises at times other than day (7am-6pm). It is likely that this type of land use would have the following restrictions applied:

- All dogs should be fed and locked away by 6pm each evening. No pickups/deliveries permitted after this time.
- All windows and doors to animal wards should be closed during the evening and night.
- Thicker and heavier laminated glass (typically 6.38-8.76mm) will be required for all windows.
- Proprietary acoustic seals will need to be fitted to all doors and operable windows.
- All doors solid core or laminated glass panels.

7.12 Health & Fitness Centres / Gyms

It is likely that this type of land use would have the following restrictions applied:

7.12.1 An acoustic assessment will be required for any gym or fitness centre in the new subdivision.

7.12.2 No amplified music or PA System is permitted in any section of the centre unless compliance with the NPfI can be demonstrated.

7.12.3 Background (incidental) music is permitted. Output must be limited to 70dB(A) at a distance of 3m from each speaker. Once this level is achieved, corresponding references should be assigned to the sound system controls.

7.12.4 Rubber gym flooring may need to be installed in areas where free weights are used to reduce impact noise.

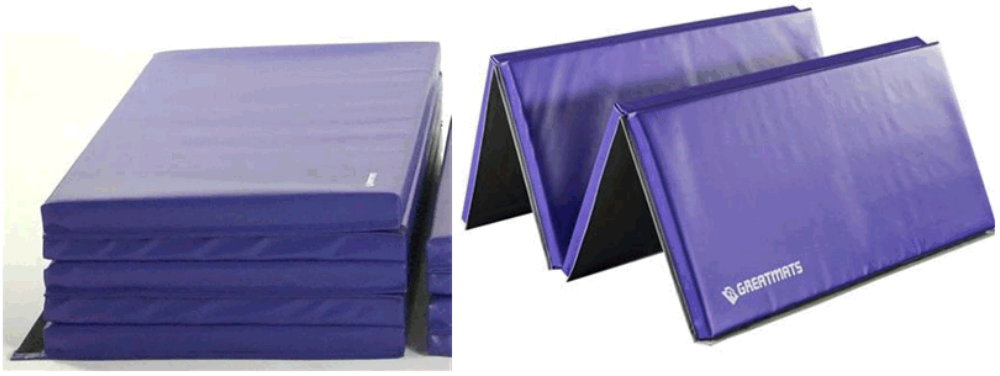
7.12.5 The roller doors may typically remain open during class to an approximate height of 2500mm above FGL. In the event of complaint, closing the roller doors should be the first course of action.

7.12.6 No training activities are permitted in carpark prior to 7am unless compliance with the NPfI can be demonstrated.

7.12.7 The following strategies may need to be implemented to eliminate audible structure-borne noise transmission in "cross-fit" type areas where weights are often dropped from height:

- Install 15mm thick compressed rubber flooring to entire active studio area.
- Store 40-50mm thick gymnastic mats (say 2400mm x 1200mm dimensions) in an easily accessible location to be used as an overlay when required.
- Details of selected mats are to be forwarded to the acoustic consultant for approval prior to purchase.
- Comparable systems may be used subject to review by an accredited acoustic consultant.

Figure 1: Examples of Typical Additional Matting Overlay.



The above noise control recommendations are not necessarily the only options available, but are expected to be the most cost-effective and practical with the information currently to hand. Alternative options can be considered providing they result in the same or lower received noise levels at any nearby residence, subject to submission of a noise impact assessment.

8 CONCLUSION

An assessment of noise impacting on a proposed subdivision at Lots 150 and 287 DP.751709 and Lot 12623 DP.257263, Leonard Road, Hanwood, has been completed, resulting in the compilation of a schedule of minimum glazing thicknesses and types, roof/ceiling and wall construction, etc, to ensure the acoustic amenity of future occupants is maintained. **Note: The typical glazing shown in Tables 6 and 7 should be used as a guide only. The supplier of the window/door must be able to provide evidence that the complete system will achieve the specified Rw performance, i.e. do not simply install our recommended glass in a standard window frame.**

This assessment has shown that the site is suitable for the intended purpose, subject to our recommendations. With these or equivalent measures in place, noise impacting on the site is predicted to be compliant with the criteria.

The guidelines herein are preliminary in that the selection of building materials depends on user/client requirements, space limitations, budgetary constraints and practicalities that relate to the acoustic design of suites. Adequate building facade design may be achieved through many different combinations of materials, all of which may achieve the same result, subject to review by us.

Note that acoustic certification for individual dwellings on each Lot is the responsibility of the builder, as the acoustic consultant cannot be present at critical stages of construction.

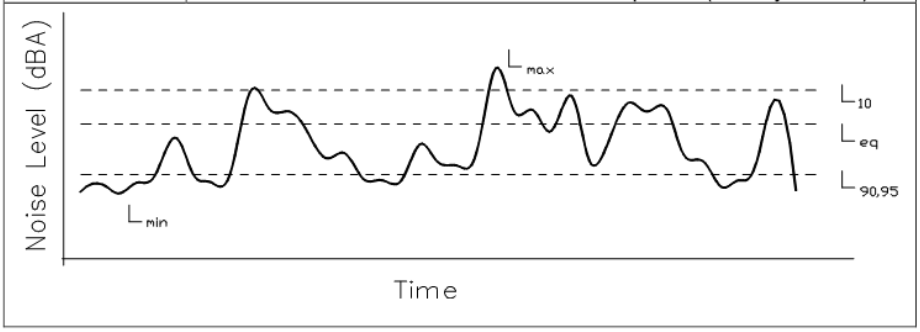
In conclusion, providing the recommendations given in this report are implemented, noise from passing road traffic and nearby industry will comply with the requirements of the EPA, AS/NZS2107, and DPE's Guideline. We therefore see no acoustic reason why the proposal should be denied.

Steve Brady M.A.S.A. A.A.A.S.
Principal Consultant

APPENDIX A
Definition of Acoustic Terms

Definition of Acoustic Terms

Term	Definition
dB(A)	A unit of measurement in decibels (A), of sound pressure level which has its frequency characteristics modified by a filter ("A-weighted") so as to more closely approximate the frequency response of the human ear.
Rw	Weighted Sound Reduction Index. The ability of a partition to attenuate sound, in dB. Given as a single number representation.
Leq	Equivalent Continuous Noise Level - which, lasting for as long as a given noise event has the same amount of acoustic energy as the given event.
L90	The noise level which is equalled or exceeded for 90% of the measurement period. An indicator of the mean minimum noise level, and is used in Australia as the descriptor for background or ambient noise (usually in dBA).
Lmax	The maximum level for the measurement period (usually in dBA)



APPENDIX B
Noise Control Zones


ZONE 1
ZONE 2
ZONE 3
KIDMAN WAY
LEONARD RD
1ST AVENUE
2ND AVENUE
2ND STREET
3RD STREET
5TH STREET
6TH STREET
OLD WILBRIDGE RD

Torrent Consulting Pty Ltd
PO Box 57
Wallsend NSW 2287

ABN 11 636 418 089

www.torrentconsulting.com.au

Our Ref: DJW: L.T2411.004.docx

19 September 2025
Planningmatters Development Service
23 Noorilla Street
Griffith NSW 2680
Attn: Martin Ruggeri

Dear Martin

RE: FLOOD IMPACT AND RISK ASSESSMENT FOR PROPOSED REZONING OF LOT 1623 DP 257265 AND LOT 150 & 287 DP 751709, LEONARD ROAD, HANWOOD NSW

Background

Torrent Consulting was engaged to undertake a Flood Impact and Risk Assessment to assist in the approval process for the proposed rezoning of Lot 1623 DP 257265 and Lot 150 & 287 DP 751709, Leonard Road, Hanwood, NSW (the Site). It is understood that a flood report will be required by Griffith City Council, with the far western end of the Site identified as being located within the floodplain.

This Site is generally located on relatively high ground sloping away from the intersection of Leonard Road and Andreatta Road. However, the western part of Lot 150 DP 751709 behind the Kidman Way is lower lying and subject to flood inundation. There is a drainage channel bisecting the Site (DC 'DA') that then runs along the southern boundary and under the Kidman Way, as shown in Figure 1.

The existing design flood conditions at the Site are detailed in the Griffith Main Drain J and Mirrool Creek Yenda Flood Mapping Update (Torrent Consulting, 2021). The flood mapping in this study was derived from an updated TUFLOW hydraulic model, originally developed for the Griffith Main Drain J and Mirrool Creek Flood Study (BMT WBM, 2015). However, these are regional flood studies and the modelled drainage detail local to Hanwood was limited to the principal drainage channel servicing the area, i.e. DC 'A'. The flooding experienced during the March 2012 event and represented in the flood studies is dominated by the backwater flood inundation from Main Drain J.

Following the March 2012 flood event and subsequent completion of the Griffith Main Drain J and Mirrool Creek Floodplain Risk Management Study (BMT WBM, 2015), a levee design has been developed for Hanwood to protect it from backwater inundation within Main Drain J, DC 'A', DC 'DA' and DC 'Handepot'. The works include one-way outlets on local pipe drainage in Hanwood and a pumping station with a capacity of around 1 m^3/s to discharge local catchment runoff during backwater flood conditions.

For this assessment, modelling has been undertaken of the local catchment draining through the Site to the outlet point of DC 'DA' into DC 'A', as this mechanism will result in the critical flood conditions east of the Kidman Way. By addressing the flood risk and potential flood impacts of future development of the Site for local catchment runoff, the risk and impact of regional backwater flood conditions will also be inherently satisfied.

Figure 2 shows the local catchment topography, which is evidently very flat, grading at around 0.15% from Old Willbriggie Road down to the Kidman Way. The landscape features a network of irrigation supply and drainage canals, with the local catchment boundary identifying land that drains to the culvert structure

beneath the Kidman Way on DC 'DA'. This includes the village of Hanwood and totals some 1.6 km^2. The modelling methodology employed in this assessment is a rain-on-grid rainfall-runoff TUFLOW model and as such represents local catchment runoff conditions across the entire modelled area. Throughout most of the area the nature of the simulated rainfall-runoff is local catchment stormwater drainage, which should not be considered as flood inundation from a risk management perspective. However, towards the south-western end of the model, as the contributing catchment area increases, the nature of inundation becomes sufficient to consider from a flood risk management rather than a local stormwater management perspective.

Ultimately, the management of local catchment stormwater runoff will be a key consideration for future development of the Site, as it will alter the hydrological response of the subject land. This is dependent on the civil design, including regrading, road and stormwater drainage, for which details are not available at this early stage of the process. However, modifications have been made to the TUFLOW model to represent a potential future development condition to simulate potential impacts and understand at a high level, what the key constraints and opportunities will be moving forward through the development design process.

Model Development

For this assessment, a TUFLOW model was developed covering the local draining through the Site to the Kidman Way (as presented in Figure 3). The model extends to the west to the interface with DC 'A' at which a downstream model boundary is applied. The TUFLOW model covers a total area of around 2.4 km^2. The model utilised the NSW Spatial Services LiDAR data (dated 2021) to define the floodplain topography and was constructed using a 4 m horizontal grid cell resolution. The sub-grid sampling routine was employed in TUFLOW to represent ground surface elevations at a 0.5 m horizontal spacing. This exceeds the resolution of the LiDAR data (which has 1 m horizontal gridded resolution) but enables a more detailed representation of the open drainage channel network that has been re-enforced within the model.

The dimensions of the open drainage channels and sub-surface stormwater drainage infrastructure were derived from a combination of design drawings for the Hanwood levee, the LiDAR survey data, Google StreetView and aerial imagery. The drainage channel geometry was enforced within the model as trapezoidal channels with a batter slope of 1-in-1.5 and bed widths ranging from 0.6 m to 1.7 m. The levee crest was enforced at a level of 122.3 m AHD. Stormwater drainage infrastructure was modelled using 1D elements, dynamically linked to the 2D model domain.

Land use coverage in the catchment was separated into agricultural, urban and grassed areas using aerial imagery. Manning's 'n' hydraulic roughness values of 0.05, 0.03 and 0.04 were applied to these areas, respectively. A depth-varied roughness was applied, increasing the roughness for shallow sheet flow conditions. The modelled drainage channels were assigned an 'n' value of 0.035. An impervious area of 50% was applied to the urban areas and drainage channels, with 0% impervious adopted elsewhere. For the proposed future development scenario, the agricultural land use was changed to urban, with the adoption of a 60% impervious surface coverage.

Rainfall losses were modelled using the Green-Ampt infiltration method, with a three-layer soil model comprising a 0.1 m deep topsoil, 0.2 m transition zone and a variable depth subsoil layer. The depth of the subsoil layer was derived from the September 2019 CSIRO gridded soil depth mapping dataset. Soil types for each layer were derived from the September 2022 NSW DPE gridded soil properties mapping dataset, with classification based on the clay, silt, and sand content. The available water holding capacity for each

soil type was based on the MEDLI guidelines. The standard Green-Ampt parameters for suction and hydraulic conductivity were adopted.

The downstream boundary of the model was configured as a tailwater condition, representative of the discharge rates being conveyed within DC 'DA'.

Design Flood Hydrology

Catchment runoff was simulated (using the HPC solver) for the 5% AEP, 1% AEP and PMF events for storm durations ranging from 15 minutes to nine hours. The design rainfall depths were sourced from the BoM IFD (Intensity Frequency Duration) portal. An Areal Reduction Factor (ARF) was applied to the design point rainfall for each rainfall event, which given the small catchment area is no lower than 98%. The initial soil moisture was set at the 90th percentile conditions from the BoM AWRA-L model data.

As per the updated ARR 2019 climate change guidance, an adjustment was made to the adopted design rainfall to account for potential increases in rainfall intensity. The rainfall adjustment is determined through a combination of an expected increase in global mean temperature and an associated percentage increase in design rainfall intensity per degree of warming.

For this assessment the Shared Socioeconomic Pathway SSP2 was adopted, which represents a continuation of historic global attitudes towards climate policy, i.e. a neutral rather than optimistic or pessimistic outlook. The SSP2-4.5 climate scenario has a best-estimate warming of around 2.7ºC by 2100. For the expected increase in design rainfall, the 7% per degree warming recommended in the NSW Flood Risk Management Manual (2023) was adopted. This gives a total increase in design rainfall intensity of 20% when using Equation 1.6.1 of ARR 2019. Therefore, the hydrological assessment applied a factor of 1.2 to the BOM IFD rainfall depths.

The ensemble method involves the simulation of ten rainfall temporal patterns for each design event magnitude and duration, with the average condition of the ten being adopted for design purposes. The TUFLOW model simulations were analysed for each event to identify the critical storm duration, i.e. that which produces the peak flood flow (and levels) for each design event magnitude. The 270-minute duration was identified as being critical for the local catchment outlet at the Kidman Way. For the PMF event the GSDM method developed by the BOM was used. The critical duration of the PMP was found to be the 180-minute event, with a total rainfall depth of 470 mm (~157 mm/h intensity).

Table 1 presents the modelled peak design flows and downstream tailwater conditions modelled for each of the considered design events.

Table 1 – Modelled Peak Design Flood Flows and Adopted Tailwater Levels

Event	Flow (m^3/s)	Tailwater (m AHD)
5% AEP	2.1	120.9
1% AEP	2.7	121.0
PMF	75	121.7

Design Flood Conditions

The modelled design flood conditions for the existing scenario were post-processed to filter out areas of inundation depth less than 100 mm. This is to remove areas of sheet flow from rainfall-runoff inherent in the modelling methodology and outputs, limiting the mapping to areas with a more significant accumulation

of surface water. Figure 4 presents the mapped peak flood extents for the 5% AEP, 1% AEP and PMF events, with the Site boundary shown for context.

Figure 5, Figure 6 and Figure 7 are presented for additional context and show the modelled peak flood depths for the 5% AEP, 1% AEP and PMF events respectively. The mapping indicates that the modelled surface water inundation is relatively shallow throughout much of the study area, being no more than around 200 mm deep. There are localised areas of deeper water (~300-500 mm) in low-lying areas of the existing fields, particularly where water is backed up behind the Kidman Way in the south-western corner of the Site. This is the same location that is impacted by backwater flooding from Main Drain J.

Figure 8, Figure 9 and Figure 10 present the flood hazard classification for the 5% AEP, 1% AEP and PMF events respectively. The flood hazards have been determined in accordance with Guideline 7-3 of the Australian Disaster Resilience Handbook 7 Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia (AIDR, 2017). This produces a six-tier hazard classification, based on modelled flood depths, velocities and velocity-depth product. The hazard classes relate directly to the potential risk posed to people, vehicles and buildings, as presented in Chart 1.

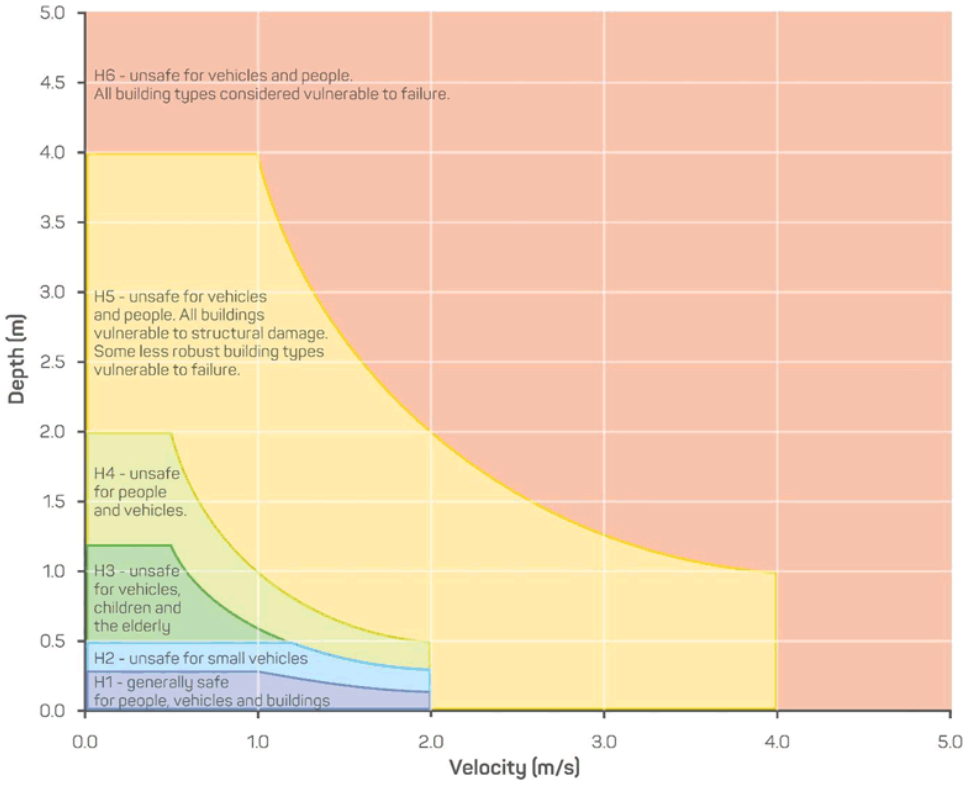


Chart 1 – General Flood Hazard Vulnerability Curves (AIDR, 2017)

The flood hazard mapping is useful for providing context to the nature of the modelled flood risk and to identify potential constraints for development of the Site with regards to floodplain risk management. The

principal consideration of good practice floodplain risk management is to ensure compatibility of the proposed development with the flood hazard of the land, including the risk to life and risk to property.

Given the flat nature of the local topography, there is a minimal velocity component to the modelled flood waters, being under 1.0 m/s in the drainage channels and under 0.5 m/s in the adjacent floodplain, even at the PMF event. This translates to relatively low flood hazard conditions, with medium hazard conditions (H3-H4) being limited largely to the open drainage channels at the 1% AEP event. An H3 hazard is more extensive at the PMF event. However, this represents an extremely rare condition in the order of a 1-in-10,000,000 AEP and do not present a risk to buildings.

Floodplain Risk Management Considerations

Ministerial Direction 4.1 provides guidance on how to consider flooding implications when considering planning proposals on land identified within a flood planning area or below the probable maximum flood. Relevant provisions of the Ministerial Direction are that:

- A planning proposal must not rezone land within the flood planning area from Recreation, Rural, Special Purpose or Conservation Zones to a Residential, Employment, Mixed Use, W4 Working Waterfront or Special Purpose Zones.
- A planning proposal must not contain provisions that apply to the flood planning area which permit a significant increase in the development and/or dwelling density of that land.

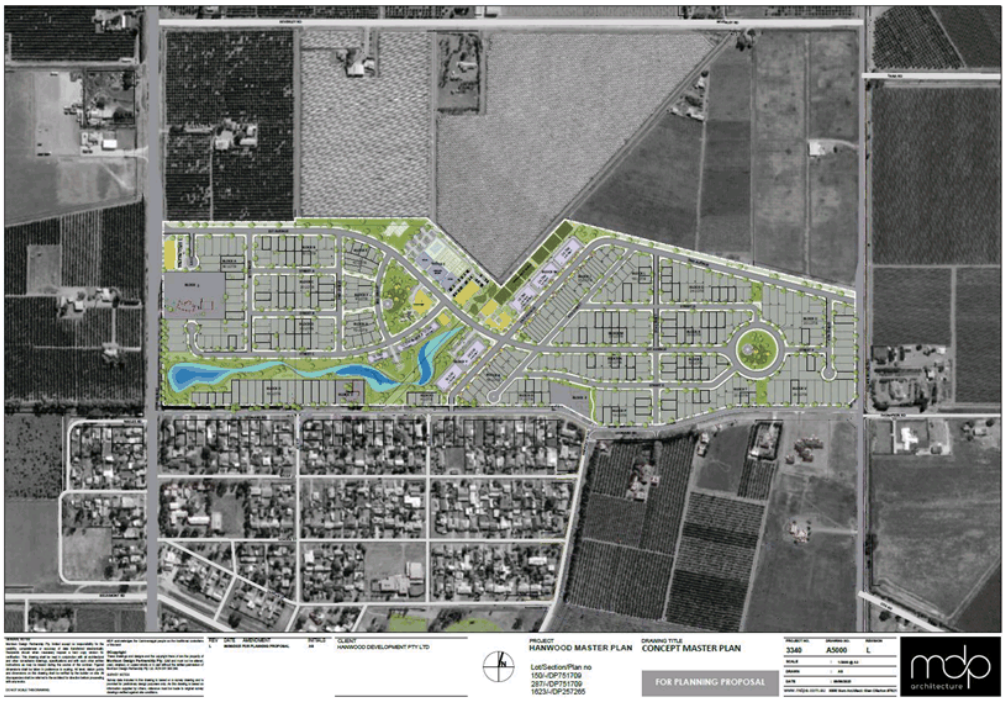
This requirement directly impacts the Site, as the Flood Planning Area can effectively be considered as anywhere mapped as being within the PMF extent shown in Figure 4, Figure 7 or Figure 10. However, the intent behind this requirement is to prevent unsustainable future development of locations within mainstream fluvial floodplains, where such development will likely result in a high level of residual flood risk exposure and/or impact the flood conditions for existing development. To cover the full range of flood risk environments that might be subject to Ministerial Direction 4.1, it allows for inconsistency with the policy, provided that the planning proposal authority can satisfy the Planning Secretary (or their nominee) that:

- the planning proposal is in accordance with a floodplain risk management study or plan adopted by the relevant council in accordance with the principles and guidelines of the Floodplain Development Manual 2005, or
- where there is no council adopted floodplain risk management study or plan, the planning proposal is consistent with the flood study adopted by the council prepared in accordance with the principles of the Floodplain Development Manual 2005 or
- the planning proposal is supported by a flood and risk impact assessment accepted by the relevant planning authority and is prepared in accordance with the principles of the Floodplain Development Manual 2005 and consistent with the relevant planning authorities' requirements, or
- the provisions of the planning proposal that are inconsistent are of minor significance as determined by the relevant planning authority.

This flood risk and impact assessment has been prepared to satisfy the above inconsistency with Ministerial Direction 4.1 Flooding.

Revision L of the Hanwood Masterplan provides a conceptual future development layout for the Site and is shown in Insert 1. It is generally compatible with local flooding, providing wetland areas and additional open space along the alignment of the lower-lying areas of land. Although the available detail is only conceptual

at this stage of the planning process, a reasonable representation of the future development has been made in the TUFLOW model to identify any potential impacts to the existing flooding regime.



Insert 1 – Hanwood Masterplan Rev L (MDP Architecture)

The key elements of the potential future development that have been modelled include:

- Raising of the development area above the floodplain
- Increased surface runoff due to additional impervious surfaces
- Modification of the existing drainage channel to a more natural wetland geometry
- Filling of DC 'DA' along Leonard Road and diversion of flows to the rear of the allotments fronting Leonard Road (i.e. Block H).

The levels of the developable area of the Site were raised above the existing 1% AEP flood level along the interface with the wetland and open space and then graded at around 0.3% to facilitate surface water drainage. The modelled grading approximately maintains the existing surface water runoff distribution to the drainage channel network. The impervious surface coverage of the proposed development areas was set at 50%, with the open space areas set at 0%.

The indicative wetland drainage concept in the masterplan includes three shades of blue and a single shade of blue green. These have been used to make reasonable assumptions regarding a preliminary regraded surface level. The outside of the lightest blue colouration (which is continuous throughout the Site) was set to match the approximate bed level of the existing drainage channel. The land within the two deeper shades of blue was then lowered by an additional 0.5 m and 1.0 m, respectively. The outer edge of the blue green

shading was set 0.5 m above the existing drainage channel bed, then tying into the existing surface levels at the edge of the open space.

The modelled peak flood depth conditions for the 1% AEP event concept development scenario are shown in Figure 11, with the corresponding flood hazard classification mapping shown in Figure 12. A comparison of the modelled peak flood levels between the concept development scenario and the existing scenario has been undertaken, with the results shown in Figure 13.

Overall, the modelled concept development scenario provides a larger volume of floodplain storage than is available under the existing scenario. The modelled wetland concept more than offsets the loss of floodplain storage volume associated with the fill required to satisfy Ministerial Direction 4.1 flooding. This is particularly notable in Hanwood, where less water spills from the channel into the area of existing development.

Preliminary concept development model scenarios resulted in a minor flood level increase from the existing scenario in the areas adjacent to the Kidman Way. This was a function of flood waters being conveyed to the highway more efficiently due to the increased drainage capacity associated with the wetland. Flood mitigation measures were therefore implemented in the TUFLOW model, at the locations indicated in Figure 11 through Figure 13. This comprises a series of earthen embankments with a 1500 x 750 mm box culvert to detain the flow within the wetland and mitigate the downstream impacts.

The ultimate impacts of the potential future development will change throughout the subsequent design stages. However, the conceptual modelling undertaken for this assessment indicates that there is sufficient opportunity to control and mitigate any off-site flood impacts through design. The proposed wetland area can more than offset any loss of floodplain storage associated with filling of the adjacent residential development.

To provide for future development that is compatible with the flood hazard of the land, consistent with the LEP and DCP requirements, any land below the 1% AEP flood level will need to be regraded to be at or above the flood level, as has been undertaken in the TUFLOW model of the conceptual development. This is readily achievable with the excavation of material that is required the creation of the new drainage alignment and wetland environment.

For the management of risk to property from flooding, the finished floor levels of future dwellings will need to be constructed at or above the Flood Planning Level (FPL), which is 0.5 m above the 1% AEP flood level. With the external surface levels being set at or above the 1% AEP flood level, this will require future dwellings to be constructed at a height no more than a 0.5 m above the ground surface.

The FPL for each allotment will be dependent on the ultimate development design. However, the conceptual modelling that has been undertaken for this assessment indicates that this is expected to range between around 122.6 m AHD at the western end of the Site, to around 123.4 m AHD midway across the Site and around 124.5 m AHD at the eastern end of the Site. The FPL at the western end is fixed by the 1% AEP flood level overtopping the Kidman Way. Further east, the FPL can be controlled to some degree through the design of the wetland and drainage channels.

With regards to the management of risk to life from flooding, the finished floor levels of future dwellings will be above the PMF level, meaning that residents will be safe within their homes. Because of the flat nature of the local topography, the PMF level is typically only around 0.2-0.3 m above the 1% AEP flood level and

so is readily accommodated by the FPL. External flood hazard conditions at the PMF event will also be low (H1-H2) and so will not present a risk to people or building structures.

Conclusion

Torrent Consulting was engaged to undertake a Flood Impact and Risk Assessment for the proposed rezoning of Lot 1623 DP 257265 and Lot 150 & 287 DP 751709, Leonard Road, Hanwood, NSW. This assessment has included development of a TUFLOW model for the local catchment and has simulated design flood conditions in accordance with the ARR 2019 guidelines, specifically the ensemble method for design flood hydrology. An allowance has been made for future climate change impacts through the application of a 20% increase in design rainfall intensities.

With the planning proposal being for the rezoning of rural land to residential use and most of the Site being located within the FPA, it is inconsistent with Ministerial Direction 4.1 Flooding. However, this flood assessment has demonstrated that this inconsistency results in only a minimal flood risk exposure and that potential off-site flood impacts can be readily mitigated through design.

To provide for future development that is compatible with the flood hazard of the land, consistent with the LEP and DCP requirements, any land below the 1% AEP flood level will need to be regraded to be at or above the flood level. With future dwellings having finished floor levels set at or above the FPL, the requirements for the management of flood risk to both property and life can be readily satisfied.

A relative flood impact assessment has been undertaken and identified that the proposed drainage modification to that of a constructed wetland, together with increased runoff volumes associated with impervious surfaces, result in a higher peak flow rate at the Kidman Way and therefore increased peak flood levels. However, the implementation of mitigation works in the form of earthen embankments and culvert cross-drainage structures serves to detain the runoff within the wetland and mitigates the potential off-site flood impacts.

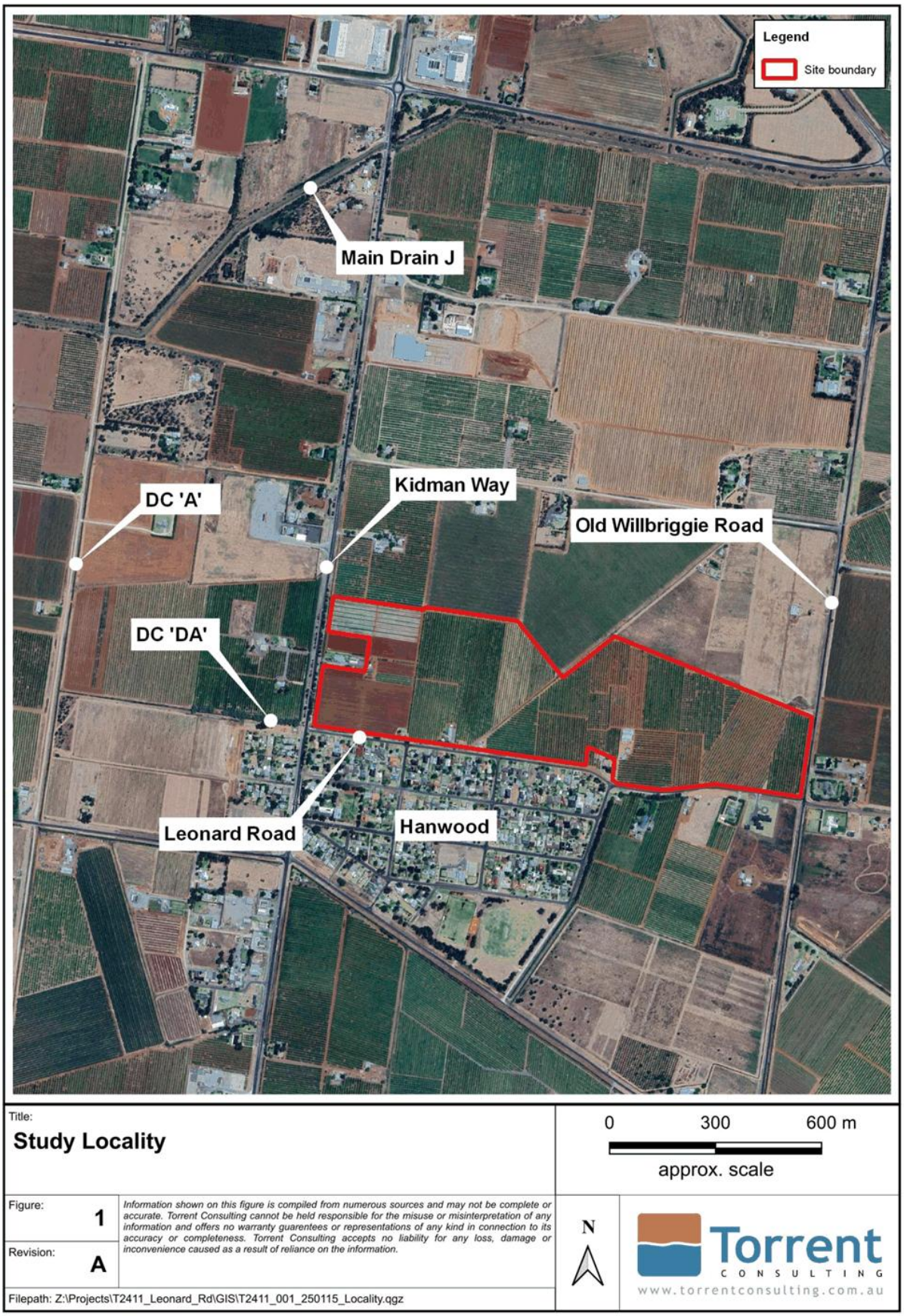
The concept development design is compatible with the flood hazard of the land and can be rezoned with confidence that the flood risk at the Site can be managed through the subsequent design and approval stages.

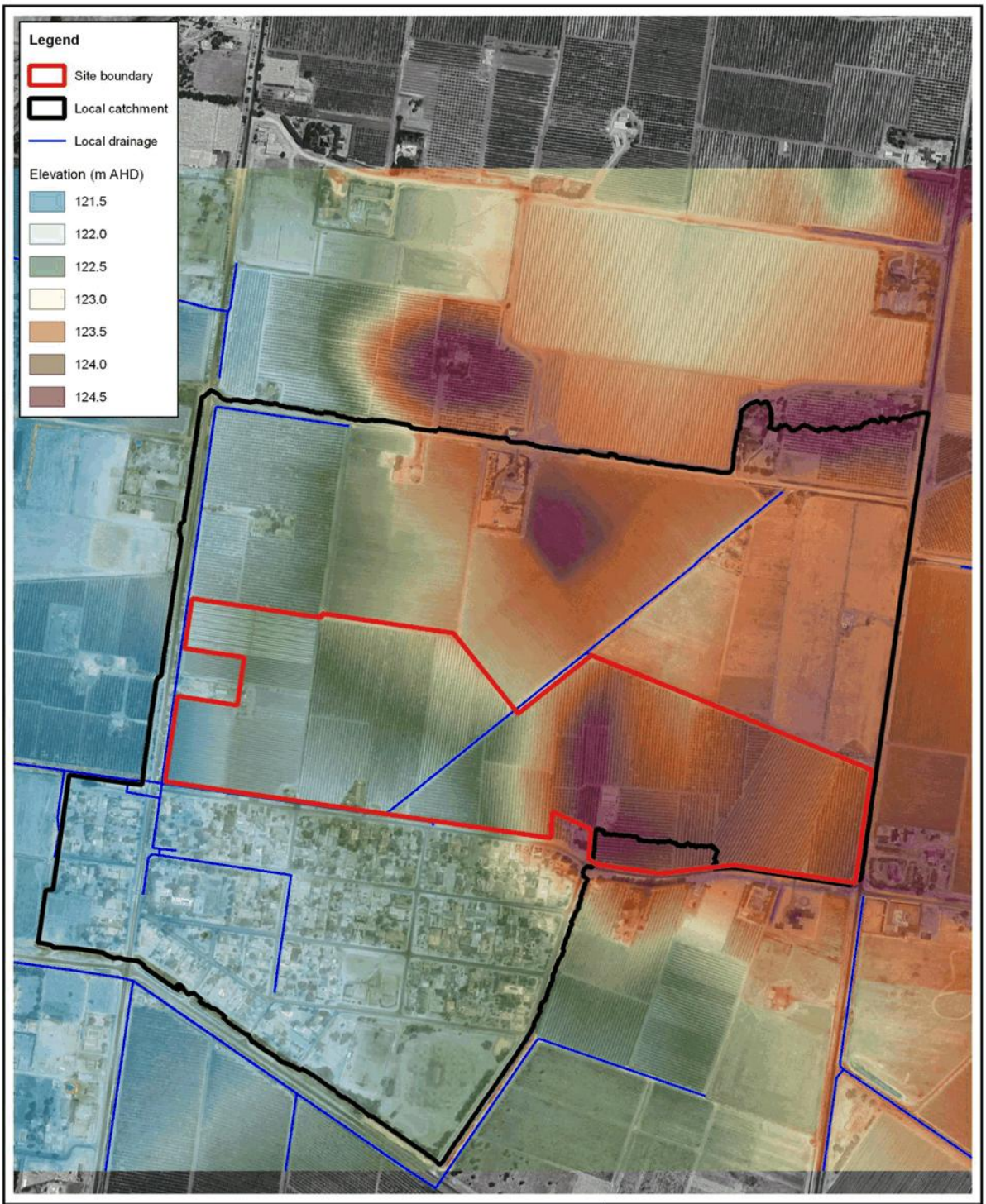
We trust that this report meets your requirements. For further information or clarification please contact the undersigned.

Yours faithfully

Torrent Consulting

Dan Williams
Director


Legend
Site boundary
Main Drain J
Kidman Way
DC 'A'
Old Willbriggie Road
DC 'DA'
Leonard Road
Hanwood
Title:
Study Locality
0
300
600 m
approx. scale
Figure: 1
Revision: A
Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.
N
Torrent CONSULTING
www.torrentconsulting.com.au
Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_001_250115_Locality.qgz



Title:

Study Locality

0 200 400 m

approx. scale

Figure: 2

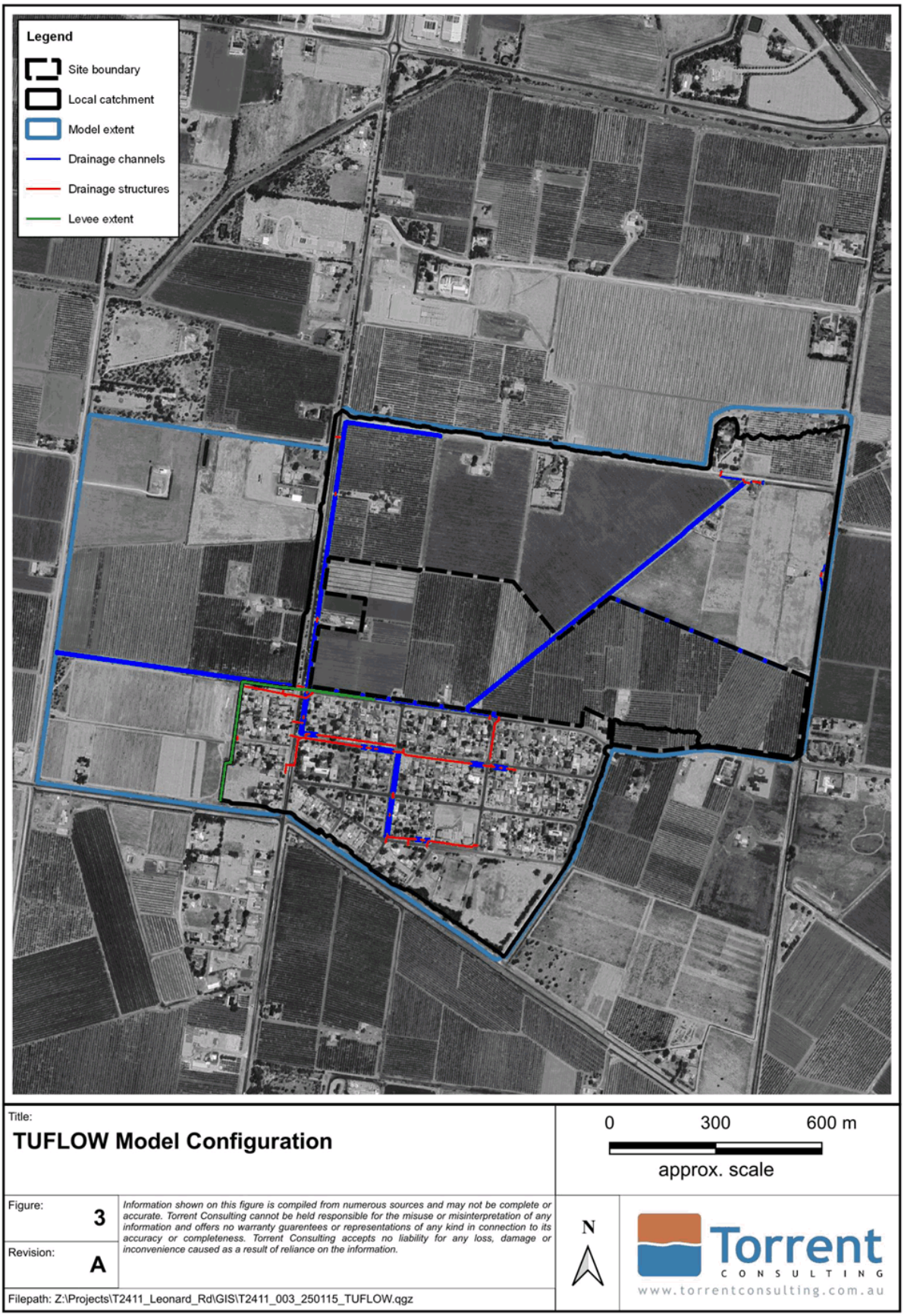
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_002_250115_Topography.qgz


Legend
Site boundary
Local catchment
Model extent
Drainage channels
Drainage structures
Levee extent
Title:
TUFLOW Model Configuration
0
300
600 m
approx. scale
Figure: 3
Revision: A
Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.
N
Torrent CONSULTING
www.torrentconsulting.com.au
Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_003_250115_TUFLOW.qgz

Title:

Modelled Design Flood Extents with a 100 mm depth limit filter

0 200 400 m

approx. scale

Figure: 4

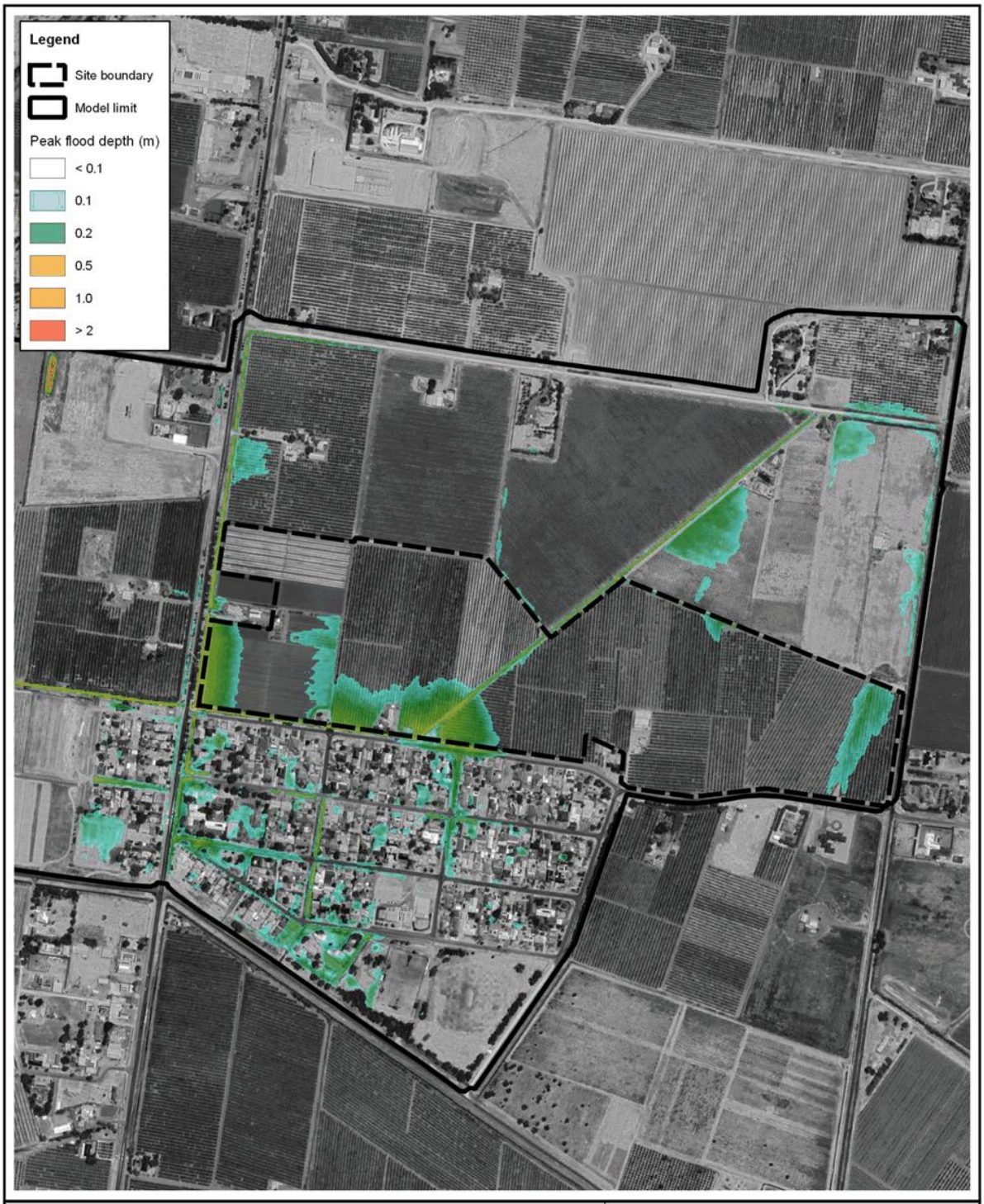
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_004_250115_Extents.qgz



Title:

Modelled 5% AEP Peak Flood Depth Conditions with a 100 mm depth limit filter

0 200 400 m

approx. scale

Figure: 5

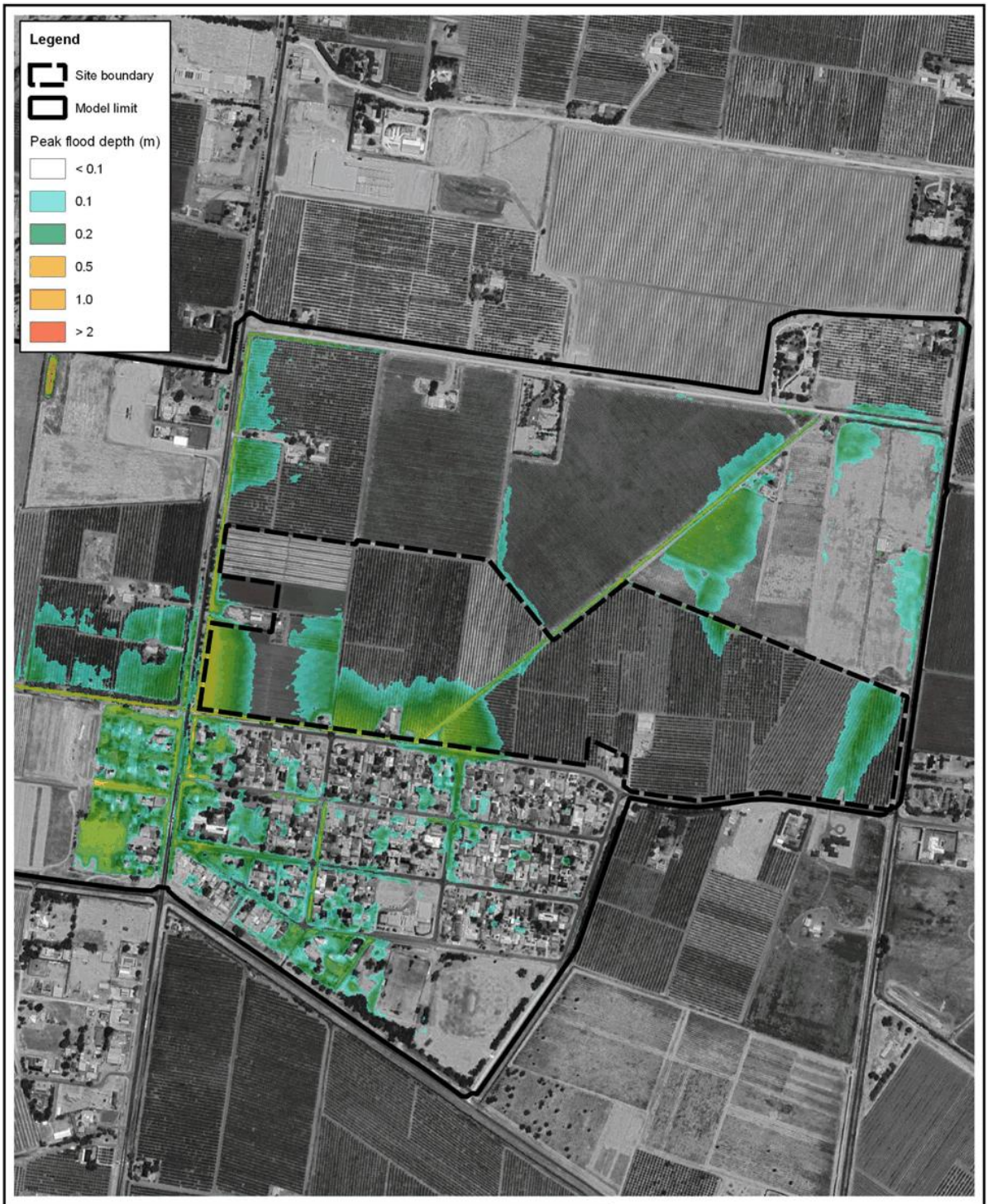
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_005_250115_20y_depth.qgz



Title:

Modelled 1% AEP Peak Flood Depth Conditions with a 100 mm depth limit filter

0 200 400 m

approx. scale

Figure: 6

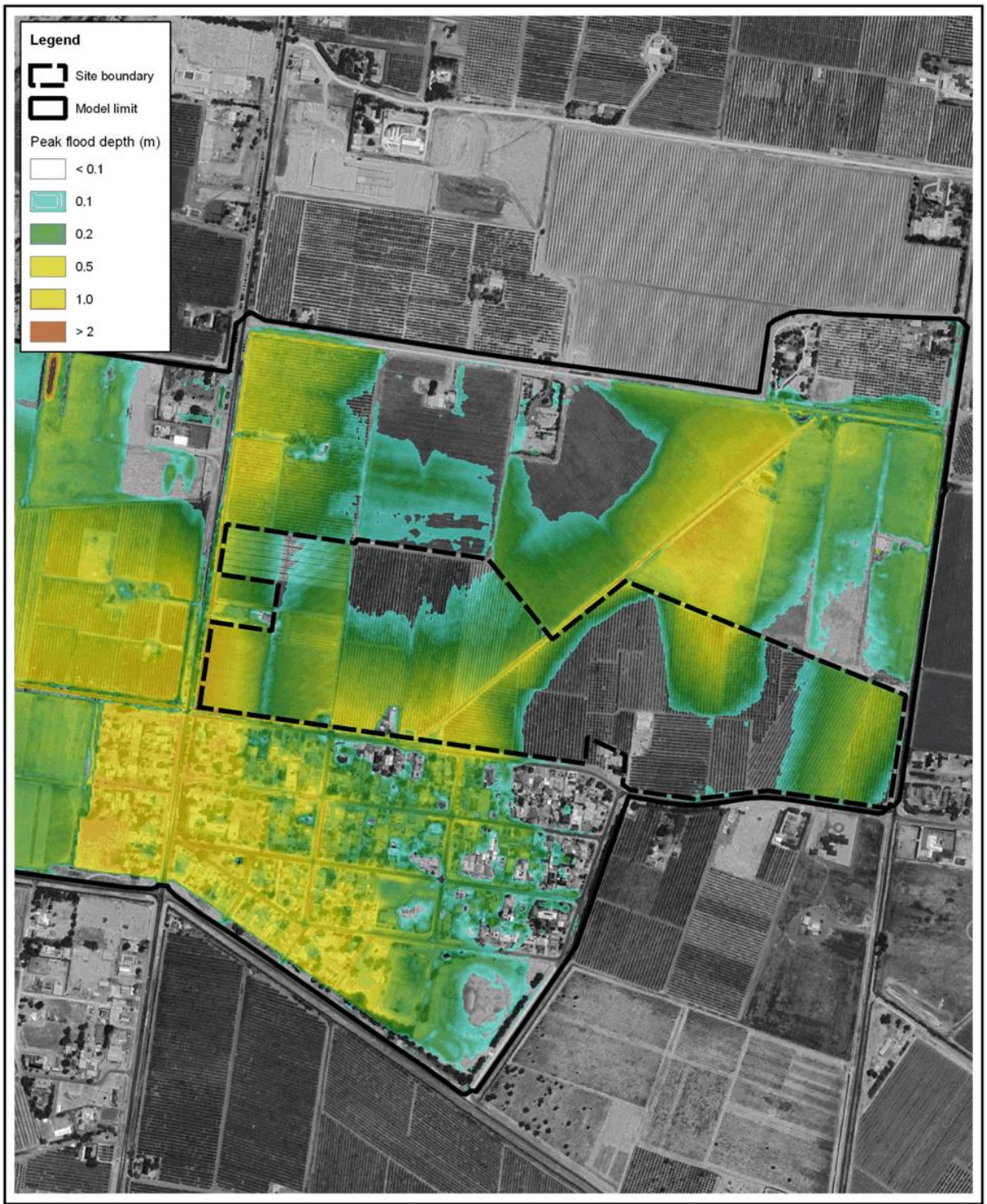
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_006_250115_100y_depth.qgz



Title:

Modelled PMF Peak Flood Depth Conditions with a 100 mm depth limit filter

0 200 400 m

approx. scale

Figure: 7

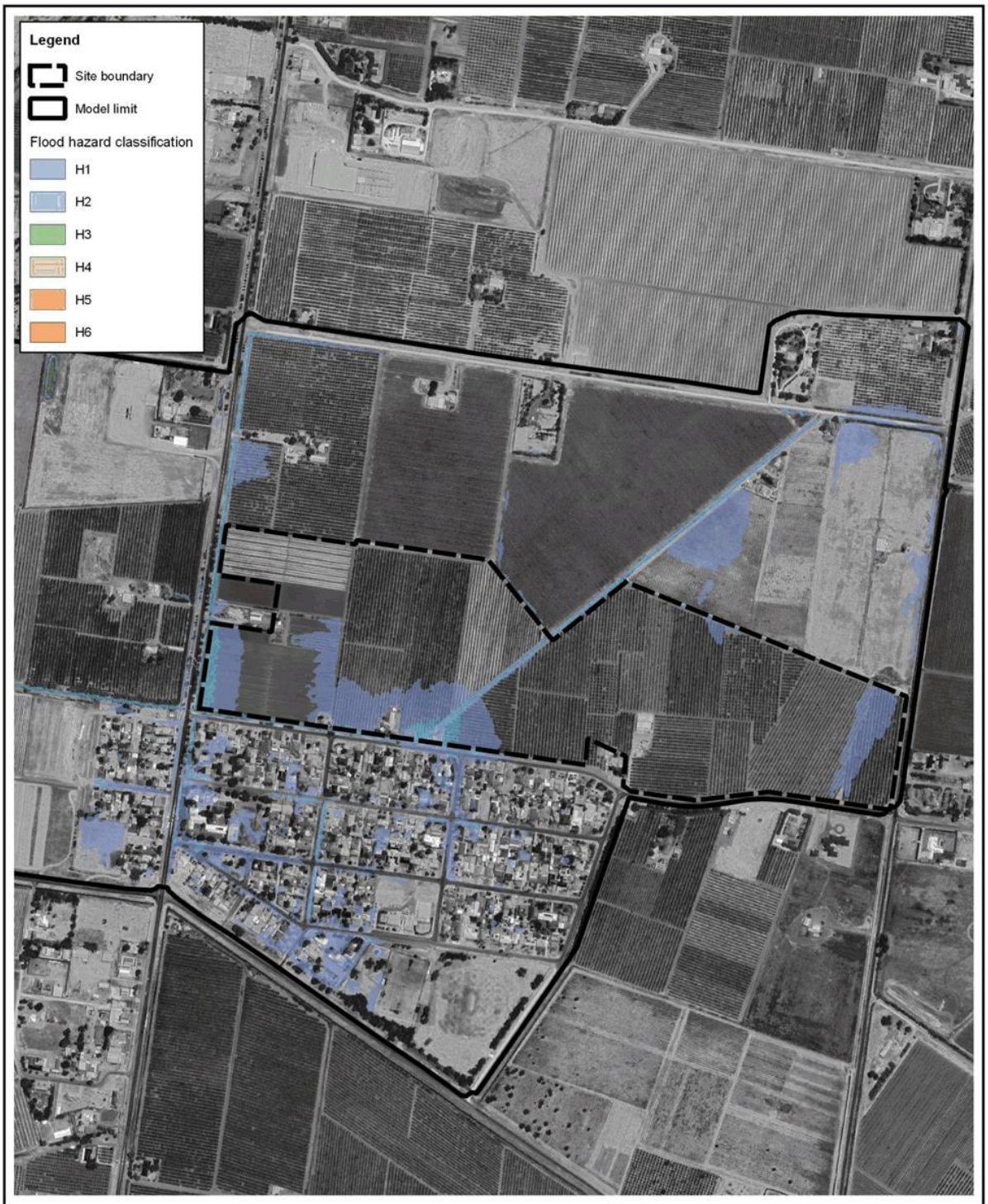
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_007_250115_PMF_depth.qgz



Title:

5% AEP Flood Hazard Classification with a 100 mm depth limit filter

0 200 400 m

approx. scale

Figure: 8

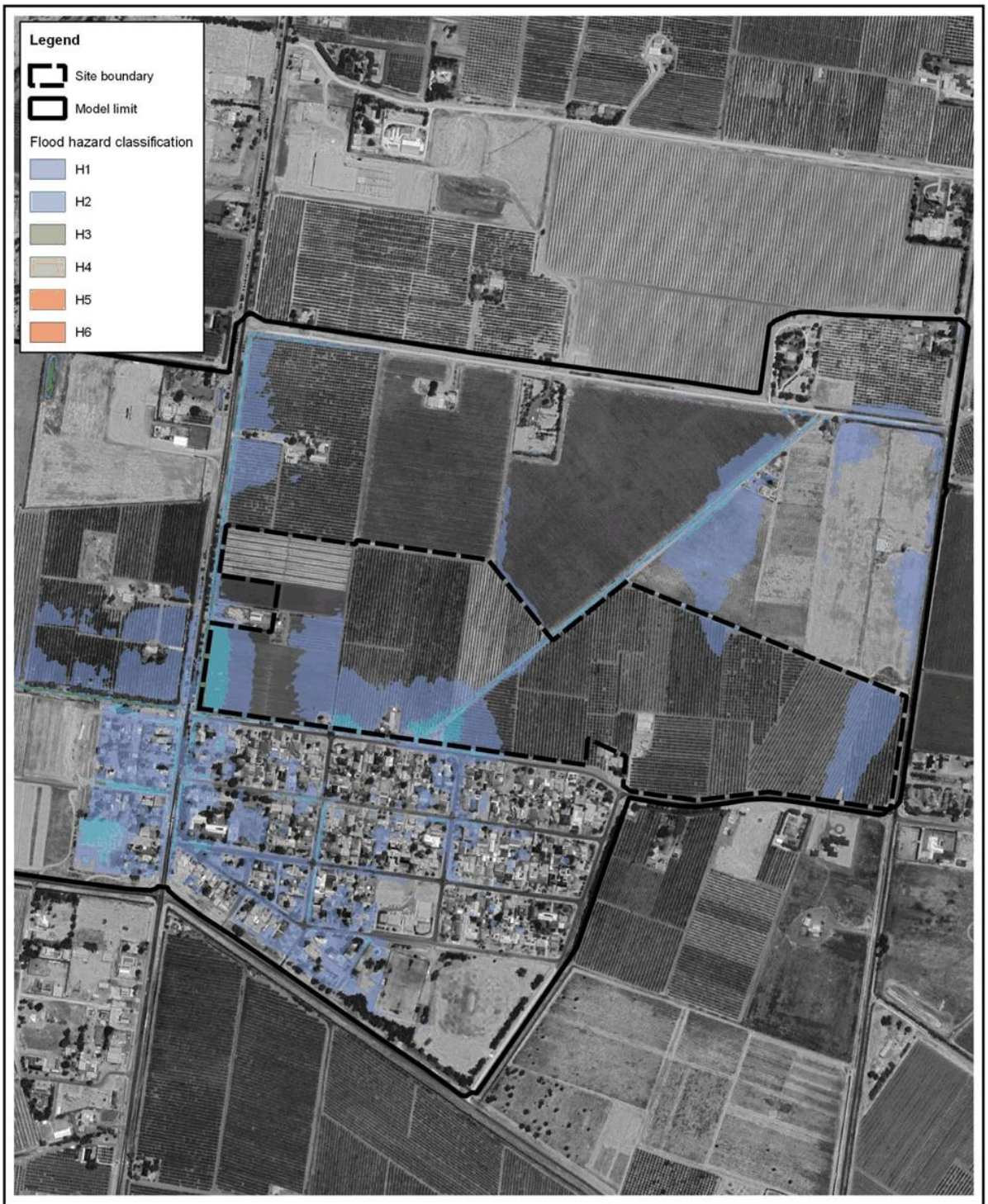
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_008_250115_20y_hazard.qgz



Title:

1% AEP Flood Hazard Classification with a 100 mm depth limit filter

0 200 400 m

approx. scale

Figure: 9

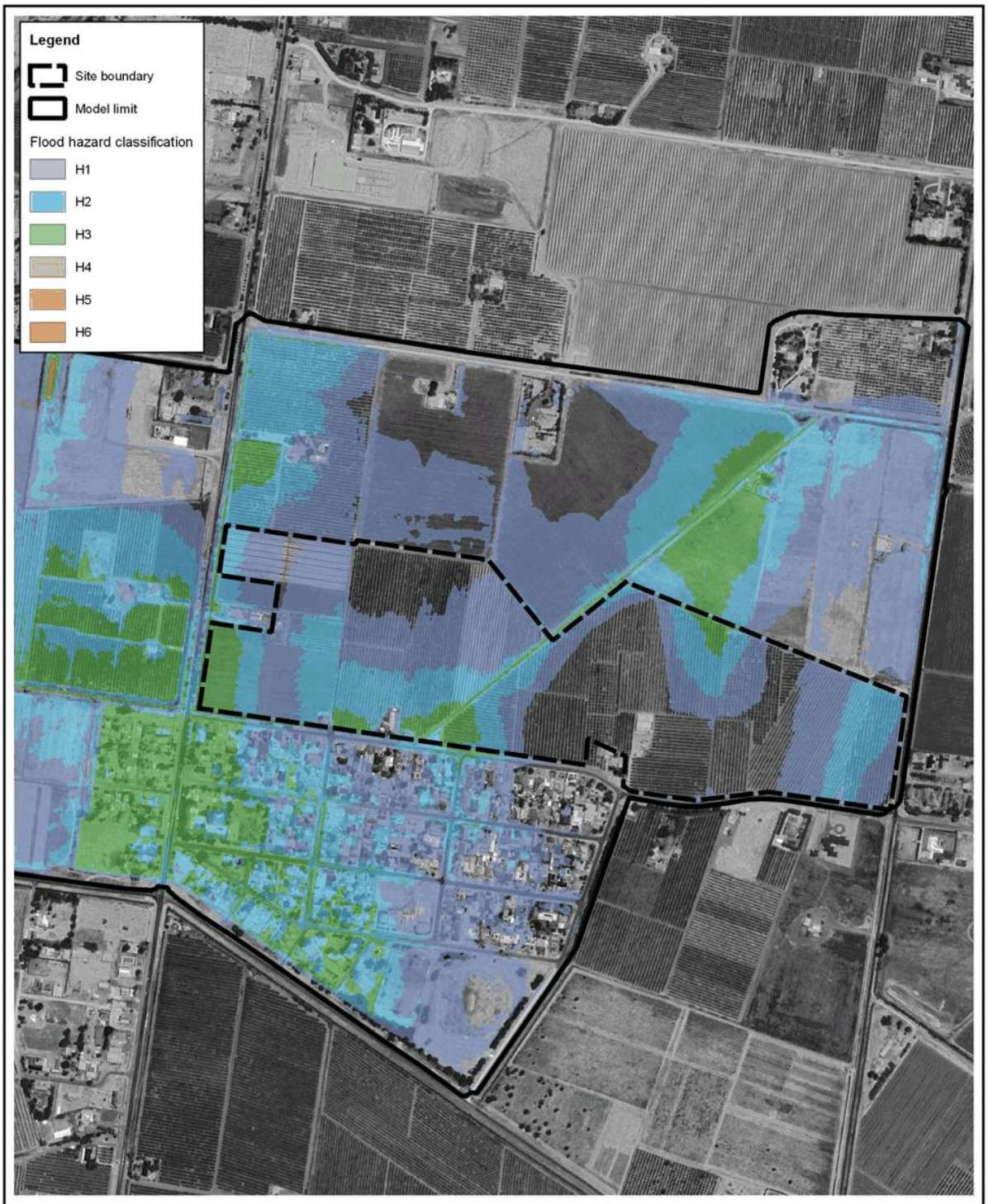
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_009_250115_100y_hazard.qgz



Title:

PMF Flood Hazard Classification with a 100 mm depth limit filter

0 200 400 m

approx. scale

Figure: 10

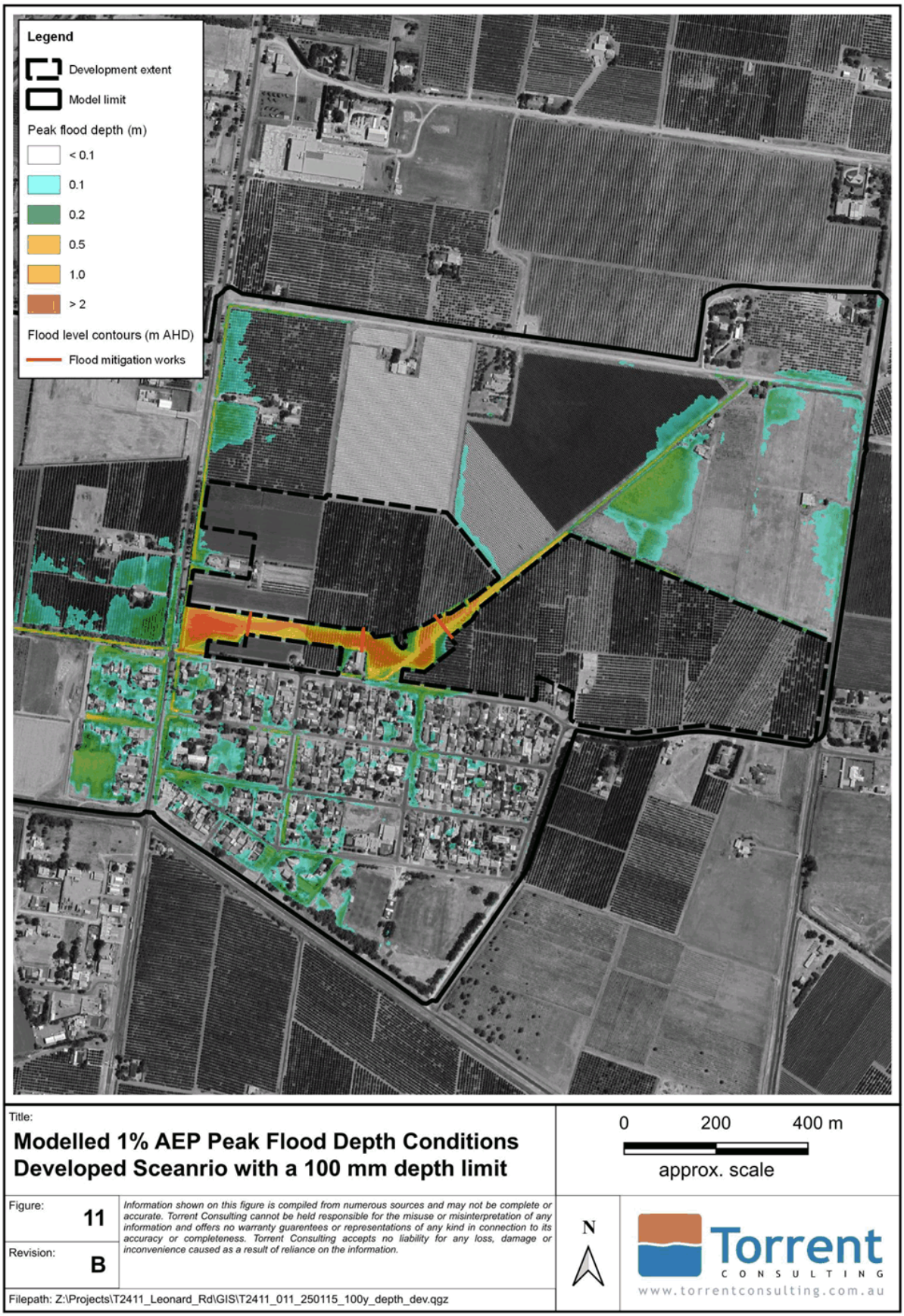
Revision: A

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_010_250115_pmf_hazard.qgz



Title:

Modelled 1% AEP Peak Flood Depth Conditions Developed Sceanrio with a 100 mm depth limit

0 200 400 m

approx. scale

Figure: 11

Revision: B

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_011_250115_100y_depth_dev.qgz

Title:

1% AEP Flood Hazard Classification
Developed Sceanrio with a 100 mm depth limit

0 200 400 m

approx. scale

Figure: 12

Revision: B

Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.

N

Torrent CONSULTING
www.torrentconsulting.com.au

Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_012_250115_100y_hazard_dev.qgz


Legend
Development extent
Model limit
Flood level impact (m)
< -0.10
-0.10 to -0.05
-0.05 to -0.02
-0.02 to -0.01
-0.01 to +0.01
+0.01 to +0.02
+0.02 to +0.05
+0.05 to +0.10
> +0.10
Flood extent impact
was wet, now dry
was dry, now wet
Flood mitigation works
Title:
Modelled 1% AEP Peak Flood Level Impacts
Developed Sceanrio with a 100 mm depth limit
0
200
400 m
approx. scale
Figure: 13
Revision: B
Information shown on this figure is compiled from numerous sources and may not be complete or accurate. Torrent Consulting cannot be held responsible for the misuse or misinterpretation of any information and offers no warranty guarentees or representations of any kind in connection to its accuracy or completeness. Torrent Consulting accepts no liability for any loss, damage or inconvenience caused as a result of reliance on the information.
N
Torrent
CONSULTING
www.torrentconsulting.com.au
Filepath: Z:\Projects\T2411_Leonard_Rd\GIS\T2411_013_250115_100y_h_impact.qgz

View south across the orchard in the study area.

ARCHAEOLOGICAL TECHNICAL REPORT

REZONING OF LOT 150 DP 751709, LOT 2 DP 1309816 AND LOT 1623 DP 257263, HANWOOD, NSW

GRIFFITH CITY LOCAL GOVERNMENT AREA

APRIL 2025

Report prepared by

OzArk Environment & Heritage

for Hanwood Developments Pty Ltd

OzArk
Environment & Heritage

145 Wingewarra St
(PO Box 2069)
Dubbo NSW 2830

Phone: (02) 6882 0118
Fax: (02) 6882 0630
enquiry@ozarkehm.com.au
www.ozarkehm.com.au

This page has intentionally been left blank.

DOCUMENT CONTROLS

Proponent	Hanwood Developments Pty Ltd
Client	Planningmatters Development Service
Document Description	Archaeological Technical Report: Rezoning of Lot 150 DP 751709, Lot 2 DP 1309816 And Lot 1623 DP 257263, Hanwood, NSW
File Location	OzArk Job No.
Clients\PlanningMatters\Hanwood Road South Griffith Rezoning_October 2024\ATR	4689

Document Status: V2.0 DRAFT	Date: 24 April 2025
OzArk internal edits	V1.0 WM author 26/3/25 V1.1 JH edit 27/3/25 V1.2 WM amends 28/3/25 V1.3 SR review 22/4/25
OzArk and client edits	V2.0 OzArk to client 24/4/25
Final document	
Prepared for	Prepared by
Martin Ruggeri Principal 23 Noorilla Street Griffith NSW 2680 0427 844 374 mruggeri@planningmatters.net.au	Jordan Henshaw Archaeologist OzArk Environment & Heritage 145 Wingewarra Street (PO Box 2069) Dubbo NSW 2830 02 6882 0118 jordan@ozarkehm.com.au

Acknowledgement

OzArk acknowledge the traditional custodians of the area on which this assessment took place and pay respect to their beliefs, cultural heritage, and continuing connection with the land. We also acknowledge and pay respect to the post-contact experiences of Aboriginal people with attachment to the area and to the Elders, past and present, as the next generation of role models and vessels for memories, traditions, culture and hopes of local Aboriginal people.

ABBREVIATIONS AND GLOSSARY

ACHAR	Aboriginal Cultural Heritage Assessment Report. As set out in the *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*, all developments where harm to Aboriginal objects is likely must be assessed in an ACHAR.
ACHCRs	*Aboriginal Cultural Heritage Consultation Requirements for Proponents.* Guidelines for conducting Aboriginal community consultation for developments where harm to Aboriginal objects is likely.
AHIMS	Aboriginal Heritage Information Management System. Administered by the DCCEEW, AHIMS is the central register of all Aboriginal sites within NSW.
AHIP	Aboriginal Heritage Impact Permit. Issued by Heritage NSW to allow harm to Aboriginal objects.
Code of Practice	*Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* under Part 6 NPW Act. Issued by DECCW in 2010, the Code of Practice is a set of guidelines that allows limited test excavation without the need to apply for an AHIP. The test excavation program for this assessment was conducted under the Code of Practice.
DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water. DCCEEW contains the Environment and Heritage Group including Heritage NSW.
DPHI	NSW Department of Planning, Housing and Infrastructure. DPHI contains the Planning agency.
GSE	Ground surface exposure. A measure of factors that may reveal surface artefacts such as erosion scalds.
GSV	Ground surface visibility. A measure of factors that may obscure the detection of surface artefacts such as leaf litter.
Heritage NSW	Government department tasked with ensuring compliance with the NPW Act. Heritage NSW is advised by the Aboriginal Cultural Heritage Advisory Committee (ACHAC).
NPW Act	*National Parks and Wildlife Act 1974*. Primary legislation governing Aboriginal cultural heritage within NSW.
PAD	Potential archaeological deposit. Indicates that a particular location has potential to contain subsurface archaeological deposits, although no Aboriginal objects are visible.

EXECUTIVE SUMMARY

OzArk Environment & Heritage (OzArk) has been engaged by Planningmatters Development Service, on behalf of Hanwood Developments Pty Ltd (the proponent) to complete an *Archaeological Technical Report* (ATR) of Lot 150 DP 751709, Lot 2 DP 1309816 and Lot 1623 DP 257263 (the study area) which are proposed to be rezoned (the proposal). The proposal is in the Griffith City Council Local Government Area (LGA)

The proposal includes the rezoning of the study area from RU1-Primary Production and RU6-Transition to a residential zoning such as R1 – General Residential or RU5 - Village, prior to the construction of a new residential housing development.

The study area includes approximately 46 hectares (ha) of land located on the northern side of Leonard Road between The Kidman Way & Old Willbriggie Road at Hanwood, NSW. The study area consists of farmland including orchards as well as agricultural facilities and irrigation infrastructure.

A search of the Aboriginal Heritage Information Management System (AHIMS) completed prior to the survey shows there are no previously recorded Aboriginal sites within or near the study area.

No Aboriginal archaeological sites were recorded within the study area during the survey. Further, no landforms within the study area were assessed to have potential for intact subsurface archaeological deposits. The lack of potential for subsurface archaeological deposits is attributed to high levels of previous land disturbance, lack of topographic variation and distance to water.

No tangible or intangible Aboriginal cultural values were identified by the site officer representing Griffith Local Aboriginal Land Council.

Recommendations concerning the Aboriginal archaeological values within the study area are as follows:

1. There are no recorded Aboriginal archaeological sites within the study area and hence there are no specific management measures relevant to heritage at this stage.
2. To inform the planning proposal for the rezoning, an *Aboriginal Cultural Heritage Assessment Report* (ACHAR), documenting adherence to the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs; DECCW 2010a), should be prepared.
3. Based on the results of the ACHCRs, the recommendations of the ACHAR will guide whether any mitigation / managements measures are warranted for Aboriginal cultural heritage values.

CONTENTS

FIGURES

TABLES

1 INTRODUCTION

1.1 DESCRIPTION OF THE PROPOSAL

OzArk Environment & Heritage (OzArk) has been engaged by Planningmatters Development Service, on behalf of Hanwood Developments Pty Ltd (the proponent) to complete an *Archaeological Technical Report* (ATR) prior to the completion of an *Aboriginal Cultural Heritage Assessment Report* (ACHAR), which will include adherence to the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRs; DECCW 2010a).

This ATR assesses the archaeological values of Lot 150 DP 751709, Lot 2 DP 1309816 and Lot 1623 DP 257263, at Hanwood, NSW, which are proposed to be rezoned (the proposal). The proposal is in the Griffith City Local Government Area (LGA) (**Figure 1-1**).

Figure 1-1: Map showing the location of the study area for the proposal.

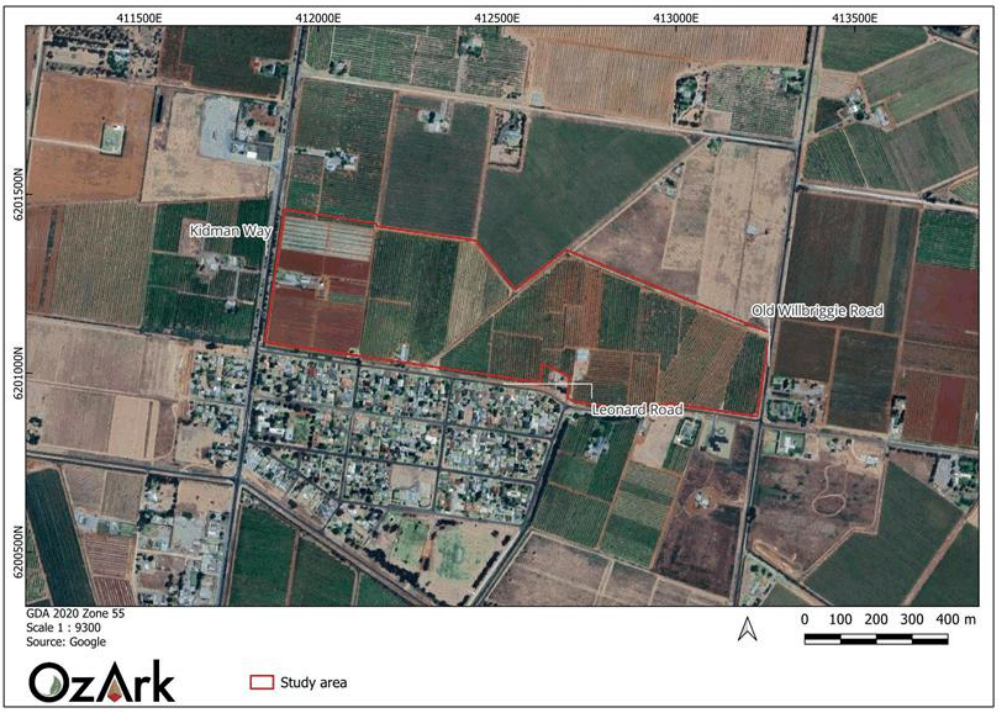
1.2 PROPOSED WORK

The proposal includes the rezoning of the study area from RU1-Primary Production (Lot 150 DP 751709 and Lot 1623 DP 257263) and RU6-Transition (Lot 150 DP 751709) to a residential zoning such as R1 – General Residential or RU5 - Village, prior to the construction of a new residential housing development.

1.3 STUDY AREA

The study area includes approximately 46 hectares (ha) of land located on the northern side of Leonard Road between The Kidman Way and Old Willbriggie Road at Hanwood, NSW. The study area consists of farmland including orchards as well as agricultural facilities and irrigation infrastructure (**Figure 1-2**).

Figure 1-2: Aerial showing the study area.



2 THE ABORIGINAL ARCHAEOLOGICAL ASSESSMENT

2.1 RELEVANT LEGISLATION

Cultural heritage is managed by several state and national Acts. Baseline principles for the conservation of heritage places and relics can be found in the *Burra Charter* (Burra Charter). The *Burra Charter* has become the standard of best practice in the conservation of heritage places in Australia, and heritage organisations and local government authorities have incorporated the inherent principles and logic into guidelines and other conservation planning documents. The *Burra Charter* generally advocates a cautious approach to changing places of heritage significance. This conservative notion embodies the basic premise behind legislation designed to protect our heritage, which operates primarily at a state level.

Several Acts of parliament provide for the protection of heritage at various levels of government.

2.1.1 Commonwealth legislation

2.1.1.1 Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), administered by the Commonwealth Department of Climate Change, Energy, the Environment and Water, provides a framework to protect nationally significant flora, fauna, ecological communities, and heritage places. The EPBC Act establishes both a National Heritage List and Commonwealth Heritage List of protected places. These lists may include Aboriginal cultural sites or sites in which Aboriginal people have interests. The assessment and permitting processes of the EPBC Act are triggered when a proposed activity or development could potentially have an impact on one of the matters of national environment significance listed by the Act. Ministerial approval is required under the EPBC Act for proposals involving significant impacts to national/commonwealth heritage places.

2.1.1.2 Aboriginal and Torres Strait Islander Heritage Protection Act 1984

The *Aboriginal and Torres Strait Islander Heritage Protection Act 1984* is aimed at the protection from injury and desecration of areas and objects that are of significance to Aboriginal Australians. This legislation has usually been invoked in emergency and conflicted situations.

2.1.2 State legislation

2.1.2.1 Environmental Planning and Assessment Act 1979

This Act establishes requirements relating to land use and planning. The main part of the EP&A Act that relate to planning proposals is Part 3 (Planning Instruments). Division 3.4 (Local Environmental Plans [LEP]) states:

3.33 Planning proposal authority to prepare explanation of and justification for proposed instrument—the planning proposal

(1) Before an environmental planning instrument is made under this Division, the planning proposal authority is required to prepare a document that explains the intended effect of the proposed instrument and sets out the justification for making the proposed instrument (the planning proposal).

(2) The planning proposal is to include the following—

(a) a statement of the objectives or intended outcomes of the proposed instrument,

(b) an explanation of the provisions that are to be included in the proposed instrument,

(c) the justification for those objectives, outcomes and provisions and the process for their implementation (including whether the proposed instrument will give effect to the local strategic planning statement of the council of the area and will comply with relevant directions under section 9.1),

(d) if maps are to be adopted by the proposed instrument, such as maps for proposed land use zones; heritage areas; flood prone land—a version of the maps containing sufficient detail to indicate the substantive effect of the proposed instrument,

(e) details of the community consultation that is to be undertaken before consideration is given to the making of the proposed instrument.

(3) The Planning Secretary may issue requirements with respect to the preparation of a planning proposal.

Applicability to the proposal

This ATR forms part of the supporting information for this planning proposal. It includes field assessment in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (Code of Practice; DECCW 2010b).

2.1.2.2 Planning Proposal – Rezonings

Heritage assessment for planning proposals for rezoning are required to follow the broad approach described in the *Local Planning Directions* (NSW Department of Planning & Environment; now Department of Planning Housing, and Infrastructure [DPHI]), *Ministerial Direction 2.3, Heritage Conservation*, which requires planning proposals to address the conservation of Aboriginal objects as follows:

Direction 3.2

(1) A planning proposal must contain provisions that facilitate the conservation of:

(a) items, places, buildings, works, relics, moveable objects or precincts of environmental heritage significance to an area, in relation to the historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic value of the item, area, object or place, identified in a study of the environmental heritage of the area,

(b) Aboriginal objects or Aboriginal places that are protected under the *National Parks and Wildlife Act* 1974, and

(c) Aboriginal areas, Aboriginal objects, Aboriginal places or landscapes identified by an Aboriginal heritage survey prepared by or on behalf of an Aboriginal Land Council, Aboriginal body or public authority and provided to the relevant planning authority, which identifies the area, object, place or landscape as being of heritage significance to Aboriginal culture and people.

Applicability to the proposal

The *Local Planning Directions* (NSW DPHI), Ministerial Direction 2.3, Heritage Conservation has been followed according to Direction 3.2 (1c) as the assessment considers '*Aboriginal objects, Aboriginal places or landscapes identified by an Aboriginal heritage survey*' undertaken in conjunction with a representative from the Griffith Local Aboriginal Land Council (LALC).

2.1.2.3 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) provides for the protection of Aboriginal objects (sites, objects, and cultural material) and Aboriginal places. Under the Act (Part 6), an Aboriginal object is defined as: any deposit, object, or material evidence (not being a handicraft for sale) relating to Aboriginal habitation of the area that comprises NSW, being habitation both prior to and concurrent with the occupation of that area by persons of European extraction and includes Aboriginal remains.

An Aboriginal place is defined under the NPW Act as an area which has been declared by the Minister administering the Act as a place of special significance for Aboriginal culture. It may or may not contain physical Aboriginal objects.

It is an offence under Section 86 of the NPW Act to 'harm or desecrate an object the person knows is an Aboriginal object'. It is also a strict liability offence to 'harm an Aboriginal object' or to 'harm or desecrate an Aboriginal place', whether knowingly or unknowingly. Section 87 of the Act provides a series of defences against the offences listed in Section 86, such as:

- The harm was authorised by and conducted in accordance with the requirements of an *Aboriginal Heritage Impact Permit* (AHIP) under Section 90 of the Act
- The defendant exercised 'due diligence' to determine whether the action would harm an Aboriginal object
- The harm to the Aboriginal object occurred during the undertaking of a 'low impact activity' (as defined in the regulations).

Under Section 89A of the Act, it is a requirement to notify the Secretary of the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) of the location of an Aboriginal object. Identified Aboriginal items and sites are registered on Aboriginal Heritage Information Management System (AHIMS) that is administered by Heritage NSW.

Applicability to the proposal

Any Aboriginal sites within the study area are afforded legislative protection under the NPW Act. The Secretary of DCCEEW will be notified of the location of an Aboriginal object recorded by sending the relevant details to the AHIMS register.

2.2 Assessment approach

The archaeological assessment followed the Code of Practice (DECCW 2010b).

2.3 Purpose and objectives

The purpose of this study is to identify and assess heritage constraints relevant to the proposed works.

The study will apply the Code of Practice in the completion of the Aboriginal archaeological assessment to meet the following objectives:

Objective One: Undertake background research on the study area to formulate a predicative model for site location within the study area

Objective Two: Identify and record Aboriginal cultural heritage sites within the study area. This includes Aboriginal objects, and any landforms likely to contain further archaeological deposits

Objective Three: To assess the archaeological significance of any recorded Aboriginal objects, or sites in consultation with the local LALC

Objective Four: Assess the likely impacts of the proposed work to Aboriginal objects or sites and provide management recommendations.

2.4 Report compliance with the Code of Practice

The Code of Practice establishes requirements that should be followed by all archaeological investigations where harm to Aboriginal objects may be possible. **Table 2-1** tabulates the compliance of this report with the requirements established by the Code of Practice.

Table 2-1: Report compliance with the Code of Practice.

Code of Practice Requirement	Context of the Requirement	Concordance in this report
Requirement 1a	Review previous archaeological work	**Section 4**
Requirement 1b	Review AHIMS searches	**Section 4.3.1**
Requirement 2	Review the landscape context	**Section 3**

Code of Practice Requirement	Context of the Requirement	Concordance in this report
Requirement 3	Summarise and discuss the local and regional character of Aboriginal land use and its material traces	**Section 4.1**
Requirement 4a	Develop predictive model	**Section 4.4**
Requirement 4b	Present predictive model results	**Section 4.4.3**
Requirement 5a	Archaeological survey sampling strategy	**Section 5.1**
Requirement 5b	Archaeological survey requirements	This Requirement was fulfilled during the undertaking of the survey
Requirement 5c	Archaeological survey units	**Section 3.1**
Requirement 6	Site definition	**Section 4.4.1**
Requirement 7a	Site recording information to be recorded	Not applicable to this report as no new sites were recorded.
Requirement 7b	Site recording: scales for photography	Not applicable to this report as no new sites were recorded.
Requirement 8a	Geospatial information	All pedestrian transects were logged using a non-differential handheld GPS.
Requirement 8b	Datum and grid coordinates	All coordinates are provided in GDA 2020 Zone 55.
Requirement 9	Record survey coverage data	**Section 5**
Requirement 10	Analyse survey coverage	**Section 5.3**
Requirement 11	Archaeological Report content and format	This report adheres to this Requirement.
Requirement 12	Records	OzArk undertakes to maintain all survey records for at least five years.
Requirement 13a	Notifying Heritage NSW of breaches	Not applicable
Requirement 13b	Providing Heritage NSW with information	Not applicable
Requirement 14	Test excavation which is not excluded from the definition of harm	Not applicable as test excavation not warranted.
Requirement 15a	Consultation regarding test excavation	Not applicable as test excavation not warranted.
Requirement 15b	Developing a test excavation sampling strategy	Not applicable as test excavation not warranted.
Requirement 15c	Providing Heritage NSW with notification of the test excavation	Not applicable as test excavation not warranted.
Requirement 16a	Test excavation that can be carried out in accordance with the Code of Practice	Not applicable as test excavation not warranted.
Requirement 16b	Objects recovered during test excavations	Not applicable as test excavation not warranted.
Requirement 17	When to stop test excavations	Not applicable as test excavation not warranted.
Requirement 18–20	Artefact recording	Not applicable to this report as no new sites were recorded.

2.5 DATE OF ARCHAEOLOGICAL ASSESSMENT

The field survey was undertaken by OzArk on 19 February 2025.

2.6 OzArk involvement

2.6.1 Field survey

The fieldwork survey was undertaken by Jordan Henshaw (Bachelor of Ancient History, Macquarie University).

2.6.2 Reporting

The reporting component of the heritage assessment was undertaken by:

- Report author: Will Marris (OzArk Archaeologist; BA Archaeological Practice, The Australian National University).
- Contributor: Jordan Henshaw
- Reviewer: Stephanie Rusden (OzArk Senior Archaeologist; B. Science University of Wollongong, B. Arts University of New England).

3 LANDSCAPE CONTEXT

An understanding of the environmental context of a study area is requisite in any Aboriginal archaeological investigation (DECCW 2010b). It is a particularly important consideration in the development and implementation of survey strategies for the detection of archaeological sites. In addition, natural geomorphic processes of erosion and/or deposition, as well as human-activated landscape processes, influence the degree to which the remains of material culture are retained in the landscape as archaeological sites; and the degree to which they are preserved, revealed and/or conserved in present environmental settings.

3.1 TOPOGRAPHY

The study area is situated within the Murrumbidgee subregion of the Riverina bioregion. The Murrumbidgee subregion is characterised by an alluvial fan with distributary channels into floodplains and undulating plains with depressions (NSW Parks and Wildlife Service 2003).

The study area is located on a level landform that has been used intensively for agriculture (**Figure 3-1**). Any natural topographical variation in the landform of the study area has been levelled through agricultural activities. As such, the study area has not been divided into survey units based on landforms for this assessment as it lacks any topographic variation.

Figure 3-1: Topography of the study area.

1. View east over flat agricultural land in the study area.

2. View west over flat agricultural land in the study area.

3.2 GEOLOGY AND SOILS

Soil analysis has important ramifications for archaeological research through the potential impact of different soils on human activity (such as agricultural exploitation) and the impact of the soils on archaeological evidence (such as post-depositional movement).

The Murrumbidgee subregion is dominated by river channels, floodplains, back plains, swamps, lakes and lunettes that are all quaternary age. As such, the subregion is characterised by

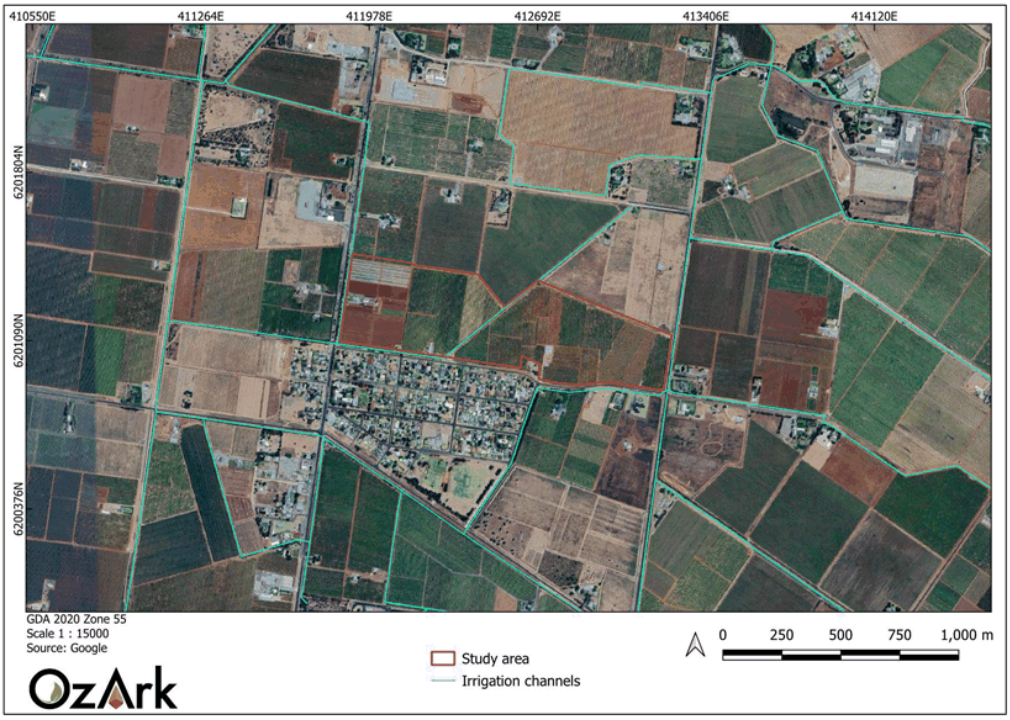
quaternary alluvial sediments with geological profiles heavy in clay and sand where they border dunes and lakes (NSW Parks and Wildlife Service 2003).

The Murrumbidgee subregion is also characterised by calcareous soils, which are often tightly compacted, restricting water movement and root growth. This also applies to the post-depositional movement of Aboriginal objects within the soil.

3.3 HYDROLOGY

The study area is bordered by artificial irrigation channels on the southern, eastern and western boundaries. An additional irrigation channel intersects diagonally through the study area. The irrigation infrastructure associated with the study area is situated within a large-scale network of artificial irrigation lines within Griffith and its surrounds (**Figure 3-2**). Mirrool Creek is the nearest permanent named waterway and is located approximately 5.5 km southeast of the study area.

Figure 3-2: Artificial irrigation in relation to the study area.



3.4 VEGETATION

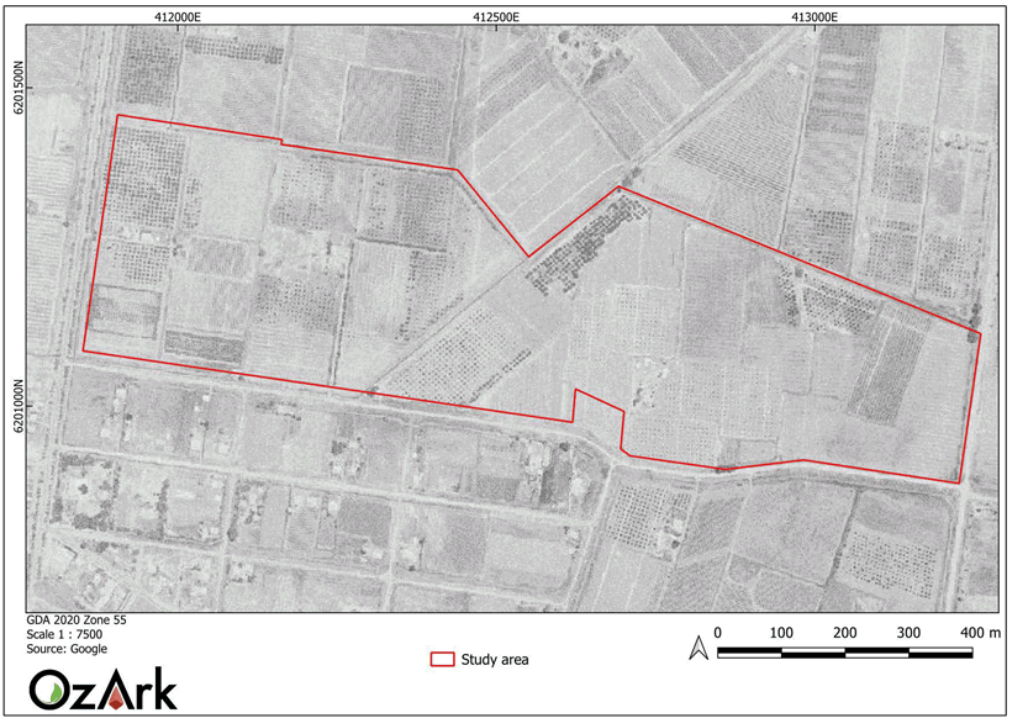
Vegetation throughout the wider region can include river red gum and river cooba on channels (Mitchell 2002). Black box, lignum and old man salt bush can be found on flood plains, whilst Myall and old man saltbush with other saltbush and grasses red gum was formerly widespread along back plain (Mitchell 2002). White cypress may be present in dune landforms.

The study area is entirely cleared of remnant native vegetation, only containing introduced species for agricultural purposes.

3.5 LAND USE HISTORY AND EXISTING LEVELS OF DISTURBANCE

The area is used for agricultural operations. Disturbances across the study area include clearance of vegetation and subsequent crop cultivation, as well as the construction of property fencing and associated farm infrastructure, such as sheds and a dwelling. An aerial from 1958 covering the study area shows that there have been minor changes in terms of land use in the past 67 years (**Figure 3-3**).

Figure 3-3: 1958 aerial showing the study area.



3.6 CONCLUSION

The review of the environmental factors associated with the study area allows the following conclusions to be drawn in terms past Aboriginal occupation:

- Topography and hydrology: the flat landform of the study area would not have been a hinderance to Aboriginal people, however, the lack of topographic variation and the distance from permanent waterways (the nearest being over 5 km away) indicates that the are no features that would have encouraged long-term occupation of the landform present.

- Geology and soils: landforms which typically comprise outcropping rock, are not present within the study area, and therefore sources of stone procurement for tool manufacture will not be present. The soil profiles of the subregion are comprised of alluvial sediments, which are generally poor preservers of archaeological material. Furthermore, the soil profiles are heavily disturbed and there is unlikely to be any remnant intact profile within at least the upper 20-30 centimetres (cm).
- Vegetation: the study area would have once supported an open woodland which would have provided some resources for Aboriginal subsistence in the past. However, resources likely to have supported a large population of people would have been present closer to the banks of more permanent water sources including Mirrool Creek. The study area has been entirely cleared of remnant vegetation and as such, culturally modified trees will not be present.
- Land use: the study area has been heavily disturbed by agricultural activities such as vegetation clearance, cultivation, orchard plantings and construction of irrigation channels. These activities are likely to have displaced potential Aboriginal objects from a primary context. Based on the land use history of the study area, there is negligible potential for the presence of intact subsurface deposits.

4 ARCHAEOLOGICAL CONTEXT

4.1 ETHNO-HISTORIC SOURCES OF REGIONAL ABORIGINAL CULTURE

The study area is located within the southern extent of the Wiradjuri tribal and linguistic group (Tindale 1974); however, it is noted that this is only an interpretation and is not a definitive boundary marker. The Wiradjuri tribal area is in the Murray Darling Basin and extends across three general physiographic regions: the highlands or central tablelands in the east, riverine plains in the west, and the transitional western slope zone in between (White & Cane 1986). The Wiradjuri is one of the largest language groups in NSW, extending across the districts of Mudgee, Bathurst, Dubbo, Parks, West Wyalong, Forbes, Orange, Junee, Cowra, Young, Holbrook, Wagga Wagga, Narrandera, Griffith, and Mossgiel (Tindale 1974). Although the area was noted to have a single basic language, various dialects were found throughout the region (Tindale 2000).

At the beginning of the nineteenth century the Wiradjuri group occupied the area to the south of the Murrumbidgee River and east of the Lachlan River (Kass 2003:10). The woodland communities of the region provided habitat for possums (used for meat and fur) including many reptiles and birds (Kabaila 1995). The Murrumbidgee River was a source of mussels and fish, including the Murray cod. The country between the rivers provided seasonal plants, tubers, nuts, seeds, and daisy yams. Larger game such as kangaroos and emus were hunted to make up an overall nutritious and varied diet. Small groups moved around regularly according to seasonal resource fluctuations and ritual obligations (Kass 2003). A relatively large number of carved trees are associated with important sites marked out by clans, including burial sites (Kass 2003:10).

Wiradjuri social organisation appears to have been based upon an extended kinship networks involving totemic designations and associations. The kinship system governed and controlled marriage and determined ceremonial obligations. Individual identity and clan affiliations were expressed partly through elaborate carvings on wooden implements and on skin cloaks (White & Cane 1986:61).

4.2 REGIONAL ARCHAEOLOGICAL CONTEXT

The Aboriginal occupation of Australia begins prior to 40,000 BP (years before present) and possibly earlier than 50,000 BP. Dates exceeding 20,000 years occur in almost all parts of Australia resulting in the expectation that most areas should have a Pleistocene (>12,000 BP) occupational signature. However, such dates remain relatively rare due to a range of factors, both behavioural and post-depositional. These factors include a possible low density of occupation in the Pleistocene period and poor preservation of archaeological materials (particularly dateable organic materials).

There are several broad scale regional archaeological studies which have been undertaken across the region. These studies have been summarised below.

Witter 1980

An archaeological assessment was undertaken for a proposed pipeline between Wagga Wagga and Young approximately 150 km east of the study area. The study recorded 14 open camp sites, 21 isolated finds, a scarred tree, and a possible Aboriginal rock well. Some of these sites were recorded in landforms similar to those within the study area, such as depressions situated adjacent to waterways.

Hiscock 1983

After surveying the Wagga Wagga to Darlington Point 330 kilovolt (kV) electricity transmission line, Hiscock agreed with Witter (1980) as their results followed similar patterns. These patterns include:

- Mounds, occupation debris of worked stone and scarred cypress pine may be located adjacent to major flood channels
- Scarred trees, fired clay hearths and occupation debris or worked stone, particularly where sand features are present, may be located adjacent to minor flood channels and temporary swamps
- Rare, isolated artefacts flaked or abraded stone, and scarred trees can be found throughout the plains.

Edmonds 1990, 1992, 1995 and 1996

Edmonds (1990, 1992, 1996), undertook archaeological investigations in the Benerembah Irrigation District (BID), a 44,000 ha area about 20 km west of Griffith. The 1990 and 1992 surveys resulted in 13 scarred trees, three artefact scatters, four hearths. Two of the hearths were associated with artefacts. Edmonds identified six landscape units within the BID:

- Prior Streams
- Elevated Lands
- Alluvial Plains
- Linear Depressions
- Alluvial Floodplain
- Occluded Depressions.

Edmonds concluded from her surveys that Linear Depressions and Prior Stream Formations were archaeologically sensitive (1996:11). Edmonds also undertook several surveys on Wyvern Station (1995), on the western edge of the BID. During these surveys 10 scarred trees, 10 artefact scatters and four campsites were recorded. Edmonds noted that the Occluded Depression

landscape could be added as another landscape that was archaeologically sensitive, after several scarred trees were identified in this landscape. The results of these surveys showed that certain landscapes had higher potential to contain Aboriginal sites than others. It also showed a difference in the occurrence of site types, with scarred trees fond on Black Box trees in association with Linear Depressions and Occluded depressions. The open artefact scatters and campsites were found within Prior Stream Formations, while Edmonds noted that within this landscape, sites were found on micro features such as linear sandhills and elevated levee banks.

NSW NPWS 1996

South of Griffith in the Leeton area, Koonadan Historic Site is located adjacent to Tuckerbil Swamp, which encompasses part of a low dune. Aboriginal skeletal material has been recovered from the dune and local Aboriginal community members believe that this is an ancestral Wiradjuri burial ground. The dune landform was relatively undisturbed, with the only disturbances from natural process such as slope wash erosion. No signs of post-colonisation earthworks, infrastructure or development was evident.

OzArk 2013

OzArk undertook an archaeological survey for an upgrade to the Darlington Point levee and extension at Darlington Point, located along the lower reaches of the Murrumbidgee River. The area assessed comprised an approximately 5.8 km levee bank surrounding the township of Darlington Point. Three Aboriginal scarred tree sites were recorded in the vicinity of the levee and bank of the Murrumbidgee River. All three trees were in good condition, including two black box and a river red gum, and all three were in the vicinity of the Murrumbidgee River and associated creek lines. One of the scarred trees (a river red gum) was situated along the bank of the Murrumbidgee River, while the two black box scarred trees were located 1 km to the west of the Murrumbidgee River.

4.3 LOCAL ARCHAEOLOGICAL CONTEXT

4.3.1 Desktop database searches conducted

A desktop search was conducted on the following databases to identify any previously recorded heritage within the study area. The results of this search are summarised in **Table 4-1** and presented in detail in **Appendix 1**.

Table 4-1: Aboriginal cultural heritage: desktop-database search results.

Name of Database Searched	Date of Search	Type of Search	Comment
Commonwealth Heritage Listings	14 February 2025	Griffith City LGA	No places listed on either the National or Commonwealth heritage lists are located within the study area.
National Native Title Claims Search	14 February 2025	NSW	The study area is not currently subject to a Native Title Claim.

Name of Database Searched	Date of Search	Type of Search	Comment
AHIMS	14 February 2025	10 x 10 km centred on the study area	25 sites are located within the search area. No sites are located within the study area.
Local Environmental Plan (LEP)	14 February 2025	Griffith LEP of 2014	None of the Aboriginal places noted occur near the study area.

A search of the AHIMS database on 14 February 2025 returned 25 records for Aboriginal heritage sites within a 10km radius centred on the study area (GDA Zone 55 Eastings: 402554.0 - 422490.0, Northings: 6191221.0 - 6211119.0), however no sites are located within the study area.

Table 4-2 lists the site types returned in the search area. The most frequently recorded site types are stone artefact sites of varying densities (artefact scatters, isolated finds and artefact sites with unspecified quantities) which account for 92% of all sites located by the search. **Figure 4-1** shows the location of the AHIMS sites that have been recorded near the study area.

The closest sites to the study area (AHIMS ID# 49-2-0128 and ID# 49-2-0127) are located approximately 2.5 km south of the proposal. No other sites have been recorded within the vicinity of the study area.

Isolated finds have previously been recorded in a wide variety of contexts, including highly disturbed landforms creating difficulties in determining a pattern of distribution for this site type. There are multiples instances of isolated finds in what appear to be heavily disturbed areas within the current AHIMS search area. However, isolated finds located by the current AHIMS search are largely associated with areas of elevation and remnant vegetation along Scenic Drive.

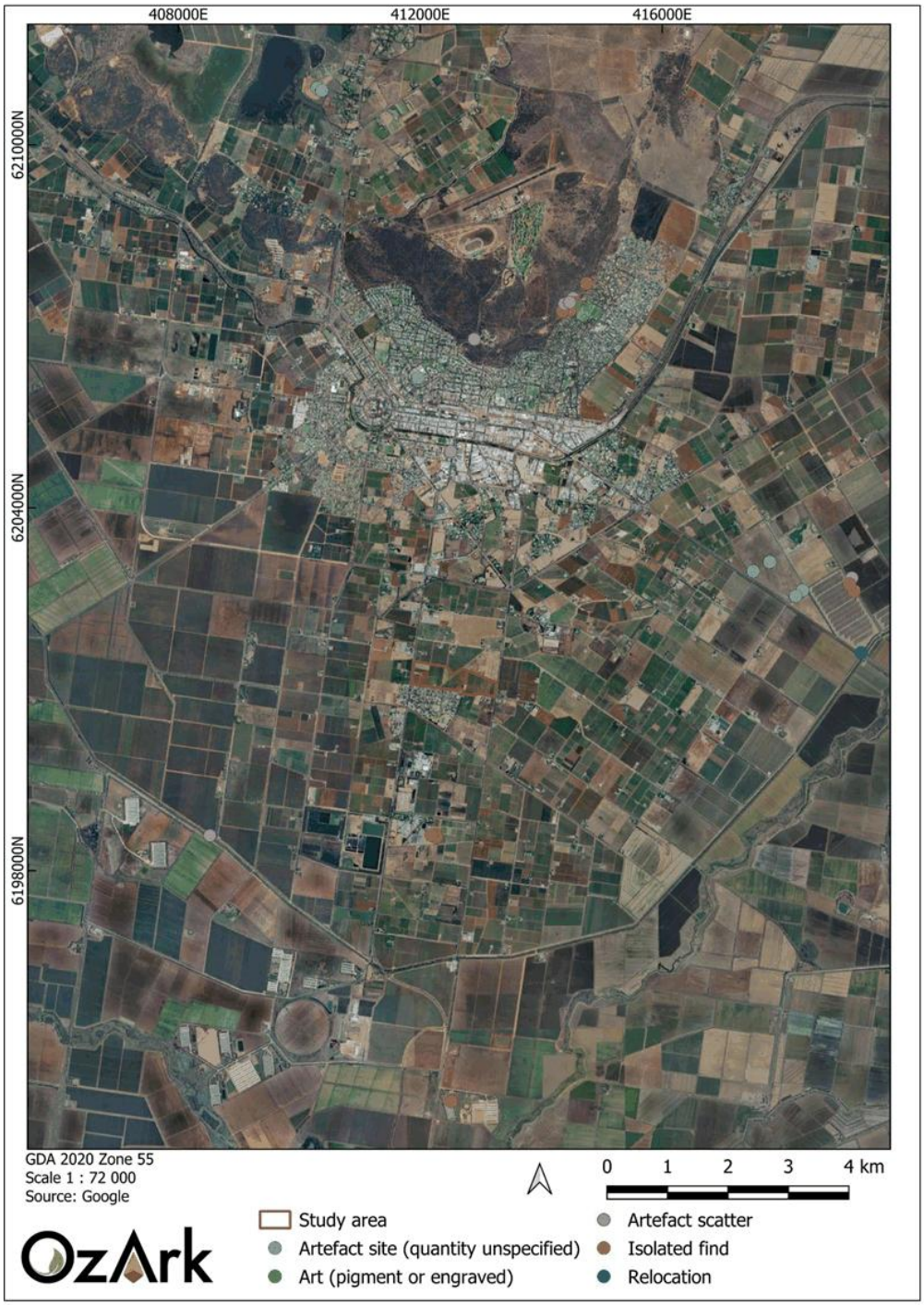
Artefact scatters have also been recorded along vegetated areas of Scenic Drive and Remembrance Drive as well as adjacent to Lake Wyangan, located 10 km north of the study area. It is unlikely that this site type will be present within the study area as artefact scatters tend to follow a pattern of association with waterways more closely than other site types.

There is one recorded rock art site in close association with the stone artefacts found along Scenic Drive.

Table 4-2: Site types and frequencies of AHIMS sites near the study area.

Site Type	Number	% Frequency
Isolated find	9	36
Artefact scatter	7	28
Artefact site (quantity unspecified)	7	28
Art (pigment or engraved)	1	4
Relocation	1	4
Total	**25**	**100**

Figure 4-1: Location of previously recorded AHIMS sites in relation to the study area.



4.3.2 Previous studies in or near the study area

Palmer 1984

Palmer carried out a survey for a proposed reservoir on the southern ridge of McPhersons Range, at Scenic Hill Reserve, Griffith. Several artefacts had been identified at the general location on a graded track. The artefacts had been collected and included a ground edge axe, a pecked axe, two cores and a unifacial pebble implement. Palmer also found additional flakes scattered across the disturbed area and concluded that the location was infrequently visited by Aboriginal people, based on the scattered and low-density nature of the site.

Barber 1998

In 1998, Barber conducted an archaeological assessment of a proposed housing subdivision at Lake Wyangan, approximately 10 km north of the study area. One isolated find, 49-2-0027 (LW1) was recorded, along with three artefact scatters 49-1-0044 (LW2), 49-1-0042 (LW3), and 49-1-0043 (LW4). 49-2-0027 (LW1), 49-1-0044 (LW2), and 49-1-0042 (LW3) were all recorded in a lunette landform, and 49-1-0043 (LW4) was recorded in a slight depression. In total, 47 artefacts were recording during the visual inspection for this due diligence assessment. Barber (1998) indicated there was potential for subsurface deposits, particularly in elevated portions of the lunette that surrounded the depression. As a result, subsurface testing for cultural material was recommended for the sites situated within the Lake Wyangan lunette: 49-2-0027 (LW1), 49-1-0044 (LW2), and 49-1-0042 (LW3).

Barber 2000

Subsequently, a test excavation program was undertaken for the proposed subdivision at Lake Wyangan was conducted by Barber (2000). A total of 27 test units of various sizes and excavation methods were excavated across the lunette landform. These test units included 12 25 centimetres (cm) x 25 cm, four 50 x 50 cm, and three 100 x 50 cm test probes. These test units were excavated by hand. Eight 1200 cm to 1600 cm x 65 cm mechanical test units were also excavated. The various sized test pits excavated equate to 57.6 (14.4 square metres [m^2]). Thus, 35 artefacts were recovered within these mechanical and hand excavated test units in the lunette landform, with silcrete being the dominant raw material, followed by volcanics, quartzite, and quartz. Most artefacts were recorded within the top 50 cm of the deposits, with the lowest artefacts recorded at a depth of 70 cm. Additional test units were also conducted further to the south along a ridgeline (outside the study area). Of the 16 test units excavated along the ridgeline, only one artefact was recovered at a depth of 20–30 cm. However, four additional artefacts were recovered on the surface whilst test excavations took place on the ridgeline.

During this test excavation program, a representative of the Griffith LALC, Max Harris, noted that Aboriginal human remains were uncovered at Lake Wyangan in c.1935. This is information has been orally passed down. The location of this burial remains unknown and may have been

reburied however it is believed to be situated on the eastern side of the southern lake. Barber concluded that this burial discovery is a possible indication of the good preservation conditions in the local area and that caution must be undertaken if excavating in the area, and that the lunettes are of higher sensitivity for burials to occur.

OzArk 2011

OzArk (2011) undertook assessment of two areas in the Hanwood area, about 4 km south of study area. No sites were recorded within the first assessment area within a generally flat area with a fine cracking silt deposit. The second assessment area a proposed bottling plant and an 8 km long pipeline across the plain. Two isolated artefacts were recorded in a ploughed paddock and a low-density scatter identified in a table drain. All the artefacts were silcrete and in highly disturbed contexts, but OzArk concluded that despite predictions suggesting there would be no archaeological material present, the presence of the artefacts indicate Aboriginal movement across the landscape, and possibly associated with now altered depressions or basins that could have held water after flooding or rain prior to European land alterations (OzArk 2011:24).

NGH 2016

NGH assessed 120 ha of land for the Griffith Solar Farm, located 7 km southeast of Griffith, NSW. Three Aboriginal sites were located including one artefact scatter consisting of 11 artefacts manufactured from silcrete quartzite, volcanic material and sandstone was recorded along with two isolated artefacts. The identification of these sites demonstrate surface artefact materials may still be retained within an agricultural landscape despite considerable ground disturbances associated with farming activity. However, owing to the highly modified context of these sites, low scientific value was attributed to the archaeological material. It was concluded that disturbed nature and limited distribution of low-density artefact finds was unlikely to reflect intact subsurface deposits.

NGH 2018a

In 2018, NGH conducted a due diligence assessment for a proposed housing subdivision, now known as Lakeside Estate, approximately 10 km north of the study area near Lake Wyangan. Previous assessment of the area (formerly known as Pelican Shores) and permit approval to impact the relevant sites had been undertaken by Barber (1998 and 2000)., However, no development proceeded for the Pelican Shores proposals and the permit approved had since expired.

Additional artefacts were recorded at 49-1-0044 (LW2) in the lunette landform. NGH (2000) concluded that although the area had since been disturbed by grading and land clearing activity by the previous landowners (not related to the proposal or the housing development), artefacts were still present. Due to this disturbance and the test excavation program conducted by Barber

(2000), it was also concluded that no additional test excavation at 49-1-0044 (LW2) was necessary as the landform has already been characterised.

NGH 2018b

NGH (2018) conducted an ACHAR for the first stages of the Lakeside Estate housing subdivision. During the survey, three additional Aboriginal sites were recorded: 49-2-0168 (LW5), 49-2-0167 (LW6), and 49-2-0166 (LW7). These included a range of low to high density artefact scatters. The assessment included test excavation program of those subsurface deposits in identified in areas that had not been previously investigated by Barber (2000). A total of 20 test units were excavated across four transects. Six artefacts were recovered, with no more than one artefact recorded from any test unit. Four of the artefacts recorded were from test units located at 49-2-0167 (LW6), with two more artefacts recorded at an additional site, 49-2-0165 (LW8). NGH concluded that the landforms of the study area had low potential for subsurface deposits.

OzArk 2021

In 2021, OzArk conducted a salvage program for the surface collection of the four sites 49-1-0042 (LW3), 49-2-0168 (LW5), 49-2-0167 (LW6) and 49-2-0166 (LW7) at Lake Wyangan. A total of 68 artefacts were reburied as part of this salvage program. These included 53 artefacts from 49-2-0167 (LW6), six artefacts from 49-1-0042 (LW3), one isolated artefact from 49-2-0168 (LW5), one isolated artefact from 49-2-0166 (LW7). Additionally, the artefacts recovered from the test excavation program completed by NGH (NGH 2018b) were buried with the artefacts. These included an additional four artefacts from 49-2-0167 (LW6) and two artefacts from 49-2-0165 (LW8).

OzArk 2024

OzArk was engaged by LWLE Pty Ltd to complete an assessment of approximately 31.3 ha of land within Lot 146 DP1214737 near Lake Wyangan in Griffith, New South Wales (NSW), which had the potential to be impacted by the proposed Stage 4 Lakeside Estate residential subdivision. One additional Aboriginal site 49-2-0187 (Lake Wyangan OS-1) was recorded during the survey and a previously recorded site 49-1-0044 (LW2) was located. 49-2-0187 is low-density artefact scatter consisting of 23 artefacts primarily composed of silcrete along with chert and quartz in smaller quantities. Based on the considerable level of disturbance within the study area, and the limited subsurface materials recorded in the Barber (2000) and NGH (2018b) excavation, the site was deemed as having low potential for subsurface deposits. A second previously recorded site (49-2-0165 [LW8]) was visited to ground-truth that no surface artefacts are present.

4.4 PREDICTIVE MODEL FOR SITE LOCATION

Across Australia, numerous archaeological studies in widely varying environmental zones and contexts have demonstrated a high correlation between the permanence of a water source and

the permanence and/or complexity of Aboriginal occupation. Site location is also affected by the availability of and/or accessibility to a range of other natural resources including plant and animal foods, stone and ochre resources and rock shelters, as well as by their general proximity to other sites/places of cultural/mythological significance. Consequently, sites tend to be found along permanent and ephemeral water sources, along access or trade routes, or in areas that have good flora/fauna resources and appropriate shelter.

In formulating a predictive model for Aboriginal archaeological site location within any landscape it is also necessary to consider post-depositional influences on Aboriginal material culture. In all but the best preservation conditions very little of the organic material culture remains of ancestral Aboriginal communities survives to the present. Generally, it is the more durable materials such as stone artefacts, stone hearths, shells, and some bones that remain preserved in the current landscape. Even these, however, may not be found in their original depositional context since these may be subject to either (a) the effects of wind and water erosion/transport, both over short- and long-time scales, or (b) the historical impacts associated with the introduction of European farming practices including grazing and cropping, land degradation, and farm related infrastructure. Scarred trees, due to their nature, may survive for up to several hundred years but rarely beyond.

4.4.1 Site types in the region of the study area

The site types listed in **Table 4-3** are present in the region of the study area. The likelihood of these sites being present in the study area is discussed in **Section 4.4.3**.

Table 4-3: Site types recorded in the region of the study area.

Site type	Site description
Isolated finds	May be indicative of random loss or deliberate discard of a single artefact, the remnant of a now dispersed and disturbed artefact scatter, or an otherwise obscured or subsurface artefact scatter. They may occur anywhere within the landscape but are more likely to occur in topographies where open artefact scatters typically occur.
Open artefact scatters	Artefact scatters are defined as two or more artefacts, not located within a rock shelter, and located no more than 50 metres away from any other constituent artefact. This site type may occur almost anywhere that Aboriginal people have travelled and may be associated with hunting and gathering activities, short- or long-term camps, and the manufacture and maintenance of stone tools. Artefact scatters typically consist of surface scatters or sub-surface distributions of flaked stone discarded during the manufacture of tools but may also include other artefactual rock types such as hearth and anvil stones. Less commonly, artefact scatters may include archaeological stratigraphic features such as hearths and artefact concentrations which relate to activity areas. Artefact density can vary considerably between and across individual sites. Small ground exposures revealing low density scatters may be indicative of a background scatter rather than a spatially or temporally distinct artefact assemblage. These sites are classed as 'open', that is, occurring on the land surface unprotected by rock overhangs, and are sometimes referred to as 'open camp sites'. Artefact scatters are most likely to occur on level or low gradient contexts, along the crests of ridgelines and spurs, and elevated areas fringing watercourses or wetlands. Larger sites may be expected in association with permanent water sources. Topographies which afford effective through-access across, and relative to, the surrounding landscape, such as the open basal valley slopes and the valleys of creeks, will tend to contain more and larger sites, mostly camp sites evidenced by open artefact scatters.

4.4.2 Landform modelling of archaeological potential

The large number of archaeological studies undertaken within the vicinity of the study area provides information to obtain a sound understanding of the nature and distribution of archaeological sites within the area. Although there is some conjecture about the relationship between stream order, site numbers and densities, the general pattern is that most sites are present close to watercourse.

The study area is located 5.5 km northwest of the nearest permanent waterway. This would indicate a decreased likelihood of recording sites within the study area.

Crucial for the preservation of archaeological deposits is the history of past land use in an area. Historically, the study area has been subjected to widespread vegetation clearing and subsequent long-term intensive farming and agricultural practices which have significantly disturbed the ground surface and any archaeological deposits in the topmost levels of the soil profile.

4.4.3 Conclusion

Based on knowledge of the environmental contexts of the study area and a desktop review of the known local and regional archaeological record, the following predictions are made concerning the probability of landforms within the study area to contain Aboriginal objects (**Table 4-4**), and what types of sites may be present within the study area (**Table 4-5**).

Table 4-4: Likelihood of landforms within the study area to contain Aboriginal objects.

Survey Unit	Landform type	Likelihood to contain Aboriginal objects
1	Flat plain, disturbed	The flat plain landform present in the study area is distant from water and has been subject to high levels of disturbance. As a result, the landform has low potential to contain Aboriginal sites. If present, site types will include isolated finds or low-density scatters in disturbed contexts.

Table 4-5: Likelihood of certain site types being present in the study area.

Site type	Likelihood of being present in the study area
Isolated finds	As isolated finds can occur anywhere, particularly within disturbed contexts, it is predicted that this site type could be recorded within the study area.
Artefact scatters	As the study area is within a heavily disturbed level plain landform distant from permanent water, it is highly unlikely that this site type will be present. If present, this site type will be low-density and in a secondary contact.

The archaeological studies undertaken near the study area provide insight into the nature and distribution of archaeological sites within the area. However, the location of sites can only reflect what has been identified, usually this has been because of infrastructure/development-driven studies, thus presenting the site data clustered. Generally, sites have been recorded in proximity to a recognised water source, in locations that have been subject to reduced landform disturbance. The results of previous surveys indicate that stone artefact sites are the most likely site type to be present within the study area and all other site types are unlikely.

4.5 RESEARCH QUESTIONS

Several research questions can meaningfully be applied to the investigation of the study area. These research questions include:

- What resources were available to the Aboriginal people using the land within the study area (food, stone, and water) and what resources were transported to the area?
- How do the raw materials recorded within the study area compare to those in recorded in the surrounding region?
- Establish how the findings within the study area (if any) accord with the regional archaeological context examined in **Section 4.2.**

5 RESULTS OF ABORIGINAL ARCHAEOLOGICAL ASSESSMENT

5.1 SAMPLING STRATEGY AND FIELD METHODS

Standard archaeological field survey and recording methods were employed in this study (Burke & Smith 2004).

The field survey was undertaken by OzArk Archaeologist Jordan Henshaw, with the assistance of Cody Crisson representing the Griffith LALC.

The entire study area was subject to systematic transects, and the pedestrian tracks of the archaeologist are shown on **Figure 5-1**. Views of the study area are produced in **Figure 5-2**.

The aims of the survey were to:

- Conduct pedestrian survey across the study area so that the:
  - archaeological potential of the study area could be determined
  - archaeological material could be recorded, if present
- Evaluate whether the predictive model set out in **Section 4.4** is valid
- Determine of any portions of the study area contain subsurface potential to understand the archaeological potential of a particular location in more detail
- Advise on any project impact avoidance of Aboriginal heritage, if required.

Figure 5-1: Aerial showing survey coverage of the study area.

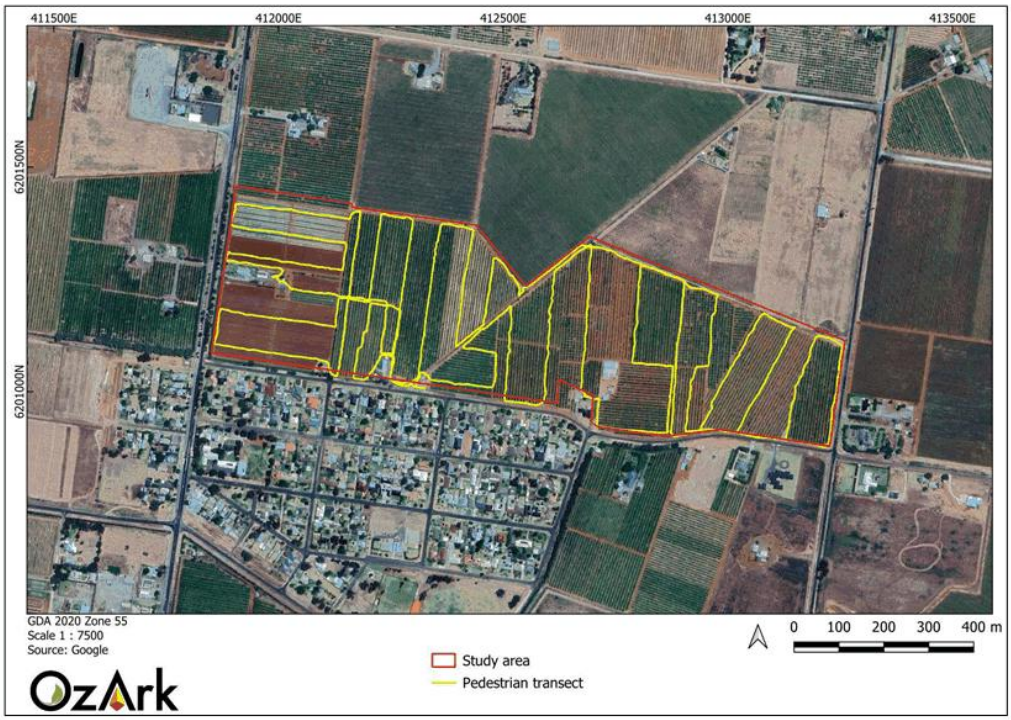


Figure 5-2: Views of the study area.

1. View west across the cropped portion of the study area.

2. View south along a portion of the citrus orchard.

3. View southwest along the artificial irrigation channel.

4. View of subsurface irrigation infrastructure.

5.2 PROJECT CONSTRAINTS

There were no constraints to the survey and the entire study area was adequately assessed.

5.3 EFFECTIVE SURVEY COVERAGE

Two of the key factors influencing the effectiveness of archaeological survey are GSV and ground surface exposure (GSE). These factors are quantified to ensure that the survey data provides adequate evidence for the evaluation of the archaeological materials across the landscape. For the purposes of the current assessment, these terms are used in accordance with the definitions provided in the Code of Practice.

GSV is defined as:

> *… the amount of bare ground (or visibility) on the exposures which might reveal artefacts or other archaeological materials. It is important to note that visibility, on its own, is not a reliable indicator of the detectability of buried archaeological material. Things like vegetation, plant or leaf litter, loose sand, stone ground or introduced materials will affect the visibility. Put another way, visibility refers to 'what conceals'* (DECCW 2010b: 39).

GSE is defined as:

> *… different to visibility because it estimates the area with a likelihood of revealing buried artefacts or deposits rather than just being an observation of the amount of bare ground. It is the percentage of land for which erosion and exposure was sufficient to reveal archaeological evidence on the surface of the ground. Put another way, exposure refers to 'what reveals'* (DECCW 2010b: 37).

Table 5-1 calculates the effective survey coverage within the study area. In general, **Table 5-1** presents an approximation of the amount of ground surface able to be seen at any location within specific landform units. Visibility throughout the study area was high due to an absence of ground

vegetation coverage between the orchard and crop rows. As the study area is within an active farm, naturally occurring visual obstructions such as leaf litter and other organic materials that usually impact survey efficacy, were mostly absent.

Table 5-1: Effective survey coverage within the study area.

Survey Unit	Landform	Survey Unit Area (sq m)	Visibility %	Exposure %	Effective Coverage Area (sq m)	Effective Coverage %
1	Flat plain	46000	90	90	41400	90

Table 5-2 demonstrates that despite high overall survey efficacy, no sites were recorded due to high levels of disturbance within the study area.

Table 5-2: Effective survey coverage and incidences of site recording.

Landform	Landform area (sq m)	Area Effectively Surveyed	% of Landform Effectively Surveyed	Number of Sites	Number of Artefacts or Features
1	Flat plain	41400	90	0	0

5.4 SUMMARY OF SURVEY RESULTS

No Aboriginal sites were recorded within the study area during the survey. Further, no landforms within the study area were assessed to have potential for subsurface archaeological deposits. The lack of potential for subsurface archaeological deposits is attributed to high levels of prior disturbance and the distance between the study area and permanent waterways.

No tangible or intangible Aboriginal cultural values were identified by the site officer representing Griffith LALC.

5.4.1 Discussion

The absence of Aboriginal sites recorded during the current survey was overall predicted due to high levels of disturbance, lack of topographic variation and distance to permanent waterways. While previous assessments such as OzArk (2011) and NGH (2016) have found that artefact scatters can still occur across the flat, apparently featureless plains of the district, these sites are of low density and low archaeological significance as they are typically in disturbed content with no associated subsurface potential.

Due to the distance of the study area from permanent waterways and absence of desirable landforms for Aboriginal occupation, it is considered unlikely that Aboriginal people spent extended periods of time within vicinity of the study area. This is evidenced by the sparsity of Aboriginal sites within the region. The site types that are present are characterised by their low densities, which suggests that the landscape may have acted as more of transitory space for past Aboriginal people as opposed to a focused point of habitation. However, as archaeological work in Australia is predominantly development driven, this “absence of archaeology” within the Griffith region may simply be the result of a lack of archaeological investigation. Moreover, as Griffith has

been historically subject to high levels of disturbance, the absence of archaeology within the region is likely a consequence of both these factors.

If any Aboriginal objects were present within the study area in the past, they are highly likely to have been disturbed over decades of intensive agricultural land use in conjunction with natural erosional processes.

5.4.2 Responses to the research questions

In **Section 4.5**, several research questions were advanced to guide the survey of the study area. Following the survey, responses to these research questions are set out below.

- What resources were available to the Aboriginal people using the land within the study area (food, stone, and water) and what resources were transported to the area?
    - There were no potential resources or raw materials that would be advantageous to Aboriginal present in the study area.
- How do the raw materials recorded within the study area compare to those in recorded in the surrounding region?
    - As no objects were identified within the study area, no comparison can be drawn with the sites across the region.
- Establish how the findings within the study area (if any) accord with the regional archaeological context examined in **Section 4.2.**
    - The findings of the survey accord with the regional and local archaeological context. Previous assessments indicated that site location is closely correlated with proximity to waterways. Due to the lack of waterways within or near the study area, the likelihood of Aboriginal objects being identified in the study area was low. It is concluded that the area may be more likely to have been a location passed through by Aboriginal people, rather than a focus of occupation.

6 ASSESSING HARM

6.1 AVOIDING AND MINIMISING HARM

6.1.1 Conserving significant Aboriginal cultural heritage

An object of the NPW Act is the '*conservation of objects places and features… of cultural value within the landscape, including… places, objects and features of significance to Aboriginal people*' (s.2A(1(b)(i)).

As heritage professionals, OzArk, strives for good conservation outcomes. In particular, OzArk is primarily concerned with the conservation and protection of Aboriginal cultural heritage that is of significance to Aboriginal people.

Two primary objectives when managing harm to an Aboriginal object are:

- Impacts to significant Aboriginal objects and places should always be avoided wherever possible
- Where impacts to Aboriginal objects and places cannot be avoided, proposals should be amended to reduce the extent and severity of impacts to significant Aboriginal objects and places using reasonable and feasible measures.

6.1.2 Opportunities to conserve Aboriginal cultural heritage values

No Aboriginal sites or areas of archaeological sensitivity were identified during the survey. Therefore, there are no opportunities for conservation.

Additionally, preliminary discussions with a member of Griffith LALC have not identified any intangible cultural values associated with the study area.

6.2 LIKELY IMPACTS TO ABORIGINAL HERITAGE FROM THE PROPOSAL

As no Aboriginal sites or specific cultural values were recorded during the current assessment, there are no known impacts to Aboriginal cultural heritage from the proposal.

7 RECOMMENDATIONS

Under Section 89A of the NPW Act it is mandatory that all newly recorded Aboriginal sites be registered with AHIMS. As a professional in the field of cultural heritage management it is the responsibility of OzArk to ensure this process is undertaken.

To this end it is noted that no Aboriginal sites were recorded during the assessment.

The following recommendations are made based on these impacts and with regard to:

- Legal requirements under the terms of the NPW Act whereby it is illegal to damage, deface or destroy an Aboriginal place or object without an approved AHIP.
- The findings of the current investigations undertaken within the study area
- The interests of the Aboriginal community.

Recommendations concerning Aboriginal archaeological values within the study area are as follows:

1. There are no recorded Aboriginal archaeological sites within the study area and hence there are no specific management measures relevant to heritage at this stage.
2. To inform the planning proposal for the rezoning, an ACHAR, documenting adherence to the ACHCRs (DECCW 2010a), should be prepared.
3. Based on the results of the ACHCRs, the recommendations of the ACHAR will guide whether any mitigation / managements measures are warranted for Aboriginal cultural heritage values.

REFERENCES

Barber 1998	Barber 1998. *An Archaeological Survey of Proposed Subdivision at Lake Wyangan, Griffith NSW*. Unpublished report to Griffith Local Aboriginal Land Council.
Barber 2000	Barber 2000. *An Archaeological Subsurface Investigation at Lake Wyangan, Griffith NSW*. Unpublished report to Griffith Local Aboriginal Land Council.
Burke & Smith 2004	Burke, H. and Smith, C. 2004. *The Archaeologist's Field Handbook*, Blackwell, Oxford.
Burra Charter 2013	International Council on Monuments and Sites 2013. *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance*.
DECCW 2010a	Department of Environment, Climate Change and Water, Sydney (now Heritage NSW). *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010*.
DECCW 2010b	Department of Environment, Climate Change and Water, Sydney (now Heritage NSW). *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales*.
Edmonds 1990	Edmonds, V. 1990 *An Archaeological Survey of the Benerembah Irrigation District, Griffith, NSW*. Report to Department of Water Resources, Sydney.
Edmonds 1992	Edmonds, V. 1992 *Further Archaeological Investigations of the Benerembah Irrigation District*. Report to Water Resources, Sydney
Edmonds 1995	Edmonds, V. 1995 *An Archaeological Survey of Wyvern Station, West of Griffith, NSW*. Report to Booth Associates.
Edmonds 1996	Edmonds, V. 1996 *An Archaeological Survey of the Benerembah Irrigation District Stage 4 Drainage, West of Griffith*, NSW. Report to Booth Associates.
Kabaila 1995	Kabaila, P. (1995). *Wiradjuri Places: The Murrumbidgee River Basin, with a section on Ngunawal Country*. Volume 1. Black Mountain Projects.
Kass 2003	Kass, T. (2003). *A Thematic History of the Central West: Comprising the NSW Historical Regions of Lachlan and Central Tablelands*. NSW Heritage Office.
NGH 2016	NGH Environmental. 2016. *Archaeological assessment for the Griffith Solar Farm*. Report to Neoen.

NGH 2018a	NGH Environmental 2018. *Aboriginal Heritage Due Diligence Assessment: Lakeside Estate*. Report for Norgriff Pty Ltd.
NGH 2018b	NGH Environmental 2018. *Aboriginal Cultural Heritage Assessment: Lakeside Estate, Griffith*. Report for Norgriff Pty Ltd.
NSW NPWS 1996	New South Wales National Parks and Wildlife Service. 1996. *Koonadan Historic Site Plan of Management*.
NSW NPWS 2003	New South Wales National Parks and Wildlife Service. 2003. *The Bioregions of New South Wales, their biodiversity, conservation and history*.
OEH 2011	Office of Environment and Heritage 2011. *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW*.
OzArk 2011	OzArk Environment & Heritage. 2011. *Aboriginal Heritage Assessment McWilliams Hanwood Proposed Winery Expansion Project*. Report to McWilliams Wines Pty Ltd.
OzArk 2013	OzArk Environment & Heritage. 2013. *Aboriginal and Historic Heritage Assessment: Darlington Point Levee Upgrade*. Report prepared for NSW Public Works on behalf of Murrumbidgee Council.
OzArk 2021	OzArk Environment and Heritage 2021. *Aboriginal Cultural Heritage Salvage Report: Lakeside Estate Stages 1 & 2, Lake Wyangan – AHIP 4333 / C0004458*. Report prepared for Davis Sanders Homes on behalf of LWLE Pty Ltd.
OzArk 2024	OzArk Environment and Heritage 2024. *Revised Aboriginal Cultural Heritage Assessment Report: Stage 4, Lakeside Estate, Lake Wyangan*. Report prepared for Davis Sanders Homes on behalf of LWLE Pty Ltd.
Palmer 1984 1984	Palmer, G. 1984. *An Aboriginal Archaeological Site Survey of a Proposed Reservoir Site at Griffith, NSW*. Griffith Water Supply Augmentation Scheme II. Report to Public Works Department, NSW.
Tindale 1974	Tindale N. *Aboriginal Tribes of Australia*. ANU Press, Canberra.
Tindale 2000	Tindale NB. 2000. Wiradjuri. In Tindale's *Catalogue of Australian Aboriginal Tribes*. South Australian Museum on South Australian Museum Website, South Australia.
White and Cane 1986	White. I and Cane. S. 1986. *An Investigation of Aboriginal Settlements and Burial Patterns in the Vicinity of Yass*. Report to the NSW NPWS, Queanbeyan.

White 1999 — White E. *From artefacts to the actions of people in prehistory: a behavioural study of the W2 stone artefact assemblage, Hunter Valley, NSW*. Master of Philosophy Thesis, University of Sydney.

Witter 1980 — Witter D. 1980. *Archaeological Gas Pipeline Survey between Wagga Wagga and Young*.

APPENDIX 1: AHIMS SEARCH RESULTS

AHIMS Web Services (AWS)
Extensive search - Site list report

Your Ref/PO Number : 4689 Griffith Rezoning
Client Service ID : 975771

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
49-2-0013	Griffith Scenic Hill Reserve	AGD	55	412780	6206600	Open site	Valid	Artefact : -	Open Camp Site	890
	Contact	Recorders	Celia Ingram					Permits		
49-2-0019	Griffith Brick Works;	AGD	55	412400	6194000	Open site	Valid	Artefact : -	Isolated Find	
	Contact	Recorders	Harvey Johnston					Permits		
49-2-0108	Scenic Hill Reserve Site 1 (SHR1)	GDA	55	414529	6207464	Open site	Valid	Artefact : 11		101033
	Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd					Permits		
49-2-0109	Scenic Hill Reserve Site 2 (SHR2)	GDA	55	414574	6207381	Open site	Valid	Artefact : 1		101033
	Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd					Permits		
49-2-0110	Scenic Hill Reserve Site 3 (SHR3)	GDA	55	414554	6207349	Closed site	Valid	Art (Pigment or Engraved) : 3		101033
	Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd					Permits		
49-2-0111	Scenic Hill Reserve Site 4 (SHR4)	GDA	55	414476	6207266	Open site	Valid	Artefact : 1		101033
	Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd					Permits		
49-2-0112	Scenic Hill Reserve Site 5 (SHR5)	GDA	55	414354	6207248	Open site	Valid	Artefact : 1		101033
	Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd					Permits		
49-2-0113	Scenic Hill Reserve Site 6 (SHR6)	GDA	55	414387	6207372	Open site	Valid	Artefact : 3		101033
	Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd					Permits		
49-2-0114	Scenic Hill Reserve Site 7 (SHR7)	GDA	55	414475	6207395	Closed site	Valid	Artefact : 4		101033
	Contact	Recorders	Navin Officer Heritage Consultants Pty Ltd					Permits		
49-2-0127	McWilliams Isolated Find 1	GDA	55	412269	6198552	Open site	Valid	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo					Permits		
49-2-0128	McWilliams Isolated Find 2	GDA	55	412183	6198586	Open site	Valid	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo					Permits		
49-2-0129	McWilliams Open Site 1	GDA	55	408523	6198580	Open site	Valid	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo					Permits		
49-2-0130	Hermits Cave Isolated Artefact	GDA	55	414752	6207708	Open site	Valid	Artefact : -		
	Contact	Recorders	Harvey Johnston,DPIE - Armidale					Permits		
49-2-0156	Griffith Solar Relocated Artefacts	GDA	55	419292	6201601	Open site	Valid	Artefact : -		
	Contact	Recorders	Mr Matthew Barber,NGH Heritage - Fyshwick					Permits		
49-2-0148	Griffith Solar Isolated Find 2	GDA	55	419175	6202622	Open site	Destroyed	Artefact : -		
	Contact	Recorders	Mr Matthew Barber,Mr Matthew Barber,NGH Heritage - Fyshwick,NGH Heritage - F					Permits		
49-2-0149	Griffith Solar Artefact Scatter 1	GDA	55	419140	6202839	Open site	Destroyed	Artefact : -		
	Contact	Recorders	Mr Matthew Barber,Mr Matthew Barber,NGH Heritage - Fyshwick,NGH Heritage - F					Permits		
49-2-0150	Griffith Solar Isolated Find 1	GDA	55	419103	6202729	Open site	Destroyed	Artefact : -		
	Contact	Recorders	Mr Matthew Barber,Mr Matthew Barber,NGH Heritage - Fyshwick,NGH Heritage - F					Permits		
49-2-0151	YOOGALI SITE 2	GDA	55	417782	6203103	Open site	Valid	Artefact : -		
	Contact	Recorders	RPS AAP Consulting Pty Ltd - Hamilton,Ms Jo Nelson					Permits		

Report generated by AHIMS Web Service on 14/02/2025 for Jordan Henshaw for the following area at Datum :GDA, Zone : 55, Eastings : 402554.0 - 422490.0, Northings : 6191221.0 - 6211119.0 with a Buffer of 0 meters. Number of Aboriginal sites and Aboriginal objects found is 25

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 1 of 2

AHIMS Web Services (AWS)
Extensive search - Site list report

Your Ref/PO Number : 4689 Griffith Rezoning
Client Service ID : 975771

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
49-2-0152	YOOGALI SITE 4	GDA	55	418323	6202631	Open site	Valid	Artefact : -		
	Contact	Recorders	RPS AAP Consulting Pty Ltd - Hamilton,Ms Jo Nelson					Permits		
49-2-0153	YOOGALI SITE 3	GDA	55	418211	6202539	Open site	Valid	Artefact : -		
	Contact	Recorders	RPS AAP Consulting Pty Ltd - Hamilton,Ms Jo Nelson					Permits		
49-2-0154	YOOGALI SITE 1	GDA	55	417507	6202950	Open site	Valid	Artefact : -		
	Contact	Recorders	RPS AAP Consulting Pty Ltd - Hamilton,Ms Jo Nelson					Permits		
49-2-0167	LW6	GDA	55	410299	6210943	Open site	Destroyed	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo,Mr Matthew Barber,Mr Jo					Permits	4333	
49-2-0166	LW7	GDA	55	410372	6210899	Open site	Destroyed	Artefact : -		
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo,Mr Matthew Barber,NGH					Permits	4333	
49-2-0180	Griffith Base Hospital Site 01	GDA	55	411965	6206147	Open site	Destroyed	Artefact : -		
	Contact	Recorders	Comber Consultants Pty Limited,Comber Consultants Pty Limited,Ms Veronica Nor					Permits	4667,4683	
49-2-0295	Griffith AMS Stone Axes	GDA	55	412506	6204929	Open site	Valid	Artefact : 2		
	Contact	Recorders	Mr Daniel Clegg					Permits		

** Site Status
Valid - The site has been recorded and accepted onto the system as valid
Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.
Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground
Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 14/02/2025 for Jordan Henshaw for the following area at Datum :GDA, Zone : 55, Eastings : 402554.0 - 422490.0, Northings : 6191221.0 - 6211119.0 with a Buffer of 0 meters. Number of Aboriginal sites and Aboriginal objects found is 25

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

Page 2 of 2

Cite Group
Capital, Property & Development

Hanwood Developments Pty Ltd
ACN 664 671 685
PO Box 456, Pyrmont NSW 2009

1 July 2025

Mr Brett Stonestreet
General Manager
Griffith City Council
PO Box 485, Griffith NSW 2680
admin@griffith.nsw.gov.au

Dear Brett,

HANWOOD GROWTH AREA (STAGE 2) - PROPOSED PLANNING AGREEMENT

We refer to the Planning Proposal for Stage 2 of the Hanwood Growth Area prepared by Gyde Consulting on behalf of Hanwood Developments Pty Ltd. The Planning Proposal seeks to rezone land on the northern side of Leonard Road to RU5 – Village to facilitate the delivery of new housing and social infrastructure to meet the local community needs as identified in the draft Griffith Housing Strategy (2025).

Hanwood Developments Pty Ltd propose to enter into a Planning Agreement with Council to support the Planning Proposal. This letter provides an outline of the nature and extent of potential contributions that could form the basis of a formal offer and is provided for the purpose of facilitating future discussions.

The proposed contributions will provide key public benefits and infrastructure and could comprise of the following:

- Hanwood Developments is open to discussing works in Kind in lieu of Section 7.11 of the *Environmental Planning and Assessment Act* and Section 64 of the *Water Management Act* for the water main extension proposed by Council form Griffith to Hanwood along old Willbriggie Rd.
- Hanwood Developments designing and constructing a new intersections and turning lanes both at Old Willbriggie Road adjacent to the north-eastern corner of their site and on Kidman Way to the North Westen corner.
- Hanwood Developments designing and constructing new electrical lead-in infrastructure that will cater for further development within the immediate locality that is not located on their site.

02 8488 5828 | reception@citegroup.com.au | citegroup.com.au
Suite 2, Level 14, 99 Bathurst Street, Sydney NSW 2000

Cite Group
Capital, Property & Development

Hanwood Developments Pty Ltd
ACN 664 671 685
PO Box 456, Pyrmont NSW 2009

- Hanwood Developments designing and constructing new telecommunications lead-in infrastructure that will cater for further development within the immediate locality that is not located on their site.
- Hanwood Developments designing and constructing new natural gas lead-in infrastructure that will cater for further development within the immediate locality that is not located on their site.
- Hanwood Development committing to pay any required contributions levied under Section 7.11 of the *Environmental Planning and Assessment Act* and Section 64 of the *Water Management Act* prior to the issue of Subdivision Works Certificate for each respective stage of their development. Council currently permits developers to defer the payment of contributions until after the allotments have been sold. Considering that most subdivisions take almost 1 year to construct a stage the upfront payment of contributions for each stage provides Council with a cash injection when the necessary infrastructure needs to be provided. The upfront payment of contributions reduces the likelihood of Council needing to source funding or a grant to pay for infrastructure that may not receive partial reimbursement payments for a couple of years.
- Hanwood Developments providing a stormwater detention system that caters for post developed flows from their entire development area. This system is proposed to comprise a large basin and/or series of basins running close to the current alignment of Murrumbidgee Irrigation's drainage channel to the south-western corner of the site. This detention system can be sized to not only cater for post developed flows from the developed area but to also have additional capacity to cater for up-stream stormwater and floodwaters. Hanwood Developments are willing to enter into discussion with Council regarding the potential to increase the size/capacity of the stormwater detention system and the possibility of providing retaining stormwater for passive recreational and irrigation purposes.
- Hanwood developments providing pedestrian links and pathways throughout their site that will link with the existing shared path on The Kidman Way. Hanwood Developments will consider providing a pedestrian link along Club Street between their site and the existing sports precinct located on the southern side of Yarran Street in lieu of a Section 7.11 Contribution.
- Hanwood Developments providing public open space and recreational areas throughout their subdivision at or above the minimum requirement for land area per lot created listed in Council's masterplan and the relevant section of Council's Residential DCP for the Hanwood Growth Area. Hanwood Developments are willing to consider entering into a Contract with Council to maintain these public open space areas
- Hanwood Developments providing passive open space area along each side of the drainage channel and stormwater basins to be constructed through the centre of the site. Hanwood

02 8488 5828 | reception@citegroup.com.au | citegroup.com.au
Suite 2, Level 14, 99 Bathurst Street, Sydney NSW 2000

Cite Group
Capital, Property & Development

Hanwood Developments Pty Ltd
ACN 664 671 685
PO Box 456, Pyrmont NSW 2009

Developments will maintain to a reserve standard the open space area to located on either side of the drainage channel and basins

The finer details regarding timing of the works, works in kind and payments will be subject to further discussions with Griffith Council.

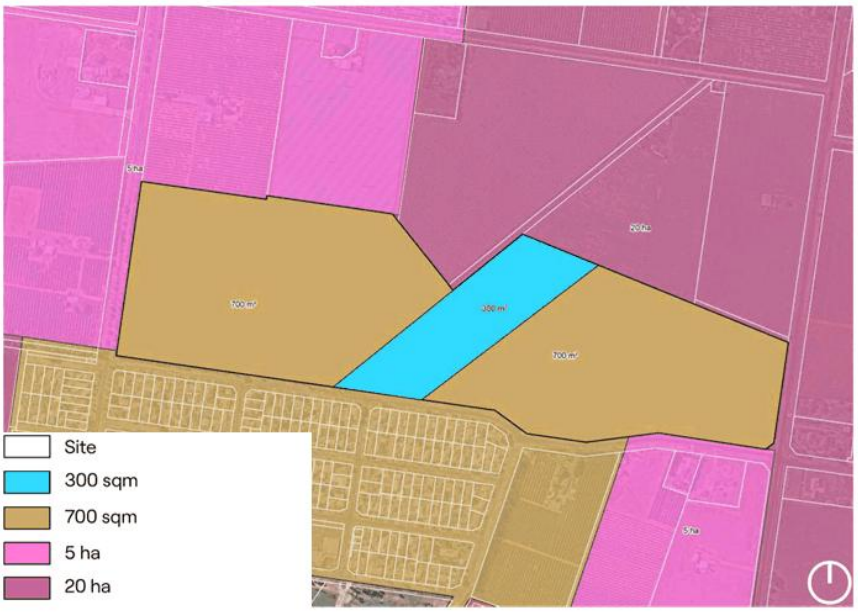
Yours sincerely

Luke Scobie
Head of Property and Regional Development
Cite Group
Luke

02 8488 5828 | reception@citegroup.com.au | citegroup.com.au
Suite 2, Level 14, 99 Bathurst Street, Sydney NSW 2000

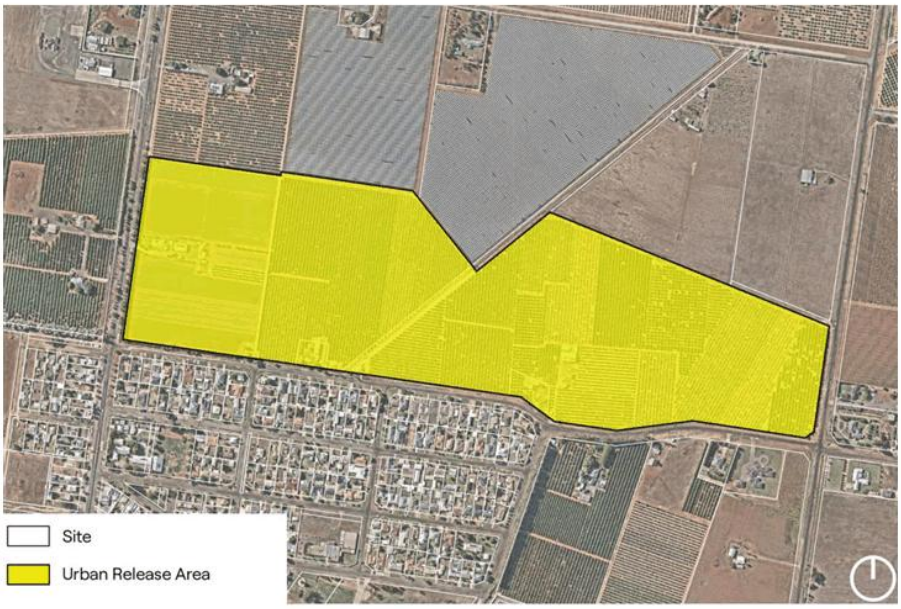
Land Use Zone Map

Minimum Lot Size Map



GYDE

Urban Release Area Map



Hannah Collins

From:	Carel Potgieter < >
Sent:	Wednesday, 10 July 2024 10:08 AM
To:	luke
Cc:	Martin Ruggeri | Planningmatters Development Service; Kelly McNicol; Joe Rizzo
Subject:	Hanwood - Proposal Unzoned Land
Attachments:	Letter - Hanwood Developments Pty Ltd - Hanwood Proposed Rezone - Luke Scobie - Hanwood Master Plan - 21 Feb 2024.PDF; Email Trail - Hanwood Land - Luke Scobie.pdf; 240520 FINAL Scoping Report-Hanwood.pdf

Hi Luke,
Sorry for the delayed response

Following the discussion we had after the housing forum (meeting 13/07/2024 related to a different matter) please note the following:

- I met with staff to discuss the Hanwood Scoping Report you provided.
- I also reviewed some of the correspondence which Council has sent to you previously regarding your proposal for unzoned land in Hanwood (refer to attached letter and email).

I will summarise as follows:

In our last letter to you, dated 21 February 2024, we provided a detailed response regarding Council's historical strategic planning efforts to identify and rezone land in an orderly, fair and transparent manner ensuring enough land is available for the planning horizon.
To rezone additional land in Griffith, the Department and the Ministerial Directions require the preparation of a Strategy or alternatively, should the proponent believe their proposal has enough strategic merit, they must provide this in a their own strategy or assessment. We have previously requested that you focus on this requirement prior to carrying out detailed investigations to prepare plans etc. We have also stated that Council would not entertain additional meetings regarding the proposal until such a time as the strategic justification has been provided to council and reviewed by staff.

We have reviewed the scoping proposal sent to Council in late May and note that it does not address our previous requests for a detailed strategic justification for the proposal to meet the requirements of the Ministerial Directions to rezone rural land for residential development: https://www.planning.nsw.gov.au/sites/default/files/2023-03/local-planning-directions.pdf

Way forward:

Council advise that the most appropriate, fair, transparent and justified approach to considering the land for rezoning is through the review of the Housing Strategy 2019 which is budgeted for the 2024/2025 financial year. As part of this process, Council would receive and review submissions from all landowners wishing to develop their lands for residential development including for landholdings which are also strategically identified in our LSPS and Land Use Strategy.(including submissions received to rezone land as part of the recent General Amendment Planning Proposal and previous LSPS review).

Council will advise you when the Housing Strategy review process has commenced so that you can prepare a detailed submission for the land.

Regards

Carel Potgieter

1

Carel Potgieter
Planning & Environmental Manager
p 02 | m

Griffith City Council
a 1 Benerembah Street Gril
p PO Box 485 Griffith NSW

Griffith City Council acknowledges and respects the Wiradjuri people as the traditional custodians and ancestors of the land and waters where we work.

There is no expectation for you to read or respond to this email outside of your normal working hours

Community benefits:

The proposal has been carefully designed to benefit the whole community, including:

- **New facilities for everyone**, including public open space, sporting facilities, urban market gardens, child care and retail offerings.
- **Best practice, contemporary design** that builds a strong, supported community.
- **A diverse range of housing and lot sizes** to suit a wide range of budgets, buyers and lifestyles.
- **A range of housing choices** close to employment, health services and education, supporting the next generations to live and work in Hanwood.
- **A central marketplace** designed to create community connections and promote a higher quality of life.
- **A commitment to advanced ecology** and regenerative practices, exemplified by our recycling initiatives and zerowaste system.
- **Improved water management** and flooding prevention
- **A tailored, sustainable approach** to increasing housing and infrastructure as it is needed.

Have your say on the proposal.

We are now seeking community feedback on the concept design for the development of land on the northern side of Leonard Road. Your feedback will ensure that we deliver what the Hanwood community wants and needs.

We invite you to speak with a member of our team:

Date: Wednesday 28 August 2024, 4pm to 8pm
Thursday 29 August 2024, 3pm to 8pm
Friday 30 August 2024, 3pm to 8pm

Location: Hanwood Sports Club
21 Yarran St, Hanwood NSW 2680

Bookings essential:
To book a time that suits you, please
visit: www.hanwood.com.au
or call: 0409 818 980.

Bookings are available for up to 6 people per session to ensure everyone can have their say.

If you are unable to attend this session and would like to know more, please visit: **www.hanwood.com.au**

What happens next?

Following consultation with the Hanwood community, we will take on board any feedback and look to update the concept design.

The next step will be to prepare and lodge a Planning Proposal with Council and other relevant planning authorities that seeks to amend the land zoning and change the staging that Council is currently considering for land on Leonard Road.

Once the Planning Proposal has been approved and the land has been re-zoned we want to submit Development Applications for the land on the northern side of Leonard Road as soon as possible.

A NEW VISION FOR HANWOOD

The development of land on the northern side of Leonard Road enables the expansion of Hanwood village to provide much needed housing diversity and public amenities, as well as recreational and public open spaces for the local community.

Centred around community urban market gardens and an associated commercial hub, the proposal builds on what makes Hanwood unique, and will provide new facilities for the Hanwood community.

Your feedback on the proposal to develop land on the northern side of Leonard Road, will help us realise a new vision for the Hanwood community.

Community benefits:

Located on the northern side of Leonard Road, between Kidman Way and Old Willbriggie Drive, the site is a natural, walkable extension of the Hanwood community.

A central marketplace is designed to create community connections and promote a higher quality of life.

Diverse housing and lot sizes will offer increased lifestyle choices for everyone.

The whole Hanwood community will benefit from new, open green spaces, community facilities, and a central market garden.